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United States Patent and Trademark Office

*January 23, 2025*

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OF:

APPLICATION NUMBER: 16/696,383

FILING DATE: *November 26, 2019*

PATENT NUMBER: 11713209

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Certified by

*Coke Moya Smead*

ACTING DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                        |            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------|------------|
| <b>Application Data Sheet 37 CFR 1.76</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       | Attorney Docket Number | 00058P00US |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       | Application Number     |            |
| Title of Invention                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | GLOW FISH TAPE SYSTEM |                        |            |
| The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.<br>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application. |                       |                        |            |

## Secrecy Order 37 CFR 5.2:

|                          |                                                                                                                                                                                                                                       |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.) |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Inventor Information:

|                                                                                                                                                                                 |                   |                             |                    |                                          |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------|--------------------|------------------------------------------|----|
| <b>Inventor 1</b>                                                                                                                                                               |                   |                             |                    |                                          |    |
| <b>Legal Name</b>                                                                                                                                                               |                   |                             |                    |                                          |    |
| <b>Prefix</b>                                                                                                                                                                   | <b>Given Name</b> | <b>Middle Name</b>          | <b>Family Name</b> | <b>Suffix</b>                            |    |
|                                                                                                                                                                                 | Daniel            | R.                          | Pearson            |                                          |    |
| <b>Residence Information (Select One)</b> <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service |                   |                             |                    |                                          |    |
| <b>City</b>                                                                                                                                                                     | Fortworth         | <b>State/Province</b>       | TX                 | <b>Country of Residence <sup>i</sup></b> | US |
| <b>Mailing Address of Inventor:</b>                                                                                                                                             |                   |                             |                    |                                          |    |
| <b>Address 1</b>                                                                                                                                                                |                   | Klein Tools, Inc            |                    |                                          |    |
| <b>Address 2</b>                                                                                                                                                                |                   | 501 Easy Drive              |                    |                                          |    |
| <b>City</b>                                                                                                                                                                     | Mansfield         | <b>State/Province</b>       | TX                 |                                          |    |
| <b>Postal Code</b>                                                                                                                                                              | 76063             | <b>Country <sup>i</sup></b> | US                 |                                          |    |
| All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the <b>Add</b> button. <span>Add</span>                    |                   |                             |                    |                                          |    |

## Correspondence Information:

|                                                                                                                                       |                           |                        |                           |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------|---------------------------|
| Enter either Customer Number or complete the Correspondence Information section below.<br>For further information see 37 CFR 1.33(a). |                           |                        |                           |
| <input type="checkbox"/> An Address is being provided for the correspondence information of this application.                         |                           |                        |                           |
| <b>Customer Number</b>                                                                                                                | 144588                    |                        |                           |
| <b>Email Address</b>                                                                                                                  | ipcounsel@kleintools.com  | <span>Add Email</span> | <span>Remove Email</span> |
| <b>Email Address</b>                                                                                                                  | jfairchild@kleintools.com | <span>Add Email</span> | <span>Remove Email</span> |

## Application Information:

|                                                |                       |                                                  |                          |
|------------------------------------------------|-----------------------|--------------------------------------------------|--------------------------|
| <b>Title of the Invention</b>                  | GLOW FISH TAPE SYSTEM |                                                  |                          |
| <b>Attorney Docket Number</b>                  | 00058P00US            | <b>Small Entity Status Claimed</b>               | <input type="checkbox"/> |
| <b>Application Type</b>                        | Nonprovisional        |                                                  |                          |
| <b>Subject Matter</b>                          | Utility               |                                                  |                          |
| <b>Total Number of Drawing Sheets (if any)</b> | 4                     | <b>Suggested Figure for Publication (if any)</b> | 1                        |

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| <b>Application Data Sheet 37 CFR 1.76</b> |                       | Attorney Docket Number | 00058P00US |
|                                           |                       | Application Number     |            |
| Title of Invention                        | GLOW FISH TAPE SYSTEM |                        |            |

**Filing By Reference:**

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

|                                                        |                          |                                            |
|--------------------------------------------------------|--------------------------|--------------------------------------------|
| Application number of the previously filed application | Filing date (YYYY-MM-DD) | Intellectual Property Authority or Country |
|                                                        |                          |                                            |

**Publication Information:**

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

**Representative Information:**

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

|                                                                                                                    |            |                                              |             |                                                         |        |
|--------------------------------------------------------------------------------------------------------------------|------------|----------------------------------------------|-------------|---------------------------------------------------------|--------|
| Please Select One:                                                                                                 |            |                                              |             |                                                         |        |
| <input checked="" type="radio"/> Customer Number                                                                   |            | <input type="radio"/> US Patent Practitioner |             | <input type="radio"/> Limited Recognition (37 CFR 11.9) |        |
| Customer Number                                                                                                    |            | 144588                                       |             |                                                         |        |
| Prefix                                                                                                             | Given Name | Middle Name                                  | Family Name | Suffix                                                  | Remove |
|                                                                                                                    |            |                                              |             |                                                         |        |
| Registration Number                                                                                                |            |                                              |             |                                                         |        |
| Prefix                                                                                                             | Given Name | Middle Name                                  | Family Name | Suffix                                                  | Remove |
|                                                                                                                    |            |                                              |             |                                                         |        |
| Registration Number                                                                                                |            |                                              |             |                                                         |        |
| Additional Representative Information blocks may be generated within this form by selecting the <b>Add</b> button. |            |                                              |             |                                                         |        |

|                                           |                       |                        |            |
|-------------------------------------------|-----------------------|------------------------|------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                       | Attorney Docket Number | 00058P00US |
|                                           |                       | Application Number     |            |
| Title of Invention                        | GLOW FISH TAPE SYSTEM |                        |            |

### Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

|                          |                 |                          |                                    |
|--------------------------|-----------------|--------------------------|------------------------------------|
| Prior Application Status |                 | Remove                   |                                    |
| Application Number       | Continuity Type | Prior Application Number | Filing or 371(c) Date (YYYY-MM-DD) |
|                          |                 |                          |                                    |

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

### Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

|                    |                      |                          |                                          |
|--------------------|----------------------|--------------------------|------------------------------------------|
| Application Number | Country <sup>i</sup> | Filing Date (YYYY-MM-DD) | Access Code <sup>i</sup> (if applicable) |
|                    |                      |                          |                                          |

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

### Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.<br>NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



|                                           |                       |                        |            |
|-------------------------------------------|-----------------------|------------------------|------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                       | Attorney Docket Number | 00058P00US |
|                                           |                       | Application Number     |            |
| Title of Invention                        | GLOW FISH TAPE SYSTEM |                        |            |

## Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

**NOTE:** This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

### 1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

**A. Priority Document Exchange (PDX)** - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

**B. Search Results from U.S. Application to EPO** - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

### 2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

**NOTE:** Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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| <b>Application Data Sheet 37 CFR 1.76</b> |                       | Attorney Docket Number | 00058P00US |
|                                           |                       | Application Number     |            |
| Title of Invention                        | GLOW FISH TAPE SYSTEM |                        |            |

## Applicant Information:

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                        |                                      |                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------|--------------------------------------|
| Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                        |                                      |                                      |
| <b>Applicant 1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                        |                                      |                                      |
| If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section. |                                                                        |                                      |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                        |                                      | <input type="button" value="Clear"/> |
| <input checked="" type="radio"/> Assignee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <input type="radio"/> Legal Representative under 35 U.S.C. 117         | <input type="radio"/> Joint Inventor |                                      |
| <input type="radio"/> Person to whom the inventor is obligated to assign.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <input type="radio"/> Person who shows sufficient proprietary interest |                                      |                                      |
| If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                        |                                      |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                        |                                      |                                      |
| Name of the Deceased or Legally Incapacitated Inventor: <input type="text"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                        |                                      |                                      |
| If the Applicant is an Organization check here. <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                        |                                      |                                      |
| Organization Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Klein Tools, Inc.                                                      |                                      |                                      |
| <b>Mailing Address Information For Applicant:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                        |                                      |                                      |
| Address 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Klein Tools, Inc. c/o Jeff Fairchild                                   |                                      |                                      |
| Address 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 450 Bond Street                                                        |                                      |                                      |
| City                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Lincolnshire                                                           | State/Province                       | IL                                   |
| Country <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | US                                                                     | Postal Code                          | 60069                                |
| Phone Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 8478215549                                                             | Fax Number                           |                                      |
| Email Address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ipcounsel@kleintools.com                                               |                                      |                                      |
| Additional Applicant Data may be generated within this form by selecting the Add button.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                        |                                      |                                      |

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|-------------------------------------------|-----------------------|------------------------|------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                       | Attorney Docket Number | 00058P00US |
|                                           |                       | Application Number     |            |
| Title of Invention                        | GLOW FISH TAPE SYSTEM |                        |            |

## Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                 |                |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------|-------|
| <b>Assignee 1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                 |                |       |
| Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication. |                                 |                |       |
| If the Assignee or Non-Applicant Assignee is an Organization check here. <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                           |                                 |                |       |
| Organization Name                                                                                                                                                                                                                                                                                                                                                                                                                                      | Klein Tools, Inc.               |                |       |
| <b>Mailing Address Information For Assignee including Non-Applicant Assignee:</b>                                                                                                                                                                                                                                                                                                                                                                      |                                 |                |       |
| Address 1                                                                                                                                                                                                                                                                                                                                                                                                                                              | Klein Tools, c/o Jeff Fairchild |                |       |
| Address 2                                                                                                                                                                                                                                                                                                                                                                                                                                              | 450 Bond Street                 |                |       |
| City                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Lincolnshire                    | State/Province | IL    |
| Country <sup>i</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                   | US                              | Postal Code    | 60069 |
| Phone Number                                                                                                                                                                                                                                                                                                                                                                                                                                           | 8478215549                      | Fax Number     |       |
| Email Address                                                                                                                                                                                                                                                                                                                                                                                                                                          | ipcounsel@kleintools.com        |                |       |
| Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.                                                                                                                                                                                                                                                                                                                                      |                                 |                |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                 |                |       |

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|                                           |                       | Application Number     |            |
| Title of Invention                        | GLOW FISH TAPE SYSTEM |                        |            |

**Signature:**

**NOTE:** This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

|                                                                                     |                       |           |           |                     |       |
|-------------------------------------------------------------------------------------|-----------------------|-----------|-----------|---------------------|-------|
| <b>Signature</b>                                                                    | /JEFFERY N. FAIRCHLD/ |           |           | Date (YYYY-MM-DD)   |       |
| First Name                                                                          | Jeffery               | Last Name | Fairchild | Registration Number | 37825 |
| Additional Signature may be generated within this form by selecting the Add button. |                       |           |           |                     |       |

## GLOW FISH TAPE SYSTEM

### CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** None

### BACKGROUND OF THE DISCLOSURE

**[0002]** The present disclosure relates fish tapes that are deployed from a case that stores the fish tape when the fish tape is not in use. Most current fish tapes of this type utilize a case that deploys the fish tape from an annular slot, typically in an outer perimeter of the case, with at least a portion of the fish tape being retained in the case during use. Fish tapes are typically made of nylon, fiberglass, nylon jacketed fiberglass, or a suitable metal, such as stainless steel or tempered spring steel or multi-stranded steel wire, with the fish tape having sufficient stiffness to be pushed through a conduit or other enclosed space while being sufficiently flexible to flex around bends or corners in the conduit or other enclosed space. Fish tapes are provided in a variety of sizes and lengths, with the commercially available lengths typically being provided in the range of 20 feet to 240 feet.

**[0003]** Such fish tapes are used to pull electrical wires and fiber optic cables through conduit or into enclosed wall space and there are commercially available light emitting tips that can be connected to the end of the fish tape to improve the ability of a user to see the fish tape as it is moving near an opening through which a user wishes to pull electrical wire or fiber optic cable. While such fish tapes, cases and tips work well for their intended purpose, there is always room for improvement. For example, the light emitting tips are not as effective if the tip has already moved past the opening through which a user wants to pull the electrical wire or fiber optic cable.

### BRIEF SUMMARY OF THE DISCLOSURE

**[0004]** In accordance with one feature of this disclosure, a fish tape system includes a fish tape and a donut shaped case. The fish tape has a length extending from a first

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end to a second end, and the length of the fish tape includes a luminescent material that emits light after being energized by exposure to a light source. The donut shaped case has a pair of sidewalls extending between a radially innermost wall and a radially outermost wall. The sidewalls are spaced from each other to define a fish tape storage compartment that stores the length of fish tape for deployment via the annular opening in the case. The case further includes an annular opening extending around a circumference of one of the inner and outer walls. At least a portion of the case is transparent to allow the luminescent material to be energized by light passing through the portion.

**[0005]** As one feature, the outermost wall has the annular opening extending around a circumference of the outer wall, and at least one of the sidewalls of the case is transparent to allow the luminescent material to be energized by light passing through the at least one of the sidewalls.

**[0006]** In one feature, both of the sidewalls of the case are transparent to allow the luminescent material to be energized by light passing through the sidewalls.

**[0007]** According to one feature, at least one of the innermost and outermost walls is transparent to allow the luminescent material to be energized by light passing through the sidewalls.

**[0008]** As one feature, one of the sidewalls and portions of the innermost and outermost walls are defined by a first component of the case, and the other of the sidewalls and other portions of the innermost and outermost walls are defined by a second component of the case. The first and second components are assembled together to form the storage compartment. In a further feature, at least one of the first and second components includes a transparent material. In yet a further feature, both of the first and second components includes a transparent material.

**[0009]** In one feature, the fish tape system further includes a handle engaged with the case for sliding movement along a circumference of one of the inner and outer walls, the handle engageable with the fish tape to deploy the fish tape from the storage compartment and to reload the fish tape into the compartment.

**[0010]** According to one feature, the fish tape system further includes a handle engaged with the case for sliding movement along a circumference of the outer wall. The handle is engageable with the fish tape to deploy the fish tape from the storage compartment and to reload the fish tape into the compartment.

**[0011]** As one feature, the fish tape further includes a threaded opening in at least one of the first and second ends.

**[0012]** In one feature, at least a portion of at least one of the sidewalls of the case is transparent to allow the luminescent material to be energized by light passing through the at least one of the sidewalls.

**[0013]** According to one feature, at least portions of both of the sidewalls of the case are transparent to allow the luminescent material to be energized by light passing through the sidewalls.

**[0014]** As one feature, at least portions of all the walls of the case are transparent.

**[0015]** In accordance with one feature, a fish tape system includes a fish tape and a case. The fish tape has a length extending from a first end to a second end, and the length of the fish tape includes a luminescent material that emits light after being energized by exposure to a light source. The case has a fish tape storage compartment that stores the length of fish tape for deployment and reloading via an opening in the case. At least a portion of the case is transparent to allow the luminescent material to be energized by light passing through the portion and into the storage compartment.

**[0016]** As one feature, the storage compartment has an annular shape bounded by a pair of spaced sidewalls. According to further feature, at least a portion of at least one of the sidewalls is transparent. In yet a further feature, portions of both of the sidewalls are transparent.

**[0017]** In one feature, the case includes a pair of components that are joined to each other to define the storage compartment, and at least one of the pair of components includes a transparent material.

**[0018]** It should be understood that the inventive concepts disclosed herein do not require each of the features discussed above, may include any combination of the features discussed, and may include features not specifically discussed above.

#### BRIEF SUMMARY OF THE SEVERAL VIEWS OF THE DRAWINGS

- [0019] Fig. 1 is a view is a perspective view from above and to the left of a fish tape system according to this disclosure;
- [0020] Fig. 2 is a plan view of a fish tape of the fish tape system shown in Fig.1, with the fish tape removed from a case of the system and with a portion of the fish tape broken away for purposes of illustration;
- [0021] Fig. 3 is a left side elevation view of the fish tape system of Fig. 1;
- [0022] Fig. 4 is a right side elevation view of the fish tape system of Figs. 1 and 3;
- [0023] Fig. 5, is a view taken from line 5-5 in Fig. 3;
- [0024] Figs. 6A and 6B are enlarged views taken from line 6-6 in Fig.2 and show alternate embodiments of the fish tape shown in Fig. 2; and
- [0025] Fig. 7 is an enlarged perspective view showing an end configuration for a fish tape according to this disclosure.

#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

- [0026] As seen in Figs. 1-5, a fish tape system 10 is provided and includes a fish tape 12 and a case 14. As best seen in Fig. 2, the fish tape 12 has a length 16 extending from a first end 18 to a second end 20. The length 16 includes a luminescent material 22 that emits light after being energized by exposure to a light source 24, such as the sun or a light emitting element. The case 14 has a fish tape storage compartment 26 that stores the fish tape 12 for deployment via an opening 28 in the case 14. At least a portion of the case 14 is transparent to allow the luminescent material 22 to be energized by light passing through the transparent portion and into the storage compartment 26.
- [0027] In the illustrated embodiment, the case 14 is donut shaped and includes a pair of sidewalls 32 (best seen in Fig. 5) extending between a radially innermost wall 34 and a radially outermost wall 36. The wall 36 includes the opening 28 in the form of an annular opening 28 extending around the entire circumference of the wall 36. The



sidewalls 32 are spaced from each other, and in combination with inwardly facing annular surfaces 38 and 40 of the walls 34 and 36, respectively, define the storage compartment 26 with an annular shape. As best seen in Figs. 1 and 5, the illustrated and preferred case 14 is an assembly of two, half-case components 44 and 46 that are joined to each other using threaded fasteners 48. Each of the components 44 and 46 define one of the sidewalls 32 and approximately one-half of each of the walls 34 and 36 and are preferably molded using a suitable process, such as injection molding. The annular opening 28 is defined between each portion of the wall 36 defined by each of the components 44 and 46. Such constructions for donut shaped fish tape cases are well known, with a few examples of such commercially cases being offered by Ideal Electronics under model numbers 31-542, 31-056, and 31-064; by Gardner Bender under model numbers FTS-125R, FTS-250R, and FTS-50B; and Klein Tools under model numbers 56001, 56014, 56002, and 56005.

**[0028]** In the illustrated and highly preferred embodiment, the walls 32, 34 and 36 are all transparent to allow the luminescent material 22 to be energized by light passing into the compartment 26 through the wall 32, 34, and 36. In this regard, the components 44 and 46 can be molded from any suitable material, such a suitable polymeric/plastic/composite material. Non-limiting examples of suitable materials include: polycarbonate, polypropylene, and Acrylonitrile butadiene styrene (ABS).

**[0029]** The illustrated and preferred embodiment of the system 10 also includes a winding handle 50 that is mounted to slide within the annular opening 28 around the entire circumference of the wall 36. The handle 50 includes a grip 52 and a hoop or ring 54. As best seen in Fig. 5, the ring 54 has oppositely facing annular ribs 56, with each rib received in a corresponding annular channel in a corresponding one of the half-case components 44 and 46 for guided, sliding movement around the entire circumference of the wall 36. As best seen in Fig. 3, the grip 52 includes a tape guide portion 58 having a linear slot 60 that receives and guides the fish tape 12 as it is deployed from and wound into the compartment 26 via an opening 62 that extends through the ring 54. The features 52, 54, 56, 58, 60 and 62 are well known and employed in commercially available fish tape systems.

**[0030]** It is highly preferred that system 10 be configured to allow the fish tape 12 to be easily removed from the case 14 for use and then rewound into the case 14 after use. In the illustrated and novel embodiment, this is achieved by sizing the slot 60 and opening 62 to allow the end 20 to be readily removed from the case 14 and reinserted into the case 14, by providing an opening 64 in the wall 34 that allows the end 20 to readily pass through the wall 34, and by providing the case 14 with an anchor slot 66 that provide a snap-fit with the end 20 to allow the end 20 to be releasably retained in the slot 66. In the illustrated embodiment, the slot 66 is defined in a boss 68 that is formed as an integral, unitary part of the half-case component 46.

**[0031]** The length 16 of the fish tape 12 is formed from a structural member 70 that extends over the entire length 16. The structural member 70 can be a flexible strip of metal, a multi-strand metallic wire, or a cord or rope of nylon, fiberglass, or other flexible, high tensile strength material. The luminescent material 22 can be provided in any suitable form and preferably extends over the entire length 16, such as, for example, in the form of a luminescent coating that includes the material 20, such as a paint, on the structural member 70 that extends over the entire length 16 (shown in Fig. 2); a luminescent sheath/jacket that includes the material 20 and surrounds the structural member 70 extending over the entire length 16 (shown in Fig. 6A); or in the form as an integral component of the material that forms the structural member 70 (shown in Fig. 6B). Non-limiting examples of suitable materials for the luminescent material 22 include: strontium aluminate, zinc sulfide, or either of those materials blended with a base material, such as nylon, polyethylene, and/or polyethylene terephthalate (PET).

**[0032]** Each end 18 and 20 of the fish tape 12 may be provided in any suitable form and/or configuration, many of which are known, to allow or assist a user in the attachment of an electrical wire or optic cable or in the grasping of the fish tape 12 during a pulling or pushing operation. Non-limiting examples of suitable forms/configurations for the ends 18 and 20 include eyelet ends (shown in Figs. 1-4 for end 18), hook shaped ends, no-snag plastic tips, bullet ends, mini-eyelet ends, domed-eyelet ends, claw ends, male threaded connector ends, or female threaded connector

ends, all of which are well known in commercially available fish tape systems and fish rod systems. Figs. 1-4 and 7 shows an embodiment wherein the 20 has a threaded connector in the form of a female threaded opening 74.

**[0033]** Preferred embodiments of the inventive concepts are described herein, including the best mode known to the inventor(s) for carrying out the inventive concepts. Variations of those preferred embodiments will become apparent to those of ordinary skill in the art upon reading the foregoing description. The inventor(s) expect skilled artisans to employ such variations as appropriate, and the inventor(s) intend that the inventive concepts can be practiced otherwise than as specifically described herein. Accordingly, the inventive concepts disclosed herein include all modifications and equivalents of the subject matter recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements and features in all possible variations thereof is encompassed by the inventive concepts unless otherwise indicated herein or otherwise clearly contradicted by context. Further in this regard, while highly preferred forms of the fish tape system 10 are shown in the figures, it should be understood that this disclosure anticipates variations in the specific details of each of the disclosed components and features of the fish tape system 10 and that no limitation to a specific form, configuration, or detail is intended unless expressly and specifically recited in an appended claim.

**[0034]** For example, while specific and preferred forms have been shown for the case 14, in some applications other forms and configurations for the case 14 may be employed. For example, in some applications it may be desirable for just one of the side walls 32 to be transparent, with the other side wall 32 and the other walls 34 and 36 being opaque. As another example, it may be desirable for just a portion of one of the walls 32, 34, and/or 36 to be transparent. As yet another example, while it is preferred for the annular opening 28 to be provided in the radially outermost wall, in some applications it may be desirable for the annular opening 28 to be provide in the radially innermost wall 34. As another example, while an annular opening 28 is preferred, in some applications a different opening configuration/shape may be desired. In another example, while the two half-case components 44 and 46 preferred, in some

embodiments it may be desirable to form the case 14 from a different configuration of components or a different number of components. Similarly, while the donut shape is a preferred form for the case 14, in some applications it may be desirable for the case 14 to have a different shape. As yet another example, while the disclosed configuration for the handle 50 is preferred, in some applications it may be desirable to utilize other configurations, many of which are known, for a winding handle. Similarly, in some applications it may be desirable for the system 10 to not have any type or configuration of winding handle. In a further example, while the opening 64, anchor slot 64 and boss 66 are preferred, in some application it may be desirable for these features to be eliminated and/or for replaced with other features to attach or anchor the end 20 in the case 14. In another example, while circular and rectangular cross sections have been shown for the fish tape 12, other cross sections may be desirable depending upon the specific application and/or material(s) used for the fish tape 12.

**[0035]** The use of the terms “a” and “an” and “the” and “at least one” and similar referents in the context of describing the invention (especially in the context of the following claims) are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The use of the term “at least one” followed by a list of one or more items (for example, “at least one of A and B”) is to be construed to mean one item selected from the listed items (A or B) or any combination of two or more of the listed items (A and B), unless otherwise indicated herein or clearly contradicted by context. The terms “comprising,” “having,” “including,” and “containing” are to be construed as open-ended terms (i.e., meaning “including, but not limited to,”) unless otherwise noted. The use of any and all examples, or exemplary language (e.g., “such as”) provided herein, is intended merely to better illuminate the inventive concepts disclosed herein and does not pose a limitation on the scope of any invention unless expressly claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the inventive concepts disclosed herein.

**[0036]** All references, including publications, patent applications, and patents, cited herein are hereby incorporated by reference to the same extent as if each reference

were individually and specifically indicated to be incorporated by reference and were set forth in its entirety herein.

## CLAIMS

What is claimed is:

1. A fish tape system comprising:
  - a fish tape having a length extending from a first end to a second end, the length of the fish tape comprising a luminescent material that emits light after being energized by exposure to a light source; and
  - a donut shaped case having a pair of sidewalls extending between a radially innermost wall and a radially outermost wall, the outermost wall having an annular opening extending around a circumference of the outer wall, the sidewalls being spaced from each other to define a fish tape storage compartment that stores the length of fish tape for deployment via the annular opening in the case;
  - wherein at least one of the sidewalls of the case is transparent to allow the luminescent material to be energized by light passing through the at least one of the sidewalls.
2. The fish tape system of claim 1 wherein both of the sidewalls of the case are transparent to allow the luminescent material to be energized by light passing through the sidewalls.
3. The fish tape system of claim 2 wherein at least one of the innermost and outermost walls is transparent to allow the luminescent material to be energized by light passing through the sidewalls.
4. The fish tape system of claim 1 wherein one of the sidewalls and portions of the innermost and outermost walls are defined by a first component of the case, and the other of the sidewalls and other portions of the innermost and outermost walls are defined by a second component of the case, the first and second components being assembled together to form the storage compartment.

5. The fish tape system of claim 1 further comprising a handle engaged with the case for sliding movement along the circumference of the outer wall, the handle engageable with the fish tape to deploy the fish tape from the storage compartment and to reload the fish tape into the compartment.
6. The fish tape system of claim 1 wherein the fish tape further comprises a threaded opening in at least one of the first and second ends.
7. A fish tape system comprising:
  - a fish tape having a length extending from a first end to a second end, the length of the fish tape comprising a luminescent material that emits light after being energized by exposure to a light source; and
  - a donut shaped case having a pair of sidewalls extending between a radially innermost wall and a radially outermost wall, an annular opening extending around a circumference of one of the inner and outer walls, the sidewalls being spaced from each other to define a fish tape storage compartment that stores the length of fish tape for deployment via the annular opening in the case;
  - wherein at least a portion of the case is transparent to allow the luminescent material to be energized by light passing through the portion.
8. The fish tape system of claim 7 wherein at least a portion of at least one of the sidewalls of the case is transparent to allow the luminescent material to be energized by light passing through the at least one of the sidewalls.
9. The fish tape system of claim 7 wherein at least portions of both of the sidewalls of the case are transparent to allow the luminescent material to be energized by light passing through the sidewalls.
10. The fish tape system of claim 7 wherein at least portions of all the walls of the case are transparent.

11. The fish tape system of claim 7 wherein one of the sidewalls and portions of the innermost and outermost walls are defined by a first component of the case, and the other of the sidewalls and other portions of the innermost and outermost walls are defined by a second component of the case, the first and second components being assembled together to form the storage compartment.

12. The fish tape system of claim 11 wherein at least one of the first and second components comprises a transparent material.

13. The fish tape system of claim 11 wherein both of the first and second components comprises a transparent material.

14. The fish tape system of claim 7 further comprising a handle engaged with the case for sliding movement along a circumference of one of the inner and outer walls, the handle engageable with the fish tape to deploy the fish tape from the storage compartment and to reload the fish tape into the compartment.

15. The fish tape system of claim 7 wherein the fish tape further comprises a threaded opening in at least one of the first and second ends.

16. A fish tape system comprising:

a fish tape having a length extending from a first end to a second end, the length of the fish tape comprising a luminescent material that emits light after being energized by exposure to a light source; and

a case having a fish tape storage compartment that stores the length of fish tape for deployment and reloading via an opening in the case;

wherein at least a portion of the case is transparent to allow the luminescent material to be energized by light passing through the portion and into the storage compartment.



17. The fish tape system of claim 16 wherein the storage compartment has an annular shape bounded by a pair of spaced sidewalls.
18. The fish tape system of claim 17 wherein at least a portion of at least one of the sidewalls is transparent.
19. The fish tape system of claim 18 wherein portions of both of the sidewalls are transparent.
20. The fish tape system of claim 16 wherein the case comprises a pair of components that are joined to each other to define the storage compartment, and at least one of the pair of components comprises a transparent material.

### ABSTRACT

A fish tape system includes a fish tape and a case having a storage compartment that stores the fish tape for deployment from the case. The fish tape has a length extending from a first end to a second end. The length includes a luminescent material that emits light after being energized by exposure to a light source. At least a portion of the case is transparent to allow the luminescent material 22 to be energized by light passing through the transparent portion and into the storage compartment.

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Fig. 1

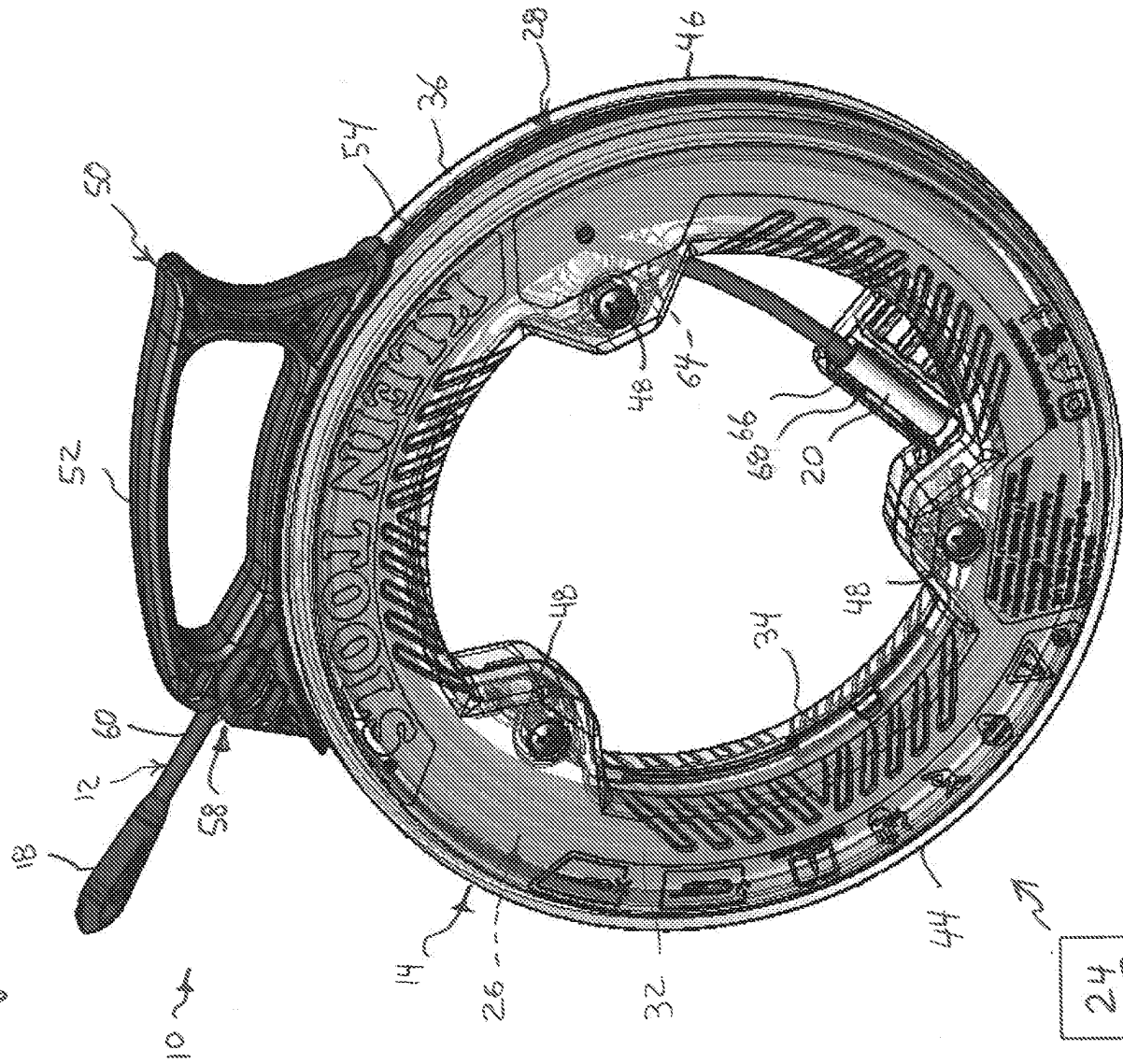
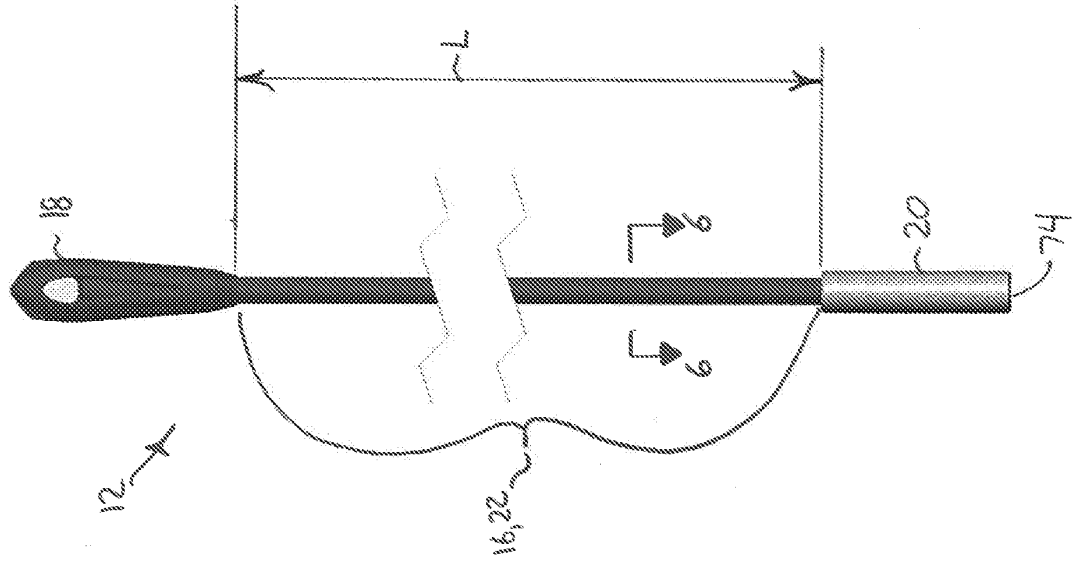
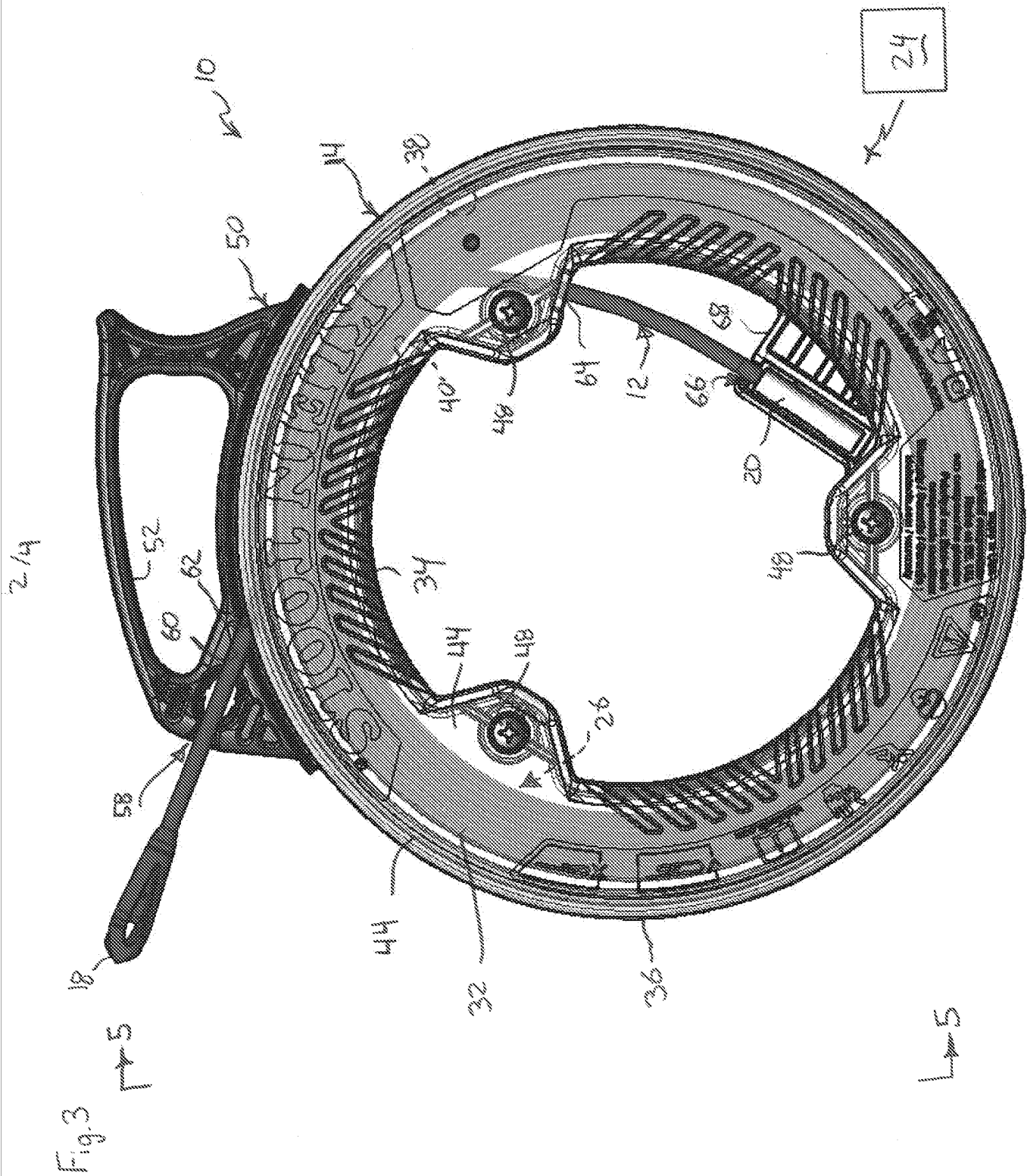
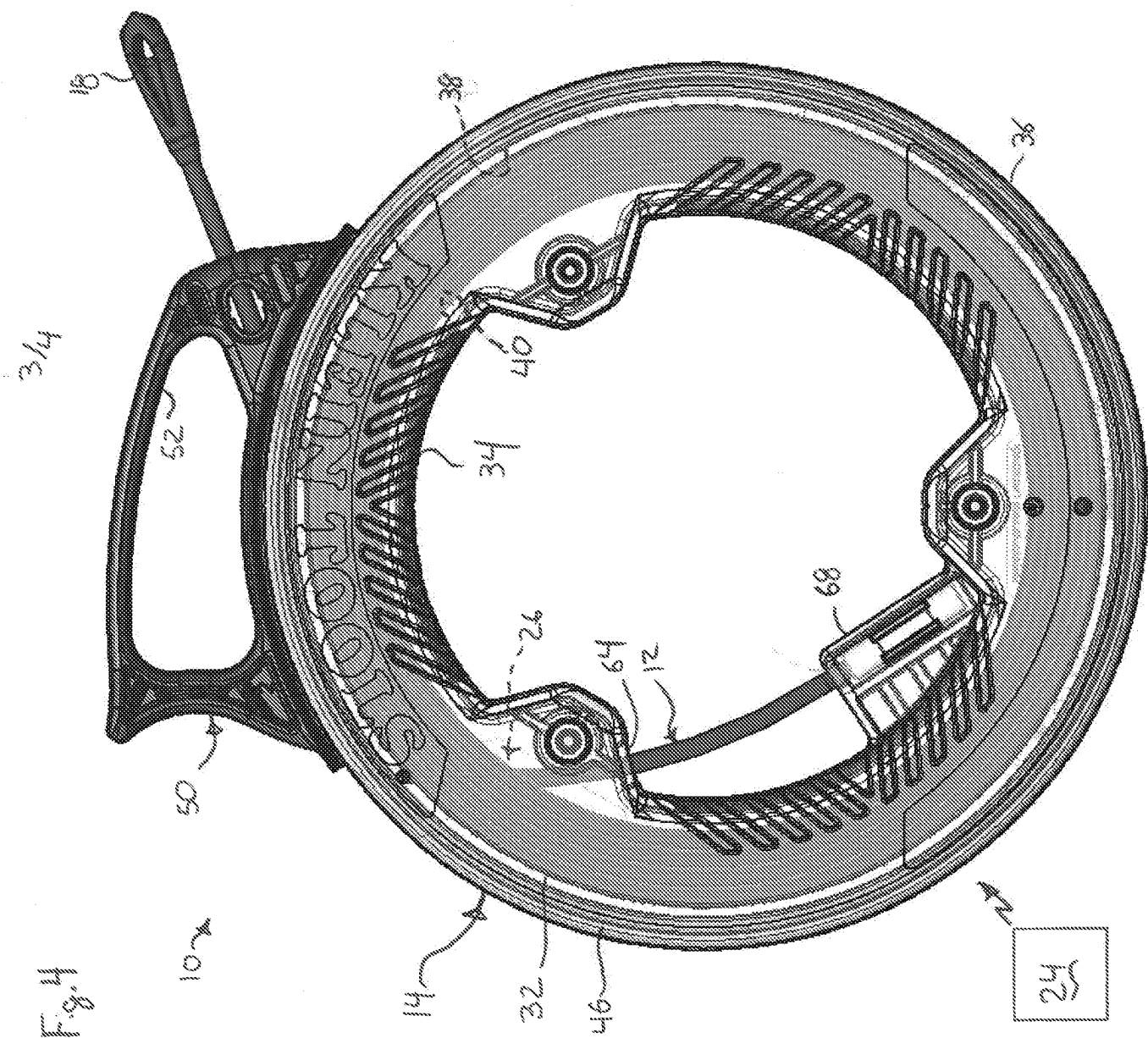
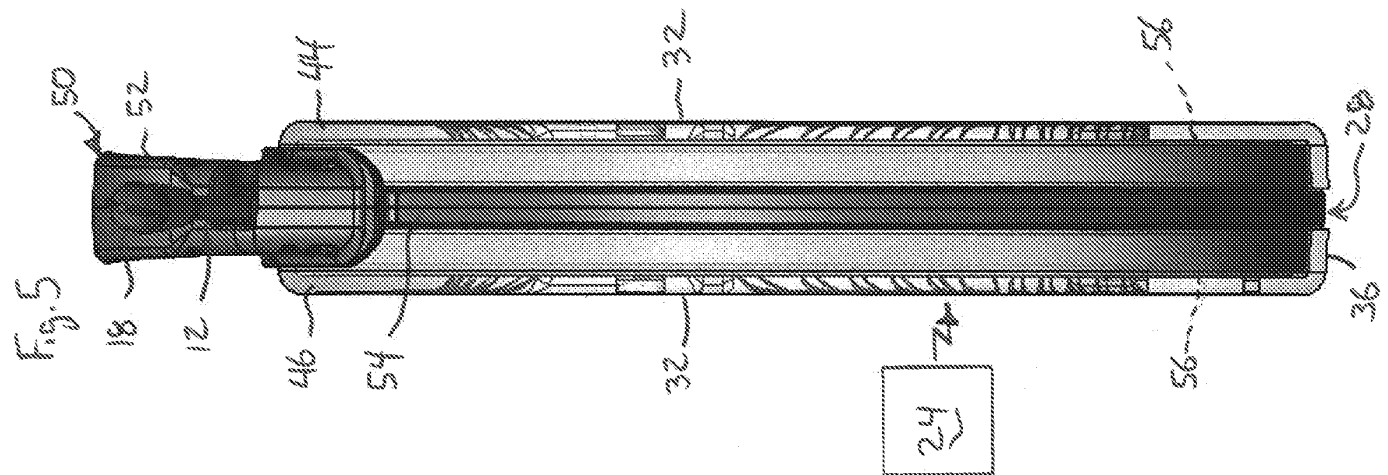


Fig. 2







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Fig. 6A

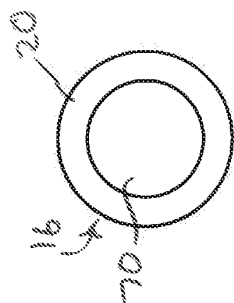


Fig. 6B

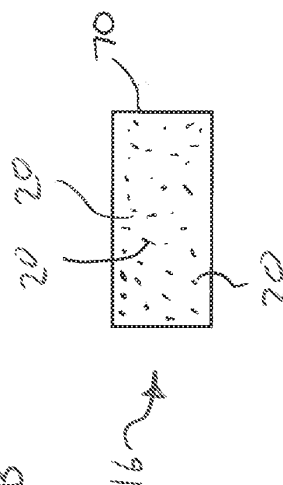
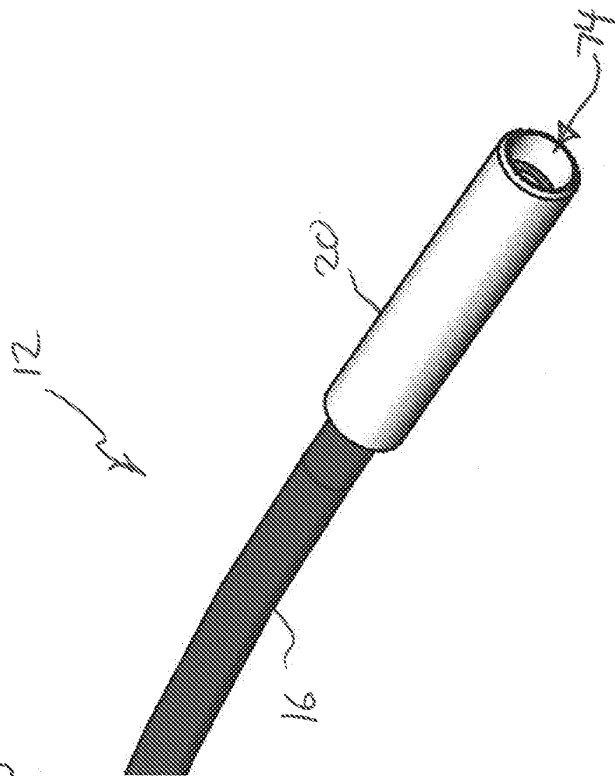
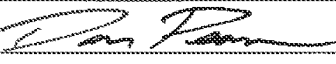


Fig. 7



**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN  
APPLICATION DATA SHEET (37 CFR 1.76)**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Title of<br/>Invention</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>GLOW FISH TAPE SYSTEM</b> |
| <p>As the below named inventor, I hereby declare that:</p> <p>This declaration is directed to: <input checked="" type="checkbox"/> The attached application, or<br/><input type="checkbox"/> United States application or PCT international application number _____<br/>filed on _____.</p> <p>The above-identified application was made or authorized to be made by me.</p> <p>I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.</p> <p>I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.</p> <p style="text-align: center;"><b>WARNING:</b></p> <p>Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.</p> |                              |
| <p><b>LEGAL NAME OF INVENTOR</b></p> <p>Inventor: <u>Daniel R. Pearson</u> Date (Optional) : _____</p> <p>Signature: </p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                              |
| <p><small>Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.</small></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                              |

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8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
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| Electronic Patent Application Fee Transmittal |          |                        |        |                      |
|-----------------------------------------------|----------|------------------------|--------|----------------------|
| Application Number:                           |          |                        |        |                      |
| Filing Date:                                  |          |                        |        |                      |
| Title of Invention:                           |          | GLOW FISH TAPE SYSTEM  |        |                      |
| First Named Inventor/Applicant Name:          |          | Daniel R. Pearson      |        |                      |
| Filer:                                        |          | Jeffery Neal Fairchild |        |                      |
| Attorney Docket Number:                       |          | 00058P00US             |        |                      |
| Filed as Large Entity                         |          |                        |        |                      |
| Filing Fees for Utility under 35 USC 111(a)   |          |                        |        |                      |
| Description                                   | Fee Code | Quantity               | Amount | Sub-Total in USD(\$) |
| <b>Basic Filing:</b>                          |          |                        |        |                      |
| UTILITY APPLICATION FILING                    | 1011     | 1                      | 300    | 300                  |
| UTILITY SEARCH FEE                            | 1111     | 1                      | 660    | 660                  |
| UTILITY EXAMINATION FEE                       | 1311     | 1                      | 760    | 760                  |
| <b>Pages:</b>                                 |          |                        |        |                      |
| <b>Claims:</b>                                |          |                        |        |                      |
| <b>Miscellaneous-Filing:</b>                  |          |                        |        |                      |
| <b>Petition:</b>                              |          |                        |        |                      |
| <b>Patent-Appeals-and-Interference:</b>       |          |                        |        |                      |

| Description                              | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|------------------------------------------|----------|----------|--------|----------------------|
| <b>Post-Allowance-and-Post-Issuance:</b> |          |          |        |                      |
| <b>Extension-of-Time:</b>                |          |          |        |                      |
| <b>Miscellaneous:</b>                    |          |          |        |                      |
| <b>Total in USD (\$)</b>                 |          |          |        | <b>1720</b>          |

| Electronic Acknowledgement Receipt          |                             |
|---------------------------------------------|-----------------------------|
| <b>EFS ID:</b>                              | 37868752                    |
| <b>Application Number:</b>                  | 16696383                    |
| <b>International Application Number:</b>    |                             |
| <b>Confirmation Number:</b>                 | 6816                        |
| <b>Title of Invention:</b>                  | GLOW FISH TAPE SYSTEM       |
| <b>First Named Inventor/Applicant Name:</b> | Daniel R. Pearson           |
| <b>Customer Number:</b>                     | 144588                      |
| <b>Filer:</b>                               | Jeffery Neal Fairchild      |
| <b>Filer Authorized By:</b>                 |                             |
| <b>Attorney Docket Number:</b>              | 00058P00US                  |
| <b>Receipt Date:</b>                        | 26-NOV-2019                 |
| <b>Filing Date:</b>                         |                             |
| <b>Time Stamp:</b>                          | 16:25:11                    |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a) |

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| Submitted with Payment                                                                                                                                                                                                                    | yes               |
| Payment Type                                                                                                                                                                                                                              | DA                |
| Payment was successfully received in RAM                                                                                                                                                                                                  | \$1720            |
| RAM confirmation Number                                                                                                                                                                                                                   | E2019APG25544274  |
| Deposit Account                                                                                                                                                                                                                           | 602056            |
| Authorized User                                                                                                                                                                                                                           | Jeffery Fairchild |
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|-----------------|------------------------|------------|------------------------------------------|------------------|------------------|
| 1               | Application Data Sheet | WebADS.pdf | 114963                                   | no               | 7                |
|                 |                        |            | 1f8f4abe2dbc3ca4be018f6946663855c72c9b21 |                  |                  |

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|---|--|---------------------------|------------------------------------------|-----|----|
| 2 |  | 00058P00USApplication.pdf | 735370                                   | yes | 14 |
|   |  |                           | 546b2458a2ece1679c2156b3f0af4cbc2cf8794f |     |    |

**Multipart Description/PDF files in .zip description**

|  | Document Description |  | Start | End |
|--|----------------------|--|-------|-----|
|  | Specification        |  | 1     | 9   |
|  | Claims               |  | 10    | 13  |
|  | Abstract             |  | 14    | 14  |
|  |                      |  |       |     |

**Warnings:****Information:**

|   |                                                   |                              |                                          |    |   |
|---|---------------------------------------------------|------------------------------|------------------------------------------|----|---|
| 3 | Drawings-other than black and white line drawings | 00058PUSDDrawingsRevised.pdf | 895369                                   | no | 4 |
|   |                                                   |                              | bce027bb44eac2c555e28ce96508e6b4f03ce289 |    |   |

**Warnings:**

The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing

**Information:**

|   |                           |                                  |                                          |    |   |
|---|---------------------------|----------------------------------|------------------------------------------|----|---|
| 4 | Oath or Declaration filed | 00058P00USDeclarationPearson.pdf | 78544                                    | no | 2 |
|   |                           |                                  | 774947cb2ccb9c8796cf66eb62cfedd03008dbe4 |    |   |

**Warnings:**

The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing

**Information:**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |              |                                          |    |   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------|------------------------------------------|----|---|
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Fee Worksheet (SB06) | fee-info.pdf | 34721                                    | no | 2 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |              | 625aeb7282af6d1be38dafb1141596b4320b798c |    |   |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |              |                                          |    |   |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |              |                                          |    |   |
| <b>Total Files Size (in bytes):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |              | 1858967                                  |    |   |
| <p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b><br/> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b><br/> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b><br/> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> |                      |              |                                          |    |   |

## SCORE Placeholder Sheet for IFW Content

Application Number: 16696383

Document Date: 11/26/2019

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Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

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| APPLICATION<br>NUMBER | FILING or<br>371(c) DATE | GRP ART<br>UNIT | FIL FEE REC'D | ATTY. DOCKET NO | TOT CLAIMS | IND CLAIMS |
|-----------------------|--------------------------|-----------------|---------------|-----------------|------------|------------|
| 16/696,383            | 11/26/2019               | 3723            | 1720          | 00058P00US      | 20         | 3          |

CONFIRMATION NO. 6816

## FILING RECEIPT



0000000113384644

144588  
Klein Tools, Inc  
450 Bond Street  
Lincolnshire, IL 60069

Date Mailed: 12/18/2019

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

**Please verify the accuracy of the data presented on this receipt.** If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

### Inventor(s)

Daniel R. Pearson, Fortworth, TX;

### Applicant(s)

Klein Tools, Inc., Lincolnshire, IL;

### Assignment For Published Patent Application

Klein Tools, Inc., Lincolnshire, IL

**Power of Attorney:** None

### Domestic Applications for which benefit is claimed - None.

*A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.*

**Foreign Applications** for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

*Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.*

**Permission to Access Application via Priority Document Exchange:** Yes

**Permission to Access Search Results:** Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

**If Required, Foreign Filing License Granted:** 12/17/2019

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/696,383**

**Projected Publication Date:** 05/27/2021

**Non-Publication Request:** No

**Early Publication Request:** No  
**Title**

GLOW FISH TAPE SYSTEM

**Preliminary Class**

254

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

## **PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

page 2 of 4



countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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| <b>PATENT APPLICATION FEE DETERMINATION RECORD</b><br>Substitute for Form PTO-875                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                               |                                    |                 |              | Application or Docket Number<br>16/696,383 |                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------|--------------|--------------------------------------------|-------------------------|
| <b>APPLICATION AS FILED - PART I</b>                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                               |                                    |                 |              |                                            |                         |
| (Column 1)                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                               | (Column 2)                         |                 | SMALL ENTITY |                                            | OR                      |
| FOR                                                                                                                                                                                                                                                                                                                                                                                                        | NUMBER FILED                                                                                                                                                                                                                  | NUMBER EXTRA                       | RATE(\$)        | FEE(\$)      | OTHER THAN SMALL ENTITY                    |                         |
| BASIC FEE<br><small>(37 CFR 1.16(a), (b), or (c))</small>                                                                                                                                                                                                                                                                                                                                                  | N/A                                                                                                                                                                                                                           | N/A                                | N/A             |              | N/A                                        | 300                     |
| SEARCH FEE<br><small>(37 CFR 1.16(k), (l), or (m))</small>                                                                                                                                                                                                                                                                                                                                                 | N/A                                                                                                                                                                                                                           | N/A                                | N/A             |              | N/A                                        | 660                     |
| EXAMINATION FEE<br><small>(37 CFR 1.16(o), (p), or (q))</small>                                                                                                                                                                                                                                                                                                                                            | N/A                                                                                                                                                                                                                           | N/A                                | N/A             |              | N/A                                        | 760                     |
| TOTAL CLAIMS<br><small>(37 CFR 1.16(i))</small>                                                                                                                                                                                                                                                                                                                                                            | 20                                                                                                                                                                                                                            | minus 20 = *                       |                 |              | x 100 =                                    | 0.00                    |
| INDEPENDENT CLAIMS<br><small>(37 CFR 1.16(h))</small>                                                                                                                                                                                                                                                                                                                                                      | 3                                                                                                                                                                                                                             | minus 3 = *                        |                 |              | x 460 =                                    | 0.00                    |
| APPLICATION SIZE FEE<br><small>(37 CFR 1.16(s))</small>                                                                                                                                                                                                                                                                                                                                                    | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). |                                    |                 |              |                                            | 0.00                    |
| MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                               |                                    |                 |              |                                            | 0.00                    |
| * If the difference in column 1 is less than zero, enter "0" in column 2.                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                               |                                    | TOTAL           |              | TOTAL                                      | 1720                    |
| <b>APPLICATION AS AMENDED - PART II</b>                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                               |                                    |                 |              |                                            |                         |
| (Column 1)                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                               | (Column 2)                         |                 | (Column 3)   |                                            | SMALL ENTITY            |
| AMENDMENT A                                                                                                                                                                                                                                                                                                                                                                                                | CLAIMS REMAINING AFTER AMENDMENT                                                                                                                                                                                              | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA   | RATE(\$)     | ADDITIONAL FEE(\$)                         | OTHER THAN SMALL ENTITY |
|                                                                                                                                                                                                                                                                                                                                                                                                            | Total<br><small>(37 CFR 1.16(i))</small>                                                                                                                                                                                      | *                                  | Minus           | **           | =                                          | RATE(\$)                |
|                                                                                                                                                                                                                                                                                                                                                                                                            | Independent<br><small>(37 CFR 1.16(h))</small>                                                                                                                                                                                | *                                  | Minus           | ***          | =                                          | ADDITIONAL FEE(\$)      |
|                                                                                                                                                                                                                                                                                                                                                                                                            | Application Size Fee (37 CFR 1.16(s))                                                                                                                                                                                         |                                    |                 |              |                                            |                         |
|                                                                                                                                                                                                                                                                                                                                                                                                            | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))                                                                                                                                                               |                                    |                 |              |                                            |                         |
|                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                               |                                    | TOTAL ADD'L FEE |              | TOTAL ADD'L FEE                            |                         |
| (Column 1)                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                               | (Column 2)                         |                 | (Column 3)   |                                            | SMALL ENTITY            |
| AMENDMENT B                                                                                                                                                                                                                                                                                                                                                                                                | CLAIMS REMAINING AFTER AMENDMENT                                                                                                                                                                                              | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA   | RATE(\$)     | ADDITIONAL FEE(\$)                         | OTHER THAN SMALL ENTITY |
|                                                                                                                                                                                                                                                                                                                                                                                                            | Total<br><small>(37 CFR 1.16(i))</small>                                                                                                                                                                                      | *                                  | Minus           | **           | =                                          | RATE(\$)                |
|                                                                                                                                                                                                                                                                                                                                                                                                            | Independent<br><small>(37 CFR 1.16(h))</small>                                                                                                                                                                                | *                                  | Minus           | ***          | =                                          | ADDITIONAL FEE(\$)      |
|                                                                                                                                                                                                                                                                                                                                                                                                            | Application Size Fee (37 CFR 1.16(s))                                                                                                                                                                                         |                                    |                 |              |                                            |                         |
|                                                                                                                                                                                                                                                                                                                                                                                                            | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))                                                                                                                                                               |                                    |                 |              |                                            |                         |
|                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                               |                                    | TOTAL ADD'L FEE |              | TOTAL ADD'L FEE                            |                         |
| * If the entry in column 1 is less than the entry in column 2, write "0" in column 3.<br>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".<br>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".<br>The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1. |                                                                                                                                                                                                                               |                                    |                 |              |                                            |                         |

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|                        |                       |
|------------------------|-----------------------|
| Application Number     | 16/696,383            |
| Filing Date            | November 26, 2019     |
| First Named Inventor   | Daniel R. Pearson     |
| Title                  | Glow Fish Tape System |
| Art Unit               |                       |
| Examiner Name          |                       |
| Attorney Docket Number | 751391                |

### SIGNATURE of Applicant or Patent Practitioner

|                     |                   |           |                  |
|---------------------|-------------------|-----------|------------------|
| Signature           | /Elias P. Soupos/ | Date      | December 4, 2020 |
| Name                | Elias P. Soupos   | Telephone | (312) 616-5600   |
| Registration Number | 57,375            |           |                  |

**NOTE:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications.



\*Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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## POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number

Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)



I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above:

OR

161268



I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

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The address associated with the above-mentioned Customer Number

OR



The address associated with Customer Number:

OR

Firm or  
Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Klein Tools, Inc.



Inventor or Joint Inventor (title not required below)



Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)



Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)



Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

### SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature

Date (Optional)

4-9-19

Name

ROBERT J. VEGA/OLA

Title

VP, General Counsel & Corporate Secretary

**NOTE:** Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.



Total of

1

forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

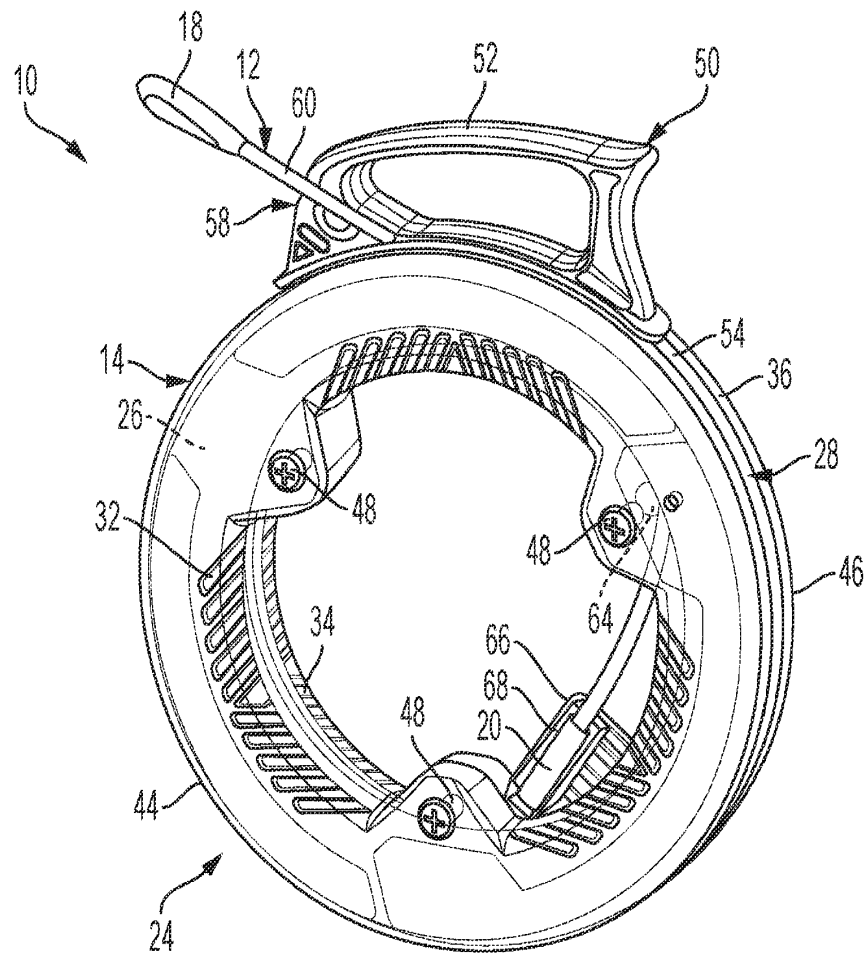


FIG. 1

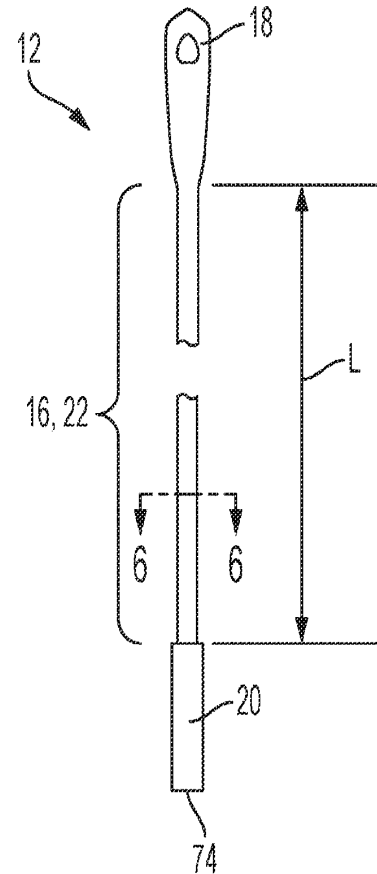


FIG. 2

REPLACEMENT SHEET  
1/4

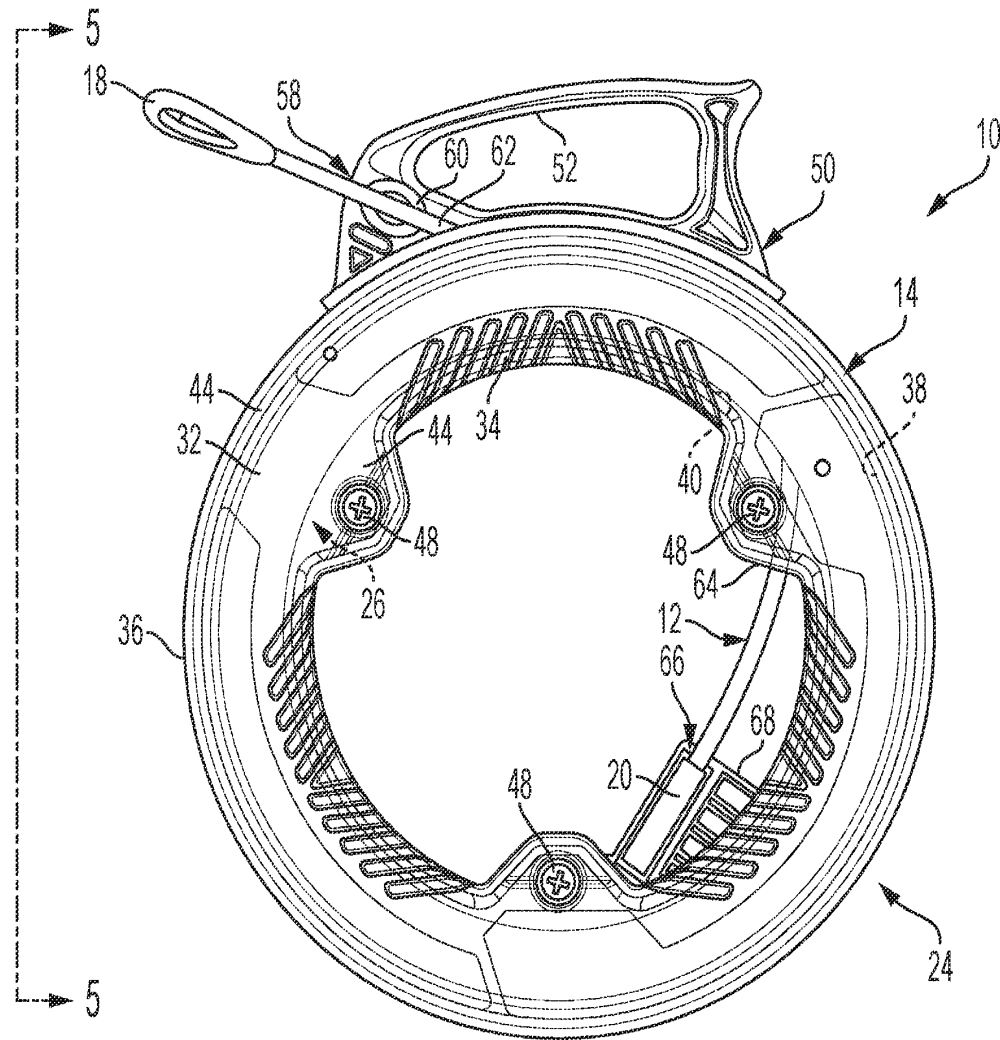


FIG. 3

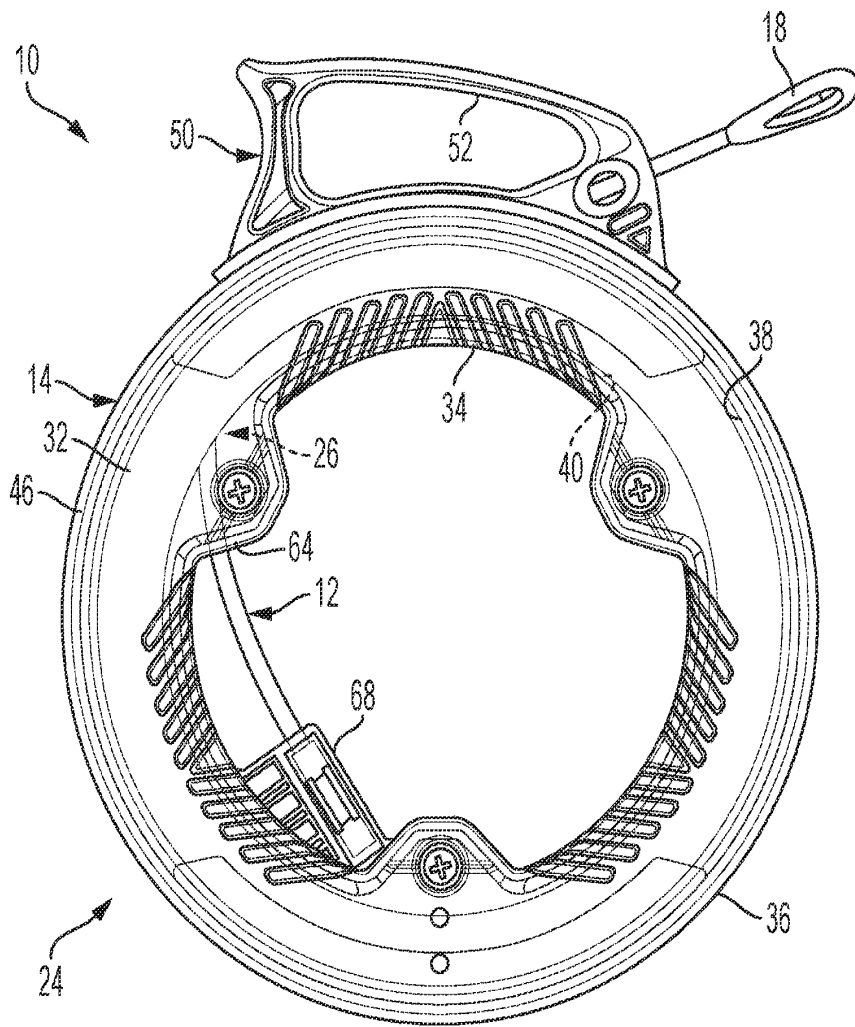


FIG. 4

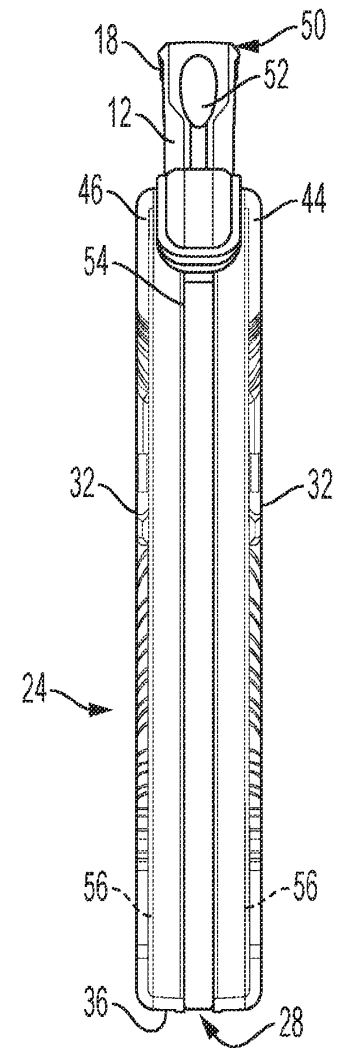


FIG. 5

REPLACEMENT SHEET  
3/4



# REPLACEMENT SHEET

4/4

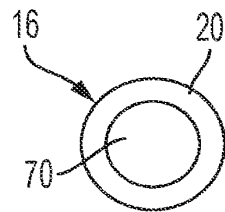


FIG. 6A

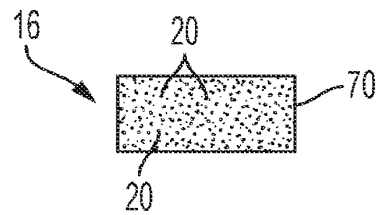


FIG. 6B

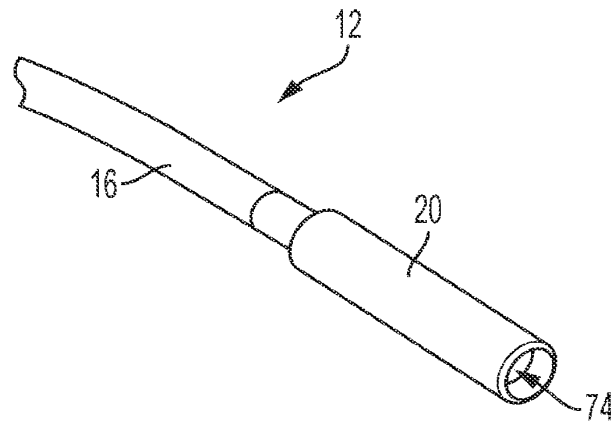


FIG. 7

| Electronic Acknowledgement Receipt   |                                   |
|--------------------------------------|-----------------------------------|
| EFS ID:                              | 41298863                          |
| Application Number:                  | 16696383                          |
| International Application Number:    |                                   |
| Confirmation Number:                 | 6816                              |
| Title of Invention:                  | GLOW FISH TAPE SYSTEM             |
| First Named Inventor/Applicant Name: | Daniel R. Pearson                 |
| Customer Number:                     | 144588                            |
| Filer:                               | Elias Panos Soupos/Robert Holland |
| Filer Authorized By:                 | Elias Panos Soupos                |
| Attorney Docket Number:              | 00058P00US                        |
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| Time Stamp:                          | 14:37:59                          |
| Application Type:                    | Utility under 35 USC 111(a)       |

### Payment information:

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### File Listing:

| Document Number | Document Description | File Name                             | File Size(Bytes)/<br>Message Digest          | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|---------------------------------------|----------------------------------------------|------------------|------------------|
| 1               | Transmittal Letter   | Submission_of_Formal_Drawin<br>gs.pdf | 83196                                        | no               | 1                |
|                 |                      |                                       | d7f4e7f4b3f6460c51c7b372bfb3d52e1291<br>bd08 |                  |                  |

### Warnings:

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| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                             |                          |                                          |    |   |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                             |                          | 7d111e49537b118481a1907366e2b85b518bc1b8 |    |   |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                             |                          |                                          |    |   |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                             |                          |                                          |    |   |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Drawings-only black and white line drawings | Drawings-Replacement.pdf | 155939                                   | no | 4 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                             |                          | ac492dce67a0bee0b9bf514b03e93b093c85a666 |    |   |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                             |                          |                                          |    |   |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                             |                          |                                          |    |   |
| <b>Total Files Size (in bytes):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                             |                          | 605652                                   |    |   |
| <p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b><br/> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b><br/> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b><br/> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> |                                             |                          |                                          |    |   |

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Patent Application No. 16/696,383

Confirmation No. 6816

Attorney Docket No. 746860 (Client ref. no. 00058P00US)

**SUBMISSION OF FORMAL DRAWINGS**

Applicant encloses herewith 6 sheets of formal drawings and requests that the same be made of record in this application as a substitute for the drawings filed with the application on November 26, 2019.

The Commissioner is hereby authorized to charge any fees which may be required to Account No. 12-1216.

Respectfully submitted,

**Leydig**

/Elias P. Soupos/

Elias P. Soupos, Reg. No. 57,375

Telephone: 312-616-5600

Facsimile: 312-616-5700

Date: December 4, 2020



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|--------------------|-----------------------|-----------------------|------------------------|
| 16/696,383         | 11/26/2019            | Daniel R. Pearson     | 751391                 |

**CONFIRMATION NO. 6816**

**POA ACCEPTANCE LETTER**

161268  
LEYDIG VOIT & MAYER, LTD (Klein Tools)  
TWO PRUDENTIAL PLAZA, SUITE 4900  
180 NORTH STETSON AVENUE  
CHICAGO, IL 60601-6731



Date Mailed: 12/08/2020

**NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 12/04/2020.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/cnguyen/

**To:** Chgpatent@leydig.com,,  
**From:** PAIR\_eOfficeAction@uspto.gov  
**Cc:** PAIR\_eOfficeAction@uspto.gov  
**Subject:** Private PAIR Correspondence Notification for Customer Number 161268

Dec 08, 2020 04:11:50 AM

Dear PAIR Customer:

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TWO PRUDENTIAL PLAZA, SUITE 4900  
180 NORTH STETSON AVENUE  
CHICAGO, IL 60601-6731  
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 161268 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

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Thank you for prompt attention to this notice,

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|                                                          |   |    |   |                        |            |
|----------------------------------------------------------|---|----|---|------------------------|------------|
| Substitute for Form 1449A/B/PTO                          |   |    |   | Patent Application No. | 16/696,383 |
| <b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b> |   |    |   | Confirmation No.       | 6816       |
|                                                          |   |    |   | Attorney Docket No.    | 751391     |
| Sheet                                                    | 1 | of | 1 |                        |            |

| U.S. PATENT DOCUMENTS |          |                              |           |                               |                     |                            |
|-----------------------|----------|------------------------------|-----------|-------------------------------|---------------------|----------------------------|
| Examiner Initials     | Doc. No. | U.S. Patent Document         |           | Name of Patentee or Applicant | Date of Publication | Filing Date If Appropriate |
|                       |          | Application or Patent Number | Kind Code |                               |                     |                            |
|                       | AA       | 6,293,519                    | B1        | Farretta                      | 09-25-2001          |                            |
|                       | AB       | 2004/0206529                 | A1        | Sawyer et al.                 | 10-21-2004          |                            |
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|                       |          |                              |           |                               |                     |                            |

| FOREIGN PATENT DOCUMENTS |          |                         |                              |           |                               |                     |                  |
|--------------------------|----------|-------------------------|------------------------------|-----------|-------------------------------|---------------------|------------------|
| Examiner Initials        | Doc. No. | Foreign Patent Document |                              |           | Name of Patentee or Applicant | Date of Publication | Translation *    |
|                          |          | Office                  | Application or Patent Number | Kind Code |                               |                     |                  |
|                          | AE       | EP                      | 1914508                      | A2        | The Stanley Works             | 04-23-2008          |                  |
|                          | AF       | JP                      | 2001-174202                  | A         | Hara Rule Mfg.                | 06-29-2001          | English abstract |
|                          |          |                         |                              |           |                               |                     |                  |
|                          |          |                         |                              |           |                               |                     |                  |
|                          |          |                         |                              |           |                               |                     |                  |

| OTHER - NON PATENT LITERATURE DOCUMENTS |          |                                                                                                                                                                                                                                                                  |               |
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| Examiner Initials                       | Doc. No. | include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number (s), publisher, city and/or country where published. | Translation * |
|                                         | AG       | UNITED KINGDOM INTELLECTUAL PROPERTY OFFICE, Search Report in United Kingdom Patent Application No. GB2018458.6, 4 pp. (Apr. 23, 2021)                                                                                                                           |               |
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| Examiner Signature |  | Date Considered |  |
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\* If the reference is not in English, then at least one of the following is provided: (a) an English translation in whole or in part or (b) a concise statement of relevance in the form of, for example, an English language counterpart, an English-language abstract, or an English-language version of the search report or action by a foreign patent office in a counterpart foreign application indicating the degree of relevance found by the foreign office.

(19)



(11)

**EP 1 914 508 A2**

(12)

**EUROPEAN PATENT APPLICATION**

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**G01B 3/10 (2006.01)**

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(30) Priority: **16.10.2006 US 581071**

(71) Applicant: **THE STANLEY WORKS**  
**New Britain, CT 06053 (US)**

(54) **A retractable rule assembly and a measuring device**

(57) The invention provides a retractable rule assembly, comprising a housing assembly; a reel rotatably mounted in said housing assembly; an elongated blade formed of a ribbon of metal being wound on the reel, said elongated blade having a concavo-convex configuration when extended from said housing assembly, said elongated blade having measuring indicia formed on the con-

cave side thereof, and a translucent fluorescent material provided on said concave side of said blade and overlying the indicia; a coil spring formed of a ribbon of metal constructed to rotate said reel in said housing assembly in a direction to wind up the elongated blade onto said reel; and a blade holding assembly constructed to hold the blade in a position of extension outwardly of said housing assembly.

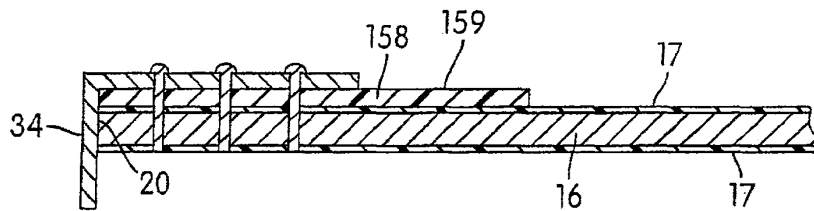


**FIG. 5a**

**EP 1 914 508 A2**



## Description

[0001] The present invention relates to a retractable rule assembly and a measuring device.

[0002] In embodiments, this invention is generally related to measuring devices.

[0003] Measuring devices are well known in the art. Other measuring devices include retractable tape rule assemblies, such as that disclosed in U.S. Patent No. 6,804,899, hereby incorporated by reference. There is a constant need in the tool industry for measuring devices with improved utility.

[0004] According to a first aspect of the present invention, there is provided a retractable rule assembly, comprising a housing assembly; a reel rotatably mounted in said housing assembly; an elongated blade formed of a ribbon of metal being wound on the reel, said elongated blade having a concavo-convex configuration when extended from said housing assembly, said elongated blade having measuring indicia formed on the concave side thereof, and a translucent fluorescent material provided on said concave side of said blade and overlying the indicia; a coil spring formed of a ribbon of metal constructed to rotate said reel in said housing assembly in a direction to wind up the elongated blade onto said reel; and a blade holding assembly constructed to hold the blade in a position of extension outwardly of said housing assembly.

[0005] According to a second aspect of the present invention, there is provided a measuring device, comprising a base material; measuring indicia formed on the base material, said measuring indicia including lines and numbers; and a translucent fluorescent material provided in overlying relation with respect to said indicia.

[0006] According to a third aspect of the present invention, there is provided a retractable rule assembly, comprising a housing assembly; a reel rotatably mounted in said housing assembly; an elongated blade wound on said reel, said blade having measuring indicia formed thereon, said blade comprising a light energy storage material that is capable of releasing light energy to provide visibility to said indicia in unlit conditions; and a coil spring arranged to rotate said reel in a direction to wind up the blade onto the reel.

[0007] According to a fifth aspect of the present invention, there is provided A retractable rule assembly, comprising a housing assembly; a reel rotatably mounted in said housing assembly; an elongated blade formed of a ribbon of metal being wound on the reel, said elongated blade having a concavo-convex configuration when extended from said housing assembly, a fluorescent layer of material provided on said concave side of said blade, and indicia formed on said fluorescent layer of material; a coil spring formed of a ribbon of metal constructed to rotate said reel in said housing assembly in a direction to wind up the elongated blade onto said reel; and a blade holding assembly constructed to hold the blade in a position of extension outwardly of said housing assembly.

[0008] According to a sixth aspect of the present invention, there is provided a retractable rule assembly, comprising a housing assembly; a reel rotatable in the housing assembly; an elongated blade wound on the reel, the blade having measuring indicia formed thereon, the measuring indicia comprising a light energy storage material capable of releasing light energy in unlit conditions; and a coil spring arranged to rotate the reel in a direction to wind up the blade onto the reel

[0009] One aspect of an invention disclosed herein relates to a tape rule with improved visibility of measuring indicia and other graphics that may be on the tape blade. In accordance with this aspect, there is provided a retractable rule assembly comprising a housing assembly; a reel rotatably mounted in the housing assembly; and an elongated blade formed of a ribbon of metal being wound on the reel. The elongated blade has a concavo-convex configuration when extended from said housing assembly, the elongated blade having measuring indicia formed on the concave side thereof, and a translucent fluorescent material provided on the concave side of said blade and overlying the indicia. A coil spring formed of a ribbon of metal is constructed to rotate the reel in the housing assembly in a direction to wind up the elongated blade; and a blade holding assembly holds the blade in a position of extension outwardly of the housing assembly.

[0010] Another aspect of an invention disclosed herein relates to a measuring device, comprising a base material; measuring indicia formed on the base material, the measuring indicia including lines and numbers; and a translucent fluorescent material provided in overlying relation with respect to the indicia.

[0011] Another aspect of an invention disclosed herein relates to a retractable rule assembly, comprising a housing assembly; a reel rotatably mounted in said housing assembly; an elongated blade wound on said reel, said blade having measuring indicia formed thereon, said blade comprising a light energy storage material that is capable of releasing light energy to provide visibility to said indicia in unlit conditions; and a coil spring constructed to rotate said reel in a direction to wind up the blade onto the reel.

[0012] These and other objectives, features, and advantages of the present invention will become apparent from the following detailed description, the accompanying drawings, and the appended claims.

[0013] Examples of embodiments of the present invention will now be described in detail with reference to the accompanying drawings, in which:

FIG. 1 shows a perspective view of a tape rule assembly constructed according to an embodiment of the present invention;

FIG. 2 shows a front elevational view of the tape rule assembly;

FIG. 3 shows a side or elevational view of the tape rule assembly;

FIG. 4 shows a cross-sectional view of the tape rule assembly taken through the line 4-4 in FIG. 2 showing a blade thereof in a fully retracted configuration;

FIG. 5 is a view similar to FIG. 4 except showing the blade in a fully extended configuration;

FIGS. 5a-c show three cross sections of configurations of the blade with a film of plastic material on the concave and convex sides, respectively.

FIG. 6 is an enlarged sectional view of a portion of FIG. 5, so as to more clearly illustrate the thumb engaging portion;

FIG. 7a-7d are various embodiments of holding members in accordance with various aspects of the inventions disclosed herein;

FIG. 8a-8d are additional embodiments of holding members in accordance with various aspects of the inventions disclosed herein;

FIG. 9a-d are additional embodiments of holding members, with a resilient portion disposed at the free end thereof.

FIG. 10a-d are various embodiments of thumb engaging portions in accordance with various aspects of the inventions disclosed herein.

FIGS. 1-3 show an exterior view of a retractable rule assembly that is generally designated 10 and is constructed according to the principles of an embodiment of the present invention. The rule assembly 10 includes a housing assembly 12 and a reel 14 that is rotatably mounted inside the housing assembly 12 (best seen in the cross-sectional views of FIGS. 4-5). The reel 14 is mounted in the housing assembly 12 by a reel spindle 15 that is secured within the housing assembly 12 (FIGS. 4-5). An elongated tape rule blade 16 is mounted on the reel 14.

**[0014]** The blade 16 is formed of a ribbon of metal, the preferred metal being steel, and the top concave surface of the blade is printed with measuring indicia, such as lines and digits (not shown) for measuring lengths and distances. One longitudinal end 18 of the blade 16 is connected to the reel 14 and a second longitudinal free end 20 of the blade 16 extends generally outwardly of the reel 14 (see FIG. 4 and 5c). The blade 16 is constructed and arranged with respect to the housing assembly 12 to extend generally from a position tangential of the reel 14 outwardly through a spaced opening 22 provided in the housing assembly 12 (as shown, for ex-

ample, in FIG. 4).

**[0015]** Preferably the reel 14 is made of a molded plastic. The blade 16 is wrapped around the reel and has a proximal end thereof fixed relative to the reel 14 for rotation therewith.

**[0016]** A coil spring 32 has an interconnection between the housing assembly 12 and the reel 14 to rotate the reel 14 with respect to the housing assembly 12 in a direction to wind the elongated blade 16 about the reel when the blade 16 is extending outwardly of the housing assembly opening 22. In one embodiment, as best seen in FIG. 5, the blade 16 is connected to the reel 14 by virtue of the beginning end (distal end) 33 of the blade within the housing being connected to a terminal end 38 of the spring 32 in a conventional, known manner with the spring 32 having a portion thereof (adjacent the connection with the blade 16) being pinned, clipped by protruding reel portion 37 to an outer periphery of the reel 14. Preferably the spring 32 is a thin, flat ribbon of metal, such as steel.

**[0017]** The blade 16 is generally movable between a fully retracted position outwardly of the housing assembly 12 to a fully extended position. The fully retracted position of the blade 16 is shown in FIG. 4 and the fully extended position of the blade is shown (in fragmentary view) in FIG. 5. It can be appreciated from a comparison of FIG. 4 and FIG. 5 that as the blade is unwound from the reel 14, the coil spring 32 is wound around the rigidly fixed spindle 15. This winding of the spring around the spindle stores energy in the spring to provide spring powered rewinding of the blade 16 around the reel 14 when the extended blade is released.

**[0018]** The blade 16 is constructed of a ribbon of sheet metal that is shaped during the manufacturing to have a normal or memory configuration that has a generally arcuate or concavo-convex transverse cross-section. The blade 16 has a layer of paint on both sides thereof, with the paint on the concave side of the blade 16 providing measuring indicia 21. In one embodiment, yellow paint is used for background, with black paint on top of the yellow for the numbers and gradations on the top of the blade. However, any combination of colors may be used. The paint layer on each side of the blade preferably has a thickness of about .0001" - .0014" (about 0.00025-0.0036 cm), more preferably between .0006" - .0012" (about 0.00015-0.003 cm), and more preferably between .0008" - .0010" (about 0.002-0.0025 cm). A water-based paint or solvent-based paint is preferred. The "paint" as referred to herein is also sometimes referred to in the art as "ink." In order to reduce damage to the paint layer from rust, corrosion and wear, the paint layer on both sides of the entire blade length is coated with a thin, clear plastic protective coating 17 as shown in FIG. 5a. One such coating may employ materials as described in U.S. Patent 3,121,957, hereby incorporated by reference. The thin plastic coating 17 is preferably provided throughout the length of the blade and on both sides of the blade, with each side of the blade having a coating

thickness of less than .004" (about 0.01 cm), and more preferably between about .002 (about 0.005 cm)" and about .003" (about 0.0075 cm). Any appropriate flexible or semi-flexible material may be used, but Mylar, Polyester, Nylon, Lacquer or Acrylic are most preferred. The material of coating 17 can be of a film type, or of a curable liquid type. In addition, an appropriate thermoset, rubber, thermoplastic, thermoplastic elastomer, polyamide, polyvinyl, silicone, polyimide, polyethylene, fluoropolymer, polyurethane or polyethylene terephthalate may be also used, for example. The coating 17 provides a wear-resistant layer that reduces or inhibits wear of the indicia on the blade. It also preferably provides a sealing function to inhibit rust formation on the blade. If the plastic coating 17 is omitted, it is preferable to use a wear resistant paint to provide the measuring indicia.

**[0019]** In accordance with one aspect of the present invention, the coating 17 provided on the top or upper portion of the blade (that covers the measuring indicia and numerals) has a fluorescent dye or material additive mixed therein. The fluorescent dye within the coating 17 retains the translucency (or transparency) of the coating so that the painted indicia therebeneath on the paint layer can be clearly viewed. The fluorescent coating applied over the printed tape measure blade graphics, numbers and measuring graduation improves the ease of identification and readability of such blade graphics, particularly in dimly lit conditions. The top coating 17 creates contrast and illumination that also provides improved readability in brightly lit conditions.

**[0020]** In one embodiment, the coating 17 has a thickness of between about .0002" to .010 (about 0.0005-0.025 cm)".

**[0021]** As used herein, the term "translucent" is meant to broadly encompass transparent, clear, and light diffusing, but such that indicia or other markings therebehind can be viewed.

**[0022]** In another embodiment, the coating 17 on both the top and bottom of the blade are provided with the fluorescent additive.

**[0023]** When a portion of the normally concavo-convex cross-sectional blade 16 is wound about the reel 14, the wound portion has a flattened transverse cross-section and the wound layers of the coiled blade provide the wound blade with an abutting volute coil configuration. It can therefore be understood, that when the blade 16 is wound around the reel 14, it has a flat cross-section and when the blade 16 is withdrawn from the housing assembly 12 to measure an object, it returns to the concavo-convex cross-section. For an example, see U.S. Patent No. 6,804,899, which has been incorporated by reference. The coil spring 32 is constructed and arranged between the housing assembly 12 and the reel 14 to rotate the reel 14 about the spindle with respect to the housing assembly 12 in a direction to wind up the elongated blade 16 into the housing when extending outwardly of the housing assembly opening 22 in a normal concavo-convex cross-sectional configuration onto the reel 14 in an

abutting volute coil formation in a flattened cross-sectional configuration. The concavo-convex cross-section provides the extended blade with rigidity and maintains the blade essentially straight in the longitudinal direction.

**[0024]** A holding assembly, generally designated to 124, is constructed and arranged to be manually actuated to hold the blade 16 in any position of extension outwardly of the housing assembly opening 22 and to release the blade 16 from any position in which it is held. The structure and operation of the holding assembly 124 is best appreciated from a comparison of FIGS. 4-5. The holding assembly 124 includes a holding member 126 mounted on the housing assembly 12 for movement in opposite directions between a normally inoperative position (FIG. 4) and a holding position (FIG. 5). It can be appreciated that the blade holding member 126 is a generally arcuate member that is movable along an arcuate path between the two positions as aforesaid. The holding member 126 has an interior free end portion 128 that is movable into wedging engagement with the tangentially extending portion of the blade 16 to engage and hold the blade against an interior holding structure 130 (FIG. 5) on the housing assembly 12 when the holding member 126 is in its holding position. The free end portion 128 includes a central recess 129 (FIG. 2, for example) that is described in detail below. The holding member 126 has an exterior thumb engaging portion 132 configured to be moved digitally to selectively move the holding member 126 from its normally inoperative position and its holding position. The exterior thumb engaging portion 132 is best seen in FIGS. 1-2.

**[0025]** In one embodiment, the thumb engaging portion or slide button 132 is constructed to be impact resistant. Specifically, as best seen in FIG. 6, thumb engaging portion 132, in one embodiment is made from a flexible or elastic material, such as a compliant flexible rubber or thermoplastic elastomer "TPE." In one embodiment, the thumb engaging portion 132 exterior surface has perforations 153, as illustrated in FIG. 10a. In another embodiment, the thumb engaging portion 132 exterior surface has either recessed grooves 154, protruding grooves (protrusions) 155, or a combination of both to bias the direction the outer surface deformation upon impact as illustrated in FIGS. 10b-10d. In another embodiment, the thumb engaging portion 132 exterior surface has a non-uniform cross-sectional thickness to facilitate movement of the holding member 126 in the arcuate actuation direction. This also allows the thumb engaging portion 132 to yield in a perpendicular direction or the direction of the impact.

**[0026]** As seen in FIGS. 5 and 6-9e, the thumb engaging portion 132 is connected to an elongated arcuate flexible body portion 133 that terminates in the interior free end 128. The body portion 133 is made from an appropriate durable flexible plastic. The body portion 133 may be a one-piece molded structure, or may be a plurality of pieces connected together in any suitable manner. The connection 139 between the thumb engaging portion 132

and the body portion 133 can be achieved by an adhesive connection, a welding operation, or a co-molding operation. In one embodiment, the connection 139 is a chemical polymer bond. In another embodiment, the connection 139 is an adhesive bond. In another embodiment, the connection 139 is a mechanical bond. In another embodiment, the connection 139 is a friction fit. In another embodiment, the connection 139 is integrally formed in a co-molding or sequential molding operation with the body portion 133 and thumb engaging portion 132. As illustrated in the enlarged partial view of FIG. 6, a receiving region 135 is provided behind the thumb engaging portion 132. This gap or void allows the flexible thumb engaging portion 132 to deform into the receiving region 135 and thereby absorb and deflect the drop impact energy in the event that the rule assembly 10 is dropped and the portion 132 impacts the ground or other surface. In one embodiment, the receiving region 135 may comprise a void or space. Following the impact and resultant deformation, the thumb engaging portion 132 flexes back to its original form. As a result, the structural integrity of the thumb engaging portion 132 is preserved, as it will not fracture upon impact. The outwardly extending portion 134 is slidably held within and guided by a slot 136 (see FIG. 2) formed within a front part of housing assembly 12 by the members 40, 42. The movement of a lower portion of the holding member 126 is guided by a pair of tabs 131 integrally formed on respective housing members 40, 42 (only one tab is shown in the figures). An integral locking structure 138 on the holding member 126 engages holding structure 140 (FIG. 5) integrally formed on the housing assembly 12 to releasably lock the holding member 126 in the holding position in wedging engagement with the blade 16.

**[0027]** In one embodiment, the thumb engaging portion 132 deforms a distance that is greater than 50% of the cross-sectional thickness thereof, wherein the thickness measurement is taken at a region of maximum cross-sectional thickness for a portion of the thumb engaging portion 132 that flexes toward the receiving region 135.

**[0028]** FIGS. 7a-7d illustrate various, non-limiting arrangements for the body portion 133 and thumb engaging portion 132 joined therewith at connection 139. In FIG. 7a, the void 135 is formed between the thumb engaging portion 132 and body portion 133, by having the ends of the thumb engaging portion joined at connection 139 with the body portion 133 as illustrated. In the embodiment of FIG. 7b, the void 135 is formed entirely within the resilient material of the thumb engaging portion 132, which has an exterior end surface thereof joined with the body portion 133, as illustrated. FIG. 7c is similar to FIG. 7b, with the void 135 formed entirely within the thumb engaging portion 132, but has an exterior bottom surface thereof joined with the body portion 133. FIG. 7d illustrates an arrangement wherein the body portion 133 has an outwardly extending neck portion 148 to accommodate the side edges defining slot 136 in the housing (see FIG. 2)

as known in the art. As shown, in FIG. 7d, the neck portion 148 joins with a mounting portion 143 to which the thumb engaging portion 132 is joined.

**[0029]** In one embodiment, the receiving region 135 is comprised of a thru void as seen in FIG. 10a. As shown, the thru void is generally empty and the void is open on either side. In another embodiment, the receiving region 135 is comprised of a plurality of voids, as seen in FIG. 10b. In another embodiment, the void 135 is entirely enclosed within the thumb engaging portion, as can be appreciated from FIG. 10d. In another embodiment, the receiving region 135 is not a void, but rather comprises a gel, foam, or other material that is of a lower durometer, or a more compliant material than the thumb engaging portion 132, as can be appreciated from FIGS. 8a, 8c and 10c. FIG. 8a illustrates the receiving region 135 comprising a cellular type material. FIG. 8c illustrates the receiving region 135 comprising a gel material. FIGS. 8b and 10c illustrate the receiving region 135 comprising a foam material, which foam material is of a different color than the thumb engaging portion 132, as discussed below. In these embodiments, the receiving region comprise a relatively softer material than that of the resilient thumb engaging portion 132 to allow the thumb engaging portion 132 to deform into the receiving region 135 upon impact. As discussed above, in some embodiments, the receiving region 135 comprises a material of a different color than the thumb engaging portion 132, and can be viewed from a side profile of the device to provide the holding member 126 with a distinctive look, as illustrated in FIG. 10c. For example, in one embodiment, the thumb engaging portion 132 is a black resilient material, and the receiving region 135 comprises a yellow resilient material of lower durometer (e.g., foam or gel), as illustrated in FIG. 10c. In another embodiment, the receiving region 135 is a cellular structure, as seen in FIG. 8a. The cellular structure of the receiving region 135 is of a different (softer durometer) material than the thumb engaging portion 132 and of the holding member 126. However, in one embodiment, the receiving region is of the same material, but a foamed version of a non-foamed thumb engaging portion 132. This facilitates bonding between these materials. In another embodiment, they are of different materials.

**[0030]** To lock the blade 16 in a given position of extension, as known in the art, the user (while holding the blade 16 outwardly of the housing assembly 12 against the spring force of the coil spring 32) slides the thumb engaging portion 132 downwardly with respect to the housing assembly 12 causing the locking structure 138 to slide over a ramped surface 142 on the holding structure 140 and causing the free end or blade engaging portion 128 to move in a locking direction with respect to the blade 16. The flexible plastic locking structure 138 bends resiliently inwardly slightly as it passes over the holding structure 140. After the free end 128 contacts the blade 16, continued movement of the thumb engaging portion 132 in the locking (downward) direction thereafter

wedges the free end 128 of the flexible body portion 133 against blade 16 to hold the blade 16 in place against the spring force of the coil spring 32 and moves the locking structure 138 into abutting engagement with a locking surface 141 on the holding structure 140. The holding member flexes slightly as the free end 128 is wedged against the blade 16. The abutting engagement between the locking structure 138 and the locking surface 141 locks the holding member 126 in its holding position.

**[0031]** It can be understood from FIG. 5 that the blade 16 is held in an extended position (against the spring force of the coil spring 32) between the free end 128 of the body portion 133 and the interior holding structure 130 by the downward force exerted by the wedged body portion 133. The interior holding structure 130 (not visible in detail) is a series of longitudinally spaced, transversely extending ribs that are constructed and arranged to support the convex side of the blade 16. When viewed from the point of view of FIG. 5 (i.e., on a transversely directed line of sight), the top surfaces (not visible in the FIGS.) of the ribs cooperate to provide a generally downwardly sloped support (in a direction toward the opening 22) for the blade 16; and when viewed from the front, (i.e., on a longitudinally directed line of sight) the top surfaces (not visible in the figures) of each rib of the interior holding structure 130 are transversely spaced in a concave array to receive and support the convex side of the blade. The ribs can be a plurality of ribs as discussed above, or a single rib. The rib(s) can be formed of a plastic and/or TPE material.

**[0032]** To release the blade 16, the user pulls upwardly on the thumb engaging portion 132 which causes the locking structure 138 on the plastic holding member 126 to move resiliently outwardly and past the locking surface 141 to release the holding member 126 from engagement with a blade 16. The holding member 126 resiliently returns to its normal arcuate shape. It can be appreciated from FIG. 2 that the recess 129 on the free end 128 of the holding member 126 defines two transversely spaced teeth 147 which have spaced arcuate side surfaces 144 sized to conform to the concave surface of the blade 16 to hold the same in locked position.

**[0033]** It can be understood that the use of the holding member 126 when a measurement is being taken is optional. When taking a measurement, the user typically holds the housing assembly 12 in one hand and manually pulls the blade 16 out of the housing assembly 12 with the other hand. When a sufficient length of blade 16 has been withdrawn from the housing assembly 12, the user can lock the blade 16 with respect to the housing assembly 12 using the holding member 126 to prevent the blade 16 from retracting back into the housing assembly 12 (under the spring force of spring 32) when the user releases the blade 16. When the measurement has been taken, the user simply releases the holding member 126 from holding engagement with the blade 16 by moving the free end 128 thereof out of wedging engagement with the blade 16 in the manner described above. If the holding

member 126 is not used during the taking of a measurement, the user can simply hold the blade 16 with his other hand while the measurement is being taken or, alternatively, the hook member 34 can be placed in hooking engagement with the workpiece to hold the blade 16 outwardly of the housing assembly 12 in a controlled and steady manner against the spring force of spring 32 while the measurement is being taken.

**[0034]** When the blade 16 is released after taking the measurement, the spring 32 rotates the reel 14 with respect to the housing assembly 12 in a blade-winding direction to wind the blade 16 around the reel 14.

**[0035]** In one embodiment, the holding member 126 has a resilient portion 150 that comprises a blade engaging surface. The resilient portion 150 is attached to the free end 128 of the holding member 126, as seen in FIG. 9a. In one embodiment, the resilient portion 150 is made of an elastomeric material. In another embodiment, as shown in FIGS. 9b-9d, the resilient portion 150 has a void receiving portion 151 behind or within the resilient portion 150 that enables the resilient portion 150 to deform elastically to a greater extent, in comparison with no receiving portion, when the resilient portion 150 contacts the blade 16. Either arrangement provides for enhanced holding force applied to the blade 16 in comparison with no resilient portion. In one embodiment, the receiving portion 151 at the free end 128 of the holding member 126 is comprised of a void, as seen in FIG. 9b. In one embodiment, the receiving region 151 at the free end 128 of the holding member 126 is not a void, but rather comprises a cellular material (FIG. 9c), or a foam or gel (FIG. 9d). These materials are of a lower durometer, or more compliant material than the resilient portion 150. In one embodiment, the receiving region material is chemically compatible with the resilient portion so as to facilitate overmolding and chemical bonding therebetween. For example, the receiving region material 151 can be a foamed version of the same material as the non-foamed resilient portion 150.

**[0036]** In one embodiment, a relatively short free end portion of the blade 16 has a film 158 of a clear, translucent (as defined herein) plastic material adhered to the concave and/or to the convex side thereof to protect the blade 16 while the same is out of the housing assembly 12 and while the blade 16 is being retracted under the spring force of the spring 32 back into the housing assembly 12. Though the film 158 may be clear to permit reading of measuring indicia beneath the film, it may also be opaque, particularly in the case where it is on the convex side of the blade 16 as shown in FIG. 5b. Moreover, if an opaque film 158 is used on the concave side of the blade, it may itself contain the measuring indicia for that portion of the blade, so that even if the film obscures printed indicia on the blade 16, the device can still be readily used. Preferably the film 158 is made of polyurethane and is adhered to the blade (i.e., over the paint layer), or, in the case that the blade includes a protective plastic coating 17, to the coating 17, by an acrylic adhesive.

sive. Adhesive may not be necessary if the plastic coating is made of the same material as the film, since the two components can chemically bond, for example under heat treatment, obviating the need for adhesive. It is also contemplated to use Mylar® or Nylon® to construct the film. The film 158 has a thickness dimension that is larger than the thickness dimension of the thin plastic coating 17, if coating 17 is provided. In one embodiment, the film 158 has a thickness within the range of approximately 0.006 inches (about 0.015 cm) to approximately 0.014 inches (about 0.036 cm). It is within the scope of the invention to apply this film to the blade of any known tape rule assembly.

**[0037]** In one embodiment, the film 158 is self-adhering and is placed over several leading inches (preferably within a broad range of approximately 2 inches to approximately 12 inches) of the free end 20 of the blade 16, including the portion of the blade on which the hook member 34 is disposed so that the film goes under the hook member 34 all the way to the free end 20 of the blade 16. In another embodiment, the film 158 is applied along a length from the free end 20 of the blade 16 that is less than 10.5 inches; and in another embodiment, the length of the blade 16 from the free end thereof that is covered by the film 158 is approximately 6 inches. In one embodiment, the film-covered portion ends at approximately the point on the blade 16 where the volutes of the coiled blade are in overlying relation to one another when the blade 16 is in its fully retracted configuration. Typically in a tape rule assembly, the tape blade starts to wrap on itself at approximately 9.5 inches when a typical reel size of approximately 2.9 inches in outer diameter is used in the construction. The film 158 is provided because most failures in a rule blade 16 occur within the first six inches of the free end of the blade 16 from cracks or tearing. The cracks or tearing occur because when the blade is wound back around reel under the spring force of the coil spring, the free end of the blade tends to "whip" as it enters the opening 22, causing the last several inches of the blade 16 to hit against the housing assembly 12. This can cause cracking or breaking of the free end of the blade 16 over time. The protective film 158 prevents these cracks and tears and other damage to the blade 16 associated with blade whipping.

**[0038]** The free end of the blade 16 is frequently handled by the user and this handling can over time cause the numbering and markings on the concave side of the blade 16 to wear off or become difficult to read, even where the protective coating 17 is applied. When applied to the concave side of the blade, the film 158 prevents this damage because it covers the numbering and markings on the free end of the blade and thereby protects the same from being worn off. Film 158 provided on the concave side of the blade may also be subjected to less wear in comparison to film provided on the convex side.

**[0039]** There are several possibilities for the protective film 158 that remain within the scope of the present invention. For example, the film 158 may cover only a por-

tion of the width of the blade 16. A range of between about 25% to about 100% may be sufficient to provide an increase in the blade life while reducing the amount of material necessary to provide the film. Most preferably, however, about 100% of the blade width is covered. In addition, the film, illustrated in FIG. 5c as film 165, may include a plurality of sub-layers 166. The sub-layers may be formed into the film prior to attachment to the blade 16, or may alternatively be individually attached to the blade in an iterative process. Also, the film 158, 165 may include at least one reinforcing member; such as, where in the reinforcing member is a fiber 168 as in FIG. 5b.

**[0040]** In one embodiment, the film 158 and/or film 165 (or one or more sub-layer 166 thereof), in any of the embodiments above, may be provided with a fluorescent additive, so as to provide similar benefits (for portions of the blade with such film) noted above with respect to the coating 17, irrespective of whether the coating 17 is provided with the fluorescent additive. In yet another embodiment, a translucent (as defined herein) fluorescent coating layer is provided as a separate layer positioned between a non-fluorescent coating layer 17 and a non-fluorescent protective film 158 and/or 165. This separate layer may be formed from polyester in one embodiment, with the fluorescent additive.

**[0041]** In other embodiments, indicia are formed on top of the translucent fluorescent coating in any of the previously disclosed embodiments, rather than therebeneath. In another embodiment, the indicia is formed on top of an opaque, plastic coating layer formed on top of the metal blade.

**[0042]** In any of the embodiments herein, the fluorescent dye may provide a yellowish, greenish, orangeish or other colored tint.

**[0043]** In yet other embodiments, rather than using a fluorescent additive as described above, a light energy absorbing and releasing material (or "luminescent" or "phosphorescent material") is used. Such material is capable of subsequently releasing and emitting light energy to provide illumination to the measuring indicia in unlit environmental conditions. Unlike fluorescent materials, phosphorescent materials do not immediately discharge the radiation it absorbs. This type of light energy absorbing and releasing (or phosphorescent) material is commonly referred to as "glow-in-the-dark" material. Thus, in the embodiments described above, the layer 17 and/or layer 158 may include a "glow-in-the-dark" substance. In one configuration, the "glow-in-the-dark" layer 17 is substantially translucent (as defined herein) and illuminates the indicia printed therebeneath to enable the indicia to be viewed in unlit environmental conditions.

**[0044]** In another modification, the "glow-in-the-dark" material layer 17 is substantially opaque. In this modification, the indicia is a non-phosphorescent material (e.g., conventional measuring tape paint, or a fluorescent material such as fluorescent paint) printed on top of the layer 17, and the glow of the layer 17 will provide substantial contrast to the indicia printed thereon in unlit conditions.

[0045] In this last configuration, a thin translucent or transparent layer or coating may be provided on top of the "glow-in-the-dark" material and the indicia. This thin clear or translucent layer may be similar to the layer 17 as described in U.S. Patent No. 6,804,899, or as described above, and protects the indicia from becoming worn or faded.

[0046] In yet another embodiment, a "glow-in-the-dark" (phosphorescent) material is used for the indicia (lines and/or numbers), and this is formed on a non-phosphorescent background material (e.g., a background of conventional paint, or fluorescent material). In this embodiment, the glow of the indicia will provide substantial contrast in relation to the background material on which the indicia is formed, particularly in unlit conditions.

[0047] In yet another embodiment, the "glow-in-the-dark" material comprises an opaque "glow-in-the-dark" plastic material that constitutes essentially the entire thickness of the blade 16, thus eliminating the need for a metal layer. The indicia in this embodiment is printed directly on the top surface of the plastic blade 16.

[0048] The "glow-in-the-dark" or phosphorescent material may be any suitable type of chemical compound emitting light, such as zinc sulfide or strontium aluminate, just for example.

[0049] The construction of the hook member 34 and the manner in which it is disposed on the free end 20 of the blade 16 is best seen in FIGS. 1-4. Preferably the end hook member 34 is formed of sheet metal and is mounted on the free end 20 of the blade 16.

[0050] One skilled in the art will understand that the embodiment of the tape rule assembly 10 shown in the figures and described above is exemplary only and not intended to be limiting. It is within the scope of the invention to provide any known tape rule assembly with any or all of the features of the present invention. For example, the clear film of plastic material with fluorescent dye can be applied to any known tape rule assembly, such as a dual mode rule assembly as disclosed by U.S. Patent No. 6,643,948, hereby incorporated by reference in its entirety, or a "Lever Lock" type tape rule. It should be appreciated that the "blade holding assembly" as disclosed and claimed herein can be any type of blade holding assembly, including the dual mode type or "Lever Lock" type. Similarly, a lock member constructed according to the principles of the present invention can be applied to any known rule assembly.

[0051] It can also be appreciated that it is contemplated to use any of the aforementioned features singly or in any appropriate combination on a tape rule assembly that has a spring-powered retractable blade or, alternatively, on any tape rule assembly in which the blade is manually retracted.

[0052] It will thus be seen that the objects of the present invention have been fully and effectively accomplished. It will be realized, however, that the foregoing specific embodiments have been shown and described for the purposes of illustrating the functional and structural prin-

ciples of the present invention and is subject to change without departure from such principles. Therefore, this invention includes all modifications encompassed within the spirit and scope of the following claims.

[0053] Embodiments of the present invention have been described with particular reference to the examples illustrated. However, it will be appreciated that variations and modifications may be made to the examples described within the scope of the present invention.

## Claims

### 1. A retractable rule assembly, comprising:

a housing assembly (12);  
a reel (14) rotatably mounted in said housing assembly;  
an elongated blade (16) formed of a ribbon of metal being wound on the reel (14), said elongated blade having a concavo-convex configuration when extended from said housing assembly, said elongated blade having measuring indicia (21) formed on the concave side thereof, and a translucent fluorescent material provided on said concave side of said blade and overlying the indicia;  
a coil spring (32) formed of a ribbon of metal constructed to rotate said reel in said housing assembly (12) in a direction to wind up the elongated blade (16) onto said reel; and  
a blade holding assembly (124) constructed to hold the blade in a position of extension outwardly of said housing assembly.

2. A retractable rule assembly according to claim 1, wherein said fluorescent material comprises a plastic material having a thickness dimension of between about .0002" to .010" (about 0.0005-0.025 cm).

3. A retractable rule assembly according to claim 1 or 2, wherein said indicia (21) is provided by a layer of paint between said blade and said fluorescent material, said layer of paint having a thickness of between .0001" to .0014" (about 0.000025-0.0036 cm).

4. A retractable rule assembly according to any of claims 1 to 3, wherein said fluorescent material comprises a material selected from the group consisting of: polyamides, polyvinyl, polyesters, silicone, polyimides, polyethylene, fluoropolymers, polyurethane and polyethylene terephthalate.

5. A retractable rule assembly according to any of claims 1 to 4, wherein said fluorescent material is also on said convex side of said blade.

6. A retractable rule assembly according to any of claims 1 to 5, wherein said fluorescent material is provided on an entire length of said blade.
7. A retractable rule assembly according to any of claims 1 to 6, wherein said fluorescent material is provided on less than an entire length of said blade.
8. A retractable rule assembly according to any of claims 1 to 7, wherein said film extends across less than one hundred percent of the width of said blade.
9. A retractable tape rule assembly according to any of claims 1 to 8, wherein said translucent material is transparent.
10. A measuring device, comprising:  
     a base material;  
     measuring indicia (31) formed on the base material, said measuring indicia including lines and numbers; and  
     a translucent fluorescent material provided in overlying relation with respect to said indicia.
11. A measuring device according to claim 10, wherein said translucent material is transparent.
12. A retractable rule assembly, comprising:  
     a housing assembly (12);  
     a reel (14) rotatably mounted in said housing assembly;  
     an elongated blade (16) wound on said reel, said blade having measuring indicia (31) formed thereon, said blade comprising a light energy storage material that is capable of releasing light energy to provide visibility to said indicia in unlit conditions; and  
     a coil spring (32) arranged to rotate said reel in a direction to wind up the blade onto the reel (14).
13. A retractable rule assembly according to claim 12, wherein said light energy storage material is opaque and said indicia is formed over said opaque light energy storage material.
14. A retractable rule assembly according to claim 12 or 13, wherein said blade is formed from a plastic material comprising the light energy storage material.
15. A retractable rule assembly according to any of claims 12 to 14, wherein said blade is formed from a metal material, and said light energy storage material is formed over said metal material.
16. A retractable rule assembly according to claim 15, wherein said light energy storage material is opaque and said indicia is formed over said opaque light energy storage material.
17. A retractable rule assembly according to claim 15, wherein said light energy storage material is translucent or transparent.
18. A retractable rule assembly according to any of claims 12 to 17, wherein the indicia is between the metal material and the translucent or transparent light energy storage material.
19. A retractable rule assembly according to any of claims 12 to 17, wherein the indicia is formed over the translucent or transparent material.
20. A retractable rule assembly according to claim 16, further comprising a translucent or transparent material formed over the light energy storage material and the indicia so as to protect the indicia.
21. A retractable rule assembly according to any of claims 12 to 20, wherein the light energy storage material comprises a phosphorescent material.
22. A retractable rule assembly, comprising:  
     a housing assembly (12);  
     a reel (14) rotatably mounted in said housing assembly;  
     an elongated blade (16) formed of a ribbon of metal being wound on the reel, said elongated blade having a concavo-convex configuration when extended from said housing assembly, a fluorescent layer of material provided on said concave side of said blade, and indicia formed on said fluorescent layer of material;  
     a coil spring (32) formed of a ribbon of metal constructed to rotate said reel in said housing assembly in a direction to wind up the elongated blade onto said reel; and  
     a blade holding assembly (124) constructed to hold the blade in a position of extension outwardly of said housing assembly (12).
23. A retractable rule assembly according to claim 22, wherein the fluorescent layer of material is translucent.
24. A retractable rule assembly according to claim 22 or 23, further comprising a transparent layer disposed in overlying relationship with the indicia.
25. A retractable rule assembly according to any of claims 12 to 24, wherein the light energy storage material comprises a luminescent material.
26. A retractable rule assembly according to any of



claims 12 to 25, wherein the light energy storage material is formed on a concave side of the blade.

27. A retractable rule assembly according to any of claims 12 to 26, wherein the light energy storage material is formed on a convex side of the blade. 5

28. A retractable rule assembly, comprising:

a housing assembly (12); 10  
a reel (14) rotatable in the housing assembly;  
an elongated blade wound on the reel, the blade having measuring indicia (31) formed thereon, the measuring indicia comprising a light energy storage material capable of releasing light energy in unlit conditions; and a coil spring (32) 15  
arranged to rotate the reel (14) in a direction to wind up the blade onto the reel.

29. A retractable rule assembly according to claim 28, wherein the indicia comprises numbers. 20

30. A retractable rule assembly according to claim 28 or 29, wherein the indicia comprises lines. 25

31. A retractable rule assembly according to any of claims 28 to 30, wherein the indicia is formed on top of a non-light energy releasing material. 30

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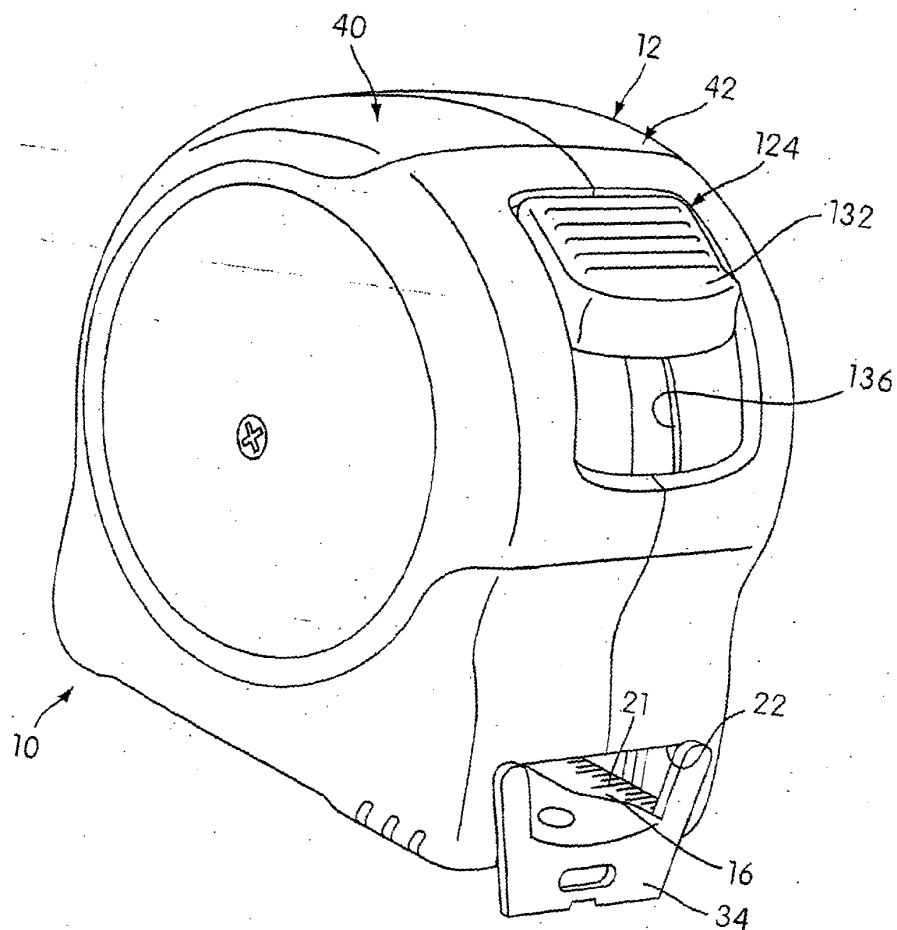


FIG. 1

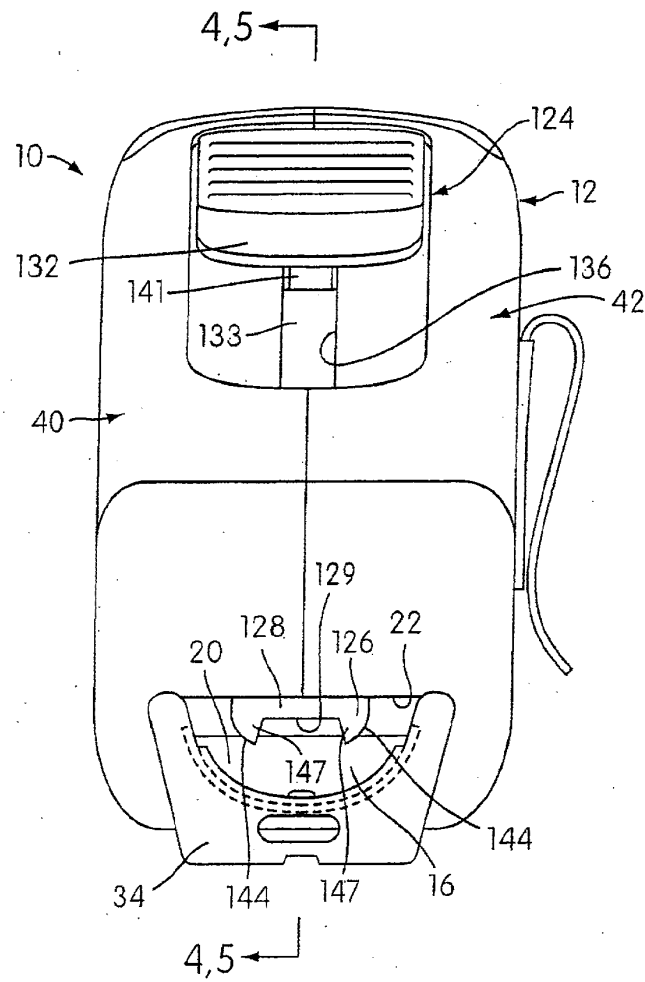


FIG. 2

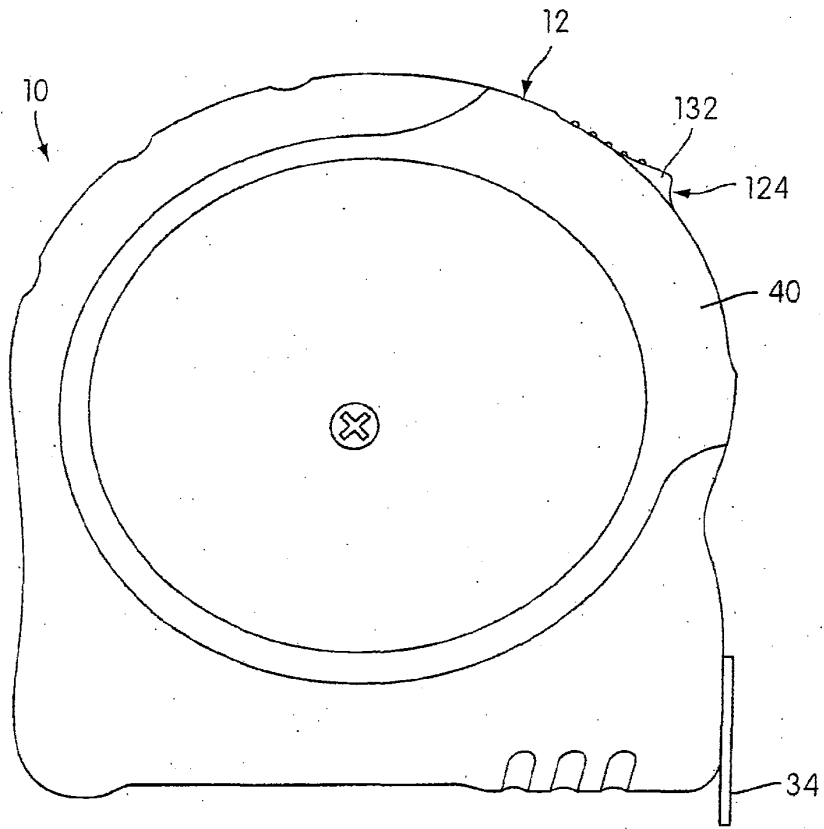


FIG. 3

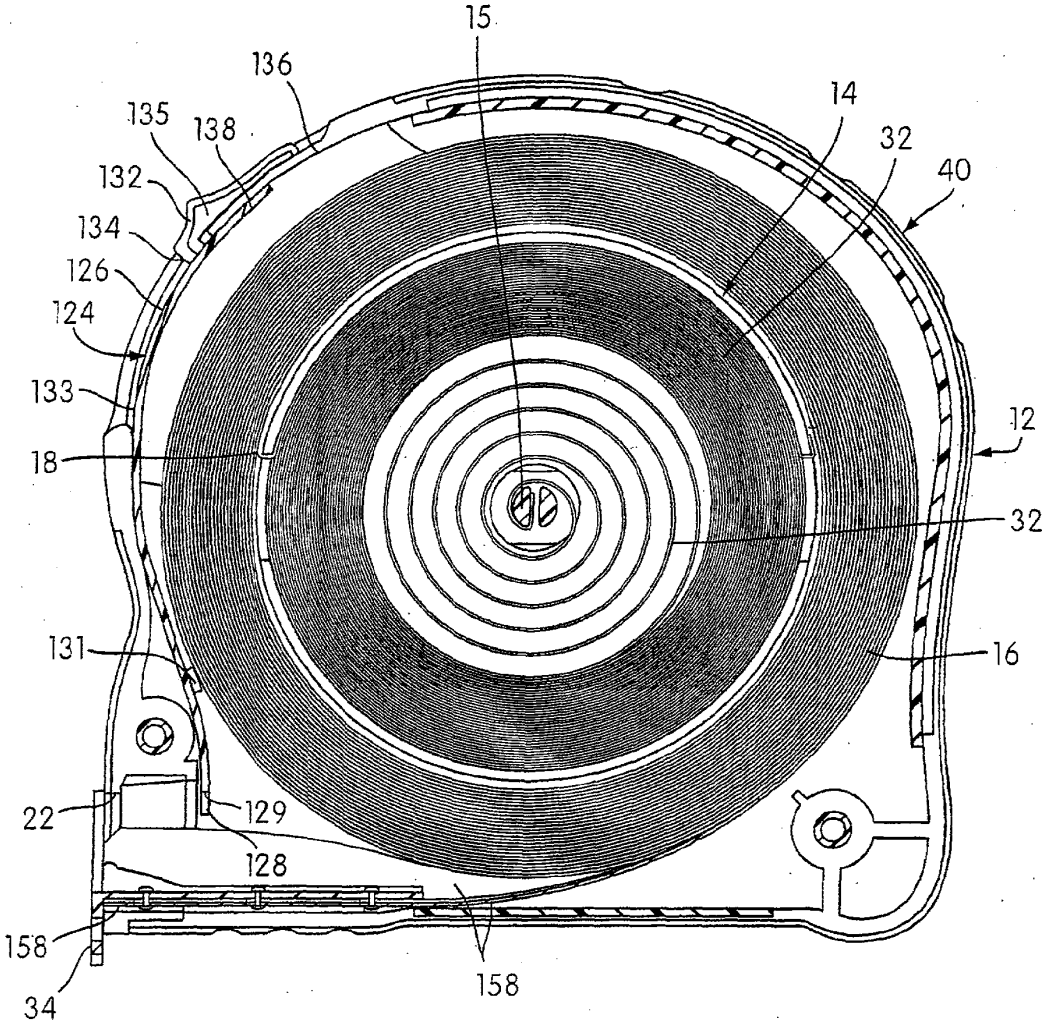


FIG. 4

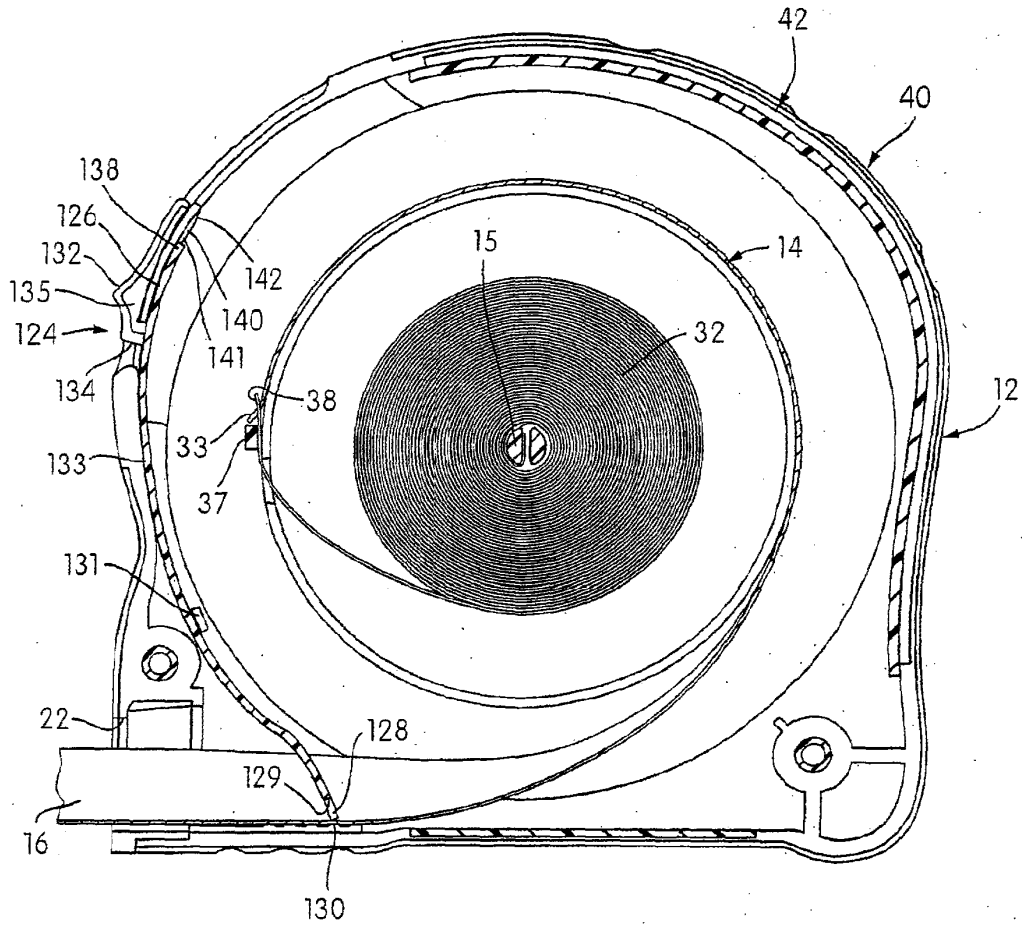


FIG. 5

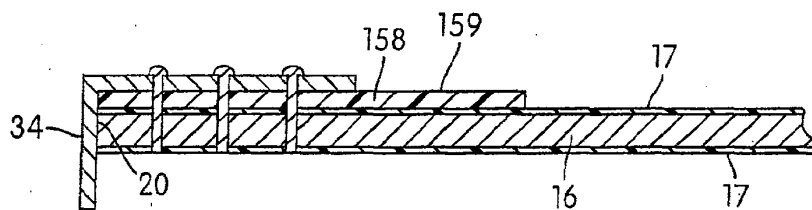


FIG. 5a

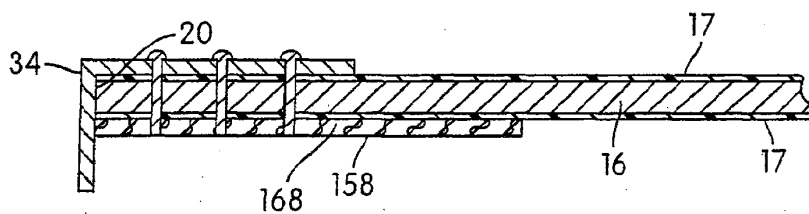


FIG. 5b

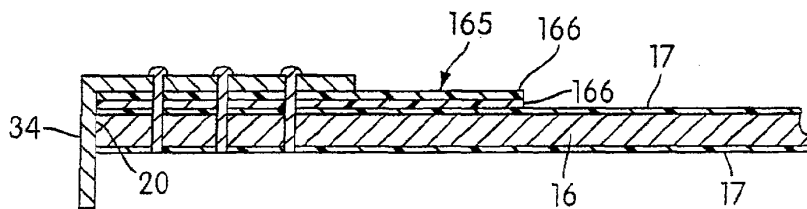


FIG. 5c

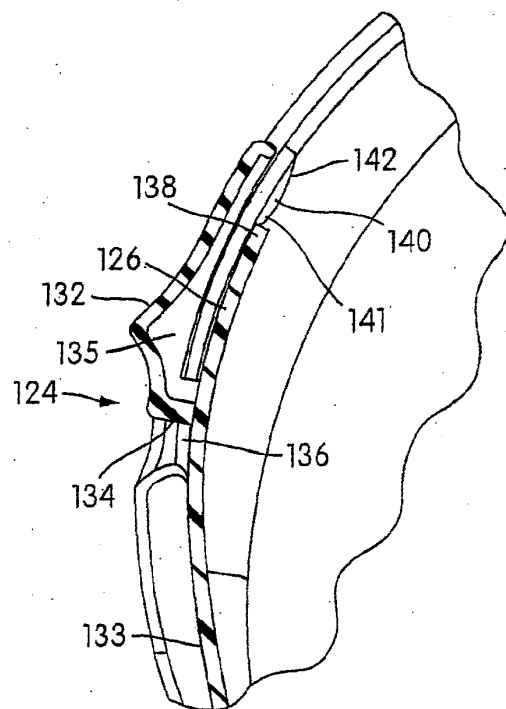


FIG. 6



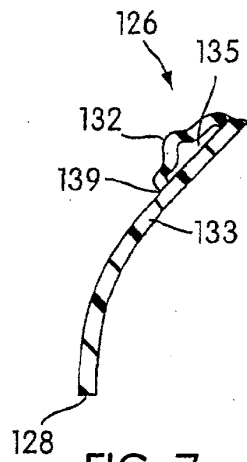


FIG. 7a

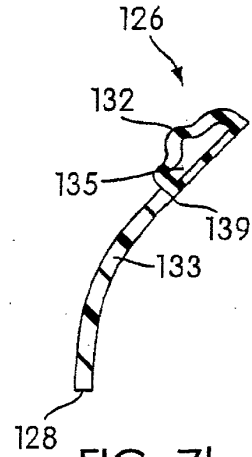


FIG. 7b

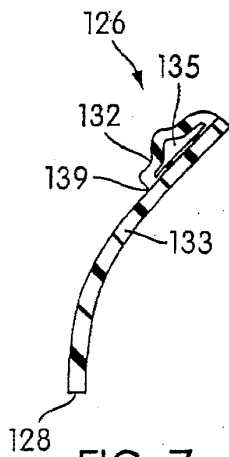


FIG. 7c

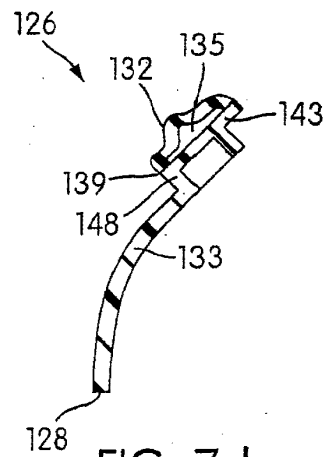


FIG. 7d

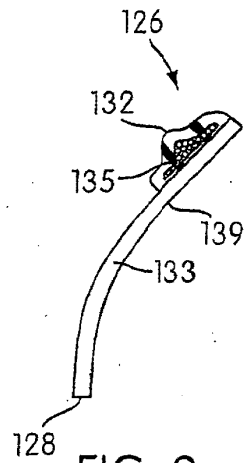


FIG. 8a

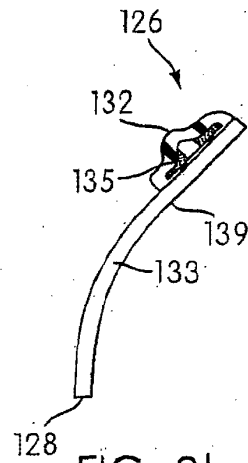


FIG. 8b

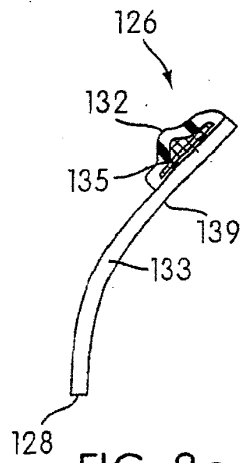


FIG. 8c

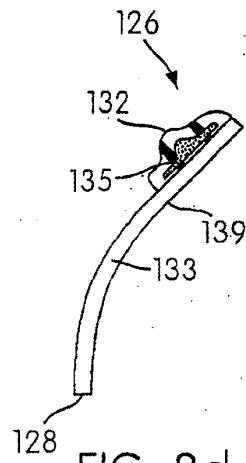


FIG. 8d

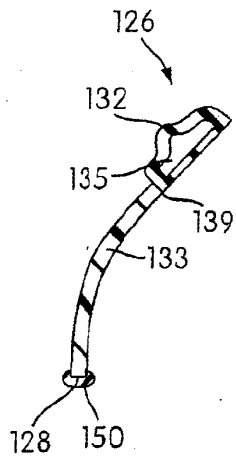


FIG. 9a

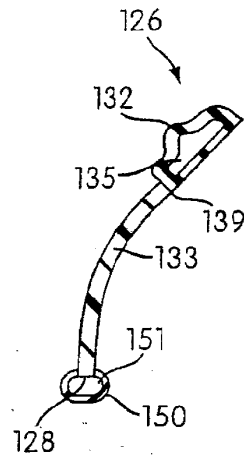


FIG. 9b

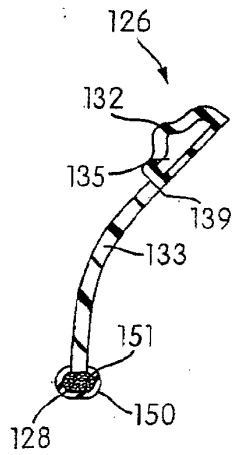


FIG. 9c

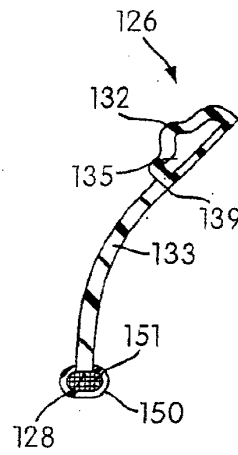


FIG. 9d

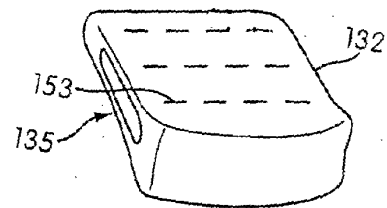


FIG. 10a

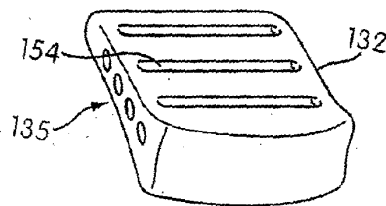


FIG. 10b

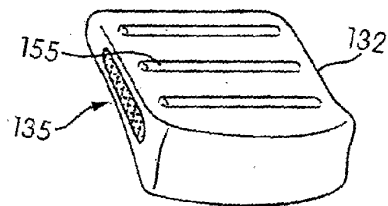


FIG. 10c

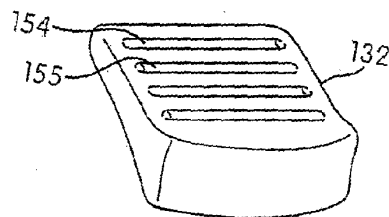


FIG. 10d

REFERENCES CITED IN THE DESCRIPTION

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**Bibliographic data: JP2001174202 (A) — 2001-06-29****MEASURING TAPE**

**Inventor(s):** HARA TAKESHI ± (HARA TAKESHI)  
**Applicant(s):** HARA RULE MFG ± (HARA DOKI KK)  
**Classification:** - **international:** G01B3/10; (IPC1-7): G01B3/10  
- **cooperative:** G01B3/1003 (EP); G01B3/1041 (EP)  
**Application number:** JP19990357978 19991216  
**Priority number(s):** JP19990357978 19991216  
**Also published as:** JP4435349 (B2)

**Abstract of JP2001174202 (A)**

PROBLEM TO BE SOLVED: To provide a measuring tape which enables easy reading of scale at night and in darkness, and has improved maintainability. SOLUTION: A surface 8 of a tape 7 or a scale 9 printed on the surface is coated with a phosphorescent coating material. A part or the whole part of a tape reeling drum 5 for reeling up the tape 7 is made transparent. A part or the whole part of a case (right-half case 2/left-half case 3) is made transparent, and the measuring tape is constituted.

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開2001-174202

(P2001-174202A)

(43) 公開日 平成13年6月29日 (2001.6.29)

(51) Int.Cl.<sup>7</sup>

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識別記号

1 0 1

F I

G 0 1 B 3/10

データベース\* (参考)

A 2 F 0 1 1

1 0 1

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(21) 出願番号

特願平11-357978

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平成11年12月16日 (1999.12.16)

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100071238

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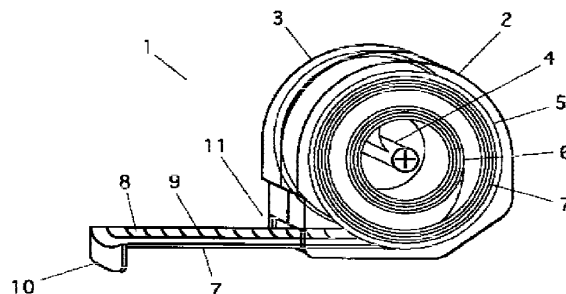
Fターム (参考) 2F011 AA02 AB02 AC02 AD02

(54) 【発明の名称】 巻 尺

(57) 【要約】

【目的】夜間や暗がりでもメモリを容易に読み取ることができ且つメンテナンス性を向上させた巻尺を提供することを目的とする。

【構成】テープ7の表面8またはその上に印刷されるメモリ9を蓄光可能な塗料で塗装し、そのテープ7を巻取るテープ巻取りドラム5の一部または全部を透明として、更にそれらを取容するケース（右ハーフケース2／左ハーフケース3）の一部または全部を透明にして巻尺を構成する。



【特許請求の範囲】

【請求項1】 ケース内に、テープの巻取りバネを内装するテープ巻取りドラムが回動自在に軸装された巻尺において、テープの表面またはその上に印刷されるメモリが蓄光可能な塗料で塗装され、そのテープを巻取るテープ巻取りドラムの一部または全部が透明であり、更にそれらを収容するケースの一部または全部が透明であることを特徴とする巻尺

【請求項2】 テープの表面およびその上に印刷されるメモリの両方が蓄光可能な塗料で塗装されていることを特徴とする請求項1の巻尺

【請求項3】 テープ巻取りドラムの巻胴の両端に有する鰐の一方または両方が透明であることを特徴とする請求項1の巻尺

【請求項4】 テープ巻取りドラムの鰐を有する蓋体の一部または全部が透明であることを特徴とする請求項1の巻尺

【請求項5】 ケースが左右のハーフケースから構成されてなり、そのハーフケースの一方または両方が透明であることを特徴とする請求項1の巻尺

【請求項6】 ケースが、少なくとも前壁と後壁と底壁を有する周回壁とその周回壁の左右周縁に係合する左右の側壁から構成されてなり、その3ピースケースの左右またはその一方の側壁が透明であることを特徴とする請求項1の巻尺

【請求項7】 固定的にあるいは格納可能にして、ケースのテープ出入口の近傍にテープのメモリ側の面を照光する照明装置を設けたことを特徴とする請求項1の巻尺

【請求項8】 明暗を感知するセンサーにより照明装置のスイッチが自動的にオンオフすることを特徴とする請求項7の巻尺

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、暗い場所でも使用することができる巻尺に関するものである。

【0002】

【従来技術と問題点】 従来、巻尺の使用に際して一般的には昼間が多く、よって測定用のテープに印刷されているメモリも昼間は容易に読み取ることができる。しかし、夜間や暗がりでは巻尺を使用することもあり、その場合は照明器具によって作業現場全体を照光するなどして使用しているのであるが、測定場所が狭く照明器具からの光が届かない場所であったり、照明器具が無かったりまた用意していなかった時には暗い状態で作業をしなければならず、メモリの読み取りは困難を極め測定寸法を読み間違えてしまうこともしばしばあった。

【0003】 このことから、暗闇での使用を想定して常に照明器具や懐中電灯を持ち歩けばよいのだが、多くの人はそれらを工具箱に収納してはいるものの、作業中に巻尺と共にそれらを持ち歩くことは皆無に等しいの

である。そして、その測定作業場所が照明器具や懐中電灯を収納している工具箱から離れている場所であった時は、照明器具や懐中電灯を取りに行くのが面倒なことから、暗い状態のままで寸法測定をしてしまうことが多いのである。

【0004】 また、作業者は測定場所の明暗に関係なくメモリの判読が不可能となるまではその明るさで測定作業を行ってしまうことが多いため、測定寸法の読み間違えに係するミスは一向に減ることがなかった。このことから、電池を電源とした照明装置を備える巻尺が考案されたが、これは電池の消耗により使用できなくなったり、また、電球が切れてしまえば電池が残っていても使用できなくなってしまうものであるため、作業者からはメンテナンス性が良く昼夜共にメモ리를判読できる巻尺の開発を望んでいた。

【0005】

【目的】 本発明は上述した問題点を鑑みてなされたもので、夜間や暗がりでもメモ리를容易に読み取ることができ且つメンテナンス性を向上させた巻尺を提供することを目的とするものである。

【0006】

【問題を解決するための手段】 本発明の要旨とするところは、ケース内に、テープの巻取りバネを内装するテープ巻取りドラムが回動自在に軸装された巻尺において、テープの表面またはその上に印刷されるメモリが蓄光可能な塗料で塗装され、そのテープを巻取るテープ巻取りドラムの一部または全部が透明であり、更にそれらを収容するケースの一部または全部が透明であることを特徴とする巻尺である。

【0007】 この巻尺をさらに詳しく説明すると、ケースの内側壁の軸にテープの巻取りバネを内装するテープ巻取りドラムが回動自在に軸装されており、このテープ巻取りドラムの巻胴にメモリが印刷されたテープが巻回される。このテープの表面すなわちメモ리를印刷する部分、または、テープの表面に印刷されるメモリ、あるいはその両方が蓄光可能な塗料で塗装されているものである。蓄光可能な塗料は一般に市販されているものを用いればよい。

【0008】 テープの表面も、その全部または一部を蓄光可能な塗料で塗装して、その塗装面積や塗装形状（デザイン）等も特に限定するものではなく適宜所望の塗装をすればよい。また、塗装色においても特に限定するものではなく、昼夜を問わず容易に判読することができる色であれば何でもよい。

【0009】 このテープを巻回するテープ巻取りドラムは、その一部または全部を透明にして巻回するテープの側面に光が到達できるように構成しなければならないが、その形態は特に限定するものではない。このとき、巻尺のケース自体もその一部または全部を透明にして、光がテープ巻取りドラムに到達するようにしなければなら



らない。

【0010】テープ巻取りドラムの一部または全部を透明にするにあたり、その形態や方法は特に限定するものではないが、一部を透明にする場合の具体例としては、テープ巻取りドラムの巻胴の両端に有する鋸の一方または両方を透明にする。また、テープ巻取りドラムの鋸を有するテープ巻取りドラムの蓋体の一部または全部を透明にしてもよい。

【0011】巻尺のケースの一部または全部を透明にするにあたり、その形態や方法は特に限定するものではないが、具体的には、ケースが左右のハーフケースから構成されるものは、そのハーフケースの一方または両方を透明にすればよい。また、ケースが少なくとも前壁と後壁と底壁を有する周回壁とその周回壁の左右周縁に係合する左右の側壁から構成されるものは、その3ピースケースの左右またはその一方の側壁を透明にすればよい。

【0012】さらには、この巻尺のケースのテープ出入口上部の前壁に、固定的にあるいは格納可能にして、テープのメモリ側の面を照光する照明装置を設けてもよい。照明装置も特に限定するものではなく何でもよいが、発光体にはLEDを用いるのがよく、また、電源はボタン電池を用いるのが望ましい。照明装置のスイッチも手動または自動どちらでもよいが、周囲の明暗を感知するセンサーを設けて、照明装置が使用される場合にスイッチが自動的にオンオフするようにしてもよい。

【0013】

【作用】本発明の巻尺は以上のような構造であることから、昼間に於いては巻尺を携帯することにより、太陽光が巻尺の透明ケースを透過してケース内部に入ると共に、透明部材により形成されたテープ巻取りドラムまた蓋体の鋸を透過して、蓄光塗料により印刷されたテープの側面に光が到達する。これにより、太陽光がテープの側面から蓄光塗料に蓄えられる。

【0014】そして、夜間や暗い所で巻尺が使用される時は、ケースより引き出されたテープの表面またはメモリから蓄えられている光が発せられて、テープの表面またはメモリ表示がネオンサインの如く発光する。また、照明装置を備えるものは、蓄光塗料に蓄えられた光量が少ないとき蓄光塗料の発光を補助することができる。

【0015】

【実施例】本発明の巻尺を以下図面に従って説明すると、図1は、本発明に係わる巻尺の斜視図であり、1はその巻尺、2は右ハーフケース、3は左ハーフケースで、一方のハーフケースの内壁に軸4が立設している。5は巻胴54にテープ7を巻回するテープ巻取りドラムで、その内部にはテープ7を巻取るテープ巻取りバネ6が内装されている。テープ7はその表面8にメモリ9が印刷されており、また先端にフック10が設けられている。11はテープ出入口である。

【0016】そして、そのテープ7の表面8またはメモ

リ9、あるいは表面8とメモリ9が蓄光可能な塗料で印刷されている。蓄光可能な塗料とは一般的には蓄光塗料と呼ばれているものである。また、テープ巻取りドラム5と右ハーフケース2および左ハーフケース3が透明素材から形成されており、これにより太陽光等の外光がケース内部に収納されているテープ7の側面に届くようになっている。

【0017】図2は、テープの平面図であり、そのテープ7の表面8またはメモリ9、あるいは表面8とメモリ9が蓄光可能な塗料で印刷されているのである。

【0018】図3は、テープ巻取りドラムの正面図であり、(a)は、巻胴の両端に鋸を備えるテープ巻取りドラムで、テープ巻取りドラム5は軸4に支持される。51はテープ7を巻回する巻胴54の両端に設けられている鋸、52はテープ巻取りバネ6の収納部の蓋である。

(b)は、蓋体に鋸を備えるテープ巻取りドラムで、テープ巻取りバネ6の収納部の蓋の径をテープ巻取りドラム5の径とほぼ同じにして、巻胴54の鋸を兼用するものである。53が鋸である。

【0019】図4は、巻尺ケースの構成図であり、

(a)は、左右のハーフケースから構成された巻尺ケースで、一般には本形態のケースが主流である。2は右ハーフケース、3は左ハーフケースであり、11はテープ出入口となる開口である。(b)は、3ピース構成の巻尺ケースで、前壁121と底壁122と図では示していないが前壁121の後ろに位置する後壁を有する周回壁12と、左右の周縁部に係合する右側壁13および左側壁14とから形成されている。11はテープ出入口となる開口である。図で示したものは一例であり、例えば、右側壁13および左側壁14が板状に近いものであってもよい。すなわち、3ピースの部品から構成されるケースを指すものである。

【0020】図5は、照明装置を設けた巻尺の側面図であり、15は支持軸18により格納可能に構成された照明装置で、発光体にLED16が用いられており明暗センサー17により暗い場所での作業時に自動的にLED16が発光する。また、図には示していないがLED16の電源としてボタン電池が用いられている。(a)は、照明装置を格納した状態で、(b)は、照明装置を出した状態を示すものである。

【0021】

【効果】本発明の巻尺は、テープの表面またはメモリが蓄光塗料で印刷されているので、昼間の太陽光線等の光をその蓄光塗料に蓄えることができ、巻尺が夜間また暗い所で使用される時にはその蓄えた光が発光するため、テープ表面のメモリを判読することができる。すなわちテープの表面またはメモリが発光するため、測定に際しテープの最小メモリをも容易に読み取ることができる。

【0022】また、照明装置を備えるものは、蓄光塗料に蓄えた光量が少ないとき蓄光塗料の発光を補助するこ

とができる。そして、照明装置の発光体もLEDであるため、使用の際の衝撃にも強く且つ消費電力も小さいため電池の消耗も少なく、よってメンテナンス性を向上させることができる。

【図面の簡単な説明】

【図1】 本発明に係る巻尺の斜視図

【図2】 テープの平面図

【図3】 テープ巻取りドラムの正面図

(a) 巻胴の両端に鍔を備えるテープ巻取りドラム

(b) 蓋体に鍔を備えるテープ巻取りドラム

【図4】 巻尺ケースの構成図

(a) 左右のハーフケースから構成された巻尺ケース

(b) 3ピース構成の巻尺ケース

【図5】 照明装置を設けた巻尺の側面図

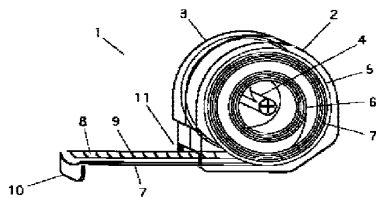
(a) 照明装置を格納した状態

(b) 照明装置を出した状態

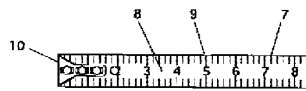
【符号の説明】

1-巻尺, 1a-巻尺, 2-右ハーフケース, 3-左ハーフケース, 3a-左ハーフケース, 4-軸, 5-テープ巻取りドラム, 51-鍔, 52-蓋, 53-鍔, 54-巻胴, 6-テープ巻取りバネ, 7-テープ, 8-表面, 9-メモリ, 10-フック, 11-テープ出入口, 12-周回壁, 121-前壁, 122-底壁, 13-右側壁, 14-左側壁, 15-照明装置, 16-LED, 17-明暗センサー, 18-支持軸

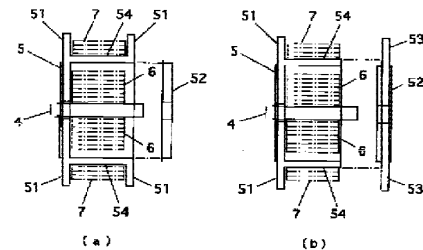
【図1】



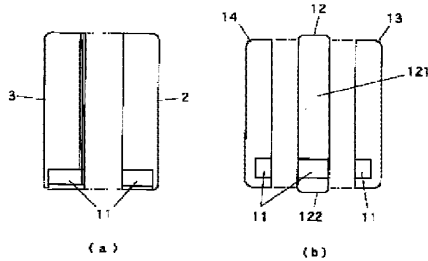
【図2】



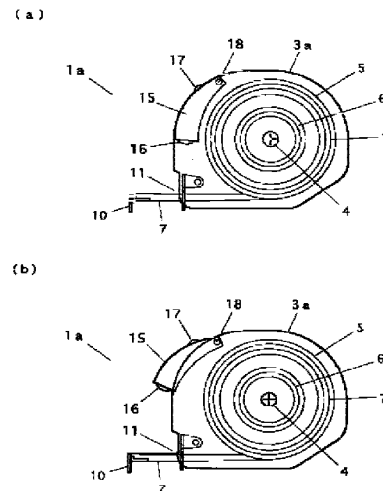
【図3】



【図4】



【図5】





Intellectual  
Property  
Office

Klein Tools, Inc.  
c/o Boulton Wade Tennant LLP  
Salisbury Square House  
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**Patents Directorate**

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**Direct Line:** 01633 811225  
**E-Mail:** Tony.Walbeoff@ipo.gov.uk  
**Switchboard:** 0300 300 2000

**Your Reference:** SJG/P218385GB00  
**Application No:** GB2018458.6

23 April 2021

Dear Sirs

**Patents Act 1977: Search Report under Section 17(5)**

I enclose a copy of my search report. Please note that published patent documents mentioned in my report may be obtained for free on the internet and are usually freely available from <http://worldwide.espacenet.com>.

**Inventive Step**

US '519 and US '529 disclose luminous fish tapes for routing cabling whilst JP '202 and EP '508 disclose tape deployment systems with luminous tapes and transparent cases. It would appear obvious for the skilled addressee to combine either of the US documents with either JP'202 or EP '508 to arrive at the invention defined by the current application.

**Other search results**

If you have applied to another patent office for a patent for this invention you will be receiving from them the results of their search. If you decide to proceed with the present application you are asked to provide a copy of any such official search report or details of any documents cited and category assigned in the report. You may file such information electronically using the online patent filing services detailed in <https://www.gov.uk/government/publications/how-to-file-documents-with-the-intellectual-property-office>.

*Cut-off date* This request applies to search reports that you have received before the date when you send a response to our first examination report under section 18(3) or section 18(4); if you make no response to an initial section 18(4) report the cut-off date is two months after the date of that report. Tell us about a search report sooner rather than later if that would allow it to be considered during our first examination.

**Use of E-mail:** Please note that e-mail should be used for correspondence only.  
**Disclaimer:** Please note the documents we send you may be subject to copyright.



*Exceptions* You do not have to supply details of a search report that (1) shows a nil response, or (2) has been published by WIPO or EPO, or (3) you have already supplied to us on a previous GB application.

### **Publication**

I estimate that preparations for publication of your application will be completed soon after **25 May 2021**. At this time you will receive a letter confirming the exact date of the completion of the preparations for publication. This letter will also tell you the publication number and date of publication of your application. However, it should **NOT** be relied upon as a reminder if you are intending to withdraw your application before publication, as it may not be issued in time for you to do so.

On the date of publication details of your application, including your name and address, will be entered in the Register of Patents and will become publicly available, including on our website. Some documents and correspondence from your application file will also be made publicly available on our website at <http://www.ipo.gov.uk/p-ipsum>.

### **Withdrawal**

If you wish to withdraw your application to prevent publication you must withdraw it before the preparations for publication are complete. One way that you can withdraw your application is by emailing [withdraw@ipo.gov.uk](mailto:withdraw@ipo.gov.uk). Further details on withdrawal are available from <https://www.gov.uk/patent-your-invention>. **WARNING** — once preparations for publication are complete it will NOT be possible to prevent publication.

### **Amendment**

If you wish to file amended claims for inclusion with the published application you must do so before the preparations for publication are completed.

### **Correspondence**

If you write to the Office less than 3 weeks before 25 May 2021 please mark your letter prominently: **"URGENT - PUBLICATION IMMINENT"**.

Yours faithfully

*Mr Tony Walbeoff*

Mr Tony Walbeoff  
Examiner



Application No: GB2018458.6

Examiner: Mr Tony Walbeoff

Claims searched: 1-20.

Date of search: 22 April 2021

## Patents Act 1977: Search Report under Section 17

### Documents considered to be relevant:

| Category | Relevant to claims | Identity of document and passage or figure of particular relevance        |
|----------|--------------------|---------------------------------------------------------------------------|
| Y        | 1-4, 7-13, 16-20.  | US 6293519 B1 (FARRETTA) See figures and abstract (AN 2002-009351).       |
| Y        | 1-4, 7-13, 16-20.  | US 2004/0206529 A1 (SAWYER et al.) See figure 1 and paragraph 3.          |
| Y        | 1-4, 7-13, 16-20.  | JP 2001174202 A (HARA) See figures and abstract (AN 2001-478968)          |
| Y        | 1-4, 7-13, 16-20.  | EP 1914508 A2 (STANLEY WORKS) See figures and                             |
| A        | -                  | US 2009/0257221 A1 (PATTERSON) See figures and abstract (AN 2009-P85765). |
| A        | -                  | US 2017/0213431 A1 (HUO) See figures and abstract (AN 2017-02665E)        |

### Categories:

|   |                                                                                                           |   |                                                                                                                  |
|---|-----------------------------------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------|
| X | Document indicating lack of novelty or inventive step                                                     | A | Document indicating technological background and/or state of the art.                                            |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category. | P | Document published on or after the declared priority date but before the filing date of this invention.          |
| & | Member of the same patent family                                                                          | E | Patent document published on or after, but with priority date earlier than, the filing date of this application. |

### Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>X</sup> :

Worldwide search of patent documents classified in the following areas of the IPC

B65H; H02G

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC, Patent Fulltext



Intellectual  
Property  
Office

**International Classification:**

| <b>Subclass</b> | <b>Subgroup</b> | <b>Valid From</b> |
|-----------------|-----------------|-------------------|
| B65H            | 0075/40         | 01/01/2006        |
| H02G            | 0001/08         | 01/01/2006        |

| Electronic Acknowledgement Receipt   |                                   |
|--------------------------------------|-----------------------------------|
| EFS ID:                              | 42622949                          |
| Application Number:                  | 16696383                          |
| International Application Number:    |                                   |
| Confirmation Number:                 | 6816                              |
| Title of Invention:                  | GLOW FISH TAPE SYSTEM             |
| First Named Inventor/Applicant Name: | Daniel R. Pearson                 |
| Customer Number:                     | 161268                            |
| Filer:                               | Elias Panos Soupos/Robert Holland |
| Filer Authorized By:                 | Elias Panos Soupos                |
| Attorney Docket Number:              | 751391                            |
| Receipt Date:                        | 03-MAY-2021                       |
| Filing Date:                         | 26-NOV-2019                       |
| Time Stamp:                          | 16:56:01                          |
| Application Type:                    | Utility under 35 USC 111(a)       |

### Payment information:

|                        |    |
|------------------------|----|
| Submitted with Payment | no |
|------------------------|----|

### File Listing:

| Document Number | Document Description | File Name   | File Size(Bytes)/<br>Message Digest      | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|-------------|------------------------------------------|------------------|------------------|
| 1               | Transmittal Letter   | IDS-1st.pdf | 187927                                   | no               | 4                |
|                 |                      |             | 40206eaab0583cdc19a92c6a5d391a4ec102315e |                  |                  |

### Warnings:

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |                       |                                          |    |    |
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| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |                       |                                          |    |    |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Information Disclosure Statement (IDS)<br>Form (SB08) | 1449-1st.pdf          | 65669                                    | no | 1  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |                       | 7e32ccf1eaf053f29234ebc18751d21484589f3e |    |    |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                       |                       |                                          |    |    |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |                       |                                          |    |    |
| This is not an USPTO supplied IDS fillable form                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |                       |                                          |    |    |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Foreign Reference                                     | EP_1914508-A2.pdf     | 1088492                                  | no | 22 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |                       | 72422f21d617d1c5585a9f3053a88f6b5be67647 |    |    |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                       |                       |                                          |    |    |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |                       |                                          |    |    |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Foreign Reference                                     | JP_2001-174202-A.pdf  | 330814                                   | no | 5  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |                       | 374ea39764ba445d6fc5c933d928ed412c58d026 |    |    |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                       |                       |                                          |    |    |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |                       |                                          |    |    |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Other Reference-Patent/App/Search documents           | SR_in_GB2018458-6.pdf | 3246324                                  | no | 4  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |                       | 73c4afd3dd8dd1113d7833cf89c7da8d0fb58e3e |    |    |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                       |                       |                                          |    |    |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |                       |                                          |    |    |
| <b>Total Files Size (in bytes):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |                       | 4919226                                  |    |    |
| <p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b><br/> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b><br/> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b><br/> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> |                                                       |                       |                                          |    |    |



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Patent Application No. 16/696,383

Confirmation No. 6816

Attorney Docket No. 751391

**INFORMATION DISCLOSURE STATEMENT**

Pursuant to 37 CFR 1.97 and 1.98, the documents listed on the accompanying Form PTO-1449, Substitute Form PTO-1449, and/or USPTO Form SB/08 (hereinafter, individually or collectively referred to as "Form") are submitted for consideration by the Examiner in the examination of the above-identified patent application.

The full consideration of the documents in their entirety by the Examiner is respectfully requested and encouraged. Also, it is respectfully requested that the documents be entered into the record of the present application and that the Examiner initial the appropriate area on the accompanying Form, thereby indicating the Examiner's consideration of each of the documents.

The submission of the documents listed on the Form is for the purpose of providing a complete record and is not a concession that the documents listed thereon are prior art to the invention claimed in the patent application. The right is expressly reserved to establish an invention date earlier than the above-identified filing date in order to remove any document submitted herewith as prior art should it be deemed appropriate to do so.

Further, the submission of the documents is not to be taken as a concession that any reference represents art that is relevant or analogous to the claimed invention. Accordingly, the right to argue that any document is not properly within the scope of prior art relevant to an examination of the claims in the above-identified application is also expressly reserved.

The Information Disclosure Statement is being filed:

☒ **within** any one of the following time periods: (a) within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d); (b) within three months of the date of entry of the national stage as set forth in 37 CFR 1.491 of an international application; (c) before the mailing date of a first Office Action on the merits; or (d) before the mailing of a first Office Action after the filing of a request for continued examination under 37 CFR 1.114.

☐ Note: This submission includes the Statement under 37 CFR 1.704(d) (see "Statement under 37 CFR 1.704(d)" below), such that no reduction in patent term adjustment is warranted by the filing of this Information Disclosure Statement.

☐ **after** (a), (b), (c) or (d) above, but before the mailing date of a final action under 37 CFR 1.113, a Notice of Allowance under 37 CFR 1.311, or an action that otherwise closes prosecution in the application, and includes *one* of:

☐ the Statement under 37 CFR 1.97(e) (see “Statement under 37 CFR 1.97(e)” below).

☐ Note: This submission includes the Statement under 37 CFR 1.704(d) (see “Statement under 37 CFR 1.704(d)” below), such that no reduction in patent term adjustment is warranted by the filing of this Information Disclosure Statement.

– or –

☐ the fee set forth in 37 CFR 1.17(p) (see “Fees” below).

☐ **on or after** the mailing date of a final action under 37 CFR 1.113 or a Notice of Allowance under 37 CFR 1.311, or an action that otherwise closes prosecution in the application, and on or before payment of the issue fee, and includes the Statement under 37 CFR 1.97(e) (see “Statement under 37 CFR 1.97(e)” below), and the fee set forth in 37 CFR 1.17(p) (see “Fees” below).

☐ Note: This submission includes the Statement under 37 CFR 1.704(d) (see “Statement under 37 CFR 1.704(d)” below), such that no reduction in patent term adjustment is warranted by the filing of this Information Disclosure Statement.

**Statement under 37 CFR 1.97(e)**

☐ The **undersigned** hereby states that each item of information contained in the Information Disclosure Statement was first cited in any communication from a foreign patent office in a counterpart foreign patent application not more than three months prior to the filing of the Information Disclosure Statement.

☐ The **undersigned** hereby states that no item of information contained in the Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign patent application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in the Information Disclosure Statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the Information Disclosure Statement.

**Statement under 37 CFR 1.704(d)**

☐ The **undersigned** hereby states that each item of information contained in the Information Disclosure Statement was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office and that this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the Information Disclosure Statement.

**Citation to Other Patent Applications**

- ☐ The following U.S. patent applications are hereby brought to the attention of the Examiner. The U.S. patent applications claim subject matter that may be considered by the Examiner to be similar to the subject matter claimed in the above-identified patent application. Accordingly, these U.S. patent applications and/or the prosecution pertaining thereto may include information considered to be material to the prosecution of the above-identified patent application. Since the Examiner has electronic access to the prosecution histories of these U.S. patent applications, copies of prosecution materials therefrom are not provided herewith, but will be promptly provided if the Examiner so desires and requests same.

| U.S. APPLICATIONS |                  | STATUS ( <i>check one</i> ) |         |                                    |
|-------------------|------------------|-----------------------------|---------|------------------------------------|
| U.S. APPLICATIONS | U.S. FILING DATE | Patented                    | Pending | Never Issued:<br>Abandoned/Expired |
| 1.                |                  |                             |         |                                    |
| 2.                |                  |                             |         |                                    |
| 3.                |                  |                             |         |                                    |

**Copies of the Documents**

- ☒ Copies of any U.S. patents and published patent applications that are listed on the accompanying Form are not enclosed herewith. Copies of any other documents identified on the accompanying Form are enclosed herewith.
- ☒ For each document not in the English language, at least one of the following is provided: (a) an English translation in whole or in part or (b) a concise statement of relevance in the form of, for example, an English language counterpart, an English-language abstract, or an English-language version of the search report or action by a foreign patent office in a counterpart foreign application indicating the degree of relevance found by the foreign office.
- ☐ The documents listed on the accompanying Form were previously identified in the parent application(s) of the present application, and copies of the documents were furnished at that time. Accordingly, additional copies of the documents are not submitted herewith, so as not to burden the file with duplicate copies of documents. The Examiner is respectfully requested to carefully review the documents in accordance with the requirements set out in the Manual of Patent Examining Procedure. In accordance with 37 CFR 1.98(d), the details of the parent application(s) relied upon for an earlier filing date under 35 USC 120 in which copies of the documents were previously furnished are set out below:

| U.S. APPLICATIONS |                               | STATUS ( <i>check one</i> ) |         |           |
|-------------------|-------------------------------|-----------------------------|---------|-----------|
| U.S. APPLICATIONS | U.S. FILING OR<br>371(c) DATE | Patented                    | Pending | Abandoned |
| 1.                |                               |                             |         |           |
| 2.                |                               |                             |         |           |
| 3.                |                               |                             |         |           |

**Fee Calculation**

- ☒ **No fee** is owed by the applicant(s).
- ☐ IDS Fee (37 CFR 1.17(p)) \$260.00
- ☐ Applicant(s) assert(s) small entity status. Therefore, the fee shown above is reduced by 50%, and the resulting fee is shown below.
- ☐ Applicant(s) certifies/certify micro entity status. Therefore, the fee shown above is reduced by 75%, and the resulting fee is shown below. Note: Form PTO/SB15A or B must either be enclosed or have been submitted previously
- ☒ **Total Fee Due** **\$0.00**

**Fee Payment**

- ☐ Charge the indicated **Total Fee Due** to Deposit Account No. 12-1216.
- ☒ Charge any additional fees owed in connection with this communication to Deposit Account No. 12-1216.
- ☒ Credit any refund to Account No. 12-1216.

**Leydig**

/Elias P. Soupos/

Elias P. Soupos, Reg. No. 57,375

Telephone: 312-616-5600

Facsimile: 312-616-5700

Date: May 3, 2021

| <b>MAILING/TRANSMISSION CERTIFICATE UNDER 37 CFR 1.8</b>                                                                                                                                                                                                                                                                                          |                  |             |             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|-------------|
| I hereby certify that this correspondence is being facsimile transmitted to the USPTO, EFS-Web transmitted to the USPTO, or deposited with the United States Postal Service with sufficient postage in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on the date indicated below. |                  |             |             |
| <i>Name (Print/Type)</i>                                                                                                                                                                                                                                                                                                                          | Robert Holland   |             |             |
| <i>Signature</i>                                                                                                                                                                                                                                                                                                                                  | /Robert Holland/ | <i>Date</i> | May 3, 2021 |



# UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office  
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P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|-----------------------|-----------------------|------------------------|
| 16/696,383         | 11/26/2019            | Daniel R. Pearson     | 751391                 |

**CONFIRMATION NO. 6816**

161268

LEYDIG VOIT & MAYER, LTD (Klein Tools)  
TWO PRUDENTIAL PLAZA, SUITE 4900  
180 NORTH STETSON AVENUE  
CHICAGO, IL 60601-6731

## PUBLICATION NOTICE



\*OC000000125913504\*

**Title:**GLOW FISH TAPE SYSTEM

**Publication No.**US-2021-0155445-A1

**Publication Date:**05/27/2021

## NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at [www.uspto.gov](http://www.uspto.gov). The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

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May 28, 2021 04:47:27 AM

Dear PAIR Customer:

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| Application | Document | Mailroom Date | Attorney Docket No. |
|-------------|----------|---------------|---------------------|
| 16696383    | NTC.PUB  | 05/27/2021    | 751391              |

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|----------------------------------------|-------------|----------------------|---------------------|------------------|
| APPLICATION NO.                        | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 16/696,383                             | 11/26/2019  | Daniel R. Pearson    | 751391              | 6816             |
| 161268                                 | 7590        | 06/08/2022           |                     |                  |
| LEYDIG VOIT & MAYER, LTD (Klein Tools) |             |                      | EXAMINER            |                  |
| TWO PRUDENTIAL PLAZA, SUITE 4900       |             |                      | NGUYEN, HOAI AN D   |                  |
| 180 NORTH STETSON AVENUE               |             |                      |                     |                  |
| CHICAGO, IL 60601-6731                 |             |                      | ART UNIT            | PAPER NUMBER     |
|                                        |             |                      | 2858                |                  |
|                                        |             |                      | NOTIFICATION DATE   | DELIVERY MODE    |
|                                        |             |                      | 06/08/2022          | ELECTRONIC       |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

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Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

Chgpatent@leydig.com





## DETAILED ACTION

### *Notice of Pre-AIA or AIA Status*

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

### *Information Disclosure Statement*

2. The information disclosure statement (IDS) submitted on May 3, 2021 is being considered by the examiner.

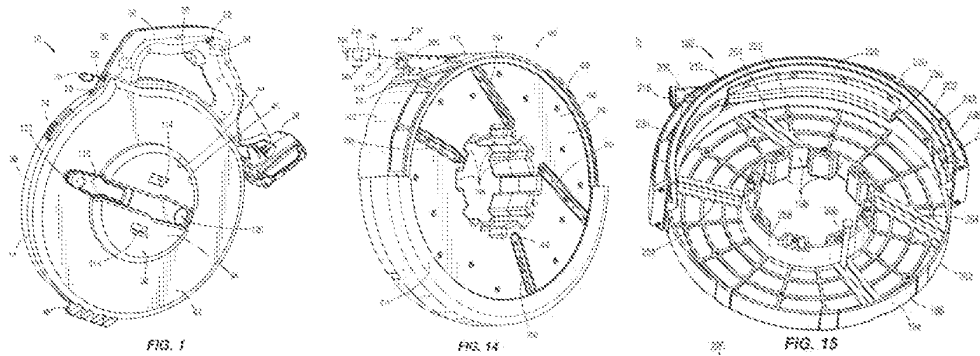
### *Claim Rejections - 35 USC § 103*

3. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.
4. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-20 are rejected under 35 U.S.C. 103 as being unpatentable over Miller et al. (US 2019/0292005 A1) in view of Farretta (US 6,293,519 B1).

Miller et al. teaches a fish tape assembly comprising:



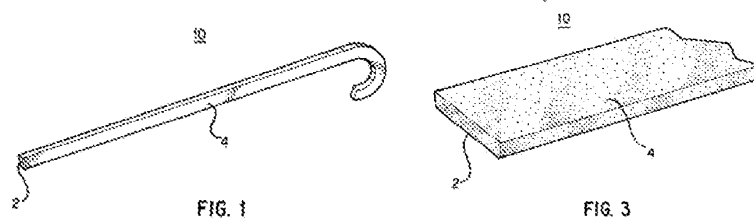
With regard to claims 1, 7 and 16, a fish tape (FIG. 14 in view of FIG. 1, fish tape 196) having a length extending from a first end (FIG. 14 in view of FIG. 1, moving end 218) to a second end (FIG. 14 in view of FIG. 1, anchor end, which is opposite of the moving end 218 and secured to the pin 266); and a donut shaped case (FIG. 14 in view of FIG. 1, fish tape drum 182) having a pair of sidewalls (FIG. 14 in view of FIG. 1, first and second clamshells 190 and 194) extending between a radially innermost wall (FIG. 15 in view of FIG. 1, inner wall 258) and a radially outermost wall (FIG. 15 in view of FIG. 1, outer wall 262), the outermost wall (FIG. 15 in view of FIG. 1, outer wall 262) having an annular opening (FIG. 14 in view of FIG. 1, the rim of the fish tape drum 182) extending around a circumference of one of the inner and outer walls (FIG. 15 in view of FIG. 1, inner wall 258 and outer wall 262), the sidewalls (FIG. 14 in view of FIG. 1, first and second clamshells 190 and 194) being spaced from each other to define a fish tape storage compartment (FIG. 14 in view of FIG. 1, drum portion 186) that stores the length of fish tape (FIG. 14 in view of FIG. 1, fish tape 196) for deployment via the annular opening (FIG. 14 in view of FIG. 1, the rim of the fish tape drum 182) in the case (FIG. 14 in view of FIG. 1, fish tape drum 182); wherein at least one of the sidewalls (FIG. 14 in view of FIG. 1, first clamshell 190) of the case (FIG. 14 in view of FIG. 1, fish tape drum 182) is transparent to allow the luminescent material to be energized by light passing through the at least one of the sidewalls

(FIG. 14 in view of FIG. 1, first clamshell 190) (For more details please read: Abstract; and paragraphs: [0047]-[0050] and [0066]-[0072]).

Miller et al. teaches all that is claimed as discussed in the above rejection of claims 1-7 and 10-14 including the length extending from a first end (FIG. 14 in view of FIG. 1, moving end 218) to a second end (FIG. 14 in view of FIG. 1, anchor end, which is opposite of the moving end 218 and secured to the pin 266), but it does not specifically teach the following feature:

- The length of the fish tape comprising a luminescent material that emits light after being energized by exposure to a light source.

Farretta teaches a luminous snake comprising:



With regard to claims 1, 7 and 16, fish tape (FIG. 1, flexible core strip 2) comprising a luminescent material (FIG. 3 in view of FIG. 1, phosphorescent coating 4) that emits light after being energized by exposure to a light source (From page 9, line 31 to page 10, line 25).

Therefore, it would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to modify the fish tape assembly of Miller et al. to utilize a fish tape comprising a luminescent material that emits light after being energized by exposure to a light source as taught by Farretta since Farretta teaches that such an arrangement is beneficial to provide a fish tape assembly that is visible and easy to locate in the low light

environments of ducts, wall cavities and other passages used to house electrical wiring as disclosed in column 1, lines 8-13.

With regard to claims 2, 3, 8-10, 13, 18 and 19, as Miller et al. teaches one of the sidewalls (FIG. 14 in view of FIG. 1, first clamshell 190) of the case (FIG. 14 in view of FIG. 1, fish tape drum 182) is transparent, these claims do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements in respect of inventive step. The additional features of these claims relate to slight modifications in the switching apparatus according to claims 1, 7 and 16 that lie in the scope of what someone skilled in the art is accustomed to performing based on well-known considerations common and commercially available to those skilled in the art. Therefore, it would be easy for a person skilled in the art to conceive of applying these features to the fish tape assembly of Miller et al. according to claims 1, 7 and 16 to take advantage of the physical property of the transparent material to allow the luminescent material to be energized by light passing through the walls.

With regard to claims 4, 11 and 20, Miller et al. teaches one of the sidewalls (FIG. 14 in view of FIG. 1, first clamshell 190) and portions of the innermost and outermost walls (FIG. 15 in view of FIG. 1, inner wall 258 and outer wall 262) are defined by a first component (FIG. 14 in view of FIG. 1, right half of the fish tape drum 182) of the case (FIG. 14 in view of FIG. 1, fish tape drum 182), and the other of the sidewalls (FIG. 14 in view of FIG. 1, second clamshell 194) and other portions of the innermost and outermost walls (FIG. 15 in view of FIG. 1, inner wall 258 and outer wall 262) are defined by a second component (FIG. 15 in view of FIG. 1, left half of the fish tape drum 182) of the case (FIG. 14 in view of FIG. 1, fish tape drum 182), the first and second components being assembled together to form the storage compartment (FIG. 14 in view of FIG. 1, drum portion 186).

With regard to claims 5 and 14, Miller et al. teaches a handle (FIG. 1, handle 56) engaged with the case (FIG. 14 in view of FIG. 1, fish tape drum 182) for sliding movement along the circumference of the outer wall (FIG. 15 in view of FIG. 1, outer wall 262), the handle (FIG. 1, handle 56) engageable with the fish tape (FIG. 14 in view of FIG. 1, fish tape 196) to deploy the fish tape (FIG. 14 in view of FIG. 1, fish tape 196) from the storage compartment (FIG. 14 in view of FIG. 1, drum portion 186) and to reload the fish tape (FIG. 14 in view of FIG. 1, fish tape 196) into the compartment (FIG. 14 in view of FIG. 1, drum portion 186).

With regard to claims 6 and 15, Miller et al. discloses that the fish tape (FIG. 14 in view of FIG. 1, fish tape 196) comprises the first end (FIG. 14 in view of FIG. 1, moving end 218) to the second end (FIG. 14 in view of FIG. 1, anchor end, which is opposite of the moving end 218 and secured to the pin 266), wherein the anchor end (FIG. 30, anchor end 370) is a connector looped over the pin 266 and welded to itself at a weld point 374. It is noted that these claims do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements in respect of inventive step. The additional feature, “a threaded opening in at least one of the first and second ends”, of these claims relates to slight modifications of the connector at the second end (FIG. 14 in view of FIG. 1, anchor end, which is opposite of the moving end 218 and secured to the pin 266) according to claims 1, 7 and 16 that lie in the scope of what someone skilled in the art is accustomed to performing based on well-known considerations common and commercially available to those skilled in the art. Therefore, it would be easy for a person skilled in the art to conceive of applying this feature to the fish tape assembly of Miller et al. according to claims 1, 7 and 16 to take advantage of desirable and exemplary choices for a specific configuration of a threaded opening in at least one of the first and second ends.

With regard to claim 12, at least one of the first and second components (FIG. 14 in view of FIG. 1, right half of the fish tape drum 182) comprises a transparent material (first clamshell 190 is clear plastic) (Paragraph: [0076]).

With regard to claim 17, the storage compartment (FIG. 14 in view of FIG. 1, drum portion 186) has an annular shape bounded by a pair of spaced sidewalls (FIG. 14 in view of FIG. 1, first and second clamshells 190 and 194).

### *Conclusion*

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant's attention is invited to the followings whose inventions disclose similar devices.

- Moffatt et al. (US 2015/0330771 A1) teaches a .
- Patterson (US 2009/0257221 A1) teaches a screw on lighted end attachment for use with a flexible snake.
- Radle et al. (US 2006/0065883 A1) teaches a fish tape assembly used by electricians to pull wire through conduit or other spaces, includes fish tape mounted to fish reel and made of electrically non-conductive material having a rectilinear cross-section.
- Konen (US 2005/0062028 A1) teaches a fish tape handle with continuous belt.
- Tucker (US 6,433,703 B1) teaches a fishing reel signaling device.
- Minobe (US 3,601,330 A) teaches a fish tape with adjustable tape engaging lips.

### CONTACT INFORMATION

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HOAI-AN D. NGUYEN whose telephone number is (571) 272-2170. The examiner can normally be reached MON-THURS (7:00 AM - 5:00 PM).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, PATRICK J. ASSOUD can be reached on 571-272-2210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HOAI-AN D. NGUYEN  
Primary Examiner  
Art Unit 2858

/HOAI-AN D. NGUYEN/  
Primary Examiner, Art Unit 2858

|                                          |                                       |  |                                                                  |             |
|------------------------------------------|---------------------------------------|--|------------------------------------------------------------------|-------------|
| <b><i>Notice of References Cited</i></b> | Application/Control No.<br>16/696,383 |  | Applicant(s)/Patent Under<br>Reexamination<br>Pearson, Daniel R. |             |
|                                          | Examiner<br>HOAI-AN D NGUYEN          |  | Art Unit<br>2858                                                 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Name                  | CPC Classification | US Classification |
|---|---|--------------------------------------------------|-----------------|-----------------------|--------------------|-------------------|
| * | A | US-20190292005-A1                                | 09-2019         | Miller; Justin        | B65H75/4428        | 1/1               |
| * | B | US-6433703-B1                                    | 08-2002         | Tucker; Thomas L.     | A01K89/0102        | 340/815.5         |
| * | C | US-3601330-A                                     | 08-1971         | Minobe; Mickey M.     | H02G11/02          | 242/405.1         |
| * | D | US-20150330771-A1                                | 11-2015         | Moffatt; Wilbur Keith | G01B11/022         | 356/634           |
| * | E | US-20090257221-A1                                | 10-2009         | Patterson; Jason      | H02G1/081          | 362/362           |
| * | F | US-20060065883-A1                                | 03-2006         | Radle; Patrick J.     | H02G11/02          | 254/134.3FT       |
| * | G | US-20050062028-A1                                | 03-2005         | Konen, Bruce P.       | H02G11/02          | 254/134.3FT       |
|   | H |                                                  |                 |                       |                    |                   |
|   | I |                                                  |                 |                       |                    |                   |
|   | J |                                                  |                 |                       |                    |                   |
|   | K |                                                  |                 |                       |                    |                   |
|   | L |                                                  |                 |                       |                    |                   |
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**FOREIGN PATENT DOCUMENTS**

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|---|---|--------------------------------------------------|-----------------|---------|------|--------------------|
|   | N |                                                  |                 |         |      |                    |
|   | O |                                                  |                 |         |      |                    |
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\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
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|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------|
| <b><i>Search Notes</i></b><br> | <b>Application/Control No.</b><br>16/696,383 | <b>Applicant(s)/Patent Under Reexamination</b><br>Pearson, Daniel R. |
|                                                                                                                 | <b>Examiner</b><br>HOAI-AN D NGUYEN          | <b>Art Unit</b><br>2858                                              |

| CPC - Searched*                              |            |          |
|----------------------------------------------|------------|----------|
| Symbol                                       | Date       | Examiner |
| B65H75/00, 02, 34, 36, 362, 364, 38, 40, 406 | 05/31/2022 | HADN     |
| B65H2701/00, 30, 37, 376                     | 05/31/2022 | HADN     |
| H02G11/00, 006, 02, 06, 08, 083, 085         | 05/31/2022 | HADN     |

| CPC Combination Sets - Searched* |      |          |
|----------------------------------|------|----------|
| Symbol                           | Date | Examiner |
|                                  |      |          |

| US Classification - Searched* |                 |            |          |
|-------------------------------|-----------------|------------|----------|
| Class                         | Subclass        | Date       | Examiner |
| 254                           | 134.3R, 134.3FT | 05/31/2022 | HADN     |

\* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

| Search Notes                |            |          |
|-----------------------------|------------|----------|
| Search Notes                | Date       | Examiner |
| Considered IDS.             | 05/31/2022 | HADN     |
| Inventor's name searched.   | 05/31/2022 | HADN     |
| Text search in PE2E SEARCH. | 05/31/2022 | HADN     |
|                             | 06/01/2022 | HADN     |
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| <b><i>Search Notes</i></b><br> | <b>Application/Control No.</b><br>16/696,383 | <b>Applicant(s)/Patent Under Reexamination</b><br>Pearson, Daniel R. |
|                                                                                                                 | <b>Examiner</b><br>HOAI-AN D NGUYEN          | <b>Art Unit</b><br>2858                                              |

| Interference Search                   |                       |            |          |
|---------------------------------------|-----------------------|------------|----------|
| US Class/CPC Symbol                   | US Subclass/CPC Group | Date       | Examiner |
| Interference Search History Printout. |                       | 05/31/2022 | HADN     |

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# PE2E SEARCH - Search History (Prior Art)

| Ref # | Hits | Search Query                                                         | DBs                                                                                                                                                                                                                                                                                                                  | Default Operator | Plurals | British Equivalents | Time Stamp          |
|-------|------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------|---------------------|---------------------|
| L1    | 4    | "20210155445"                                                        | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2022/05/31 10:24 AM |
| L2    | 317  | (Pearson near2 Daniel).inv.                                          | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2022/05/31 10:28 AM |
| L3    | 11   | ("6,293,519" OR "20040206529" OR "20090257221" OR "20170213431").pn. | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2022/05/31 10:35 AM |
| L4    | 7    | ep-1914508-\$.did.                                                   | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU,                                                                                                                                                                                                                                        | OR               | ON      | ON                  | 2022/05/31 10:52 AM |

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|    |      |                                     | CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                               |    |    |    |                     |
| L5 | 3    | jp-2001174202-\$.did.               | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 10:53 AM |
| L6 | 1282 | (B65H75/00.cpc.) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 11:58 AM |
| L7 | 983  | (B65H75/02.cpc.) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN,                                        | OR | ON | ON | 2022/05/31 11:59 AM |

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|-----|------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
|     |      |                                         | WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                                                                                                                      |    |    |    |                        |
| L8  | 1128 | (B65H75/34.cpc.) AND<br>@ad<"20191126"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>11:59 AM |
| L9  | 4090 | (B65H75/38.cpc.) AND<br>@ad<"20191126"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>11:59 AM |
| L10 | 2909 | (B65H75/40.cpc.) AND<br>@ad<"20191126"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>11:59 AM |
| L11 | 1991 | (B65H75/406.cpc.) AND<br>@ad<"20191126" | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,                                                                                                                                                                                                                                                     | OR | ON | ON | 2022/05/31<br>11:59 AM |

|     |      |                                      |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|     |      |                                      | EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                   |    |    |    |                     |
| L12 | 1191 | (B65H75/36.cpc.) AND @ad<"20191126"  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 03:23 PM |
| L13 | 852  | (B65H75/362.cpc.) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 03:24 PM |
| L14 | 1450 | (B65H75/364.cpc.) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;                        | OR | ON | ON | 2022/05/31 03:24 PM |

|     |      |                                           |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
|-----|------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
|     |      |                                           | JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                                                                                                                                         |    |    |    |                        |
| L15 | 28   | (B65H2701/00.cpc.)<br>AND @ad<"20191126"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>03:26 PM |
| L16 | 424  | (B65H2701/30.cpc.)<br>AND @ad<"20191126"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>03:26 PM |
| L17 | 3881 | (B65H2701/37.cpc.)<br>AND @ad<"20191126"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>03:26 PM |
| L18 | 312  | (B65H2701/376.cpc.)<br>AND @ad<"20191126" | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,                                                                                                                                                                                                                          | OR | ON | ON | 2022/05/31<br>03:27 PM |



|     |       |                                      |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|-------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|     |       |                                      | HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                           |    |    |    |                     |
| L19 | 11544 | (H02G11/00.cpc.) AND @ad<"20191126"  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 03:30 PM |
| L20 | 9021  | (H02G11/006.cpc.) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 03:30 PM |
| L21 | 16219 | (H02G11/02.cpc.) AND @ad<"20191126"  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT;          | OR | ON | ON | 2022/05/31 03:31 PM |

|     |      |                                     |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|     |      |                                     | IBM_TDB)                                                                                                                                                                                                                                                                                                             |    |    |    |                     |
| L22 | 7010 | (H02G1/06.cpc.) AND @ad<"20191126"  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 03:39 PM |
| L23 | 6928 | (H02G1/08.cpc.) AND @ad<"20191126"  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 03:40 PM |
| L24 | 1028 | (H02G1/083.cpc.) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 03:40 PM |
| L25 | 1567 | (H02G1/085.cpc.) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,                                                                                                                                                                    | OR | ON | ON | 2022/05/31 03:47 PM |

|     |      |                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|     |      |                                                                                                                                                                                                        | IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                   |    |    |    |                     |
| L26 | 1132 | (254/134.3R.ccls.) AND @ad<"20191126"                                                                                                                                                                  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 04:01 PM |
| L27 | 548  | (254/134.3FT.ccls.) AND @ad<"20191126"                                                                                                                                                                 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 04:01 PM |
| L28 | 4    | I2 AND (((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 04:28 PM |

|     |   |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L29 | 2 | (L6 L7 L8 L9 L10 L11 L12 L13 L14) AND (((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 04:43 PM |
| L30 | 2 | (L15 L16 L17 L18) AND (((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location)))                 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 04:44 PM |
| L31 | 0 | (L19 L20 L21) AND (((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location)))                     | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 04:48 PM |
| L32 | 4 | (L26 L27) AND (((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location)))                         | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,                                                                                                                        | OR | ON | ON | 2022/05/31 04:56 PM |

|     |      |                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|     |      | location)))                                                                                                                                                                                                                                                                | NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                               |    |    |    |                     |
| L33 | 6512 | (H02G1/00.cpc.) AND @ad<"20191126"                                                                                                                                                                                                                                         | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 04:57 PM |
| L34 | 5    | (L22 L23 L24 L25 L33) AND (((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location)))                                                  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 04:58 PM |
| L35 | 3    | L28 AND (((fish flex\$3) adj2 tape) WITH (luminescent adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH (light adj2 (source supply generat\$3 pump gun input))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 05:12 PM |
| L36 | 0    | L29 AND (((fish flex\$3)                                                                                                                                                                                                                                                   | (US-PGPUB; USPAT;                                                                                                                                                                                                                                                                                                    | OR | ON | ON | 2022/05/31          |

|     |   |                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
|-----|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
|     |   | adj2 tape) WITH<br>(luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH (light<br>adj2 (source supply<br>generat\$3 pump gun<br>input)))                             | USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                      |    |    |    | 05:12 PM               |
| L37 | 0 | L30 AND (((fish flex\$3)<br>adj2 tape) WITH<br>(luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH (light<br>adj2 (source supply<br>generat\$3 pump gun<br>input))) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>05:12 PM |
| L38 | 0 | L32 AND (((fish flex\$3)<br>adj2 tape) WITH<br>(luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH (light<br>adj2 (source supply<br>generat\$3 pump gun<br>input))) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>05:13 PM |
| L39 | 0 | L34 AND (((fish flex\$3)<br>adj2 tape) WITH<br>(luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen                                                                                     | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,                                                                                                                      | OR | ON | ON | 2022/05/31<br>05:13 PM |

|     |   |                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
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|     |   | compound)) WITH (light<br>adj2 (source supply<br>generat\$3 pump gun<br>input)))                                                                                                                                                                                                                                                                   | PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                                                 |    |    |    |                        |
| L40 | 0 | (L6 L7 L8 L9 L10 L11<br>L12 L13 L14) AND<br>(((fish flex\$3) adj2 tape)<br>WITH (luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH (light<br>adj2 (source supply<br>generat\$3 pump gun<br>input))) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>05:14 PM |
| L41 | 0 | (L15 L16 L17 L18) AND<br>(((fish flex\$3) adj2 tape)<br>WITH (luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH (light<br>adj2 (source supply<br>generat\$3 pump gun<br>input)))                    | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>05:15 PM |
| L42 | 0 | (L19 L20 L21) AND<br>(((fish flex\$3) adj2 tape)<br>WITH (luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH (light<br>adj2 (source supply<br>generat\$3 pump gun<br>input)))                        | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>05:15 PM |
| L43 | 0 | (L22 L23 L24 L25 L33)<br>AND (((fish flex\$3) adj2                                                                                                                                                                                                                                                                                                 | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,                                                                                                                                                                                                                                                                                                                          | OR | ON | ON | 2022/05/31<br>05:16 PM |

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|     |   | tape) WITH<br>(luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH (light<br>adj2 (source supply<br>generat\$3 pump gun<br>input)))                                                                                                                                                                                                                                                                                                          | AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                             |    |    |    |                        |
| L44 | 0 | (L26 L27) AND (((fish<br>flex\$3) adj2 tape) WITH<br>(luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH (light<br>adj2 (source supply<br>generat\$3 pump gun<br>input)))                                                                                                                                                                                                                                                                   | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>05:17 PM |
| L45 | 3 | L35 AND (((donut ring<br>circle doughnut annulus<br>circular annular) adj2<br>(frame fixture structure<br>form shap\$3 enclose<br>receptacle container<br>holder reservoir<br>enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore bore wall)<br>WITH radial\$2 WITH<br>(hole opening aperture<br>orifice outlet entrance<br>port recess window<br>through thru) WITH<br>(circumference<br>perimeter border<br>borderline (boundary<br>adj2 line) delimitation)) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>05:44 PM |
| L46 | 4 | (L6 L7 L8 L9 L10 L11<br>L12 L13 L14) AND<br>(((donut ring circle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,                                                                                                                                                                                                                                                                                                   | OR | ON | ON | 2022/05/31<br>05:48 PM |



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|     |   | doughnut annulus<br>circular annular) adj2<br>(frame fixture structure<br>form shap\$3 enclose<br>receptacle container<br>holder reservoir<br>enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore bore wall)<br>WITH radial\$2 WITH<br>(hole opening aperture<br>orifice outlet entrance<br>port recess window<br>through thru) WITH<br>(circumference<br>perimeter border<br>borderline (boundary<br>adj2 line) delimitation))                                                  | CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                    |    |    |    |                        |
| L47 | 1 | (L15 L16 L17 L18) AND<br>(((donut ring circle<br>doughnut annulus<br>circular annular) adj2<br>(frame fixture structure<br>form shap\$3 enclose<br>receptacle container<br>holder reservoir<br>enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore bore wall)<br>WITH radial\$2 WITH<br>(hole opening aperture<br>orifice outlet entrance<br>port recess window<br>through thru) WITH<br>(circumference<br>perimeter border<br>borderline (boundary<br>adj2 line) delimitation)) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>05:48 PM |
| L48 | 4 | (L19 L20 L21) AND<br>(((donut ring circle<br>doughnut annulus<br>circular annular) adj2<br>(frame fixture structure<br>form shap\$3 enclose<br>receptacle container<br>holder reservoir<br>enclosure infrastructure                                                                                                                                                                                                                                                                                                                                                                                        | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,                                                                                                                                             | OR | ON | ON | 2022/05/31<br>05:48 PM |

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|     |   | chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore bore wall)<br>WITH radial\$2 WITH<br>(hole opening aperture<br>orifice outlet entrance<br>port recess window<br>through thru) WITH<br>(circumference<br>perimeter border<br>borderline (boundary<br>adj2 line) delimitation))                                                                                                                                                                                                                                | NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                          |    |    |    |                        |
| L49 | 1 | (L22 L23 L24 L25 L33)<br>AND (((donut ring circle<br>doughnut annulus<br>circular annular) adj2<br>(frame fixture structure<br>form shap\$3 enclose<br>receptacle container<br>holder reservoir<br>enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore bore wall)<br>WITH radial\$2 WITH<br>(hole opening aperture<br>orifice outlet entrance<br>port recess window<br>through thru) WITH<br>(circumference<br>perimeter border<br>borderline (boundary<br>adj2 line) delimitation)) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>05:49 PM |
| L50 | 0 | (L26 L27) AND (((donut<br>ring circle doughnut<br>annulus circular<br>annular) adj2 (frame<br>fixture structure form<br>shap\$3 enclose<br>receptacle container<br>holder reservoir<br>enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore bore wall)                                                                                                                                                                                                                                | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>05:49 PM |

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|-----|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|     |   | WITH radial\$2 WITH (hole opening aperture orifice outlet entrance port recess window through thru) WITH (circumference perimeter border borderline (boundary adj2 line) delimitation))                                                                       |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
| L51 | 3 | L45 AND ((sidewall sidebore bore wall) WITH (clear transparent crystal) WITH (luminescent adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH light) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 05:58 PM |
| L52 | 0 | L46 AND ((sidewall sidebore bore wall) WITH (clear transparent crystal) WITH (luminescent adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH light) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 05:58 PM |
| L53 | 0 | L47 AND ((sidewall sidebore bore wall) WITH (clear transparent crystal) WITH (luminescent adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH light) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 05:58 PM |

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|-----|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L54 | 0    | L48 AND ((sidewall sidebore bore wall) WITH (clear transparent crystal) WITH (luminescent adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH light) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 05:58 PM |
| L55 | 0    | L49 AND ((sidewall sidebore bore wall) WITH (clear transparent crystal) WITH (luminescent adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH light) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 05:59 PM |
| L56 | 20   | ((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location))) AND @ad<"20191126"                                             | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 06:00 PM |
| L58 | 6920 | ((donut ring circle doughnut annulus circular annular) adj2 (frame fixture structure form shap\$3 enclose receptacle container holder reservoir enclosure infrastructure chassis housing house                                                                | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,                                                                                                                        | OR | ON | ON | 2022/05/31 06:00 PM |

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|-----|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
|     |     | framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore bore wall)<br>WITH radial\$2 WITH<br>(hole opening aperture<br>orifice outlet entrance<br>port recess window<br>through thru) WITH<br>(circumference<br>perimeter border<br>borderline (boundary<br>adj2 line) delimitation))<br>AND @ad<"20191126" | NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                          |    |    |    |                        |
| L59 | 831 | ((sidewall sidebore bore<br>wall) WITH (clear<br>transparent crystal)<br>WITH (luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH light)<br>AND @ad<"20191126"                                                                 | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>06:01 PM |
| L60 | 0   | (((((fish flex\$3) adj2 tape)<br>WITH luminescent<br>WITH (light adj2<br>(source supply<br>generat\$3 pump gun<br>input))) AND<br>@ad<"20191126"                                                                                                                                                                                                                             | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/05/31<br>06:02 PM |
| L61 | 0   | (((((fish flex\$3) adj2 tape)<br>WITH luminescen\$2<br>WITH (light adj2<br>(source supply<br>generat\$3 pump gun<br>input))) AND<br>@ad<"20191126"                                                                                                                                                                                                                           | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,                                                                                                                                             | OR | ON | ON | 2022/05/31<br>06:03 PM |

|     |   |                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
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|     |   |                                                                                                                                                                                                                                                                                      | NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                               |    |    |    |                     |
| L62 | 0 | ((fish flex\$3) adj2 tape) WITH (luminescent adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH (light adj2 (source supply generat\$3 pump gun input))) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 06:04 PM |
| L63 | 0 | L56 AND I58 AND L59                                                                                                                                                                                                                                                                  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 06:05 PM |
| L64 | 0 | L56 AND L58                                                                                                                                                                                                                                                                          | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 06:05 PM |
| L65 | 0 | L56 AND L59                                                                                                                                                                                                                                                                          | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31          |

|     |       |                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
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|     |       |                                                                                                                                                                                                                                                                                                                       | USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                   |    |    |    | 06:05 PM            |
| L66 | 0     | L58 AND L59                                                                                                                                                                                                                                                                                                           | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 06:05 PM |
| L68 | 193   | ((snak\$3 tap\$3 chain) WITH ((luminescen\$3 luminous phosphorescent visible) adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH (light adj2 (source supply generat\$3 pump gun input))) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 11:13 PM |
| L69 | 17561 | ((snak\$3 tap\$3 chain) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location))) AND @ad<"20191126"                                                                                                        | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL,                                                                                                    | OR | ON | ON | 2022/05/31 11:14 PM |

|     |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
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|     |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                                                   |    |    |    |                     |
| L70 | 1570 | ((sidewall sidebore bore wall) WITH (clear transparent crystal) WITH ((luminescen\$3 luminous phosphorescent visible) adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH light) AND @ad<"20191126"                                                                                                                                                                                                                     | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 11:22 PM |
| L71 | 6920 | ((((donut ring circle doughnut annulus circular annular) adj2 (frame fixture structure form shap\$3 enclose receptacle container holder reservoir enclosure infrastructure chassis housing house framework shell chamber tank envelope box case tube cassette socket body cavity)) WITH (sidewall sidebore bore wall) WITH radial\$2 WITH (hole opening aperture orifice outlet entrance port recess window through thru) WITH (circumference perimeter border borderline (boundary adj2 line) delimitation)) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 11:25 PM |
| L72 | 0    | L68 AND L69 AND L70 AND L71                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL,                                                                                                    | OR | ON | ON | 2022/05/31 11:26 PM |



|     |   |                     |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
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|     |   |                     | PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                                                   |    |    |    |                     |
| L73 | 0 | L68 AND L69 AND L70 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 11:27 PM |
| L74 | 0 | L68 AND L69 AND L71 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 11:27 PM |
| L75 | 0 | L68 AND L70 AND L71 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 11:27 PM |
| L76 | 0 | L69 AND L70 AND L71 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT,                                                                                                                                                                                                                                                                                | OR | ON | ON | 2022/05/31 11:27 PM |

|     |   |             |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
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|     |   |             | AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                       |    |    |    |                     |
| L77 | 0 | L68 AND L69 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 11:27 PM |
| L78 | 2 | L68 AND L70 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 11:27 PM |
| L79 | 0 | L68 AND L71 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE,                                                                                | OR | ON | ON | 2022/05/31 11:28 PM |

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|     |   |                                  | SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                                                                       |    |    |    |                     |
| L80 | 0 | L69 AND L70                      | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 11:28 PM |
| L81 | 8 | L69 AND L71                      | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 11:28 PM |
| L82 | 0 | L70 AND L71                      | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/31 11:28 PM |
| L86 | 5 | ("7565751" OR "20080086902").pn. | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY,                                                                                                                                                                                                                                                            | OR | ON | ON | 2022/06/01 10:34 AM |

|     |       |                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
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|     |       |                                                                                                                                                                                                                                                                                                                                                                         | CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                           |    |    |    |                     |
| L87 | 32    | ("3,606,402" OR "3,600,011" OR "3,181,897").pn.                                                                                                                                                                                                                                                                                                                         | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 12:06 PM |
| L88 | 938   | ((snak\$3 tap\$3 chain reel bobbin spool winder roll\$3 rotat\$3 spin\$4) WITH ((luminescen\$3 luminous phosphorescent visible) adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH (light adj2 (source supply generat\$3 pump gun input))) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 12:14 PM |
| L89 | 96735 | ((snak\$3 tap\$3 chain reel bobbin spool winder roll\$3 rotat\$3 spin\$) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH                                                                                                                                                                                 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,                                                                                                                        | OR | ON | ON | 2022/06/01 01:53 PM |

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|     |        | (second adj2 (end\$3 terminal point node location))) AND @ad<"20191126"                                                                                                                                                                                                                                                                                                                                       | NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                               |    |    |    |                     |
| L90 | 512681 | (((((feed\$3 guid\$3 fish\$3 push\$3 pull\$3 direct\$3 rout\$3) near2 (lead conduct\$3 strip\$3 wir\$3 cord\$3 cabl\$3 line trace (transmiss\$5 adj2 (line medium path channel link trace wir\$3)))))) WITH (cavity ceiling trusses attic trailer studs conduit pipe wall frame region space structure)) WITH (snak\$3 tap\$3 chain reel bobbin spool winder roll\$3 rotat\$3 spin\$)) AND @ad<"20191126"     | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 02:03 PM |
| L91 | 350596 | ((((donut ring circle doughnut annulus circular annular) adj2 (frame fixture structure form shap\$3 enclose receptacle container holder reservoir enclosure infrastructure chassis housing house framework shell chamber tank envelope box case tube cassette socket body cavity)) WITH (sidewall sidebore bore wall) WITH (innermost inner inward inmost) WITH (outermost outer outmost)) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 02:09 PM |
| L92 | 0      | L88 AND L89 AND L90 AND L91                                                                                                                                                                                                                                                                                                                                                                                   | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH,                                                            | OR | ON | ON | 2022/06/01 02:10 PM |

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|     |    |                     | TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                                                                                           |    |    |    |                     |
| L93 | 0  | L88 AND L89 AND L90 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 02:10 PM |
| L94 | 0  | L88 AND L89 AND L91 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 02:11 PM |
| L95 | 0  | L88 AND L90 AND L91 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 02:11 PM |
| L96 | 64 | L89 AND L90 AND L91 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU,                                                                                                                                                                                                                                        | OR | ON | ON | 2022/06/01 02:11 PM |

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|     |    |             | CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                               |    |    |    |                     |
| L97 | 0  | L88 AND L89 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 02:12 PM |
| L98 | 11 | L88 AND L90 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 02:12 PM |
| L99 | 0  | L88 AND L91 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN,                                        | OR | ON | ON | 2022/06/01 02:12 PM |

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|      |       |                                                                                                                        | WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                                                                                                                      |    |    |    |                        |
| L100 | 3556  | L89 AND L90                                                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/06/01<br>02:12 PM |
| L101 | 815   | L89 AND L91                                                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/06/01<br>02:13 PM |
| L102 | 7271  | L90 AND L91                                                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/06/01<br>02:13 PM |
| L104 | 61549 | ((snak\$3 tap\$3 chain<br>reel bobbin spool<br>winder roll\$3 rotat\$3<br>spin\$) adj2 (assembly<br>unit system device | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,                                                                                                                                                                                                                                                     | OR | ON | ON | 2022/06/01<br>03:41 PM |



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|      |     | apparatus machine<br>mechanism means<br>module instrument tool<br>equipment structure<br>arrangement)) WITH<br>(((feed\$3 guid\$3 fish\$3<br>push\$3 pull\$3 direct\$3<br>rout\$3) near2 (lead<br>conduct\$3 strip\$3 wir\$3<br>cord\$3 cabl\$3 line trace<br>(transmiss\$5 adj2 (line<br>medium path channel<br>link trace wir\$3)))<br>WITH (cavity ceiling<br>trusses attic trailer<br>studs conduit pipe wall<br>frame region space<br>structure))) AND<br>@ad<"20191126"                           | EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                  |    |    |    |                        |
| L105 | 732 | L104 AND L91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/06/01<br>03:42 PM |
| L106 | 772 | (((donut ring circle<br>doughnut annulus<br>circular annular) adj2<br>(frame fixture structure<br>form shap\$3 enclose<br>receptacle container<br>holder reservoir<br>enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore) WITH<br>((innermost inner<br>inward inmost) adj2<br>(bore wall)) WITH<br>((outermost outer<br>outmost) adj2 (bore<br>wall))) AND<br>@ad<"20191126" | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/06/01<br>03:44 PM |

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| L107 | 0        | L104 AND L106                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 03:44 PM |
| L108 | 185      | ((donut ring circle doughnut annulus circular annular) adj2 (frame fixture structure form shap\$3 enclose receptacle container holder reservoir enclosure infrastructure chassis housing house framework shell chamber tank envelope box case tube cassette socket body cavity)) WITH (sidewall sidebore) WITH (((innermost inner inward inmost) adj2 (bore wall)) WITH ((outermost outer outmost) adj2 (bore wall)) WITH (snak\$3 tap\$3 chain reel bobbin spool winder roll\$3 rotat\$3 spin\$)) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 03:46 PM |
| L109 | 17134851 | ((frame fixture structure form shap\$3 enclose receptacle container holder reservoir enclosure infrastructure chassis housing house framework shell chamber tank envelope box case tube cassette socket body cavity) WITH (sav\$3 stor\$3 put\$4 load\$3 preserv\$3 contain\$3 deposit\$3 receiv\$3 reserv\$3 fill\$3 stock\$3 wind\$3 wrap\$4 roll\$3) WITH (tape lead                                                                                                                                               | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 09:49 PM |

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|      |     | conduct\$3 strip\$3 wir\$3<br>cord\$3 cabl\$3 line trace<br>(transmiss\$5 adj2 (line<br>medium path channel<br>link trace wir\$3)))) AND<br>@ad<"20191126"                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
| L110 | 0   | L104 AND L108                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/06/01<br>09:51 PM |
| L111 | 64  | L109 AND L108                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/06/01<br>09:51 PM |
| L112 | 168 | ((((donut ring circle<br>doughnut annulus<br>circular annular) adj2<br>(frame fixture structure<br>form shap\$3 enclose<br>receptacle container<br>holder reservoir<br>enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (tape lead<br>conduct\$3 strip\$3 wir\$3<br>cord\$3 cabl\$3 line trace<br>(transmiss\$5 adj2 (line<br>medium path channel<br>link trace wir\$3)))) WITH | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/06/01<br>10:08 PM |

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|      |        | (sidewall sidebore)<br>WITH ((innermost inner<br>inward inmost) adj2<br>(bore wall)) WITH<br>((outermost outer<br>outmost) adj2 (bore<br>wall))) AND<br>@ad<"20191126"                                                                                         |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
| L113 | 793217 | ((((snak\$3 tap\$3 chain<br>reel bobbin spool<br>winder roll\$3 rotat\$3<br>spin\$) adj2 (assembly<br>unit system device<br>apparatus machine<br>mechanism means<br>module instrument tool<br>equipment structure<br>arrangement)) .ti.) AND<br>@ad<"20191126" | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/06/01<br>10:13 PM |
| L114 | 4      | L113 AND L106                                                                                                                                                                                                                                                  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/06/01<br>10:13 PM |
| L115 | 7279   | L113 AND L104                                                                                                                                                                                                                                                  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/06/01<br>10:15 PM |

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| L116 | 5555  | L109 AND L115                                                                                                                                                                | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 10:15 PM |
| L117 | 50    | L89 AND L116                                                                                                                                                                 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 10:16 PM |
| L118 | 97966 | ((snak\$3 tap\$3 reel) adj2 (assembly unit system device apparatus machine mechanism means module instrument tool equipment structure arrangement)) .ti.) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 11:12 PM |
| L119 | 1083  | L118 AND L104                                                                                                                                                                | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,                                                                                                                        | OR | ON | ON | 2022/06/01 11:12 PM |

|      |     |               |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|-----|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |     |               | NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                               |    |    |    |                     |
| L120 | 0   | L118 AND L106 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 11:13 PM |
| L121 | 827 | L109 AND L119 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 11:13 PM |
| L122 | 7   | L89 AND L121  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 11:14 PM |
| L123 | 0   | L112 AND L121 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01          |

|      |    |                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |    |                                                                                                                                                                                 | USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                   |    |    |    | 11:16 PM            |
| L125 | 8  | L91 AND L121                                                                                                                                                                    | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/01 11:19 PM |
| L126 | 58 | ((fish adj2 (tape taping) adj2 (assembly unit system device apparatus machine mechanism means module instrument tool equipment structure arrangement)) .ti.) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/02 08:01 AM |
| L127 | 0  | L112 AND L126                                                                                                                                                                   | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL,                                                                                                    | OR | ON | ON | 2022/06/02 08:05 AM |

|      |    |                                                                         |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|----|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |    |                                                                         | PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                                                   |    |    |    |                     |
| L128 | 33 | L109 AND L126                                                           | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/02 08:06 AM |
| L129 | 0  | L128 AND L70                                                            | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/02 08:13 AM |
| L130 | 2  | L128 AND (sidewall sidebore bore wall) WITH (clear transparent crystal) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/02 08:14 AM |
| L131 | 2  | L128 AND (clear transparent crystal)                                    | (US-PGPUB; USPAT; USOCR; FIT (AP, AT,                                                                                                                                                                                                                                                                                | OR | ON | ON | 2022/06/02 08:49 AM |



|      |    |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |    |                                                                                                                                                                         | AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                       |    |    |    |                     |
| L132 | 3  | L126 AND (clear transparent crystal)                                                                                                                                    | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/02 08:50 AM |
| L133 | 43 | ("8,651,459" OR "4,092,780" OR "4,242,574" OR "4,092,780" OR "4,747,215" OR "5,142,793" OR "7150448" OR "20060065883" OR "20050062028" OR "5,423,516" OR "6416040").pn. | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/02 10:37 AM |
| L137 | 0  | L133 AND (sidewall sidebore bore wall cover) WITH (clear transparent crystal visible visual\$5)                                                                         | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE,                                                                                | OR | ON | ON | 2022/06/02 10:40 AM |

|      |        |                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |        |                                                                                                                                                                                                | SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                                                                       |    |    |    |                     |
| L138 | 12     | L133 AND (clear transparent crystal visible visual\$5)                                                                                                                                         | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/02 10:40 AM |
| L140 | 147074 | ((reel snak\$3 (fish adj2 (tape taping)) adj2 (assembly unit system device apparatus machine mechanism means module instrument tool equipment structure arrangement)) .ti.) AND @ad<"20191126" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/02 10:51 AM |
| L142 | 496    | L140 AND ((sidewall sidebore bore wall cover) near2 (clear transparent crystal visible visual\$5))                                                                                             | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/02 10:51 AM |
| L143 | 250    | L142 AND I109                                                                                                                                                                                  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY,                                                                                                                                                                                                                                                            | OR | ON | ON | 2022/06/02 10:53 AM |

|      |    |                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |    |                                                                                                                                                                                                                                                                                                                                                    | CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                           |    |    |    |                     |
| L145 | 3  | L143 AND ((reel snak\$3 (fish adj2 (tape taping)) adj2 (assembly unit system device apparatus machine mechanism means module instrument tool equipment structure arrangement)) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/02 10:55 AM |
| L146 | 7  | L138 AND L109                                                                                                                                                                                                                                                                                                                                      | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/06/02 01:53 PM |
| L147 | 31 | L121 AND ((sidewall sidebore bore wall cover frame fixture structure form shap\$3 enclose receptacle container holder reservoir enclosure infrastructure chassis housing house framework shell chamber tank envelope                                                                                                                               | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE,                                                                                | OR | ON | ON | 2022/06/02 02:39 PM |

|      |     |                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
|------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
|      |     | box case tube cassette<br>socket body cavity)<br>near2 (clear transparent<br>crystal visible visual\$5<br>Translucent))                                                                                                                                                                                                                                                       | SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                                                                        |    |    |    |                        |
| L148 | 101 | L121 AND ((sidewall<br>sidebore bore wall<br>cover frame fixture<br>structure form shap\$3<br>enclose receptacle<br>container holder<br>reservoir enclosure<br>infrastructure chassis<br>housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity)<br>WITH (clear transparent<br>crystal visible visual\$5<br>Translucent))  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/06/02<br>02:49 PM |
| L149 | 0   | L126 AND ((sidewall<br>sidebore bore wall<br>cover frame fixture<br>structure form shap\$3<br>enclose receptacle<br>container holder<br>reservoir enclosure<br>infrastructure chassis<br>housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity)<br>near2 (clear transparent<br>crystal visible visual\$5<br>Translucent)) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/06/02<br>03:18 PM |
| L150 | 4   | L126 AND ((sidewall<br>sidebore bore wall<br>cover frame fixture<br>structure form shap\$3<br>enclose receptacle<br>container holder<br>reservoir enclosure<br>infrastructure chassis<br>housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity)<br>WITH (clear transparent<br>crystal visible visual\$5<br>Translucent))  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/06/02<br>03:18 PM |

## PE2E SEARCH - Search History (Interference)

| Ref # | Hits | Search Query | DBs | Default | Plurals | British | Time Stamp |
|-------|------|--------------|-----|---------|---------|---------|------------|
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06/03/2022 10:23:37 PM  
Workspace: 16696383

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HN

|    |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   | Operator |    | Equivalents |                     |
|----|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|----|-------------|---------------------|
| N1 | 2   | ((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location))).clm.                                                                                                                                                                                                                                                                                                              | (US-PGPUB; USPAT) | OR       | ON | ON          | 2022/05/31 09:03 PM |
| N2 | 15  | ((sidewall sidebore bore wall) WITH (clear transparent crystal) WITH (luminescent adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH light).clm.                                                                                                                                                                                                                                                       | (US-PGPUB; USPAT) | OR       | ON | ON          | 2022/05/31 09:04 PM |
| N3 | 242 | ((donut ring circle doughnut annulus circular annular) adj2 (frame fixture structure form shap\$3 enclose receptacle container holder reservoir enclosure infrastructure chassis housing house framework shell chamber tank envelope box case tube cassette socket body cavity)) WITH (sidewall sidebore bore wall) WITH radial\$2 WITH (hole opening aperture orifice outlet entrance port recess window through thru) WITH (circumference perimeter border borderline (boundary adj2 line) delimitation)).clm. | (US-PGPUB; USPAT) | OR       | ON | ON          | 2022/05/31 09:04 PM |
| N4 | 1   | ((fish flex\$3) adj2 tape) WITH (luminescent adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen                                                                                                                                                                                                                                                                                                                        | (US-PGPUB; USPAT) | OR       | ON | ON          | 2022/05/31 09:04 PM |

|     |   |                                                                                                                                |                   |    |    |    |                        |
|-----|---|--------------------------------------------------------------------------------------------------------------------------------|-------------------|----|----|----|------------------------|
|     |   | compound)) WITH (light<br>adj2 (source supply<br>generat\$3 pump gun<br>input))).clm.                                          |                   |    |    |    |                        |
| N5  | 1 | ((fish flex\$3) adj2 tape)<br>WITH luminescent<br>WITH (light adj2<br>(source supply<br>generat\$3 pump gun<br>input))).clm.   | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/31<br>09:04 PM |
| N6  | 1 | ((fish flex\$3) adj2 tape)<br>WITH luminescen\$2<br>WITH (light adj2<br>(source supply<br>generat\$3 pump gun<br>input))).clm. | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/31<br>09:04 PM |
| N7  | 1 | N1 AND N2 AND N3                                                                                                               | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/31<br>09:05 PM |
| N8  | 1 | N1 AND N2                                                                                                                      | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/31<br>09:05 PM |
| N9  | 1 | N1 AND N3                                                                                                                      | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/31<br>09:05 PM |
| N10 | 1 | N2 AND N3                                                                                                                      | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/31<br>09:05 PM |
| N11 | 1 | N1 AND N2 AND N3                                                                                                               | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/31<br>09:15 PM |
| N12 | 1 | N1 AND N2                                                                                                                      | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/31<br>09:17 PM |
| N13 | 1 | N1 AND N3                                                                                                                      | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/31<br>09:17 PM |
| N14 | 1 | N2 AND N3                                                                                                                      | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/31<br>09:17 PM |

Receipt date: 05/03/2021

16/696,383 -- GAU: 2858

|                                                          |   |    |   |                        |            |
|----------------------------------------------------------|---|----|---|------------------------|------------|
| Substitute for Form 1449A/B/PTO                          |   |    |   | Patent Application No. | 16/696,383 |
| <b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b> |   |    |   | Confirmation No.       | 6816       |
|                                                          |   |    |   | Attorney Docket No.    | 751391     |
| Sheet                                                    | 1 | of | 1 |                        |            |

| U.S. PATENT DOCUMENTS |             |                                 |           |                               |                        |                               |
|-----------------------|-------------|---------------------------------|-----------|-------------------------------|------------------------|-------------------------------|
| Examiner<br>Initials  | Doc.<br>No. | U.S. Patent Document            |           | Name of Patentee or Applicant | Date of<br>Publication | Filing Date If<br>Appropriate |
|                       |             | Application or<br>Patent Number | Kind Code |                               |                        |                               |
|                       | AA          | 6,293,519                       | B1        | Farretta                      | 09-25-2001             |                               |
|                       | AB          | 2004/0206529                    | A1        | Sawyer et al.                 | 10-21-2004             |                               |
|                       | AC          | 2009/0257221                    | A1        | Patterson                     | 10-15-2009             |                               |
|                       | AD          | 2017/0213431                    | A1        | Huo                           | 07-27-2017             |                               |
|                       |             |                                 |           |                               |                        |                               |
|                       |             |                                 |           |                               |                        |                               |
|                       |             |                                 |           |                               |                        |                               |

| FOREIGN PATENT DOCUMENTS |             |                         |                                 |              |                               |                        |                  |
|--------------------------|-------------|-------------------------|---------------------------------|--------------|-------------------------------|------------------------|------------------|
| Examiner<br>Initials     | Doc.<br>No. | Foreign Patent Document |                                 |              | Name of Patentee or Applicant | Date of<br>Publication | Translation *    |
|                          |             | Office                  | Application or<br>Patent Number | Kind<br>Code |                               |                        |                  |
|                          | AE          | EP                      | 1914508                         | A2           | The Stanley Works             | 04-23-2008             |                  |
|                          | AF          | JP                      | 2001-174202                     | A            | Hara Rule Mfg.                | 06-29-2001             | English abstract |
|                          |             |                         |                                 |              |                               |                        |                  |
|                          |             |                         |                                 |              |                               |                        |                  |
|                          |             |                         |                                 |              |                               |                        |                  |

| OTHER - NON PATENT LITERATURE DOCUMENTS |             |                                                                                                                                                                                                                                                                  |               |
|-----------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Examiner<br>Initials                    | Doc.<br>No. | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number (s), publisher, city and/or country where published. | Translation * |
|                                         | AG          | UNITED KINGDOM INTELLECTUAL PROPERTY OFFICE, Search Report in United Kingdom Patent Application No. GB2018458.6, 4 pp. (Apr. 23, 2021)                                                                                                                           |               |
|                                         |             |                                                                                                                                                                                                                                                                  |               |
|                                         |             |                                                                                                                                                                                                                                                                  |               |
|                                         |             |                                                                                                                                                                                                                                                                  |               |

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /HADN/

|                    |                     |                 |            |
|--------------------|---------------------|-----------------|------------|
| Examiner Signature | /HOAI-AN D. NGUYEN/ | Date Considered | 05/31/2022 |
|--------------------|---------------------|-----------------|------------|

\* If the reference is not in English, then at least one of the following is provided: (a) an English translation in whole or in part or (b) a concise statement of relevance in the form of, for example, an English language counterpart, an English-language abstract, or an English-language version of the search report or action by a foreign patent office in a counterpart foreign application indicating the degree of relevance found by the foreign office.

**To:** Chgpatent@leydig.com,,  
**From:** PAIR\_eOfficeAction@uspto.gov  
**Cc:** PAIR\_eOfficeAction@uspto.gov  
**Subject:** Private PAIR Correspondence Notification for Customer Number 161268

Jun 08, 2022 05:23:11 AM

Dear PAIR Customer:

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The following USPTO patent application(s) associated with your Customer Number, 161268 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

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| Application | Document | Mailroom Date | Attorney Docket No. |
|-------------|----------|---------------|---------------------|
| 16696383    | CTNF     | 06/08/2022    | 751391              |
|             | 892      | 06/08/2022    | 751391              |
|             | 1449     | 06/08/2022    | 751391              |

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Thank you for prompt attention to this notice,

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PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM



| Electronic Acknowledgement Receipt   |                             |
|--------------------------------------|-----------------------------|
| EFS ID:                              | 46578168                    |
| Application Number:                  | 16696383                    |
| International Application Number:    |                             |
| Confirmation Number:                 | 6816                        |
| Title of Invention:                  | GLOW FISH TAPE SYSTEM       |
| First Named Inventor/Applicant Name: | Daniel R. Pearson           |
| Customer Number:                     | 161268                      |
| Filer:                               | Jeffery Neal Fairchild      |
| Filer Authorized By:                 |                             |
| Attorney Docket Number:              | 751391                      |
| Receipt Date:                        | 08-SEP-2022                 |
| Filing Date:                         | 26-NOV-2019                 |
| Time Stamp:                          | 15:37:41                    |
| Application Type:                    | Utility under 35 USC 111(a) |

### Payment information:

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|------------------------|----|
| Submitted with Payment | no |
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### File Listing:

| Document Number | Document Description                                                  | File Name                                | File Size(Bytes)/<br>Message Digest           | Multi Part /.zip | Pages (if appl.) |
|-----------------|-----------------------------------------------------------------------|------------------------------------------|-----------------------------------------------|------------------|------------------|
| 1               | Amendment/Request for<br>Reconsideration-After Non-Final<br>Rejection | 00058P00USResponseToOffice<br>Action.pdf | 74844                                         | no               | 4                |
|                 |                                                                       |                                          | 31774200c0e32fc6db8ec90b1947fa567048<br>eae1e |                  |                  |

### Warnings:

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |
| <b>Total Files Size (in bytes):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 74844 |
| <p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b><br/> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b><br/> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b><br/> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> |       |

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Patent Application No. 16/696,383

Confirmation No. 6816

First Named Inventor: Pearson

Filed or 371 Date: 11/26/2019

TC/AU: 2858

Examiner: Nguyen, Hoai An D

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

**Response**

Sir, in response to the Office Action 06/08/2022, Applicant hereby responds as follows:

### Remarks/Arguments

Claims 1-20 are pending and at issue.

The rejection of claims 1-20 as unpatentable over Miller et al. (US 2019/0292005 A1) in view of Farretta (US 6,293,519) is respectfully traversed. The rejection is based on clear mischaracterization of the disclosure of Miller et al., and on a failure to establish a prima facie case of obvious as required by the MPEP.

More specifically, the rejection of all the claims is based on a mischaracterization of the disclosure of Miller et al. In this regard, the rejection asserts that Miller et al. discloses “at least one of the sidewalls (FIG. 14 in view of FIG. 1, first clamshell 190) of the case (FIG. 14 in view of FIG. 1, fish tape drum 182) is transparent to allow luminescent material to be energized by light passing through the at least one of the sidewalls (FIG. 14 in view of FIG. 1, first clamshell 190) (For more details please read: Abstract; and paragraphs [0047]-[0050] and [0066]-[0072])” (emphasis added). Contrary to this assertion, there is nothing in Miller et al. that even hints at a transparent sidewall, let alone teaches a transparent sidewall, let alone further teaches such a sidewall that allows a luminescent material to be energized by light passing through such a sidewall. In this regard, it is further noted that the undersigned can find nothing in the figures and description cited in the rejection (FIG. 14, FIG. 1, the Abstract, and/or paragraphs [0047]-[0050] and [0066]-[0072]) that supports the rejections assertion that the clamshell 190 and/or fish tape drum 182 is transparent as asserted in the rejection. Further in this regard, it is noted that all the figures portray the drum 182 and clamshell 190 as being opaque rather than transparent, with not a single figure, or even a portion of a single figure, being illustrated to show a transparent wall. Indeed, FIGS. 14 and 19 show that the clamshell 190 blocks the view of the interior except where the interior can be view through the slots 250 that extend through the clamshell 190. Farretta also fails to disclose or suggest transparent structures as recited in the claims. Additionally, the rejection expressly admits that Miller et al. fails to disclose a luminescent material as recited in the rejected claims, which is contrary to the assertion in the rejection that Miller et al. discloses a sidewall that is “transparent to allow luminescent material to be energized by light passing through” the sidewall (emphasis added). For these reasons, taken alone or together, Miller at al. and Farretta fail to disclose and/or suggest all the limitations

recited in each of the rejected claims and the rejection of claims 1-20 is improper and should be withdrawn.

Because Miller et al. fails to disclose a transparent structure as recited in the claims, there is no support for a modification of Miller et al. by adding the luminescent material of Farretta. Accordingly, the rejection also fails to establish a prima facie case of obviousness as required by the MPEP (See sections 2142-2144) and for this additional reason alone the rejection of all the claims should be withdrawn.

Specifically with respect to the rejection of claims 2, 3, 8-10, 13, 18, and 19, the rejection depends on an “inventive step” standard that isn’t required under U.S. patent law. Additionally, the rejection discusses a “switching apparatus” structure that isn’t recited in any of the rejected claims. Further, the rejection fails to cite any prior art teaching the additional structure recited in each of claims 2, 3, 8-10, 13, 18, and 19. To the extent the rejection is asserting inherency or that such structure is well known, the assertion is hereby traversed and it is expressly requested that the Examiner provide evidence to support such assertions in any future rejection of the claims. Furthermore, to the extent the rejection attempts to address the structure recited in each of the rejected claims, the attempts are all based on the erroneous assertion that Miller et al. discloses a transparent sidewall. For each of these reasons, taken alone or together, the rejection fails to establish a prima facie case of obviousness against claims 2, 3, 8-10, 13, 18, 19 as required by MPEP sections 2142-44 et seq. Accordingly, the rejection of claims 2, 3, 8-10, 13, 18 and 19 is improper and should be withdrawn.

Specifically with respect to the rejection of claims 5 and 14, the rejection is based on a mischaracterization of Miller et al. In this regard, the rejection asserts that Miller et al. teaches that its handle 56 is engageable with the fish tape 196 to deploy the fish tape from the storage compartment and to reload the fish tape into the compartment. Contrary to this assertion, the handle 56 of Miller et al. is not engageable with the fish tape, let alone engageable to deploy or reload the fish tape into a compartment as recited in the rejected claims. In this regard, Miller et al. is specifically directed to a motor driven fish tape device wherein the handle 56 does not engage the fish tape, let alone engage the fish tape to deploy or reload the fish tape. Farretta adds nothing in this regard. Accordingly, taken alone or together, Miller et al. and Farretta fail to

disclose or suggest all of the structure recited in claims 5 and 14 and for this reason alone the rejection of claims 5 and 14 should be withdrawn.

To the extent that a future office action repeats an assertion that Miller et al. discloses transparent structures as recited in the pending claims, it is respectfully requested that the Examiner provide a specific quotation of any language in Miller et al. and an identification of the specific parts of each figure of Miller et al. that the Examiner believes supports the assertion, together with a detailed explanation of how the quoted language and/or identified parts of each figure disclose the transparent structure recited in the claims.

If there are any other issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

Dated: **September 8<sup>th</sup>, 2022**

Respectfully submitted,

By     /Jeffery N. Fairchild/    

Jeffery N. Fairchild, Reg. No. 37825

Klein Tools  
450 Bond Street  
Lincolnshire, IL 60069  
(847) 821-5549 (Telephone)  
Attorney for Applicant



# UNITED STATES PATENT AND TRADEMARK OFFICE

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| APPLICATION NO.                                                                                                                                            | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.             | CONFIRMATION NO.            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------|---------------------------------|-----------------------------|
| 16/696,383                                                                                                                                                 | 11/26/2019  | Daniel R. Pearson    | 751391                          | 6816                        |
| 161268 7590 09/26/2022<br>LEYDIG VOIT & MAYER, LTD (Klein Tools)<br>TWO PRUDENTIAL PLAZA, SUITE 4900<br>180 NORTH STETSON AVENUE<br>CHICAGO, IL 60601-6731 |             |                      | EXAMINER<br>NGUYEN, HOAI AN D   |                             |
|                                                                                                                                                            |             |                      | ART UNIT<br>2858                | PAPER NUMBER                |
|                                                                                                                                                            |             |                      | NOTIFICATION DATE<br>09/26/2022 | DELIVERY MODE<br>ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

Chgpatent@leydig.com

|                              |                                      |                                           |                                 |
|------------------------------|--------------------------------------|-------------------------------------------|---------------------------------|
| <b>Office Action Summary</b> | <b>Application No.</b><br>16/696,383 | <b>Applicant(s)</b><br>Pearson, Daniel R. |                                 |
|                              | <b>Examiner</b><br>HOAI-AN D NGUYEN  | <b>Art Unit</b><br>2858                   | <b>AIA (FITF) Status</b><br>Yes |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on September 8, 2022.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims\***

- 5) ☒ Claim(s) 1-20 is/are pending in the application.  
     5a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 1-20 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement

\* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

**Application Papers**

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
**Certified copies:**  
     a) ☐ All      b) ☐ Some\*\*      c) ☐ None of the:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                |                                                         |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                               | 3) <input type="checkbox"/> Interview Summary (PTO-413) |
|                                                                                                | Paper No(s)/Mail Date ____.                             |
| 2) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) | 4) <input type="checkbox"/> Other: ____.                |
| Paper No(s)/Mail Date ____.                                                                    |                                                         |

U.S. Patent and Trademark Office

PTOL-326 (Rev. 11-13)

Office Action Summary

Part of Paper No./Mail Date 20220920



## DETAILED ACTION

### *Notice of Pre-AIA or AIA Status*

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

### *Response to Amendment*

2. Receipt is acknowledged of the Amendment filed on September 8, 2022. Accordingly, claims 1-20 are currently pending in the application.

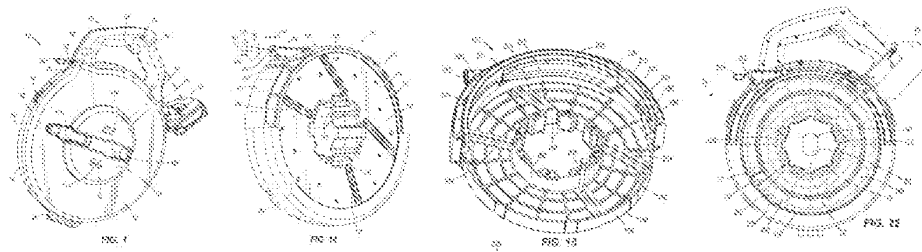
### *Claim Rejections - 35 USC § 103*

3. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.
4. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-20 are rejected under 35 U.S.C. 103 as being unpatentable over Miller et al. (US 2019/0292005 A1) in view of Farretta (US 6,293,519 B1).

Miller et al. teaches a fish tape assembly comprising:



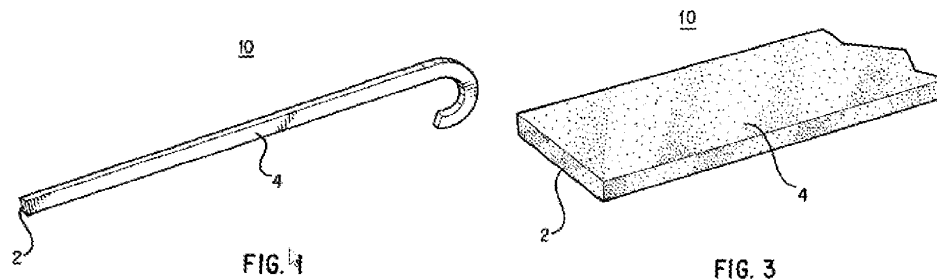
With regard to claims 1, 7 and 16, a fish tape (FIG. 14 in view of FIG. 1, fish tape 196) having a length extending from a first end (FIG. 14 in view of FIG. 1, moving end 218) to a second end (FIG. 14 in view of FIG. 1, anchor end, which is opposite of the moving end 218 and secured to the pin 266); and a donut shaped case (FIG. 14 in view of FIG. 1, fish tape drum 182) having a pair of sidewalls (FIG. 14 in view of FIG. 1, first and second clamshells 190 and 194) extending between a radially innermost wall (FIG. 15 in view of FIG. 1, inner wall 258) and a radially outermost wall (FIG. 15 in view of FIG. 1, outer wall 262), the outermost wall (FIG. 15 in view of FIG. 1, outer wall 262) having an annular opening (FIG. 14 in view of FIG. 1, the rim of the fish tape drum 182) extending around a circumference of one of the inner and outer walls (FIG. 15 in view of FIG. 1, inner wall 258 and outer wall 262), the sidewalls (FIG. 14 in view of FIG. 1, first and second clamshells 190 and 194) being spaced from each other to define a fish tape storage compartment (FIG. 14 in view of FIG. 1, drum portion 186) that stores the length of fish tape (FIG. 14 in view of FIG. 1, fish tape 196) for deployment via the annular opening (FIG. 14 in view of FIG. 1, the rim of the fish tape drum 182) in the case (FIG. 14 in view of FIG. 1, fish tape drum 182); wherein at least one of the sidewalls (FIG. 14 in view of FIG. 1 and FIG. 22, first clamshell 190, which is clear plastic) of the case (FIG. 14 in view of FIG. 1, fish tape drum 182) is transparent to allow the luminescent material to be energized by light passing through the at least one of the sidewalls (FIG. 14 in view of FIG. 1 and FIG. 22, first clamshell

190, which is clear plastic as disclosed in paragraph [0076]) (For more details please read: Abstract; and paragraphs: [0047]-[0050] and [0066]-[0076]).

Miller et al. teaches all that is claimed as discussed above including fish tape (FIG. 14 in view of FIG. 1, fish tape 196) having a length extending from a first end (FIG. 14 in view of FIG. 1, moving end 218) to a second end (FIG. 14 in view of FIG. 1, anchor end, which is opposite of the moving end 218 and secured to the pin 266), but it does not specifically teach the following feature:

- The length of the fish tape comprising a luminescent material that emits light after being energized by exposure to a light source.

Farretta teaches a luminous snake comprising:



With regard to claims 1, 7 and 16, fish tape (FIG. 1, flexible core strip 2) comprising a luminescent material (FIG. 3 in view of FIG. 1, phosphorescent coating 4) that emits light after being energized by exposure to a light source (From page 9, line 31 to page 10, line 25).

Therefore, it would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to modify the fish tape assembly of Miller et al. to utilize a fish tape comprising a luminescent material that emits light after being energized by exposure to a light source as taught by Farretta since Farretta teaches that such an arrangement is beneficial to provide a fish tape assembly that is visible and easy to locate in the low light

environments of ducts, wall cavities and other passages used to house electrical wiring as disclosed in column 1, lines 8-13.

With regard to claims 2, 3, 8-10, 13, 18 and 19, as Miller et al. in view of Farretta teaches one of the sidewalls (FIG. 14 in view of FIG. 1 and FIG. 22, first clamshell 190, which is clear plastic) of the case (FIG. 14 in view of FIG. 1, fish tape drum 182) is transparent to allow the luminescent material to be energized by light passing through the at least one of the sidewalls, these claims do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements in respect of inventive step. The additional features of these claims relate to slight modifications in the fish tape assembly according to claims 1, 7 and 16 that lie in the scope of what someone skilled in the art is accustomed to performing based on well-known considerations common and commercially available to those skilled in the art. Therefore, it would be easy for a person skilled in the art to conceive of applying these features to the fish tape assembly of Miller et al. according to claims 1, 7 and 16 to take advantage of the physical property of the transparent material to allow the luminescent material to be energized by light passing through the walls.

With regard to claims 4, 11 and 20, Miller et al. teaches one of the sidewalls (FIG. 14 in view of FIG. 1 and FIG. 22, first clamshell 190, which is clear plastic) and portions of the innermost and outermost walls (FIG. 15 in view of FIG. 1, inner wall 258 and outer wall 262) are defined by a first component (FIG. 14 in view of FIG. 1, right half of the fish tape drum 182) of the case (FIG. 14 in view of FIG. 1, fish tape drum 182), and the other of the sidewalls (FIG. 14 in view of FIG. 1, second clamshell 194) and other portions of the innermost and outermost walls (FIG. 15 in view of FIG. 1, inner wall 258 and outer wall 262) are defined by a second component (FIG. 15 in view of FIG. 1, left half of the fish tape drum 182) of the case (FIG. 14 in

view of FIG. 1, fish tape drum 182), the first and second components being assembled together to form the storage compartment (FIG. 14 in view of FIG. 1, drum portion 186).

With regard to claims 5 and 14, Miller et al. teaches a handle (FIG. 1, handle 56) engaged with the case (FIG. 14 in view of FIG. 1, fish tape drum 182) for sliding movement along the circumference of the outer wall (FIG. 15 in view of FIG. 1, outer wall 262), the handle (FIG. 1, handle 56) engageable with the fish tape (FIG. 14 in view of FIG. 1, fish tape 196) to deploy the fish tape (FIG. 14 in view of FIG. 1, fish tape 196) from the storage compartment (FIG. 14 in view of FIG. 1, drum portion 186) and to reload the fish tape (FIG. 14 in view of FIG. 1, fish tape 196) into the compartment (FIG. 14 in view of FIG. 1, drum portion 186).

With regard to claims 6 and 15, Miller et al. discloses that the fish tape (FIG. 14 in view of FIG. 1, fish tape 196) comprises the first end (FIG. 14 in view of FIG. 1, moving end 218) to the second end (FIG. 14 in view of FIG. 1, anchor end, which is opposite of the moving end 218 and secured to the pin 266), wherein the anchor end (FIG. 30, anchor end 370) is a connector looped over the pin 266 and welded to itself at a weld point 374. It is noted that these claims do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements in respect of inventive step. The additional feature, "a threaded opening in at least one of the first and second ends", of these claims relates to slight modifications of the connector at the second end (FIG. 14 in view of FIG. 1, anchor end, which is opposite of the moving end 218 and secured to the pin 266) according to claims 1, 7 and 16 that lie in the scope of what someone skilled in the art is accustomed to performing based on well-known considerations common and commercially available to those skilled in the art. Therefore, it would be easy for a person skilled in the art to conceive of applying this feature to the fish tape assembly of Miller et al. according to claims 1, 7 and 16 to take advantage of

desirable and exemplary choices for a specific configuration of a threaded opening in at least one of the first and second ends.

With regard to claim 12, at least one of the first and second components (FIG. 14 in view of FIG. 1, right half of the fish tape drum 182) comprises a transparent material (first clamshell 190 is clear plastic) (Paragraph: [0076]).

With regard to claim 17, the storage compartment (FIG. 14 in view of FIG. 1, drum portion 186) has an annular shape bounded by a pair of spaced sidewalls (FIG. 14 in view of FIG. 1, first and second clamshells 190 and 194).

### ***Response to Arguments***

6. Applicant's arguments filed September 8, 2022 have been fully considered but they are not persuasive.

It is noted that, the term "transparent" (transmitting light; able to be seen through with clarity: <https://www.wordwebonline.com/search.pl/?w=transparent>) as recited in the rejected claims at issue was given its broadest reasonable interpretation of "clear" (allowing light to pass through: <https://www.wordwebonline.com/search.pl/?w=clear>), which is common and consistent with the interpretation that those skilled in the art would reach.

In response to applicant's argument in the third paragraph at page 2 of 4 that "Contrary to this assertion, there is nothing in Miller et al. that even hints at a transparent sidewall, let alone teaches a transparent sidewall, let alone further teaches such a sidewall that allows a luminescent material to be energized by light passing through such a sidewall", the Examiner disagrees.

Miller et al. clearly discloses in paragraph [0076] and FIG. 14 in view of FIG. 22 that the first clamshell 190 of the fish tape drum 182 is a side wall and clear plastic, which reads on the

limitation “at least one of the sidewalls of the case is transparent to allow the luminescent material to be energized by light passing through the at least one of the sidewalls” as recited in the rejected claims at issue. In addition, it is advisable for the applicant to review the whole reference, not only the cited portions, to fully understand the cited structure.

In response to applicant’s argument in the first paragraph at page 3 of 4 that “Because Miller et al. fails to disclose a transparent structure as recited in the claims, there is no support for a modification of Miller et al. by adding the luminescent material of Farretta”, the Examiner disagrees.

As discussed right above, Miller et al. discloses a transparent structure (FIG. 14 in view of FIG. 22, first clamshell 190, which is clear plastic (Paragraph: [0076])) as recited in the claims. Therefore, a modification of Miller et al. by adding the luminescent material that emits light after being energized by exposure to a light source as taught by Farretta is still deemed proper.

In response to applicant’s argument in the second paragraph at page 3 of 4 that “Additionally, the rejection discusses a ‘switching apparatus’ structure that isn’t recited in any of the rejected claims”, the Examiner admits that the phrase “switching apparatus” has been inadvertently inserted in the passage. Therefore, the “switching apparatus” has been replaced with -- fish tape assembly -- in the rejection of claims 2, 3, 8-10, 13, 18 and 19.

In response to applicant’s arguments in the second paragraph at page 3 of 4 that “Furthermore, to the extent the rejection attempts to address the structure recited in each of the rejected claims, the attempts are all based on the erroneous assertion that Miller et al. discloses a transparent sidewall” and “Accordingly, the rejection of claims 2, 3, 8-10, 13, 18 and 19 is improper and should be withdrawn”, the Examiner disagrees.

As discussed right above, Miller et al. discloses a transparent structure (FIG. 14 in view of FIG. 22, first clamshell 190 , which is clear plastic (Paragraph: [0076])) as recited in the claims. Therefore, the rejection of claims 2, 3, 8-10, 13, 18 and 19 is still deemed improper.

In response to applicant's arguments in the last paragraph at page 3 of 4 that "Contrary to this assertion, the handle 56 of Miller et al. is not engageable with the fish tape, let alone engageable to deploy or reload the fish tape into a compartment as recited in the rejected claims", the Examiner disagrees.

Miller et al. clearly discloses in paragraph [0049] and FIG. 14 in view of FIGS. 1 and 2 that the handle 56 includes a trigger 58 for actuating the motor 18 and a directional shuttle 62 that can slide between a dispensing position and a retracting position such that the fish tape 32 is dispensed from and retracted into the fish tape drum 30, respectively. That is, the handle 56 is engageable with the fish tape 32 via the trigger 58, the motor 18 and the directional shuttle 62. Therefore, the combination of Miller et al. and Farretta is still deemed improper.

With regard to claims 2-6, 8-15 and 17-20, all of applicant's arguments are addressed by the above rejections.

### ***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period



will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### CONTACT INFORMATION

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HOAI-AN D. NGUYEN whose telephone number is (571) 272-2170. The examiner can normally be reached MON-THURS (7:00 AM - 5:00 PM).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, PATRICK J. ASSOUAD can be reached on 571-272-2210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC)

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at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service

Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HOAI-AN D. NGUYEN  
Primary Examiner  
Art Unit 2858

/HOAI-AN D. NGUYEN/  
Primary Examiner, Art Unit 2858

|                                                                                                                 |                                              |                                                                      |
|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------|
| <b><i>Search Notes</i></b><br> | <b>Application/Control No.</b><br>16/696,383 | <b>Applicant(s)/Patent Under Reexamination</b><br>Pearson, Daniel R. |
|                                                                                                                 | <b>Examiner</b><br>HOAI-AN D NGUYEN          | <b>Art Unit</b><br>2858                                              |

| CPC - Searched*                                         |            |          |
|---------------------------------------------------------|------------|----------|
| Symbol                                                  | Date       | Examiner |
| B65H75/00, 02, 34, 36, 362, 364, 38, 40, 406 (Updated). | 09/19/2022 | HADN     |
| B65H2701/00, 30, 37, 376 (Updated).                     | 09/19/2022 | HADN     |
| H02G11/00, 006, 02, 06, 08, 083, 085 (Updated).         | 09/19/2022 | HADN     |

| CPC Combination Sets - Searched* |      |          |
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| Symbol                           | Date | Examiner |
|                                  |      |          |

| US Classification - Searched* |                            |            |          |
|-------------------------------|----------------------------|------------|----------|
| Class                         | Subclass                   | Date       | Examiner |
| 254                           | 134.3R, 134.3FT (Updated). | 05/31/2022 | HADN     |

\* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

| Search Notes                                           |            |          |
|--------------------------------------------------------|------------|----------|
| Search Notes                                           | Date       | Examiner |
| Reviewed all previously searched prior art references. | 09/19/2022 | HADN     |
| Inventor's name searched.                              | 09/19/2022 | HADN     |
| Text search in PE2E SEARCH.                            | 09/13/2022 | HADN     |

| Interference Search                   |                       |            |          |
|---------------------------------------|-----------------------|------------|----------|
| US Class/CPC Symbol                   | US Subclass/CPC Group | Date       | Examiner |
| Interference Search History Printout. |                       | 09/19/2022 | HADN     |

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| <b><i>Search Notes</i></b><br> | <b>Application/Control No.</b><br>16/696,383 | <b>Applicant(s)/Patent Under Reexamination</b><br>Pearson, Daniel R. |
|                                                                                                                 | <b>Examiner</b><br>HOAI-AN D NGUYEN          | <b>Art Unit</b><br>2858                                              |

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## PE2E SEARCH - Search History (Prior Art)

| Ref # | Hits | Search Query                                           | DBs                                                                                                                                                                                                                                                                                                                  | Default Operator | Plurals | British Equivalents | Time Stamp          |
|-------|------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------|---------------------|---------------------|
| L151  | 4    | (B65H75/00.cpc.) AND @ad<"20191126" AND @pd>"20220531" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2022/09/19 08:04 AM |
| L152  | 7    | (B65H75/02.cpc.) AND @ad<"20191126" AND @pd>"20220531" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2022/09/19 08:09 AM |
| L153  | 5    | (B65H75/34.cpc.) AND @ad<"20191126" AND @pd>"20220531" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2022/09/19 08:09 AM |
| L154  | 4    | (B65H75/36.cpc.) AND @ad<"20191126" AND @pd>"20220531" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU,                                                                                                                                                                                                                                        | OR               | ON      | ON                  | 2022/09/19 08:14 AM |

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|      |    |                                                         | CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                               |    |    |    |                     |
| L155 | 2  | (B65H75/362.cpc.) AND @ad<"20191126" AND @pd>"20220531" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 08:21 AM |
| L156 | 10 | (B65H75/364.cpc.) AND @ad<"20191126" AND @pd>"20220531" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 08:22 AM |
| L157 | 13 | (B65H75/38.cpc.) AND @ad<"20191126" AND @pd>"20220531"  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN,                                        | OR | ON | ON | 2022/09/19 08:26 AM |

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|------|----|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
|      |    |                                                                | WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                                                                                                                      |    |    |    |                        |
| L158 | 6  | (B65H75/40.cpc.) AND<br>@ad<"20191126" AND<br>@pd>"20220531"   | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/09/19<br>08:29 AM |
| L159 | 10 | (B65H75/406.cpc.) AND<br>@ad<"20191126" AND<br>@pd>"20220531"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/09/19<br>08:30 AM |
| L160 | 0  | (B65H2701/00.cpc.)<br>AND @ad<"20191126"<br>AND @pd>"20220531" | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/09/19<br>08:33 AM |
| L161 | 9  | (B65H2701/30.cpc.)<br>AND @ad<"20191126"<br>AND @pd>"20220531" | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,                                                                                                                                                                                                                                                     | OR | ON | ON | 2022/09/19<br>08:34 AM |



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|      |    |                                                           | EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                   |    |    |    |                     |
| L162 | 13 | (B65H2701/37.cpc.) AND @ad<"20191126" AND @pd>"20220531"  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 08:39 AM |
| L163 | 3  | (B65H2701/376.cpc.) AND @ad<"20191126" AND @pd>"20220531" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 08:56 AM |
| L164 | 58 | (H02G11/00.cpc.) AND @ad<"20191126" AND @pd>"20220531"    | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;                        | OR | ON | ON | 2022/09/19 08:58 AM |

|      |    |                                                               |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
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|      |    |                                                               | JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                                                                                                                                         |    |    |    |                        |
| L165 | 29 | (H02G11/006.cpc.)<br>AND @ad<"20191126"<br>AND @pd>"20220531" | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/09/19<br>08:59 AM |
| L166 | 40 | (H02G11/02.cpc.) AND<br>@ad<"20191126" AND<br>@pd>"20220531"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/09/19<br>09:30 AM |
| L167 | 0  | (H02G11/06.cpc.) AND<br>@ad<"20191126" AND<br>@pd>"20220531"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/09/19<br>09:31 AM |
| L168 | 0  | (H02G11/08.cpc.) AND<br>@ad<"20191126" AND<br>@pd>"20220531"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,                                                                                                                                                                                                                          | OR | ON | ON | 2022/09/19<br>09:32 AM |

|      |   |                                                          |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|---|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |   |                                                          | HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                           |    |    |    |                     |
| L169 | 0 | (H02G11/083.cpc.) AND @ad<"20191126" AND @pd>"20220531"  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 09:41 AM |
| L170 | 0 | (H02G11/085.cpc.) AND @ad<"20191126" AND @pd>"20220531"  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 09:42 AM |
| L171 | 0 | (254/134.3R.ccls.) AND @ad<"20191126" AND @pd>"20220531" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT;          | OR | ON | ON | 2022/09/19 09:52 AM |

|      |     |                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |     |                                                                                                                                                                                                                                                     | IBM_TDB)                                                                                                                                                                                                                                                                                                             |    |    |    |                     |
| L172 | 0   | (254/134.FT.ccls.) AND @ad<"20191126" AND @pd>"20220531"                                                                                                                                                                                            | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 09:53 AM |
| L173 | 321 | (Pearson near2 Daniel).inv.                                                                                                                                                                                                                         | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 02:57 PM |
| L174 | 0   | (L151 L152 L153 L154 L155 L156 L157 L158 L159 ) AND (((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 03:04 PM |
| L175 | 0   | (L161 L162 L163 ) AND (((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)))                                                                                        | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,                                                                                                                                                                    | OR | ON | ON | 2022/09/19 03:05 PM |

|      |   |                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |   | WITH (second adj2 (end\$3 terminal point node location)))                                                                                                                                                                                                                                                 | IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                   |    |    |    |                     |
| L176 | 0 | (L164 L165 L166 ) AND (((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location)))                                                                                     | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 03:06 PM |
| L177 | 4 | L173 AND (((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location)))                                                                                                  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 03:07 PM |
| L178 | 0 | (L151 L152 L153 L154 L155 L156 L157 L158 L159 ) AND ((sidewall sidebore bore wall) WITH (clear transparent crystal) WITH (luminescent adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH light) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 03:11 PM |

|      |   |                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L179 | 0 | (L161 L162 L163 ) AND ((sidewall sidebore bore wall) WITH (clear transparent crystal) WITH (luminescent adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH light) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 03:12 PM |
| L180 | 0 | (L164 L165 L166 ) AND ((sidewall sidebore bore wall) WITH (clear transparent crystal) WITH (luminescent adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH light) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 03:13 PM |
| L181 | 3 | L177 AND ((sidewall sidebore bore wall) WITH (clear transparent crystal) WITH (luminescent adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH light)              | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 03:13 PM |
| L182 | 0 | (L151 L152 L153 L154 L155 L156 L157 L158 L159 ) AND (((donut ring circle doughnut annulus circular annular) adj2 (frame fixture structure form shap\$3 enclose receptacle container                                                                                         | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,                                                                                                                        | OR | ON | ON | 2022/09/19 03:14 PM |

|      |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
|------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
|      |   | holder reservoir<br>enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore bore wall)<br>WITH radial\$2 WITH<br>(hole opening aperture<br>orifice outlet entrance<br>port recess window<br>through thru) WITH<br>(circumference<br>perimeter border<br>borderline (boundary<br>adj2 line) delimitation))                                                                                                                                                                            | NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                          |    |    |    |                        |
| L183 | 0 | (L161 L162 L163 ) AND<br>(((donut ring circle<br>doughnut annulus<br>circular annular) adj2<br>(frame fixture structure<br>form shap\$3 enclose<br>receptacle container<br>holder reservoir<br>enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore bore wall)<br>WITH radial\$2 WITH<br>(hole opening aperture<br>orifice outlet entrance<br>port recess window<br>through thru) WITH<br>(circumference<br>perimeter border<br>borderline (boundary<br>adj2 line) delimitation)) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/09/19<br>03:15 PM |
| L184 | 0 | (L164 L165 L166 ) AND<br>(((donut ring circle<br>doughnut annulus<br>circular annular) adj2<br>(frame fixture structure<br>form shap\$3 enclose<br>receptacle container<br>holder reservoir<br>enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))                                                                                                                                                                                                                                                             | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;                              | OR | ON | ON | 2022/09/19<br>03:15 PM |

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|------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |   | WITH (sidewall sidebore bore wall) WITH radial\$2 WITH (hole opening aperture orifice outlet entrance port recess window through thru) WITH (circumference perimeter border borderline (boundary adj2 line) delimitation))                                                                                                                                                                                                                                                                                            | JPO; DERWENT; IBM_TDB)                                                                                                                                                                                                                                                                                               |    |    |    |                     |
| L185 | 3 | L181 AND (((donut ring circle doughnut annulus circular annular) adj2 (frame fixture structure form shap\$3 enclose receptacle container holder reservoir enclosure infrastructure chassis housing house framework shell chamber tank envelope box case tube cassette socket body cavity)) WITH (sidewall sidebore bore wall) WITH radial\$2 WITH (hole opening aperture orifice outlet entrance port recess window through thru) WITH (circumference perimeter border borderline (boundary adj2 line) delimitation)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 03:15 PM |
| L186 | 0 | ((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location))) AND @ad<"20191126" AND @pd>"20220531"                                                                                                                                                                                                                                                                                  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/09/19 03:30 PM |
| L187 | 5 | ((sidewall sidebore bore wall) WITH (clear transparent crystal) WITH (luminescent adj2 (material substance media medium                                                                                                                                                                                                                                                                                                                                                                                               | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,                                                                                                                                                                                            | OR | ON | ON | 2022/09/19 03:30 PM |



|      |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
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|      |   | substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH light)<br>AND @ad<"20191126"<br>AND @pd>"20220531"                                                                                                                                                                                                                                                                                                                                                                                                                                     | HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                             |    |    |    |                        |
| L188 | 9 | ((donut ring circle<br>doughnut annulus<br>circular annular) adj2<br>(frame fixture structure<br>form shap\$3 enclose<br>receptacle container<br>holder reservoir<br>enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore bore wall)<br>WITH radial\$2 WITH<br>(hole opening aperture<br>orifice outlet entrance<br>port recess window<br>through thru) WITH<br>(circumference<br>perimeter border<br>borderline (boundary<br>adj2 line) delimitation))<br>AND @ad<"20191126"<br>AND @pd>"20220531" | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/09/19<br>03:31 PM |
| L189 | 0 | L187 AND L188                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/09/19<br>03:37 PM |

## PE2E SEARCH - Search History (Interference)

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | British Equivalents | Time Stamp |
|-------|------|--------------|-----|------------------|---------|---------------------|------------|
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|     |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |    |    |    |                        |
|-----|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----|----|----|------------------------|
| N15 | 1 | (((fish flex\$3) adj2<br>tape) WITH (length size<br>dimension width range<br>distance) WITH (first<br>adj2 (end\$3 terminal<br>point node location))<br>WITH (second adj2<br>(end\$3 terminal point<br>node location))).clm.)<br>AND @pd>"20220531"                                                                                                                                                                                                                                                                                                                                                              | (US-PGPUB; USPAT) | OR | ON | ON | 2022/09/19<br>03:37 PM |
| N16 | 5 | (((donut ring circle<br>doughnut annulus<br>circular annular) adj2<br>(frame fixture structure<br>form shap\$3 enclose<br>receptacle container<br>holder reservoir<br>enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore bore wall)<br>WITH radial\$2 WITH<br>(hole opening aperture<br>orifice outlet entrance<br>port recess window<br>through thru) WITH<br>(circumference<br>perimeter border<br>borderline (boundary<br>adj2 line)<br>delimitation)).clm.) AND<br>@pd>"20220531" | (US-PGPUB; USPAT) | OR | ON | ON | 2022/09/19<br>03:38 PM |
| N17 | 0 | (((sidewall sidebore<br>bore wall) WITH (clear<br>transparent crystal)<br>WITH (luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH<br>light).clm.) AND<br>@pd>"20220531"                                                                                                                                                                                                                                                                                           | (US-PGPUB; USPAT) | OR | ON | ON | 2022/09/19<br>03:38 PM |
| N18 | 0 | N15 AND N16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | (US-PGPUB; USPAT) | OR | ON | ON | 2022/09/19<br>03:40 PM |

**To:** Chgpatent@leydig.com,,  
**From:** PAIR\_eOfficeAction@uspto.gov  
**Cc:** PAIR\_eOfficeAction@uspto.gov  
**Subject:** Private PAIR Correspondence Notification for Customer Number 161268

Sep 26, 2022 03:19:13 AM

Dear PAIR Customer:

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UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 161268 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

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| Application | Document | Mailroom Date | Attorney Docket No. |
|-------------|----------|---------------|---------------------|
| 16696383    | CTFR     | 09/26/2022    | 751391              |

To view your correspondence online or update your email addresses, please visit us anytime at <https://sportal.uspto.gov/secure/myportal/privatepair>.

If you have any questions, please email the Electronic Business Center (EBC) at [EBC@uspto.gov](mailto:EBC@uspto.gov) with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE  
PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

Doc code: RCEX

Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-08)

Approved for use through 07/31/2012, OMB 05E1-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

| <b>REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL</b><br><b>(Submitted Only via EFS-Web)</b>                                                                                                                                                                                                                                                                                                |                   |             |            |                               |                   |          |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------|------------|-------------------------------|-------------------|----------|------|
| Application Number                                                                                                                                                                                                                                                                                                                                                                             | 16/596,383        | Filing Date | 11/26/2019 | Docket Number (if applicable) | 751391            | Art Unit | 2858 |
| First Named Inventor                                                                                                                                                                                                                                                                                                                                                                           | Daniel R. Pearson |             |            | Examiner Name                 | Nguyen, Hoai An D |          |      |
| This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application. Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The instruction sheet for this form is located at <a href="http://WWW.USPTO.GOV">WWW.USPTO.GOV</a> |                   |             |            |                               |                   |          |      |
| <b>SUBMISSION REQUIRED UNDER 37 CFR 1.114</b>                                                                                                                                                                                                                                                                                                                                                  |                   |             |            |                               |                   |          |      |
| Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).                                          |                   |             |            |                               |                   |          |      |
| <input type="checkbox"/> Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.                                                                                                                                                                                  |                   |             |            |                               |                   |          |      |
| <input type="checkbox"/> Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____                                                                                                                                                                                                                                                                                   |                   |             |            |                               |                   |          |      |
| <input type="checkbox"/> Other _____                                                                                                                                                                                                                                                                                                                                                           |                   |             |            |                               |                   |          |      |
| <input checked="" type="checkbox"/> Enclosed                                                                                                                                                                                                                                                                                                                                                   |                   |             |            |                               |                   |          |      |
| <input checked="" type="checkbox"/> Amendment/Reply                                                                                                                                                                                                                                                                                                                                            |                   |             |            |                               |                   |          |      |
| <input type="checkbox"/> Information Disclosure Statement (IDS)                                                                                                                                                                                                                                                                                                                                |                   |             |            |                               |                   |          |      |
| <input type="checkbox"/> Affidavit(s)/ Declaration(s)                                                                                                                                                                                                                                                                                                                                          |                   |             |            |                               |                   |          |      |
| <input checked="" type="checkbox"/> Other <u>Petition for Extension of time</u>                                                                                                                                                                                                                                                                                                                |                   |             |            |                               |                   |          |      |
| <b>MISCELLANEOUS</b>                                                                                                                                                                                                                                                                                                                                                                           |                   |             |            |                               |                   |          |      |
| <input type="checkbox"/> Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)                                                                                                                                                          |                   |             |            |                               |                   |          |      |
| <input type="checkbox"/> Other _____                                                                                                                                                                                                                                                                                                                                                           |                   |             |            |                               |                   |          |      |
| <b>FEES</b>                                                                                                                                                                                                                                                                                                                                                                                    |                   |             |            |                               |                   |          |      |
| <input checked="" type="checkbox"/> The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.                                                                                                                                                                                                                                                                        |                   |             |            |                               |                   |          |      |
| <input type="checkbox"/> The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No _____                                                                                                                                                                                                                                         |                   |             |            |                               |                   |          |      |
| <b>SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED</b>                                                                                                                                                                                                                                                                                                                                     |                   |             |            |                               |                   |          |      |
| <input checked="" type="checkbox"/> Patent Practitioner Signature                                                                                                                                                                                                                                                                                                                              |                   |             |            |                               |                   |          |      |
| <input type="checkbox"/> Applicant Signature                                                                                                                                                                                                                                                                                                                                                   |                   |             |            |                               |                   |          |      |

EFS - Web 2.1.15

Doc code: RCEX

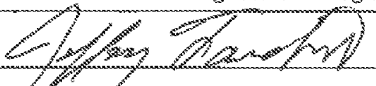
Doc description: Request for Continued Examination (RCE)

PTO/SB/36EFS (07-09)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

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| Signature of Registered U.S. Patent Practitioner |                                                                                   |                     |           |
|--------------------------------------------------|-----------------------------------------------------------------------------------|---------------------|-----------|
| Signature                                        |  | Date (YYYY-MM-DD)   | 2/27/2023 |
| Name                                             | Jeffery Fairchild                                                                 | Registration Number | 37825     |

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

| Electronic Patent Application Fee Transmittal |          |                        |        |                      |
|-----------------------------------------------|----------|------------------------|--------|----------------------|
| Application Number:                           |          | 16696383               |        |                      |
| Filing Date:                                  |          | 26-Nov-2019            |        |                      |
| Title of Invention:                           |          | GLOW FISH TAPE SYSTEM  |        |                      |
| First Named Inventor/Applicant Name:          |          | Daniel R. Pearson      |        |                      |
| Filer:                                        |          | Jeffery Neal Fairchild |        |                      |
| Attorney Docket Number:                       |          | 751391                 |        |                      |
| Filed as Large Entity                         |          |                        |        |                      |
| Filing Fees for Utility under 35 USC 111(a)   |          |                        |        |                      |
| Description                                   | Fee Code | Quantity               | Amount | Sub-Total in USD(\$) |
| Basic Filing:                                 |          |                        |        |                      |
| Pages:                                        |          |                        |        |                      |
| Claims:                                       |          |                        |        |                      |
| Miscellaneous-Filing:                         |          |                        |        |                      |
| Petition:                                     |          |                        |        |                      |
| Patent-Appeals-and-Interference:              |          |                        |        |                      |
| Post-Allowance-and-Post-Issuance:             |          |                        |        |                      |
| Extension-of-Time:                            |          |                        |        |                      |

| Description                        | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|------------------------------------|----------|----------|--------|----------------------|
| Extension - 2 months with \$0 paid | 1252     | 1        | 640    | 640                  |
| <b>Miscellaneous:</b>              |          |          |        |                      |
| RCE- 1ST REQUEST                   | 1801     | 1        | 1360   | 1360                 |
| <b>Total in USD (\$)</b>           |          |          |        | <b>2000</b>          |

| Electronic Acknowledgement Receipt          |                             |
|---------------------------------------------|-----------------------------|
| <b>EFS ID:</b>                              | 47597274                    |
| <b>Application Number:</b>                  | 16696383                    |
| <b>International Application Number:</b>    |                             |
| <b>Confirmation Number:</b>                 | 6816                        |
| <b>Title of Invention:</b>                  | GLOW FISH TAPE SYSTEM       |
| <b>First Named Inventor/Applicant Name:</b> | Daniel R. Pearson           |
| <b>Customer Number:</b>                     | 161268                      |
| <b>Filer:</b>                               | Jeffery Neal Fairchild      |
| <b>Filer Authorized By:</b>                 |                             |
| <b>Attorney Docket Number:</b>              | 751391                      |
| <b>Receipt Date:</b>                        | 27-FEB-2023                 |
| <b>Filing Date:</b>                         | 26-NOV-2019                 |
| <b>Time Stamp:</b>                          | 16:14:53                    |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a) |

### Payment information:

|                                                                                                                                                                                                                                                     |                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Submitted with Payment                                                                                                                                                                                                                              | yes               |
| Payment Type                                                                                                                                                                                                                                        | DA                |
| Payment was successfully received in RAM                                                                                                                                                                                                            | \$2000            |
| RAM confirmation Number                                                                                                                                                                                                                             | E20232QG16238408  |
| Deposit Account                                                                                                                                                                                                                                     | 602056            |
| Authorized User                                                                                                                                                                                                                                     | Jeffery Fairchild |
| <p>The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:</p> <p>37 CFR 1.17 (Patent application and reexamination processing fees)</p> <p>37 CFR 1.21 (Miscellaneous fees and charges)</p> |                   |



|                                             |                                                                                                                           |                                              |                                          |                  |                  |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------|------------------|------------------|
|                                             |                                                                                                                           |                                              |                                          |                  |                  |
| File Listing:                               |                                                                                                                           |                                              |                                          |                  |                  |
| Document Number                             | Document Description                                                                                                      | File Name                                    | File Size(Bytes)/ Message Digest         | Multi Part /.zip | Pages (if appl.) |
| 1                                           | Extension of Time                                                                                                         | 00058P00USPetitionForExtensionOfTime.pdf     | 429736                                   | no               | 2                |
|                                             |                                                                                                                           |                                              | e91720baebd0150fc82d7a79db6bc5f97d983076 |                  |                  |
| Warnings:                                   |                                                                                                                           |                                              |                                          |                  |                  |
| Information:                                |                                                                                                                           |                                              |                                          |                  |                  |
| 2                                           | Request for Continued Examination (RCE)                                                                                   | 00058P00USRequestForContinuedExamination.pdf | 84196                                    | no               | 2                |
|                                             |                                                                                                                           |                                              | 43f95bc59d43cea4bcc9c8cdd4a7285d563f3bc5 |                  |                  |
| Warnings:                                   |                                                                                                                           |                                              |                                          |                  |                  |
| This is not a USPTO supplied RCE SB30 form. |                                                                                                                           |                                              |                                          |                  |                  |
| Information:                                |                                                                                                                           |                                              |                                          |                  |                  |
| 3                                           | Amendment Submitted/Entered with Filing of Continued Prosecution Application (CPA)/Request for Continued Examination(RCE) | 00058P0USResponseToFinalOfficeAction.pdf     | 82841                                    | no               | 7                |
|                                             |                                                                                                                           |                                              | 8b135002a373e90b23bcfe5819cdd4c6a43346ad |                  |                  |
| Warnings:                                   |                                                                                                                           |                                              |                                          |                  |                  |
| Information:                                |                                                                                                                           |                                              |                                          |                  |                  |
| 4                                           | Fee Worksheet (SB06)                                                                                                      | fee-info.pdf                                 | 40749                                    | no               | 2                |
|                                             |                                                                                                                           |                                              | c3603ffdac89b35c1c368f542d07b37a4ba3b599 |                  |                  |
| Warnings:                                   |                                                                                                                           |                                              |                                          |                  |                  |
| Information:                                |                                                                                                                           |                                              |                                          |                  |                  |
| Total Files Size (in bytes):                |                                                                                                                           |                                              | 637522                                   |                  |                  |

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

| <b>PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                       | Docket Number (Optional)<br><b>751391</b> |                         |               |                         |                         |  |                                                        |       |      |      |          |                                                                    |       |       |       |               |                                                           |         |       |       |          |                                                          |         |       |       |          |                                                          |         |         |       |          |                                           |                           |                                                   |                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------|-------------------------|---------------|-------------------------|-------------------------|--|--------------------------------------------------------|-------|------|------|----------|--------------------------------------------------------------------|-------|-------|-------|---------------|-----------------------------------------------------------|---------|-------|-------|----------|----------------------------------------------------------|---------|-------|-------|----------|----------------------------------------------------------|---------|---------|-------|----------|-------------------------------------------|---------------------------|---------------------------------------------------|---------------------------------------|
| Application Number<br><b>16/696,383</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Filed<br><b>11/26/2019</b>            |                                           |                         |               |                         |                         |  |                                                        |       |      |      |          |                                                                    |       |       |       |               |                                                           |         |       |       |          |                                                          |         |       |       |          |                                                          |         |         |       |          |                                           |                           |                                                   |                                       |
| For<br><b>Response to Office Action and RCA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                       |                                           |                         |               |                         |                         |  |                                                        |       |      |      |          |                                                                    |       |       |       |               |                                                           |         |       |       |          |                                                          |         |       |       |          |                                                          |         |         |       |          |                                           |                           |                                                   |                                       |
| Art Unit<br><b>2858</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Examiner<br><b>Nguyen, Hoai An D</b>  |                                           |                         |               |                         |                         |  |                                                        |       |      |      |          |                                                                    |       |       |       |               |                                                           |         |       |       |          |                                                          |         |       |       |          |                                                          |         |         |       |          |                                           |                           |                                                   |                                       |
| <p>This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.</p> <p>The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):</p> <table style="width: 100%; border-collapse: collapse;"><thead><tr><th></th><th style="text-align: center;"><u>Fee</u></th><th style="text-align: center;"><u>Small Entity Fee</u></th><th style="text-align: center;"><u>Micro Entity Fee</u></th><th></th></tr></thead><tbody><tr><td><input type="checkbox"/> One month (37 CFR 1.17(a)(1))</td><td style="text-align: center;">\$220</td><td style="text-align: center;">\$88</td><td style="text-align: center;">\$44</td><td>\$ _____</td></tr><tr><td><input checked="" type="checkbox"/> Two months (37 CFR 1.17(a)(2))</td><td style="text-align: center;">\$640</td><td style="text-align: center;">\$256</td><td style="text-align: center;">\$128</td><td>\$ <b>640</b></td></tr><tr><td><input type="checkbox"/> Three months (37 CFR 1.17(a)(3))</td><td style="text-align: center;">\$1,480</td><td style="text-align: center;">\$592</td><td style="text-align: center;">\$296</td><td>\$ _____</td></tr><tr><td><input type="checkbox"/> Four months (37 CFR 1.17(a)(4))</td><td style="text-align: center;">\$2,320</td><td style="text-align: center;">\$928</td><td style="text-align: center;">\$464</td><td>\$ _____</td></tr><tr><td><input type="checkbox"/> Five months (37 CFR 1.17(a)(5))</td><td style="text-align: center;">\$3,160</td><td style="text-align: center;">\$1,264</td><td style="text-align: center;">\$632</td><td>\$ _____</td></tr></tbody></table> <p><input type="checkbox"/> Applicant asserts small entity status. See 37 CFR 1.27.</p> <p><input type="checkbox"/> Applicant certifies micro entity status. See 37 CFR 1.29.<br/>Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.</p> <p><input type="checkbox"/> A check in the amount of the fee is enclosed.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> The Director has already been authorized to charge fees in this application to a Deposit Account.</p> <p><input type="checkbox"/> The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to<br/>Deposit Account Number _____.</p> <p><input checked="" type="checkbox"/> Payment made via USPTO's patent electronic filing system (Patent Center or EFS-Web).</p> <p><b>WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</b></p> <p>I am the</p> <p><input type="checkbox"/> applicant.</p> <p><input checked="" type="checkbox"/> attorney or agent of record. Registration number <u>37825</u>.</p> <p><input checked="" type="checkbox"/> attorney or agent acting under 37 CFR 1.34. Registration number <u>37825</u>.</p> <table style="width: 100%; border-collapse: collapse;"><tr><td style="width: 50%; padding: 5px;"><u>/JEFFERY N FAIRCHILD/</u><br/>Signature</td><td style="width: 50%; padding: 5px;"><u>02/27/2023</u><br/>Date</td></tr><tr><td style="padding: 5px;"><u>Jeffery Fairchild</u><br/>Typed or printed name</td><td style="padding: 5px;"><u>8478215549</u><br/>Telephone Number</td></tr></table> <p><b>NOTE:</b> This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.</p> |                                       |                                           |                         | <u>Fee</u>    | <u>Small Entity Fee</u> | <u>Micro Entity Fee</u> |  | <input type="checkbox"/> One month (37 CFR 1.17(a)(1)) | \$220 | \$88 | \$44 | \$ _____ | <input checked="" type="checkbox"/> Two months (37 CFR 1.17(a)(2)) | \$640 | \$256 | \$128 | \$ <b>640</b> | <input type="checkbox"/> Three months (37 CFR 1.17(a)(3)) | \$1,480 | \$592 | \$296 | \$ _____ | <input type="checkbox"/> Four months (37 CFR 1.17(a)(4)) | \$2,320 | \$928 | \$464 | \$ _____ | <input type="checkbox"/> Five months (37 CFR 1.17(a)(5)) | \$3,160 | \$1,264 | \$632 | \$ _____ | <u>/JEFFERY N FAIRCHILD/</u><br>Signature | <u>02/27/2023</u><br>Date | <u>Jeffery Fairchild</u><br>Typed or printed name | <u>8478215549</u><br>Telephone Number |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <u>Fee</u>                            | <u>Small Entity Fee</u>                   | <u>Micro Entity Fee</u> |               |                         |                         |  |                                                        |       |      |      |          |                                                                    |       |       |       |               |                                                           |         |       |       |          |                                                          |         |       |       |          |                                                          |         |         |       |          |                                           |                           |                                                   |                                       |
| <input type="checkbox"/> One month (37 CFR 1.17(a)(1))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | \$220                                 | \$88                                      | \$44                    | \$ _____      |                         |                         |  |                                                        |       |      |      |          |                                                                    |       |       |       |               |                                                           |         |       |       |          |                                                          |         |       |       |          |                                                          |         |         |       |          |                                           |                           |                                                   |                                       |
| <input checked="" type="checkbox"/> Two months (37 CFR 1.17(a)(2))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | \$640                                 | \$256                                     | \$128                   | \$ <b>640</b> |                         |                         |  |                                                        |       |      |      |          |                                                                    |       |       |       |               |                                                           |         |       |       |          |                                                          |         |       |       |          |                                                          |         |         |       |          |                                           |                           |                                                   |                                       |
| <input type="checkbox"/> Three months (37 CFR 1.17(a)(3))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | \$1,480                               | \$592                                     | \$296                   | \$ _____      |                         |                         |  |                                                        |       |      |      |          |                                                                    |       |       |       |               |                                                           |         |       |       |          |                                                          |         |       |       |          |                                                          |         |         |       |          |                                           |                           |                                                   |                                       |
| <input type="checkbox"/> Four months (37 CFR 1.17(a)(4))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | \$2,320                               | \$928                                     | \$464                   | \$ _____      |                         |                         |  |                                                        |       |      |      |          |                                                                    |       |       |       |               |                                                           |         |       |       |          |                                                          |         |       |       |          |                                                          |         |         |       |          |                                           |                           |                                                   |                                       |
| <input type="checkbox"/> Five months (37 CFR 1.17(a)(5))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | \$3,160                               | \$1,264                                   | \$632                   | \$ _____      |                         |                         |  |                                                        |       |      |      |          |                                                                    |       |       |       |               |                                                           |         |       |       |          |                                                          |         |       |       |          |                                                          |         |         |       |          |                                           |                           |                                                   |                                       |
| <u>/JEFFERY N FAIRCHILD/</u><br>Signature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <u>02/27/2023</u><br>Date             |                                           |                         |               |                         |                         |  |                                                        |       |      |      |          |                                                                    |       |       |       |               |                                                           |         |       |       |          |                                                          |         |       |       |          |                                                          |         |         |       |          |                                           |                           |                                                   |                                       |
| <u>Jeffery Fairchild</u><br>Typed or printed name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <u>8478215549</u><br>Telephone Number |                                           |                         |               |                         |                         |  |                                                        |       |      |      |          |                                                                    |       |       |       |               |                                                           |         |       |       |          |                                                          |         |       |       |          |                                                          |         |         |       |          |                                           |                           |                                                   |                                       |

☐ \* Total of ONE forms are submitted.

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013). <https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf>

Routine uses of the information in this record may include disclosure to: 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law; 2) a Federal, state, local, or international agency, in response to its request; 3) a contractor of the USPTO having need for the information in order to perform a contract; 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record; 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record; 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations; 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals; 8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)); 9) the Office of Personnel Management (OPM) for personnel research purposes; and 9) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

## Additional Uses

Additional USPTO uses of the information in this record may include disclosure to: 1) the International Bureau of the World Intellectual Property Organization, if the record is related to an international application filed under the Patent Cooperation Treaty; 2) the public i) after publication of the application pursuant to 35 U.S.C. 122(b), ii) after issuance of a patent pursuant to 35 U.S.C. 151, iii) if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections, or an issued patent, or iv) without publication of the application or patent under the specific circumstances provided for by 37 CFR 1.14(a)(1)(v)-(vii); and/or 3) the National Archives and Records Administration, for inspection of records.

|                                                                                                                                 |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |                     |                                       |  |  |
|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------------|---------------|---------------------------|---------------------|---------------------------------------|--|--|
| <b>PATENT APPLICATION FEE DETERMINATION RECORD</b><br>Substitute for Form PTO-875                                               |                                                                                          |                                                                                                                                                                                                                               |              | Application or Docket Number<br>16/696,383 |               | Filing Date<br>11/26/2019 |                     | <input type="checkbox"/> To be Mailed |  |  |
| ENTITY: <input checked="" type="checkbox"/> LARGE <input type="checkbox"/> SMALL <input type="checkbox"/> MICRO                 |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |                     |                                       |  |  |
| <b>APPLICATION AS FILED - PART I</b>                                                                                            |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |                     |                                       |  |  |
|                                                                                                                                 |                                                                                          | (Column 1)                                                                                                                                                                                                                    | (Column 2)   |                                            |               |                           |                     |                                       |  |  |
| FOR                                                                                                                             |                                                                                          | NUMBER FILED                                                                                                                                                                                                                  | NUMBER EXTRA |                                            | RATE (\$)     |                           | FEE (\$)            |                                       |  |  |
| <input type="checkbox"/> BASIC FEE<br>(37 CFR 1.16(a), (b), or (c))                                                             |                                                                                          | N/A                                                                                                                                                                                                                           | N/A          |                                            | N/A           |                           |                     |                                       |  |  |
| <input type="checkbox"/> SEARCH FEE<br>(37 CFR 1.16(k), (l), or (m))                                                            |                                                                                          | N/A                                                                                                                                                                                                                           | N/A          |                                            | N/A           |                           |                     |                                       |  |  |
| <input type="checkbox"/> EXAMINATION FEE<br>(37 CFR 1.16(o), (p), or (q))                                                       |                                                                                          | N/A                                                                                                                                                                                                                           | N/A          |                                            | N/A           |                           |                     |                                       |  |  |
| TOTAL CLAIMS<br>(37 CFR 1.16(j))                                                                                                |                                                                                          | minus 20 =                                                                                                                                                                                                                    | *            |                                            | x \$100 =     |                           |                     |                                       |  |  |
| INDEPENDENT CLAIMS<br>(37 CFR 1.16(h))                                                                                          |                                                                                          | minus 3 =                                                                                                                                                                                                                     | *            |                                            | x \$460 =     |                           |                     |                                       |  |  |
| <input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))                                                                  |                                                                                          | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). |              |                                            |               |                           |                     |                                       |  |  |
| <input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))                                                      |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |                     |                                       |  |  |
| * If the difference in column 1 is less than zero, enter "0" in column 2.                                                       |                                                                                          |                                                                                                                                                                                                                               |              |                                            | TOTAL         |                           |                     |                                       |  |  |
| <b>APPLICATION AS AMENDED - PART II</b>                                                                                         |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |                     |                                       |  |  |
|                                                                                                                                 |                                                                                          | (Column 1)                                                                                                                                                                                                                    | (Column 2)   |                                            | (Column 3)    |                           |                     |                                       |  |  |
| AMENDMENT                                                                                                                       | 02/27/2023                                                                               | CLAIMS REMAINING AFTER AMENDMENT                                                                                                                                                                                              |              | HIGHEST NUMBER PREVIOUSLY PAID FOR         | PRESENT EXTRA | RATE (\$)                 | ADDITIONAL FEE (\$) |                                       |  |  |
|                                                                                                                                 | Total<br>(37 CFR 1.16(j))                                                                | * 18                                                                                                                                                                                                                          | Minus        | ** 20                                      | = 0           | x \$100 =                 | 0                   |                                       |  |  |
|                                                                                                                                 | Independent<br>(37 CFR 1.16(h))                                                          | * 3                                                                                                                                                                                                                           | Minus        | *** 3                                      | = 0           | x \$480 =                 | 0                   |                                       |  |  |
|                                                                                                                                 | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))                           |                                                                                                                                                                                                                               |              |                                            |               |                           |                     |                                       |  |  |
|                                                                                                                                 | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) |                                                                                                                                                                                                                               |              |                                            |               |                           |                     |                                       |  |  |
|                                                                                                                                 |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               | TOTAL ADD'L FEE           |                     | 0                                     |  |  |
| AMENDMENT                                                                                                                       |                                                                                          | (Column 1)                                                                                                                                                                                                                    | (Column 2)   |                                            | (Column 3)    |                           |                     |                                       |  |  |
|                                                                                                                                 |                                                                                          | CLAIMS REMAINING AFTER AMENDMENT                                                                                                                                                                                              |              | HIGHEST NUMBER PREVIOUSLY PAID FOR         | PRESENT EXTRA | RATE (\$)                 | ADDITIONAL FEE (\$) |                                       |  |  |
|                                                                                                                                 | Total<br>(37 CFR 1.16(j))                                                                | *                                                                                                                                                                                                                             | Minus        | **                                         | =             | x \$0 =                   |                     |                                       |  |  |
|                                                                                                                                 | Independent<br>(37 CFR 1.16(h))                                                          | *                                                                                                                                                                                                                             | Minus        | ***                                        | =             | x \$0 =                   |                     |                                       |  |  |
|                                                                                                                                 | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))                           |                                                                                                                                                                                                                               |              |                                            |               |                           |                     |                                       |  |  |
| <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))                                        |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |                     |                                       |  |  |
|                                                                                                                                 |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               | TOTAL ADD'L FEE           |                     |                                       |  |  |
| * If the entry in column 1 is less than the entry in column 2, write "0" in column 3.                                           |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               | LIE                       |                     |                                       |  |  |
| ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".                                       |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               | /ANITA JOHNSON/           |                     |                                       |  |  |
| *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".                                        |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |                     |                                       |  |  |
| The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1. |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |                     |                                       |  |  |

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Patent Application No. 16/696,383

Confirmation No. 6816

First Named Inventor: Pearson

Filed or 371 Date: 11/26/2019

TC/AU: 2858

Examiner: Nguyen, Hoai An D

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

**Response**

Sir, in response to the Office Action dated 9/26/2022 Applicant hereby responds as follows:

**Amendments to the Claims**

Please amend the claims as follows:

1. (Currently amended) A fish tape system comprising:  
a fish tape having a length extending from a first end to a second end, the length of the fish tape comprising a luminescent material that emits light after being energized by exposure to a light source; ~~and~~  
a donut shaped case having a pair of sidewalls extending between a radially innermost wall and a radially outermost wall, the outermost wall having an annular opening extending around a circumference of the outer wall, the sidewalls being spaced from each other to define a fish tape storage compartment that stores the length of fish tape for deployment via the annular opening in the case; and  
a handle engaged with the fish tape and mounted to slide within the annular opening of the case around the entire circumference of the outer wall to deploy the fish tape from the storage compartment and to reload the fish tape into the compartment;  
wherein at least one of the sidewalls of the case is transparent to allow the luminescent material to be energized by light passing through the at least one of the sidewalls.
2. The fish tape system of claim 1 wherein both of the sidewalls of the case are transparent to allow the luminescent material to be energized by light passing through the sidewalls.
3. The fish tape system of claim 2 wherein at least one of the innermost and outermost walls is transparent to allow the luminescent material to be energized by light passing through the sidewalls.
4. The fish tape system of claim 1 wherein one of the sidewalls and portions of the innermost and outermost walls are defined by a first component of the case, and the other of the sidewalls and other portions of the innermost and outermost walls are defined by a second component of the case, the first and second components being assembled together to form the storage compartment.
5. (Canceled)

6. The fish tape system of claim 1 wherein the fish tape further comprises a threaded opening in at least one of the first and second ends.
7. (Currently amended) A fish tape system comprising:
  - a fish tape having a length extending from a first end to a second end, the length of the fish tape comprising a luminescent material that emits light after being energized by exposure to a light source; ~~and~~
  - a donut shaped case having a pair of sidewalls extending between a radially innermost wall and a radially outermost wall, an annular opening extending around a circumference of one of the inner and outer walls, the sidewalls being spaced from each other to define a fish tape storage compartment that stores the length of fish tape for deployment via the annular opening in the case; and
  - a handle engaged with the fish tape and mounted to slide within the annular opening of the case around the entire circumference to deploy the fish tape from the storage compartment and to reload the fish tape into the compartment;
  - wherein at least a portion of the case is transparent to allow the luminescent material to be energized by light passing through the portion.
8. The fish tape system of claim 7 wherein at least a portion of at least one of the sidewalls of the case is transparent to allow the luminescent material to be energized by light passing through the at least one of the sidewalls.
9. The fish tape system of claim 7 wherein at least portions of both of the sidewalls of the case are transparent to allow the luminescent material to be energized by light passing through the sidewalls.
10. The fish tape system of claim 7 wherein at least portions of all the walls of the case are transparent.



11. The fish tape system of claim 7 wherein one of the sidewalls and portions of the innermost and outermost walls are defined by a first component of the case, and the other of the sidewalls and other portions of the innermost and outermost walls are defined by a second component of the case, the first and second components being assembled together to form the storage compartment.
12. The fish tape system of claim 11 wherein at least one of the first and second components comprises a transparent material.
13. The fish tape system of claim 11 wherein both of the first and second components comprises a transparent material.
14. (Cancelled)
15. The fish tape system of claim 7 wherein the fish tape further comprises a threaded opening in at least one of the first and second ends.
16. (Currently amended) A fish tape system comprising:
  - a fish tape having a length extending from a first end to a second end, the length of the fish tape comprising a luminescent material that emits light after being energized by exposure to a light source; ~~and~~
  - a case having a fish tape storage compartment that stores the length of fish tape for deployment and reloading via an annular opening in the case; and
  - a handle engaged with the fish tape and mounted to slide within the annular opening of the case around an entire circumference of the annular opening to deploy the fish tape from the storage compartment and to reload the fish tape into the compartment;
  - wherein at least a portion of the case is transparent to allow the luminescent material to be energized by light passing through the portion and into the storage compartment.
17. The fish tape system of claim 16 wherein the storage compartment has an annular shape bounded by a pair of spaced sidewalls.

18. The fish tape system of claim 17 wherein at least a portion of at least one of the sidewalls is transparent.

19. The fish tape system of claim 18 wherein portions of both of the sidewalls are transparent.

20. The fish tape system of claim 16 wherein the case comprises a pair of components that are joined to each other to define the storage compartment, and at least one of the pair of components comprises a transparent material.

**Remarks/Arguments**

Claims 5 and 14 have been cancelled. Accordingly, claims 1-4, 6-13, and 15-20 are pending and at issue.

Independent claims 1, 7, and 16 have been amended to overcome the Section 103 rejection based on Miller et al. (US 2019/0292005 A1) in view of Farretta (US 6,293,519 B1).

More specifically, independent claims 1, 7, and 16 have been amended to further recite a handle engaged with the fish tape and mounted to slide within the annular opening of the case around an entire circumference to deploy the fish tape from the storage compartment and to reload the fish tape into the compartment. This structure is neither shown nor suggested in Miller et al. which discloses a fish tape tool having a housing with a handle that is fixed to prevent relative movement between the handle and the housing, with the housing being configured to receive fish tape drums that, with each fish tape drum containing a length of fish tape. The housing of Miller et al. doesn't have an annular opening, let alone a handle mounted to slide within such an annular opening to deploy a fish tape from a storage compartment and to reload the fish tape into the compartment. Furthermore, one skilled in the art would not modify Miller et al. to include such a handle because such a modification would completely change the principle of operation of Miller et al. (the use of a housing with a fixed handle, with a output reel that rotates a fish tape drum contained within the housing to deploy a fish tape from the fish tape drum and to reload the fish tape into the fish tape drum), would require a complete reconstruction of the structures disclosed in Miller et al. (the elimination of the housing, the elimination of the output reel, and the addition of a handle to the fish tape drum) and would defeat the purpose of Miller et al. which is to provide a housing that can receive individual fish tape drums and rotate each of those drums within the housing to deploy and retract a fish tape from and into each of the individual fish tape drums. Farretta adds nothing in this regard and in no way suggests that the fish tape tools of Miller et al. should be modified in a way that would completely change the principle of operation of the fish tape tools, or that would require a complete reconstruction of the fish tape tools, or that would defeat the very purpose of the fish tape tools. Accordingly, it is respectfully submitted that the Section 103 rejection of claims 1, 7, and 16 and their dependent claims should be withdrawn and the claims allowed in view of the amendments to claims 1, 7, and 16.

Applicant hereby petitions for any time extension required for consideration of this response and for the Request for Continued Examination filed herewith, The Director is hereby authorized to charge any additional fees that may be required for this time extension, or to credit any overpayment, to Deposit Account Number 602056.

If there are any other issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

Dated: **2/27/2023**

Respectfully submitted,

By     /Jeffery N. Fairchild/    

Jeffery N. Fairchild, Reg. No. 37825

Klein Tools  
450 Bond Street  
Lincolnshire, IL 60069  
(847) 821-5549 (Telephone)  
Attorney for Applicant



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161268 7590 03/10/2023  
LEYDIG VOIT & MAYER, LTD (Klein Tools)  
TWO PRUDENTIAL PLAZA, SUITE 4900  
180 NORTH STETSON AVENUE  
CHICAGO, IL 60601-6731

EXAMINER

NGUYEN, HOAI AN D

ART UNIT

PAPER NUMBER

2858

DATE MAILED: 03/10/2023

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 16/696,383      | 11/26/2019  | Daniel R. Pearson    | 751391              | 6816             |

TITLE OF INVENTION: GLOW FISH TAPE SYSTEM

| APPLN. TYPE    | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|---------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | UNDISCOUNTED  | \$1200        | \$0.00              | \$0.00               | \$1200           | 06/12/2023 |

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

### HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at [www.uspto.gov/PatentMaintenanceFees](http://www.uspto.gov/PatentMaintenanceFees).**

## PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

161268 7590 03/10/2023  
LEYDIG VOIT & MAYER, LTD (Klein Tools)  
TWO PRUDENTIAL PLAZA, SUITE 4900  
180 NORTH STETSON AVENUE  
CHICAGO, IL 60601-6731

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

### Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

|                         |
|-------------------------|
| (Typed or printed name) |
| (Signature)             |
| (Date)                  |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 16/696,383      | 11/26/2019  | Daniel R. Pearson    | 751391              | 6816             |

TITLE OF INVENTION: GLOW FISH TAPE SYSTEM

| APPLN. TYPE    | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|---------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | UNDISCOUNTED  | \$1200        | \$0.00              | \$0.00               | \$1200           | 06/12/2023 |

| EXAMINER          | ART UNIT | CLASS-SUBCLASS |
|-------------------|----------|----------------|
| NGUYEN, HOAI AN D | 2858     | 254-1343FT     |

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies \_\_\_\_\_

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. \_\_\_\_\_

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

**NOTE:** Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

**NOTE:** If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

**NOTE:** Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO.                                                                                                                                            | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.           | CONFIRMATION NO. |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------|-------------------------------|------------------|
| 16/696,383                                                                                                                                                 | 11/26/2019  | Daniel R. Pearson    | 751391                        | 6816             |
| 161268 7590 03/10/2023<br>LEYDIG VOIT & MAYER, LTD (Klein Tools)<br>TWO PRUDENTIAL PLAZA, SUITE 4900<br>180 NORTH STETSON AVENUE<br>CHICAGO, IL 60601-6731 |             |                      | EXAMINER<br>NGUYEN, HOAI AN D |                  |
|                                                                                                                                                            |             |                      | ART UNIT<br>2858              | PAPER NUMBER     |

DATE MAILED: 03/10/2023

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.** Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

### Privacy Act Statement

**The Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



|                               |                                      |                                           |                                 |
|-------------------------------|--------------------------------------|-------------------------------------------|---------------------------------|
| <b>Notice of Allowability</b> | <b>Application No.</b><br>16/696,383 | <b>Applicant(s)</b><br>Pearson, Daniel R. |                                 |
|                               | <b>Examiner</b><br>HOAI-AN D NGUYEN  | <b>Art Unit</b><br>2858                   | <b>AIA (FITF) Status</b><br>Yes |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE filed on February 27, 2023.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-4,6-13 and 15-20. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to **PPHfeedback@uspto.gov**.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**  
a) ☐ All      b) ☐ Some\*      c) ☐ None of the:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

|                                                                                                                   |                                                                                      |
|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)                                                  | 5. <input type="checkbox"/> Examiner's Amendment/Comment                             |
| 2. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date _____.          | 6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material _____. | 7. <input type="checkbox"/> Other _____.                                             |
| 4. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date. _____.                           |                                                                                      |

|                                                        |  |
|--------------------------------------------------------|--|
| /HOAI-AN D. NGUYEN/<br>Primary Examiner, Art Unit 2858 |  |
|--------------------------------------------------------|--|

## **DETAILED ACTION**

### ***Notice of Pre-AIA or AIA Status***

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

### ***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 27, 2023 has been entered. Accordingly, claims 5 and 14 are cancelled; claims 1-4, 6-13 and 15-20 are currently pending in the application.

### ***Allowable Subject Matter***

3. Claims 1-4, 6-13 and 15-20 are allowed.

4. The following is an examiner's statement of reasons for allowance:

With regard to claims 1, 7 and 16, applicants' arguments in the second paragraph at page 6 of 7 of the Remarks and amendments have been considered and found persuasive.

With regard to claims 2-4, 6, 8-13, 15 and 17-20, these claims are allowed at least by virtue of their dependencies directly or indirectly from the base claims, respectively.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### CONTACT INFORMATION

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HOAI-AN D. NGUYEN whose telephone number is (571) 272-2170. The examiner can normally be reached MON-THURS (7:00 AM - 5:00 PM).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, PATRICK J. ASSOUD can be reached on 571-272-2210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HOAI-AN D. NGUYEN  
Primary Examiner  
Art Unit 2858

/HOAI-AN D. NGUYEN/  
Primary Examiner, Art Unit 2858

|                                                                                                                  |                                              |                                                                      |
|------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------|
| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>16/696,383 | <b>Applicant(s)/Patent Under Reexamination</b><br>Pearson, Daniel R. |
|                                                                                                                  | <b>Examiner</b><br>HOAI-AN D NGUYEN          | <b>Art Unit</b><br>2858                                              |

| CPC    |   |      |   |     |      |            |
|--------|---|------|---|-----|------|------------|
| Symbol |   |      |   |     | Type | Version    |
| B65H   | / | 75   | / | 406 | F    | 2013-01-01 |
| H02G   | / | 11   | / | 02  | I    | 2013-01-01 |
| B65H   | / | 2701 | / | 376 | A    | 2013-01-01 |

| CPC Combination Sets |   |  |   |      |     |         |
|----------------------|---|--|---|------|-----|---------|
| Symbol               |   |  |   | Type | Set | Ranking |
|                      | / |  | / |      |     |         |

|                                                        |               |                              |                   |
|--------------------------------------------------------|---------------|------------------------------|-------------------|
| NONE                                                   |               | <b>Total Claims Allowed:</b> |                   |
| (Assistant Examiner)                                   | (Date)        | 18                           |                   |
| /HOAI-AN D. NGUYEN/<br>Primary Examiner, Art Unit 2858 | 07 March 2023 | O.G. Print Claim(s)          | O.G. Print Figure |
| (Primary Examiner)                                     | (Date)        | 1                            | 1                 |

U.S. Patent and Trademark Office

Part of Paper No.: 20230307

|                                                                                                                  |                                              |                                                                      |
|------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------|
| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>16/696,383 | <b>Applicant(s)/Patent Under Reexamination</b><br>Pearson, Daniel R. |
|                                                                                                                  | <b>Examiner</b><br>HOAI-AN D NGUYEN          | <b>Art Unit</b><br>2858                                              |

|                                     |  |    |    |
|-------------------------------------|--|----|----|
| <b>INTERNATIONAL CLASSIFICATION</b> |  |    |    |
| <b>CLAIMED</b>                      |  |    |    |
| B65H                                |  | 75 | 40 |
| H02G                                |  | 11 | 02 |
| <b>NON-CLAIMED</b>                  |  |    |    |
|                                     |  |    |    |

|                                   |                 |
|-----------------------------------|-----------------|
| <b>US ORIGINAL CLASSIFICATION</b> |                 |
| <b>CLASS</b>                      | <b>SUBCLASS</b> |
| 254                               | 134.3FT         |

|                            |                                          |  |  |  |  |
|----------------------------|------------------------------------------|--|--|--|--|
| <b>CROSS REFERENCES(S)</b> |                                          |  |  |  |  |
| <b>CLASS</b>               | <b>SUBCLASS (ONE SUBCLASS PER BLOCK)</b> |  |  |  |  |
| 254                        | 134.3R                                   |  |  |  |  |

|                                                        |               |                              |                   |
|--------------------------------------------------------|---------------|------------------------------|-------------------|
| NONE                                                   |               | <b>Total Claims Allowed:</b> |                   |
| (Assistant Examiner)                                   | (Date)        | 18                           |                   |
| /HOAI-AN D. NGUYEN/<br>Primary Examiner, Art Unit 2858 | 07 March 2023 | O.G. Print Claim(s)          | O.G. Print Figure |
| (Primary Examiner)                                     | (Date)        | 1                            | 1                 |

U.S. Patent and Trademark Office

Part of Paper No.: 20230307

|                                                                                                                  |                                              |                                                                      |
|------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------|
| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>16/696,383 | <b>Applicant(s)/Patent Under Reexamination</b><br>Pearson, Daniel R. |
|                                                                                                                  | <b>Examiner</b><br>HOAI-AN D NGUYEN          | <b>Art Unit</b><br>2858                                              |

|                                                                                                                                                                                   |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|
| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47 |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| <b>CLAIMS</b>                                                                                                                                                                     |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| <b>Final</b>                                                                                                                                                                      | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> |
| 1                                                                                                                                                                                 | 1               | 10           | 10              | 17           | 19              |              |                 |              |                 |              |                 |              |                 |              |                 |
| 2                                                                                                                                                                                 | 2               | 11           | 11              | 18           | 20              |              |                 |              |                 |              |                 |              |                 |              |                 |
| 3                                                                                                                                                                                 | 3               | 12           | 12              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| 4                                                                                                                                                                                 | 4               | 13           | 13              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| -                                                                                                                                                                                 | 5               | -            | 14              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| 5                                                                                                                                                                                 | 6               | 7            | 15              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| 6                                                                                                                                                                                 | 7               | 14           | 16              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| 8                                                                                                                                                                                 | 8               | 15           | 17              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| 9                                                                                                                                                                                 | 9               | 16           | 18              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |

|                                                                                                         |  |                                    |                        |
|---------------------------------------------------------------------------------------------------------|--|------------------------------------|------------------------|
| NONE<br><br>(Assistant Examiner) _____ (Date) _____                                                     |  | <b>Total Claims Allowed:</b><br>18 |                        |
| /HOAI-AN D. NGUYEN/<br>Primary Examiner, Art Unit 2858<br>(Primary Examiner) _____ (Date) 07 March 2023 |  | O.G. Print Claim(s)<br>1           | O.G. Print Figure<br>1 |

|                                                                                                                    |                                              |                                                                      |
|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------|
| <b><i>Index of Claims</i></b><br> | <b>Application/Control No.</b><br>16/696,383 | <b>Applicant(s)/Patent Under Reexamination</b><br>Pearson, Daniel R. |
|                                                                                                                    | <b>Examiner</b><br>HOAI-AN D NGUYEN          | <b>Art Unit</b><br>2858                                              |

|   |                 |   |                   |   |                     |   |                 |
|---|-----------------|---|-------------------|---|---------------------|---|-----------------|
| ✓ | <b>Rejected</b> | - | <b>Cancelled</b>  | N | <b>Non-Elected</b>  | A | <b>Appeal</b>   |
| = | <b>Allowed</b>  | ÷ | <b>Restricted</b> | I | <b>Interference</b> | O | <b>Objected</b> |

| CLAIMS                                                                                                                                                                            |          |            |  |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|--|--|--|--|--|--|--|
| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47 |          |            |  |  |  |  |  |  |  |
| CLAIM                                                                                                                                                                             |          | DATE       |  |  |  |  |  |  |  |
| Final                                                                                                                                                                             | Original | 03/07/2023 |  |  |  |  |  |  |  |
| 1                                                                                                                                                                                 | 1        | =          |  |  |  |  |  |  |  |
| 2                                                                                                                                                                                 | 2        | =          |  |  |  |  |  |  |  |
| 3                                                                                                                                                                                 | 3        | =          |  |  |  |  |  |  |  |
| 4                                                                                                                                                                                 | 4        | =          |  |  |  |  |  |  |  |
|                                                                                                                                                                                   | 5        | -          |  |  |  |  |  |  |  |
| 5                                                                                                                                                                                 | 6        | =          |  |  |  |  |  |  |  |
| 6                                                                                                                                                                                 | 7        | =          |  |  |  |  |  |  |  |
| 8                                                                                                                                                                                 | 8        | =          |  |  |  |  |  |  |  |
| 9                                                                                                                                                                                 | 9        | =          |  |  |  |  |  |  |  |
| 10                                                                                                                                                                                | 10       | =          |  |  |  |  |  |  |  |
| 11                                                                                                                                                                                | 11       | =          |  |  |  |  |  |  |  |
| 12                                                                                                                                                                                | 12       | =          |  |  |  |  |  |  |  |
| 13                                                                                                                                                                                | 13       | =          |  |  |  |  |  |  |  |
|                                                                                                                                                                                   | 14       | -          |  |  |  |  |  |  |  |
| 7                                                                                                                                                                                 | 15       | =          |  |  |  |  |  |  |  |
| 14                                                                                                                                                                                | 16       | =          |  |  |  |  |  |  |  |
| 15                                                                                                                                                                                | 17       | =          |  |  |  |  |  |  |  |
| 16                                                                                                                                                                                | 18       | =          |  |  |  |  |  |  |  |
| 17                                                                                                                                                                                | 19       | =          |  |  |  |  |  |  |  |
| 18                                                                                                                                                                                | 20       | =          |  |  |  |  |  |  |  |
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|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------|
| <b><i>Search Notes</i></b><br> | <b>Application/Control No.</b><br>16/696,383 | <b>Applicant(s)/Patent Under Reexamination</b><br>Pearson, Daniel R. |
|                                                                                                                 | <b>Examiner</b><br>HOAI-AN D NGUYEN          | <b>Art Unit</b><br>2858                                              |

| CPC - Searched*                                         |            |          |
|---------------------------------------------------------|------------|----------|
| Symbol                                                  | Date       | Examiner |
| B65H75/00, 02, 34, 36, 362, 364, 38, 40, 406 (Updated). | 03/07/2023 | HADN     |
| B65H2701/00, 30, 37, 376 (Updated).                     | 03/07/2023 | HADN     |
| H02G11/00, 006, 02, 06, 08, 083, 085 (Updated).         | 03/07/2023 | HADN     |

| CPC Combination Sets - Searched* |      |          |
|----------------------------------|------|----------|
| Symbol                           | Date | Examiner |
|                                  |      |          |

| US Classification - Searched* |                            |            |          |
|-------------------------------|----------------------------|------------|----------|
| Class                         | Subclass                   | Date       | Examiner |
| 254                           | 134.3R, 134.3FT (Updated). | 03/19/2023 | HADN     |

\* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

| Search Notes                                           |            |          |
|--------------------------------------------------------|------------|----------|
| Search Notes                                           | Date       | Examiner |
| Reviewed all previously searched prior art references. | 03/06/2023 | HADN     |
| Inventor's name searched.                              | 03/07/2023 | HADN     |
| Text search in PE2E SEARCH.                            | 03/07/2023 | HADN     |

| Interference Search                   |                       |            |          |
|---------------------------------------|-----------------------|------------|----------|
| US Class/CPC Symbol                   | US Subclass/CPC Group | Date       | Examiner |
| Interference Search History Printout. |                       | 03/07/2023 | HADN     |

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|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------|
| <b><i>Search Notes</i></b><br> | <b>Application/Control No.</b><br>16/696,383 | <b>Applicant(s)/Patent Under Reexamination</b><br>Pearson, Daniel R. |
|                                                                                                                 | <b>Examiner</b><br>HOAI-AN D NGUYEN          | <b>Art Unit</b><br>2858                                              |

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## PE2E SEARCH - Search History (Prior Art)

| Ref # | Hits | Search Query                                           | DBs                                                                                                                                                                                                                                                                                                                  | Default Operator | Plurals | British Equivalents | Time Stamp          |
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| L190  | 6    | (B65H75/00.cpc.) AND @ad<"20191126" AND @pd>"20220919" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/03/07 08:19 AM |
| L191  | 7    | (B65H75/02.cpc.) AND @ad<"20191126" AND @pd>"20220919" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/03/07 08:19 AM |
| L192  | 14   | (B65H75/34.cpc.) AND @ad<"20191126" AND @pd>"20220919" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/03/07 08:20 AM |
| L193  | 0    | (B65H75/36.cpc.) AND @ad<"20191126" AND @pd>"20220919" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU,                                                                                                                                                                                                                                        | OR               | ON      | ON                  | 2023/03/07 08:20 AM |

|      |    |                                                         |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
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|      |    |                                                         | CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                               |    |    |    |                     |
| L194 | 2  | (B65H75/362.cpc.) AND @ad<"20191126" AND @pd>"20220919" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 08:20 AM |
| L195 | 13 | (B65H75/364.cpc.) AND @ad<"20191126" AND @pd>"20220919" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 08:21 AM |
| L196 | 9  | (B65H75/38.cpc.) AND @ad<"20191126" AND @pd>"20220919"  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN,                                        | OR | ON | ON | 2023/03/07 08:22 AM |

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|      |    |                                                                | WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                                                                                                                      |    |    |    |                        |
| L197 | 13 | (B65H75/40.cpc.) AND<br>@ad<"20191126" AND<br>@pd>"20220919"   | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/03/07<br>08:23 AM |
| L198 | 16 | (B65H75/406.cpc.) AND<br>@ad<"20191126" AND<br>@pd>"20220919"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/03/07<br>08:23 AM |
| L199 | 3  | (B65H2701/00.cpc.)<br>AND @ad<"20191126"<br>AND @pd>"20220919" | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/03/07<br>08:26 AM |
| L200 | 1  | (B65H2701/30.cpc.)<br>AND @ad<"20191126"<br>AND @pd>"20220919" | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,                                                                                                                                                                                                                                                     | OR | ON | ON | 2023/03/07<br>08:28 AM |

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|------|----|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |    |                                                           | EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                   |    |    |    |                     |
| L201 | 22 | (B65H2701/37.cpc.) AND @ad<"20191126" AND @pd>"20220919"  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 08:28 AM |
| L202 | 5  | (B65H2701/376.cpc.) AND @ad<"20191126" AND @pd>"20220919" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 08:29 AM |
| L203 | 95 | (H02G11/00.cpc.) AND @ad<"20191126" AND @pd>"20220919"    | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;                        | OR | ON | ON | 2023/03/07 08:30 AM |

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|      |    |                                                               | JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                                                                                                                                         |    |    |    |                        |
| L204 | 80 | (H02G11/006.cpc.)<br>AND @ad<"20191126"<br>AND @pd>"20220919" | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/03/07<br>08:30 AM |
| L205 | 53 | (H02G11/02.cpc.) AND<br>@ad<"20191126" AND<br>@pd>"20220919"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/03/07<br>08:30 AM |
| L206 | 0  | (H02G11/06.cpc.) AND<br>@ad<"20191126" AND<br>@pd>"20220919"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/03/07<br>08:31 AM |
| L207 | 0  | (H02G11/08.cpc.) AND<br>@ad<"20191126" AND<br>@pd>"20220919"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,                                                                                                                                                                                                                          | OR | ON | ON | 2023/03/07<br>08:31 AM |

|      |     |                                                               |                                                                                                                                                                                                                                                                                                                      |    |    |    |                        |
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|      |     |                                                               | HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                           |    |    |    |                        |
| L208 | 0   | (H02G11/083.cpc.)<br>AND @ad<"20191126"<br>AND @pd>"20220919" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07<br>08:32 AM |
| L209 | 0   | (H02G11/085.cpc.)<br>AND @ad<"20191126"<br>AND @pd>"20220919" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07<br>08:32 AM |
| L210 | 329 | (Pearson near2<br>Daniel).inv.                                | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT;          | OR | ON | ON | 2023/03/07<br>08:32 AM |

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|------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |   |                                                                                                                                                                                                                                               | IBM_TDB)                                                                                                                                                                                                                                                                                                             |    |    |    |                     |
| L211 | 1 | (L190 L191 L192 L194 L195 L196 L197 L198) AND (((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 08:35 AM |
| L212 | 1 | (L199 L200 L201 L202) AND (((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location)))                     | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 08:36 AM |
| L213 | 0 | (L203 L204 L205) AND (((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH (second adj2 (end\$3 terminal point node location)))                          | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 08:41 AM |
| L214 | 4 | L210 AND (((fish flex\$3) adj2 tape) WITH (length size dimension width range distance) WITH (first adj2 (end\$3 terminal point node location)) WITH                                                                                           | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,                                                                                                                                                                    | OR | ON | ON | 2023/03/07 08:41 AM |



|      |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |   | (second adj2 (end\$3 terminal point node location)))                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                   |    |    |    |                     |
| L215 | 0 | L211 AND (((donut ring circle doughnut annulus circular annular) adj2 (frame fixture structure form shap\$3 enclose receptacle container holder reservoir enclosure infrastructure chassis housing house framework shell chamber tank envelope box case tube cassette socket body cavity)) WITH (sidewall sidebore bore wall) WITH radial\$2 WITH (hole opening aperture orifice outlet entrance port recess window through thru) WITH (circumference perimeter border borderline (boundary adj2 line) delimitation)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 08:59 AM |
| L216 | 0 | L212 AND (((donut ring circle doughnut annulus circular annular) adj2 (frame fixture structure form shap\$3 enclose receptacle container holder reservoir enclosure infrastructure chassis housing house framework shell chamber tank envelope box case tube cassette socket body cavity)) WITH (sidewall sidebore bore wall) WITH radial\$2 WITH (hole opening aperture orifice outlet entrance port recess window through thru) WITH (circumference perimeter border borderline (boundary adj2 line) delimitation)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 08:59 AM |

|      |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L217 | 3 | L214 AND (((donut ring circle doughnut annulus circular annular) adj2 (frame fixture structure form shap\$3 enclose receptacle container holder reservoir enclosure infrastructure chassis housing house framework shell chamber tank envelope box case tube cassette socket body cavity)) WITH (sidewall sidebore bore wall) WITH radial\$2 WITH (hole opening aperture orifice outlet entrance port recess window through thru) WITH (circumference perimeter border borderline (boundary adj2 line) delimitation))                                      | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 08:59 AM |
| L218 | 0 | (L190 L191 L192 L194 L195 L196 L197 L198) AND (((donut ring circle doughnut annulus circular annular) adj2 (frame fixture structure form shap\$3 enclose receptacle container holder reservoir enclosure infrastructure chassis housing house framework shell chamber tank envelope box case tube cassette socket body cavity)) WITH (sidewall sidebore bore wall) WITH radial\$2 WITH (hole opening aperture orifice outlet entrance port recess window through thru) WITH (circumference perimeter border borderline (boundary adj2 line) delimitation)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 08:59 AM |
| L219 | 0 | (L199 L200 L201 L202) AND (((donut ring circle doughnut annulus circular annular) adj2 (frame fixture structure form shap\$3 enclose receptacle container                                                                                                                                                                                                                                                                                                                                                                                                  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,                                                                                                                                                                    | OR | ON | ON | 2023/03/07 09:00 AM |

|      |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
|------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
|      |   | holder reservoir<br>enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore bore wall)<br>WITH radial\$2 WITH<br>(hole opening aperture<br>orifice outlet entrance<br>port recess window<br>through thru) WITH<br>(circumference<br>perimeter border<br>borderline (boundary<br>adj2 line) delimitation))                                                                                                                                                                           | IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                        |    |    |    |                        |
| L220 | 0 | (L203 L204 L205) AND<br>(((donut ring circle<br>doughnut annulus<br>circular annular) adj2<br>(frame fixture structure<br>form shap\$3 enclose<br>receptacle container<br>holder reservoir<br>enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore bore wall)<br>WITH radial\$2 WITH<br>(hole opening aperture<br>orifice outlet entrance<br>port recess window<br>through thru) WITH<br>(circumference<br>perimeter border<br>borderline (boundary<br>adj2 line) delimitation)) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/03/07<br>09:00 AM |
| L221 | 3 | L217 AND ((sidewall<br>sidebore bore wall)<br>WITH (clear transparent<br>crystal) WITH<br>(luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH light)                                                                                                                                                                                                                                                                                                        | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;                              | OR | ON | ON | 2023/03/07<br>09:03 AM |

|      |   |                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
|------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
|      |   |                                                                                                                                                                                                                                                                                                                                            | JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                                                                                                                                         |    |    |    |                        |
| L222 | 0 | (L190 L191 L192 L194<br>L195 L196 L197 L198)<br>AND ((sidewall sidebore<br>bore wall) WITH (clear<br>transparent crystal)<br>WITH (luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH light) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/03/07<br>09:03 AM |
| L223 | 0 | (L199 L200 L201 L202)<br>AND ((sidewall sidebore<br>bore wall) WITH (clear<br>transparent crystal)<br>WITH (luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH light)                        | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/03/07<br>09:03 AM |
| L224 | 0 | (L203 L204 L205) AND<br>((sidewall sidebore bore<br>wall) WITH (clear<br>transparent crystal)<br>WITH (luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH light)                             | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/03/07<br>09:04 AM |
| L225 | 1 | ((fish flex\$3) adj2 tape)<br>WITH (length size<br>dimension width range<br>distance) WITH (first<br>adj2 (end\$3 terminal<br>point node location))                                                                                                                                                                                        | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,                                                                                                                                                                                                                          | OR | ON | ON | 2023/03/07<br>09:11 AM |

|      |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |    | WITH (second adj2 (end\$3 terminal point node location))) AND @ad<"20191126" AND @pd>"20220919"                                                                                                                                                                                                                                                                                                                                                                                                                                                   | HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                           |    |    |    |                     |
| L226 | 3  | ((sidewall sidebore bore wall) WITH (clear transparent crystal) WITH (luminescent adj2 (material substance media medium substrate sheet film micro\$1film seal\$3 coat\$3 protect\$3 layer pad wafer lamina plane cover screen compound)) WITH light) AND @ad<"20191126" AND @pd>"20220919"                                                                                                                                                                                                                                                       | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 09:12 AM |
| L227 | 18 | ((donut ring circle doughnut annulus circular annular) adj2 (frame fixture structure form shap\$3 enclose receptacle container holder reservoir enclosure infrastructure chassis housing house framework shell chamber tank envelope box case tube cassette socket body cavity)) WITH (sidewall sidebore bore wall) WITH radial\$2 WITH (hole opening aperture orifice outlet entrance port recess window through thru) WITH (circumference perimeter border borderline (boundary adj2 line) delimitation)) AND @ad<"20191126" AND @pd>"20220919" | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 09:15 AM |
| L228 | 0  | L225 AND L226 AND L227                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,                                                                                                                                                                                                                    | OR | ON | ON | 2023/03/07 09:15 AM |

|      |   |               |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|---|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |   |               | EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                   |    |    |    |                     |
| L229 | 0 | L225 AND L226 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 09:15 AM |
| L230 | 0 | L225 AND L227 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/03/07 09:15 AM |
| L231 | 0 | L226 AND L227 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;                        | OR | ON | ON | 2023/03/07 09:15 AM |

|      |   |                                                                 |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
|------|---|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
|      |   |                                                                 | JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                                                                                                                                         |    |    |    |                        |
| L232 | 0 | (254/134.3R.ccls.) AND<br>@ad<"20191126" AND<br>@pd>"20220919"  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/03/07<br>02:05 PM |
| L233 | 0 | (254/134.3FT.ccls.)<br>AND @ad<"20191126"<br>AND @pd>"20220919" | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/03/07<br>02:05 PM |

#### PE2E SEARCH - Search History (Interference)

| Ref # | Hits | Search Query                                                                                                                                                                                                                                            | DBs               | Default Operator | Plurals | British Equivalents | Time Stamp             |
|-------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------|---------|---------------------|------------------------|
| N19   | 0    | (((((fish flex\$3) adj2<br>tape) WITH (length size<br>dimension width range<br>distance) WITH (first<br>adj2 (end\$3 terminal<br>point node location))<br>WITH (second adj2<br>(end\$3 terminal point<br>node location))))).clm.)<br>AND @pd>"20220919" | (US-PGPUB; USPAT) | OR               | ON      | ON                  | 2023/03/07<br>09:16 AM |
| N20   | 2    | (((((donut ring circle<br>doughnut annulus<br>circular annular) adj2<br>(frame fixture structure<br>form shap\$3 enclose<br>receptacle container<br>holder reservoir                                                                                    | (US-PGPUB; USPAT) | OR               | ON      | ON                  | 2023/03/07<br>09:17 AM |

|     |   |                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |    |    |    |                        |
|-----|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----|----|----|------------------------|
|     |   | enclosure infrastructure<br>chassis housing house<br>framework shell<br>chamber tank envelope<br>box case tube cassette<br>socket body cavity))<br>WITH (sidewall<br>sidebore bore wall)<br>WITH radial\$2 WITH<br>(hole opening aperture<br>orifice outlet entrance<br>port recess window<br>through thru) WITH<br>(circumference<br>perimeter border<br>borderline (boundary<br>adj2 line)<br>delimitation)).clm.) AND<br>@pd>"20220919" |                   |    |    |    |                        |
| N21 | 0 | ((((sidewall sidebore<br>bore wall) WITH (clear<br>transparent crystal)<br>WITH (luminescent adj2<br>(material substance<br>media medium<br>substrate sheet film<br>micro\$1film seal\$3<br>coat\$3 protect\$3 layer<br>pad wafer lamina plane<br>cover screen<br>compound)) WITH<br>light).clm.) AND<br>@pd>"20220919"                                                                                                                    | (US-PGPUB; USPAT) | OR | ON | ON | 2023/03/07<br>09:17 AM |



## Bibliographic Data

Application No: 16/696,383

Foreign Priority claimed: ☐ Yes ☒ No

35 USC 119 (a-d) conditions met: ☐ Yes ☒ No ☐ Met After Allowance

Verified and Acknowledged: /HOAI-AN D. NGUYEN/

Examiner's Signature

Initials

Title: GLOW FISH TAPE SYSTEM

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| FILING or 371(c) DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|-----------------------|-------|----------------|---------------------|
| 11/26/2019            | 254   | 2858           | 751391              |
| RULE                  |       |                |                     |

### APPLICANTS

Klein Tools, Inc., Lincolnshire, IL, UNITED STATES

### INVENTORS

Daniel R. Pearson, Fortworth, TX, UNITED STATES

### CONTINUING DATA

### FOREIGN APPLICATIONS

### IF REQUIRED, FOREIGN LICENSE GRANTED\*\*

12/17/2019

### STATE OR COUNTRY

UNITED STATES

### ADDRESS

LEYDIG VOIT & MAYER, LTD (Klein Tools)

TWO PRUDENTIAL PLAZA, SUITE 4900

180 NORTH STETSON AVENUE

CHICAGO, IL 60601-6731

UNITED STATES

### FILING FEE RECEIVED

\$1,720

**To:** Chgpatent@leydig.com,,  
**From:** PAIR\_eOfficeAction@uspto.gov  
**Cc:** PAIR\_eOfficeAction@uspto.gov  
**Subject:** Private PAIR Correspondence Notification for Customer Number 161268

Mar 10, 2023 03:34:31 AM

Dear PAIR Customer:

LEYDIG VOIT & MAYER, LTD (Klein Tools)  
TWO PRUDENTIAL PLAZA, SUITE 4900  
180 NORTH STETSON AVENUE  
CHICAGO, IL 60601-6731  
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 161268 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

**Disclaimer:**

The list of documents shown below is provided as a courtesy and is not part of the official file wrapper. The content of the images shown in PAIR is the official record.

| Application | Document | Mailroom Date | Attorney Docket No. |
|-------------|----------|---------------|---------------------|
| 16696383    | NOA      | 03/10/2023    | 751391              |

To view your correspondence online or update your email addresses, please visit us anytime at <https://sportal.uspto.gov/secure/myportal/privatepair>.

If you have any questions, please email the Electronic Business Center (EBC) at [EBC@uspto.gov](mailto:EBC@uspto.gov) with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE  
PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

**POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO**

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒ Practitioners associated with Customer Number: 144588

**OR**

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

| Name | Registration Number |
|------|---------------------|
|      |                     |
|      |                     |
|      |                     |
|      |                     |
|      |                     |
|      |                     |

| Name | Registration Number |
|------|---------------------|
|      |                     |
|      |                     |
|      |                     |
|      |                     |
|      |                     |
|      |                     |

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☐ The address associated with Customer Number:

**OR**

|                                                  |       |     |
|--------------------------------------------------|-------|-----|
| <input type="checkbox"/> Firm or individual name |       |     |
| Address                                          |       |     |
| City                                             | State | Zip |
| Country                                          |       |     |
| Telephone                                        | Email |     |

Assignee name and address: Klein Tools, Inc.  
450 Bond Street, Lincolnshire, Illinois 60069

**A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.**

**SIGNATURE of Assignee of Record**

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee.

Signature /Robert J. Vechiola/

Date April, 20, 2021

Name Robert J. Vechiola

Telephone 847-821-5551

Title V.P., General Counsel & Corporate Secretary

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 18 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

*if you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

## Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

| Electronic Patent Application Fee Transmittal |          |                        |        |                      |
|-----------------------------------------------|----------|------------------------|--------|----------------------|
| Application Number:                           |          | 16696383               |        |                      |
| Filing Date:                                  |          | 26-Nov-2019            |        |                      |
| Title of Invention:                           |          | GLOW FISH TAPE SYSTEM  |        |                      |
| First Named Inventor/Applicant Name:          |          | Daniel R. Pearson      |        |                      |
| Filer:                                        |          | Jeffery Neal Fairchild |        |                      |
| Attorney Docket Number:                       |          | 751391                 |        |                      |
| Filed as Large Entity                         |          |                        |        |                      |
| Filing Fees for Utility under 35 USC 111(a)   |          |                        |        |                      |
| Description                                   | Fee Code | Quantity               | Amount | Sub-Total in USD(\$) |
| Basic Filing:                                 |          |                        |        |                      |
| Pages:                                        |          |                        |        |                      |
| Claims:                                       |          |                        |        |                      |
| Miscellaneous-Filing:                         |          |                        |        |                      |
| Petition:                                     |          |                        |        |                      |
| Patent-Appeals-and-Interference:              |          |                        |        |                      |
| Post-Allowance-and-Post-Issuance:             |          |                        |        |                      |
| UTILITY APPL ISSUE FEE                        | 1501     | 1                      | 1200   | 1200                 |

| Description        | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|--------------------|----------|----------|--------|----------------------|
| Extension-of-Time: |          |          |        |                      |
| Miscellaneous:     |          |          |        |                      |
| Total in USD (\$)  |          |          |        | 1200                 |

| Electronic Acknowledgement Receipt          |                             |
|---------------------------------------------|-----------------------------|
| <b>EFS ID:</b>                              | 48128427                    |
| <b>Application Number:</b>                  | 16696383                    |
| <b>International Application Number:</b>    |                             |
| <b>Confirmation Number:</b>                 | 6816                        |
| <b>Title of Invention:</b>                  | GLOW FISH TAPE SYSTEM       |
| <b>First Named Inventor/Applicant Name:</b> | Daniel R. Pearson           |
| <b>Customer Number:</b>                     | 161268                      |
| <b>Filer:</b>                               | Jeffery Neal Fairchild      |
| <b>Filer Authorized By:</b>                 |                             |
| <b>Attorney Docket Number:</b>              | 751391                      |
| <b>Receipt Date:</b>                        | 09-JUN-2023                 |
| <b>Filing Date:</b>                         | 26-NOV-2019                 |
| <b>Time Stamp:</b>                          | 12:17:32                    |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a) |

### Payment information:

|                                                                                                                                                                                                                                                                                |                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Submitted with Payment                                                                                                                                                                                                                                                         | yes               |
| Payment Type                                                                                                                                                                                                                                                                   | DA                |
| Payment was successfully received in RAM                                                                                                                                                                                                                                       | \$1200            |
| RAM confirmation Number                                                                                                                                                                                                                                                        | E202369C18187412  |
| Deposit Account                                                                                                                                                                                                                                                                | 602056            |
| Authorized User                                                                                                                                                                                                                                                                | Jeffery Fairchild |
| <p>The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:</p> <p>37 CFR 1.16 (National application filing, search, and examination fees)</p> <p>37 CFR 1.17 (Patent application and reexamination processing fees)</p> |                   |

37 CFR 1.21 (Miscellaneous fees and charges)

**File Listing:**

| Document Number              | Document Description                          | File Name                                  | File Size(Bytes)/ Message Digest         | Multi Part /.zip | Pages (if appl.) |
|------------------------------|-----------------------------------------------|--------------------------------------------|------------------------------------------|------------------|------------------|
| 1                            | Issue Fee Payment (PTO-85B)                   | 00058P00USIssueFeeTransmittal.pdf          | 2615262                                  | no               | 1                |
|                              |                                               |                                            | eea5819ccf69d6654a2e5495f7f502cf17528177 |                  |                  |
| Warnings:                    |                                               |                                            |                                          |                  |                  |
| Information:                 |                                               |                                            |                                          |                  |                  |
| 2                            | Assignee showing of ownership per 37 CFR 3.73 | 00058P00USOwnerStatement373.pdf            | 740240                                   | no               | 3                |
|                              |                                               |                                            | 4b8eab37d5a7d5717c6e65dca026a275adc9923d |                  |                  |
| Warnings:                    |                                               |                                            |                                          |                  |                  |
| Information:                 |                                               |                                            |                                          |                  |                  |
| 3                            | Power of Attorney                             | PowerOfAttorneyForCustomerNumber144588.pdf | 184272                                   | no               | 2                |
|                              |                                               |                                            | 33aef836107785fb9e6aa03902100a7501edec5b |                  |                  |
| Warnings:                    |                                               |                                            |                                          |                  |                  |
| Information:                 |                                               |                                            |                                          |                  |                  |
| 4                            | Fee Worksheet (SB06)                          | fee-info.pdf                               | 37796                                    | no               | 2                |
|                              |                                               |                                            | b32eb36f5b9e195872cc7dfa0973145b84dca28  |                  |                  |
| Warnings:                    |                                               |                                            |                                          |                  |                  |
| Information:                 |                                               |                                            |                                          |                  |                  |
| Total Files Size (in bytes): |                                               |                                            | 3577570                                  |                  |                  |



This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

# PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address):

161266 7590 02/19/2023  
LEYDIG VOIT & MAYER, LTD (Klein Tools)  
TWO PRUDENTIAL PLAZA, SUITE 4900  
180 NORTH STETSON AVENUE  
CHICAGO, IL 60601-6731

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

## Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

|                         |
|-------------------------|
| (Typed or printed name) |
| (Signature)             |
| (Date)                  |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 16/696,383      | 11/26/2019  | Daniel R. Pearson    | 751391              | 6816             |

TITLE OF INVENTION: GLOW FISH TAPE SYSTEM

| APPL. TYPE     | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|---------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | UNDISCOUNTED  | \$1200        | \$0.00              | \$0.00               | \$1200           | 06/12/2023 |

| EXAMINER          | ART UNIT | CLASS-SUBCLASS |
|-------------------|----------|----------------|
| NGUYEN, HOAI AN D | 2858     | 254-1343PT     |

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.263).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type):

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.81 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE (CITY and STATE OR COUNTRY)

Klein Tools, Inc

Lincolnshire, Illinois

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies

4b. Method of Payment: (Please first reuply any previously paid fee shown above)

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No.

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature *Jeffery N. Fischler*

Date *6-9-2023*

Typed or printed name *Jeffery N. Fischler*

Registration No. *37825*

**STATEMENT UNDER 37 CFR 3.73(c)**

Applicant/Patent Owner: Klein Tools, Inc.

Application No./Patent No.: 16/696,383 Filed/Issue Date: 11/26/2019

Titled: GLOW FISH TAPE SYSTEM

Klein Tools, Inc., a corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

☐ The extent (by percentage) of its ownership interest is \_\_\_\_%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 058520, Frame 0517, or for which a copy thereof is attached.

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at

Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

2. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at

Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

**STATEMENT UNDER 37 CFR 3.73(c)**

3. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

4. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

5. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

6. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

**/JEFFERY N FAIRCHILD/**

**06/09/2023**

Signature

Date

**Jeffery Fairchild**

**37825**

Printed or Typed Name

Title or Registration Number

## Privacy Act Statement

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
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| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|-----------------------|-----------------------|------------------------|
| 16/696,383         | 11/26/2019            | Daniel R. Pearson     | 751391                 |

**CONFIRMATION NO. 6816**

161268

LEYDIG VOIT & MAYER, LTD (Klein Tools)  
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180 NORTH STETSON AVENUE  
CHICAGO, IL 60601-6731

**POWER OF ATTORNEY NOTICE**



\*OC000000058563313\*

Date Mailed: 06/22/2023

**NOTICE REGARDING CHANGE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 06/09/2023.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/sleutchit/



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| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|-----------------------|-----------------------|------------------------|
| 16/696,383         | 11/26/2019            | Daniel R. Pearson     | 751391                 |

144588  
Klein Tools, Inc  
450 Bond Street  
Lincolnshire, IL 60069

**CONFIRMATION NO. 6816**  
**POA ACCEPTANCE LETTER**



\*OC000000058563377\*

Date Mailed: 06/22/2023

**NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 06/09/2023.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

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| APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|------------|------------|---------------------|------------------|
| 16/696,383      | 08/01/2023 | 11713209   | 751391              | 6816             |

144588 7590 07/12/2023  
Klein Tools, Inc  
450 Bond Street  
Lincolnshire, IL 60069

## ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at <https://patentcenter.uspto.gov/>. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

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### Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment is 672 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.



INVENTOR(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional inventors):

Daniel R. Pearson, Fortworth, TX;

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Klein Tools, Inc., Lincolnshire, IL;

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| APPLICATION NO.                                               | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 16/696,383                                                    | 11/26/2019  | Daniel R. Pearson    | 751391              | 6816             |
| 144588                                                        | 7590        | 08/03/2023           | EXAMINER            |                  |
| Klein Tools, Inc<br>450 Bond Street<br>Lincolnshire, IL 60069 |             |                      | NGUYEN, HOAI AN D   |                  |
|                                                               |             |                      | ART UNIT            | PAPER NUMBER     |
|                                                               |             |                      | 2858                |                  |
|                                                               |             |                      | MAIL DATE           | DELIVERY MODE    |
|                                                               |             |                      | 08/03/2023          | PAPER            |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

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| APPLICATION NO. | ISSUE DATE  | PATENT NO. |
|-----------------|-------------|------------|
| 16/696,383      | 01-Aug-2023 | 11713209   |

Klein Tools, Inc  
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### EGRANT NOTIFICATION

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The electronic patent grant is the official patent grant under 35 U.S.C. 153. For more information, please visit <https://www.uspto.gov/electronicgrants>

# United States Patent

[11] 3,601,330

[72] Inventor **Mickey M. Minobe**  
Banning, Calif.  
[21] Appl. No. **783,388**  
[22] Filed **Dec. 12, 1968**  
[45] Patented **Aug. 24, 1971**  
[73] Assignee **Ideal Industries, Inc.**  
Sycamore, Ill.

[56]

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*Primary Examiner*—Stanley N. Gilreath

*Assistant Examiner*—Werner H. Schroeder

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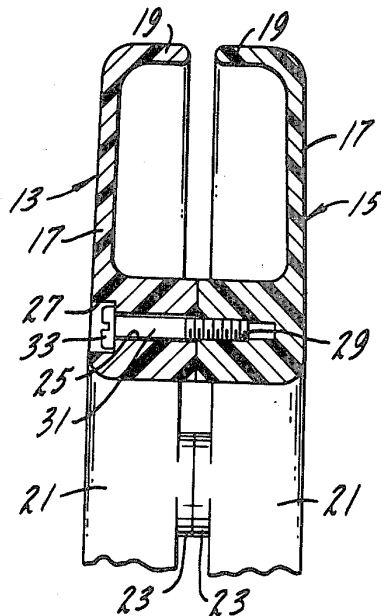
[54] **FISH TAPE WITH ADJUSTABLE TAPE ENGAGING LIPS**  
5 Claims, 6 Drawing Figs.

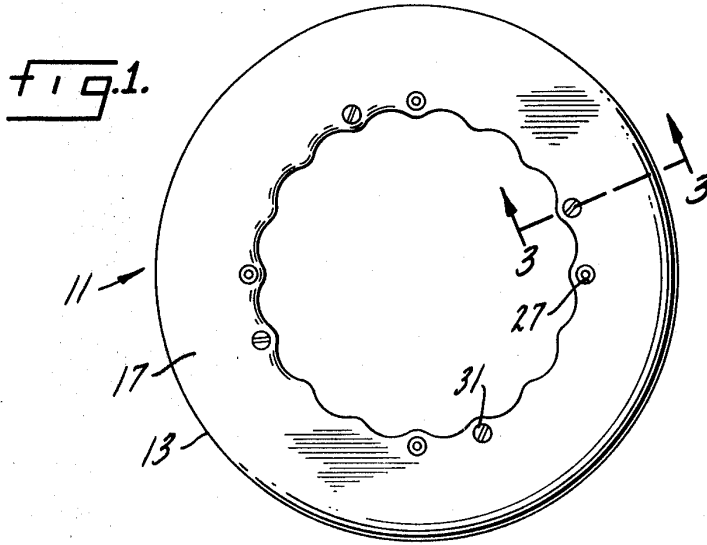
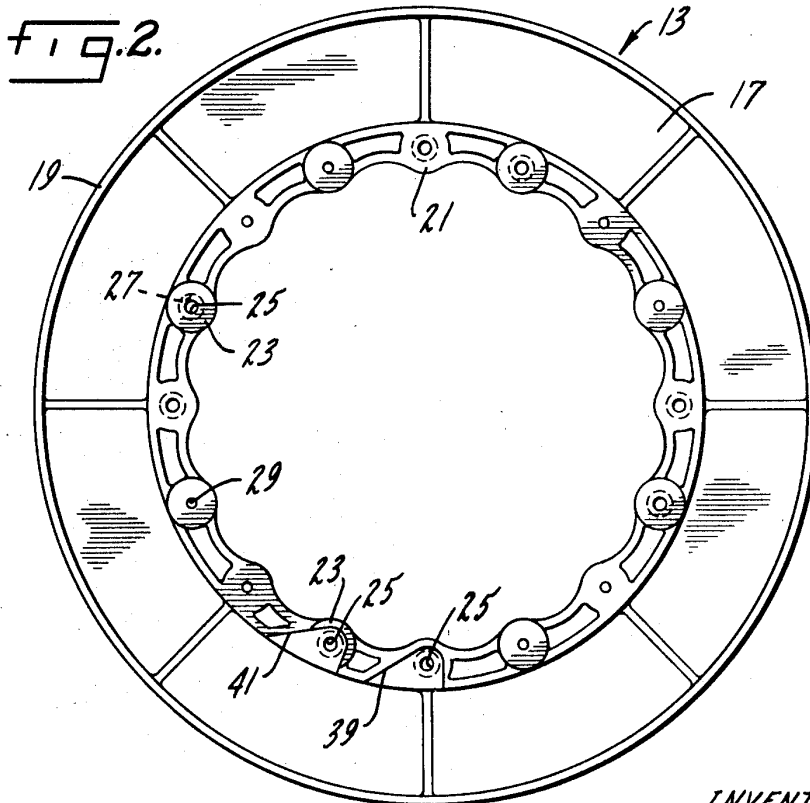
[52] U.S. Cl. .... **242/85.1,**  
254/134.3

[51] Int. Cl. .... **B65h 75/36**

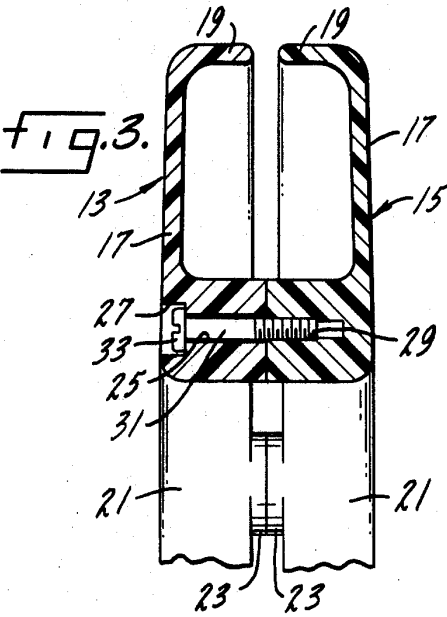
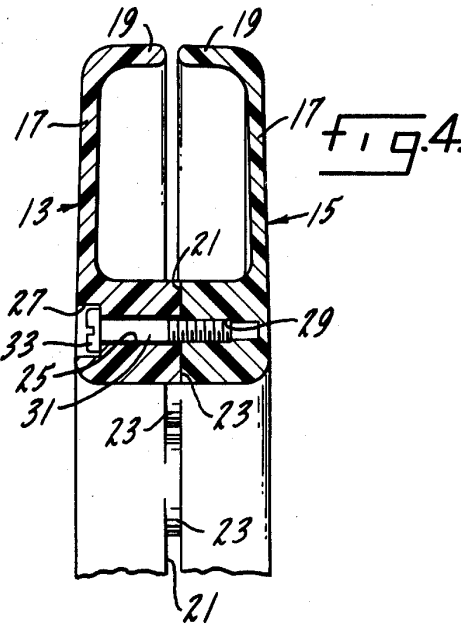
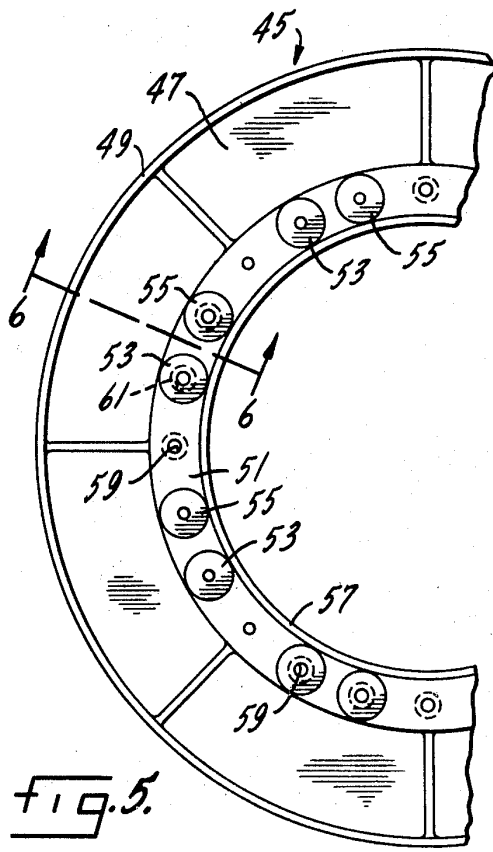
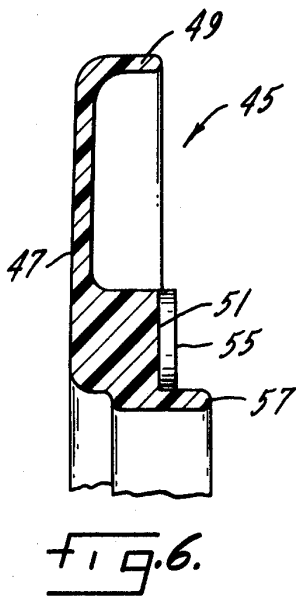
[50] Field of Search .... **242/84.8,**  
85, 85.1, 96, 107, 107.2, 115, 116; 254/134.3

**ABSTRACT:** An electrician's fish tape reel which is adjustable to accommodate fish tapes of various widths. The spacing between the outer peripheral lips of the reel sections may be varied for tapes of varying widths. This is accomplished by changing the alignment of the reel sections relative to each other to position projections on the inner peripheral walls of the reel sections in or out of contact with one another.





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Attorneys.

# FISH TAPE WITH ADJUSTABLE TAPE ENGAGING LIPS

## SUMMARY OF THE INVENTION

This invention relates to an electrician's fish tape reel and more particularly to such a reel in which the width of the peripheral opening through which the tape passes can be varied to permit use of tapes of various widths with a single reel.

An object of this invention is a fish tape reel which may be easily adjustable to accommodate fish tapes of various widths.

Another object is an adjustable fish tape reel which can be locked in each position of adjustment.

Another object is an adjustable fish tape reel that can be made from identically formed reel sections.

Other objects may be found in the following specification, claims and drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

The invention illustrated more or less diagrammatically in the following drawings wherein:

FIG. 1 is a top plan view of a fish tape reel of this invention;

FIG. 2 is an enlarged plan view of a section of a fish tape reel of this invention;

FIG. 3 is an enlarged partial cross-sectional view taken along lines 3—3 of FIG. 1;

FIG. 4 is a view similar to FIG. 3 but showing a different position of adjustment of the reel sections;

FIG. 5 is a partial plan view of a modified form of reel section; and

FIG. 6 is an enlarged partial cross-sectional view taken along lines 6—6 of FIG. 5.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. 1 through 4 of the drawings show one form of electrician's fish tape reel which embodies the novel aspects of this invention. The reel 11 is made up of two generally annular shaped sections, 13 and 15, which may be identically formed. The reel sections may be made of any suitable material, generally a high density plastic, although metal may also be used in appropriate circumstances. Each reel section is formed with a generally flat radial or sidewall 17, an upstanding outer peripheral wall 19 and an upstanding inner peripheral wall 21.

A plurality of bosses 23, which may be cylindrical in shape, are formed on and spaced around the inner peripheral wall 21 of each reel section. In this embodiment, the bosses are of equal heights and are uniformly spaced around the inner wall.

Openings 25 are formed extending through the inner wall 21 of the reel section 13. These openings are alternately centered in the bosses 23 and located between the bosses. Two adjacent openings 25 in each quadrant of this reel section are countersunk at 27 on the exterior of the reel section.

Threaded openings 29 are formed in the reel section 15 and extend only partially through the inner peripheral wall 21 from the inside surface thereof. The arrangement and number of openings 29 in the reel section 15 is the same as the arrangement and number of openings 25 in the reel section 13 so that the reel sections can be aligned to receive the bolts 31 in the manner shown in FIGS. 1, 3 and 4. It should be noted that the bolts 31 have slotted heads 33 which fit in the countersunk portions 27 of the holes 25 in reel section 13. The threads of the bolts 31 engage the threaded holes 29 of the reel section 15 and the heads 33 of the bolts engage the reel section 13 to hold the sections together.

Portions of the inner wall 21 of the reel section 13 are cut away at 39 and portions of the inner wall and boss 25 are cut away at 41 to permit a fish tape to be looped around a bolt 31 extending through either of these openings 25. Similar cutaway portions are formed on the reel section 15 but are not shown in the drawings.

A modified form of reel section 45 is shown in Figs. 5 and 6. This reel section may be combined with a similar reel section to form a fish tape reel. Reel section 45 is generally annular in shape and has a flat radial or sidewall 47, an upstanding outer peripheral wall 49 and an upstanding inner peripheral wall 51. Bosses 53 and 55 are formed on the inner peripheral wall 51 of this reel section and are arranged in pairs with a boss 53 and a boss 55 in each pair. These bosses may be generally cylindrical, as shown in the drawings, with the bosses 53 having a greater height than the bosses 55. In this particular embodiment, the bosses 53 are twice the height of the bosses 55.

A flange 57 is formed inwardly of the inner peripheral wall and has a height at least as great as that of the bosses 53. Openings 59 extending through the inner peripheral wall 51 are formed in one reel section 45 with an opening extending through each boss and through the inner peripheral wall intermediate each pair of bosses. The other reel section 45 may be formed with threaded openings similar to the openings 29 of reel section 15. A set of three openings 59 in each quadrant of the reel section 45 are countersunk at 61 at the outside surface of the reel.

The use, operation and function of this invention are as follows:

The embodiment of the electrician's fish tape reel shown in FIGS. 1 through 4 inclusive is adjustable to accommodate fish tapes of two different widths. One position of adjustment is shown in FIG. 3 and the other is shown in FIG. 4. FIG. 3 shows the maximum spacing between the outer peripheral walls 19 and it is obtained by aligning the reel sections so that the bosses 23 on opposite reel sections contact one another when the reel sections are connected together. FIG. 4 shows the position of the outer peripheral walls 19 when the reel sections 13 and 15 are connected together so that the bosses 23 on opposite reel sections are not aligned. In such an arrangement, the bosses 23 of one reel section contact the inner peripheral wall 21 of the opposite section. This position of adjustment presents the minimum spacing between the outer peripheral walls 19.

The modified form of reel shown in FIGS. 5 and 6 has three positions of adjustment. In the first position, which provides the maximum spacing between the outer peripheral walls 49, the higher bosses 53 of each reel section will be positioned in contact with one another. In the second position of adjustment, which provides an intermediate spacing between the outer peripheral walls 49, the higher bosses 53 of one section will be in contact with the lower bosses 55 of the other section. In the third position of adjustment, in which the spacing between the outer peripheral walls 49 is at a minimum, the higher bosses 53 of each section will be in contact with the inner peripheral wall 51 of the opposite section. When the reel sections are aligned and connected in any one of their three positions of adjustment, the inner flange 57, which is formed on only one of the reel sections, will meet or extend over the inner wall 51 of the other reel section to cover the gap between the reel sections. A fish tape reel may be made from identically molded sections 45 by removing the inner flange 57 from one of the reel sections.

The reel sections 45 of FIGS. 5 and 6 may also have cutaway portions similar to the cutaway portions 39 and 41 of the reel sections 13 and 15. The cutaway portions allow anchoring of a fish tape around one of the bolts 31 which hold the reel sections together.

The spacing between the outer peripheral walls of the reel sections is adjusted so that it is slightly less than the width of the fish tape being used. The outer walls of the reel sections are spread apart by the tape and provide a drag on the tape during winding and unwinding operations. The drag aids in maintaining the tape coiled around the inner peripheral walls of the reel sections.

While several preferred forms of the invention have been shown and described, it should be understood that various additions, modifications, changes and alterations may be made without departing from the invention's fundamental theme.

I claim:

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1. An electrician's fish tape reel including a pair of generally annular shaped reel sections, each reel section being generally flat and having an upstanding outer peripheral wall, said outer peripheral walls being formed and adapted to be spaced relative to each other when the reel sections are connected together, means to releasably connect the reel sections together in different positions, and means formed on the reel sections to selectively vary the spacing between said peripheral walls in different connected positions, each of said reel sections being formed with an inner peripheral wall and said means to selectively vary the spacing between the outer peripheral walls being formed on said inner peripheral walls.

2. The structure of claim 1 further characterized in that an upstanding flange is formed on one of said sections and is located inwardly of said inner peripheral wall with said flange

having height sufficient to extend to the inner wall of said other reel section when the reel sections are connected so that the outer peripheral walls are spaced apart the maximum distance of adjustment.

3. The structure of claim 1 further characterized in that said means to vary the spacing between the outer peripheral walls includes bosses formed on the inner peripheral walls of the reel sections.

4. The structure of claim 3 further characterized in that said bosses are of the same height.

5. The structure of claim 3 further characterized in that said bosses are arranged in pairs around the inner peripheral walls of each reel section with one boss of each pair having a greater height than the other boss of each pair.

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(12) **United States Patent**  
**Farretta**

(10) **Patent No.:** **US 6,293,519 B1**  
(45) **Date of Patent:** **Sep. 25, 2001**

(54) **LUMINOUS SNAKE**  
(76) Inventor: **Peter Farretta**, 114 Chickering Rd.,  
Dedham, MA (US) 02026  
(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 0 days.

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(21) Appl. No.: **09/324,415**

\* cited by examiner

(22) Filed: **Jun. 2, 1999**

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 08/888,972, filed on  
Jul. 7, 1997, now abandoned.  
(51) **Int. Cl.**<sup>7</sup> ..... **E21C 29/16**  
(52) **U.S. Cl.** ..... **254/134.3 FT**  
(58) **Field of Search** ..... 362/84; 254/134.3 R,  
254/134.3 FT

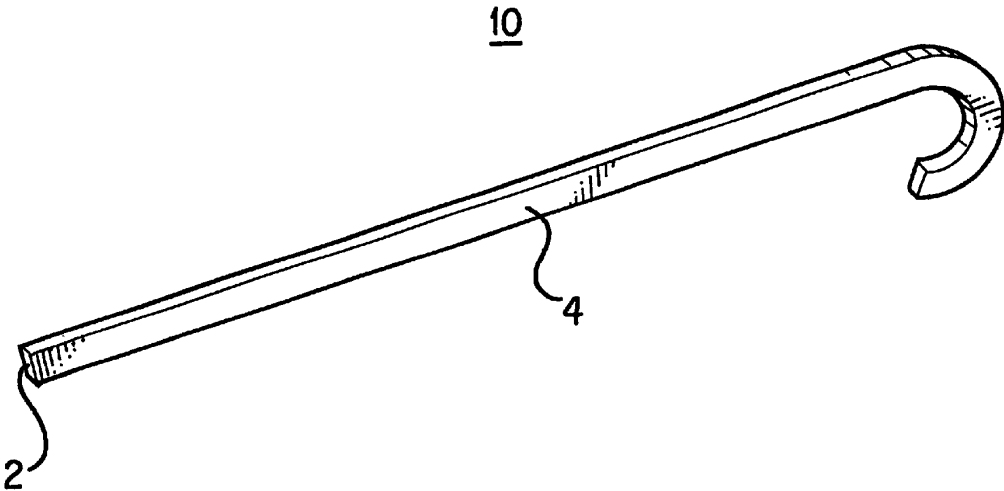
*Primary Examiner*—Robert C. Watson  
(74) *Attorney, Agent, or Firm*—Lambert and Associates;  
Gary E. Lambert; Donald J. MacDonald

(57) **ABSTRACT**

A snake apparatus with a phosphorescent coating used for feeding electrical wires through spaces contained within existing structures. The snake apparatus with phosphorescent coating is easy to use, electrically non-conductive and capable of providing sufficient luminescence to enable the snake apparatus to be visible without the benefit of ambient light several hours later.

(56) **References Cited**  
**U.S. PATENT DOCUMENTS**  
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**1 Claim, 3 Drawing Sheets**



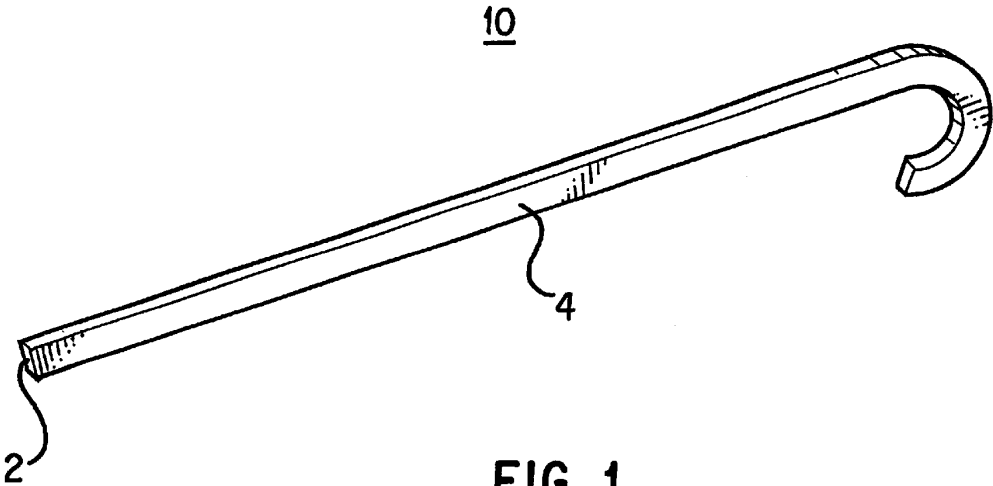


FIG. 1

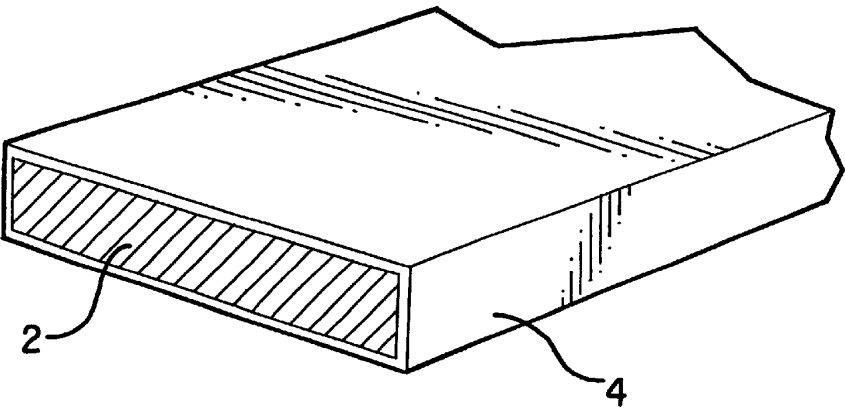


FIG. 2

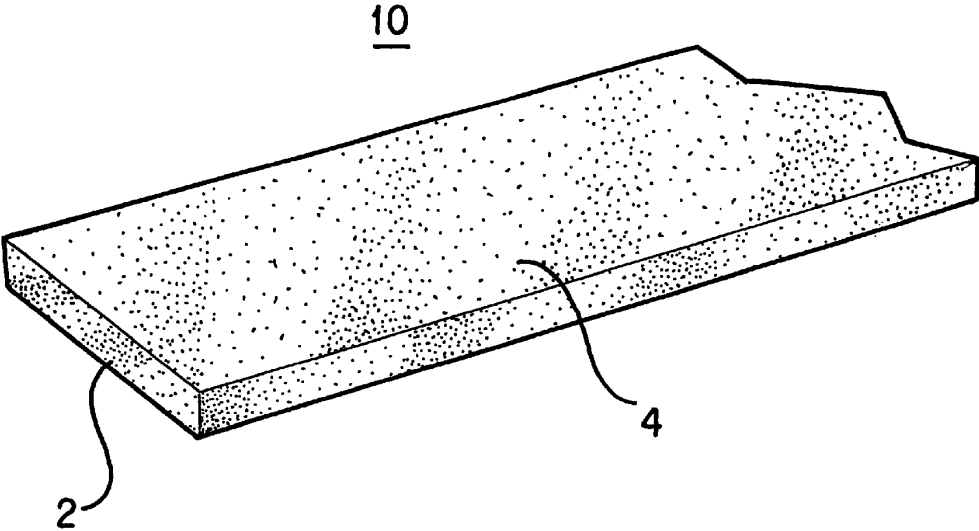


FIG. 3

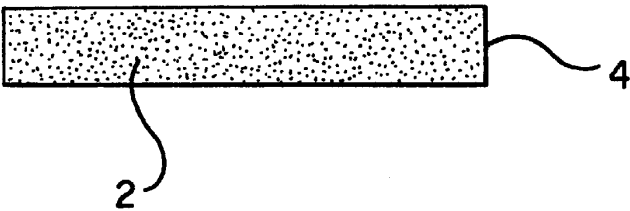


FIG. 4

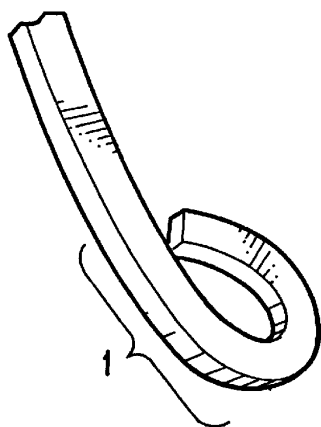


FIG. 5

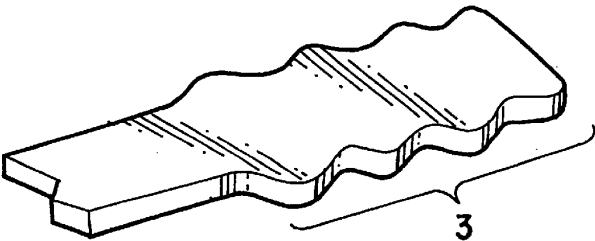


FIG. 6

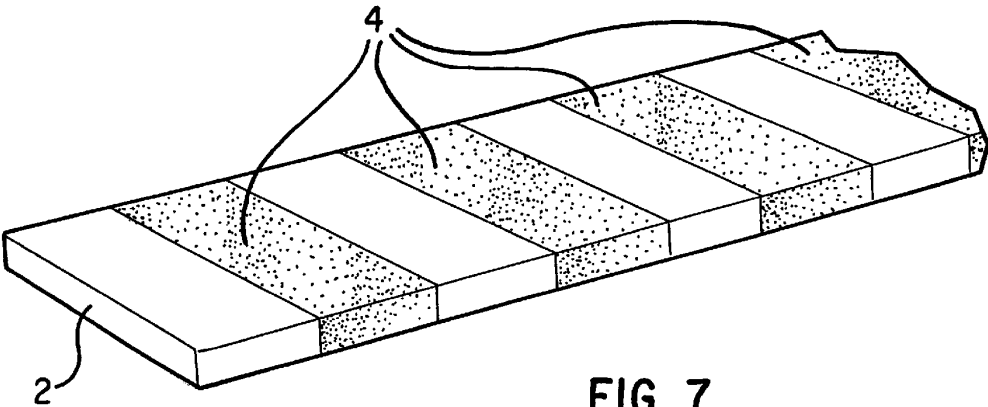


FIG. 7

## 1

## LUMINOUS SNAKE

This is a continuation-in-part of application Ser. No. 08/888,972 filed Jul 7, 1997 now abandoned. The parent application is currently pending in the United States Patent and Trademark Office.

## BACKGROUND OF THE INVENTION

This invention relates to an apparatus for feeding electrical cables through existing structures. In particular, this invention is concerned with an electrician's snake that is visible and easy to locate in the low light environments of ducts, wall cavities and other passages used to house electrical wiring.

Various devices have been employed in the past to facilitate the installation of electrical conductors in conduits, raceways, wall cavities, ceiling plenums and other passageways. Light weight and flexible chains have commonly been used to aid in the feeding of electrical cables. Light weight chains however are only practical for feeding electrical conductors or guidelines where one end of the chain can be lowered from a higher position through a passageway to a lower position. Once one end of the chain is lowered from the higher position to the lower position then the electrical conductor can be attached to the end of the chain and pulled via the chain through the passageway up to the higher position. Another common device often used to ease installation of electrical conductors in passages is an electrician's "snake" or "fish tape". A conventional snake typically comprises a flattened strip of metal. The snake is typically used to feed cables through a passage by first advancing the snake through the passage, attaching the electrical conductor or guideline to the leading end of the snake and then pulling the snake and attached conductor back through the conductor.

Electrician's snakes of the type described have proven to be difficult to use, especially in passages already occupied with electrical conductors. When using the snake in an empty passageway or duct, there is little chance of the snake becoming tangled or otherwise obstructed. If advancement of the snake through the passage does become encumbered, the snake can be pulled out and another attempt at feeding the snake through the passage can be made without fear of snagging or damaging other electrical conductors. In the case where there are preexisting electrical conductors in the passageway, the snake can and often does become entangled with or otherwise encumbered by the preexisting electrical conductors in the passage. Since the long, narrow and confined passageways housing electrical conductors are dimly illuminated or completely dark it is often difficult or impossible to determine exactly where and upon what the snake is entangled. Even when the end of the snake being advanced through the passageway is relatively near an end opening of the passageway, locating the end of the snake to attach the electrical conductor to be pulled can be difficult due to the dimly lit passageway. Locating the end of the snake is a problem encountered when working in passages with or without other preexisting electrical conductors—the problem is more pronounced in passages having other electrical conductors however. In addition to not being able to determine exactly where and upon what the snake is entangled, the metallic snake may itself become an electrical conductor if the snake comes into contact with an uninsulated electrical conductor, thereby posing a hazard to the operator of the snake.

## SUMMARY OF THE INVENTION

In accordance with this invention it is therefore an objective to provide a luminous snake device that aids in the

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feeding of electrical conductors through an electrical conduit and yet is easy to locate and identify in the dimly lit confines of an electrical conduit or other existing passageway and therefore eases location and use of the snake.

It is a further object of this invention to provide such a luminous snake device wherein the luminous snake device is electrically non-conductive.

It is a further object of this invention to provide such a luminous snake device wherein the luminous snake is easy to manufacture and produce.

It is a further object of this invention to provide such a luminous snake device wherein the luminous snake is preserved by the coating thereon which results in the increased life of the snake.

This invention results from the realization that a higher visibility and therefore a better and easier locating electrician's snake is effectuated by making a snake of a flattened metallic strip coated with a phosphorescent coating. The phosphorescent coating of the present invention is capable of remaining visibly illuminated without ambient light several hours after having been exposed to ambient light. In addition, when the core strip of the luminous snake is coated with a sufficient thickness of the phosphorescent coating material, the phosphorescent coating effectively provides an electrically non-conductive insulating barrier to the luminous snake.

This invention features an electrician's snake comprising a thin and flexible metallic core strip for feeding through electrical conduits; and a phosphorescent coating applied to the core strip that is capable of providing visible illumination in the absence of ambient light long after initially being exposed to ambient light.

The core strip of this invention is typically constructed from a flattened strip of metal. The metal core strip is flexible to the extent that the core strip is capable of folding upon itself. This degree of flexibility and resiliency in the core strip allows the snake to have a small bending radius without risk of permanent deformity to the snake. The flexibility, resiliency and small bending radius of the core strip is important to the functionality of the invention since it permits the snake to be fed through passages having numerous and various turns with ease.

The phosphorescent coating of the snake is typically a paint having luminescent properties. The luminescent properties of the phosphorescent coating applied to the core strip are such that the core strip coating, and thus the snake itself, is visible in low ambient light conditions after being initially exposed to light of suitable wavelength.

In another embodiment of the present invention the phosphorescent material of the snake is an integral part of the core strip. That is, the phosphorescent material having luminescent properties is incorporated into the structure of the material comprising the core strip. In this particular embodiment, the luminescent characteristics of the snake are maintained even if the outer surface of the subject invention becomes nicked or otherwise damaged. Even if portions of the snake become worn through use, the snake maintains its luminescent properties throughout the entirety of its length.

The terminal ends of this invention may be fashioned in a variety of shapes in order to facilitate (1) the advancement and retrieval of the snake and (2) the attachment of electrical conductors to the end of the snake. As such, one end of the snake may be shaped to facilitate the attachment of electrical conductors or guidelines and the other end of the snake may be shaped to facilitate the snake operator's grip on the snake

## BRIEF DESCRIPTION OF THE DRAWINGS

The novel features considered characteristic of the invention are set forth in the appended claims. The invention

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itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of the specific embodiments when read and understood in connection with the accompanying drawing.

FIG. 1 is a perspective view of the snake of this invention,

FIG. 2 is a cross-sectional detail view of a section of the core strip and phosphorescent coating of the snake shown in FIG. 1;

FIG. 3 is a modified form of the subject invention incorporating a snake made entirely of phosphorescent material.

FIG. 4 is a cross-sectional detail view of the invention as shown in FIG. 3.

FIG. 5 is a modified form of the subject invention wherein the attachment end of the snake is shaped to facilitate attaching electrical conductors to the snake operator.

FIG. 6 is a modified form of the subject invention wherein the manipulator end of the snake is shaped to facilitate advancement and retrieval of the snake through electrical conduit and passageways.

FIG. 7 is a modified form of the present invention wherein the phosphorescent coating is intermittently to the core strip.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Luminous snake 10, FIG. 1 of this invention includes an elongated, thin and flexible core strip 2 and a phosphorescent outer layer 4. The core strip 2 terminates at two ends, attachment end 1 and manipulator end 3.

The elongated, thin and flexible core strip 2 is ordinarily substantially longer in length than its cross-sectional width. The core strip 2 is typically constructed of a flattened strip of metallic material. Due to the form and material composition of the core strip 2, the core strip 2 has the characteristics of being flexible and capable of being bent upon itself and yet resistive to permanent deformity. The deforming resistant properties of the core strip 2 allows the operator of the luminous snake 10 to use the luminous snake 10 repeatedly in electrical conduits of varying configurations.

Referring to FIG. 1, the core strip 2 is coated with a phosphorescent coating 4. The phosphorescent coating 4 is typically applied over substantially the entirety of the core strip 2. In addition to having the phosphorescent coating applied to the length of the core strip, application of the phosphorescent coating 4 extends to the attachment end of the luminous snake. Since the phosphorescent coating 4 is applied to the entirety of the core strip 2 including the attachment end 1, the luminous snake 10 is easy to locate along its length and at its end terminating at attachment end 1.

The phosphorescent coating 4 is typically applied to the core strip 2 in sufficient thickness to form an electrically non-conductive barrier on the core strip, see FIG. 2. The electrically non-conductive barrier formed by the sufficiently thick phosphorescent coating 4 thereby electrically insulates the metallic core strip of the preferred embodiment from electrical conductors. Thus, the insulated luminous snake 10 formed by the sufficient phosphorescent coating 4 disposed on the metallic core strip 2 greatly reduces the hazard of electrical shock to the operator of the luminous snake.

The attachment end 1 of the luminous snake may be shaped to facilitate the attachment or grasping of the electrical conductors as shown in FIG. 5. The particular shape of

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the attachment end 1 depicted in FIG. 5 is merely shown to illustrate that the attachment end 1 may be shaped in a manner to better facilitate the attachment of electrical conductors and is not meant as a limitation to the configuration of the attachment end 1.

The manipulator end 3 of the luminous snake may be shaped to facilitate the advancement and retrieval of the luminous snake by the operator as shown in FIG. 6. The particular shape of the manipulator end 3 depicted in FIG. 6 is merely shown to illustrate that the attachment end 3 may be shaped in a manner to better facilitate the advancement and retrieval of the luminous snake 10 in electrical conduits and is not meant as a limitation to the configuration of the manipulator end 3.

In another embodiment of the present invention, the core strip 2 of the luminous snake 10 is made by integrally incorporating the phosphorescent coating 4 into the core strip 2 as shown in FIG. 3. The luminous snake of FIG. 3 is substantially uniform throughout its structure as depicted in the detailed drawing of FIG. 4. That is, the composition of the snake is substantially uniform at all points throughout the structure. An added benefit gained by incorporating the phosphorescent coating into the core strip is that the luminous snake 10 maintains its luminescent properties even when the outer surface layer of the snake is worn or otherwise damaged.

In another embodiment of the present invention, the phosphorescent coating 4 of the luminous snake 10 is intermittently disposed upon the core strip 2 as shown in FIG. 7. This particular embodiment too is easier to locate in a dimly lit electrical conduit than a conventional snake.

As such the method of making and using the device detailed above constitute the inventor's preferred embodiment and alternate embodiments to the invention. The inventor is aware that numerous configurations of the device as a whole or some of its constituent parts are available which would provide the desired results. While the invention has been described and illustrated with reference to specific embodiments, it is understood that these other embodiments may be resorted to without departing from the invention. Therefore the form of the invention set out above should be considered illustrative and not as limiting the scope of the following claims.

What is claimed is:

1. A snake apparatus of the type used to feed electrical wires through spaces contained within existing structures comprising:

a thin, flexible, flattened core strip capable of being flattened upon itself having two ends, an attachment end and a manipulator end and a length substantially longer than its cross-sectional width;

a phosphorescent coating, said coating to be applied to said core strip; wherein said, coating is applied in sufficient thickness and entirety to form an electrically non-conductive barrier effectively insulating said strip of metal; wherein said coating is capable of providing sufficient luminescence to enable the strip of metal to be visible without the benefit of ambient light several hours later;

wherein said core strip is made of a metallic material, said thin, flexible, flattened metallic core strip being resilient and resistant to permanent deformation,

wherein the attachment end is further shaped to facilitate the attachment of electrical conductors for feeding

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electrical conductors through electrical conduits and passageways;  
wherein said manipulator end is further shaped to facilitate the advancement and retrieval of the snake through electrical conductors and passageways by the operator 5  
of snake;

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wherein said phosphorescent coating applied to said core strip is applied intermittently spaced on said core strip thereby leaving portions of the core strip exposed and uncoated with said phosphorescent coating.

\* \* \* \* \*



US006433703B1

(12) **United States Patent**  
**Tucker**

(10) **Patent No.:** **US 6,433,703 B1**  
(45) **Date of Patent:** **Aug. 13, 2002**

(54) **FISHING REEL SIGNALING DEVICE**

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(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 0 days.

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(21) Appl. No.: **09/851,073**

(22) Filed: **May 8, 2001**

(51) **Int. Cl.<sup>7</sup>** ..... **G08B 5/00**

(52) **U.S. Cl.** ..... **340/815.51; 340/815.5**

(58) **Field of Search** ..... 340/815.57, 815.5,  
340/815.51, 815.55; 43/17, 17.5; 242/223,  
224; 362/276, 802

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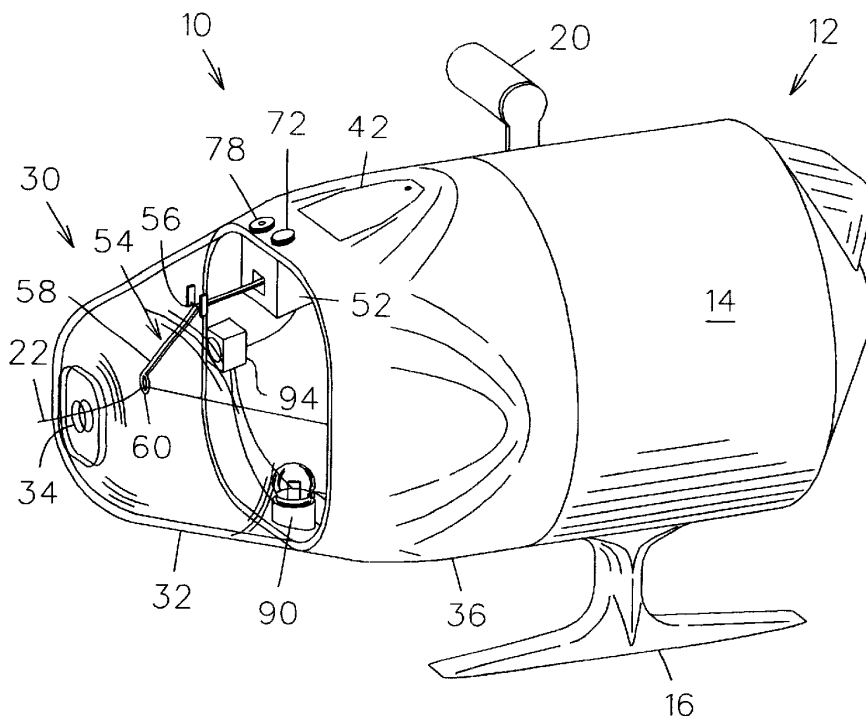
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(74) *Attorney, Agent, or Firm*—Dale J. Ream

(57) **ABSTRACT**

A signaling device includes a housing that may be releasably coupled to a fishing reel. The housing includes a transparent front wall defining an opening for receiving a fishing line of the reel therethrough. An incandescent light, battery, and light sensor are positioned within the housing. The light sensor permits current from the battery to energize the light when the level of ambient light is less than a predetermined level. A switch assembly is positioned in the housing and includes an arm pivotally mounted for teetering movement, the arm having a first arm with an eyelet through which the fishing line may extend and a second end adjacent to the battery. Changes in line tension at the first end causes the second end of the arm to move away from or toward the battery. Contact with the battery permits current to energize the light sensor and thus the light.

**19 Claims, 4 Drawing Sheets**





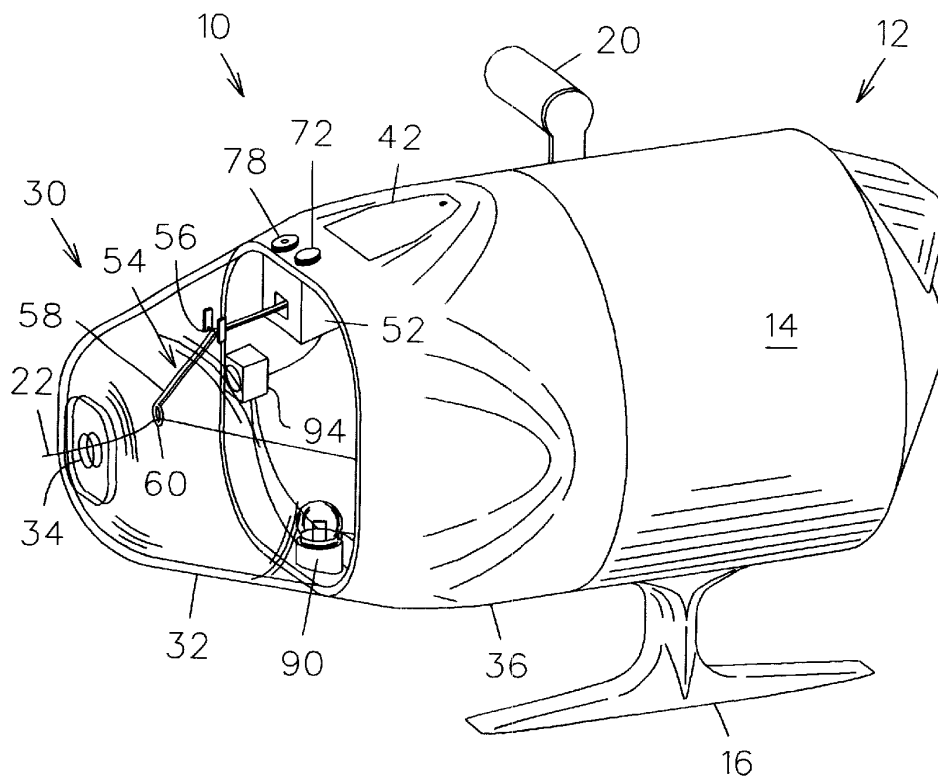


FIG. 1





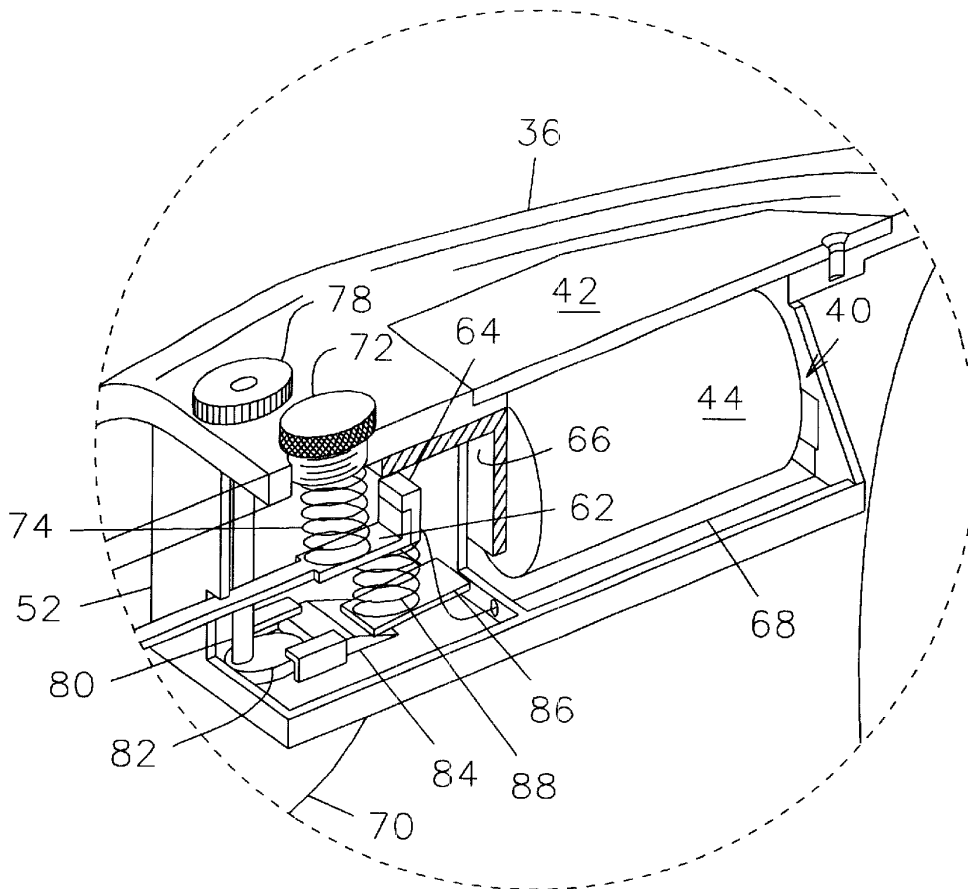


FIG. 4

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**FISHING REEL SIGNALING DEVICE****BACKGROUND OF THE INVENTION**

This invention relates generally to signal devices and, more particularly, to an audible and visual signaling device for a fishing reel which provides the appropriate signal indicative of a fish on a fishing line depending on available ambient light.

Avid fisherman may use several fishing poles at the same time and attempt to monitor each one simultaneously as to whether a fish is nibbling on the bait or has taken the bait and is running with the line. This can be difficult even in the daylight and is certainly more difficult at night. Various devices have been proposed in the art for signaling a fisherman that a fish is on the line. Although assumably effective for their intended purposes, existing devices do not provide an appropriate alarm depending on available ambient light.

Therefore, it is desirable to have a signaling device which attaches directly to a fishing reel that energizes a signal light only when the available ambient light is less than a predetermined level. Further, it is desirable to have a signaling device that energizes an appropriate alarm when the tension on the fishing line is greater than a predetermined tension. Finally, it is desirable to have a signaling device in which the tension required to activate a signal is adjustable by a user.

**SUMMARY OF THE INVENTION**

A signaling device according to the present invention includes a conical housing having a rear edge adapted to be releasably coupled to a reel of the type having a body portion attachable to a fishing rod, a spool, and means for winding and unwinding a fishing line relative to the spool. The housing defines an open back such that the spool of the reel is received in a back portion of the housing when the housing is coupled to the reel. An incandescent light, a battery power source, and a photoelectric light sensor are mounted within the housing. The front wall of the housing is constructed of a transparent material and defines an opening for receiving the fishing line therethrough. The light sensor permits current from the battery to energize the incandescent light when the level of ambient light is below a predetermined level.

A switch assembly is also mounted within the housing and includes an arm pivotally mounted therein for teetering movement. The arm includes a first end adapted to be coupled to said fishing line and a second end positioned adjacent to the battery. A change in the tension of the fishing line at the first end of the arm causes corresponding movement of the second end of the arm toward or away from the battery. Contact between the second end of the arm and the battery permits current from the battery to energize the light sensor, and thus the incandescent light. The amount of tension increase necessary to activate the light may be adjusted by a user via knob controls coupled to a pair of springs adjacent the second end of the arm. An audible alarm is also positioned in the housing and electrically connected to the light sensor such that current from the battery is permitted to energize the audible alarm upon an appropriate line tension change regardless of the level of ambient light.

Therefore, a general object of this invention is to provide a device for signaling a fisherman when a fish is on the line.

Another object of this invention is to provide a signaling device, as aforesaid, which visually or audibly signals a fisherman during the day or night.

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Still another object of this invention is to provide a signaling device, as aforesaid, which energizes an incandescent light signal in response to detecting a fish on the line only at night.

Yet another object of this invention is to provide a signaling device, as aforesaid, which energizes an audible alarm in response to detecting a fish on the line during the day or night.

A further object of this invention is to provide a signaling device, as aforesaid, which permits an alarm to be energized when a predetermined tension on the fishing line is detected.

A still further object of this invention is to provide a signaling device, as aforesaid, in which the alarm activation tension is adjustable by a user.

Another object of this invention is to provide a signaling device, as aforesaid, which includes a photoelectric light sensor for determining whether the light alarm should be energized.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings, wherein is set forth by way of illustration and example, an embodiment of this invention.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a perspective view of a signaling device according to the preferred embodiment of the present invention attached to a fishing reel;

FIG. 2 is a fragmentary view of the housing as in FIG. 1 removed from the reel;

FIG. 3 is an isolated perspective view of the switch assembly portion of the housing as in FIG. 2 on an enlarged scale in one adjusted configuration; and

FIG. 4 is an isolated perspective view of the switch assembly portion of the housing as in FIG. 2 on an enlarged scale in another adjusted configuration.

**DESCRIPTION OF THE PREFERRED EMBODIMENT**

A signaling device 10 for use with a fishing reel 12 according to a preferred embodiment of the present invention will now be described with reference to FIGS. 1 through 4 of the accompanying drawings. The signaling device 10 includes a housing 30 having a conical configuration, the housing having a front wall section 32 and a rear wall section 36 (FIG. 1). The signaling device 10 may be releasably coupled to a conventional fishing reel 12 having a body portion 14 with a flange 16 suitable for attachment to a fishing rod. Preferably, the reel 12 includes a spool 18 pivotally coupled to the body portion 14 in an open spool configuration (FIG. 2) although reels having an enclosed spool are also suitable for use with the present signaling device 10. The reel 12 also includes a conventional crank handle 20 connected to the spool 18 for winding a fishing line 22 thereabout in order to retrieve the fishing line or for unwinding the line in order to pay out the line.

The housing 30 includes a rear edge 38 that defines an open back (FIG. 2) and which may be releasably coupled to the body portion 14 of the fishing reel 12 in a friction fit arrangement (FIG. 1). The spool 18 of an open-spool reel configuration is received through the open back into the housing 30. It should be understood that the housing 30 may also be particularly constructed for use with a particularly designed fishing reel such that the housing and reel could be releasably joined in a threaded or snap-fit arrangement.

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The front wall section 32 of the housing 30 is constructed of a transparent or at least translucent plastic material. The front wall section 32 defines an opening 34 dimensioned to allow a fishing line 22 wrapped about the spool 18 to pass therethrough.

The housing 30 includes a battery compartment 40 depending from the rear wall section 36 (FIG. 3). The battery compartment 40 is accessible through a cover member 42 releasably coupled thereto. A battery 44 is the preferred power source for the components to be described below and may be removably housed within the battery compartment 40.

A switch assembly 50 is mounted to the inner surface of the rear wall section 36 of the housing 30 and includes an arm 54 pivotally mounted therein for teetering movement about an axial fulcrum 56 (FIG. 1). The arm 54 includes a first end 58 having an eyelet 60 for receiving the fishing line 22 therethrough as it passes between the opening 34 and the spool 18 of the reel 12. The arm 54 includes an opposed second end 62 positioned adjacent the battery 44 (FIG. 3). More particularly, the second end 62 is adjacent an electrical contact plate 66 that bears against one of the battery terminals. An electrical contact member 64 is fixedly attached to the second end 62 and is electrically connected to the other battery terminal with a wire 68 such that a circuit is closed when the electrical contact member 64 contacts the electrical contact plate 66. The switch assembly 50 is electrically connected to the light sensor 94 with a wire 70 (FIG. 3), as to be described more fully below.

The arm 54 is teetered about the fulcrum 56 according to the tension on the fishing line 22 at the first end 58. In general, as tension on the line 22 pulls the first end 58 downward, the second end 62 is correspondingly urged upward toward the electrical contact plate 66. The position of the second end 62 and the resistance placed against its movement toward the contact plate 66 is regulated by springs coupled to adjustment knobs and positioned within a switch housing 52 (FIG. 3). A first knob 72 is threadably coupled to the housing 30. A first compression spring 74 is fixedly attached to the first knob 72 and includes a free end extending from the first knob 72 toward the second end 62 of the arm 54. Therefore, a rotation of the first knob 72 causes the first spring 74 either to move closer to the second end 62 or further away from it, respectively, and thus to affect the resistance against the 20 second end 62 as it is urged toward the battery contact plate 66.

The switch assembly 50 includes a second adjustment knob 78 (FIG. 3) coupled to a shaft 80 that extends through the rear wall section 36 and into the switch housing 52. The end of the shaft 80 opposite the second knob 78 is fixedly attached to an obround plate commonly known as an eccentric 82. A spring-biased ramp 84 is mounted within the switch housing 52 and normally bears against the eccentric 82 such that rotation of the second knob 78 and corresponding movement of the eccentric 82 causes lateral movement of the ramp 84. A mounting plate 86 is also positioned in the switch housing 52 in contact with the ramp 84 such that the mounting plate 86 is raised or lowered upon corresponding movement of the ramp 84. A second spring-88 is mounted atop the mounting plate 86 and extends upwardly so as to contact the second end 62 of the arm 54. Therefore, adjustment of the second knob 78 allows a user to initially regulate the distance between the second end 62 and the contact plate 66 and thus how much of a line tensional change will be needed to energize an alarm.

An incandescent light 90 and an audible alarm 92 such as a piezo buzzer are mounted on an inner surface of the rear

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wall section 36 of the housing 30 (FIG. 2). A photoelectric light sensor 94 is also mounted in the housing 30 and is positioned to sense the level of ambient light entering the housing through the front wall section (FIGS. 1 and 2). The switch assembly 50 is electrically connected to the light sensor 94 as are the light 90 and audible alarm 92 (FIG. 2). Using conventional electrical components within the light sensor 94, the light sensor 94 permits current from the battery 44 to energize the audible alarm 92 when the light sensor 94 itself has been energized. Further, the light sensor 94 permits current from the battery 44 to energize the incandescent light 90 when the light sensor 94 itself has been energized and if the level of ambient light sensed by the light sensor 94 is less than a predetermined level. The light sensor 94 is able to determine an ambient light level from the light entering the housing 30 through the transparent front wall section 32.

In use, the housing 30 may be coupled to a reel 12 that is attached to a fishing pole such that the spool 18, or front portion of the reel if the spool is enclosed therein, is received through the open back of the housing 30. The fishing line 22 is threaded through the eyelet 60 at the first end 58 of the switch assembly arm 54 and then through the front wall section opening 34 (FIG. 1). When fishing, the tension of the fishing line will increase when a fish nibbles on the bait or takes the bait entirely and runs with the line. Such a tension change causes a downward pull on the first end 58 of the arm 54 and a corresponding upward movement on the second end 62. When the electrical contact member 64 of the second end 62 contacts the contact plate 66, an electrical circuit with the battery 44 is closed and the light sensor 94 is energized. This allows the audible alarm 92 to be energized as well, but only if the level of ambient light is below a predetermined level, allows the light 90 to be energized as well.

The first 72 and second 78 adjustment knobs may be rotated to increase or decrease the amount of tension that is required to trigger the alarms. The first knob 72 may be adjusted to increase or decrease the spring resistance that must be overcome by the second end 62 of the arm 54 in order to contact the contact plate 66. The second knob 78 may be rotated to increase or decrease the distance that the second end 62 must travel before contacting the contact plate 66 (FIGS. 3 and 4).

It is understood that while certain forms of this invention have been illustrated and described, it is not limited thereto except insofar as such limitations are included in the following claims and allowable functional equivalents thereof.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is as follows:

1. A signaling device for use with a fishing reel having a body portion and a spool mounted to said body portion having means for winding a fishing line onto said spool and means for unwinding said fishing line therefrom, said signaling device comprising:

- a housing having a rear edge adapted to be releasably coupled to said body portion of said reel and defining an open back, said housing having a front wall defining an opening for receiving said fishing line therethrough;
- an incandescent light positioned in said housing;
- a power source;
- a light sensor positioned in said housing for sensing the level of ambient light therein, said light sensor permitting current from said power source to energize said incandescent light when the level of ambient light is less than a predetermined level; and

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- a switch assembly having an arm pivotally mounted in said housing for teetering movement therein, said arm having a first end adapted to be coupled to said fishing line and a second end positioned adjacent said power source for permitting current from said power source to energize said light sensor when the tension of said fishing line is greater than a predetermined level.
2. The signaling device as in claim 1 wherein said switch assembly comprises:
- a first spring adjustably positioned in said housing for selectively resisting movement of said second end of said arm toward said power source; and
  - a second spring adjustably positioned in said housing for selectively positioning said second end of said arm relative to said power source, said second end of said arm having a conductive element attached thereto and electrically connected to said light sensor for energizing said light sensor upon contact with said power source.
3. The signaling device as in claim 2 further comprising:
- a first knob threadably coupled to said housing and fixedly attached to said first spring such that rotation of said first knob regulates the distance between said first spring and said second end of said arm; and
  - a second knob threadably coupled to said housing and coupled to said second spring such that a respective rotation of said second knob causes said second spring to urge said second end of said arm toward or away from said power source.
4. The signaling device as in claim 1 wherein said first end of said arm includes an eyelet through which said fishing line may extend such that a tension change relative to said fishing line indicative of a fish thereon causes a corresponding pivotal movement of said arm.
5. The signaling device as in claim 1 further comprising an audible alarm positioned in said housing and electrically connected to said light sensor, said light sensor permitting current from said power source to energize said audible alarm.
6. The signaling device as in claim 1 wherein said power source is a battery.
7. The signaling device as in claim 1 wherein said housing includes a compartment for holding said power source, said compartment having a cover member releasably coupled thereto.
8. The signaling device as in claim 1 wherein a front portion of said housing is constructed of a transparent material.
9. A signaling device for use with a fishing reel having a spool and means for winding a fishing line onto said spool and means for unwinding said fishing line therefrom, said signaling device comprising:
- housing having a rear edge adapted to be releasably coupled to said reel and defining an open back, said housing having a transparent front wall defining an opening for receiving said fishing line therethrough;
  - an audible alarm positioned in said housing;
  - an incandescent light positioned in said housing;
  - a battery;
  - a light sensor positioned in said housing for sensing the level of ambient light therein, said light sensor permitting current from said battery to energize said incandescent light when the level of ambient light is less than a predetermined level;
  - a switch assembly having an arm pivotally mounted in said housing for teetering movement therein, said and

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- having a first end adapted to be coupled to said fishing line and a second end positioned adjacent said battery, wherein said arm is pivotal upon a change in the tension of said fishing line between a first configuration in which said second end is displaced from said battery and a second configuration in which said second end is in contact with said battery;
- means for selecting an amount of tension that must be placed upon said fishing line at said first end to move said second end to said second configuration; and
- a conductive element attached to said second end of said arm and electrically coupled to said audible alarm for energizing said audible alarm at said second configuration.
10. The signaling device as in claim 9 wherein said switch assembly further comprises:
- a first spring adjustably positioned in said housing for selectively resisting movement of said second end of said arm toward said power source; and
  - a second spring adjustably positioned in said housing for selectively positioning said second end of said arm relative to said power source.
11. The signaling device as in claim 10 wherein said selecting means comprises:
- a first knob threadably coupled to said housing and fixedly attached to said first spring such that rotation of said first knob regulates the distance between said first spring and said second end of said arm; and
  - a second knob threadably coupled to said housing and coupled to said second spring such that a respective rotation of said second knob causes said second spring to urge said second end of said arm toward or away from said battery.
12. The signaling device as in claim 9 wherein said first end of said arm includes an eyelet through which said fishing line may extend such that a tension change relative to said fishing line indicative of a fish thereon causes a corresponding pivotal movement of said arm.
13. The signaling device as in claim 9 wherein said housing includes a compartment for holding said battery, said compartment having a cover member releasably coupled thereto.
14. A fishing reel signaling device, comprising:
- a fishing reel having a body portion adapted to be attached to a fishing pole, said fishing reel having a spool attached to said body portion;
- means on said fishing reel for winding a fishing line onto said spool in order to retrieve said fishing line and means for unwinding said fishing line from said spool in order to pay out said fishing line;
- a housing having a rear edge adapted to be releasably coupled to said body portion of said reel and defining an open back, said housing having a transparent front wall defining an opening for receiving said fishing line therethrough;
  - an incandescent light positioned in said housing;
  - a battery;
  - a light sensor positioned in said housing for sensing the level of ambient light therein, said light sensor permitting current from said battery to energize said incandescent light when the level of ambient light is less than a predetermined level; and
  - a switch assembly having an arm pivotally mounted in said housing and adapted for teetering movement therein, said arm having a first end adapted to be

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coupled to said fishing line and a second end positioned adjacent said battery for permitting current from said battery to energize said light sensor when the tension of said fishing line is greater than a predetermined level.

15. The apparatus as in claim 14 wherein said switch assembly comprises:

a first spring adjustably positioned in said housing for selectively resisting movement of said second end of said arm toward said power source; and

a second spring adjustably positioned in said housing for selectively positioning said second end of said arm relative to said power source, said second end of said arm having a conductive element attached thereto and electrically connected to said light sensor for energizing said light sensor upon contact with said power source.

16. The signaling device as in claim 15 further comprising:

a first knob threadably coupled to said housing and fixedly attached to said first spring such that rotation of said first knob regulates the distance between said first spring and said second end of said arm; and

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a second knob threadably coupled to said housing and coupled to said second spring such that a respective rotation of said second knob causes said second spring to urge said second end of said arm toward or away from said power source.

17. The signaling device as in claim 14 wherein said first end of said arm includes an eyelet through which said fishing line may extend such that a tension change relative to said fishing line indicative of a fish thereon causes a corresponding pivotal movement of said arm.

18. The signaling device as in claim 14 further comprising an audible alarm positioned in said housing and electrically connected to said light sensor, said light sensor permitting current from said power source to energize said audible alarm.

19. The signaling device as in claim 14 wherein said housing includes a compartment for holding said battery, said compartment having a cover member releasably coupled thereto.

\* \* \* \* \*



UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 6,433,703 B1  
DATED : August 13, 2002  
INVENTOR(S) : Thomas L. Tucker

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page.

Item [76], inventor's address, change "AK" into -- AR --.

Signed and Sealed this

Twenty-first Day of January, 2003

A handwritten signature in black ink, appearing to read "James E. Rogan", with a horizontal line drawn underneath it.

JAMES E. ROGAN  
*Director of the United States Patent and Trademark Office*



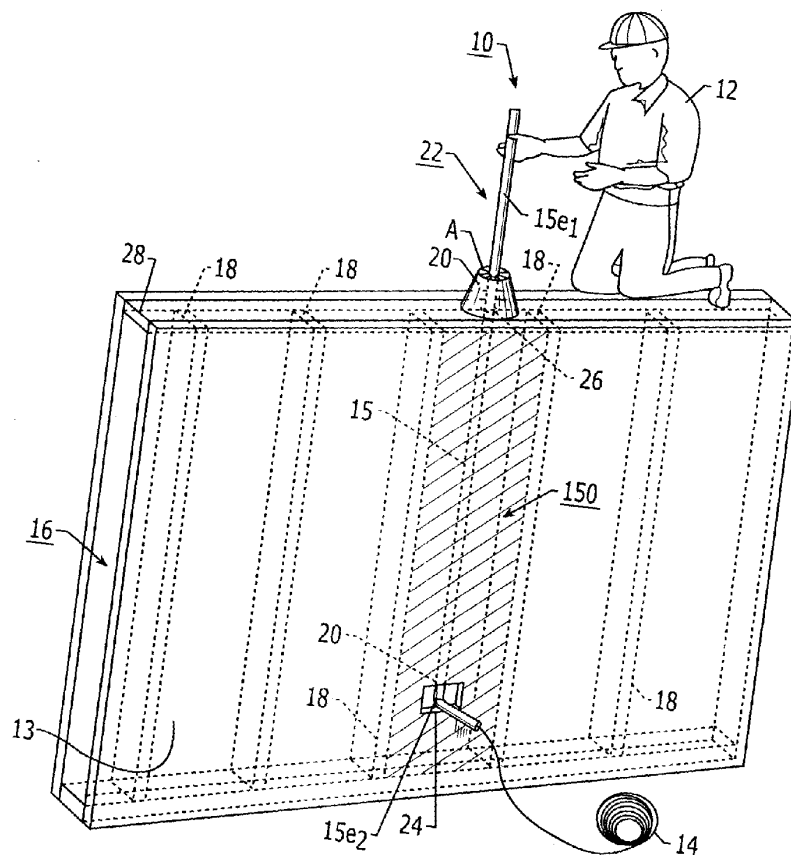
US 20040206529A1

(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2004/0206529 A1****Sawyer et al.**(43) **Pub. Date:****Oct. 21, 2004**(54) **GLOW RODS WITH EXTERNALLY  
MOUNTABLE ANCHORING MEMBERS AND  
RELATED METHODS****Publication Classification**(51) **Int. Cl.<sup>7</sup>** ..... **H02G 3/04**(52) **U.S. Cl.** ..... **174/48**(76) **Inventors:** **Charlie Sawyer**, Orlando, FL (US);  
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**MYERS BIGEL SIBLEY & SAJOVEC  
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RALEIGH, NC 27627 (US)**(57) **ABSTRACT**

Rod assemblies for guiding, routing or feeding a wire and/or cable in a target space of an existing structure having a plurality of frame members and a target internal routing space for the cable or wire, include: (a) an elongate rod having opposing first and second end portions; and (b) an anchoring member attached to the rod first end portion. In position, the anchoring member resides against a surface of a structural frame member to hold the first end portion outside of the target internal routing space and allow the second end portion to extend into the target internal routing space, thereby allowing one end of the rod to remain in a fixed location without requiring a second installer. The elongate rod can be a glow rod.

(21) **Appl. No.:** **10/417,603**(22) **Filed:** **Apr. 17, 2003**



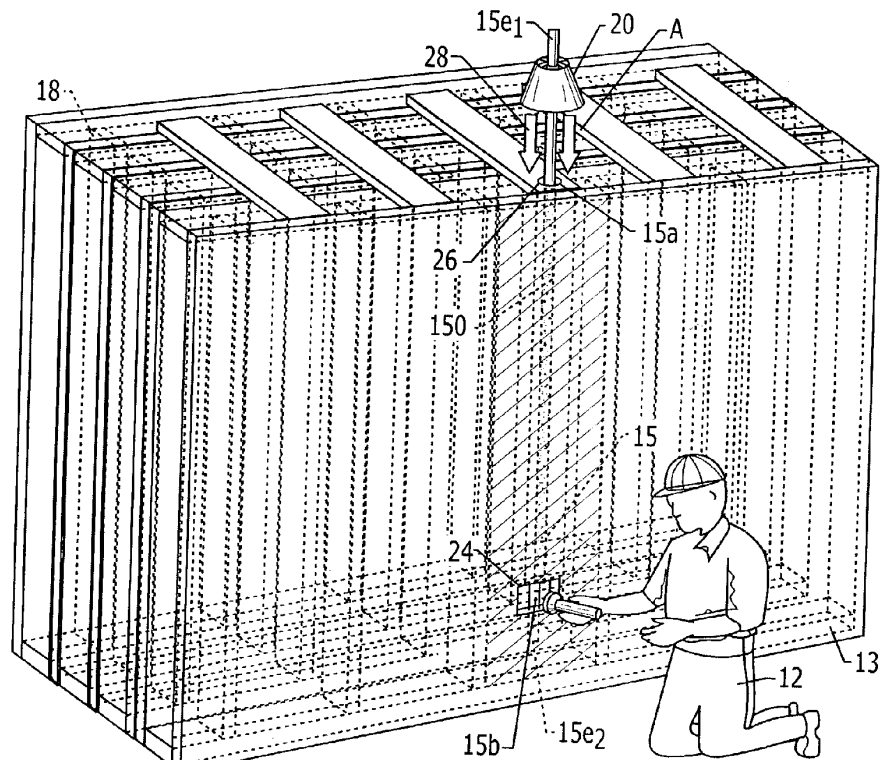


FIGURE 2

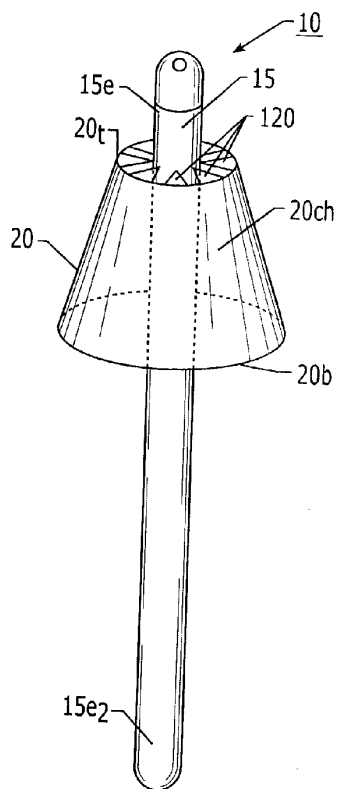


FIGURE 3A

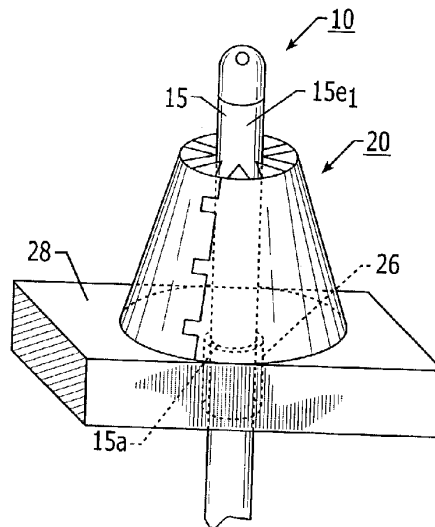


FIGURE 3B

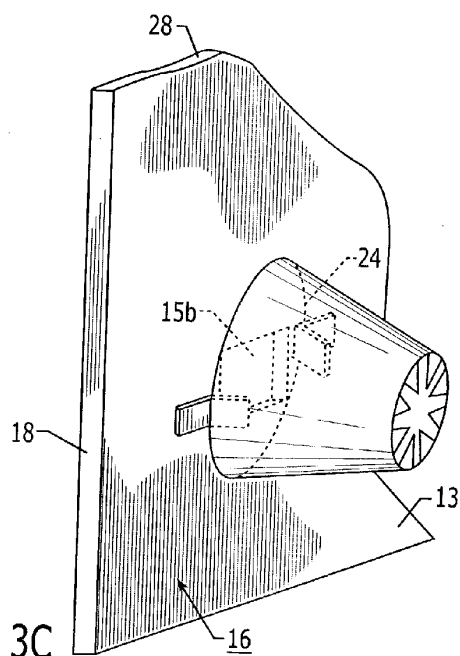


FIGURE 3C

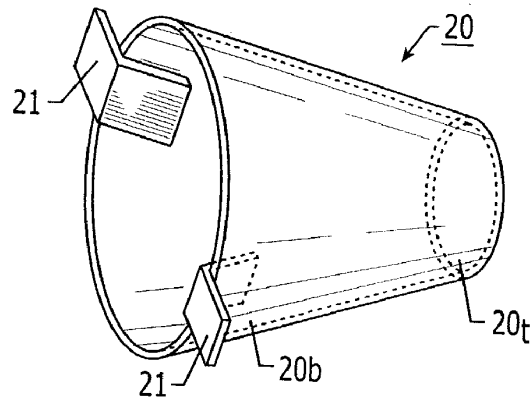


FIGURE 3D

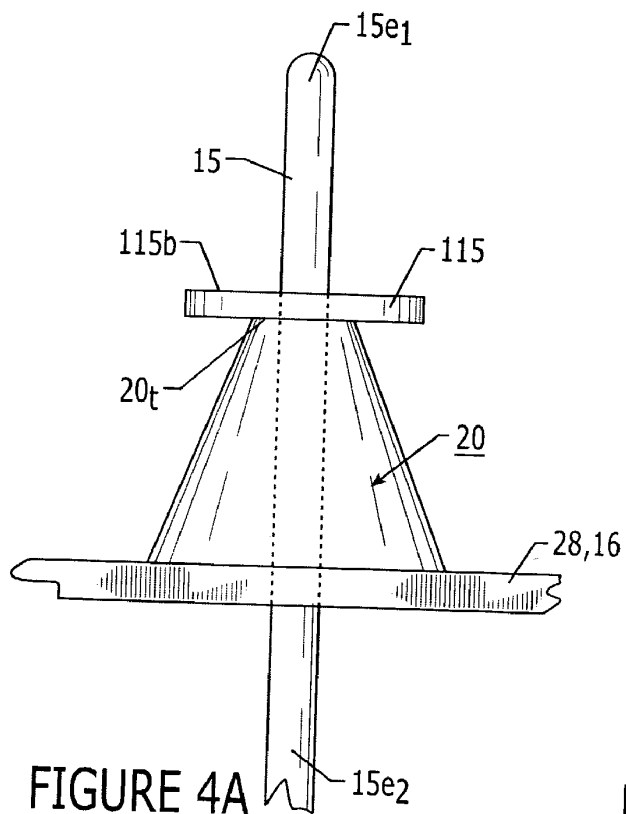


FIGURE 4A

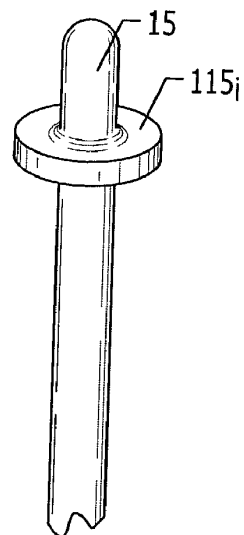


FIGURE 4B

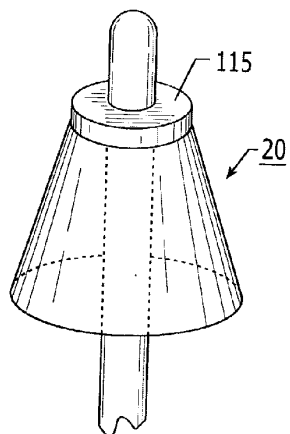


FIGURE 4C

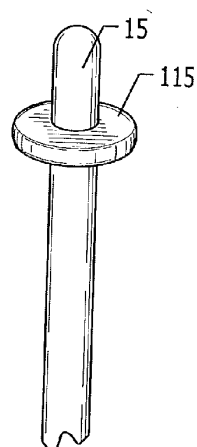


FIGURE 4D

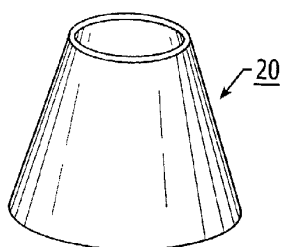


FIGURE 4E

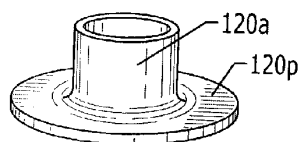


FIGURE 5A

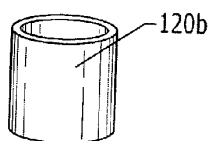


FIGURE 5B

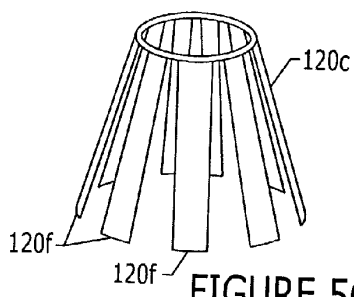


FIGURE 5C

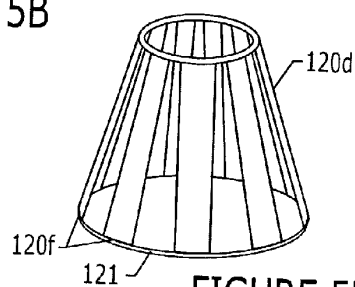


FIGURE 5D

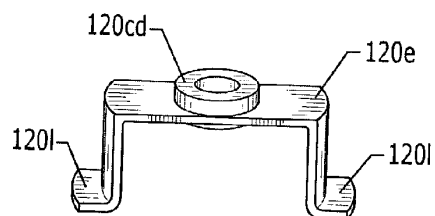


FIGURE 5E

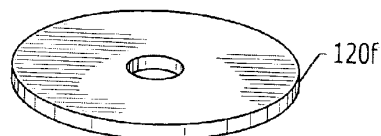


FIGURE 5F

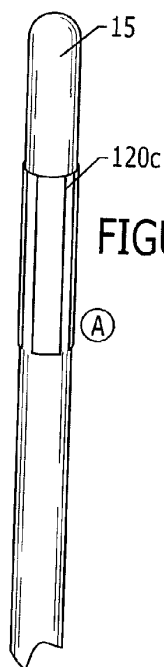


FIGURE 6A

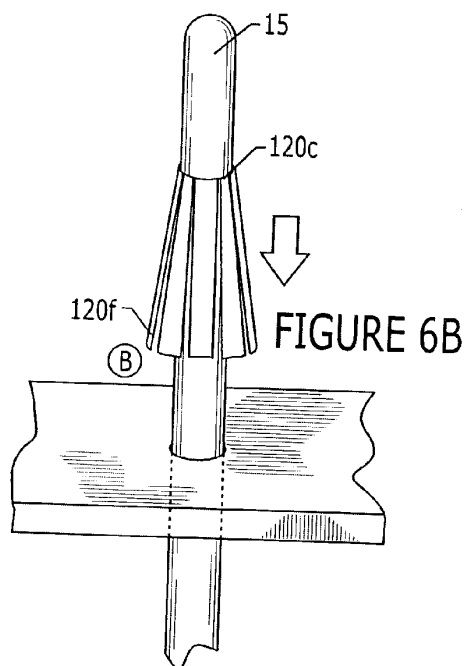


FIGURE 6B

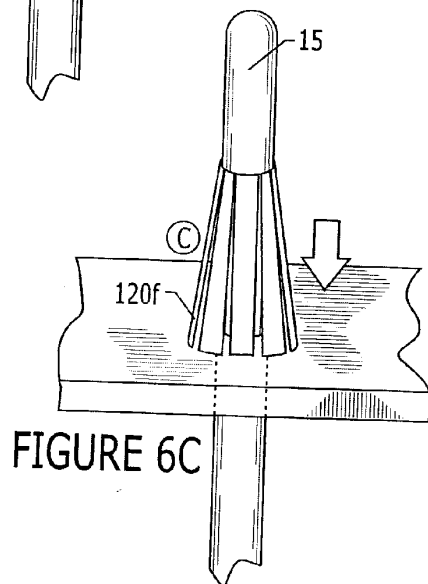


FIGURE 6C

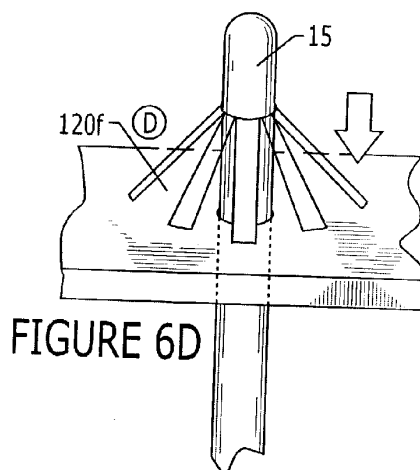


FIGURE 6D



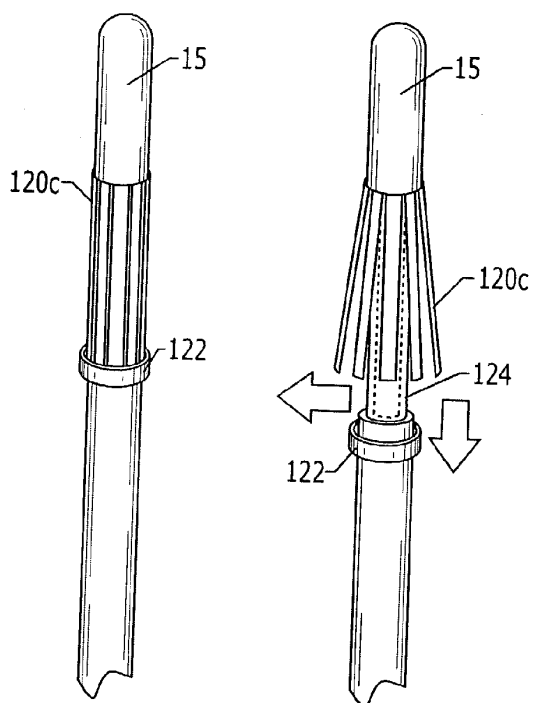


FIGURE 7A FIGURE 7B

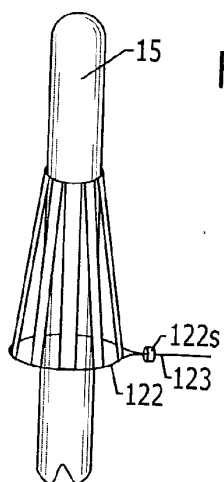


FIGURE 8A

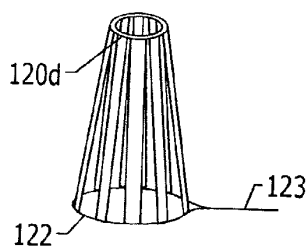


FIGURE 8B

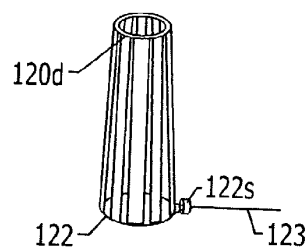


FIGURE 8C

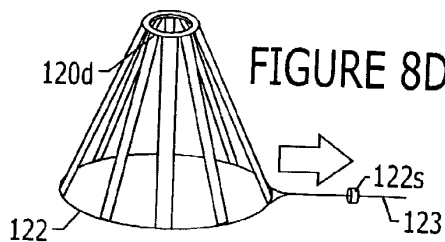


FIGURE 8D

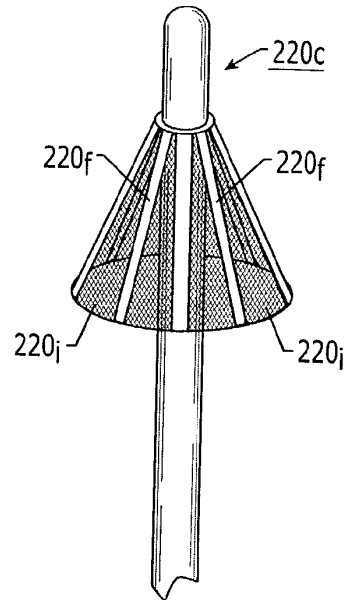


FIGURE 9A

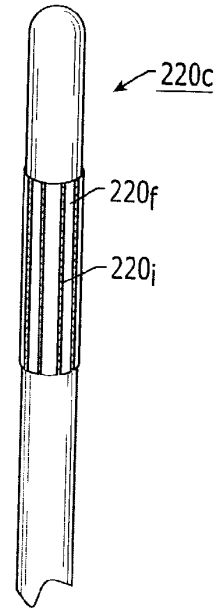


FIGURE 9B

## GLOW RODS WITH EXTERNALLY MOUNTABLE ANCHORING MEMBERS AND RELATED METHODS

### FIELD OF THE INVENTION

[0001] The present invention relates to implements or devices for pulling, guiding, or directing cables and wires in structures, and may be particularly suitable for glow rods.

### BACKGROUND OF THE INVENTION

[0002] Implements or devices have been used to install or route electrical wires and cables in existing structures in various buildings, houses, or other structures. These devices help an installer route or guide the wires and/or cables within existing cavities, ceilings, trusses, attics, trailers, studs, conduits, walls, framed regions, or other structural spaces between or within structures (such as "blind" or tightly bound spaces). The devices or implements can include rods, an electrician's "snake" or semi-flexible rod or "fish" tape. Co-pending, co-assigned U.S. patent application Ser. No. 10/307,058, identified by Attorney Docket No. BS02398, filed Nov. 30, 2002, entitled Apparatus and Method for Routing Cables and Wires, describes an exemplary apparatus for routing and guiding cables and/or wires. The content of this application is hereby incorporated by reference as if recited in full herein.

[0003] Thin long rods have been used to "fish" or guide the cable or wire in crawl spaces or other tightly bound spaces. The glow rod is an elongate thin pole-like device that can be used to "fish" or direct a cable or wire in the router space. One type of rod used to route cables and/or wires is a glow rod. A glow rod is typically configured to be a light-weight device with sufficient rigidity so as to be able to engage and direct a wire or cable to be routed as desired. Certain types of glow rods can generate light through chemical phosphorescence; others are electroluminescent rods that can be internally or externally illuminated. The glow rod may be formed of a transparent or translucent fiberglass material. The glow rod may be between about 5-20 feet long, or longer, and have a relatively small diameter, such as, for example about 0.25-0.5 inches. Certain glow rods may have about a 1 cm diameter and be about 6 feet long. Exemplary glow rods are GLO-RODS available from MidSouth Wire and Cable Company, located in Winston-Salem, NC.

[0004] Unfortunately, use of typical glow rods may require two installers, one on each end of the device in order to use the rod to route the wire and/or cable into the desired position. That is a first installer is required at the entry site to hold the rod as it fishes to an exit site and the other installer is at the exit site where he/she locates the glow rod and then attaches a cable or wire to the rod. The second installer then retrieves the glow rod with the attached wire or cable and routes the glow rod holding the wire or cable through the router space and out through the rod original entry site.

### SUMMARY OF THE INVENTION

[0005] Embodiments of the present invention provide anchoring members that can be attached to one end portion of a rod to secure the rod externally against a fixed structure (ceiling, stud, wall, beam and the like), while allowing the

rod to extend within the target installation space, which, in turn, can permit a single installer to move to a different location, with the rod held in place at the secured location to guide the cable and/or wire in the installation space.

[0006] The present invention may be particularly suitable for anchoring glow rods during cable or wire installation in a building.

[0007] Certain embodiments of the present invention are directed to rod assemblies for guiding, routing or feeding a wire and/or cable in a target space of an existing structure having a plurality of frame members and a target internal routing space for the cable or wire. The rod assemblies include an elongate rod having opposing first and second end portions and an anchoring member attached to the rod first end portion. In position, the anchoring member resides against a surface of a structural frame member to hold the first end portion outside of the target internal routing space and allow the second end portion to extend into the target internal routing space. The configuration allows one end of the rod to remain in a fixed location without requiring a second installer to hold that end during the installation and/or allowing a single installer to use the rod to position the cable or wire.

[0008] Other embodiments are directed to methods for routing or guiding a cable or wire in a target routing space of a structure. The methods include: (a) inserting a rod having opposing first and second end portions into a first aperture formed in a structural member of a structure, the first aperture allowing access to target routing space, so that the second end portion travels through the aperture into the target routing space; and (b) anchoring the first end portion to the structural member so that the first end portion resides external to the first aperture and remains fixed in position.

[0009] The method can also include directing the second end portion of the rod to exit the target routing space at a second aperture formed in the structure at a position that is spaced apart from the first aperture.

[0010] The anchoring step can be carried out by: (a) affixing an anchoring member to the wall, stud and/or beam so that the anchoring member holds the rod therein; and (c) securing the anchoring member to the rod first end portion so that the first end portion resides above or outside the aperture and the target routing space. The anchoring member can be secured to the rod in advance or after affixing it to the wall, stud or beam.

[0011] Still other embodiments of the present invention are directed to kits for a glow rod. The kits include an anchoring member sized and configured to engage a rod channel that is configured to receive and attach to a first end portion of a glow rod and to hold the first end portion of the glow rod above a target routing space in a structural member (such as, but not limited to, a beam, stud, wall, truss, ceiling or other frame structure) while allowing the second end portion of the rod to be directed to travel through the target routing space.

[0012] The kits can be used to retrofit glow rods in use in the field or provided as an accessory item with glow rods to allow for use of the anchoring member at desired installation sites. In certain embodiments, the anchoring member is configured to releasably attach to the glow rod during use and is detachable from the rod for storage after use.

[0013] In particular embodiments, the kit can include a collar sized and configured to securely attach to the elongate rod first end portion. In position, the collar extends radially outward from the rod.

[0014] Other embodiments are directed to rod assemblies for guiding, routing or feeding a wire and/or cable in a target space of an existing structure having a plurality of frame members and a target internal routing space for the cable or wire. The assembly includes an elongate rod having opposing first and second end portions and means for mounting the elongate rod so that a selected one of the first or second end portions resides against a surface of a structural frame member to hold the selected rod end portion outside of a target internal routing space and allow the opposing end portion to extend into the target internal routing space.

[0015] The foregoing and other objects and aspects of the present invention are explained in detail herein.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0016] **FIG. 1** is a schematic illustration of one type of installation that can be carried out using rod assemblies according to embodiments of the present invention.

[0017] **FIG. 2** is a schematic illustration of another exemplary installation according to embodiments of the present invention.

[0018] **FIG. 3A** is a front view of a rod assembly with an anchoring member according to embodiments of the present invention.

[0019] **FIG. 3B** is a front view of the rod assembly of **FIG. 3A** shown positioned over a horizontal stud according to embodiments of the present invention.

[0020] **FIG. 3C** is a schematic illustration of a rod assembly similar to that shown in **FIG. 3A** inserted through an aperture formed in an upstanding wall according to embodiments of the present invention.

[0021] **FIG. 3D** is an end perspective view of an alternative embodiment of the anchoring member shown in **FIG. 3A**.

[0022] **FIG. 4A** is a schematic front view of a rod with an anchoring member and a stop collar according to embodiments of the present invention.

[0023] **FIG. 4B** is a front view of an anchoring member and rod configuration with a stop collar similar to that shown in **FIG. 4A**.

[0024] **FIG. 4C** is a schematic front view of a partial rod with anchoring member according to other embodiments of the present invention.

[0025] **FIG. 4D** is a partial front view of a rod assembly that illustrates that the collar may be configured to reside on the rod according to embodiments of the present invention.

[0026] **FIG. 4E** is a front view of an example of a frustoconical anchoring member.

[0027] **FIGS. 5A-5F** are front views of examples of differently shaped anchoring members according to embodiments of the present invention.

[0028] **FIGS. 6A-6D** are schematic illustrations of one sequence of operations that may be carried out according to embodiments of the present invention.

[0029] **FIGS. 7A and 7B** are partial front views of a rod assembly with extendable arms according to embodiments of the present invention.

[0030] **FIG. 8A** is a partial front view of a rod assembly with an anchoring member having a skirt with a cord attached to a lower portion of the skirt according to embodiments of the present invention.

[0031] **FIGS. 8B-8D** illustrate that the skirt shown in **FIG. 8A** may be formed with a plurality of spaced apart segments with the cord configured to be able to gather and release the skirt segments to form the shape desired according to embodiments of the present invention.

[0032] **FIGS. 9A and 9B** illustrate a continuous skirt configuration with segments that can resiliently stretch radially outward during use and then retract to their original disposition or shape during storage according to embodiments of the present invention.

#### DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0033] The present invention will now be described more fully hereinafter with reference to the accompanying figures, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Like numbers refer to like elements throughout. In the drawings, layers, regions, or components may be exaggerated for clarity. In the figures, broken lines indicate optional features unless described otherwise. The method steps are not limited to the order in which they are set forth.

[0034] The present invention is directed to devices such as long slender rods used to install or route electrical wires and cables in existing structures such as buildings (houses, offices, hospitals, clinics) or other structures. The devices help an installer route or guide the wires and/or cables in router spaces of interest within existing cavities, ceilings, trusses, attics, trailers, studs, conduits, walls, framed regions, or other structural spaces between or within structures (such as "blind" or tightly bound spaces). The router space of interest may include an entry point that is a drilled, chiseled, or cut opening in a stud, wall or other frame member. The router space of interest is typically the space between upstanding walls or between a wall and an unfinished framed portion (truss, ceiling, attic and the like). As shown in **FIG. 1**, the wall 16 can include one or more vertical studs 18 and a horizontal stud 28 (or header) with a sheet rock or dry wall face 13 and target router space 150 behind the sheet rock face 13 and between adjacent vertical studs 18.

[0035] **FIG. 1** illustrates the exemplary use of a rod assembly 10 with an elongate rod 15 and anchoring member 20. As shown, the rod 15 includes two opposing end portions 15e<sub>1</sub>, 15e<sub>2</sub>. The anchoring member 20 may be located proximate either the first end portion 15e<sub>1</sub> (shown as location "A") and/or the second end portion 15e<sub>2</sub> (shown as position "B"). As shown, at least one end portion 15e<sub>2</sub> of the

rod assembly 10 is configured to attach to a cable or wire 14 that is to be positioned in the router space 150.

[0036] FIG. 2 illustrates the anchoring member 20 held in the upper position "A" with the rod inserted in a first aperture 15a while the technician or installer is able to access the other end of the rod 15e<sub>2</sub> in the router space 150 via a second aperture 15b. In use, the technician can view through the opening 15b to find the position of the rod 15. In particular embodiments, the rod 15 is an elongate glow rod and the technician may shine a light into the router space 150 and the rod 15 can glow in response thereto, or the glow rod may generate its own light without such external input. The technician or installer can then connect the rod 15 to the cable or wire 14 and return to the upper position to fish or pull the cable or wire 14 through the router space 150 without requiring the use of a second technician to install the wire or cable.

[0037] In any event, the installer 12 can use the rod 15 to route or "fish" the cable or wire from an upper location 22 (such as a ceiling, attic or upper floor) to a lower location 24, typically associated with a wall outlet or terminal jack (not shown). The installation can also be carried out in reverse order and/or by mounting the anchoring member 20 at the lower location.

[0038] The rod 15 may be a relatively thin rod having a length that is between 5-10 feet or longer. In particular embodiments, the rod 15 will have sufficient rigidity to be able to guide or fish a wire through the desired router space 150 and can have a diameter that is less than about 1 inch, and more typically is between about 0.25-0.33 inches.

[0039] FIG. 3A illustrates one embodiment of a rod assembly 10. As shown, the anchoring member 20 has a frustoconical shape with opposing top and bottom portions 20t, 20b, respectively, that define a rod channel 20ch therebetween. The bottom portion 20b of the anchoring member 20 is configured to overlie the wall, beam, stud, ceiling or other entry region or port into the router space 150. As such, the bottom portion 20b of the anchoring member 20 has a width that is larger than the width of the aperture 26 (FIG. 3B) or other access port in the rod entry location into the router space 150. The top portion 20t of the anchoring member 20 is sized and configured to cooperably engage with a first end portion 15e<sub>1</sub> of the rod 15. The top end portion 20t of the anchoring member 20 may be configured to frictionally engage the rod end portion 15e<sub>1</sub>. As shown in FIG. 3A, the top portion 20t of the anchoring member 20 may include laterally extending baffle segments 120 that frictionally engage the rod 15 to hold the rod in position in the anchoring member 20 while the technician is at the second routing (egress) location.

[0040] FIG. 3B illustrates the anchoring member 20 positioned on the top of a wall on a horizontal stud or header 28. A through aperture 26 is formed in the header or stud 28. The rod 15 is inserted through the aperture 26 and the anchoring member 20 engages with the top surface of the stud 28 to hold the first end portion 15e<sub>1</sub> of the rod 15 in place above the stud 28, thereby allowing the rod 15 to extend downwardly through the router space 150 to the egress or cable/wire exit location.

[0041] FIG. 3C illustrates an alternative installation procedure in which the anchoring member 20 is positioned

against an upstanding wall and allows the rod 15 to enter laterally into the router space 150 and then travel upwardly to the exit location.

[0042] FIG. 3D illustrates that the anchoring member 20 may include brackets at the bottom portion 20b to help hold the anchoring member 20 in place when used for side entries. The brackets 21 may be attached to the wall 16 proximate the aperture 24 location using screws, nails or other attachment members. In other embodiments, the brackets 21 can be configured as spaced apart spring loaded clamps or fingers 21c that can pinch the thickness of the dry wall or sheet rock to hold the anchoring member 20 in position (not shown).

[0043] FIG. 4A illustrates another embodiment of a rod 15 with an anchoring member 20. This embodiment includes a stop collar 115 attached to the first end portion 15e<sub>1</sub> of the rod 15. The stop collar 115 may be configured to extend radially outward about the entire perimeter of the rod 15 or may be configured as discontinuous segments that project outwardly to form the desired stop engagement. The stop collar 115 is configured to cooperably engage the top portion 20t of the anchoring member 20 to inhibit the rod first end portion 15e<sub>1</sub> from advancing into the entry or egress aperture and into router space 150. The collar 115 may be configured as two or more outwardly extending bars 115b as shown in FIG. 4A. The bars 115b can be sized to extend a distance beyond the opening at the top portion 20t of the anchoring member 20. The collar 115 may frictionally or matably engage the anchoring member 20 as described above. In other embodiments, the collar 115 may be configured to contact the anchoring member 20 without frictional or matable engagement.

[0044] FIG. 4B illustrates that the collar 115 may be an integrally formed collar 115i on the rod 15 itself. FIG. 4C illustrates that the anchoring member 20 may hold the collar 115 thereon and be sized to frictionally engage the rod 15 during use or assembly. FIG. 4D illustrates a collar 115 formed by an elastomeric ring. FIG. 4E illustrates that the anchoring member 20 may have an open top portion that is sized and configured to receive the rod 15 while inhibiting advancement of the rod above the stop collar 115 into the entry or egress aperture in the structure routing space 150.

[0045] FIGS. 5A-5F illustrate different embodiments of anchoring members 20 that are sized and configured with rod channels that receive and/or hold a portion of the rod 15 therein. FIG. 5A illustrates an anchoring member 120a with a cylindrical body and a planar end segment that resides against the surface of the structure proximate the entry or egress aperture. FIG. 5B illustrates that a cylindrical body anchoring member 120b can be sized and configured to overlie the aperture and hold the rod. FIG. 5C illustrates an anchoring member 120c with a plurality of outwardly extending fingers 120f. The fingers 120f may be resiliently configured with sufficient rigidity to hold the rod 15 against the entry or egress surface in the structure. FIG. 5D illustrates an anchoring member 120d with a bottom edge portion 121 attached for structural reinforcement. FIG. 5E illustrates a stepped anchoring member 120e with a center disc portion 120cd that receives the rod 15 and lower side leg portions 120l that align the center disc portion 120cd over the target (ingress or egress) aperture and hold the anchoring member 120e on the structure surface. FIG. 5F

illustrates a disc configuration that can be sized and configured to abut the aperture to hold the rod 15.

[0046] FIGS. 6A-6D illustrate a sequence of operations that can be carried out to position the rod 15 during an installation. The anchoring member 120c is shown by way of example. The fingers 120c may be formed of any suitable material and may be configured to expand outwardly upon contact with the mounting surface as shown in FIGS. 6C and 6D to hold the weight of the rod 15 so as to keep the rod 15 in the desired position. In particular embodiments, the anchoring member collar 120c may be formed of a resilient metal or elastomer. The fingers 120f may align with the body of the rod 15 during periods of non-use. As shown in FIGS. 7A and 7B, the fingers 120f may be held against the body of the rod 15 in a recess 124 so that the rod 15 and anchoring member 120c define a substantially straight side profile (with the fingers 120f substantially flush with the contour of the body of the rod). A holding member 122 may be used to hold the fingers in tight alignment and moved for deployment as also shown in FIGS. 7A and 7B.

[0047] FIGS. 8A-8D illustrate the collar 120d shown in FIG. 5D with the attached bottom edge portion 121 provided by a cord 123. As used herein, the term "cord" includes string, wire, cable, fiber, strand(s) of materials, and the like. As shown, the cord 123 can be configured to adjust the degree of deployment of the fingers 120f. The cord 123 may include a cord stop 122s that defines the degree of expansion allowed the bottom portion of the fingers 120f and/or that can be used to gather the fingers 120f into a storage configuration (with the fingers 120f arranged to abut as shown in FIG. 8C) similar to that shown in FIGS. 6A or 7A.

[0048] FIGS. 9A and 9B illustrate that the anchoring member 220c can be formed as a continuous skirt that can include a plurality of finger segments 220f separated by intermediate segments 220i. The finger segments 220f can be configured with increased rigidity (similar to the fingers noted above) relative to the intermediately positioned segments 220i. The intermediate segments 220i can be configured to laterally expand and retract (stretch and return) or to fold and/or pleat during periods of non-use. As such, the intermediate segments 220i can be formed of a different material than that of the finger segments 220. In particular embodiments, the intermediate segments 220i may be formed of stretchable fibers or fabrics such those that comprise spandex, other elastomeric materials, textile materials, or other resilient and/or elastically deformable materials.

[0049] An example of a stretch fiber is a synthetic manufactured fiber, such as spandex, in which the fiber forming substance is a long-chain synthetic polymer. As generally described in certain literature, it is believed that spandex typically comprises at least about 85% of a segmented-polyurethane. According to certain prior art sources, the polymer chain is a segmented block copolymer containing long, randomly coiled, liquid, soft segments that move to a more linear, lower entropy, structure. Generally stated, the hard segments act as "virtual cross-links" that tie all the polymer chains together into an infinite network. This network prevents the polymer chains from slipping past each other and taking on a permanent set or draw. When the stretching force is removed, the linear, low entropy, soft

segments move back to the preferred randomly coiled, higher entropy state, causing the fiber to recover to its original shape and length. This segmented block copolymer is formed in a multi-step proprietary process. It is extruded into a fiber as a monofilament thread line or, for most products, into a multiplicity of fine filaments that are coalesced shortly after they are formed into a single thread line. LYCRA® is an example of a spandex stretch fiber. Other stretch fibers may also be suitable. For example, but not limited to, fibers presently classified in the polyester textile label classification of the U.S. Federal Trade Commission, but under which a new subclass of "elasterell-p" has been proposed, may also be a suitable stretch fiber as it is described as an inherently elastic, bicomponent textile fiber consisting of two substantially different forms of polyester fibers, and DuPont's version of this fiber is referred to as "T400."

[0050] In certain embodiments, one or more stretch fibers can be blended with host fibers that may also be synthetic or natural fibers. Thus, selected ones or blends of stretch fibers can be combined with other natural or synthetic fibers such as cotton, wool, silk, RAYON®, and the like.

[0051] The foregoing is illustrative of the present invention and is not to be construed as limiting thereof. Although a few exemplary embodiments of this invention have been described, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of this invention as defined in the claims. In the claims, means-plus-function clauses, where used, are intended to cover the structures described herein as performing the recited function and not only structural equivalents but also equivalent structures. Therefore, it is to be understood that the foregoing is illustrative of the present invention and is not to be construed as limited to the specific embodiments disclosed, and that modifications to the disclosed embodiments, as well as other embodiments, are intended to be included within the scope of the appended claims. The invention is defined by the following claims, with equivalents of the claims to be included therein.

That which is claimed is:

1. A rod assembly for guiding, routing or feeding a wire and/or cable in a target space of an existing structure having a plurality of frame members and a target internal routing space for the cable or wire, comprising:

an elongate rod having opposing first and second end portions; and

an anchoring member attached to said rod first end portion,

wherein, in position, the anchoring member resides against a surface of a structural frame member to hold the rod first end portion outside of the target internal routing space and allow the rod second end portion to extend into the target internal routing space.

2. A rod assembly according to claim 1, wherein the elongate rod is a glow rod.

3. A rod assembly according to claim 1, further comprising a collar securely attached to said elongate rod first end portion.

4. A rod assembly according to claim 3, wherein, in operation, said collar cooperates with the anchoring member to releaseably engage the rod with the anchoring member.

5. A rod assembly according to claim 4, wherein, in position, the second end portion of the rod is sized and configured to axially slide through said anchoring member until the collar on the first end portion of the rod contacts and rests against the anchoring member to inhibit further axial movement of the rod through the anchoring member, thereby affixing the first end portion of the rod at a desired location on the frame member.

6. A rod assembly according to claim 4, wherein the anchoring member has opposing first and second axially spaced apart end portions defining a rod channel therethrough, the anchoring member configured to reside outside of the target routing space in the structure.

7. A rod assembly according to claim 6, wherein said collar extends radially outwardly from said rod, and wherein the collar is elastomeric.

8. A rod assembly according to claim 6, wherein the collar is releaseably attached to said rod.

9. A rod assembly according to claim 8, wherein the collar is permanently attached to said rod.

10. A rod assembly according to claim 9, wherein the collar is integrally formed on said rod.

11. A rod assembly according to claim 1, wherein the anchoring member has a frustoconical shape.

12. A rod assembly according to claim 1, wherein the anchoring member has a cylindrical segment.

13. A rod assembly according to claim 1, wherein the anchoring member has a plurality of resilient flex arms that extend outwardly to abut the surface of the structural frame member external to the target router space of the structure.

14. A rod assembly according to claim 1, wherein the anchoring member has a disc shaped segment configured to receive the rod therein.

15. A rod assembly according to claim 1, wherein the rod is sized and configured to frictionally engage the anchoring member during use.

16. A method for routing or guiding a cable or wire in a target routing space of a structure, comprising:

inserting a rod having opposing first and second end portions into a first aperture formed in a structural member of a structure, the first aperture allowing access to a target routing space, so that the second end portion travels through the aperture into the target routing space; and

anchoring the first end portion of the rod to the structural member so that the first end portion resides external to the first aperture and remains fixed in this position.

17. A method according to claim 16, further comprising: directing the second end portion of the rod to exit the target routing space at a second aperture formed in the structure at a position that is spaced apart from the first aperture;

affixing an anchoring member to the structural member of the structure above the first aperture; and

securing the rod first end portion to the anchoring member so that the first end portion resides outside of the first aperture and the target routing space.

18. A method according to claim 16, wherein the rod is a glow rod.

19. A method according to claim 17, further comprising forming the first aperture through a horizontal stud in the structure proximate in time and prior to the inserting step, and wherein the inserting step includes inserting the rod substantially vertically through the aperture and directing the rod downwardly in the routing space to the second aperture.

20. A method according to claim 19, wherein the first aperture is a cable outlet region in an upstanding wall, and wherein the inserting step comprises inserting the rod substantially horizontally through the first aperture and then directing the rod to travel upwardly in the routing space to the second aperture.

21. A method according to claim 17, wherein the anchoring member is releaseably attached to said rod.

22. A method according to claim 17, further comprising sliding the second end portion of the rod through the anchoring member after the anchoring member is in position to thereby guide the rod into the routing space.

23. A method according to claim 17, wherein the rod has a stop collar positioned on the first end portion, and wherein the sliding step is carried out until the stop collar engages the anchoring member to hold the first end portion of the rod above and/or outside the first aperture.

24. A method according to claim 17, wherein the anchoring member is fixed to the rod.

25. A method according to claim 17, wherein the anchoring member has a frustoconical shape that is substantially axially aligned with the first aperture to define a rod channel therethrough with first and second end portions with respective first and second diameters, and wherein the first and second diameters are both larger than the aperture.

26. A kit for a glow rod, comprising:

an anchoring member sized and configured with a rod channel that is configured to receive and attach to a first end portion of a glow rod and to hold the first end portion of the glow rod above a target routing space in a structural member while allowing the second end portion of the rod to be directed to travel through the target routing space.

27. A kit according to claim 26, wherein the anchoring member is configured to releasably attach to the glow rod during use and is detachable from the rod for storage after use.

28. A kit according to claim 26, further comprising a collar sized and configured to securely attach to the elongate rod first end portion, wherein, in position, the collar extends radially outward from said rod.

29. A kit according to claim 28, wherein, in operation, said collar cooperates with the anchoring member to releaseably engage the rod and the anchoring member together.

30. A kit according to claim 29, wherein the collar is elastomeric.

31. A kit according to claim 30, wherein the collar is releaseably attached to the rod.

32. A kit according to claim 29, wherein the collar is permanently attached to the rod.

33. A kit according to claim 29, wherein the collar is integrally formed on the rod.

34. A kit according to claim 26, wherein the anchoring member has a frustoconical shape.

35. A kit according to claim 26, wherein the anchoring member has a cylindrical segment that is sized and configured to receive a portion of the rod therethrough.

36. A kit according to claim 26, wherein the anchoring member has a plurality of resiliently flexible arms that extend outwardly to abut a surface of the structural member external to the target router space.

37. A kit according to claim 26, wherein the anchoring member has a disc-shaped segment configured to receive the rod therein.

38. A kit according to claim 26, wherein the rod is sized and configured to frictionally engage the anchoring member, and wherein the structural member is one of a truss, beam, stud, wall, or ceiling.

39. A rod assembly for guiding, routing or feeding a wire and/or cable in a target space of an existing structure having

a plurality of frame members and a target internal routing space for the cable or wire, comprising:

an elongate rod having opposing first and second end portions; and

means for mounting the elongate rod so that a selected one of the first or second end portions resides against a surface of a structural frame member to hold the selected rod end portion outside of a target internal routing space and allow the opposing end portion to extend into the target internal routing space.

\* \* \* \* \*





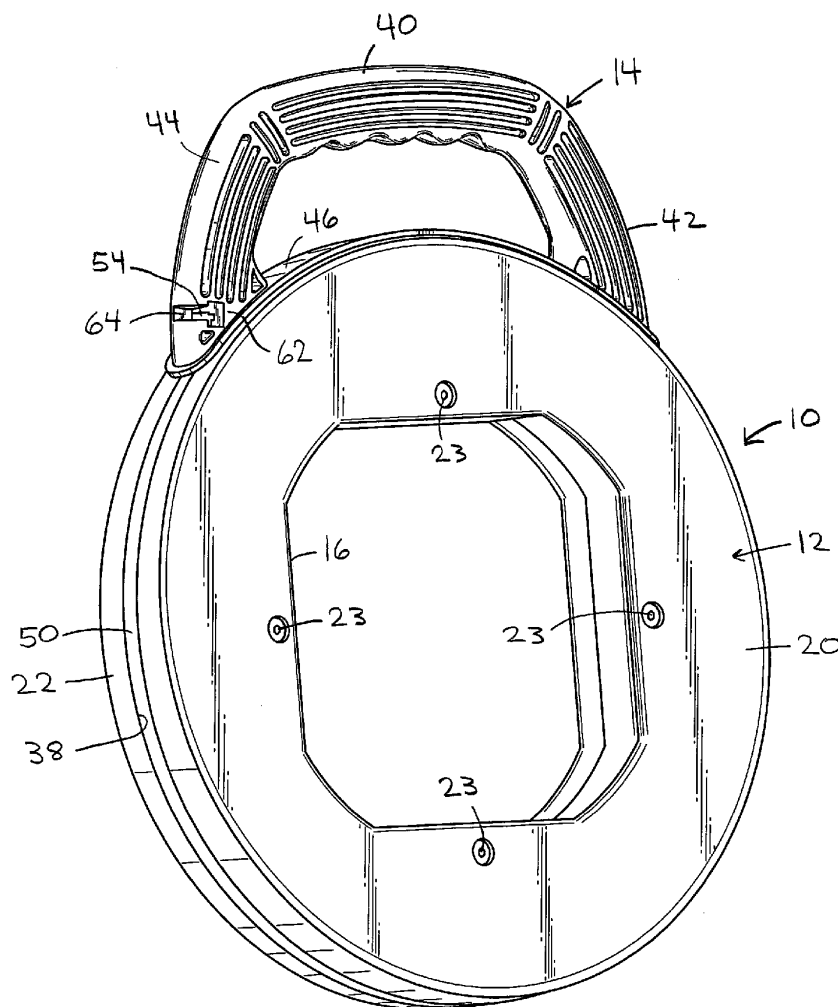
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(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2005/0062028 A1****Konen**(43) **Pub. Date: Mar. 24, 2005**(54) **FISH TAPE HANDLE WITH CONTINUOUS BELT**(52) **U.S. Cl. .... 254/134.3 FT**(76) **Inventor: Bruce P. Konen, Aurora, IL (US)**(57) **ABSTRACT**

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A fish tape assembly has a handle slidably mounted on a case formed by a pair of case halves. The periphery of the case has a gap formed therein. The handle has an exterior grip and shoe with a web extending from the shoe through the gap in the case to an interior belt. The belt is continuous around the full circumference of the case to provide increased strength and a shield that precludes a fish tape inside the case from inadvertently popping out through the gap. The handle has a passageway for the tape. The passageway includes a pair of laterally disposed posts that prevent the tape from popping out of the passageway.



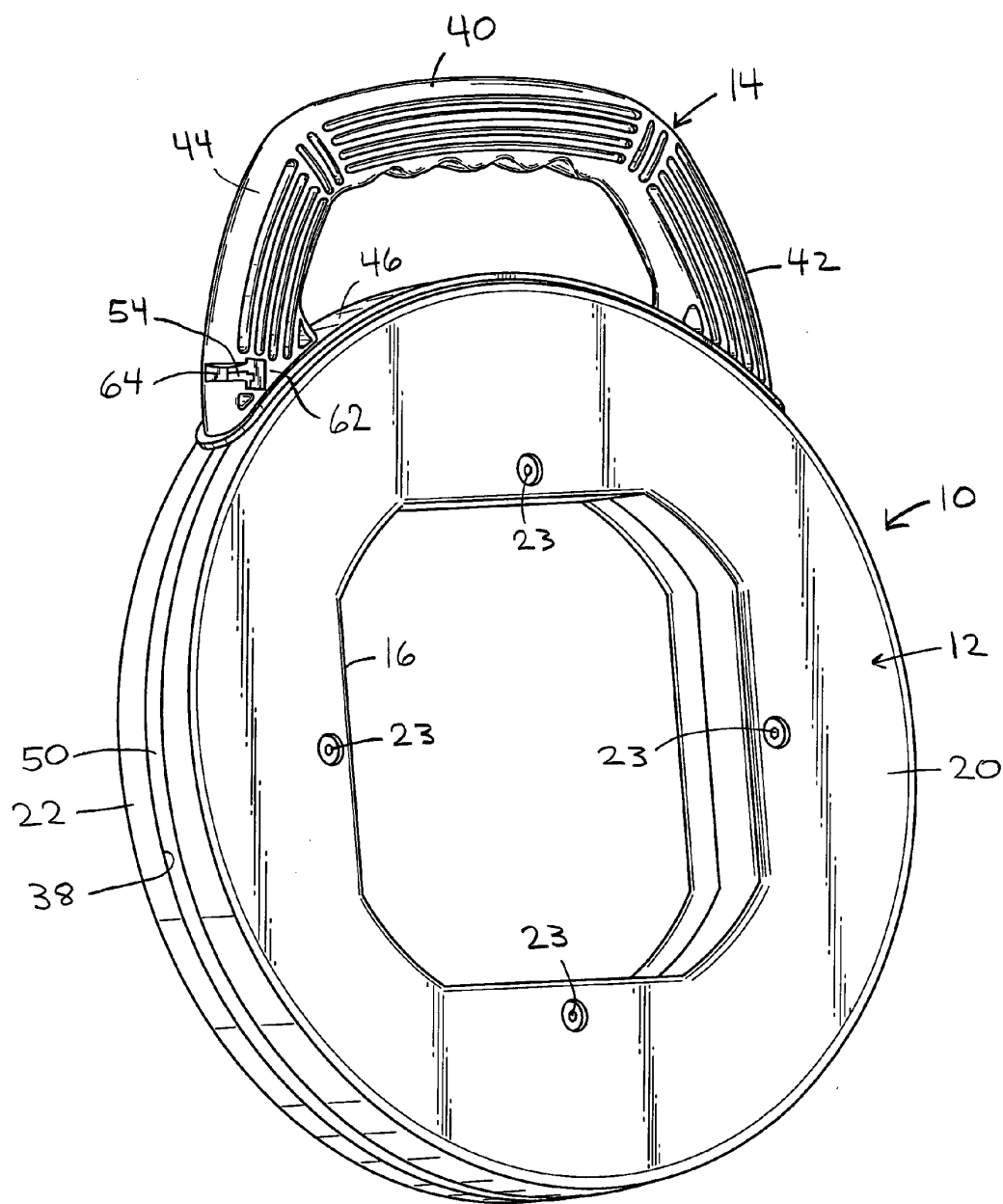


Fig. 1

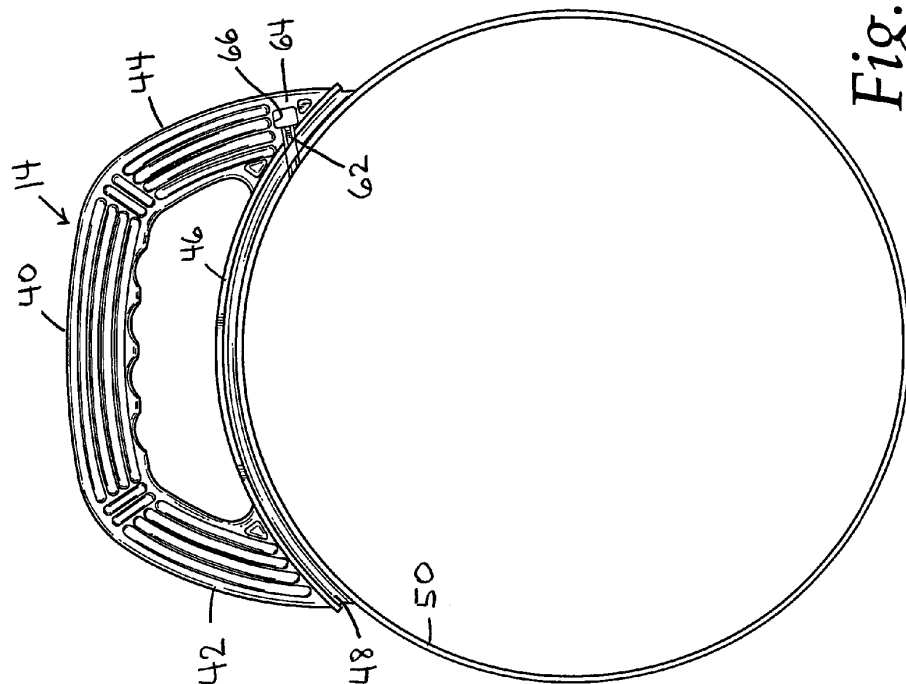


Fig. 3

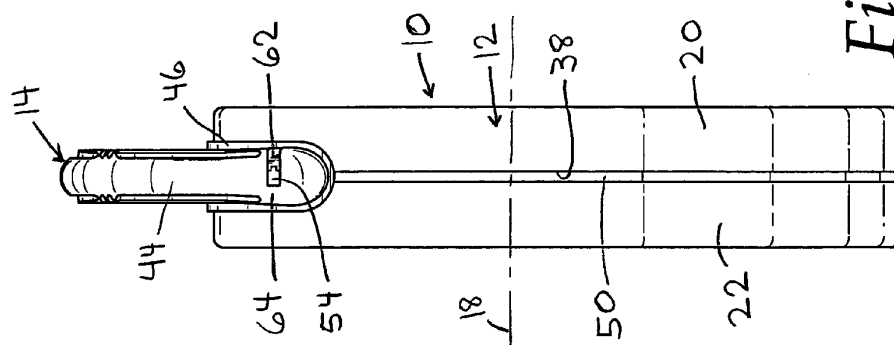
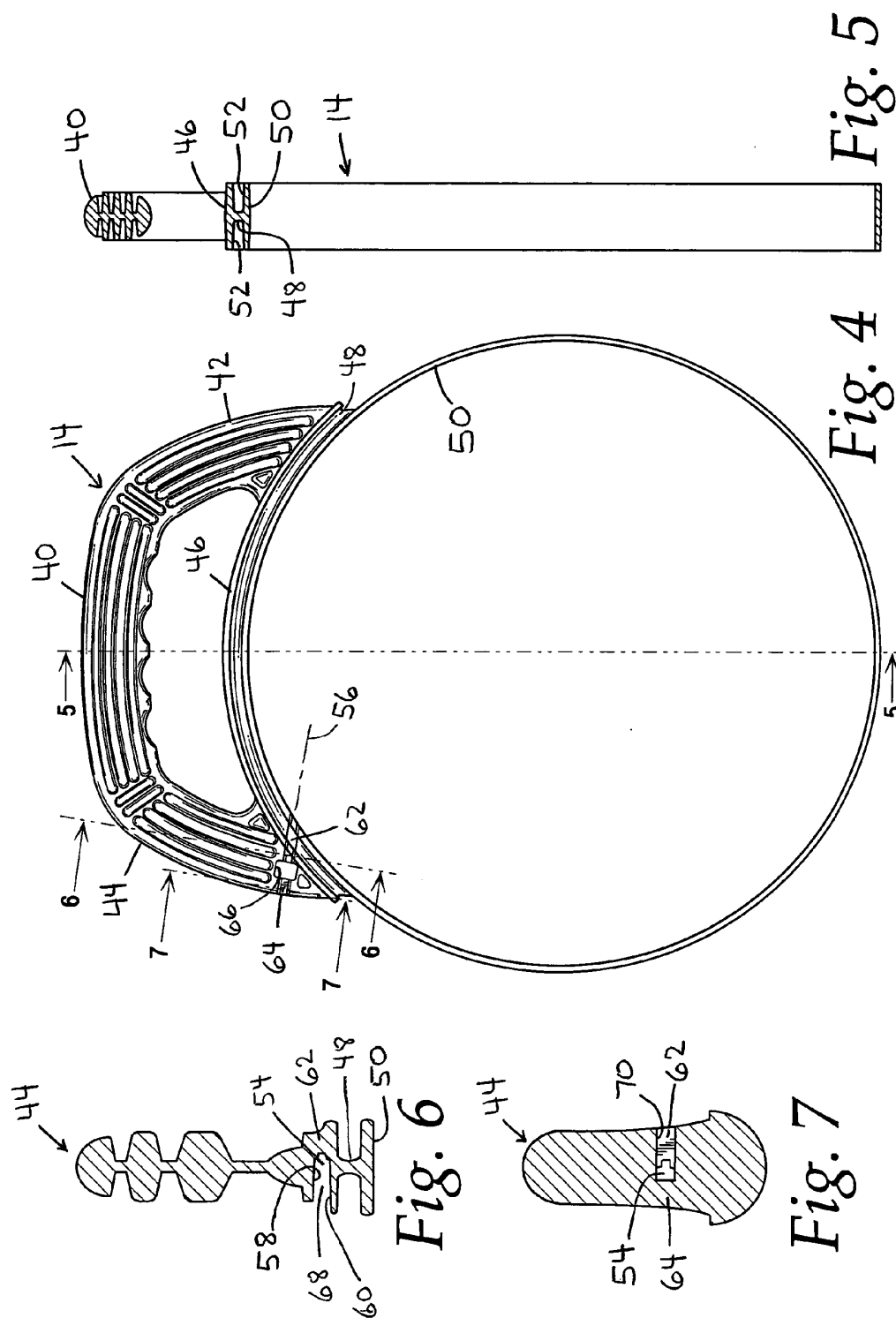
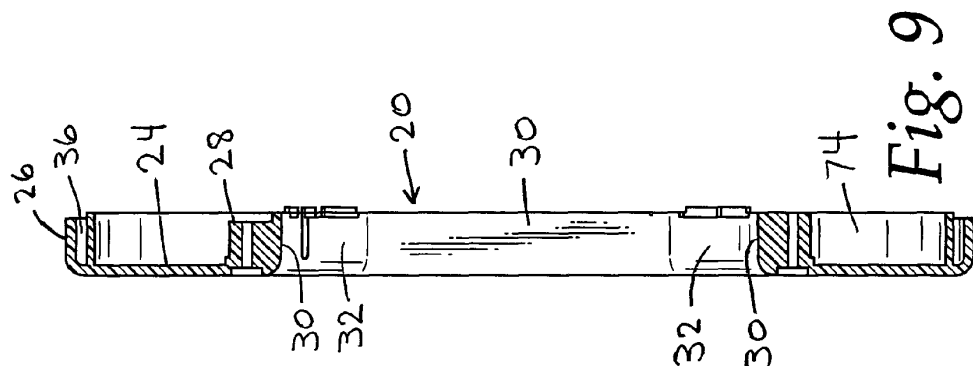
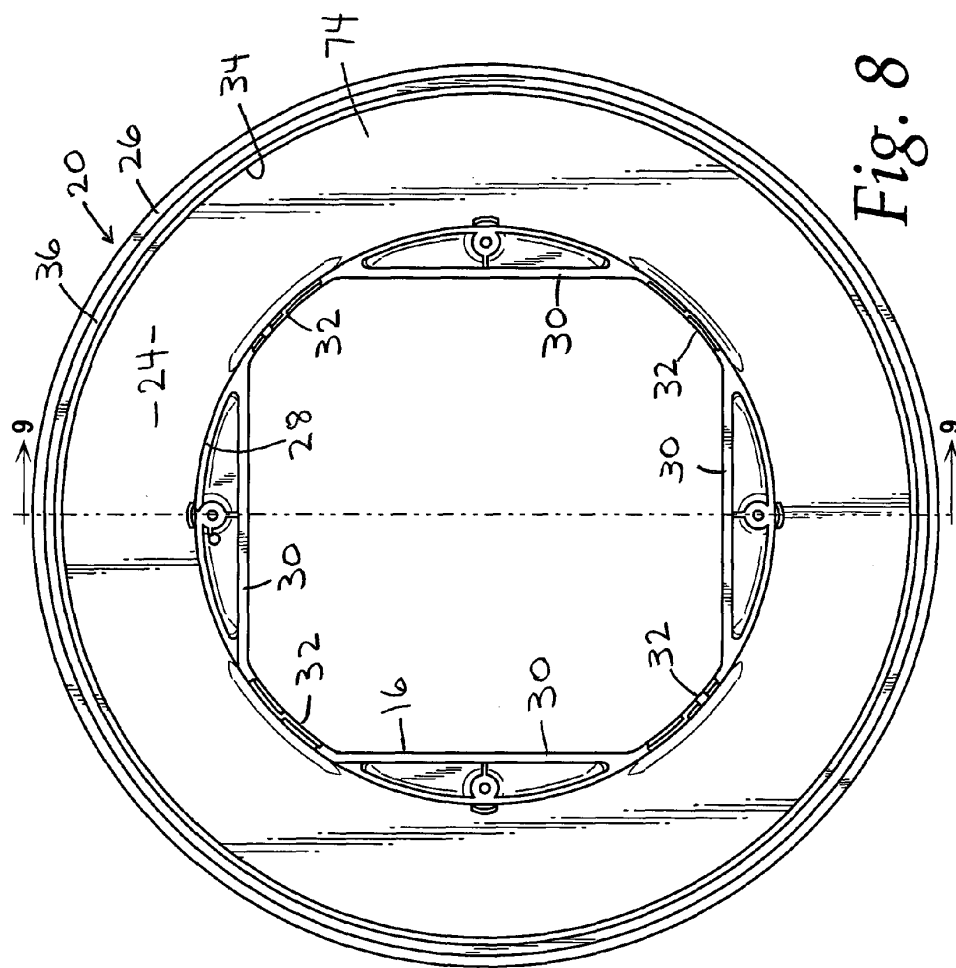


Fig. 2





**FISH TAPE HANDLE WITH CONTINUOUS BELT****BACKGROUND OF THE INVENTION**

[0001] The present invention relates generally to an electrician's fish tape assembly. More specifically, the invention relates to a fish tape housing and an improved handle therefor.

[0002] A fish tape is an electrician's tool which is used to install wires in a conduit. The fish tape itself is an elongated member made of tempered spring steel, stainless steel, nylon, fiberglass with a nylon jacket, or multi-stranded steel wire. The fish tape is rigid enough to be pushed through a conduit yet flexible enough to bend around corners or curves in the conduit. After the tape has been "fished" or threaded through a conduit, a wire or cable is attached to the end of the fish tape and the tape is pulled back through the conduit, drawing the wire with it to install the wire in the conduit.

[0003] Fish tapes are supplied in lengths ranging from 25 to 240 feet. Due to the length of the fish tape, it is usually coiled for manageability. However, the natural resilience of the material makes the coil unruly. The material at all times wants to escape the confines of the coil. That is, it seeks to return to its natural straight condition and thus wants to "spring out" of its coiled condition. Accordingly, the fish tape must be housed in some manner to maintain it in a coiled condition until it is ready to be used.

[0004] Traditionally a housing or case of some sort has been used to constrain the coils of the fish tape within a chamber formed within the case walls. The case's walls confine the coils and prevent their natural release. An opening for paying the tape into and out of the housing is provided. In some models, the housing has a circular case formed of two halves with a slot defined where the halves meet. A handle travels around the periphery of the case, widening the slot at the location of the handle to direct the tape's exit from and entry into the case. In fish tapes that contain a traveling handle mechanism, the handle projects from the case and can be rotated about its circumference. When the case and handle are revolved relative to each other, the tape will be payed into or out of the case. In many prior art housing designs, the handle rotates on an inner track, or wall, as it rotates about the housing. A slot in the handle, open on one side, permits the tape to extend through the handle.

[0005] Traditional housing and handle members present a number of problems. The case is usually made up of two halves with a gap between the halves. The halves are joined in a manner that intentionally permits widening of the gap at the handle. However, the case halves may also unintentionally separate when dropped or under otherwise subjected to extreme conditions. When that happens the tape can escape its confines. The possibility of the tape "springing out" of the case or handle presents a danger to users, particularly where the tape is of a material such as steel. The tape is particularly prone to popping out of its slot in the handle because the slot is fully open on one side of the handle. This forces the user to rethread the tape back into the handle slot before further use can be made.

**SUMMARY OF THE INVENTION**

[0006] The present invention is a fish tape housing having a handle grip and a generally annular case. The case has two

halves each including a radial wall and inner and outer axial half walls. The ends of the axial half walls are in facing relation. The outer axial half walls define a slot between them. Screws hold the case halves together. Together the radial walls and axial half walls define a fish tape receiving chamber. A handle grip has a central portion and two legs which are connected by an arcuate shoe. The shoe rides on the exterior surface of the outer half walls. A web on the underside of the shoe extends through the slot to the interior of the case. A continuous hoop or belt is attached to the web. The belt has a outside diameter slightly less than the inside diameter of the outer half walls. The continuous belt allows users of fish tapes to employ the device without fear of the tape escaping the confines of the housing, should the annular walls separate. The belt constrains the tape within the chamber, even under extreme conditions such as the fish tape being dropped from the top of a ladder, or the like.

[0007] In addition, the fish tape housing of the present invention provides an improved handle design. The handle has a passageway defined by top and bottom walls and first and second posts. The passageway has a throat adapted to receive the tape therein. The throat defines a longitudinal axis. The first post is disposed laterally of the longitudinal axis on a first side while the second post is disposed laterally of the longitudinal axis on a second side. Thus, the first and second posts are laterally spaced from one another such that a tape in the passageway is restrained on both sides and cannot pop out of the passageway. The first and second posts are also longitudinally spaced from one another to define a laterally-directed port. Installation of the tape in the case is achieved by passing an end portion of the tape through the port and then rotating the coil of tape ninety degrees to place the coil into an open case half. This construction obviates the need to thread the entire tape through the handle passageway.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0008] **FIG. 1** is a perspective view of the fish tape assembly of the present invention, with the fish tape removed for clarity.

[0009] **FIG. 2** is an end elevation view of the fish tape assembly.

[0010] **FIG. 3** is a rear elevation view of the handle and its continuous belt.

[0011] **FIG. 4** is a front elevation view of the handle and its continuous belt.

[0012] **FIG. 5** is a section taken along line 5-5 of **FIG. 4**.

[0013] **FIG. 6** is a section taken along line 6-6 of **FIG. 4**, shown on an enlarged scale.

[0014] **FIG. 7** is a section taken along line 7-7 of **FIG. 4**, shown on an enlarged scale.

[0015] **FIG. 8** is a front elevation of a case half, looking at the interior of the half.

[0016] **FIG. 9** is a section taken along line 9-9 of **FIG. 8**.

**DETAILED DESCRIPTION OF THE INVENTION**

[0017] The fish tape assembly of the present invention is shown generally at **10** in **FIGS. 1 and 2**. The fish tape

assembly 10 includes a generally circular case 12 and a handle 14. The case has a central opening 16 and defines an axis 18. The case 12 is made of first and second case halves 20 and 22. The case may be made of ABS, although other materials are possible. The halves are held together by four screws, shown schematically at 23, which extend through screw holes in one case half and into mounting posts in the other. For reference purposes the face of the fish tape assembly seen in FIG. 1 will be considered the front of the assembly.

[0018] Preferably the halves are identical so only half 20 will be described in connection with FIGS. 8 and 9. Like parts will be given like reference numerals in the two halves. The case half includes a radial wall 24 in the shape of a flat ring. An outer annular half wall 26 is attached to the outside edge of the radial wall 24. The annular half wall 26 is perpendicular to the radial wall 24 and thus extends in an axial direction. Similarly, an inner annular half wall 28 is attached to the inside edge of the radial wall 24 and extends axially therefrom. Four chordal walls 30 are spaced about the central opening 16. The chordal walls 30 are connected by corner walls 32. A pinch ring half wall 34 is attached to the radial wall 24, just inside of the outer annular half wall 26. Together the pinch ring half wall 34 and the outer annular half wall 26 define a guideway 36 between them.

[0019] It will be noted that the axial extent or height of the inner annular half wall 28 and the pinch ring half wall 34 is slightly greater than that of the outer annular half wall 26. Thus, while the inner half walls 28 of mating case halves will meet, the outer half walls 26 will have a gap or slot 38 between them. The pinch ring walls 34 of mating case halves will meet one another except in the vicinity of the location where the fish tape extends out of the case. The pinch ring walls will flex at this location to allow passage of the tape. Further details of the case halves' construction are shown and described in U.S. patent application Ser. No. 10/173,092, filed Jun. 17, 2002, the disclosure of which is incorporated herein by reference.

[0020] The handle 14 is shown in FIGS. 3-5. The handle may be made of polypropylene or other suitable material. The handle 14 has a grip that includes a central portion 40, a first leg 42 and a second leg 44. The legs are connected to an arcuate shoe 46. The inner radius of the shoe is slightly larger than the outside diameter of the outer half walls 26 so that the shoe is disposed to slide on the exterior periphery of the case. A web 48 is attached to the underside of the shoe 46. The web 48 lies in a radial plane, i.e., the web is generally perpendicular to the shoe. The web is arranged to extend through the gap 38 when the fish tape case is assembled. At its inner end the web 48 attaches to a circular belt or hoop 50. The outer diameter of the belt is slightly less than the inside diameter of the outer half walls 26 so that the belt is disposed to slide on the interior periphery of the case, in the guideway 36. Thus, as best seen in FIG. 5, the belt 50 and the shoe 46 define a pair of grooves 52 each of which receives one of the outer half walls 26. There is enough clearance of the outer half walls 26 in the grooves 52 to permit the handle 14 to slide around the periphery of the case halves.

[0021] It will be noted that the belt 50 is circular and continuous for the full 360° around the interior of the guideway 36. It is important that there is no discontinuity in

the belt because that would diminish its hoop strength and subject the handle to binding inside the case. The belt also is wide enough to span the width of the gap 38 and any separation of the pinch ring walls 34. Thus, the belt 50 fully shields the gap and prevents any coils of the tape from inadvertently popping through the pinch ring and the gap.

[0022] As seen in FIGS. 1 and 2, a passageway 54 extends through a portion of the belt 50, web 48, shoe 46 and the base of the second leg 44. This passageway defines a longitudinal axis 56 (FIG. 4) and permits the fish tape (not shown) to enter and exit the case. As seen in FIGS. 6 and 7, the passageway is defined by a top wall 58 and a bottom wall 60 formed primarily in the base of the leg 44. The passageway 54 is further defined by first and second posts 62 and 64. The posts preferably extend between the top and bottom walls 58, 60 and are connected to each of these walls. The posts are disposed laterally of the passageway axis. That is, as seen in FIGS. 3 and 4, the first post 62 is located toward the front side of the fish tape assembly while the second post 64 is located toward the rear side of the assembly. This arrangement permits the tape to pass between the posts, i.e., there is one post on either side of the tape. Accordingly, the tape is trapped between the posts and cannot pop out of the passageway, even upon encountering abnormal conditions such as the fish tape assembly being dropped.

[0023] It will be further noted in FIGS. 3 and 4 that the posts 62, 64 are spaced from one another in a direction parallel to the passageway axis. That is to say the first post 62 is closer to the interior of the case while the second post 64 is closer to the exterior of the case. This longitudinal separation of the posts defines an aperture 66 between the posts 62 and 64. The longitudinal separation of the posts is preferably greater than the lateral separation of the posts. Thus, the width of the aperture 66, as seen in FIGS. 3 and 4, is greater than the cross sectional width of the passageway 54, as seen in FIG. 2.

[0024] Another way to visualize the passageway is to consider that the posts 62, 64 define two open channels 68 (FIG. 6) and 70 (FIG. 7). The first channel 68 is laterally adjacent the first post 62 and is open toward the rear of the case. The second channel 70 is laterally adjacent the second post 64 and is open toward the front of the case. These channels can be considered to overlap one another at the middle of the passageway to form the aperture 66.

[0025] The size relationship between the aperture and passageway greatly simplifies installation of the coiled fish tape into the case. The fish tape cannot be threaded through the passageway because the end of the tape will have an eyelet or other enlarged connector affixed thereto for purposes of attaching wires to be pulled. The eyelet will not fit through the passageway. It is not desirable to enlarge the passageway to accommodate the eyelet because that would allow the tape to be wound fully inside the case, with the result that the end portion of the tape and the eyelet would be inaccessible for the next use. Also, a passageway large enough to pass the eyelet would provide too much play of the tape in the passageway and it would weaken the handle. Furthermore, the tapes wear out and have to be replaced in the field. Replacement tapes must have the eyelet already in place when they are installed in a case. The described

arrangement of the posts allows installation of a tape with a pre-formed eyelet into a passageway that accommodates the tape but not the eyelet.

[0026] There are at least two alternative procedures for assembling a complete fish tape. In a first method a coiled fish tape is held with the plane of its coils generally perpendicular to the plane of the handle. The fish tape's eyelet and a short end portion of the tape is inserted through the aperture. This insertion must be from what is referred to herein as the rear side of the handle, that is, the side shown in FIG. 2. In other words, the second post 64 must be the first one the eyelet passes upon insertion through the aperture. This orientation will then permit the plane of the coiled fish tape to be rotated ninety degrees with respect to the handle so the end portion of the tape will then reside in the open channels 68, 70 of the passageway with the eyelet outside the handle and the coils within the belt 50. Then the assembled handle and fish tape can be placed into one of the case halves 20, 22. Finally, any temporary restraints on the fish tape coils are removed and the second case half is screwed to the first one. The pinch ring walls 34 will engage the portion of the fish tape leading to the passageway, with those walls flexing sufficiently to accommodate the tape between them.

[0027] In the second assembly alternative, the handle 14 is placed in a case half 20 prior to introduction of the fish tape. In this instance a case half 20 is laid flat on a work surface and the handle 14 is laid into the open side of the case half. One edge of the belt 50 is placed in the guideway 36 of the one case half. It is important that the handle is placed with the rear side of the handle up, or toward the open side of the case half. In other words, the first post 62 must be closest to the radial wall 24 of the case half. This orientation of the handle will permit installation of the coiled fish tape. An end portion of the fish tape is uncoiled just enough to permit it to be inserted through the aperture 66 between the posts 62 and 64. The plane of the fish tape coil should be generally perpendicular to the plane of the radial wall 24 during such insertion. Then the fish tape coil is rotated ninety degrees to lay the coil within a fish tape receiving chamber 74 defined by the radial wall 24, the inner half walls 28 and the pinch ring walls 34. The end portion of the tape will then be disposed in the open channels 68, 70, between the posts, with the eyelet outside of the passageway. Once the fish tape is thus installed, any temporary restraining ties on its coils can be removed and the second case half can be installed on the first half.

[0028] When the two case halves 20, 22 are assembled the free edges of the inner annular half walls 28 and the chordal walls 30 are placed adjacent one another. Screws 23 hold the halves together. The radial walls 24 together with the inner annular half walls 28 and the pinch ring walls 34 define the

fish tape receiving chamber 74 (FIG. 9). The handle's web 48 is located between the mating outer annular half walls 26. The adjacent free edges of the outer half walls 26 are separated slightly to define the slot or gap 38 therebetween. The belt 50 is disposed in the guideway 36 while the shoe 46 is on the outside of the case. The belt, web and shoe are sized such that the handle is engageable with the outer annular wall and is slidable therealong.

[0029] While a preferred form of the invention has been shown and described, it will be realized that alterations and modifications may be made thereto without departing from the scope of the following claims.

I claim:

1. A fish tape housing, comprising:

first and second annular case halves joined together and defining an axis, each case half having a radial wall and axial inner and outer half walls, the half walls being disposed in facing relation and with the outer half walls defining a gap between them, the joined case halves defining a fish tape receiving chamber therein;

a handle mounted on the case halves for rotation relative thereto, the handle including a grip external to the fish tape receiving chamber, a web attached to the grip and extending through the gap into the fish tape receiving chamber, and a continuous belt fixed to the web and extending about the entire circumference of the fish tape receiving chamber.

2. The fish tape housing of claim 1 wherein the handle further comprises an arcuate shoe disposed on the exterior of the case halves and connected to the web, the grip being attached to the arcuate shoe.

3. The fish tape housing of claim 2 wherein the arcuate shoe and the belt define a groove in which the outer half wall reside, with the shoe and belt slidably engaging the half walls on opposite sides thereof.

4. A fish tape housing having walls that define a fish tape receiving chamber, and a handle including a groove that interfits with the walls to rotatably mount the handle to the walls, and a continuous, generally circular belt fixedly attached to said handle, the belt being disposed within the fish tape receiving chamber for rotation with the handle.

5. In a fish tape housing of the type having a fish tape receiving chamber defined by first and second radial walls and outer annular walls and a handle rotatably mounted on said walls, the improvement comprising a method of preventing a fish tape from escaping the fish tape receiving chamber, said method comprising the step of providing a continuous belt around the inner circumference of the outer annular walls of said housing.

\* \* \* \* \*





US 20060065883A1

(19) **United States**(12) **Patent Application Publication**  
**Radle et al.**(10) **Pub. No.: US 2006/0065883 A1**(43) **Pub. Date: Mar. 30, 2006**(54) **NON-CONDUCTIVE FISH TAPE****Publication Classification**(76) Inventors: **Patrick J. Radle**, Mequon, WI (US);  
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Menomonee Falls, WI (US)(51) **Int. Cl.**  
**H02G 1/08** (2006.01)  
(52) **U.S. Cl.** ..... **254/134.3 FT**

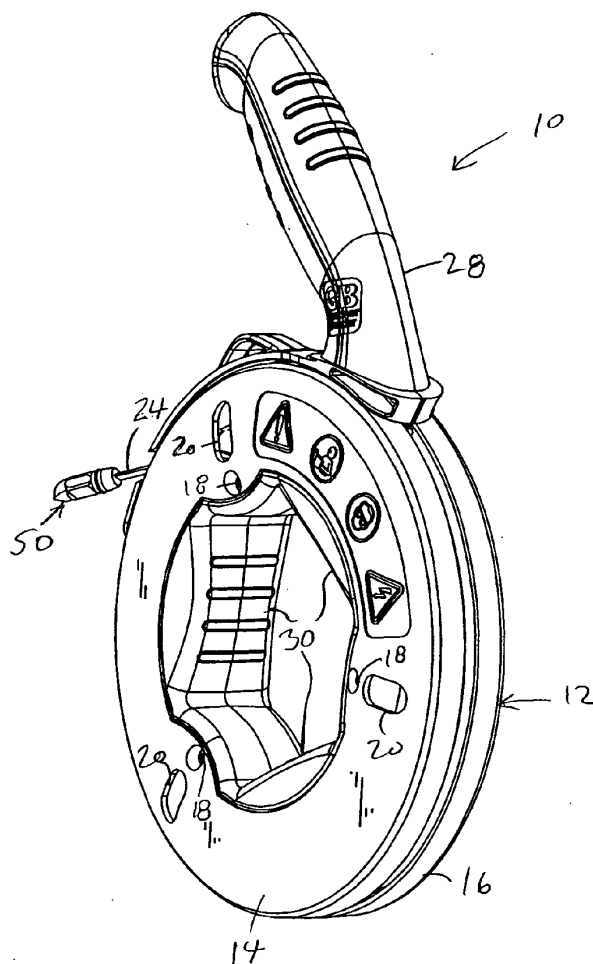
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**MILWAUKEE, WI 53202-4497 (US)**(57) **ABSTRACT**

A fish tape assembly has a flat tape made of a hybrid composite of electrically non-conductive materials, preferably a fiberglass core surrounded by a nylon jacket. The flat tape has a rectilinear lateral cross-section with its width dimension being greater than its thickness. A non-conductive feed piece is bonded to the leading end of the fish tape. The feed piece has a wedged leading end. A non-conductive anchor piece is bonded to the trailing end of the fish tape to attach the fish tape to a reel assembly. The anchor piece is angled to mount the fish tape in a generally tangential direction relative to the reel.

(21) Appl. No.: **11/235,940**(22) Filed: **Sep. 27, 2005****Related U.S. Application Data**

(60) Provisional application No. 60/614,931, filed on Sep. 30, 2004.



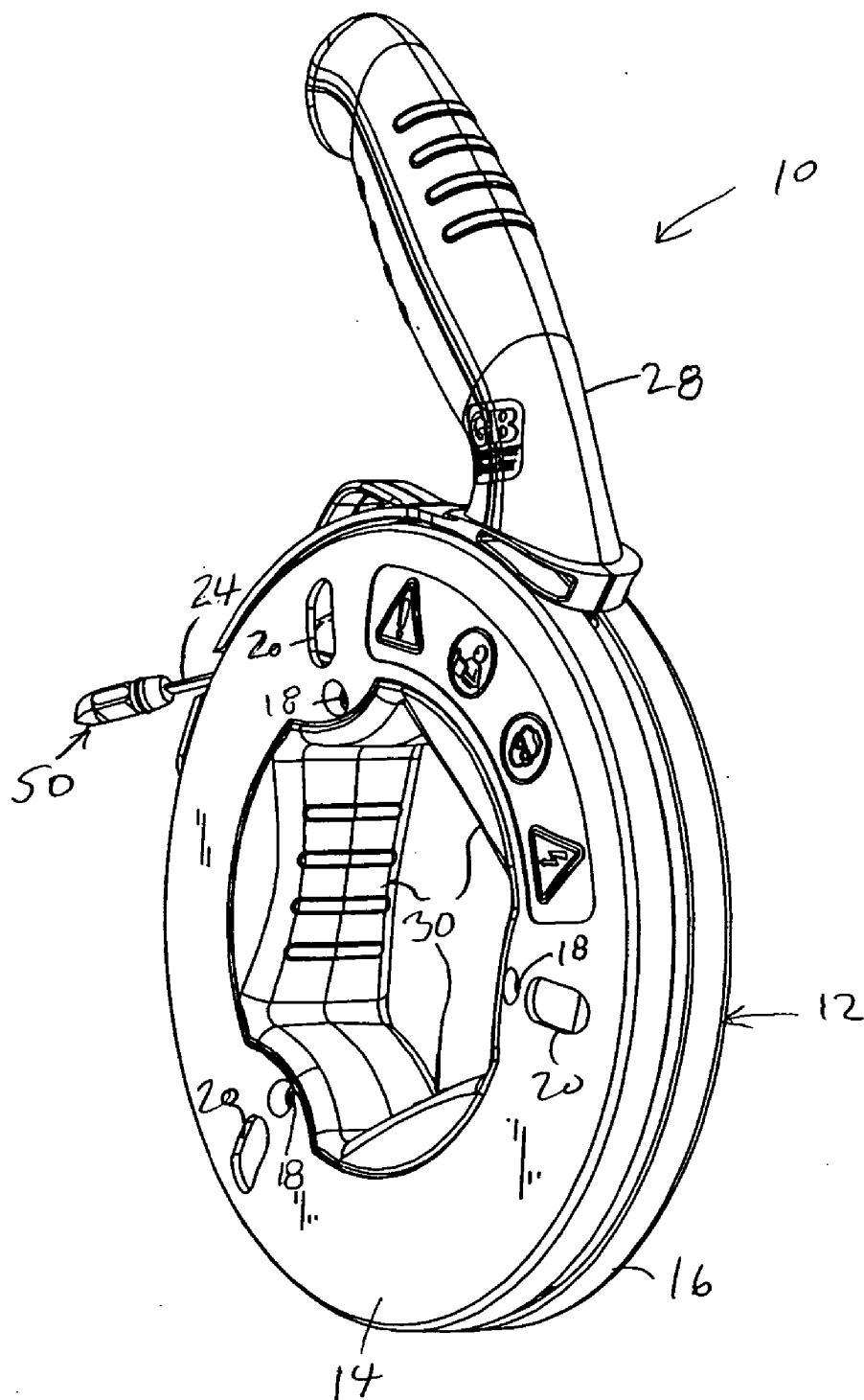


FIG. 1

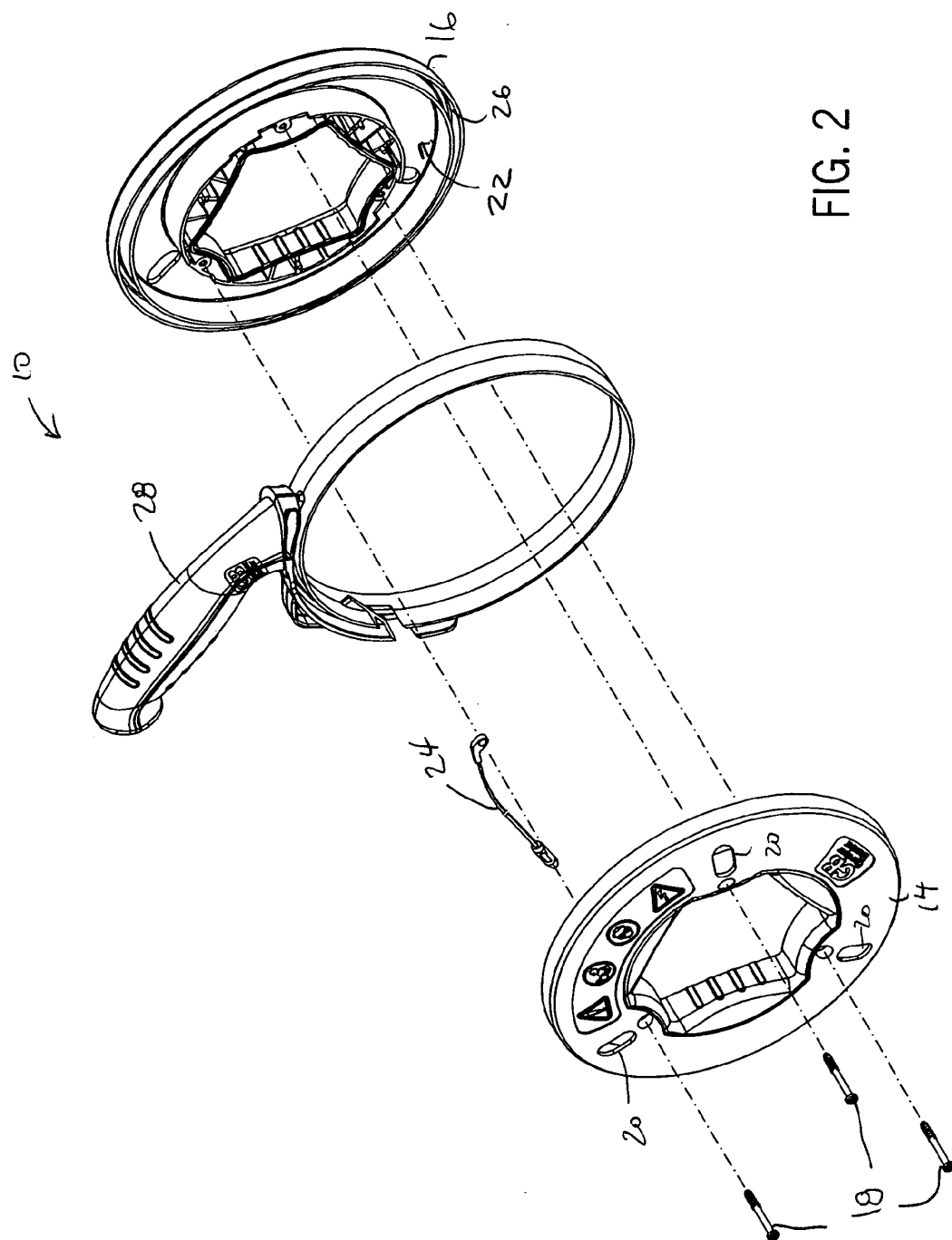


FIG. 2

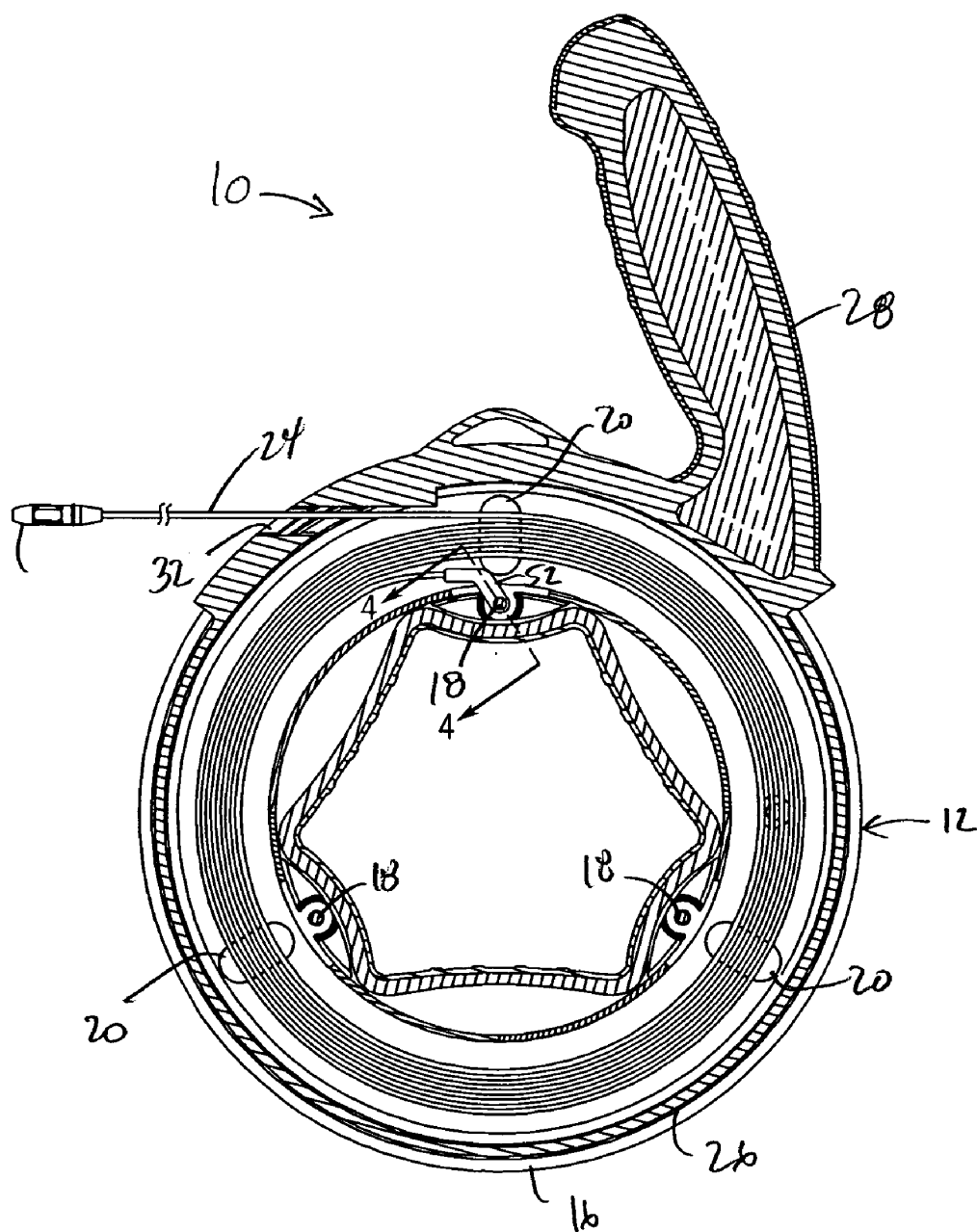


FIG. 3

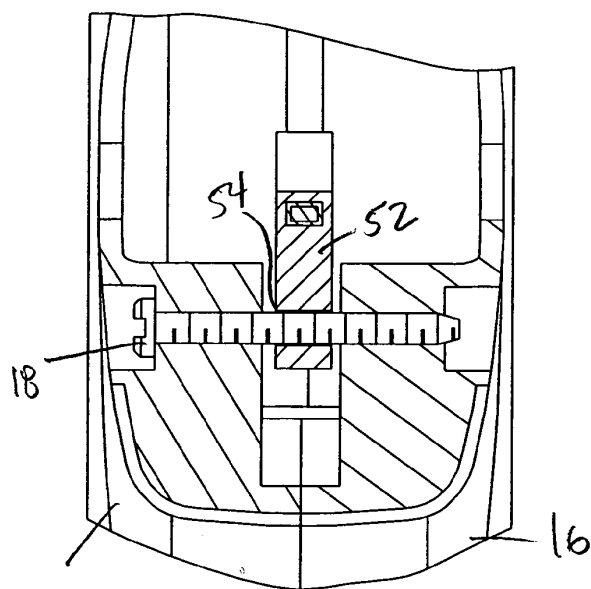


FIG. 4

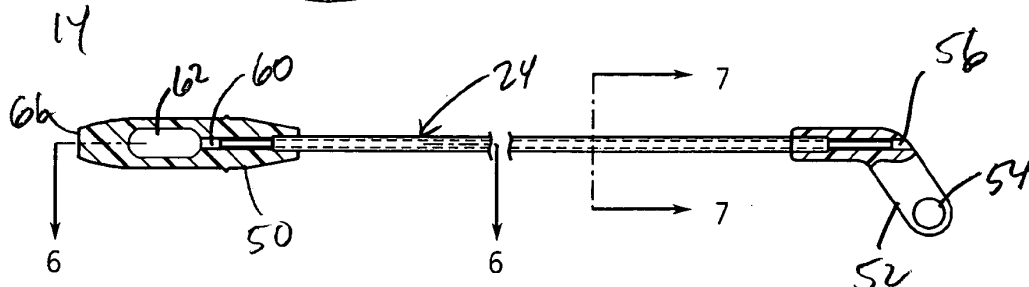


FIG. 5

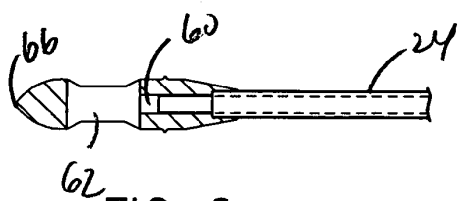
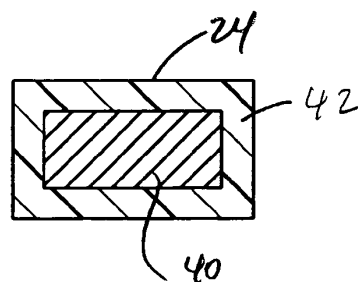


FIG. 6

FIG. 7



**NON-CONDUCTIVE FISH TAPE****CROSS-REFERENCE TO RELATED APPLICATION**

[0001] This claims the benefit of U.S. Provisional Patent Application No. 60/614,931 filed Sep. 30, 2004.

**STATEMENT OF FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT**

[0002] Not applicable.

**BACKGROUND OF THE INVENTION**

[0003] 1. Technical Field

[0004] This invention relates to fish tapes of the type used by electricians to pull wire through conduit or other spaces, and more particularly to the construction of a non-conductive fish tape assembly.

[0005] 2. Description of the Related Art

[0006] A fish tape is an elongated "wire" or flexible rod typically used to install wire in conduit or through existing walls by pushing the tape through the conduit or wall, attaching the wire, and pulling it back. Steel fish tape is often used because it is stiff enough to be pushed through conduit without collapsing or kinking, flexible enough to negotiate bends or turns, and strong enough to pull multiple wires back through the conduit without breaking or separating under what can be considerable pulling forces. The steel tape can be flat in that has a smaller thickness than width, which aids in the ability to "steer" the tape as it is pushed through the wall or conduit. However, steel may be disadvantageous because it is heavy, possibly too rigid for tight bends, and importantly because it can conduct electricity, it may not be suitable for use near live circuits with open contacts, such as in switch boxes or fuse/breaker panels.

[0007] Fish tape made of plastic fibers, such as fiberglass, have been devised to avoid the aforementioned concerns with steel fish tape. Namely, such fish tapes are lighter, more flexible and do not conduct electricity, while at the same time providing high tensile strength. Because fiberglass can splinter, it may be covered by an extruded plastic jacket having better wear and toughness characteristics that is also of lower coefficient of friction to allow it to slide through the wall or conduit easier. The fiberglass or fiberglass composite fish tapes are typically extruded rods having a circular cross-section. The circular cross-section is disadvantageous in that makes the fish tape less steerable and adds to its thickness such that it requires more space when wound in the reel.

[0008] Long lengths of fish tape are used, for example 25 ft., 50 ft. and 100 ft. lengths are standard, because the fish tape is snaked through walls and conduit. To make the long run of fish tape manageable during use and storage it is usually wound about a reel. One end of the fish tape is usually fixed to a stationary or rotatable part of the reel to keep it from coming loose. The other, leading end of the fish tape is adapted in some way to readily attach the wire to be pulled by the fish tape through the wall or conduit. For steel tapes, the ends may be turned back into a "U" or a loop to directly hook onto or loop about a catch inside the reel at the trailing end or the wires at the leading end. However, it is not

possible to bend fiberglass fish tapes to form a hook or loop. Thus, tips must be attached to the ends of a fiberglass fish tape that have some type of attachment member. At the leading end, the attachment member is often an eyelet through which the wire can be tied.

[0009] The connection to the reel can be problematic. The tape may disengage the catch, or worse, the tape may break when high pulling loads arise. The latter problem can arise when the fiberglass tape is connected to reel in way that extends it radially relative to the reel. When the fish tape is completely unwound from the reel and pulling loads are applied, a bending moment is applied to the fish tape which can cause it to fracture.

[0010] The tip at the leading end of the fish tape can also be problematic, most commonly with regard to its ability to feed through the wall or conduit and its connection to the fish tape. The tip is usually a steel piece, however it may be plastic, see e.g. the ferrule item 17 disclosed in U.S. Pat. No. 3,858,848 to MacFetrich. The leading end of a tip for a steel tape usually has flat tapered sides, while for a fiberglass tape it is usually bullet-shaped with a spherical or conical due to the circular cross-section of the fiberglass rod. Considerable effort has been undertaken to lessen the resistance in the feed direction, however, this still remains a problem.

[0011] Various techniques have been used to attach the tip to the fish tape including depending on the materials and configuration of the tip used. Welding and threaded attachments are common for steel fish tapes. Fiberglass fish tapes typically employ a friction connection, such as crimping, or an adhesive. A taper-lock connection can be used in which the fish tape is inserted into a conical bore in an externally threaded inner part of the tip and then expanded in the bore by threading a screw into the end of the tape bore the outer part of the tip is threaded onto the inner part. Although various methods of connection have been devised, it is common for tips to pull off of the fish tape under high pulling loads or to loosen after prolonged use.

[0012] Accordingly, a non-conductive fish tape assembly is desired with improved construction of the fish tape and end pieces.

**SUMMARY OF THE INVENTION**

[0013] The present invention is an improved non-conductive fish tape having a "flat" rectilinear tape construction providing strength, feedability, steerability and windability similarly to flat metal tapes but with lower cost, increased lubricity, lighter weight and without the risk of causing electrical shorting during use. Non-conductive end pieces of the fish tape are constructed to further these benefits.

[0014] In one aspect the invention provides a fish tape assembly including a fish tape mounted to a reel so as to be capable of being unwound in a feed direction relative to the reel. The fish tape is made of an electrically non-conductive material and has a rectilinear cross-section.

[0015] In preferred forms, the fish tape is a composite of at least two materials, which are both preferably electrically non-conductive, and more preferably are a fiberglass core surrounded by a nylon jacket. The fish tape is preferably "flat" which as used herein means of a greater lateral width dimension than its thickness dimension. The width dimension

sion is preferably at least 1.5 times the thickness dimension, and even more preferably at least 2 times, which is preferably 2 millimeters.

[0016] The rectilinear construction means that the fish tape has multiple straight sides. As one example, the fish tape has a "flat", rectangular cross-sectional shape with a 4 mm width and 2 mm thickness. The fish tape can bend more easily in the thickness direction than in the width direction, which allows it to follow tighter bends through walls and conduit and be "steered" more accurately across floors and ceilings than conventional circular cross-section fish tape, which is more apt to follow coiled path under such circumstances. The small thickness also allows the fish tape to occupy less space when wound. For example, the inventors have found that a 180 foot length of fish tape with the above cross-sectional dimensions can be wound inside of a 12 inch housing, which would ordinarily hold only 100 feet of a 4 mm diameter circular cross-section fish tape.

[0017] A feed piece can be connected to a leading end of the fish tape. The feed piece can be made of an electrically non-conductive material, such as a suitable thermoset plastic. The feed piece has a rectilinear opening at its trailing end that receives the fish tape and provides a location for bonding the parts together, preferably using a suitable high-strength adhesive. The leading end of the feed piece is wedge-shaped, rather than blunt or rounded over. And, the feed piece includes an eyelet allowing attachment of wires. Thus, electrically insulated feed piece provides better pull strength with less risk of separation. The wedged front end of the feed piece also allows for better feeding through walls and conduit than conventional rounded ends.

[0018] An anchor piece can also be connected to a trailing end of the fish tape for fixing the tape to the reel. The anchor piece is configured to connect to the reel such that the trailing end of the fish tape extends in a tangential direction with respect to the reel. Preferably, the anchor piece is angled or dog-leg shaped. One leg of the anchor piece has a rectilinear recess which receives the fish tape and provides a bonding location. The other leg has a mounting member, which preferably is a simple through opening through which can pass a fastener that joins mating halves of the reel together. This arrangement provides a secure, pivotal connection without the need for additional fasteners or assembly operations. The generally tangential direction of the trailing end of the fish tape reduces the bending moment realized when the tape is pulled after being completely unwound from the reel, and thus, reduces the likelihood of the fish tape fracturing and/or separating from the reel.

[0019] Another aspect the invention provides a fish tape assembly having an electrically non-conductive fish tape and an electrically non-conductive feed piece with an eyelet. The feed piece is bonded to the leading end of the fish tape to be able to withstand a pulling load of 500 pounds without separating from the fish tape.

[0020] Another aspect the invention provides a fish tape assembly having an electrically non-conductive fish tape with a rectilinear cross-section and having an electrically non-conductive feed piece with a rectilinear opening where the feed piece is bonded to the fish tape.

[0021] Yet another aspect of the invention a fish tape assembly an electrically non-conductive fish tape with a

rectilinear cross-section, an electrically non-conductive feed piece mounted to the leading end of the fish tape, and an electrically non-conductive anchor piece mounted to the trailing end of the fish tape.

[0022] The advantages of the invention will be apparent from the detailed description and drawings. What follows is a preferred embodiment of the present invention. To assess the full scope of the invention the claims should be looked to as the preferred embodiment is not intended as the only embodiment within the scope of the invention.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0023] FIG. 1 is a perspective view of a non-conductive fish tape assembly according to the present invention;

[0024] FIG. 2 is an exploded perspective view thereof;

[0025] FIG. 3 is a side sectional view taken thereof;

[0026] FIG. 4 is a detail section view showing the connection of the fish tape to the reel;

[0027] FIG. 5 is a side sectional view of the fish tape including its tapered feed end and angled anchor end;

[0028] FIG. 6 is a top sectional view taken along line 6-6 of FIG. 5; and

[0029] FIG. 7 is an end sectional view taken along line 7-7 of FIG. 5 showing the composite construction of the fish tape.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0030] The drawings referenced herein illustrate a preferred version of a fish tape reel assembly 10. This reel assembly is preferred because of its durability and many ergonomic, and is described in detail in a co-pending PCT application filed on Aug. 6, 2004, entitled "Ergonomic Fish Tape" which claims priority to U.S. provisional application Ser. No. 60/493,819, filed on Aug. 8, 2003, the entire disclosure of which is incorporated by reference herein for its teaching on the construction, assembly and use of a preferred reel assembly for use with the fish tape of the present invention.

[0031] Briefly then, with reference to FIGS. 1-3, the reel assembly 10 includes a reel housing 12 having two annular housing parts 14 and 16 joined together by three angularly spaced fasteners 18, which are aligned with windows 20, to define an annular cavity 22 in which a length of fish tape 24 is wound. The reel housing parts 14 and 16 also define an annular groove 26, ringing the annular cavity 22, in which a circular, band-like shoe of a pistol grip 28. The shoe retains the reel housing 12 to the grip 28 and allows it to be rotated as needed to unwind the fish tape from the reel and then to be wind the fish tape back onto the reel. Three inner hand grips 30 are formed at the interior of the center opening to facilitate rotation of the reel housing. The fish tape passes through an exit aperture 32 or passageway that extends generally tangentially from the annular cavity to guide the fish tape along the intended feed direction, which is essentially perpendicular to a vertical center line of the reel.

[0032] Generally, the reel assembly is used by grasping the pistol grip 28 with one hand and unwinding it in the feed direction with the other hand, either by simply pulling on the

leading end or rotating the reel housing by the hand grips 30. The fish tape then be fed through the conduit, wall, under carpet, in the ceiling or other such place until the leading end reaches an open area at the other side of the structure where wires or other items can be attached to the fish tape. The fish tape is then pulled back to pull the wires through the structure until they are accessed from the rear side of the structure. The fish tape can be wound back onto the reel during or after it is pulled through the structure.

[0033] Referring now to FIGS. 3-7, the fish tape is an elongated tape made of an electrically non-conductive material. Preferably, the tape is actually a hybrid composite structure made of multiple materials, with at least the outermost material being electrically inert, even more preferably all of the materials making up the composite structure are electrically non-conductive.

[0034] A resin-encased fiberglass strand core 40 covered in a plastic jacket 42 is one preferred composite structure. The jacket 42 helps protect the fiberglass from damage while being used, and is preferably a nylon 6, 6 due to that material's high durability and wear resistance, flexibility, low friction, and moldability. However, polypropylene, polyethylene or other plastics with properties similar to nylon could be used. Preferably, the fiberglass core and nylon jacket are formed together in a co-injection molding process.

[0035] Rather than being a rod-like structure having a circular cross-section, the fish tape is preferably rectilinear in cross-section, meaning that the fish tape has at least one straight side. Further, the fish tape is preferably "flat" which means that its width dimension is greater than its thickness dimension. FIG. 7 depicts one preferred form of the fish tape which is rectangular in cross-section with its width dimension being 1.5 or more times its thickness dimension. Working models of the fish tape having a 4 mm width and a 2 millimeter thickness have proved to be desirable.

[0036] The narrow width dimension allows the fish tape to occupy less space with wound as compared to conventional fiberglass rod fish tape (with a circular cross-section). For example, the cavity of a 12" diameter reel housing can hold only about 100 feet of conventional fiberglass rod fish tape compared to about 180 feet of similarly sized flat fish tape according to the present invention. The rectilinear configuration, and particularly the greater width dimension, increases its lateral stability and makes the fish tape much more "steerable" than conventional fiberglass rod fish tape so that it can be navigated on horizontal surfaces more accurately and without coiling.

[0037] As shown in FIG. 5, a feed piece 50 is mounted to the leading end (at the exterior of the reel) of the fish tape and an anchor piece 52 is mounted to the trailing end of the fish tape. In a preferred form, both of these end pieces are made of a high strength, non-conductive material, such that the entire run of the fish tape assembly (tape and end pieces) does not conduct electricity. A preferred plastic for the end pieces is commercially available as Grivory GV-5H Natural from EMS-Grivory, North America of Sumter, S.C. Grivory GV-5H is a 50% glass-fiber reinforced engineering thermoplastic material based on a combination of semi-crystalline polyamide with partially aromatic copolyamide. It is well suited for injection molding and exhibits high strength, dimensional stability and good surface finish.

[0038] The anchor piece 52 is angled in a dog-leg shape or boomerang shape with one leg having an attachment member in the form of a through opening 54 extending in the direction of the width dimension of the fish tape. The other leg of the anchor piece 52 has a countersunk opening or socket 56 extending in the long dimension of the fish tape. The cross-section of the socket 56 matches the rectilinear cross-section of fish tape, with the smaller portion of the socket 56 being sized to receive only the inner material and the larger portion being sized to receive the full dimension of the fish tape. The socket is open-ended to permit the free flow of adhesive and the evacuation of air bubbles that may otherwise interfere with the bond.

[0039] The anchor piece is preferably bonded to the trailing end of the fish tape, and more preferably is bonded by an adhesive. A preferred adhesive is a cyanoacrylate ester, such as JET SET 41 available from Holdtite Adhesives, Ltd., Tyne & Wear U. K., or LOCTITE 414 available from Loctite Corporation, North American Group, Rocky Hill, Conn. Although a cyanoacrylate ester adhesive is preferred for its quick set and cure times, other adhesives, such as two part thermoset adhesives may be used. Two part thermoset adhesives, such as epoxies and the like, provide a superior tensile strength at the expense of longer setting and cure times.

[0040] The adhesive is placed inside the socket the trailing end of the fish tape is inserted into the socket. In order to provide a strong bond between the fish tape and adhesive, the outer jacket is stripped away from the fiberglass core prior to insertion into the socket thereby allowing the adhesive to bond directly with the fiberglass to create a strong bond. When stripping off the jacket, care should be taken not to kink, cut or scrape the resin "skin" of the internal fiberglass. The fish tape jacket is tucked into the countersunk portion of the opening, thus eliminating a catch point when the fish tape is used.

[0041] As shown in FIGS. 3 and 4, the fish tape is anchored to the inside of the reel housing by inserting one of the housing fasteners through the opening 54 of the anchor piece during assembly. The associated window 20 gives the assembler a clear view of the fastener to facilitate anchoring the fish tape. The angle of the anchor piece is such that the trailing end of the fish tape extends in a direction generally tangential to the connection to the reel housing. This aids in reducing the bending moment realized by the trailing end of the fish tape when the wires are pulled through the structure, which can be especially high at the trailing end when the fish tape is fully unwound. Thus, an improved connection is provided that reduces the likelihood of fracturing or other damage to the fish tape which could result in the fish tape being separated from the reel.

[0042] The feed piece is mounted to the leading end of the fish tape at a counter-sunk open-ended socket 60 in its trailing end, again by stripping away the jacket and bonding the inner core, preferably with an adhesive, as described above with regard to the anchor piece. The feed piece is mounted to the leading end of the fish tape to the outside of the reel housing, and is larger than the exit aperture so that it is prevented from backing into the interior of the reel housing. The feed piece has an eyelet 62 that opens laterally in the width direction of the fish tape to provide an attachment point for wire and the like to be pulled through conduit



by the fish tape. The strength of the material and the geometry and wall thickness of the feed piece around the eyelet all it to be very strong. The inventors have successfully conducted pull tests of over 500 pounds, and expect that the feed piece is capable of withstanding 700 pounds or more.

[0043] The leading end of the feed piece is tapered in a wedge shape. As shown in **FIGS. 5 and 6**, the feed piece has a flat front edge **66** extending in the thickness dimension of the fish tape (perpendicular to its width) and widening back from there in a both the width and thickness dimensions of the fish tape in a generally straight, but slightly convex contour. The result wedge shape provides improved feedability through tight spaces such as crowded conduit.

[0044] It should be appreciated that merely a preferred embodiment of the invention has been described above. However, many modifications and variations to the preferred embodiment will be apparent to those skilled in the art, which will be within the spirit and scope of the invention. Therefore, the invention should not be limited to the described embodiment. To ascertain the full scope of the invention, the following claims should be referenced.

What is claimed is:

1. A fish tape assembly, comprising:  
a fish tape reel; and  
a fish tape mounted to the reel so as to be capable of being unwound in a feed direction relative to the reel, the fish tape being made of an electrically non-conductive material having a rectilinear cross-section.
2. The fish tape assembly of claim 1, wherein the fish tape is a composite of at least two materials.
3. The fish tape assembly of claim 2, wherein the at least two materials are electrically non-conductive.
4. The fish tape assembly of claim 3, wherein the at least two materials include a fiberglass core surrounded by a nylon jacket.
5. The fish tape assembly of claim 1, wherein the fish tape has a greater width dimension than thickness dimension.
6. The fish tape assembly of claim 5, wherein the width dimension is at least 1.5 times the thickness dimension.
7. The fish tape assembly of claim 6, wherein the thickness dimension is 2 millimeters or less.
8. The fish tape assembly of claim 1, further comprising a feed piece connected to a leading end of the fish tape, wherein the feed piece is made of an electrically non-conductive material.
9. The fish tape assembly of claim 8, wherein the feed piece has a rectilinear opening sized to receive the fish tape.
10. The fish tape assembly of claim 9, wherein the feed piece is bonded to the fish tape.
11. The fish tape assembly of claim 8, wherein the feed piece includes an eyelet.
12. The fish tape assembly of claim 8, wherein the feed piece has a wedge-shaped leading end opposite the connection of the feed piece to the fish tape.
13. The fish tape assembly of claim 8, further including an anchor piece connecting a trailing end of the fish tape to the reel.

14. The fish tape assembly of claim 13, wherein the anchor piece connects to the reel such that the trailing end of the fish tape extends in a tangential direction with respect to the reel.

15. The fish tape assembly of claim 14, wherein the anchor piece is dog-leg shaped.

16. A fish tape assembly, comprising:

an electrically non-conductive fish tape having a rectilinear cross-section and a leading end; and

an electrically non-conductive feed piece having a trailing end with a rectilinear opening receiving the leading end of the fish tape where the feed piece is bonded to the fish tape.

17. The fish tape assembly of claim 16, wherein the fish tape is a composite two electrically non-conductive materials.

18. The fish tape assembly of claim 17, wherein the two materials include a fiberglass core surrounded by a nylon jacket.

19. The fish tape assembly of claim 16, wherein the fish tape has a width dimension that is at least 1.5 times its thickness dimension.

20. The fish tape assembly of claim 16, wherein the feed piece is bonded to the fish tape by an adhesive.

21. The fish tape assembly of claim 16, wherein the feed piece has a wedge-shaped leading end.

22. The fish tape assembly of claim 16, further including an electrically non-conductive anchor piece bonded to a trailing end of the fish tape, wherein the anchor piece is angled so as to connect the trailing end of the fish tape tangentially to a reel mounting the fish tape.

23. A fish tape assembly, comprising:

an electrically non-conductive fish tape having a rectilinear cross-section and a leading end and a trailing end;

an electrically non-conductive feed piece mounted to the leading end of the fish tape; and

an electrically non-conductive anchor piece mounted to the trailing end of the fish tape.

24. The fish tape assembly of claim 23, wherein the fish tape is a composite structure.

25. The fish tape assembly of claim 23, wherein the feed piece has a wedge shaped leading end.

26. The fish tape assembly of claim 23, wherein the anchor piece is angled such that a portion of the anchor piece has a mounting member that extends at an angle relative to the trailing end of the fish tape.

27. The fish tape assembly of claim 23, wherein the feed piece and the anchor piece are bonded to the fish tape.

28. A fish tape assembly, comprising:

an electrically non-conductive fish tape having a leading end; and

an electrically non-conductive feed piece having an eyelet and being bonded to the leading end of the fish tape so as to sustain a pulling load of 500 pounds without separating from the fish tape.

\* \* \* \* \*



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(54) **SCREW ON LIGHTED END ATTACHMENT  
FOR USE WITH A FLEXIBLE SNAKE**

**Publication Classification**

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MI (US)

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(57) **ABSTRACT**

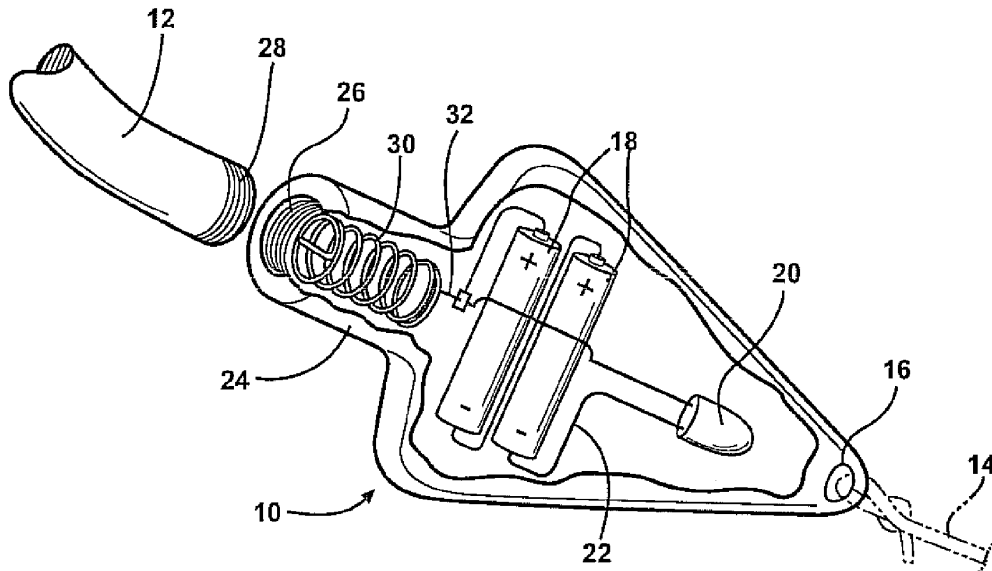
The present invention discloses a screw on lighted attachment for use with a fish wire, and which includes a conical body constructed of a durable and selectively transparent material, this further being adapted to being mounted to a remote end of the fish wire. A tip location of the body is configured with an eyelet portion formed there-through, and to which an end of a second retrieval wire is secured. An illuminating element, such as a light emitting diode, is housed within the body with a power source incorporated into the body and communicating with the LED element for activating the same to illuminate an area surrounding an inserted location associated within the body.

(21) Appl. No.: **12/423,043**

(22) Filed: **Apr. 14, 2009**

**Related U.S. Application Data**

(60) Provisional application No. 61/044,736, filed on Apr. 14, 2008.



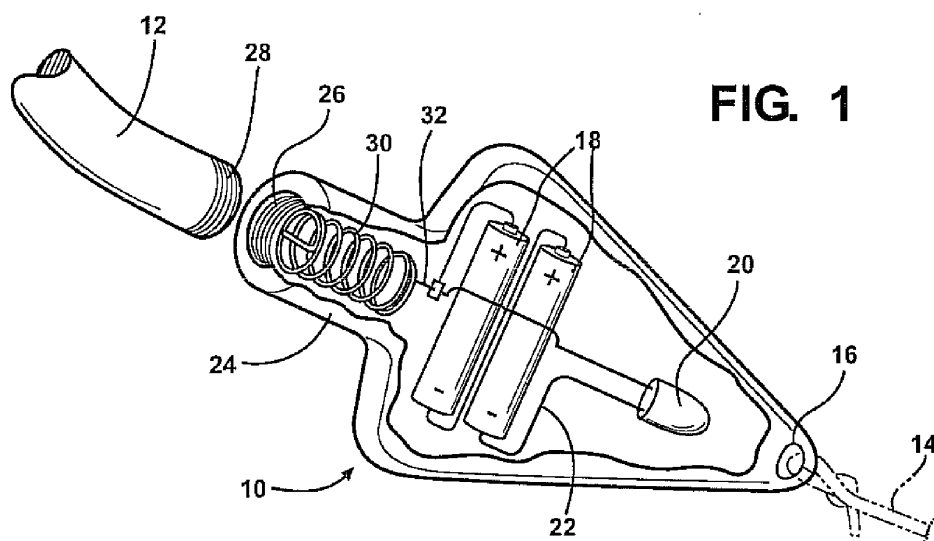


FIG. 1

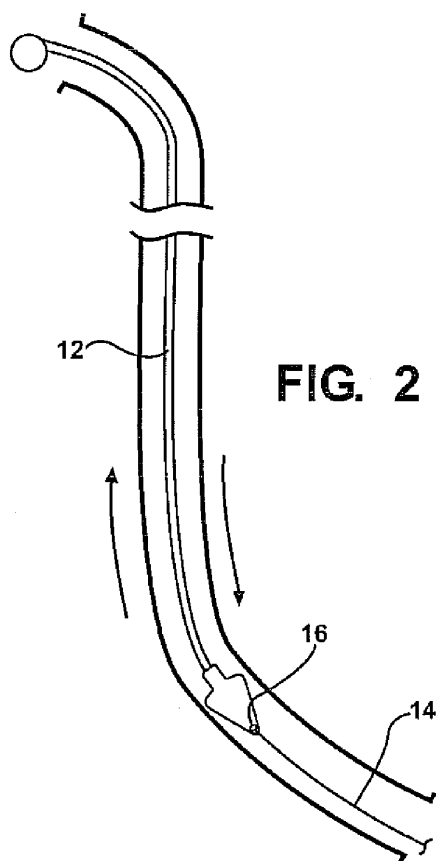


FIG. 2

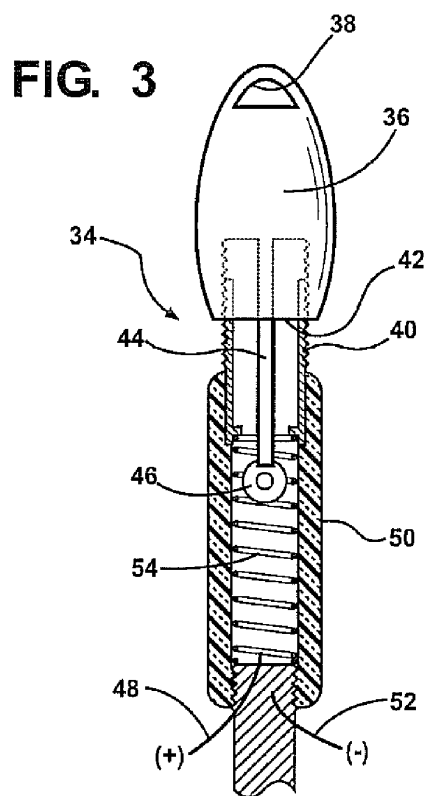


FIG. 3

## SCREW ON LIGHTED END ATTACHMENT FOR USE WITH A FLEXIBLE SNAKE

### CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This Application is a Non-Prov of Prov (35 USC 119(e)) application 61/044,736 filed on Apr. 14, 2008 SCREW ON LIGHTED END ATTACHMENT FOR USE WITH A FLEXIBLE SNAKE WIRE.

### FIELD OF THE INVENTION

[0002] The present invention relates generally to snake wire assemblies inserted through such as darkened and enclosed spaces. More specifically, the present invention discloses a screw on LED lighted end attachment for use with a fish wire and which exhibits the properties of impact resistance along with a high degree of illumination. The screw on attachment can be quickly and effortlessly translated through a remote opening, at which a wire is tied or otherwise clipped to a tip positioned aperture, and the fish wire with secured attachment is retreated with the secured wire to the initial remote insertion location

### BACKGROUND OF THE INVENTION

[0003] The prior art is well documented with examples of fish hook or tape extension/retrieval devices. One objective of such devices is in the location or a fish tape or line, such as is utilized by electrical contractors when working in tight confines or spaces and in order to run electrical lines.

[0004] Known examples include the apparatus and method for locating a fish tape as set forth in U.S. Pat. No. 5,820,249, to Walsten. The locator exhibits a first threaded end for fixing to the end of a fish tape and an opposite second end with emits light to help locate the end of the fish tape when it is being fished through a blind space. The first end is provided with a cross-bore for connecting the locator to a string, chain, hook or other line.

[0005] U.S. Pat. No. 7,025,333, issued to Gianturco, teaches a visual navigation device including a reel mounted within a reel housing. A flexible tape wound on the reel is adapted to be payed out of the housing and into an area to be navigated. A distal end of the flexible tape incorporates a video camera, a visual monitor being operatively connected to the camera and supported in the reel housing.

[0006] Other examples include U.S. Pat. No. 6,972,377, to Sawyer, and which discloses a glow rod assembly for guiding, feeding or routing a wire or cable in a target space of an existing structure. The elongate (typically glowing) rod includes first and second opposite end portions, an anchoring member attached to the rod first end portion. The anchoring member resides against a surface of a structural frame member to hold the first end portion outside of a target internal routing space to allow the second end portion to extend in the to the target internal routing space, thereby allowing one end of the rod to remain in a fixed location without requiring a second installer.

### SUMMARY OF THE INVENTION

[0007] The present invention discloses a screw on lighted attachment for use with a fish wire, and which includes a conical body constructed of a durable and selectively transparent material, this further being adapted to being mounted to a remote end of the fish wire. A tip location of the body is

configured with an eyelet portion formed there-through and to which an end of a second retrieval wire is secured. An illuminating element housed within the body is activated to illuminate an area surrounding an inserted location associated with the body.

[0008] Additional features includes the illuminating element further exhibiting an LED element and with a power source incorporated into the body and communicating with the LED element. Also, a spring element may be annularly seated within an attachment end of the body and is compressed from an open to a closed circuit configuration, this upon screwing the attachment onto the fish wire and in order to communicate at least one interiorly secured battery to the LED element. The fish wire may also include a flexible fiberglass rod exhibiting a threaded end, and to which is engaged the attachment end of the body.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Reference will now be made to the attached drawings, when read in combination with the following detailed description, wherein like reference numerals refer to like parts throughout the several views, and in which:

[0010] FIG. 1 is an illustration of the screw on lighted attachment according to a preferred embodiment of the present invention;

[0011] FIG. 2 is an environmental view of the lighted attachment and associated flex stem (fish wire) being fed in successively first and second opposite linear directions for remote acquisition and subsequent retrieval of a wire; and

[0012] FIG. 3 is an illustration of an alternately configured lighted attachment.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] Referring now to FIG. 1, an illustration is generally shown at 10 of a screw on lighted attachment according to a preferred embodiment of the present invention. As previously described, the attachment 10 is utilized for translating through a confined space from such as a remote location. As previously described, the present invention discloses a screw on LED (light emitting diode) lighted end attachment for use with an elongated and flexible element 12, this including any of a durable and flexible wire or rod. In the case of a flexible rod, the elongated element can be constructed from, such as a flex stem fiberglass or other suitable material.

[0014] The attachment 10 exhibits a generally conical or arrow three dimensional shaped body, an outer shell portion of which exhibits the properties of impact resistance and, along with a high degree of illumination, can be quickly and effortlessly translated through a remote opening, such as at which a further remote wire 14 (such as an electrical wire as shown in FIGS. 1 and 2) is tied or otherwise clipped to a tip positioned aperture, whereupon the flexible element 12 with secured attachment is retreated with the secured wire to the initial remote insertion location.

[0015] As again shown in FIG. 1, the attachment 10 is constructed of a durable plasticized and, in one variant, transparent material. A tip location of the attachment is further configured with an eyelet portion formed therethrough, see at 16, and to which the remote end of the retrieval wire 14 can be clipped, knotted or otherwise secured. It is also envisioned and understood that the eyelet portion can be reconfigured so

as to be externally fastened to the pointed end of the attachment, as well as integrally formed therewith as shown.

**[0016]** An interior spaced associated with the conical shaped body includes an interior battery compartment, in the illustrated embodiment including a pair of AA or AAA batteries, see as shown at **18** in FIG. **1**. It is also envisioned that other portable battery sources, such as lithium diode (e.g. watch type) or other batteries can be substituted for the alkaline type batteries shown, and which can also provide the necessary size, weight and power output characteristics.

**[0017]** An LED (light emitting diode) is illustrated at **20** within the transparent casing of the attachment body **10** and is provided for emitting a focused and relatively high powered degree of luminescence (illumination) focused in a direction towards the tip configured wire retrieval eyelet **16**. The use of LED lighting, as opposed to incandescent or other lighting elements, is preferred as it provides the desired features of small size, light weight, small power drain, and significantly greater impact resistance.

**[0018]** While a white light is preferred, it is also envisioned that LED bulbs emitting other lights, such as red, can be substituted in other desired operating environments. Although not shown, the scope of the present invention can also contemplate the implementation of other illuminating elements, these potentially including any of incandescent, chemical/laser generating light sources, phosphorescent glow in the dark light sources, and the like.

**[0019]** Referring again to FIG. **1**, a communication wire **22** extends inside the attachment body and between the generally forward located LED and a base attaching location **24** formed (such as integrally but also separately assembled) with the body. In a preferred embodiment, an open interior end face **26** associated with the base **24** exhibits an annular and interiorly threaded pattern or configuration, this for permitting the attachment body **10** to be rotatably and threadably engaged to a likewise exteriorly threaded portion end portion, see at **28**, associated the flexible rod **12** previously identified.

**[0020]** Activation of the lighted end attachment **10** is caused by the progressing screwing engagement of the opposing sets threads, associated with the inserting end of the elongated and flexible rod **12** and the interior end face **26** of the base **24**. A compressing motion established by the threaded rotating engaging end of the flexible support rod **12** is transferred to an electrically conductive spring element **30**, this incorporated into the base location **24** of the attachment **10** as further shown in FIG. **1**. The attachment **10**, as shown in operational fashion in FIG. **2**, is then capable of being successively inserted and, upon reaching a desired end location, retrieved with a wire **14** secured (at the end location) through the defined eyelet **16**.

**[0021]** Upon the spring elements **30** (e.g. this including such as a coiled spring element annularly seated within the interior of the base **24** as well as other potential biasing structure for creating a closed circuit) being compressed from an open to a closed circuit configuration, a further communication line **32** extends from the spring element **30** to the batteries **18** and, in this fashion, communicates power from the batteries **18** and to the LED **20** (or other suitable lighting element) via the further interior communication wire **22**.

**[0022]** In this fashion, no ON/OFF switch is required (although one can be provided in a further modified version of the invention), the LED being activated automatically upon screwing on the attachment and subsequently deactivated by likewise unscrewing removal. Additional variants also envi-

sion the power source being remotely located and communicated to the attachment, such as through an wire defined inside of the flexible rod **12**.

**[0023]** The above said, it is again contemplated that additional variants of the design can contemplate the provision of an ON/OFF switch with suitably modified wiring to the batteries and LED element. The provision of the interengaging screw threads can also be substituted by such as a bayonet tab (compression and twist-lock) configuration (not shown) and which can be established between the flexible rod **12** and the base attachment location, this for creating the necessary closed circuit for communicating power to the LED element. Such a configuration would envision some mirror reconfiguration of the engaging locations, and such as to incorporate such known alternative structure into a suitable and effective engagement scenario.

**[0024]** Referring finally to FIG. **3**, an illustration is shown at **34** of an alternately configured lighted attachment according to a further non-limiting preferred embodiment. In this variant, a screw on transparent body is shown at **36** and again includes a tip proximate located eyelet **38** to which is engaged the retrieval wire (not shown). Not evident in FIG. **3** are the inter-engaging pluralities of threads established between the interior of the body **36** and an associated exterior of an inner member **40** (reference further being made to annular configured attachment location **42**).

**[0025]** The configuration of FIG. **3** contemplates the member **40** being secured to an end of the rod or like element (see again at **12**). Progressive screw engagement of the attachment body **36** results in the downwardly displacement of an inner displacement member, see at **44**, extending from the body **36** and into a base component **40**. The displacement member **44** can include either a spring-like or a stem-like construction, and to an end of which is mounted a suitable LED element **46**, such as in turn mounted within an inner core associated with the base component **40**.

**[0026]** The inner core can exhibit such as a positive contact location (see as referenced at **48**), whereas an outer body **50** is displaceable or translatable secured over the inner member **40** can exhibit a negative contact location (see as further representatively identified at **52**). It is further envisioned and understood that, in addition to the light from the LED being evident through the transparent and end mounted body **36**, the base component **40** and outer body **50** can also be constructed to be transparent or opaque to some degree, this permitting the illumination of the LED to be readily visible to the observer.

**[0027]** A coil shaped spring, see as shown at **54**, is coaxially sandwiched between the base component **40** and the outer body **50**, and can facilitate a compressive bias established between the outer and inner translating components, such as which occurs upon the displacement of the body **36** and associated stem **44**, this in turn being configured by an appropriate linkage to cause the inner and outer elements to displace against one another and in opposition to the force of the spring **54**. In similar fashion to the closed circuit disclosed in the embodiment of FIG. **1**, the variant **34** operates by compression and in order to communicate a power source (not shown in FIG. **3**) with the LED **46** element (upon the contact locations **48** and **52** meeting) to illuminate the dark spaces or confines associated with the inserted attachment. It is also further noted that the arrangement of FIG. **3** discloses only one additional possible redesign of the present invention, this operating off of the principle of utilizing a suitable spring or

biasing element to cause contact closure between positive and negative leads and in order to communicate a power supply to an appropriate illuminating element.

[0028] Having described in invention, other and additional preferred embodiments will become apparent to those skilled in the art to which it pertains, and without deviating from the scope of the appended claims:

I claim:

1. A screw on lighted attachment for use with a fish wire, comprising:

a conical body constructed of a durable and selectively transparent material, said body adapted to being mounted to a remote end of the fish wire;

a tip location of said body being configured with an eyelet portion formed therethrough and to which an end of a second retrieval wire is secured; and

an illuminating element housed within said body and activated to illuminate an area surrounding an inserted location associated with the body.

2. The attachment as described in claim 1, said illuminating element further comprising an LED element.

3. The attachment as described in claim 2, further comprising a power source incorporated into said body and communicating with said LED element.

4. The attachment as described in claim 3, further comprising a spring element annularly seated within an attachment end of said body and being compressed from an open to a closed circuit configuration, upon screwing said attachment onto the fish wire, in order to communicate at least one battery to the LED element.

5. The attachment as described in claim 4, the fish wire including a flexible fiberglass rod exhibiting a threaded end to which is engaged said attachment end of said body.

6. A screw on lighted attachment for translating through a confined space from a remote location, comprising:

a three dimensional shaped body constructed of a durable and selectively transparent material, said body adapted to being mounted to a remote end of an elongated and flexible element;

a tip location of said body being configured with an eyelet portion formed therethrough and to which an end of a second retrieval wire is secured; and

an illuminating element housed within said body and activated to illuminate an area surrounding an inserted location associated with the body.

7. The attachment as described in claim 1, said illuminating element further comprising an LED element.

8. The attachment as described in claim 7, further comprising a power source incorporated into said body and communicating with said LED element.

9. The attachment as described in claim 8, further comprising a spring element annularly seated within an attachment end of said body and being compressed from an open to a closed circuit configuration, upon screwing said attachment onto said elongated and flexible element, in order to communicate at least one battery to the LED element.

10. The attachment as described in claim 9, said elongated element further comprising a flexible fiberglass rod exhibiting a threaded end to which is engaged said attachment end of said body.

11. The attachment as described in claim 6, said body further comprising an inner member, an outer member, and a coil spring coaxially interposed therebetween.

12. The attachment as described in claim 11, further comprising an inner translating stem extending from within said body to a contact location associated with a selected one of said inner and outer members and, upon being compressed from and open to a closed circuit configuration established between first and second contact locations associated with said inner and outer body, communicating a power source to the illuminating element.

\* \* \* \* \*



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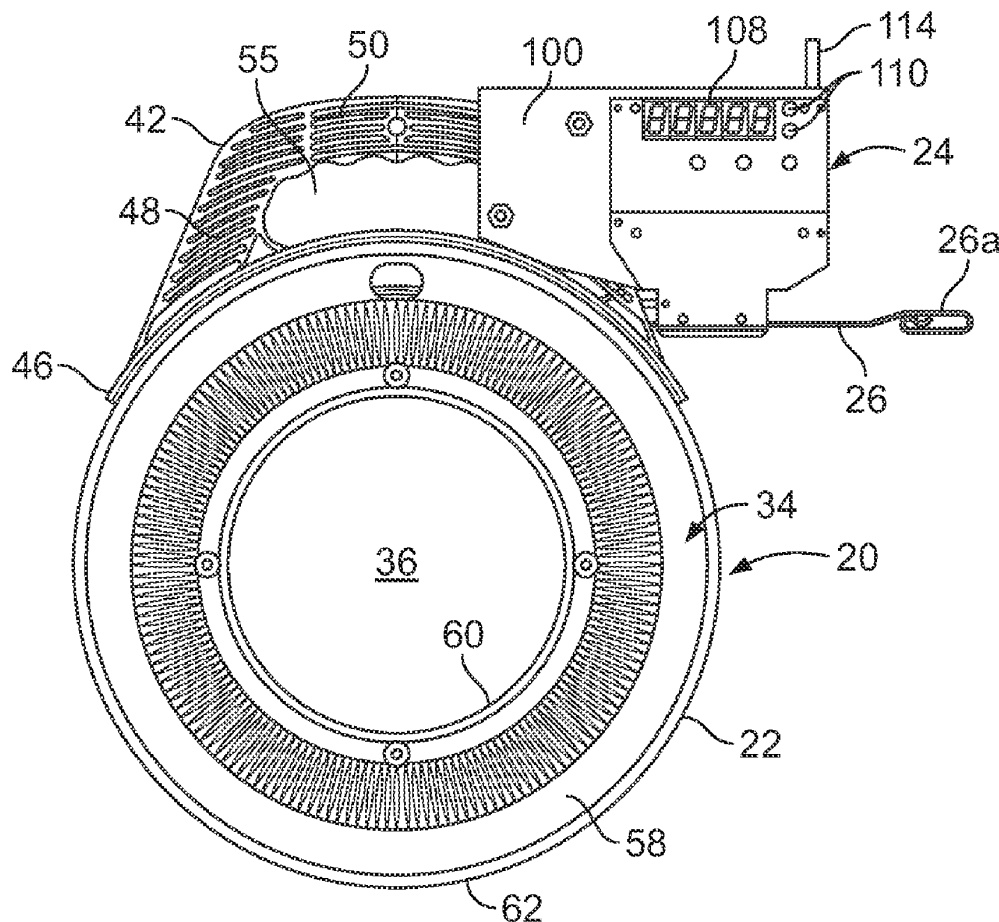
(19) **United States**(12) **Patent Application Publication**  
**Moffatt et al.**(10) **Pub. No.: US 2015/0330771 A1**(43) **Pub. Date: Nov. 19, 2015**(54) **DIGITAL MEASUREMENT UNIT FOR FISH  
TAPE DEVICE OR DUCT RODDING DEVICE**(71) Applicant: **Greenlee Textron Inc.**, Rockford, IL  
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(57) **ABSTRACT**

An assembly includes a fish tape device or a duct rodding device having digital measurement unit attached thereto. A tape is housed in the fish tape device or a duct rodding device and is paid out of the device. The digital measurement unit includes an optical sensor which is positioned proximate to the tape. As the tape is passed by the optical sensor, the optical sensor uses digital image correlation to take successive images of the tape to determine a length measurement of tape that has passed by the optical sensor.



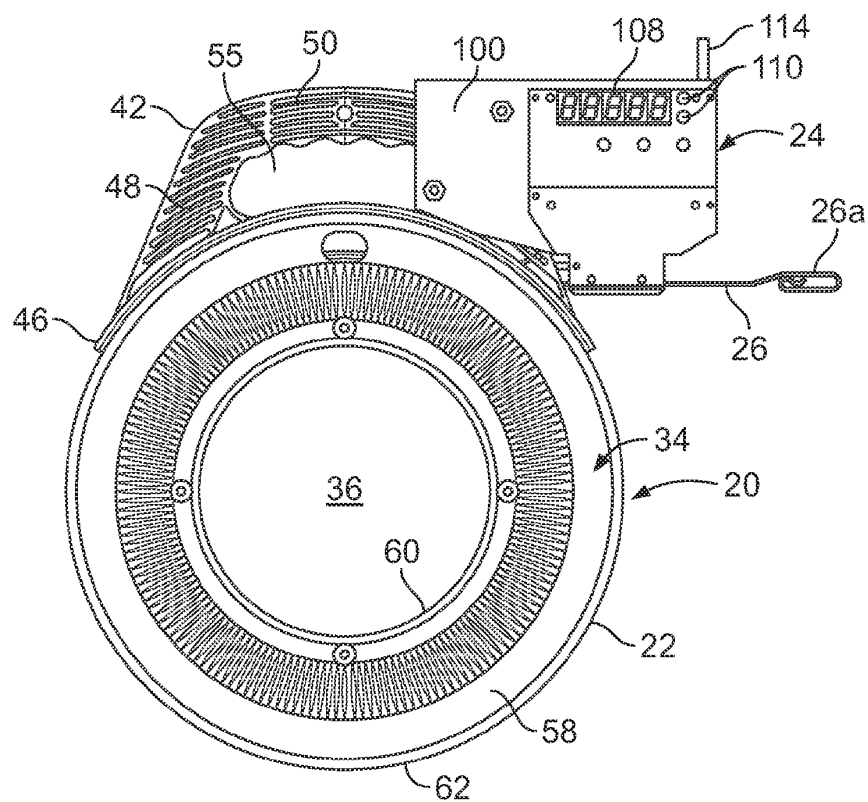


FIG. 1

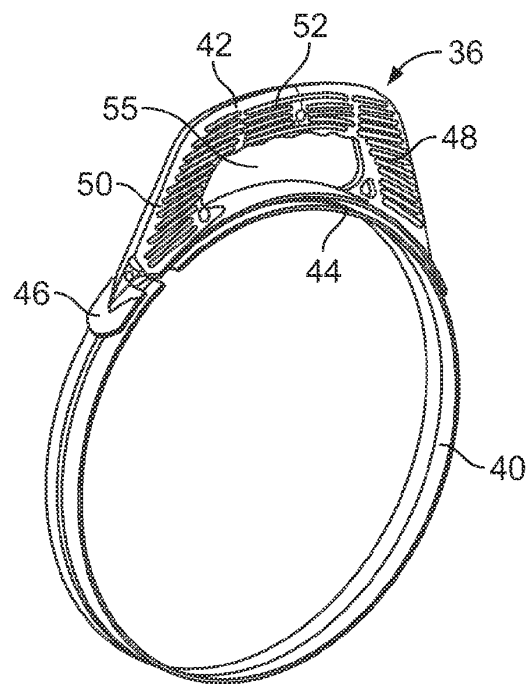
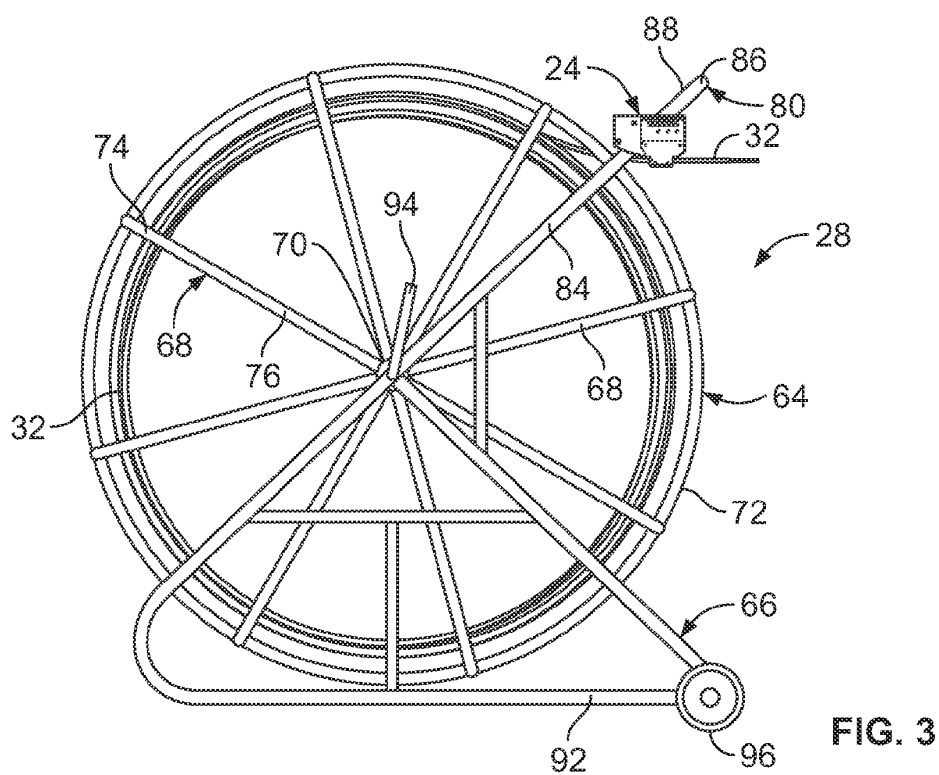
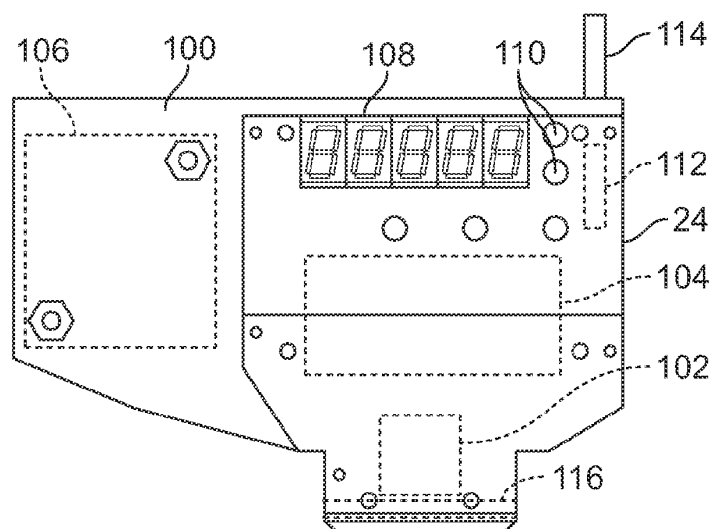


FIG. 2





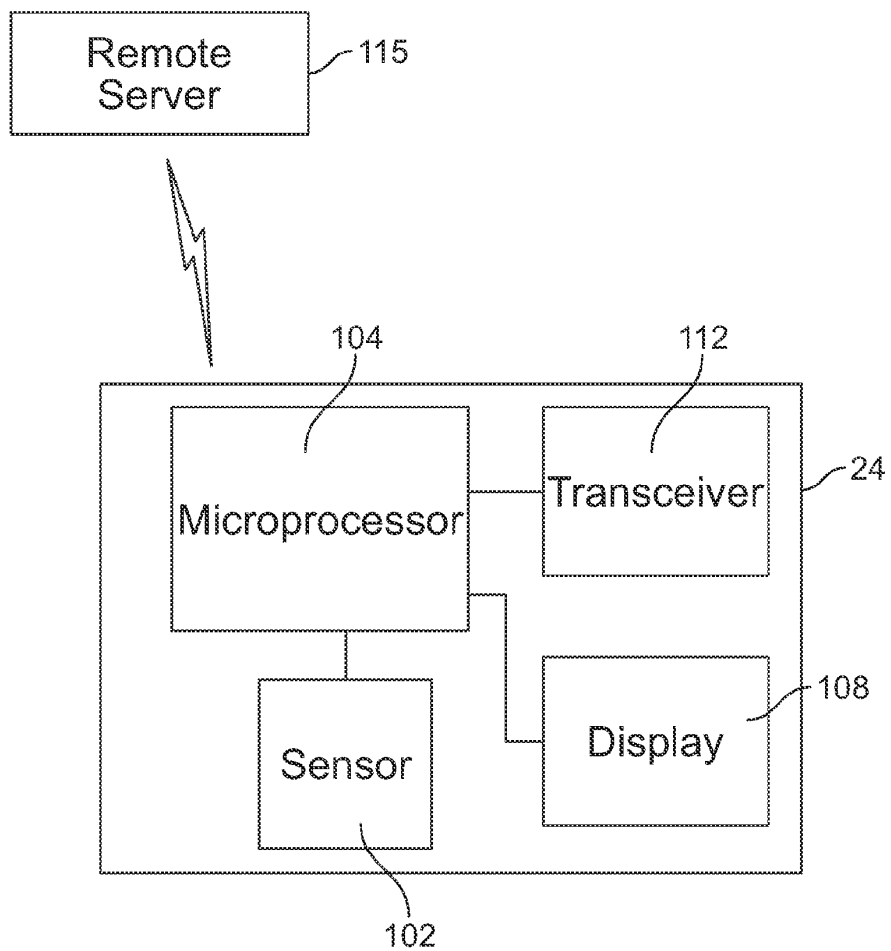


FIG. 5

## DIGITAL MEASUREMENT UNIT FOR FISH TAPE DEVICE OR DUCT RODDING DEVICE

### FIELD OF THE INVENTION

**[0001]** The present invention relates to an assembly which includes a fish tape device or a duct rodding device having digital measurement unit attached thereto. The digital measurement unit displays the length of tape paid out of the device or retracted into the device.

### BACKGROUND OF THE INVENTION

**[0002]** An electrician or homeowner installs cables or wires through a wall or electrical conduit. To perform this task, a fish tape is typically used. The fish tape is unwound or paid out and fed through the wall or conduit. Once the end of the fish tape reaches its destination, the cables or wires are connected to the end of the fish tape. Then, the fish tape and connected wires are pulled back through the wall or conduit. This process is typically referred to as a cable pull.

**[0003]** It is beneficial for the electrician to know the total length of the cable pull. This allows the electrician to confirm there is sufficient cable or wire length prior to starting the cable pull. Also, multiple wires could be cut from the same spool for one cable pull without wasting cable through inaccurate estimation of the total pull length. Wasted wire during a cable pull is costly. Another benefit is that the electrician can use the known length of the paid fish tape to locate an obstruction in the wall or conduit.

**[0004]** Often fish tape is damaged when pliers or other tools are used to aid in pulling the fish tape connected to cables and wires during a cable pull. This damage can eventually result in the fish tape breaking. The user can then reform the looped end on the remaining fish tape and continue using the fish tape. This reduces the overall length of the fish tape. Another benefit of the length measurement is to keep a record of the fish tape remaining within the case. As a result, the user does not waste time using a fish tape that does not have sufficient tape length for the cable pull.

**[0005]** U.S. Pat. No. 4,092,780 measures fish tape distance paid out through a mechanical device, which relies on mechanical friction for accurate readings. The measurement wheel must be in constant contact with the fish tape. As the fish tape is extended, the measurement wheel turns a mechanical display that indicates distance. This design is prone to inaccurate reading from the measurement wheel slipping during fast extension of the fish tape or contaminants on the fish tape. Also, continued frequent use will wear the measurement wheel and reduce the amount of friction available between the measurement wheel and the fish tape leading to increased amount of slipping and higher inaccuracies.

**[0006]** U.S. Design Pat. No. D506,939 provides dimensional marking directly on the fish tape. This allows the electrician the ability to accurately measure the pull length, however, this method requires a significant manufacturing cost to mark the tape and this method becomes more difficult for the user to identify total length if the fish tape has been broken and the laser numbers do not start from the original value.

**[0007]** Using an optical sensor to measure the length of a tape has been used in measurement tape devices, but not in fish tapes. For example, measuring tapes using optical sensors are provided in U.S. Pat. Nos. 4,242,574, 4,747,215 and 5,142,793. These devices are only capable of providing a distance measurement and use an optical sensor that requires

a specific image or pattern to be located on the measuring tape for identifying distance paid out.

### SUMMARY OF THE INVENTION

**[0008]** An assembly includes a fish tape device or a duct rodding device having digital measurement unit attached thereto. A tape is housed in the fish tape device or a duct rodding device and is paid out of the device. The digital measurement unit includes an optical sensor which is positioned proximate to the tape. As the tape is passed by the optical sensor, the optical sensor uses digital image correlation to take successive images of the tape to determine a length measurement of tape that has passed by the optical sensor.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0009]** The organization and manner of the structure and operation of the invention, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings, wherein like reference numerals identify like elements in which:

**[0010]** FIG. 1 is a side elevation view of an assembly including a fish tape device and a digital measurement unit which incorporates the features of the present invention;

**[0011]** FIG. 2 is a perspective view of a winding belt which forms a portion of the fish tape device of FIG. 1;

**[0012]** FIG. 3 is a side elevation view of an assembly including a duct rodder device and a digital measurement unit which incorporates the features of the present invention;

**[0013]** FIG. 4 is an enlarged view of the digital measurement unit showing components in broken line; and

**[0014]** FIG. 5 is a block diagram of the components of the digital measurement unit and showing a remote server.

### DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

**[0015]** While the invention may be susceptible to embodiment in different forms, there is shown in the drawings, and herein will be described in detail, specific embodiments with the understanding that the present disclosure is to be considered an exemplification of the principles of the invention, and is not intended to limit the invention to that as illustrated and described herein. Therefore, unless otherwise noted, features disclosed herein may be combined together to form additional combinations that were not otherwise shown for purposes of brevity.

**[0016]** FIG. 1 shows an example of an assembly 20 which includes a fish tape device 22 and a digital measurement unit 24. As is known in the art, the fish tape device 22 is used to pay out fish tape 26, and the fish tape 26 can be retracted into the fish tape device 22 for reuse. Commonly, fish tapes 26 are approximately 200 feet in length, but such lengths may vary depending upon the application. An example of such a fish tape device 22 is disclosed in U.S. Pat. No. 8,651,459, which disclosure is incorporated by reference in its entirety. FIG. 3 shows an example of an assembly 28 which includes a duct rodder device 30 with the digital measurement unit 24. As is known in the art, the duct rodder device 30 is used to pay out pull tape 32, and the pull tape 32 can be retracted into the duct rodder device 30 for reuse. Commonly, pull tapes are approximately 2,000 feet in length, but such lengths may vary depending upon the application. The assemblies 20, 28 mini-

mize pull length measurement inaccuracy issues, do not have a high manufacturing cost, and provide the user with information as to the amount of the unused tape 26, 32 left in the device 22, 30.

[0017] Attention is first invited to the embodiment showing the assembly 20 which includes a fish tape device 22 and a digital measurement unit 24.

[0018] The fish tape 26 is conventionally formed and includes a long strip of flexible material that has an eye or coupling 26a on one its free end. The fish tape 26 is preferably flat. The fish tape 26 of the present invention can be formed of steel, nylon, plastic, fiberglass, stainless steel, and flexible steel braid. The fish tape 26 preferably does not have dimensional markings thereon as they are not necessary for the present invention and only increase the cost of the fish tape 26, but if such dimensional markings are provided, such dimensional markings are not used in the present invention.

[0019] The fish tape device 22 includes a two-part housing 34 in which the fish tape 26 and a winding belt 36 are mounted. The housing 34 is annularly-shaped and has a central hole 36 in the middle. The housing 34 and the winding belt 36 may be made from polypropylene, ABS or another suitable plastic material. In addition, the winding belt 36 can be made of nylon.

[0020] As shown in FIG. 2, an embodiment of the winding belt 36 includes a continuous circular hoop 40 with a handle 42 attached thereto by a web 44. The web 44 extends radially outwardly from a midline of the hoop 40. The handle 42 is attached to an arcuate shoe 46 which is in turn attached to the web 44. The web 44 connects an underside of the shoe 46 to the hoop 40 such that the shoe 46 is radially spaced from the hoop 40. The handle 42 is configured to be grasped by the hand of the user and is generally U-shaped. The handle 42 includes a first and second portions 48, 50 extending from the shoe 46, and a third portion 52 connected to the ends of the first and second portions 48, 50. The third portion 52 is generally parallel to the shoe 46. An opening 55 for the user's hand is formed by the first, second and third portions 48, 50, 52 and the shoe 46. A slot 56 extends through one end of the handle 42 and extends through shoe 46, the web 44 and the hoop 40.

[0021] Each part of the housing 34 includes a circular outside wall 58, an annularly-shaped inner wall 60 which depends generally perpendicular from the outside wall 58, and an annularly-shaped outer wall 62 which depends generally perpendicular from the outside wall 58. When the two parts of the housing 34 are mated, the ends of the inner walls 60 abut each other, and the ends of the outer walls 62 are proximate to each other but spaced apart from each other such that a gap is formed therebetween. As disclosed in U.S. Pat. No. 8,651,459, the winding belt 36 is stored in a winding belt chamber formed in the housings 34 and the fish tape 26 is stored in a fish tape storage chamber in the housings 34. The web 44 of the winding belt 36 is seated within the gap between the parts, and the shoe 46 is proximate to the outer surface of the outer wall 62. The fish tape 26 is anchored to the housings 34 and is wound in the fish tape storage chamber. An end portion of the fish tape 26 exits the fish tape storage chamber and extends through the slot 56.

[0022] As shown in an embodiment, the digital measurement unit 24 is provided on the handle 42 proximate to the slot 56, but does not obstruct the user's hand opening 55. The digital measurement unit 24 can be formed as a separate member which is mechanically attached to the handle 42, or

can be formed integrally with the handle 42. Alternatively, in another embodiment, the digital measurement unit 24 may be provided on or in the housing 34, the digital measurement unit 24 can be formed as a separate member which is mechanically attached to the housing 34, or can be formed integrally with the housing 34. In each location for the digital measurement unit 24, the fish tape 26 extends therethrough. As the fish tape 26 passes through the digital measurement unit 24, the digital measurement unit 24 is configured to determine the amount of fish tape material that has passed therethrough as described herein.

[0023] Attention is now invited to the embodiment showing the assembly 28 which includes a duct rodder device 30 with the digital measurement unit 24.

[0024] The pull tape 32 is conventionally formed and includes a long strip of flexible material that has an eye or coupling 32a on its free end. The pull tape 32 is preferably round. Like the fish tape 26 of the first embodiment, the pull tape 32 of the present invention can be formed of steel, nylon, plastic, fiberglass, stainless steel, and flexible steel braid. The pull tape 32 preferably does not have dimensional markings thereon as they are not necessary for the present invention and only increase the cost of the pull tape 32, but if such dimensional markings are provided, such dimensional markings are not used in the present invention.

[0025] The duct rodder device 28 includes a housing 64, formed as a cage, in which the pull tape 32 is mounted and a stand 68 for transporting the duct rodder device 28.

[0026] The housing 64 is formed from a plurality of connecting ribs 68 which are interconnected together at a central tube 70 and an outer rib 72 which is connected to the connecting ribs 68. Each connecting rib 68 has a curved base 74 with a leg 76 extending therefrom. The legs 76 are parallel to each other. The outer rib 72 is annular and is connected to the base 74 of each connecting rib 68, such that connecting ribs 68 extend from each side of the outer rib 72. The housing 64 is preferably formed of metal, such as steel, but may be formed of other materials. The pull tape 32 is wound and stored in a pull tape storage chamber formed by the connecting ribs 68, the central tube 70 and the outer rib 72. An end portion of the pull tape 32 exits the storage chamber as described herein.

[0027] A handle 80 extends outwardly from the housing 64. The handle 80 is configured to be grasped by the hand of the user and is generally U-shaped. The handle 80 is generally U-shaped and includes first and second portions 84 extending from the central tube 70, and a third portion 86 connected to the ends of the first and second portions 84. The first and second portions 84 are parallel to each other and are parallel to the first and second portions 76 of the ribs 68. The third portion 86 is generally parallel to the central tube 70. An opening 88 for the user's hand is formed between the first, second and third portions 84, 86 and the outer rib 72.

[0028] The housing 64 is mounted to the portable stand 66. As shown, the stand 66 has a pair of triangularly-shaped legs 92 (only one of which is shown in the side elevation view of FIG. 3) which has a central shaft extending between the upper ends thereof. The shaft is rotatably mounted in the central tube 70 of the housing 64. A handle 94, which can be rotated by a user to rotate the housing 64 relative to the portable stand 66, is attached to the shaft. The housing 64 can freely rotate relative to the stand 66. The legs 92 may have wheels 96 thereon to allow a user to easily transport the duct rodder device 30.

[0029] As shown in an embodiment, the digital measurement unit 24 is provided on the handle 80, but does not obstruct the user's hand opening 88. The digital measurement unit 24 can be formed as a separate member which is mechanically attached to the handle 80, or can be formed integrally with the handle 80. Alternatively, in another embodiment, the digital measurement unit 24 may be provided on or in the housing 64, the digital measurement unit 24 can be formed as a separate member which is mechanically attached to the housing 64, or can be formed integrally with the housing 64. In each location for the digital measurement unit 24, the pull tape 32 extends therethrough. As the pull tape 32 passes through the digital measurement unit 24, the digital measurement unit 24 is configured to determine the amount of pull tape material that has passed therethrough as described herein.

[0030] In each embodiment, the digital measurement unit 24 is formed of a housing 100, having a low cost optical sensor 102 mounted therein, a processor 104 provided therein, and a battery 106 for powering the digital measurement unit 24. The optical sensor 102 and the processor 104 are in communication with each other. A digital display 108 may be provided on the housing 100 and is in communication with the processor 104 for displaying information to the user. A user interface 110, which may be formed of buttons, a touch screen, etc., is provided on the housing 100 and is in communication with the processor 104 for allowing the user to toggle between readouts and settings. The digital measurement unit 24 may include a transceiver 112 and antenna 114. The transceiver 112 is in communication with the processor 104 and is used to convey the information via wireless signals using the antenna 114 to a server 115 which is remote to the digital measurement unit 24.

[0031] The housing 100 has a passageway 116 therethrough through which the tape 26, 32 extends. The optical sensor 102 is mounted in the housing 100 proximate to the passageway 116 so that the optical sensor 102 can sense the tape 26, 32 as the tape 26, 32 passes through the housing 100.

[0032] When the tape 26, 32 moves past the optical sensor 102, the optical sensor 102 provides a digital signal to the processor 104 indicating the distance the fish or pull tape material has been moved passed the optical sensor 102. The optical sensor 102 is an optoelectronic sensor, which may include one or more light-emitting diodes (LEDs) and an imaging array of photodiodes to detect movement relative to the underlying surface and an image capturing device therein, such as a camera. Alternatively, the optical sensor 102 is an optoelectronic sensor of the optical sensor 102 may include a coherent laser light and an image capturing device therein, such as a camera. The image capturing device uses digital image correlation to take successive images of the surface of the material being passed in front of the optical sensor 102 to determine the distance the material has moved passed the optical sensor 102. This technology is often found in computing field for use in an optical mouse and such a suitable optical sensor is disclosed in U.S. Pat. No. 7,609,250, which disclosure is incorporated by reference in its entirety. The optical sensor 102 of the present invention does not rely on a mechanical connection to measure distance or costly manufacturing equipment to add any patterns or dimensional markings to the fish tape 26 or pull rod 32. The optical sensor 102 of the present invention accurately reads different types of the fish tape or pull material, that is steel, nylon, plastic, fiber-glass, stainless steel, and flexible steel braid.

[0033] The output of the optical sensor 102 is communicated to the processor 104. The processor 104 is configured to condition the signal and configured to calculate the length of tape 26, 32 that has been passed over the optical sensor 102, either during the paying out of the tape 26, 32 out of the housing 34, 64, and/or the retraction of the tape 26, 32 into the housing 34, 64. The processor 104 may be configured to output this information to the digital display 108 for display to the user, and/or the processor 104 may be configured to output this information to the remote server 115 for reading by a user at that location.

[0034] The processor 104 may be configured by the user to "zero" the distance measurement of the tape 26, 32 at any desired position along the length of the tape 26, 32. For example, the user can pay out a foot of tape 26, 32 and then "zero" the digital measurement unit 24 such that the distance measurement starts at this point along the tape 26, 32.

[0035] The processor 104 may be configured to display the length measurement in Metric or English units. The user can change this display by using the user interface 110.

[0036] The processor 104 may be configured to know that the tape 26, 32 is a certain amount of feet in length. The processor 104 may be configured to track the length of the tape 26, 32 paid out and then determine how much length of tape 26, 32 remains in the device 22, 30. The processor 104 may be configured to output this information to the digital display 108 for display to the user, and/or the processor 104 may be configured to output this information to the remote server 115 for reading by a user at that location.

[0037] The assemblies 20, 28 perform cable pulls and provides distance measurements simultaneously. This assemblies 20, 28 are capable of providing accurate length measurements repeatedly throughout the entire life of the assemblies 20, 28.

[0038] While a particular structure for the fish tape device 22 and for the duct rodder device 30 is shown and described, it is to be understood that the devices 22, 30 can take other forms and the devices 22, 30 are not limited to the embodiment shown in the drawings.

[0039] While preferred embodiments of the present invention are shown and described, it is envisioned that those skilled in the art may devise various modifications of the present invention without departing from the spirit and scope of the appended claims.

What is claimed is:

1. An assembly comprising:

one of a fish tape device and a duct rodding device comprising a housing;

a flexible tape housed in said housing, said tape being capable of being paid out of said housing and retracted into said housing; and

an optical sensor attached to said housing, said optical sensor being positioned proximate to said tape, said optical sensor using digital image correlation to take successive images of said tape as said tape passes by said optical sensor to determine a length of tape that has passed by said optical sensor; and

a processor in communication with said optical sensor, said processor configured to calculate a length measurement of tape that has passed by the optical sensor.

2. The assembly of claim 1, wherein said optical sensor is an optoelectronic sensor.

3. The assembly of claim 2, wherein said optical sensor comprises one or more light-emitting diodes and an imaging

array of photodiodes to detect movement relative to the underlying surface, and an image capturing device.

4. The assembly of claim 2, wherein said optical sensor comprises a coherent laser light and an image capturing device.

5. The assembly of claim 1, wherein said tape is formed of any one of steel, nylon, plastic, fiberglass, stainless steel and flexible steel braid.

6. The assembly of claim 1, wherein said tape is devoid of markings.

7. The assembly of claim 1, further including a digital measurement unit attached to said housing, and said optical sensor is housed in said digital measurement unit.

8. The assembly of claim 7, wherein said processor is housed in said digital measurement unit attached to said housing.

9. The assembly of claim 1, further comprising a digital display in communication with the processor for displaying information to a user, and a user interface in communication with the processor for allowing a user to toggle between readouts and settings.

10. The assembly of claim 1, further comprising a transceiver and an antenna, said transceiver in communication with said processor and conveys information to a remote server.

11. The assembly of claim 1, wherein said optical sensor is positioned proximate to said tape as said tape exits said housing.

12. A method of monitoring the length of a tape in one of a fish tape device and a duct rodding device comprising:

passing the tape by an optical sensor mounted in the device; using digital image correlation to take successive images of said tape as said tape passes by said optical sensor; determining a length of tape that has passed by said optical sensor; and outputting a length measurement to a user.

13. The method of claim 12, wherein said step of passing the tape by the optical sensor is performed during paying out of the tape from the device.

14. The method of claim 12, wherein said step of passing the tape by the optical sensor is performed during retraction of the tape into the device.

15. The method of claim 12, wherein said step of outputting the length measurement is performed by displaying the information on a display provided on the device.

16. The method of claim 12, wherein said step of outputting a measurement of the length measurement is performed by displaying the information on a server which is remote to the device.

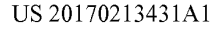
17. The method of claim 12, further comprising: paying out an amount of tape from the device to be at a location; and

zeroing the length measurement of the tape at said location.

18. The method of claim 12, wherein the length measurement is displayed in Metric or English units, and a user can toggle between said units.

19. The method of claim 12, further comprising: paying out an amount of tape from the device; and determining the amount of tape remaining in the device.

\* \* \* \* \*



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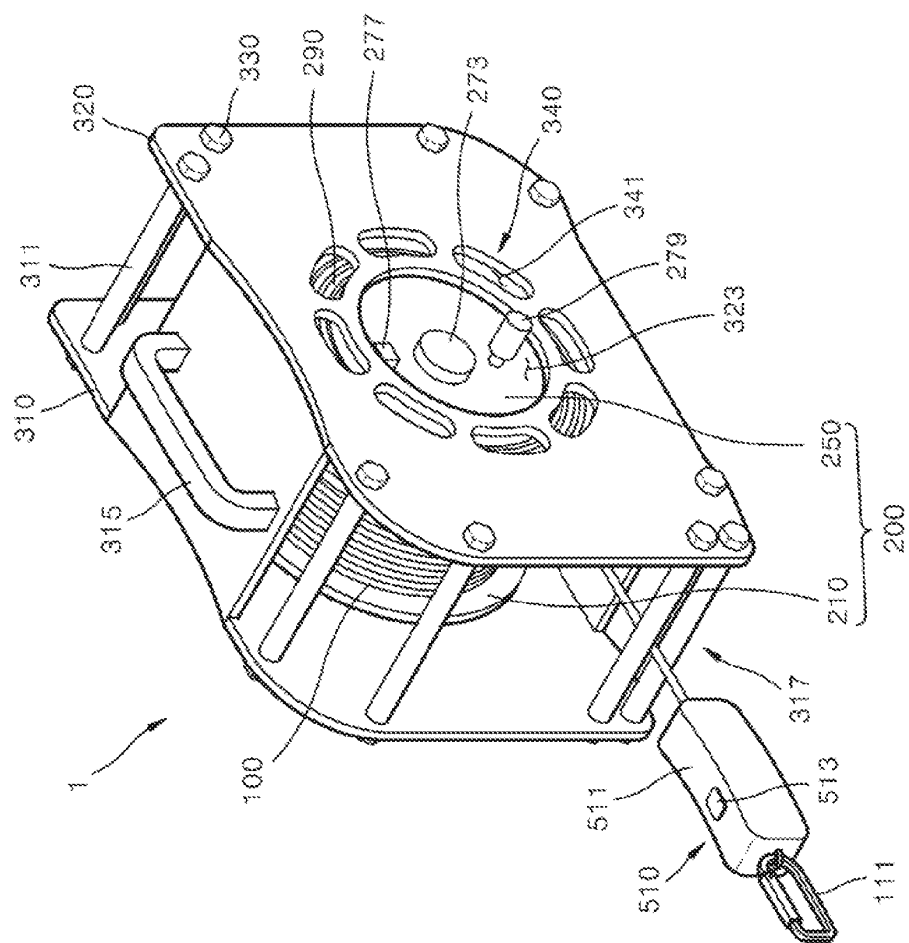


FIG. 1



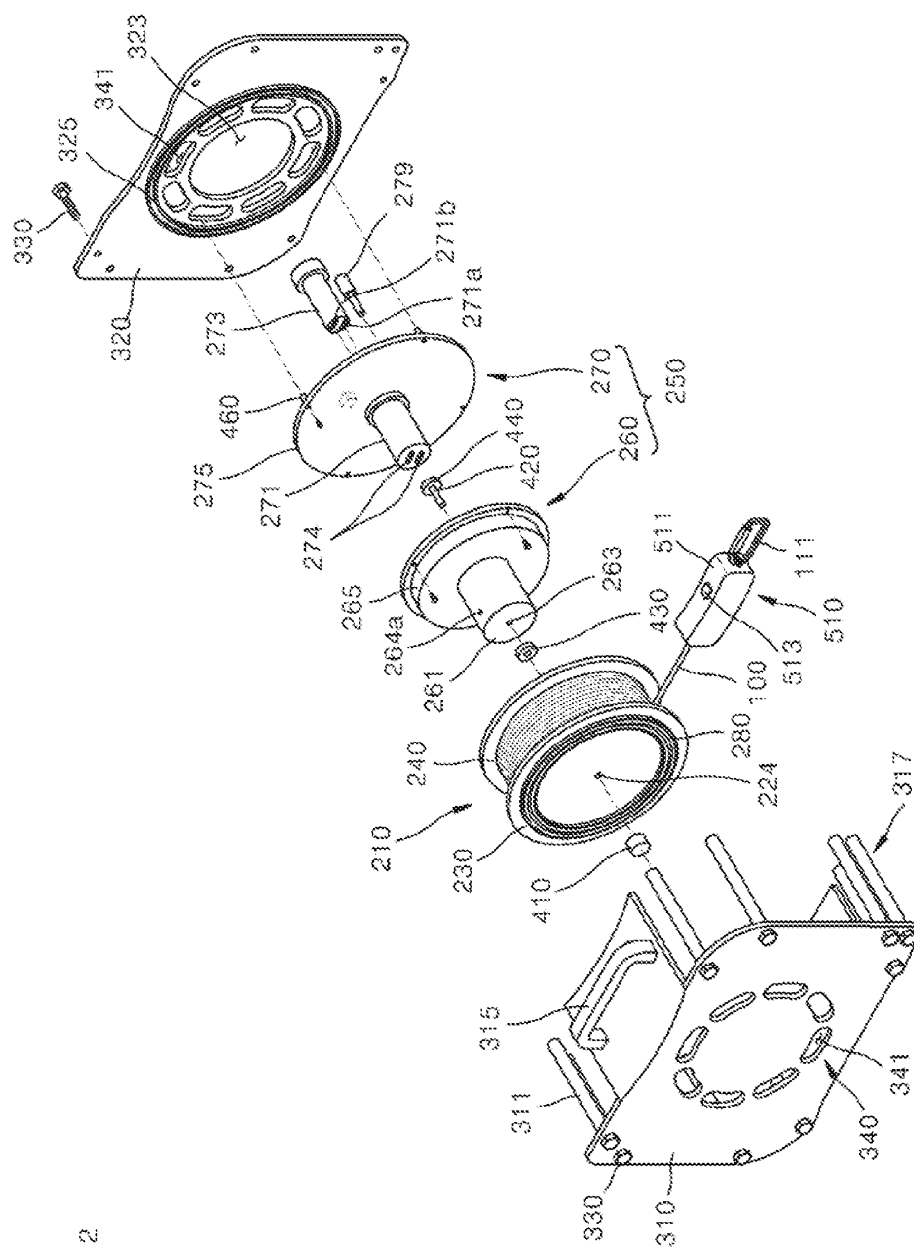


FIG. 2

FIG. 3

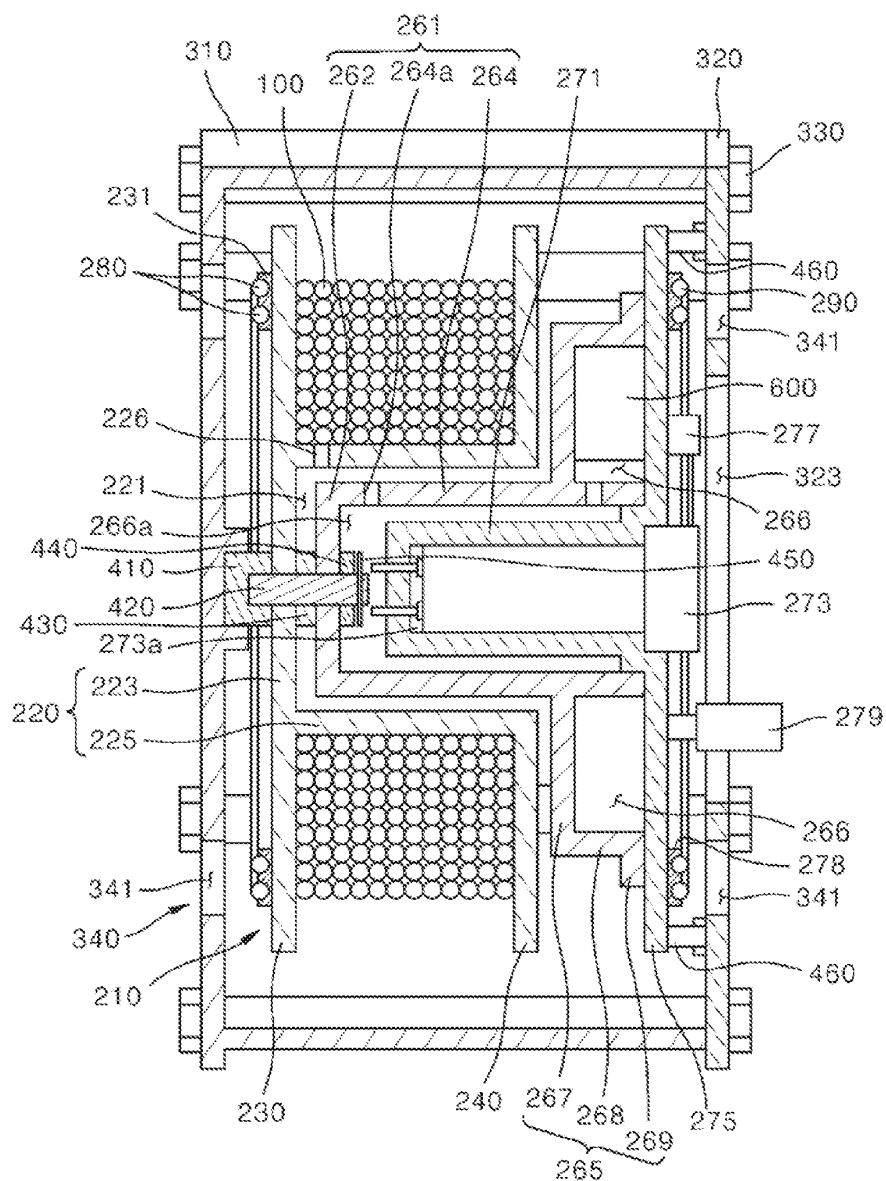


FIG. 4

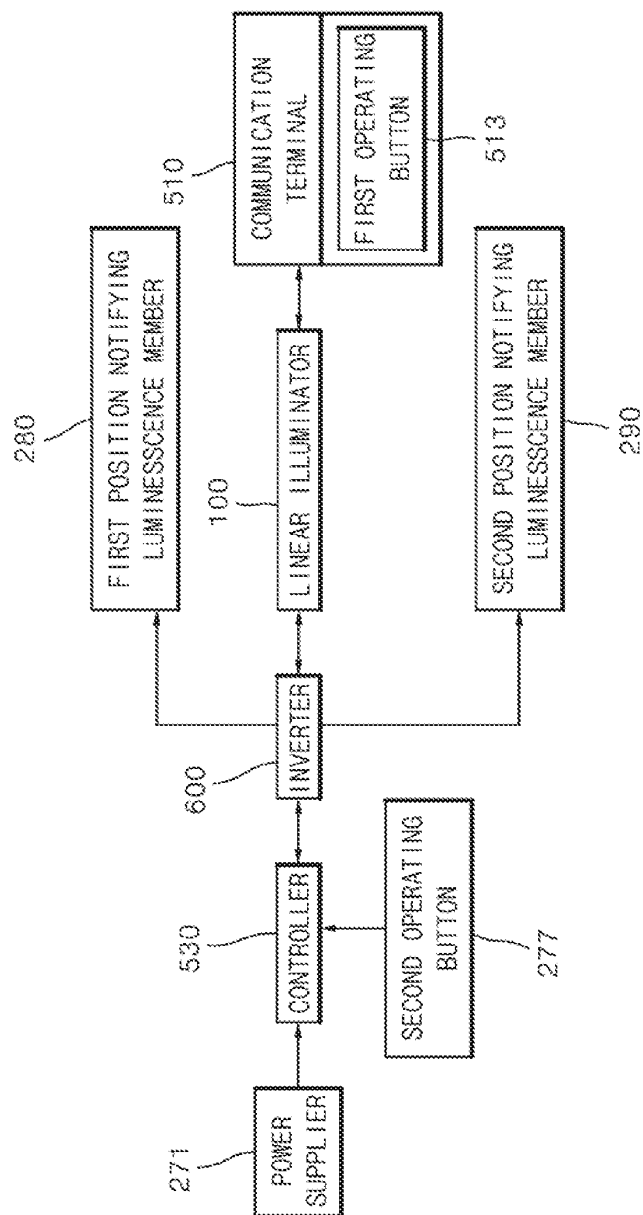


FIG. 5

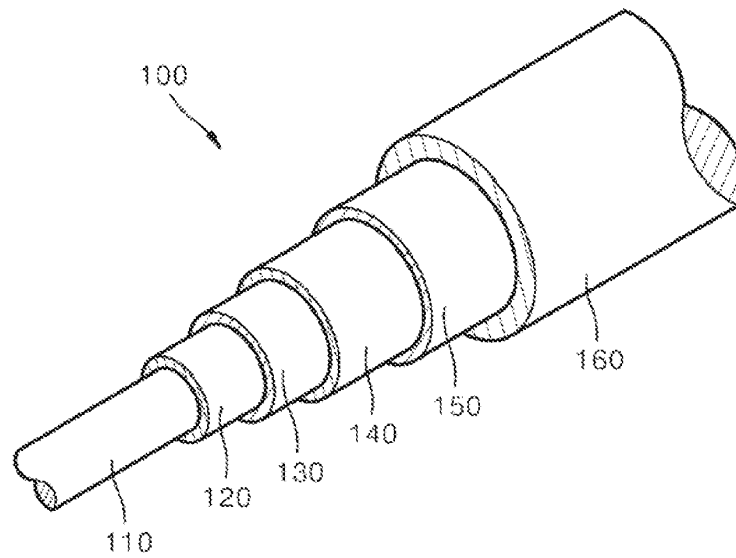
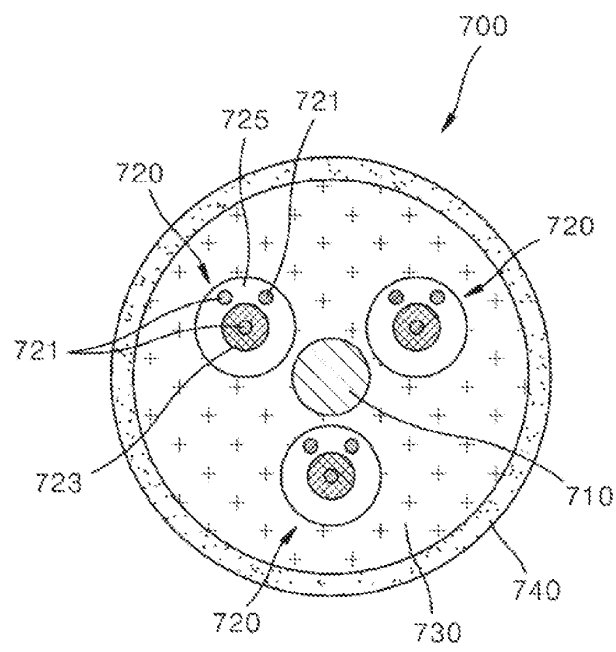
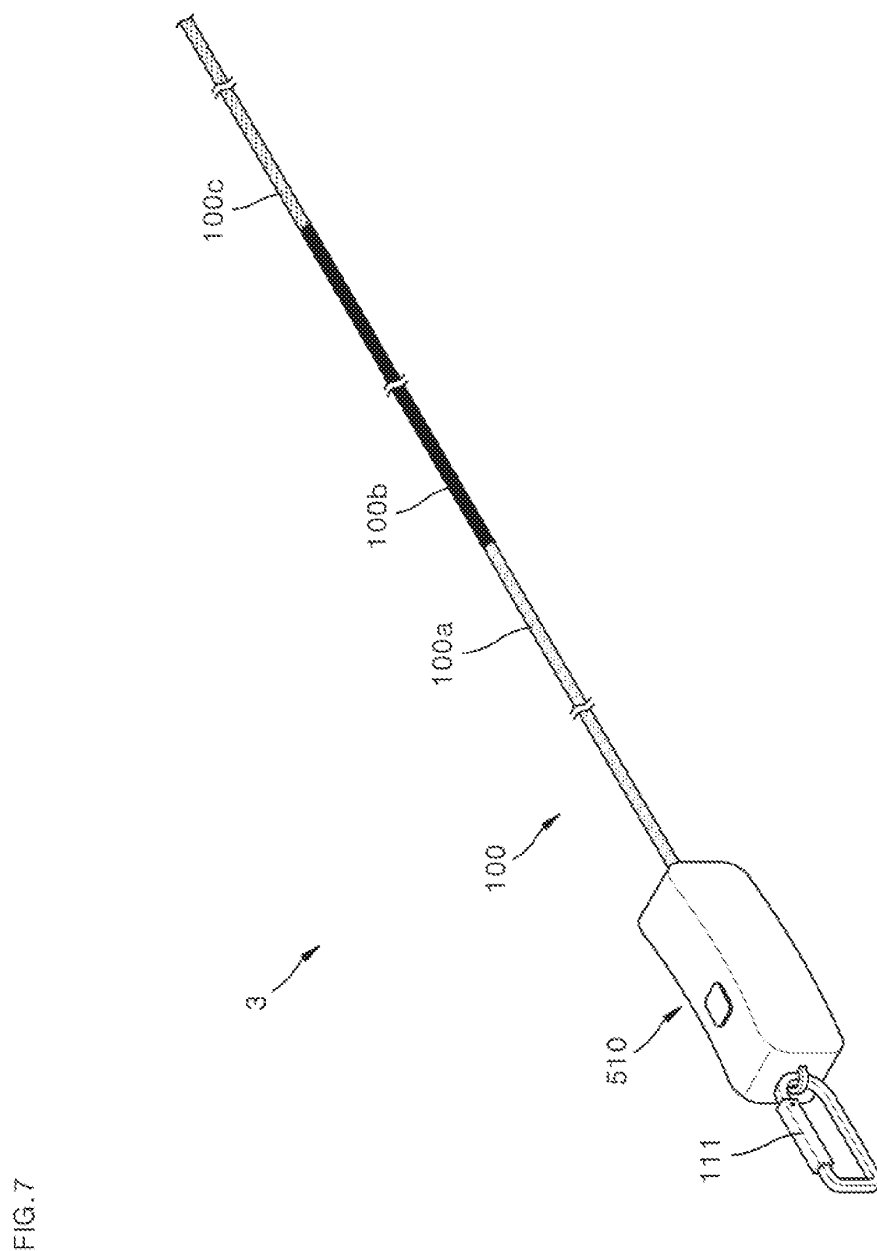
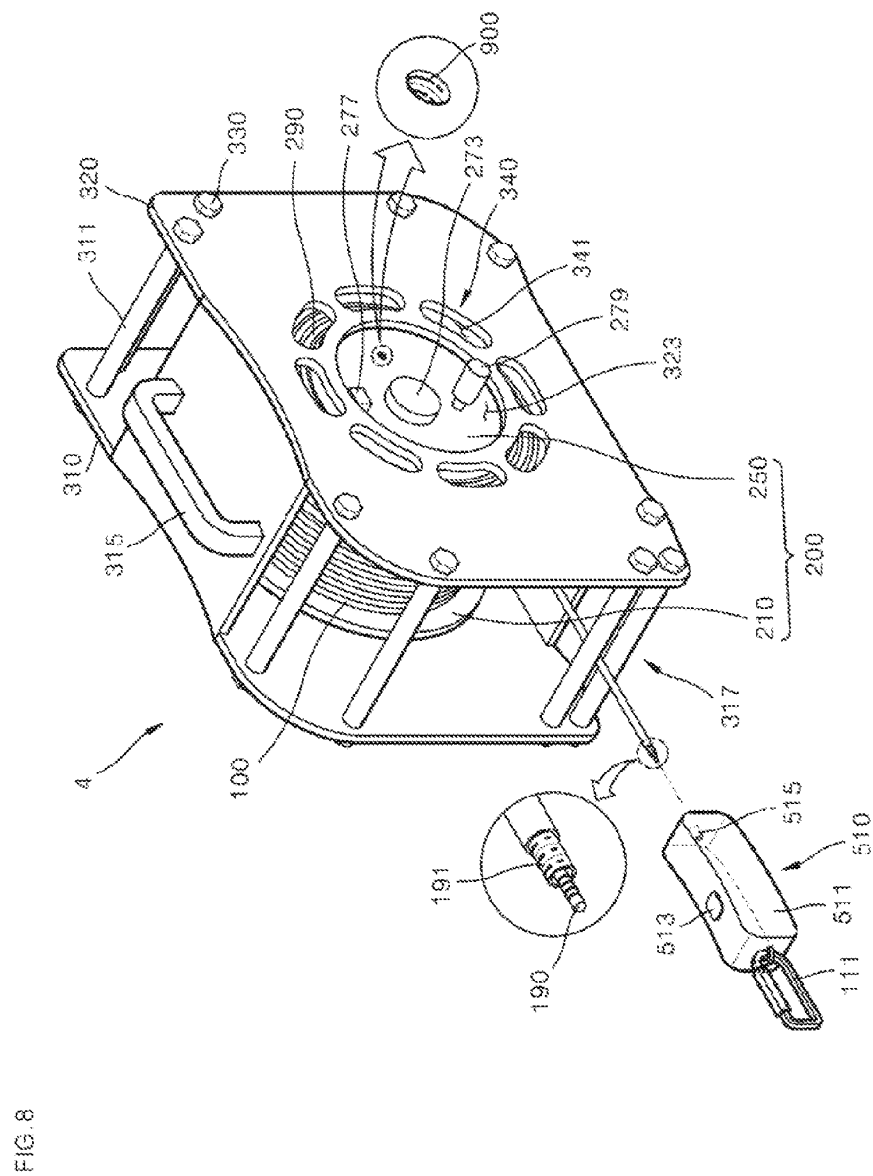
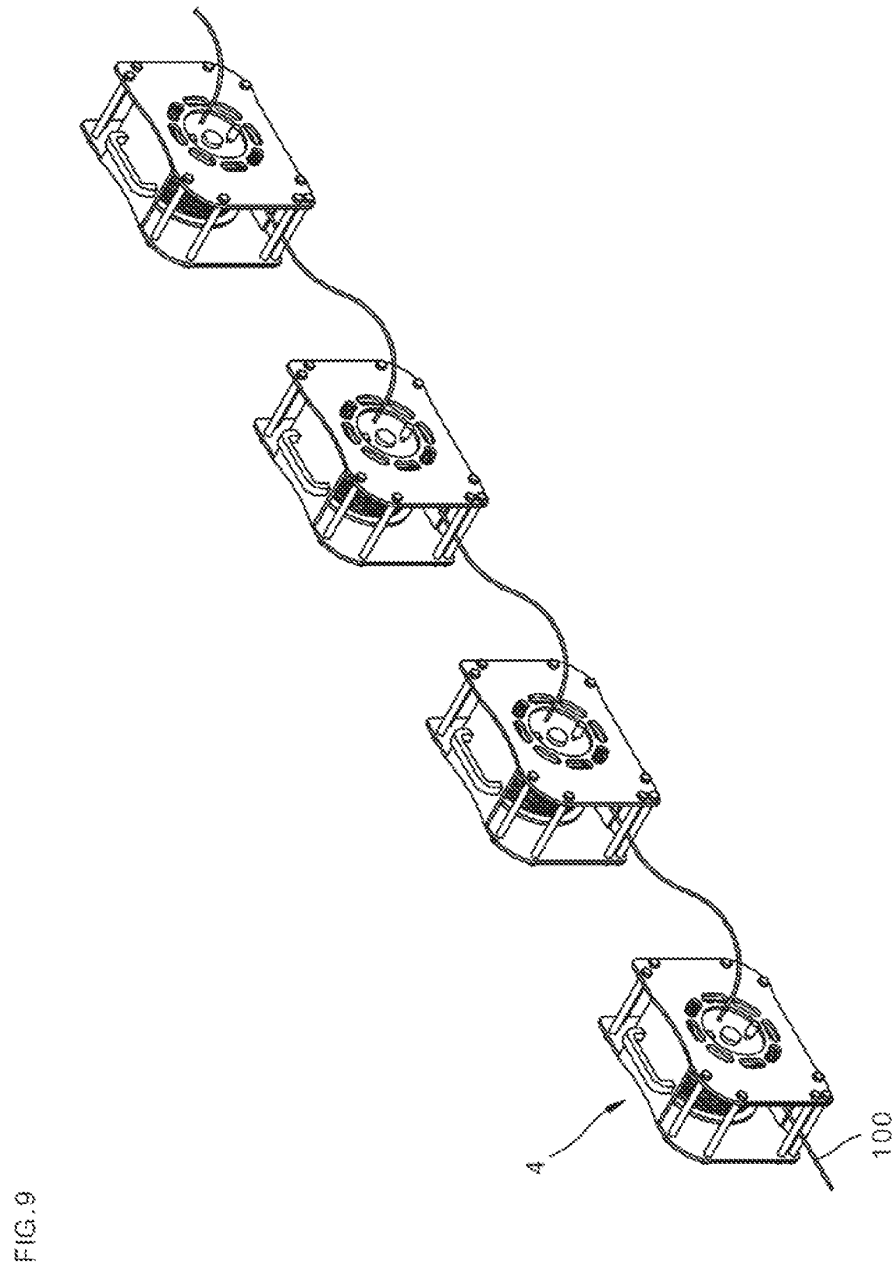


FIG. 6









## EVACUATION GUIDANCE DEVICE FOR RESCUE

### CROSS-REFERENCE TO RELATED APPLICATION

**[0001]** This application claims priority to and the benefit of Korean Patent Application No. 10-2016-0008899, filed on Jan. 25, 2016, the disclosure of which is incorporated herein by reference in its entirety.

### BACKGROUND

**[0002]** 1. Field of the Invention

**[0003]** The present disclosure relates to an evacuation guidance device for rescue, and more particularly, to an evacuation guidance device for rescue, which is capable of securing an evacuation route through a linear illuminator to guide an evacuee to a safety zone and bidirectionally communicating with a rescue agent to evaluate a rescue situation when an emergency situation occurs in a building due to fire, power failure, a gas leakage, and the like.

**[0004]** 2. Discussion of Related Art

**[0005]** An emergency guidance system, which is currently installed and operated in various buildings and facilities, is mostly an emergency guide light and an emergency guide sign. An object of the emergency guidance system is to provide a main function of securing an escape route, indicating an exit, and quickly and accurately promoting escape and evacuation of people, thereby minimizing the number of casualties when an emergency situation occurs.

**[0006]** However, the emergency guide light or the emergency guide sign indicates an escape direction by always displaying only a certain direction with an arrow, and it has no function capable of detecting the situation at the field and changing the display content according to the field situation. That is, when an emergency door is not available for a reason such as the emergency door being closed or presence of fire occurring around the emergency door, the emergency guide light or the emergency guide sign, which is fixedly installed at a building structure, may have a problem of causing more casualties due to there being no function to guide people to another safe emergency door or to secure an escape route according to the field situation.

**[0007]** To address such a problem, a portable linear emergency guidance device, which is capable of displaying an escape route for an evacuee through a linear illuminator and changing the escape route according to a field situation, is disclosed in Korean Registered Patent Publication No. 10-1016940.

**[0008]** However, the portable linear emergency guidance device has disadvantages in that it is difficult to determine how far a distance of an escape route guided by a linear illuminator and people to be rescued are from a safety zone, and to communicate with a rescue agent dispatched to rescue people as well as a commander or a control station at a safety zone.

### PRIOR ART DOCUMENT

#### Patent Document

**[0009]** 1. Korean Patent Application Publication No. 10-2013-0102970, entitled "Emergency flashlight provided with illuminating guidance string."

**[0010]** 2. Korean Utility Model Application Publication No. 20-2008-0002562, entitled "Intelligent emergency guidance line system."

### SUMMARY OF THE INVENTION

**[0011]** To address the above described problem, an object of the present disclosure is to provide an evacuation guidance device for rescue capable of easily determining a position of a bobbin around which a linear illuminator is wound and unwound, and determining an inducing distance of the linear illuminator being unwound by enabling the linear illuminator to emit a different color light at a regular interval.

**[0012]** Also, another object of the present disclosure is to provide an evacuation guidance device for rescue capable of enabling a bidirectional communication between a commander at a safety zone and a rescue agent, using a luminescence state of the linear illuminator.

**[0013]** To attain the above described objects, an evacuation guidance device for rescue, includes a bendable linear illuminator; a bobbin unit configured to wind and unwind the linear illuminator according to a rotational direction, including first and second position notifying luminescence members installed at an outer side of the bobbin unit and configured to emit light to enable position identification, and configured to supply power to the linear illuminator and the first and second position notifying luminescence members; and a case configured to rotatably accommodate the bobbin unit to enable the linear illuminator to be wound and unwound according to a rotational direction of the bobbin unit and at which a luminescence indicator is formed to enable verification of a luminescence state of each of the first and second position notifying luminescence members.

**[0014]** The linear illuminator may be provided with a color filter configured to change a color of light emitted from a light source at a regular interval to enable identification of length of the linear illuminator that is unwound from the bobbin unit.

**[0015]** The luminescence indicator may be provided with a plurality of luminescence verifying through holes which are formed at positions corresponding to the first and second position notifying luminescence members by passing through from an outer circumferential surface of the case to an inner circumferential surface thereof and are spaced apart from one another along an extending direction of each of the first and second position notifying luminescence members.

**[0016]** The bobbin unit may include an illuminator winding bobbin configured to wind or unwind the linear illuminator according to a rotational direction and including one side, which is adjacent to each of the luminescence verifying through holes formed at one side of the case, on which the first position notifying luminescence member is mounted; and a power supply bobbin mounted on the other side of the illuminator winding bobbin to be rotated by corresponding to a rotational direction and a rotational angle of the illuminator winding bobbin, including the second position notifying luminescence member mounted adjacent to each of the luminescence verifying through holes formed at the other side of the case, and configured to supply power to enable the linear illuminator and the first and second position notifying luminescence members to emit light.

**[0017]** The case may include a first cover member to which the illuminator winding bobbin is rotatably coupled and having each of the luminescence verifying through holes



formed at a position corresponding to the first position notifying luminescence member; and a second cover member coupled to the first cover member, rotatably coupled to the power supply bobbin that is coupled to the illuminator winding bobbin, and having the luminescence verifying through holes formed at a position corresponding to the second position notifying luminescence member.

**[0018]** The illuminator winding bobbin may include a winding unit formed to extend and enable the linear illuminator to be wound along an outer circumferential surface, configured to provide a first inner space that is open in a direction of the second cover member, and including one side rotatably coupled to the first cover member and the other side coupled to the power supply bobbin; a first flange formed to have an outer diameter greater than that of the winding unit at one end thereof adjacent to the first cover member, and including a surface facing the first cover member, at which the first position notifying luminescence member is installed; and a second flange formed to extend and have an outer diameter greater than that of the winding unit at the other end thereof.

**[0019]** The power supply bobbin may include an illuminator winding bobbin coupler including a winding unit accommodation part which is formed to be partially accommodated in the first inner space and includes one end fixedly coupled to the illuminator winding bobbin, and an inverter mounting part having an outer diameter larger than that of the winding unit accommodation part at the other end thereof, formed to extend in a direction of the second cover member, and including a second inner space formed inside the inverter mounting part to be open in the direction of the second cover member, thereby enabling an inverter, which is connected to the linear illuminator and the first and second position notifying luminescence member, to be mounted on the second inner space; and a second cover member coupler having one side fixedly coupled to the illuminator winding bobbin coupler and the other side rotatably coupled to the second cover member, configured to provide a power supplier supplying power to the inverter and a manipulation part connecting and disconnecting a supply of the power of the power supplier to the inverter to control the linear illuminator and the first and second position notifying luminescence members to emit light through the inverter and manipulating rotation of the illuminator winding bobbin, and including the second position notifying luminescence member installed at a surface facing the second cover member.

**[0020]** The second cover member may be provided with an opening formed to pass through and enable the power supplier and the manipulation part to be open, thereby facilitating user manipulation of the power supplier and the manipulation part which are mounted on the second cover member coupler.

**[0021]** The evacuation guidance device for rescue according to the present disclosure may further include a communication unit configured to enable communication between the end of one side of the linear illuminator, which is unwound from the bobbin unit, and the bobbin unit.

**[0022]** The linear illuminator may include a central strength member formed to extend and enable a winding and unwinding according to a rotational direction of the bobbin unit; a luminescence part extending along a length direction of the central strength member and provided at an outer side thereof; and a sheath part configured to cover an outer side

of each of the central strength member and the luminescence part, and the communication unit may include a communication terminal installed at the end of the one side of the linear illuminator being unwound from the bobbin unit and including a first operating button configured to generate a first electrical signal; a second operating button installed at the bobbin unit and configured to generate a second electrical signal; and a controller connected to each of the second operating button and the end of the other side of the linear illuminator, configured to control a supply of power to the bobbin unit according to an operation state of the second operating button, and configured to control power required for the luminescence state of the linear illuminator according to the first and second electrical signals through an electrical path via the luminescence part and the central strength member.

**[0023]** The central strength member may be preferably formed with any one of a two-fold yarn and a high carbon steel wire which are conductive and are able to increase tensile strength.

**[0024]** The linear illuminator may be provided with a terminal part provided at the end of the one side of the linear illuminator and configured to be detachable from the communication terminal and electrically connect thereto.

**[0025]** The power supply bobbin may be provided with a serial connector configured to accommodate the terminal part separated from the communication terminal and electrically connected to the terminal part.

**[0026]** In the evacuation guidance device for rescue according to the present disclosure, a position of the bobbin unit may be identified through the first and second position notifying luminescence members so that there is an advantage in which a position determination of the evacuee or the rescue agent is easy.

**[0027]** Also, the evacuation guidance device for rescue according to the present disclosure emits a different color of light at a regular interval through the color filter of the linear illuminator, and thus the evacuee or the rescue agent escapes by recognizing a distance of the escape route so that there is an advantage in which a frequency of safety accidents may be reduced.

**[0028]** Further, the evacuation guidance device for rescue according to the present disclosure is provided with a communication unit capable of transmitting intent using a luminescence state of a linear illuminator so that bidirectional communication between the rescue agent and the commander at the safety zone is possible.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0029]** The above and other objects, features and advantages of the present invention will become more apparent to those of ordinary skill in the art by describing in detail exemplary embodiments thereof with reference to the accompanying drawings, in which:

**[0030]** FIG. 1 is a perspective view of an evacuation guidance device for rescue according to a first embodiment of the present disclosure;

**[0031]** FIG. 2 is a partially exploded perspective view of the evacuation guidance device for rescue of FIG. 1;

**[0032]** FIG. 3 is a cross-sectional view of the evacuation guidance device for rescue of FIG. 1;

**[0033]** FIG. 4 is a block diagram of the evacuation guidance device for rescue of FIG. 1;

[0034] FIG. 5 is a perspective view of a partial cross-section of a linear illuminator of FIG. 1;

[0035] FIG. 6 is a cross-sectional view of a linear illuminator according to a second embodiment of the present disclosure;

[0036] FIG. 7 is a perspective view illustrating a part of a linear illuminator of an evacuation guidance device for rescue according to a third embodiment of the present disclosure;

[0037] FIG. 8 is a partially exploded perspective view of an evacuation guidance device for rescue according to a fourth embodiment of the present disclosure; and

[0038] FIG. 9 is a perspective view illustrating a state in which the evacuation guidance devices for rescue of FIG. 8 are connected in series.

#### DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0039] Hereinafter, an evacuation guidance device for rescue according to preferred embodiments of the present disclosure will be described in more detail with reference to the accompanying drawings.

[0040] An evacuation guidance device for rescue according to the present disclosure is used for indicating a route through which a rescue agent moves in a danger zone to rescue people in the danger zone and securing an escape route in advance when an emergency calamity such as fire or earthquake occurs.

[0041] An evacuation guidance device 1 for rescue according to a first embodiment of the present disclosure is configured with a linear illuminator 100, a bobbin unit 200, a case 300, a coupling unit 400, and a communication unit.

[0042] The linear illuminator 100 is configured with an electroluminescent (EL) wire that is bendable. A general EL wire refers to a super power-saving self-luminescence line having a continuous linear luminescence characteristic of a coaxial line structure in which an EL element, which is a luminescence semiconductor that emits light in an electric field method, is uniformly applied on a central copper wire, and an electric wire used as an electrode is provided outside of the applied EL element so that an electron is transferred according to phase change when an alternating current (AC) power is applied to the copper wire and the electric wire, and thus energy conversion occurs and light is emitted.

[0043] As shown in FIG. 5, the linear illuminator 100 may be an EL wire which is configured with a central electrode 110, a dielectric layer 120, a luminescence layer 130, a surface electrode 140, a color filter 150, and a sheath layer 160. The linear illuminator 100 has a structure in which an AC power is applied between the central electrode 110 and the surface electrode 140, electrons are transferred inside the luminescence layer 130 according to a phase change, light is emitted by collisions between the electrons and a fluorescent substance inside the luminescence layer 130 so that the luminescence layer 130 linearly emits light. The dielectric layer 120 serves to charge electrons therein according to the AC power supplied from the central electrode 110 and then discharge the charged electron to the luminescence layer 130. The color filter 150 is a part configured to convert light, which is emitted from the luminescence layer 130 serving as a light source, into a predetermined color of light. The color filter 150 may be set to one of various colors such as yellow, green, red, blue, and the like. The color filter 150 may be configured with a photopolymerization type photosensitive

composition and an organic pigment realizing a color. The linear illuminator 100 is connected to an inverter 600 which will be described below.

[0044] The central electrode 110 of the linear illuminator 100 acts as a minus electrode and the surface electrode 140 thereof acts a plus electrode, and they are used in the communication by the communication unit which will be described below.

[0045] Referring to FIGS. 1 and 2, the bobbin unit 200 is rotatably mounted inside the case 300 which will be described below. The bobbin unit 200 is a part configured to wind and unwind the linear illuminator 100 according to a rotational direction, at which first and second position notifying luminescence members 280 and 290 are installed at an outside to emit light to enable a position identification, and configured to supply power to the linear illuminator 100 and the first and second position notifying luminescence members 280 and 290.

[0046] The bobbin unit 200 is provided with an illuminator winding bobbin 210 and a power supply bobbin 250.

[0047] The illuminator winding bobbin 210 is rotatably coupled to a first cover member 310 of the case 300, which will be described below, through the coupling unit 400 to wind or unwind the linear illuminator 100 according to a rotational direction. Referring to FIG. 2, the illuminator winding bobbin 210 is configured with a winding unit 220, a first flange 230, and a second flange 240.

[0048] Referring to FIG. 3, the winding unit 220 is formed to extend to enable the linear illuminator 100 to be wound along an outer circumferential surface. Referring to FIG. 2, the winding unit 220 is formed to have a cylindrical shape, which is lying on its side, in which a first inner space 221, which is open in a direction of a second cover member 320 that will be described below, is provided. The winding unit 220 is provided with a first disc-shaped cover member coupler 223 rotatably coupled to the first cover member 310 that is formed at one side, and a winding main body 225 of a cylindrical shape at which the first inner space 221 is formed at an edge of the first cover member coupler 223 by extending in a direction of the second cover member 320, which will be described below, and on which the linear illuminator 100 is wound on an outer circumferential surface.

[0049] One lateral surface of the first cover member coupler 223 is rotatably coupled to the first cover member 310, and the other lateral surface thereof, which is formed in the first inner space 221, is coupled to the power supply bobbin 250. A first fixing through hole 224 is formed in a quadrangular shape at the center of the first cover member coupler 223 and passes through in a direction from the second cover member 320 to the first cover member 310. The first fixing through hole 224 is a part which is formed to pass through by corresponding to a cross-section shape of a fixing member 420 of the coupling unit 400, which will be described below, and on which the fixing member 420 passes through to be fixedly mounted. A detailed structure of each of the coupling unit 400 and the fixing member 420 will be described below. A first inverter connecting hole 226 is formed at one side of the winding main body 225 to enable the linear illuminator 100 to be connected to the inverter 600 which will be described below.

[0050] The first flange 230 is formed to have an outer diameter greater than that of the winding unit 220 at one end thereof adjacent to the first cover member 310 of the case

**300**, which will be described below, parallel with the first cover member **310**. That is, the first flange **230** is a part which is formed to extend away from the first fixing through hole **224** along an edge of the first cover member coupler **223**. A first position notifying luminescence member **280** is installed on a surface of the first flange **230** facing the first cover member **310** in a circumferential direction of the first flange **230**. The EL wire applied to the linear illuminator **100** is applied to the first position notifying luminescence member **280**, and the first position notifying luminescence member **280** is connected to the inverter **600** mounted on the power supply bobbin **250** which will be described below. A first luminescence member seating depression **231**, on which the first position notifying luminescence member **280** is seated, is formed at the first flange **230** along a circumferential direction thereof. The first position notifying luminescence member **280** emits light to the outside and serves to facilitate position identification of each of the bobbin unit **200** and the case **300**, or a user possessing the evacuation guidance device **1** for rescue.

[0051] The second flange **240** is a part which is formed to extend from the other end of the winding unit **220** in a direction parallel to the first flange **230** and thus have an outer diameter greater than that of the winding main body **225**. The first flange **230** and the second flange **240** serve to support the linear illuminator **100** being wound and stacked on the winding unit **220** so that illuminator **100** does not leave from the winding unit **220** to an outward side.

[0052] Referring to FIGS. 1 and 2, one side of the power supply bobbin **250** is fixedly coupled to the other lateral surface of the first cover member coupler **223** so as to rotate corresponding to a rotational direction and a rotational angle of the illuminator winding bobbin **210**, and the other side of the power supply bobbin **250** is rotatably coupled to the second cover member **320**. The power supply bobbin **250** supplies power to the linear illuminator **100**, the first position notifying luminescence member **280**, and a second position notifying luminescence member **290**, which will be described below, to enable them to emit light. The power supply bobbin **250** is configured with an illuminator winding bobbin coupler **260**, a second cover member coupler **270**, and the inverter **600**.

[0053] The illuminator winding bobbin coupler **260** is provided with a winding unit accommodation part **261** and an inverter mounting part **265**.

[0054] The winding unit accommodation part **261** is a part which is formed to be partially accommodated in the first inner space **221**, and one end is fixedly coupled to the illuminator winding bobbin **210** through the fixing member **420**. A third inner space **266a** is formed to be open in a direction of the second cover member **320** inside the winding unit accommodation part **261** and communicates with a second inner space **266** of the inverter mounting part **265** which will be described below.

[0055] The winding unit accommodation part **261** is configured with a fixing member coupler **262** and an accommodation part main body **264**. The fixing member coupler **262** is formed to be less than the inner diameter of the winding unit **220** and to extend in a direction parallel to the first cover member coupler **223**, and a second fixing through hole **263**, through which the fixing member **420** passes through to be coupled, is formed at a portion corresponding to the first fixing through hole **224**. The accommodation part main body **264** is formed to extend in a direction of the

second cover member **320** along an edge of the fixing member coupler **262**, and the third inner space **266a** is formed at the accommodation part main body **264**. A second inverter connecting hole **264a** is formed to pass through at one side of the accommodation part main body **264** to enable the inverter **600** to be connected to the first and second position notifying illuminator members **280** and **290** and the linear illuminator **100**.

[0056] The inverter mounting part **265** is configured with a third flange **267** which is formed to extend from the other end of the winding unit accommodation part **261**, that is, an end of the accommodation part main body **264** in a direction perpendicular to an outer circumferential surface of the accommodation part main body **264** and thus have an outer diameter larger than that of the accommodation part main body **264**, a flange extending part **268** which is formed to extend in a direction of the second cover member **320** along an edge of the third flange **267** to provide the second inner space **266** inside the flange extending part **268**, and a fourth flange **269** which is formed to extend in a direction perpendicular to an outer circumferential surface of the flange extending part **268** along an edge of the flange extending part **268** and thus have an outer diameter expanded than that of the flange extending part **268**. That is, the inverter mounting part **265** is formed to have the second inner space **266** communicate with the third inner space **266a**, and open the second inner space **266** to be open in the direction of the second cover member **320**. The inverter **600** is mounted on one side of the second inner space **266** to be connected to the linear illuminator **100** and the first and second position notifying illuminator members **280** and **290**.

[0057] One side of the second cover member coupler **270** is bolt coupled to the fourth flange **269** of the illuminator winding bobbin coupler **260**, and the other side thereof is rotatably coupled to the second cover member **320** through a second bearing **460**. The second cover member coupler **270** is provided with a power supplier **273** configured to supply power to the inverter **600** and a manipulator **276** configured to control luminescence operations of the linear illuminator **100** and the first and second position notifying illuminator members **280** and **290** through the inverter **600** by connecting and disconnecting the power supplier **273** to the inverter **600** and manipulate rotation of the illuminator winding bobbin **210**.

[0058] The second cover member coupler **270** is configured with a power supplier mounting part **271** and a manipulator mounting part **275**.

[0059] Referring to FIGS. 2 and 3, the power supplier mounting part **271** is formed to be partially accommodated in the third inner space **266a**, and a battery mounting space **273a** is formed to be open in a direction of the second cover member **320** of the case **300**, which will be described below, at the power supplier mounting part **271** to enable a battery, that is, the power supplier **273** to be mounted in the battery mounting space **273a**. The power supplier mounting part **271** is connected to power supply terminals **271a** and **272b** which are mounted at the end of one lateral side adjacent to the first cover member **310** of the case **300** and installed at one end of the battery and is configured with a terminal unit **274** connected to the inverter **600**.

[0060] The manipulator mounting part **275** is formed to expand to be greater than the outer diameter of the power supplier mounting part **271** along an edge of the end of the other side of the power supplier mounting part **271**, and a

central part is formed to pass through at the manipulator mounting part 275 to open the battery mounting space 273a. Also, one lateral surface of the manipulator mounting part 275 is bolt coupled to the fourth flange 269, and the other lateral surface thereof is rotatably coupled to the second cover member 320 through a rotational guide member 460. The rotational guide member 460 is installed at a regular interval along a circumferential direction of the manipulator mounting part 275.

[0061] The second position notifying luminescence member 290 is installed at the other lateral surface of the manipulator mounting part 275, which faces the second cover member 320. The second position notifying luminescence member 290 is installed at a position corresponding to the first position notifying luminescence member 280 to be connected to the inverter 600, and the EL wire is applied to the second position notifying luminescence member 290 like the first position notifying luminescence member 280.

[0062] A second luminescence member seating depression 278, on which the second position notifying luminescence member 290 is seated, is formed at the other lateral surface of the manipulator mounting part 275 along a circumferential direction thereof.

[0063] The manipulator 276 mounted on the manipulator mounting part 275 is configured with a second operating button 277 connected to the power supplier 273 through a controller 530 and configured to supply power to the inverter 600 and block supplying of the power thereto, and a handle 279 configured to determine rotational movement and a rotational direction of the bobbin unit 200. The handle 279 is formed to extend in a direction from the first cover member 310 to the second cover member 320, one end of the handle 279 passes through the manipulator mounting part 275 to be coupled to the illuminator winding bobbin coupler 260, and the other end of the handle 279 is formed to protrude from the other lateral surface of the manipulator mounting part 275.

[0064] Referring to FIGS. 1 and 2, the bobbin unit 200 is rotatably accommodated inside the case 300 to enable the linear illuminator 100 to be wound or unwound according to the rotational direction of the bobbin unit 200.

[0065] The case 300 is configured with the first cover member 310, the second cover member 320, and a plurality of cover member coupling bolts 330. Also, luminescence indicators 340 are formed at the case 300 to verify a luminescence state of each of the first and second position notifying luminescence members 280 and 290.

[0066] The first cover member 310 is formed to have a plate shape, and the luminescence indicator 340 is formed at a position corresponding to the first position notifying luminescence member 280. A first bearing 410 of the coupling unit 400 is mounted on an inner surface of the first cover member 310, which faces the illuminator winding bobbin 210, to enable the illuminator winding bobbin 210 to be rotatably coupled to the first cover member 310. At this point, the first bearing 410 is mounted on the first cover member 310 to enable a central axis to be located at a position corresponding to the first fixing through hole 224 formed at the illuminator winding bobbin 210. Referring to FIGS. 1 and 2, the first cover member 310 is spaced apart from and coupled to the second cover member 320, which will be described below, through one side of a coupling bar 311 that is formed to extend to a predetermined distance and the cover member coupling bolt 330. A grip part 315 is

formed to extend in a direction of the second cover member 320 spaced apart from the first cover member 310 at an upper part thereof and enable a user to grip the grip part 315. Also, a portion of a lower end of the first cover member 310, which corresponds to the bobbin unit 200, is formed to extend in the direction of the second cover member 320.

[0067] The second cover member 320 is coupled to the other end of the coupling bar 311 in a plate shape that is formed to correspond to the first cover member 310, and the luminescence indicator 340 is formed at a position corresponding to the second position notifying luminescence member 290. Also, the second cover member 320 is coupled to a rotation inducing member 460 to enable the power supply bobbin 250 coupled to the illuminator winding bobbin 210 to be rotated.

[0068] The second cover member 320 accommodates the rotation inducing member 460 that is fixedly mounted on the manipulator mounting part 275, and is provided with a rotation guide depression 325 configured to guide the rotation inducing member 460 to be moved in a circumferential direction. The rotation guide depression 325 is formed along a circumferential direction of the manipulator mounting part 275. It may be preferable to form the rotation guide depression 325 to correspond to a diameter that is formed by a plurality of rotation inducing members 460, each of which is spaced apart from one another in the circumferential direction.

[0069] An opening 323 is formed to pass through at the second cover member 320 to open the power supplier 273 and the manipulator 276, which are mounted on the second cover member coupler 270, thereby facilitating user operation of the power supplier 273 and the manipulator 276. Referring to FIGS. 1 and 2, the opening 323 is formed to be located at an inner side, of the second cover member 320, more than the luminescence indicator 340.

[0070] A plurality of coupling bars 311 are mounted, spaced apart from one another at a regular interval, along the edge of each of the first and second cover members 310 and 320, to enable the bobbin unit 200 to be located at an inner side of the plurality of coupling bars 311. A guide part 317 configured to guide forward and backward movement of the linear illuminator 100 is formed at one side of the case 300 by arranging and mounting the plurality of coupling bars 311 on the first and second cover members 310 and 320 to enable the linear illuminator 100 to be moved out.

[0071] The luminescence indicators 340 are respectively formed at positions corresponding to the first and second position notifying luminescence members 280 and 290 mounted on the bobbin unit 200 to enable verification of luminescence state of the first and second position notifying luminescence members 280 and 290 from the outside. The luminescence indicators 340 are provided with a plurality of luminescence verifying through holes 341, each of which is formed by passing through from the outer circumferential surface of each of the first and second cover members 310 and 320 to an inner circumferential surface of each thereof. The plurality of luminescence verifying through holes 341 are respectively formed to pass through in a long hole along an extending direction of each of the first and second position notifying luminescence members 280 and 290, and spaced apart from one another at a predetermined interval along the extending direction.

[0072] The shape and a mounting position of the grip part 315 are not limited to FIGS. 1 and 2 as long as the

evacuation guidance device **1** for rescue can be gripped or carried. Also, a shoulder strap (not shown) for sling on his or her shoulder may be applied to the evacuation guidance device **1** capable of performing bidirectional communication.

[0073] The case **300** according to one embodiment of the present disclosure is configured with a structure having one side at which the linear illuminator **100** is moved out and the other side open, and alternatively, it may be formed to open only one side or only the guide part **317**.

[0074] The coupling unit **400** is configured with the first bearing **410** coupled to the first cover member **310**, the fixing member **420** configured to pass through the first fixing through hole **224** of the illuminator winding bobbin **210** and the second fixing through hole **263** of the winding unit accommodation part **261** and including one side fixedly installed at the first bearing **410**, a first escape preventing ring **430** located between the first cover member coupler **223** and the fixing member coupler **262** and through which the fixing member **420** passes, a second escape preventing ring **440** configured to come into contact with a surface facing the power supplier mounting part **271** of the fixing member coupler **262** and through which the fixing member **420** passes, and a safety pin **450** configured to pass through the fixing member **420** in a direction perpendicular to a length direction of the fixing member **420** at the end of the other side thereof to prevent the second escape preventing ring **440** from escaping.

[0075] The fixing member **420** is formed as a square column, and the first fixing through hole **224** and the second fixing through hole **263** are formed to pass through, corresponding to the cross-section shape of the fixing member **420**. Therefore, when the illuminator winding bobbin **210** and the power supply bobbin **250** are rotated in one direction, the fixing member **420** is also rotated in the one direction and serves to support the illuminator winding bobbin **210** and the power supply bobbin **250** to maintain the same rotation angle of each of the illuminator winding bobbin **210** and the power supply bobbin **250**. The first escape preventing ring **430** serves to prevent the illuminator winding bobbin **210** from escaping from the fixing member **420** and eliminate a gap between the illuminator winding bobbin **210** and the power supply bobbin **250** to assist in stable rotation movement. The second escape preventing ring **440** prevents the illuminator winding bobbin coupler **260** from escaping from the fixing member **420**, and the second escape preventing ring **440** is prevented from escaping by the safety pin **450**. The safety pin **450** may be preferably made of metal, aluminum, copper, and the like to be bendable and not to be restored without an external force.

[0076] The communication unit enables bidirectional communication between the end of one side of the linear illuminator **100**, which is unwound from the bobbin unit **200**, and the bobbin unit **200**, and is configured with a communication terminal **510**, a second operating button **277**, and the controller **530**.

[0077] The communication terminal **510** is installed at the end of one side of the linear illuminator **100** unwound from the bobbin unit **200**.

[0078] The communication terminal **510** is formed to be gripped, one side of the communication terminal **510** is connected to the end of one side of the linear illuminator **100**, and the other side thereof includes a terminal main body **511** at which a ring part **111** is formed and a first

operating button **513** mounted on the terminal main body **511** and configured to generate a first electrical signal by a manipulation of a field command post located at the safety zone or a commander.

[0079] The second operating button **277** is connected to the end of the other side of the linear illuminator **100** through the controller **530** and the inverter **600** as the manipulator **276**, is electrically connected to the communication terminal **510**, and generates a second electrical signal according to a manipulation of a user.

[0080] The controller **530** is installed at the power supply bobbin **250**, is connected to the second operating button **277** and the end of the other side of the linear illuminator **100**, controls supplying of power to the communication terminal **510** through the linear illuminator **100** according to an operating state of each of the first operating button **513** and the second operating button **277**, and receives the first electrical signal or controls transmission of the second electrical signal to the communication terminal **510**.

[0081] Also, the controller **530** is connected to the battery **273** and the inverter **600** to control power applied from the battery **273** and supplies the power to the linear illuminator **100** and the first and second position notifying luminescence member **280** and **290** through the inverter **600**.

[0082] Here, operation of the evacuation guidance device **1** for rescue according to one embodiment of the present disclosure, which has a configuration as described above, will be described.

[0083] When a rescue agent enters a danger zone, the evacuation guidance device **1** for rescue may secure an escape route for evacuees in advance for the evacuees to escape from the danger zone to a safety zone, when an emergency calamity occurs.

[0084] The rescue agent entering the danger zone from the safety zone grips or carries the evacuation guidance device **1** and manipulates the second operating button **277** to emit light from the linear illuminator **100** and the first and second position notifying luminescence members **280** and **290**. A luminescence state of each of the first and second position notifying luminescence members **280** and **290** may be verified through the luminescence verifying through holes **341** of the luminescence indicators **340**.

[0085] In a state in which the battery **273** is mounted on the power supplier mounting part **271**, the rescue agent or a user manipulates the second operating button **277** to supply power required for operating the inverter **600** and emitting light from the linear illuminator **100** and the first and second position notifying luminescence members **280** and **290** through the controller **530**. The inverter **600** serves to receive a direct current (DC) power applied from the battery **273** through the controller **530** and convert the DC power into AC power suitable for the linear illuminator **100**. The power converted into AC through the inverter **600** is supplied to the first and second position notifying luminescence members **280** and **290** and the linear illuminator **100**.

[0086] Further, after the ring part **111** installed at the end of the communication terminal **510** is hooked and fixed at a portion of a surrounding structure in the safety zone, the linear illuminator **100** is unwound from the illuminator winding bobbin **210** as the rescue agent enters the danger zone, and the handle **279** is rotated in a circumferential direction to move the linear illuminator **100** out through the guide part **317**.

[0087] When the handle 279 is rotated in a clockwise direction based on the outer circumferential surface of the second cover member 320 to unwind the linear illuminator 100 from the bobbin unit 200, the rotation inducing member 460 is rotated in a circumferential direction along the rotation guide depression 325, and the power supply bobbin 250, on which the handle 279 is mounted, is rotated in the clockwise direction. As the illuminator winding bobbin 210, which is coupled to the power supply bobbin 250 through the fixing member 420, is rotated in the clockwise direction, the same as the rotational direction of the power supply bobbin 250, the linear illuminator 100 is unwound.

[0088] The escape route may be secured by the linear illuminator 100 that is unwound according to an entering route of the rescue agent, and, even when field of view is narrowed with fire or other dust, the escape route may be discriminated by luminescence of the linear illuminator 100. Also, the evacuee may easily determine a position of the rescue agent by luminescence of the first and second position notifying luminescence members 280 and 290, so that there is an advantage in which the evacuee may efficiently receive guidance of the rescue agent. Further, when returning to the safety zone, the rescue agent rotates the handle 279 in a counterclockwise direction based on the outer circumferential surface of the second cover member 320 to wind the linear illuminator 100 on the bobbin unit 200.

[0089] Further, the evacuation guidance device 1 for rescue according to a first embodiment of the present disclosure may transmit the first and second electrical signals to the communication terminal 510 installed at the end of one side of the linear illuminator 100 and the second operating button 277 installed at the bobbin unit 200 through the linear illuminator 100.

[0090] For example, when the first or second operating button 513 or 277 is pressed over a predetermined time, power of the communication terminal 510 and the power supply bobbin 250 may be turned on or turned off from an ON state.

[0091] Luminescence state of the linear illuminator 100 may be controlled through the controller 530 according to a pressed state or the number of times each of the first operating button 513 and the second operating button 277 is pressed. That is, according to a manipulation of each of the first and second operating buttons 513 and 277, the controller 530 may set the linear illuminator 100 to a first luminescence state in which the linear illuminator 100 continuously emits light, to a second luminescence state in which the linear illuminator 100 emits light for a long period and then flickers, to a third luminescence state in which the linear illuminator 100 emits light for a short period and then flickers, and to a fourth luminescence state in which the linear illuminator 100 alternately emits light for the long and short periods.

[0092] According to a signal agreed between the rescue agent and the field command post, when the second operating button 277 is pressed one more time for a short period while in an ON state of the power supply bobbin 250 in which the linear illuminator 100 emits light, the evacuation guidance device 1 for rescue may control the linear illuminator 100 to emit light in the fourth luminescence state, thereby indicating a state in which a rescue is currently normally being performed. Also, when the second operating button 277 is pressed two more times, the evacuation guidance device 1 for rescue, which is capable of performing

bidirectional communication, may control the linear illuminator 100 to emit light in the third luminescence state, thereby transmitting a current emergency rescue request, an alarm state, or the like to the field command post or the commander.

[0093] That is, the evacuation guidance device 1 for rescue may transmit a threat situation of the rescue agent or the evacuee to the field command post or the commander at the outside and may achieve the purpose of effectively integrating the power of all rescue agents, the commander, and units in an on-site command procedure.

[0094] The evacuation guidance device 1 for rescue according to a first embodiment of the present disclosure may enable a position of the bobbin unit 200 to be identified through the first and second position notifying luminescence members 280 and 290, so that there is an advantage in which a position of the evacuee or the rescue agent may be easily determined.

[0095] Also, the evacuation guidance device 1 for rescue according to the present disclosure is provided with a communication line that is configured with the communication terminal 510, the linear illuminator 100, and the second operating button 277, and thus a simple communication between the rescue agent and the commander is possible, so that there is an advantage in which a rescue situation may be easily determined.

[0096] Meanwhile, a cross-sectional view of a linear illuminator 700 of an evacuation guidance device for rescue according to a second embodiment of the present disclosure is shown in FIG. 6. The same reference numeral is given to a component having the same function shown in the above described drawings.

[0097] As shown in FIG. 6, the linear illuminator 700 may be configured with a plurality of EL wires.

[0098] The linear illuminator 700 is configured with a linear central strength member 710 formed to extend to wind and unwind according to a rotational direction of the illuminator winding bobbin 210, which will be described below, and located at a central line, a luminescence part 720 configured to extend along a length direction of the central strength member 710 and provided at an outer side thereof, and sheath parts 730 and 740 configured to cover an outer side of each of the central strength member 710 and the luminescence part 720.

[0099] The central strength member 710 may be configured with any one of a two-fold yarn and a high carbon steel wire which are conductive and capable of increasing tensile strength.

[0100] As shown in FIG. 6, the luminescence part 720 is configured with an EL wire 721 configured to extend along the length direction of the central strength member 710, a fluorescent material 723 configured to surround an outer side of the EL wire 721, and a Teflon sheath layer 725 configured to surround the outer side of the fluorescent material 723.

[0101] As shown in FIG. 6, an EL wire may be additionally applied inside the sheath layer 725.

[0102] The central strength member 710 of the linear illuminator 700 acts as a minus electrode and the EL wire 721 acts as a plus electrode, and thus they are used in communication between the communication terminal 510 and the second operating button 277.

[0103] The sheath parts 730 and 740 are configured with a first sheath layer 730 for surrounding the central strength

member **710** and the luminescence part **720**, and a second sheath layer **740** for surrounding the first sheath layer **730**.

**[0104]** The EL wire **721** may have a structure of the EL wire according to the first embodiment of the present disclosure, and, although not shown in the drawing, it may have a structure formed with a core wire located at a central portion, a fluorescent material configured to surround the core wire, and a coating layer configured to surround the fluorescent material and including a radial wire. At this point, although not shown in the drawing, the sheath parts **730** and **740** may further include a color filter configured to convert light emitted from the EL wire **721** into a predetermined color. The color filter may be set to one color among various colors including yellow, green, red, blue, and the like. Also, any one layer of the first and second sheath layers **730** and **740** may be substituted with a color filter to be applied to the sheath parts **730** and **740**.

**[0105]** A controller **530** according to the second embodiment of the present disclosure controls supplying of power to the bobbin unit **200** according to an operation state of the second operating button **277** and controls power required for a luminescence state of the linear illuminator **700** according to first and second electrical signals through an electrical path via the luminescence part **720** and the central strength member **710**.

**[0106]** The evacuation guidance device for rescue according to the second embodiment of the present disclosure is provided with a plurality of EL wires, so that there is an advantage in which verification of luminescence of the linear illuminator **700** is easily determined even when an escape route is long.

**[0107]** Meanwhile, a perspective view of a part of linear illuminator **100** of an evacuation guidance device **3** for rescue according to a third embodiment of the present disclosure is shown in FIG. 7.

**[0108]** A color filter **150** according to the third embodiment of the present disclosure is configured to change color at a regular interval for determining length of the linear illuminator **100** that is unwound from the bobbin unit **200**. That is, the color filter **150** is configured with a different color at a regular interval.

**[0109]** Referring to FIG. 7, an example in which a filter color of the color filter **150** is configured with colors in the order of blue, red, and orange at an interval of 10 meters will be described. Light emitted from a luminescence layer **130** passes through the color filter **150** to be converted into a blue color light **100a**, a red color light **100b**, and an orange color light **100c** at an interval of 10 meters. The color filter **150** may be configured with different colors for changing color of light at an interval of 5 meters or 3 meters. However, a change interval of filter color of the color filter **150** is not limited to the above described example, and it should be noted that various filter colors may be set. Also, it should be noted that length of the linear illuminator **100** is not limited.

**[0110]** In the evacuation guidance device **3** for rescue according to the third embodiment of the present disclosure, the linear illuminator **100**, which is unwound from the illuminator winding bobbin **210** and moved out from the case **300**, emits a different color of light at a regular interval according to a filter color of the color filter **150**, so that there is an advantage in which the evacuee or the rescue agent may determine length of the linear illuminator **100** that is unwound. Therefore, the rescue agent or the evacuee may approximately recognize a distance from the danger zone to

the safety zone through a color of light, which is changed at a regular interval, emitted from the linear illuminator **100** so that it may be possible to prevent a safety accident and reduce a psychological burden.

**[0111]** Although not shown in the drawing, it should be noted that a color filter having a different color at a regular interval may be applied to a structure of the linear illuminator according to the second embodiment of the present disclosure.

**[0112]** Meanwhile, an evacuation guidance device **4** for rescue according to a fourth embodiment of the present disclosure is shown in FIGS. 8 and 9. The same reference numeral is given to a component having the same function shown in the above described drawings.

**[0113]** A linear illuminator **800** of the evacuation guidance device **4** for rescue according to the fourth embodiment of the present disclosure is provided with a terminal part **190** capable of being detached from the communication terminal **510** and electrically connecting thereto in the structure of each of the linear illuminators **100** and **700** according to the first and third embodiments of the present disclosure.

**[0114]** A male screw **191** and a female screw **515**, which are screw coupled to each other, are respectively formed at the end of one side at which the terminal part **190** of the linear illuminator **800** is formed and an end side of the communication terminal **510** into which the terminal part **190** is inserted.

**[0115]** Further, the power supply bobbin **250** according to the fourth embodiment of the present disclosure is provided with a serial connector **900** configured to accommodate the terminal part **190** separated from a communication terminal **510** and electrically connect to the terminal part **190**.

**[0116]** Therefore, the terminal part **190** of the evacuation guidance device **4** for rescue according to the fourth embodiment of the present disclosure may be connected to a serial connector **900** of another evacuation guidance device **4** for rescue having a structure that is the same as that of the evacuation guidance device **4** for rescue, so that the terminal part **190** may be used for the purpose of connecting a plurality of evacuation guidance devices **4** for rescue in series as shown in FIG. 9.

**[0117]** Hereinbefore, as described above, in the evacuation guidance device for rescue according to the present disclosure, a position of the bobbin unit **200** may be identified through the first and second position notifying luminescence members **280** and **290**, so that there is an advantage in which a position determination of the evacuee or the rescue agent, or of the safety zone where the evacuee or the rescue agent desires to move may be easy.

**[0118]** Also, the evacuation guidance device for rescue according to the present disclosure emits a different color of light at a regular interval through the color filter **150** of the linear illuminator **100**, and thus the evacuee or the rescue agent escapes by recognizing a distance of the escape route, so that there is an advantage in which a frequency of a safety accident may be reduced.

**[0119]** Further, the evacuation guidance device for rescue according to the present disclosure is provided with a communication unit capable of transmitting intent using a luminescence state of a linear illuminator so that bidirectional communication between the rescue agent and the commander at the safety zone is possible.

**[0120]** While the present invention has been described with reference to exemplary embodiments thereof, it will be

apparent to those skilled in the art that various modifications and equivalent other embodiments can be devised from the above-described exemplary embodiments of the present invention. Therefore, the true scope of the present invention should be determined by the technical spirit of the appended claims.

What is claimed is:

1. An evacuation guidance device for rescue, comprising:
  - a bendable linear illuminator;
  - a bobbin unit configured to wind and unwind the linear illuminator according to a rotational direction, including first and second position notifying luminescence members installed at an outer side of the bobbin unit and configured to emit light to enable position identification, and configured to supply power to the linear illuminator and the first and second position notifying luminescence members; and
  - a case configured to rotatably accommodate the bobbin unit to enable the linear illuminator to be wound and unwound according to a rotational direction of the bobbin unit and at which a luminescence indicator is formed to enable verification of a luminescence state of each of the first and second position notifying luminescence members.
2. The evacuation guidance device for rescue of claim 1, wherein the linear illuminator is provided with a color filter configured to change color of light emitted from a light source at a regular interval to enable identification of length of the linear illuminator that is unwound from the bobbin unit.
3. The evacuation guidance device for rescue of claim 1, wherein the luminescence indicator is provided with a plurality of luminescence verifying through holes which are formed at positions corresponding to the first and second position notifying luminescence members by passing through from an outer circumferential surface of the case to an inner circumferential surface thereof and are spaced apart from one another along an extending direction of each of the first and second position notifying luminescence members.
4. The evacuation guidance device for rescue of claim 3, wherein the bobbin unit includes:
  - an illuminator winding bobbin configured to wind or unwind the linear illuminator according to a rotational direction and including one side, which is adjacent to each of the luminescence verifying through holes formed at one side of the case, on which the first position notifying luminescence member is mounted; and
  - a power supply bobbin mounted on the other side of the illuminator winding bobbin to be rotated by corresponding to a rotational direction and a rotational angle of the illuminator winding bobbin, including the second position notifying luminescence member mounted adjacent to each of the luminescence verifying through holes formed at the other side of the case, and configured to supply power to enable the linear illuminator and the first and second position notifying luminescence members to emit light.
5. The evacuation guidance device for rescue of claim 4, wherein the case includes:
  - a first cover member to which the illuminator winding bobbin is rotatably coupled and having each of the luminescence verifying through holes, each of which is formed at a position corresponding to the first position notifying luminescence member; and
  - a second cover member coupled to the first cover member, rotatably coupled to the power supply bobbin that is coupled to the illuminator winding bobbin, and having the luminescence verifying through holes, each of which is formed at a position corresponding to the second position notifying luminescence member.
6. The evacuation guidance device for rescue of claim 5, wherein the illuminator winding bobbin includes:
  - a winding unit formed to extend and enable the linear illuminator to be wound along an outer circumferential surface, configured to provide a first inner space that is open in a direction of the second cover member, and including one side rotatably coupled to the first cover member and the other side coupled to the power supply bobbin;
  - a first flange formed to have an outer diameter greater than that of the winding unit at one end thereof adjacent to the first cover member, and including a surface facing the first cover member, at which the first position notifying luminescence member is installed; and
  - a second flange formed to extend and have an outer diameter greater than that of the winding unit at the other end thereof.
7. The evacuation guidance device for rescue of claim 6, wherein the power supply bobbin includes:
  - an illuminator winding bobbin coupler including a winding unit accommodation part which is formed to be partially accommodated in the first inner space and includes one end fixedly coupled to the illuminator winding bobbin, and an inverter mounting part having an outer diameter larger than that of the winding unit accommodation part at the other end thereof, formed to extend in a direction of the second cover member, and including a second inner space formed inside the inverter mounting part to be open in the direction of the second cover member, thereby enabling an inverter, which is connected to the linear illuminator and the first and second position notifying luminescence member, to be mounted on the second inner space; and
  - a second cover member coupler having one side fixedly coupled to the illuminator winding bobbin coupler and the other side rotatably coupled to the second cover member, configured to provide a power supplier supplying power to the inverter and a manipulation part connecting and disconnecting a supply of the power of the power supplier to the inverter to control the linear illuminator and the first and second position notifying luminescence members to emit light through the inverter and manipulating rotation of the illuminator winding bobbin, and including the second position notifying luminescence member installed at a surface facing the second cover member.
8. The evacuation guidance device for rescue of claim 7, wherein the second cover member is provided with an opening formed to pass through and enable the power supplier and the manipulation part to be open, thereby facilitating user manipulation of the power supplied and the manipulation part which are mounted on the second cover member coupler.
9. The evacuation guidance device for rescue of claim 1, further comprising:



a communication unit configured to enable bidirectional communication between the end of one side of the linear illuminator, which is unwound from the bobbin unit, and the bobbin unit,

wherein the evacuation guidance device for rescue is able to perform bidirectional communication.

**10.** The evacuation guidance device for rescue of claim 9, wherein the linear illuminator includes:

a central strength member formed to extend and enable a winding and unwinding according to a rotational direction of the bobbin unit and located on a center line;

a luminescence part extending along a length direction of the central strength member and provided at an outer side thereof; and

a sheath part configured to cover an outer side of each of the central strength member and the luminescence part, and

the communication unit includes:

a communication terminal installed at the end of the one side of the linear illuminator being unwound from the bobbin unit and including a first operating button configured to generate a first electrical signal;

a second operating button installed at the bobbin unit and configured to generate a second electrical signal; and

a controller connected to each of the second operating button and the end of the other side of the linear illuminator, configured to control a supply of power to the bobbin unit according to an operation state of the second operating button, and configured to control power required for the luminescence state of the linear illuminator according to the first and second electrical signals through an electrical path via the luminescence part and the central strength member.

**11.** The evacuation guidance device for rescue of claim 10, wherein the central strength member is formed with any one of a two-fold yarn and a high carbon steel wire which are conductive and able to increase tensile strength.

**12.** The evacuation guidance device for rescue of claim 10, wherein the linear illuminator is provided with a terminal part provided at the end of the one side of the linear illuminator and configured to be detachable from the communication terminal and electrically connect thereto.

**13.** The evacuation guidance device for rescue of claim 12, wherein the power supply bobbin is provided with a serial connector configured to accommodate the terminal part separated from the communication terminal and electrically connected to the terminal part.

\* \* \* \* \*



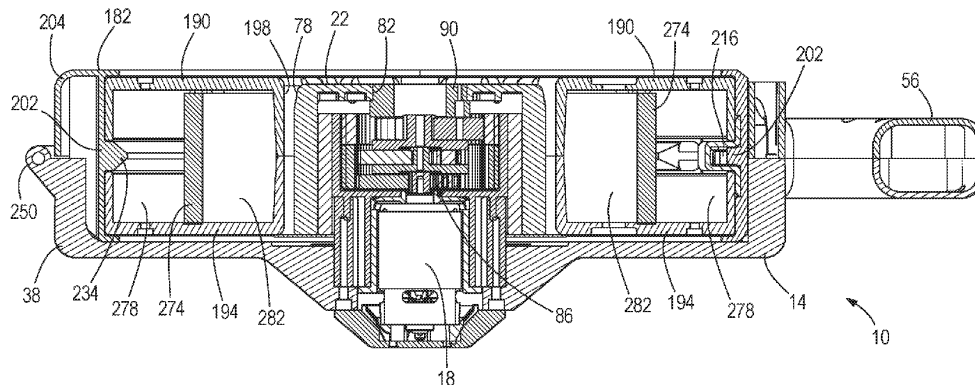
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**B65H 75/28** (2006.01)(72) Inventors: **Justin Miller**, Milwaukee, WI (US);  
**Aaron C. Grode**, Germantown, WI (US); **Nolan J. Henton**, Milwaukee, WI (US)(52) **U.S. Cl.**  
CPC ... **B65H 75/4428** (2013.01); **B65H 2701/376** (2013.01); **B65H 75/28** (2013.01); **B65H 75/4486** (2013.01)(21) Appl. No.: **16/361,344**(22) Filed: **Mar. 22, 2019****Related U.S. Application Data**

(60) Provisional application No. 62/774,707, filed on Dec. 3, 2018, provisional application No. 62/732,216, filed on Sep. 17, 2018, provisional application No. 62/647,201, filed on Mar. 23, 2018.

(57) **ABSTRACT**

A fish tape tool includes a housing, a chamber defined in the housing, and a motor supported by the housing. The motor is configured to rotate in a first direction and a second direction that is opposite the first direction. An output reel is disposed in the chamber and is rotatable in response to receiving torque from the motor. A drum contains a fish tape and including a rotatable drum portion having an inner wall that is engaged by the output reel when the drum is inserted into the chamber of the housing. When the drum portion is rotated by the output reel in the first direction, fish tape is dispensed from the drum. When the drum portion is rotated by the output reel in the second direction, fish tape is retracted into the drum.



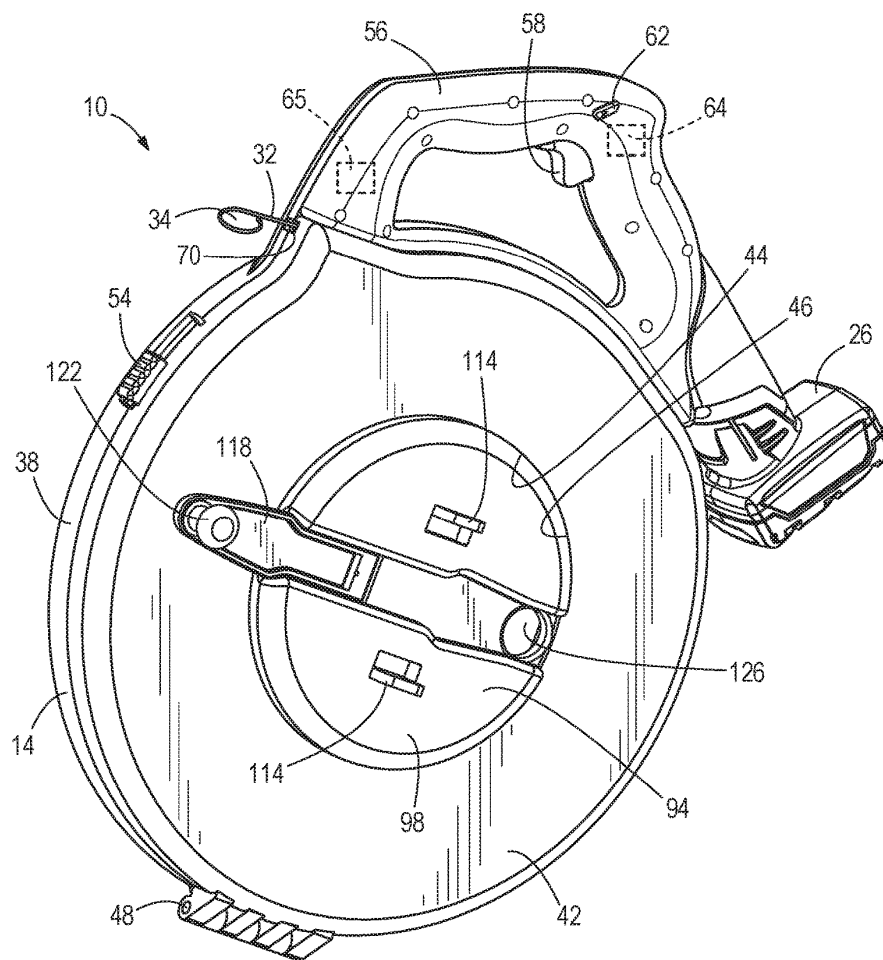


FIG. 1

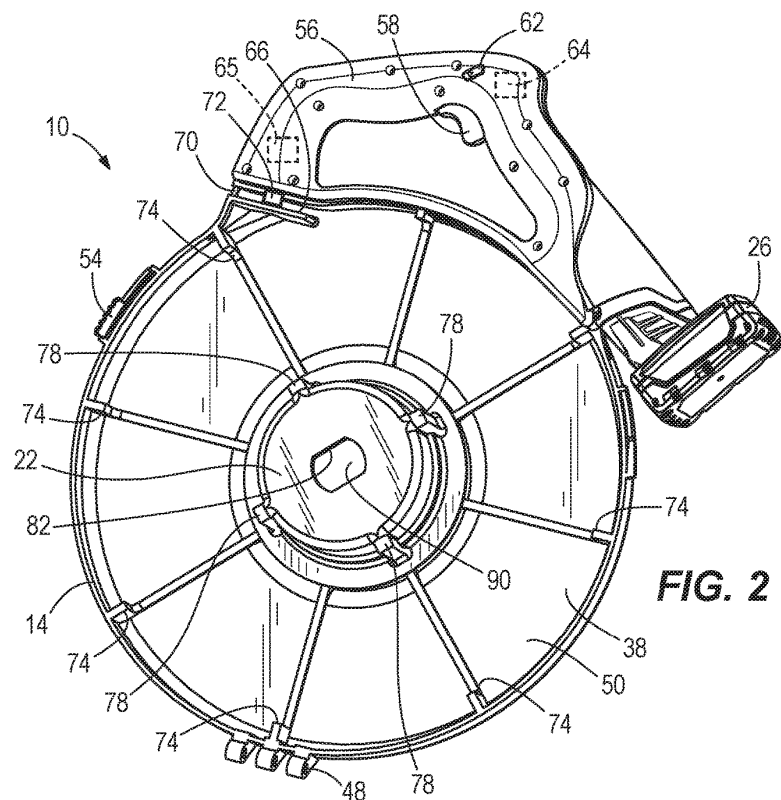


**FIG. 2**

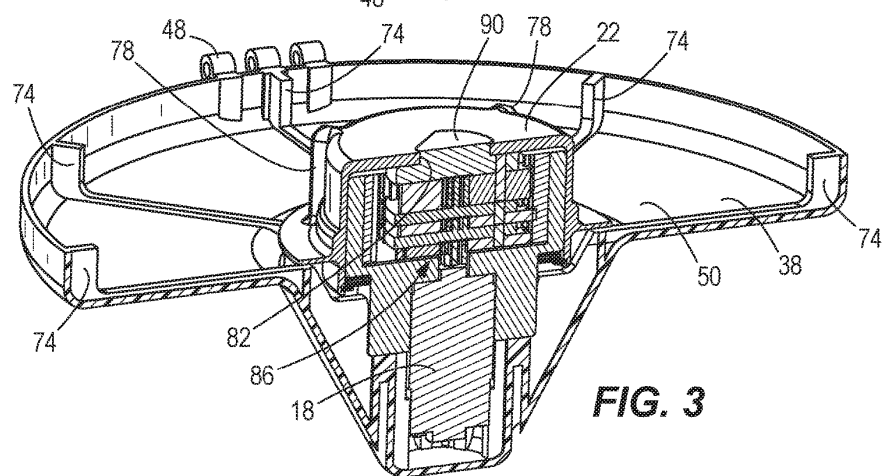
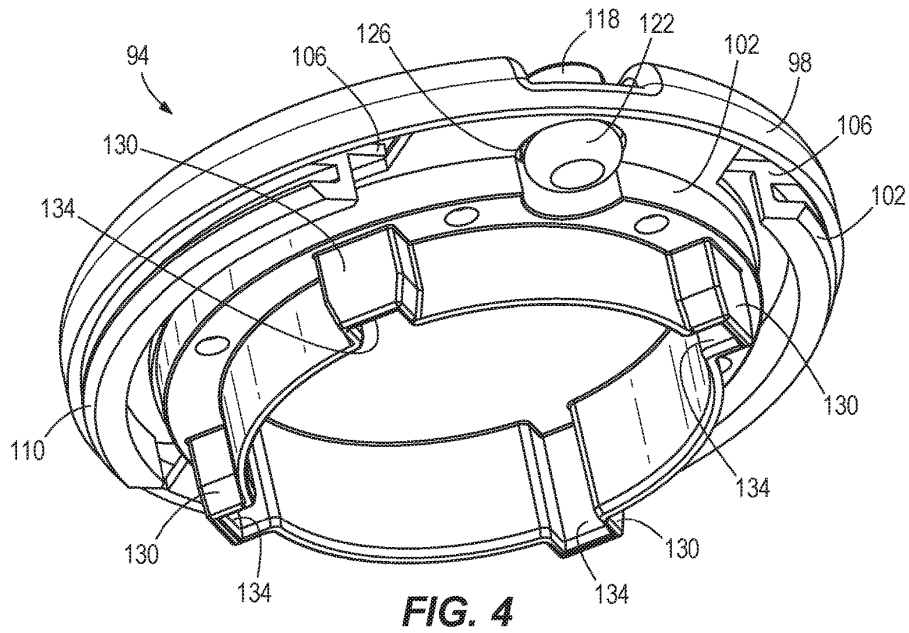
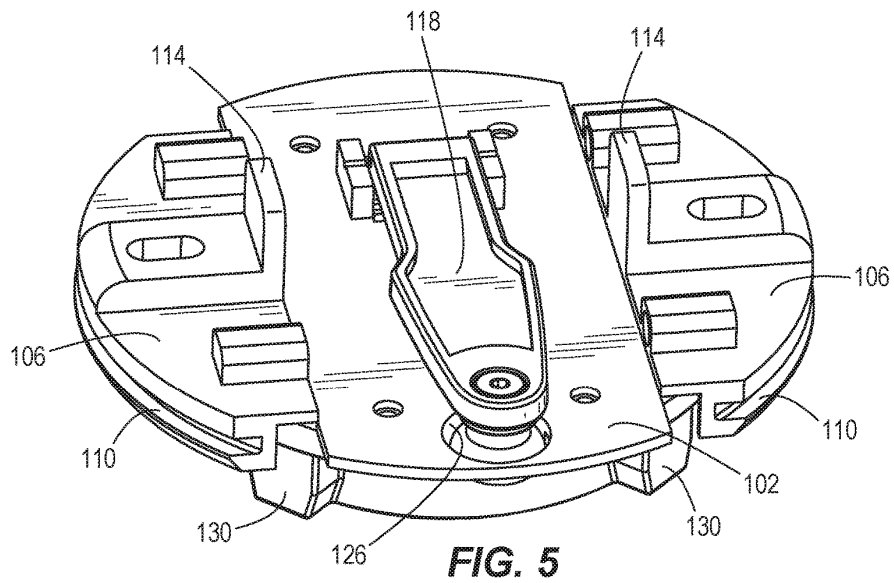


**FIG. 3**



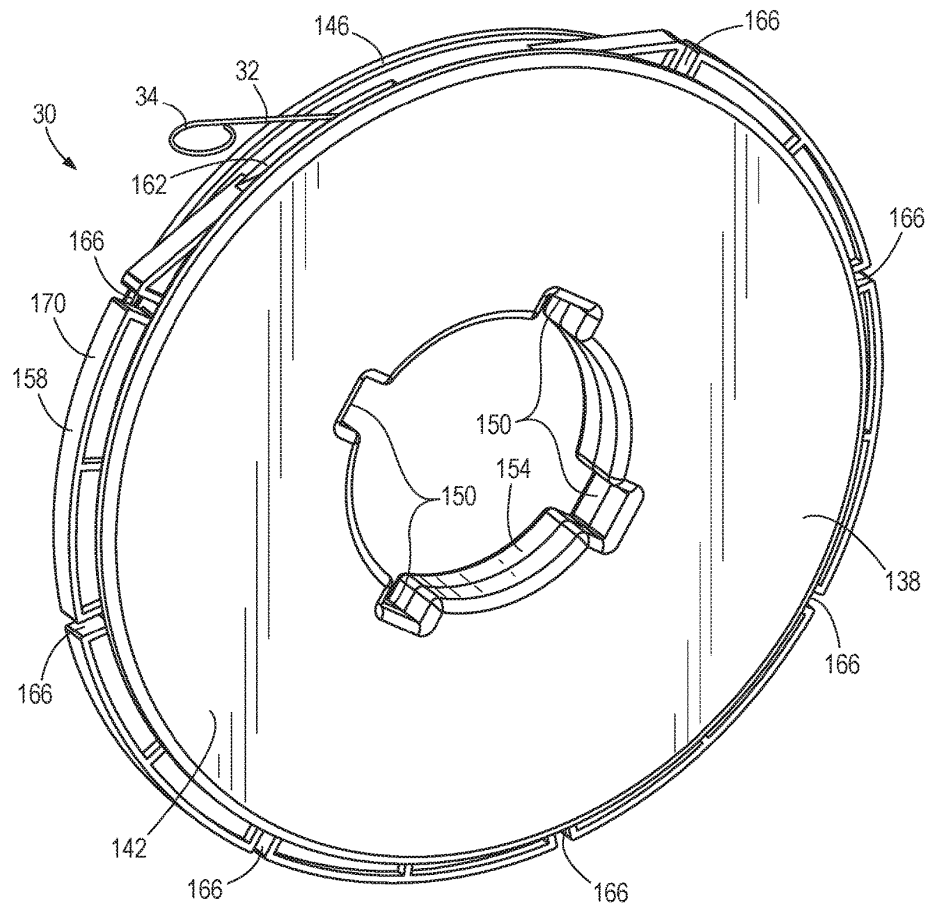


**FIG. 6**

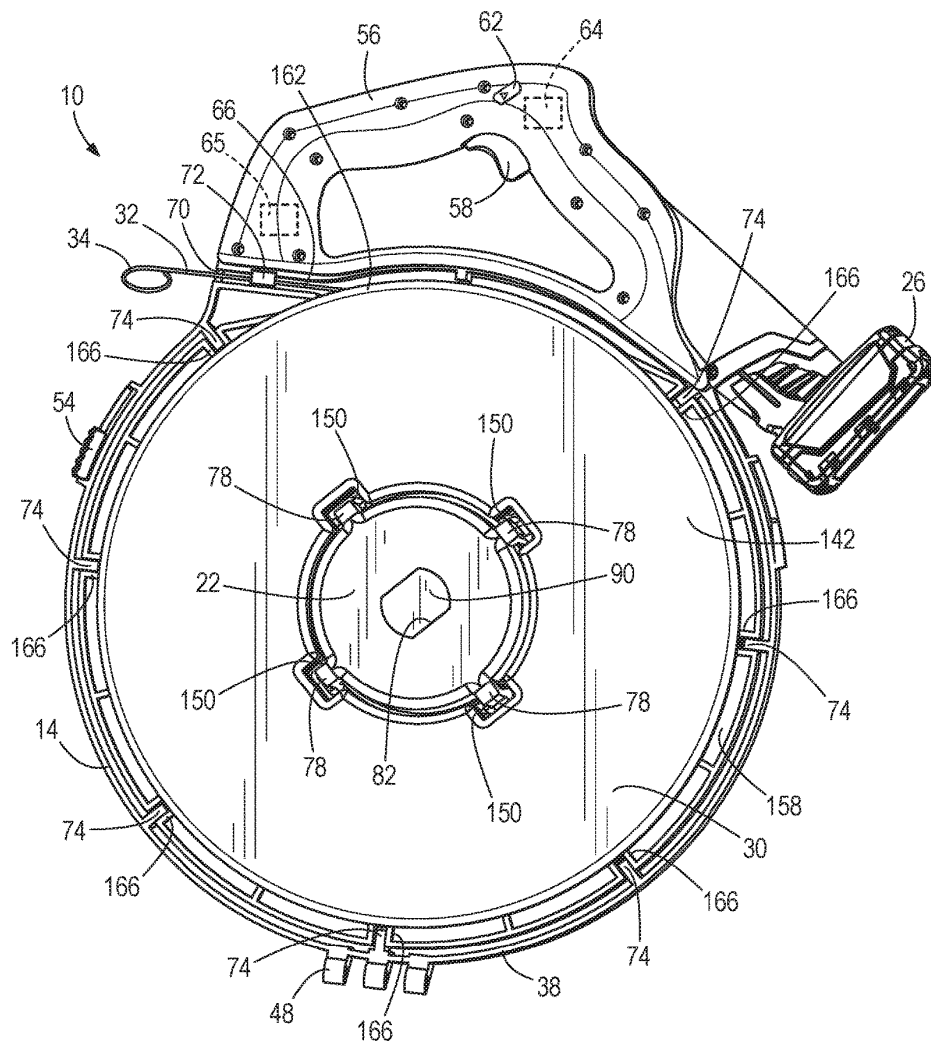
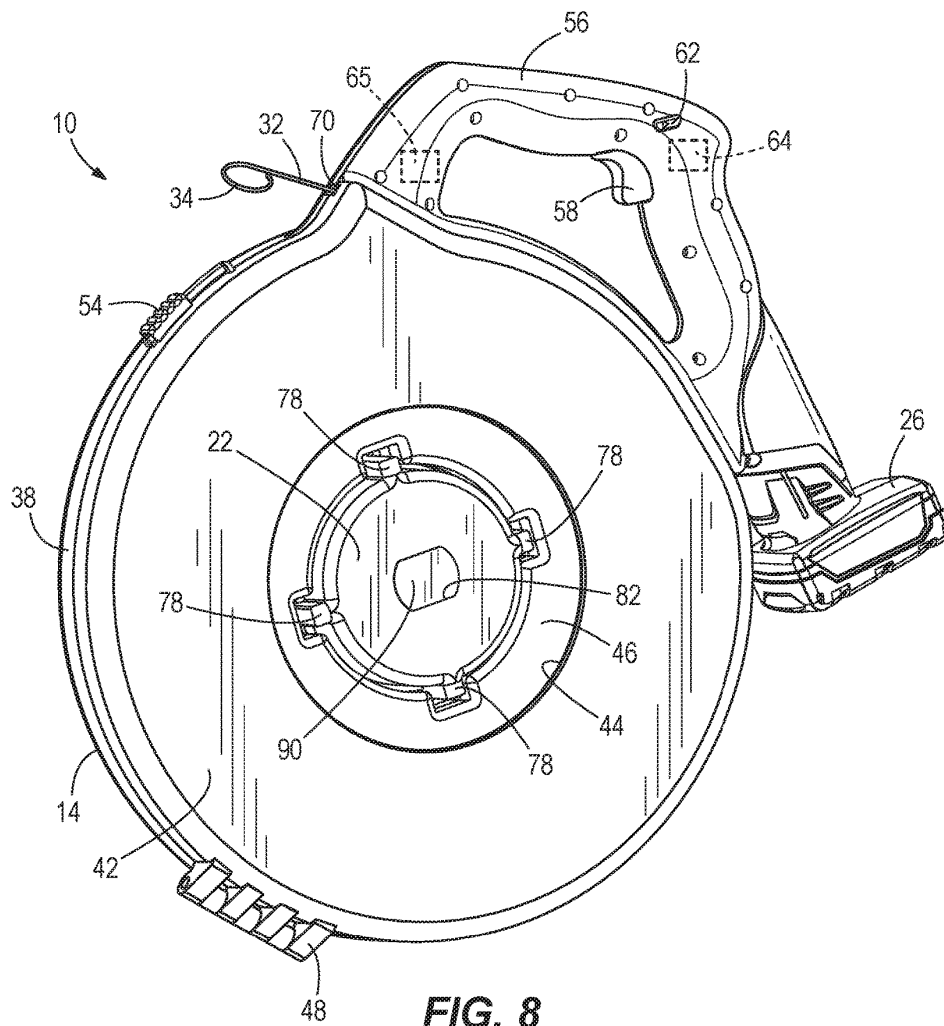


**FIG. 7**





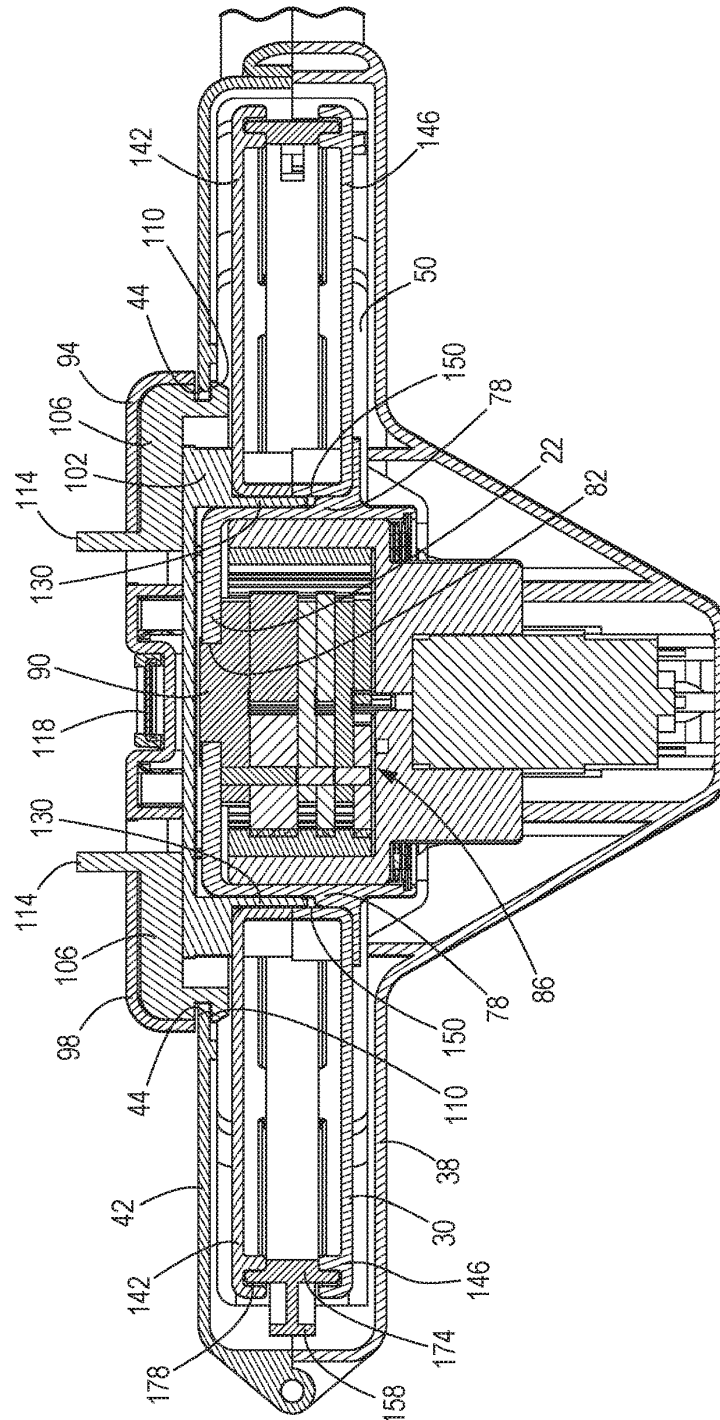


FIG. 9

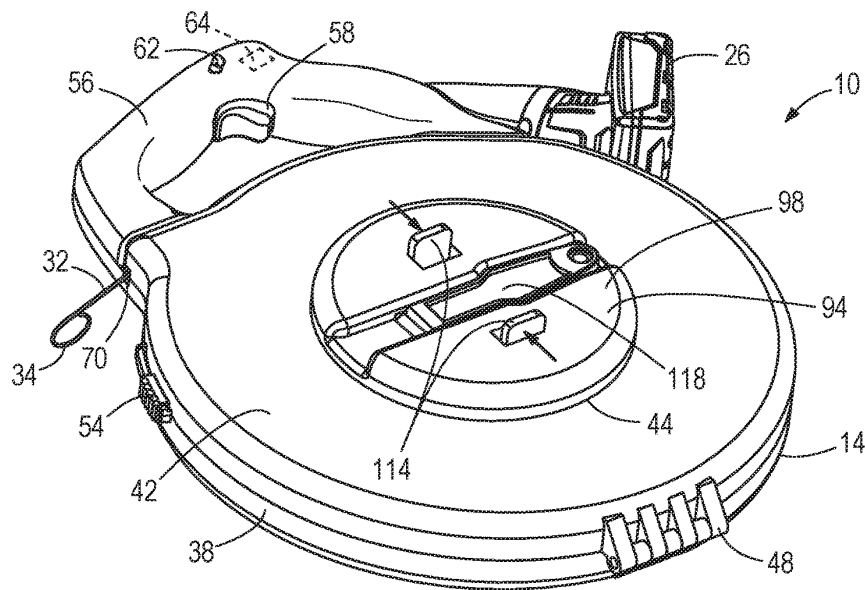


**FIG. 10**

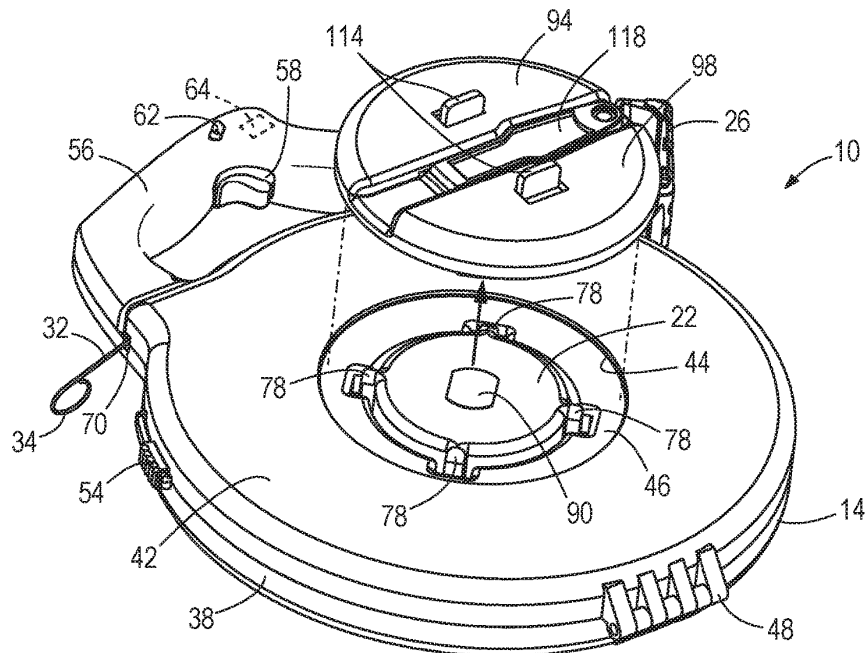
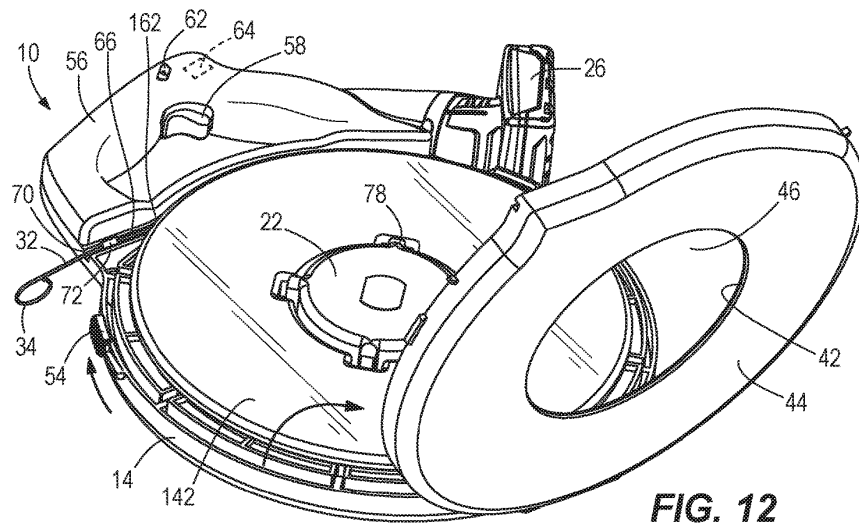
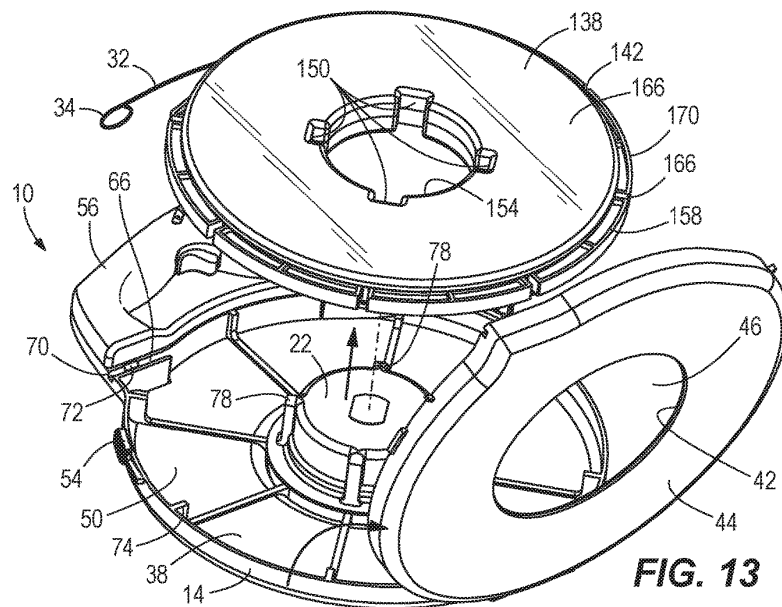


**FIG. 11**



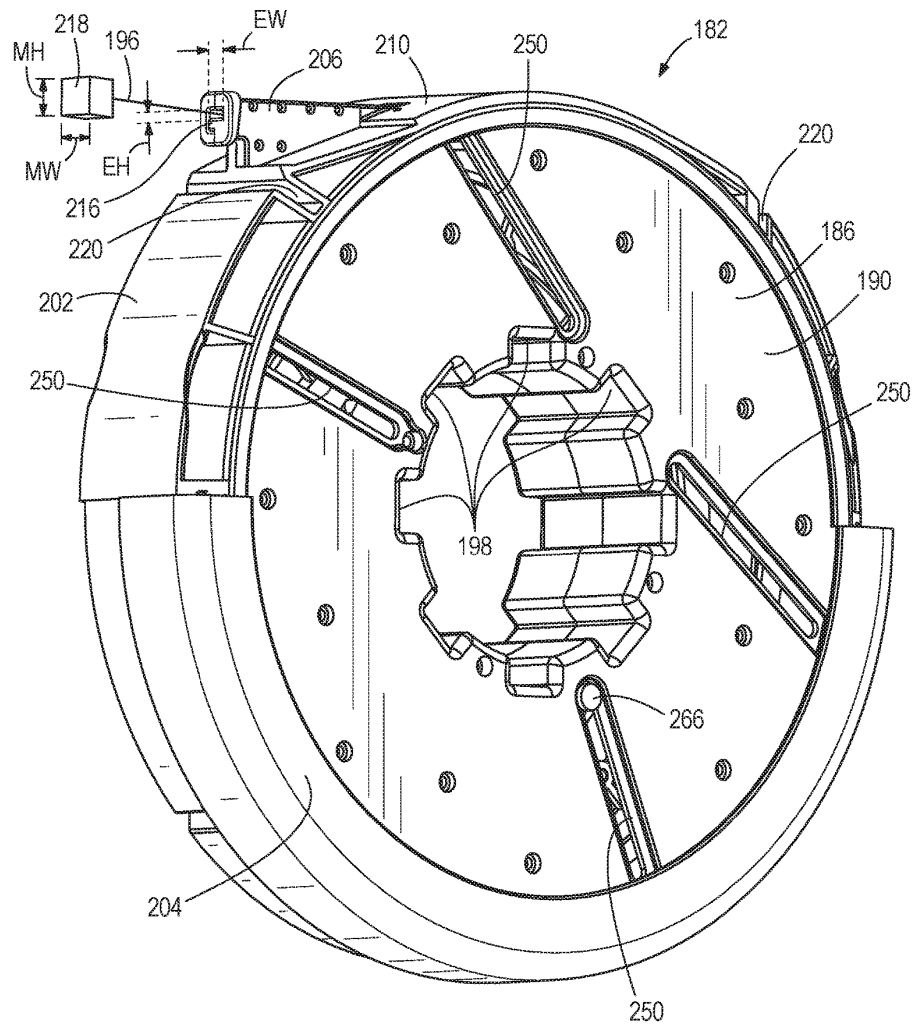


**FIG. 14**

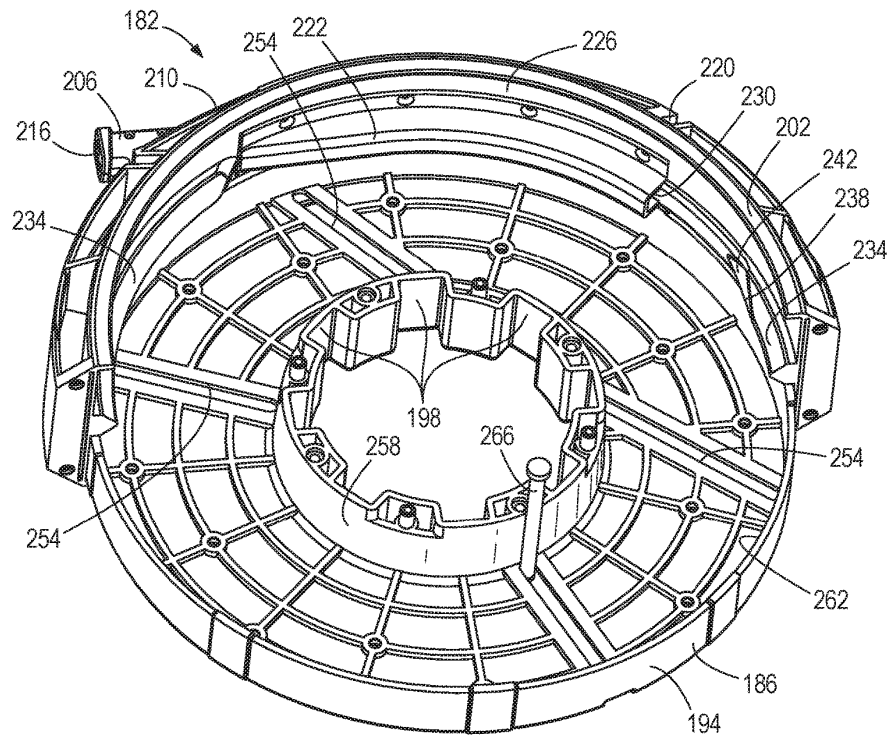


**FIG. 15**

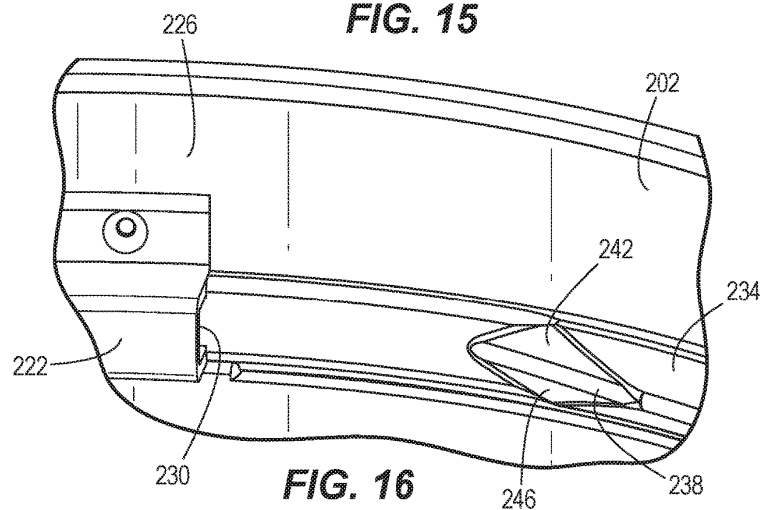


**FIG. 16**

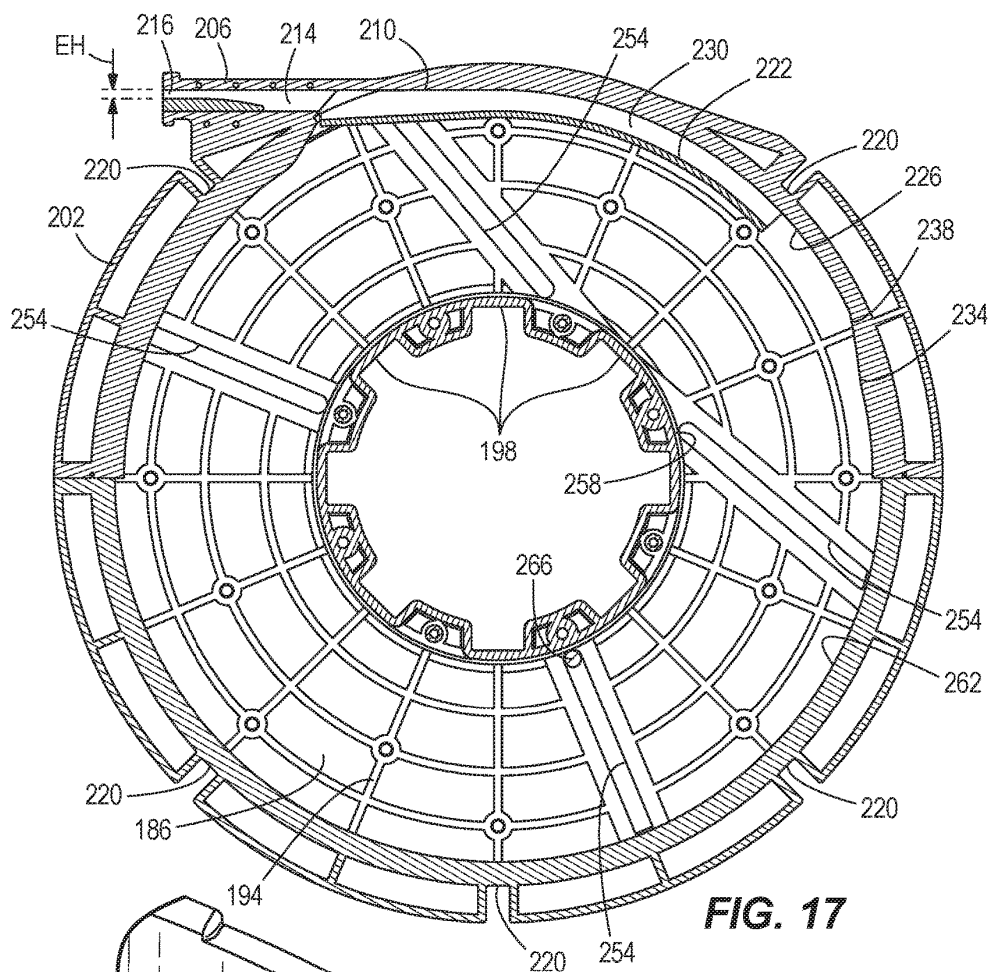


**FIG. 17**

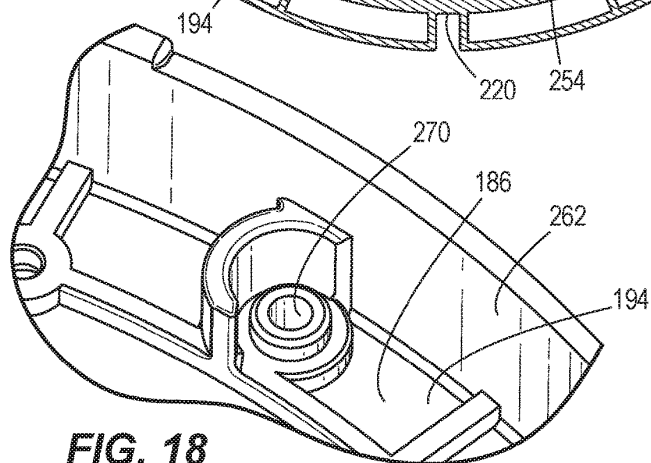
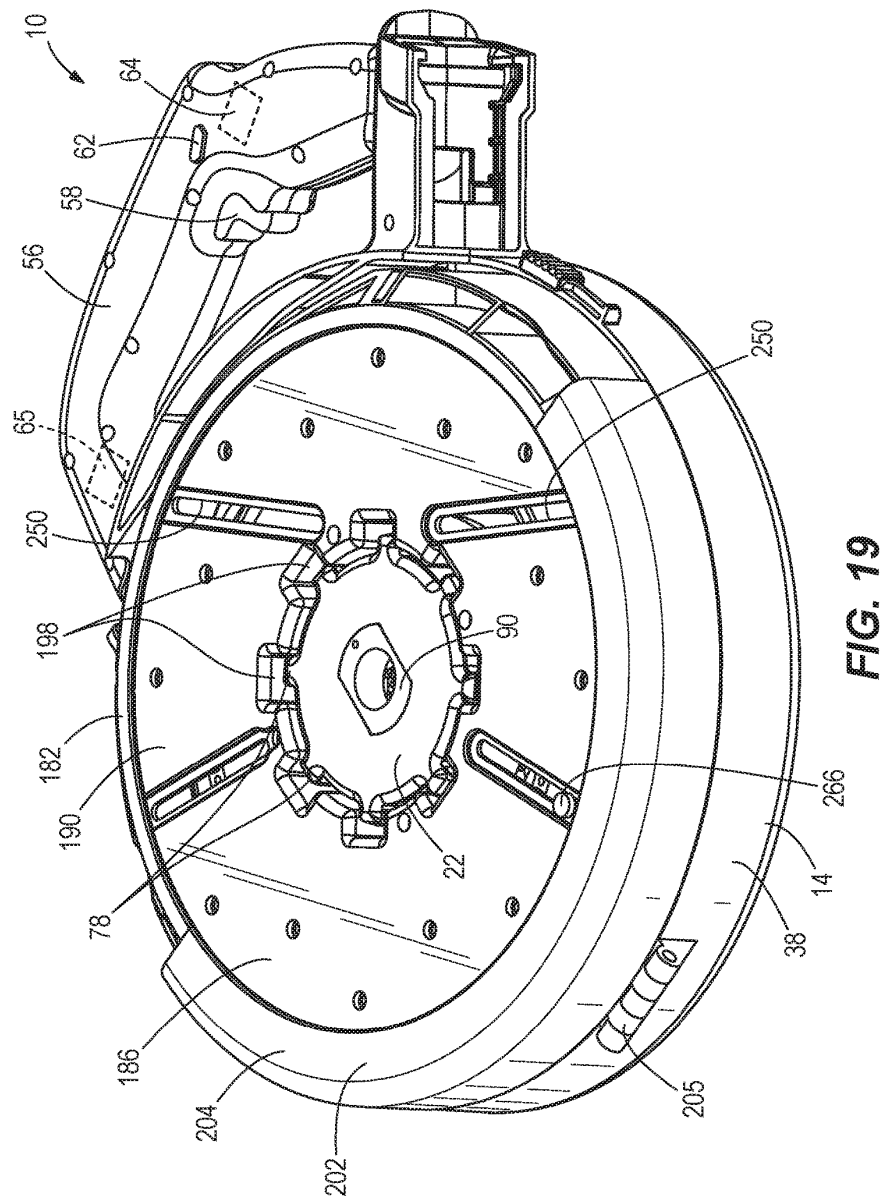


**FIG. 18**



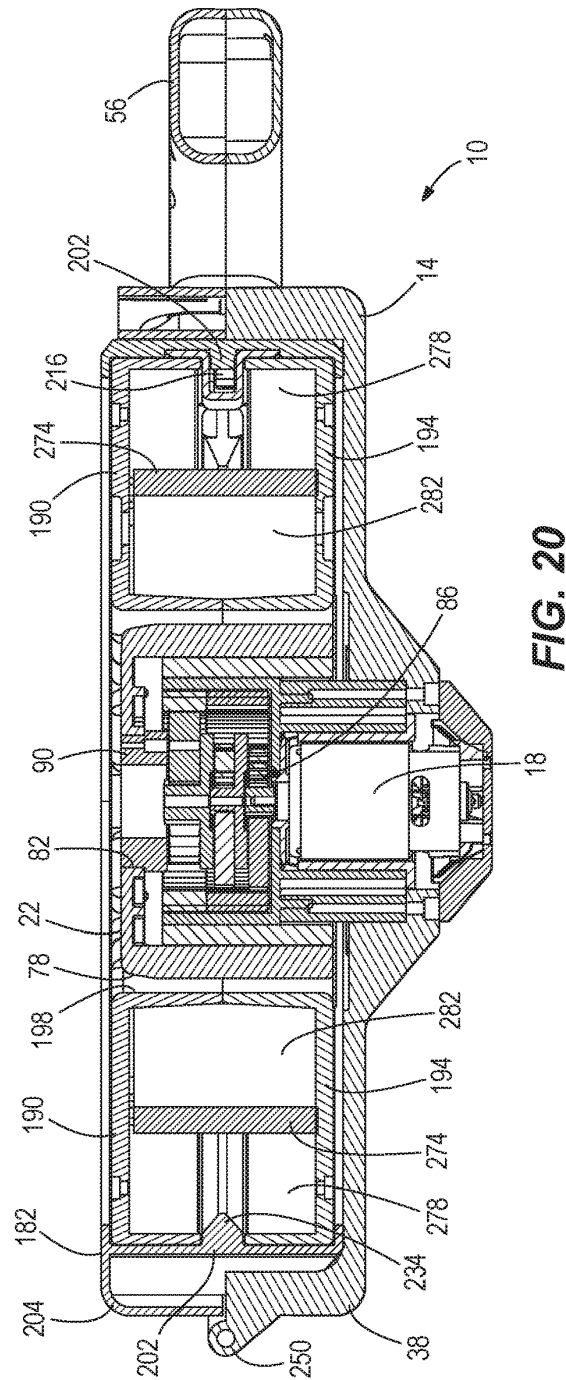
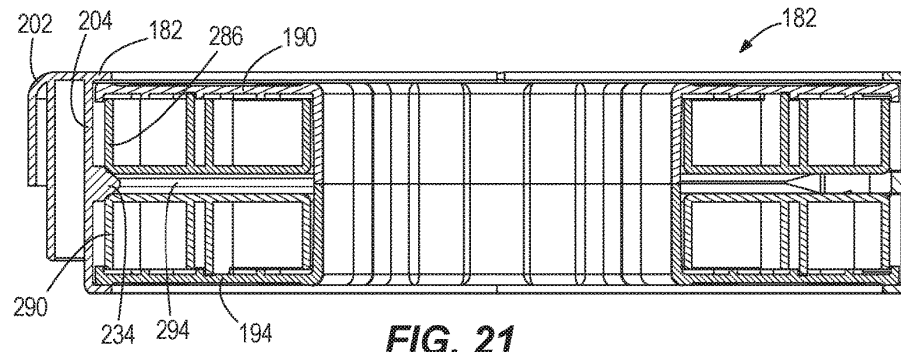
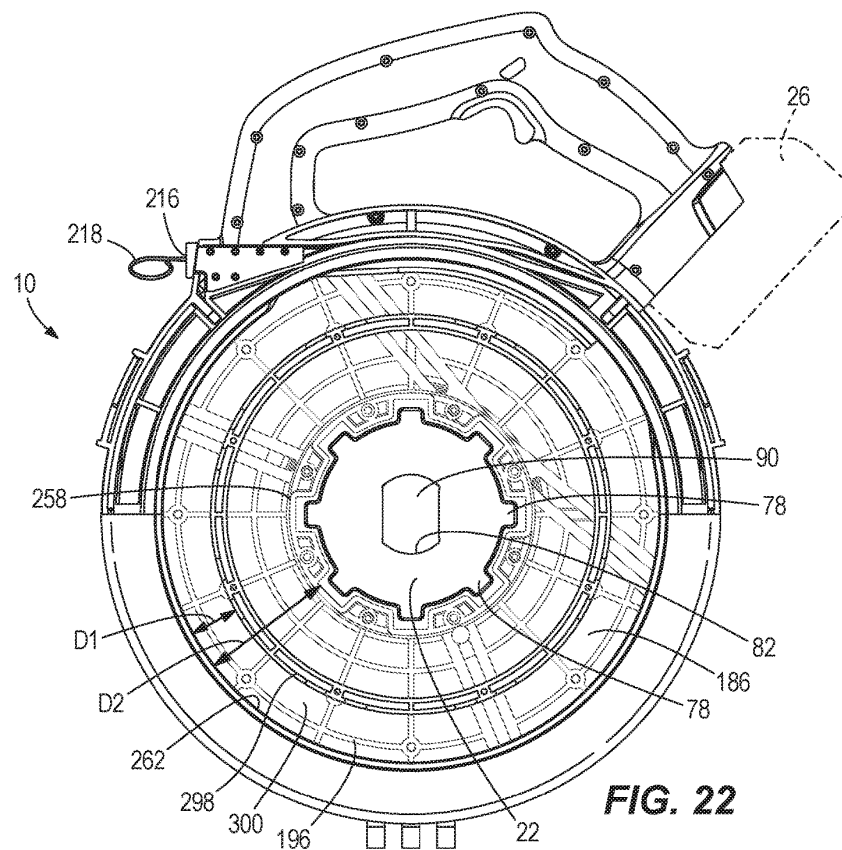
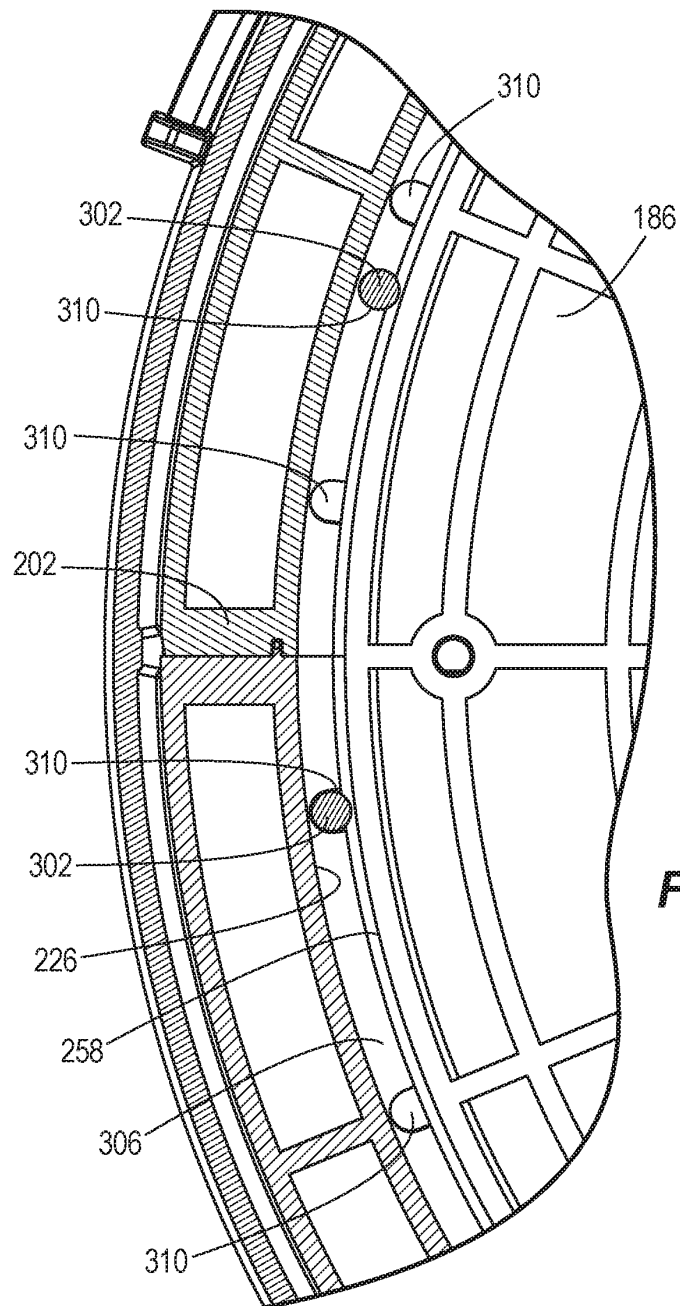
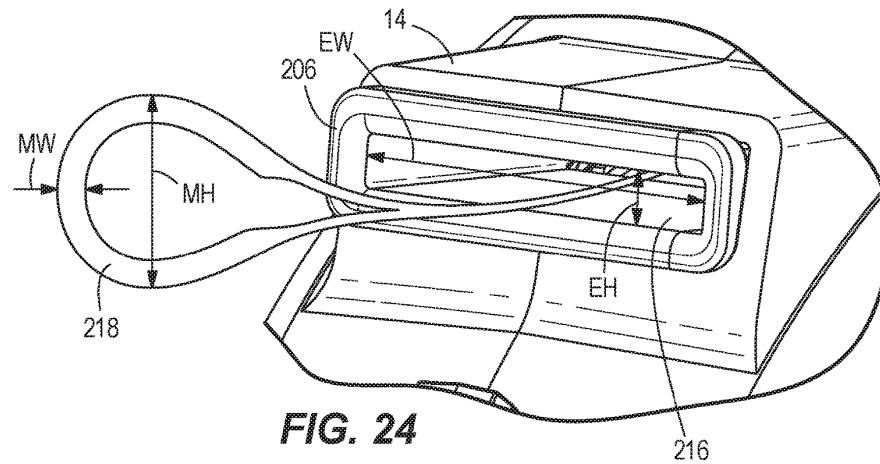
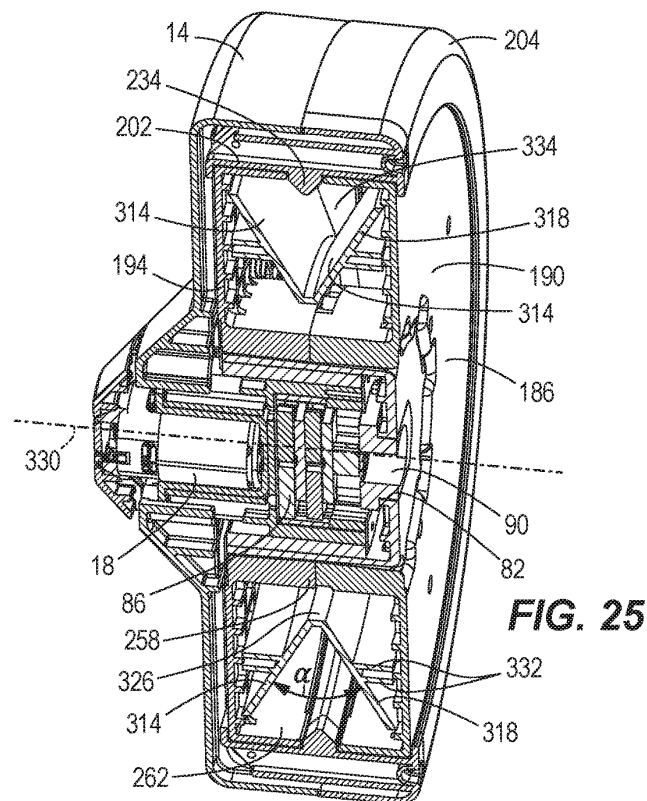


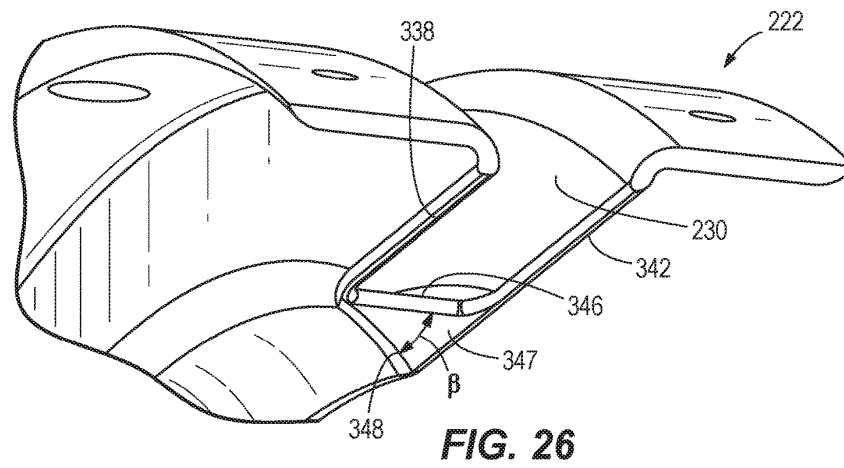
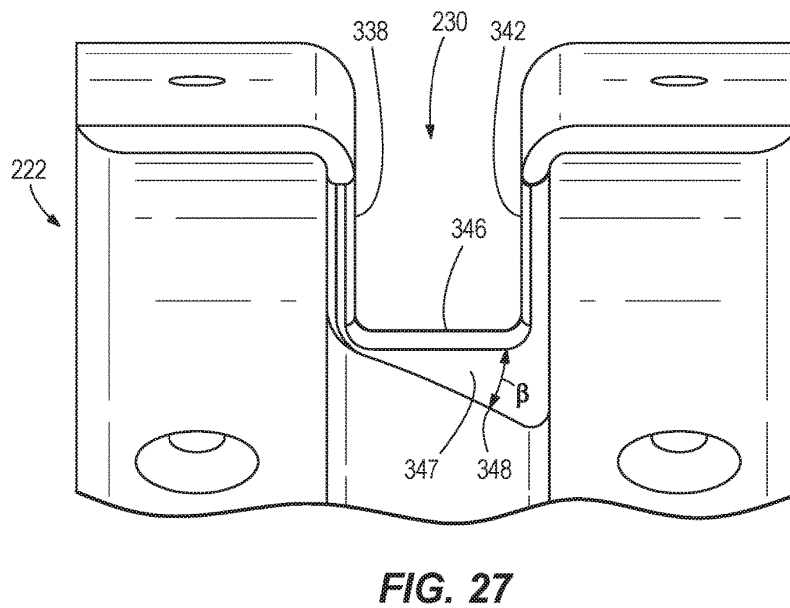
FIG. 20

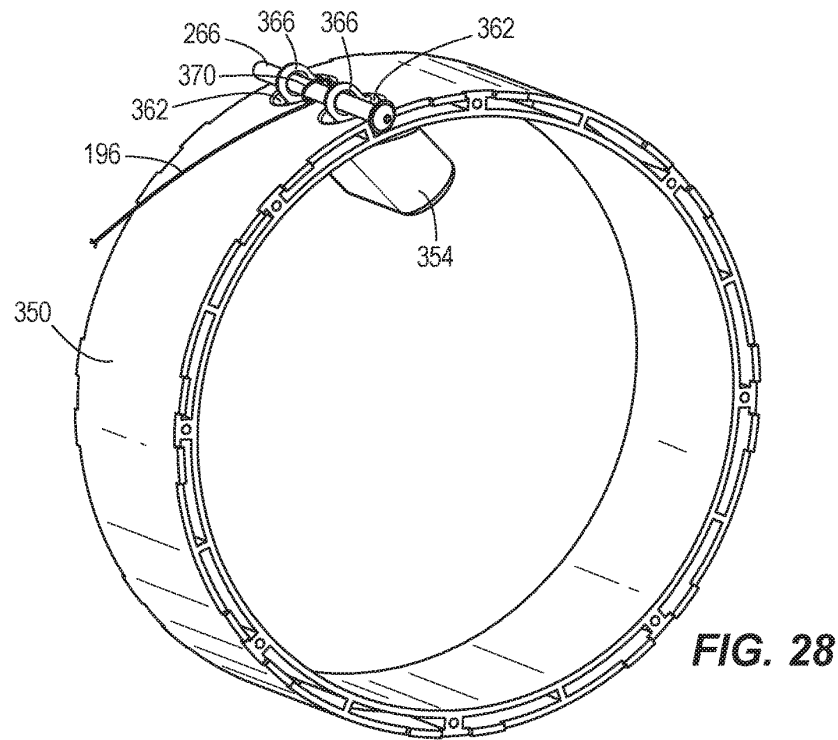
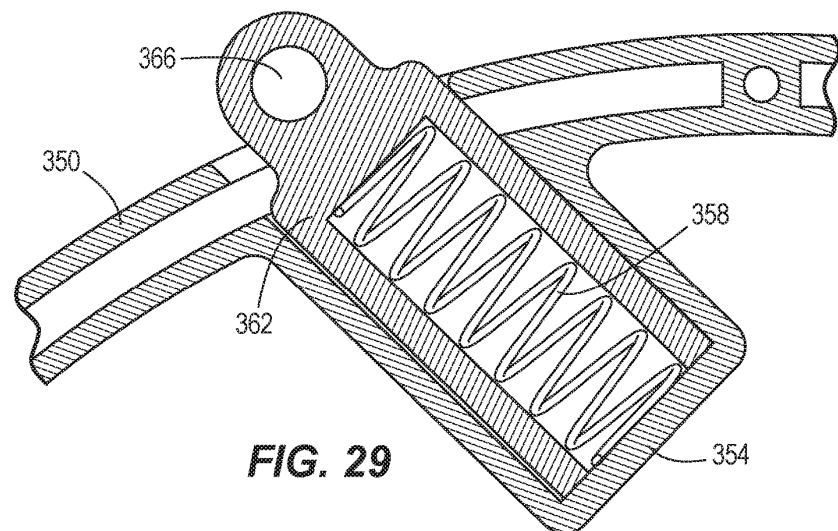


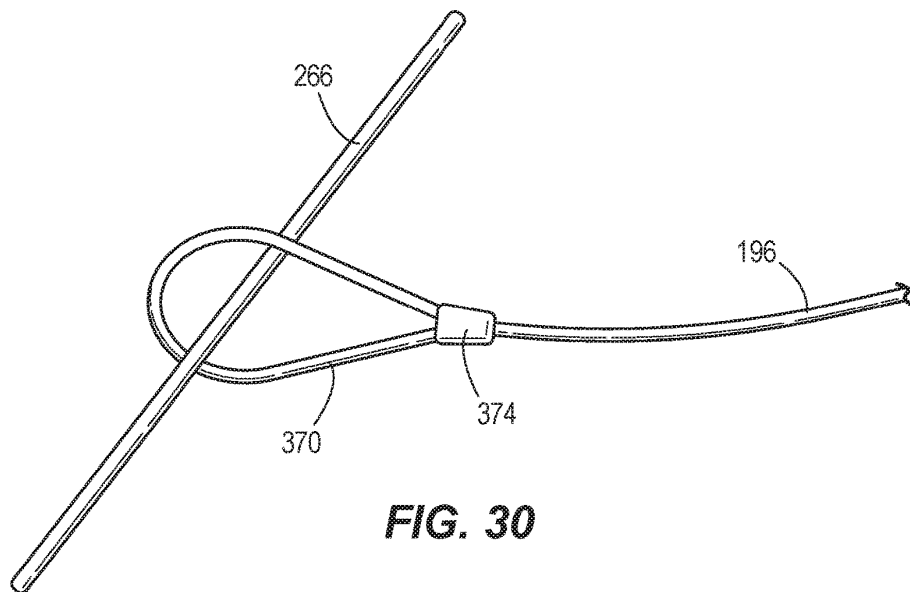












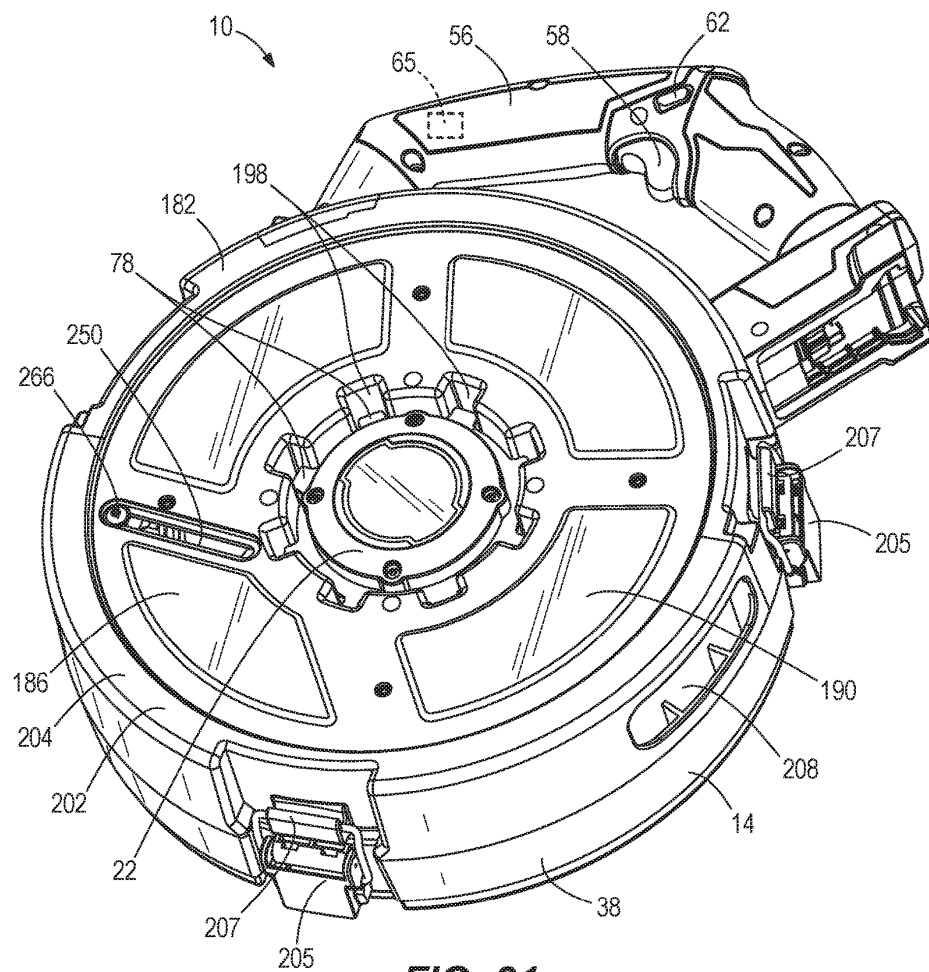


**FIG. 31**

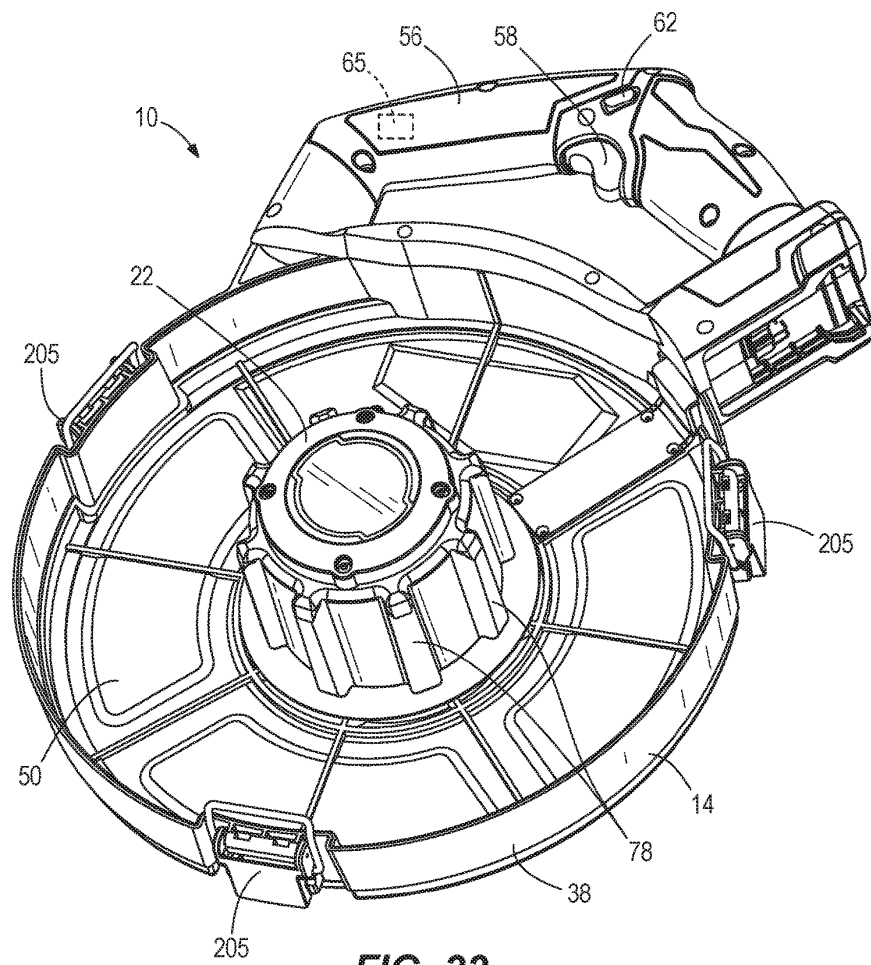


**FIG. 32**



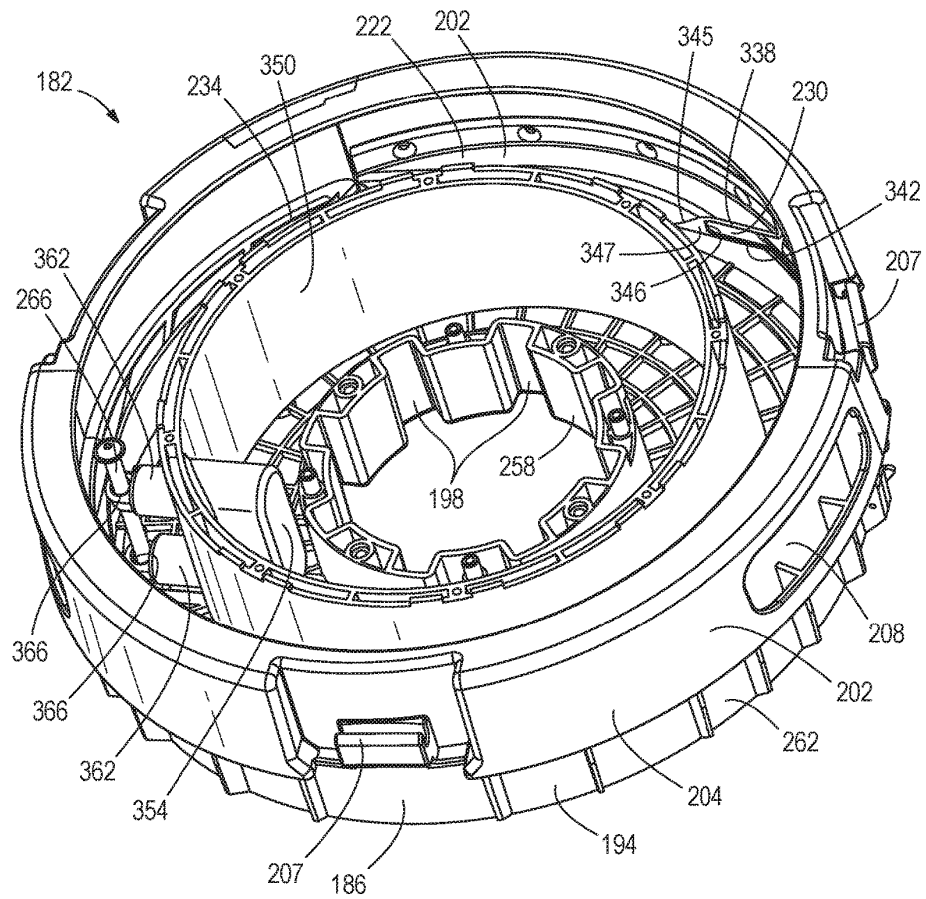


**FIG. 33**

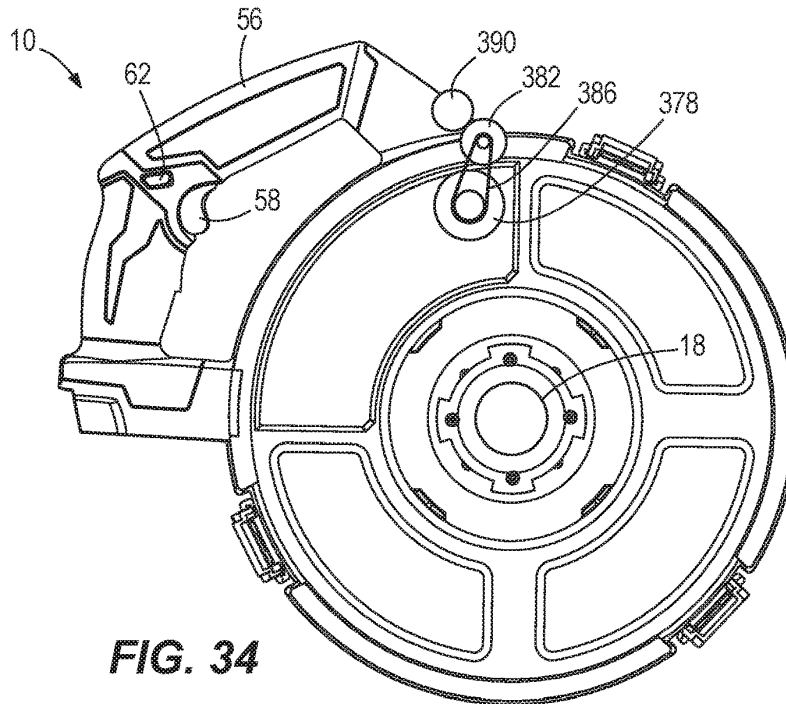


**FIG. 34**

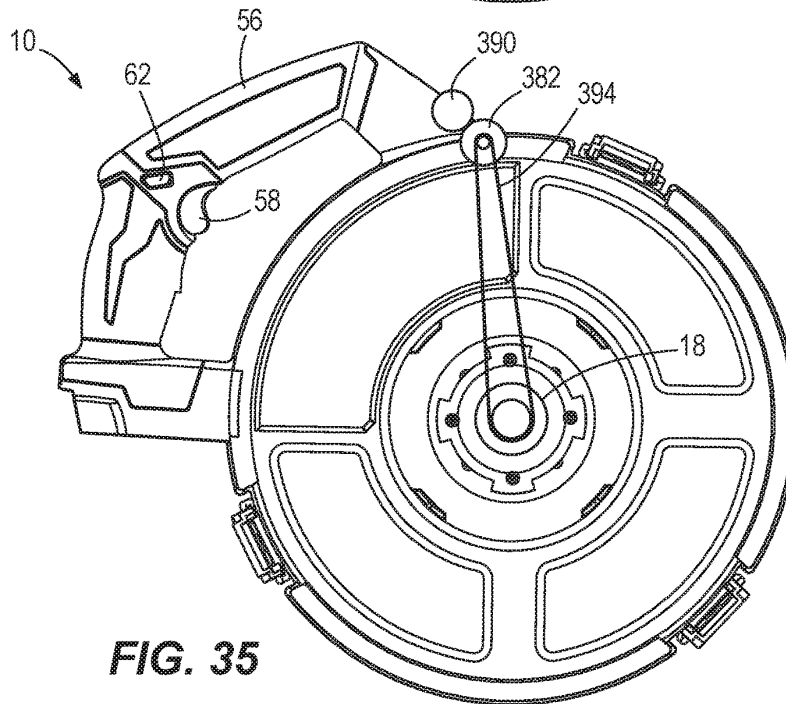


**FIG. 35**

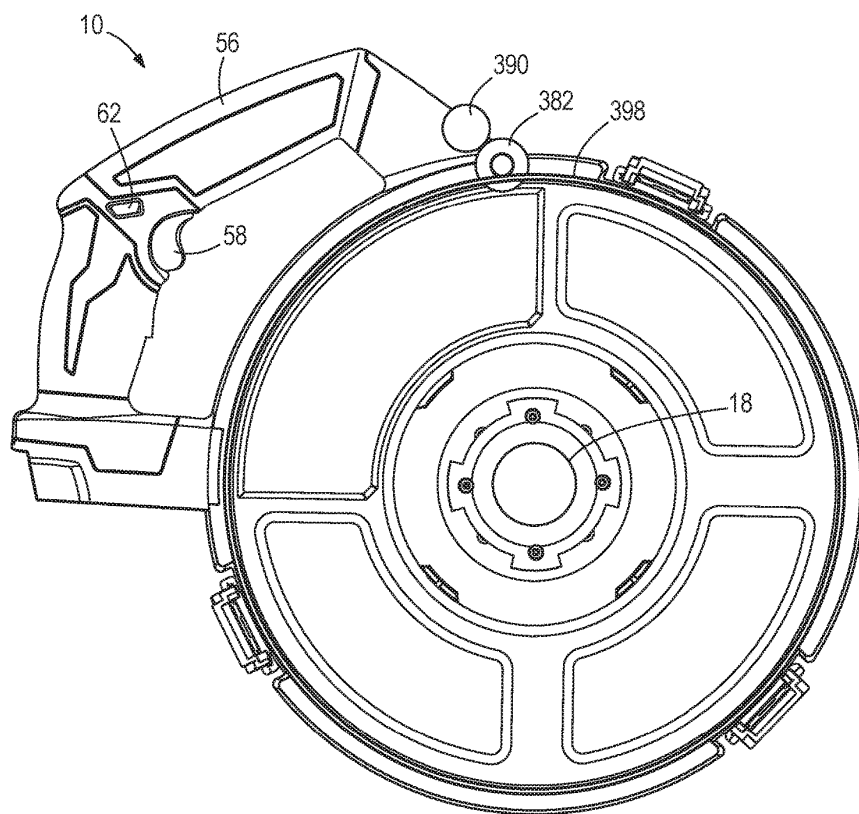


**FIG. 36**

**FISH TAPE ASSEMBLY****CROSS-REFERENCE TO RELATED APPLICATIONS**

**[0001]** This application claims priority to the following three co-pending U.S. Provisional Patent Applications, the entire contents of which are all incorporated herein by reference: (1) No. 62/647,201 filed on Mar. 23, 2018; (2) No. 62/732,216, filed on Sep. 17, 2018; and (3) 62/774,707, filed on Dec. 3, 2018.

**FIELD OF THE INVENTION**

**[0002]** The present invention relates to fish tape assemblies, and more particularly to fish tape tools and fish tape drums for use with fish tape tools.

**SUMMARY OF THE INVENTION**

**[0003]** The invention provides, in one aspect, a fish tape tool comprising a housing, a chamber defined in the housing and a motor supported by the housing. The motor is configured to rotate in a first direction and a second direction that is opposite the first direction. The fish tape tool further comprises an output reel disposed in the chamber and rotatable in response to receiving torque from the motor and a drum containing a fish tape and including a rotatable drum portion having an inner wall that is engaged by the output reel when the drum is inserted into the chamber of the housing. When the drum is in the chamber and the motor is rotated in the first direction, the drum portion is rotated by the output reel in the first direction, such that the fish tape is dispensed from the drum. When the drum is in the chamber and the motor is rotated in the second direction, the drum portion is rotated by the output reel in the second direction, such that the fish tape is retracted into the drum.

**[0004]** The invention provides, in another aspect, a power tool comprising a housing and a motor supported by the housing. The motor is configured to rotate in a first direction and a second direction that is opposite the first direction. The power tool further comprises a battery for supplying power to the motor and a drum containing a fish tape and including a rotatable drum portion configured to receive torque from the motor. When the motor is rotated in the first direction, the drum portion is rotated by the motor in the first direction, such that the fish tape is dispensed from the drum. When the motor is rotated in a second direction, the drum portion is rotated by the motor in the second direction, such that the fish tape is retracted into the drum.

**[0005]** The invention provides, in yet another aspect, a power tool comprising a housing, a chamber defined in the housing, a motor supported by the housing, and a drum configured to be inserted into the chamber of the housing. The drum contains a fish tape and includes a rotatable drum portion configured to rotate in response to receiving torque from the motor. The drum is one of a plurality of drums that are insertable into and removable from the chamber of the housing. Each drum contains a different type of fish tape.

**[0006]** The invention provides, in yet another aspect, a power tool comprising a housing, a first motor supported by the housing, a second motor supported by the housing, a drive roller configured to receive torque from the second motor, an idler roller arranged proximate the drive roller, and a drum containing a fish tape and including a rotatable drum portion configured to receive torque from the first motor. A

portion of the fish tape is wedged between the drive roller and the idler roller. When the first motor is rotated in a first direction, the drum portion is rotated by the first motor in the first direction, such that the fish tape is retracted into the drum. When the second motor is rotated in a second direction that is opposite the first direction, the drive roller is rotated in the second direction such that the fish tape is moved between the drive roller and the idler roller to dispense the fish tape from the drum.

**[0007]** The invention provides, in yet another aspect, a power tool comprising a housing, a motor supported by the housing, a drive roller configured to receive torque from the motor, an idler roller arranged proximate the drive roller, and a drum containing a fish tape and including a rotatable drum portion configured to receive torque from the first motor. A portion of the fish tape is wedged between the drive roller and the idler roller. When the motor is rotated in a first direction, the drum portion is rotated by the motor in the first direction, such that the fish tape is retracted into the drum. When the motor is rotated in a second direction that is opposite the first direction, the drive roller is rotated in the second direction, such that the fish tape is moved between the drive roller and the idler roller to dispense the fish tape from the drum.

**[0008]** The invention provides, in yet another aspect, a power tool comprising a housing, a motor supported by the housing, a drive roller, an idler roller arranged proximate the drive roller; and a drum containing a fish tape and including a rotatable drum portion configured to receive torque from the motor. A portion of the fish tape is wedged between the drive roller and the idler roller. The drum portion includes an outer ring gear that is engaged with the drive roller. When the motor is rotated in a first direction, the drum portion is rotated by the motor in the first direction such that the fish tape is retracted into the drum. When the motor is rotated in a second direction that is opposite the first direction, the drum portion is rotated by the motor in the second direction and the drive roller is rotated by the ring gear in the second direction, such that the fish tape is moved between the drive roller and the idler roller to dispense the fish tape from the drum.

**[0009]** Other features and aspects of the invention will become apparent by consideration of the following detailed description and accompanying drawings.

**BRIEF DESCRIPTION OF THE DRAWINGS**

**[0010]** FIG. 1 is perspective view of a fish tape assembly.

**[0011]** FIG. 2 is a perspective view of the fish tape assembly of FIG. 1, with portions removed.

**[0012]** FIG. 3 is a cross-sectional view of the fish tape assembly of FIG. 1, with portions removed.

**[0013]** FIG. 4 is a bottom perspective view of a crank hub of the fish tape assembly of FIG. 1.

**[0014]** FIG. 5 is a top perspective view of a crank hub of the fish tape assembly of FIG. 1, with an outer shelf removed.

**[0015]** FIG. 6 is a perspective view of a fish tape drum of the fish tape assembly of FIG. 1.

**[0016]** FIG. 7 is a plan view of the fish tape assembly of FIG. 1, with a door and a crank hub removed and the fish tape drum of FIG. 6 inserted.

**[0017]** FIG. 8 is a perspective view of the fish tape assembly of FIG. 1, with the fish tape drum of FIG. 6 inserted and a crank hub removed.

[0018] FIG. 9 is a cross-sectional view of the fish tape assembly of FIG. 1, with the fish tape drum of FIG. 6 inserted.

[0019] FIG. 10 is a perspective view of the fish tape assembly of FIG. 1, illustrating movement of detent members of a crank hub.

[0020] FIG. 11 is a perspective view of the fish tape assembly of FIG. 1, illustrating removal of a crank hub.

[0021] FIG. 12 is a perspective view of the fish tape assembly of FIG. 1, illustrating opening of a door.

[0022] FIG. 13 is a perspective view of the fish tape assembly of FIG. 13, illustrating removal of the fish tape drum of FIG. 6.

[0023] FIG. 14 is a perspective view of a fish tape drum according to another embodiment, with portions removed.

[0024] FIG. 15 is a perspective view of the fish tape drum of FIG. 14, with portions removed.

[0025] FIG. 16 is an enlarged perspective view of the fish tape drum of FIG. 14.

[0026] FIG. 17 is a cross-sectional view of the fish tape drum of FIG. 14.

[0027] FIG. 18 is an enlarged perspective view of a fish tape drum according to another embodiment.

[0028] FIG. 19 is a perspective view of the fish tape drum of FIG. 14 received in a fish tape tool.

[0029] FIG. 20 is a cross-sectional view of a fish tape drum according to another embodiment.

[0030] FIG. 21 is a cross-sectional view of the fish tape drum of FIG. 14 with a first insert and a second insert inserted into a drum portion.

[0031] FIG. 22 is a perspective view of the fish tape drum of FIG. 14 with a third insert inserted into a drum portion.

[0032] FIG. 23 is a cross-sectional view of a fish tape drum according to another embodiment.

[0033] FIG. 24 is a perspective view of nozzle of a fish tape drum according to another embodiment.

[0034] FIG. 25 is a cross-sectional view of the fish tape drum of FIG. 14 with a fourth insert inserted into a drum portion.

[0035] FIG. 26 is an enlarged perspective view of a separator rib of a fish tape drum according to another embodiment.

[0036] FIG. 27 is a plan view of the separator rib of FIG. 26.

[0037] FIG. 28 is a perspective view of an intermediate wall of a drum portion of the fish tape drum of FIG. 14, according to another embodiment.

[0038] FIG. 29 is a cross-sectional view of the intermediate wall of FIG. 28.

[0039] FIG. 30 is a perspective view of an anchor end of a fish tape coupled to an anchor, according to another embodiment.

[0040] FIG. 31 is a perspective view a fish tape assembly according to another embodiment.

[0041] FIG. 32 is a perspective view of the fish tape assembly of FIG. 31, with a fish tape drum removed.

[0042] FIG. 33 is a perspective view of a fish tape drum of the fish tape assembly of FIG. 31, with portions removed.

[0043] FIG. 34 is a schematic view of another embodiment of a fish tape tool.

[0044] FIG. 35 is a schematic view of another embodiment of a fish tape tool.

[0045] FIG. 36 is a schematic view of another embodiment of a fish tape tool.

[0046] Before any embodiments of the invention are explained in detail, it is to be understood that the invention is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the following drawings. The invention is capable of other embodiments and of being practiced or of being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting.

#### DETAILED DESCRIPTION

[0047] As shown in FIGS. 1-3, a fish tape assembly includes a fish tape tool 10 having a housing 14, a motor 18 (FIG. 3) for driving an output reel 22 (FIG. 2), and a selectively removable and rechargeable battery 26 for powering the motor 18. The fish tape tool 10 receives a fish tape drum 30 (FIG. 6) that contains a length of fish tape 32 having a moving end 34 extending out of the fish tape drum 30 and the fish tape tool 10. As explained further below, when the fish tape drum 30 is received in the fish tape tool 10, the output reel 22 can rotate to move the moving end 34 out of or into the housing 14.

[0048] As shown in FIGS. 1 and 2, the housing 14 includes a base 38 and a door 42 having an inner edge 44 defining an aperture 46. The door 42 is pivotably coupled to the base 38 via a hinge joint 48. An interior chamber 50 is defined within the housing 14. The door 42 moves with respect to the base 38 between a closed position (FIG. 1), in which the interior chamber 50 is not accessible, and an open position, in which the interior chamber 50 is accessible. The open position is shown in FIG. 2, with the door 42 removed for clarity, and in FIGS. 12 and 13. A latch 54 on the base 38 is slideable between a locked position, in which the door 42 is locked in the closed position, and an unlocked position, in which the door 42 may be pivoted to the open position.

[0049] With continued reference to FIGS. 1 and 2, the housing 14 includes a handle 56 coupled to the base 38. The handle 56 includes a trigger 58 for actuating the motor 18 and a directional shuttle 62 that can slide between a dispensing position and a retracting position. In the dispensing position, the motor 18 and the output reel 22 rotate in a dispensing direction, such that the fish tape 32 is dispensed from the fish tape drum 30 (and tool 10). In the retracting position, the motor 18 and the output reel 22 rotate in a retracting direction that is opposite the dispensing direction, such that the fish tape 32 is retracted into the fish tape drum 30 (and tool 10). The handle 56 includes a light 64, such as an LED, that is illuminated when the trigger is depressed 58 to actuate the motor 18.

[0050] The fish tape tool 10 also includes a controller 65 for variably controlling the speed of the motor 18, and thus the speed at which the fish tape 32 is dispensed or retracted. In some embodiments, the controller varies the speed of the motor 18 in response to a degree of depression of the trigger. In some embodiments, the controller 65 varies the speed of the motor 18 based on pulse width modulation. In some embodiments, the fish tape tool 10 includes a potentiometer (not shown) to vary the speed of the motor 18.

[0051] As shown in FIG. 2, the base 38 includes a channel 66 leading from the interior chamber 50 to an exit 70 out of the housing 14. The channel 66 includes a hall effect sensor 72, whose function will be described later herein. The base 38 also includes radially inward-extending ribs 74. With

continued reference to FIG. 2, the output reel 22 includes radially outward-extending legs 78 and a keyway recess 82. As shown in FIGS. 3 and 9, the fish tape tool 10 includes a transmission 86 for transferring torque from the motor 18 to the output reel 22. The transmission 86 terminates in a drive key 90 arranged in the keyway recess 82, such that the output reel 22 can receive torque from the transmission 86, and thus rotate relative to the base 38. In some embodiments the transmission 86 includes a clutch mechanism (not shown). As explained in further detail below, the clutch mechanism is used to disconnect the output reel 22 from the transmission 86, such that torque cannot be transferred from the output reel 22 to the transmission 86.

[0052] As shown in FIGS. 1, 4, and 5, the fish tape tool 10 includes a crank hub 94 including an outer shelf 98, an inner shelf 102, and a pair of detent members 106 between the outer and inner shelves 98, 102. The detent members 106 each include a radially outward-extending lip 110 and an axially extending tab 114. The detent members 106 are moveable between radially inward and outward positions, as explained in further detail below.

[0053] The outer shelf 98 includes a lever 118 moveable between an extended position shown in FIG. 1 and a collapsed position shown in FIG. 5. The lever 118 includes a detent 122 that is receivable in a recess 126 extending through the outer and inner shelves 98, 102, such that when the lever 118 is moved to the collapsed position of FIG. 5, the lever 118 is locked against the crank hub 94 unless an operator pulls the detent 122 out of the recess 126. As shown in FIG. 4, the inner shelf 102 includes radially outward-extending legs 130 in which radially outward-extending recesses 134 are defined on each leg 130. Thus, the crank hub 94 may be engaged for rotation with the output reel 22 by setting the legs 78 of the output reel 22 within the recesses 134 of the crank hub 94.

[0054] As shown in FIG. 6, the fish tape drum 30 includes a drum portion 138 including first and second clamshells 142, 146. The drum portion 138 retains the length of fish tape 32 and defines radially outward-extending recesses 150 at an inner diameter 154 thereof. A frame 158 is arranged between the first and second clamshells 142, 146 of the drum portion 138 and defines an exit 162 for the fish tape 32. The frame 158 also defines radially inward-extending recesses 166 at an outer edge 170 thereof. As explained in further detail below, the drum portion 138 is rotatable relative to the frame 158.

[0055] This fish tape 32 includes an anchor end (not shown) that is opposite of the moving end 34. The anchor end of the fish tape 32 is anchored within the drum portion 138 of the fish tape drum 30. In some embodiments, the anchor end of the fish tape 32 is anchored within the fish tape drum 30 at the inner diameter 154 of the drum portion 138 by a screw boss (not shown). Proximate the anchor end, the length of fish tape 32 includes a detectable element, such as a magnet (not shown) that is detectable by the hall effect sensor 72 in the channel 66. Thus, during a dispensing operation, when a predetermined amount of fish tape 32 has been dispensed out from the fish tape tool 10, the magnet passes by the hall effect sensor 72, which sends a signal to the controller 65. In response to the signal, the controller 65 determines that the predetermined amount of fish tape 32 has been dispensed out of the fish tape tool, and alerts the

operator, e.g. via a different color or flashing pattern from the light 64, that the predetermined amount of fish tape 32 has been dispensed.

[0056] To install the fish tape drum 30 in the fish tape tool 10, an operator slides the latch 54 to the unlocked position and then pivots the door 42 to the open position, as shown in FIG. 2. The operator then inserts the fish tape drum 30 into the interior chamber 50, aligning the exit 162 of the frame 158 with the channel 66 of the base 38 and the ribs 74 with the recesses 166 of the frame 158, as shown in FIG. 7. Thus, the frame 158 of the fish tape drum 30 is prevented from rotating with respect to the base 38. The operator then positions the fish tape 32 in the channel 66 and arranges the moving end 34 outside of the exit 70 of the housing 14, as shown in FIG. 7. The operator then closes the door 42 and moves the latch 54 to the locked position, thereby securing the fish tape drum 30 within the interior chamber 50 of the housing 14, as shown in FIG. 8. In some embodiments, the operator may now operate the fish tape tool 10 to dispense fish tape 32 from the housing 14 without insertion of the crank hub 94, because the legs 78 of the output reel 22 are positioned within the recesses 150 of the drum portion 138 of the fish tape drum 30. However, the subsequent operation described below will include insertion of the crank hub 94 into the housing 14 and operation therewith.

[0057] To insert the crank hub 94 into the housing 14, the operator pushes the tabs 114 of the detent members 106 of the crank member 94 radially inward, causing the detent members 106 to be held in a radially inward position (FIG. 9). The crank hub 94 may then be inserted through the aperture 46 of the door 42, in an alignment whereby the legs 78 of the reel output 22 are arranged in the recesses 134 of inner shelf 102 of the crank hub 94, and the legs 130 of the inner shelf 102 are received in the recesses 150 of the drum portion 138. Thus, the crank hub 94 is locked for rotation with the output reel 22 and the drum portion 138 is locked for rotation with the crank hub 94. Once the crank hub 94 has been inserted, the operator moves the tabs 114 outward, causing the detent members 106 to move to a radially outward position, such that the lips 110 are captured underneath the edge 44 of the door 42, as shown in FIG. 9. Thus, the crank hub 94 is axially locked with respect to the housing 14, and now prevented from slipping out of the aperture 46.

[0058] With continued reference to FIG. 9, the drum portion 138 is rotatable relative to the frame 150 by virtue of an inner edge 174 of the frame 158 being positioned within a channel 178 defined between the first and second clamshells 142, 146 of the drum portion 138. The length of fish tape 32 stored in the drum portion 138 has been omitted from FIG. 9 for clarity.

[0059] With the fish tape drum 30 and the crank hub 94 secured in the housing 14, the operator may now operate the fish tape tool 10. The operator slides the shuttle 62 to the dispensing position and depresses the trigger 58, thereby actuating the motor 18. The transmission 86 transmits torque from the motor 18 to the reel output 22 via the drive key 90 in the keyway recess 82. Because the legs 78 of the output reel 22 are arranged in the recesses 134 of the crank hub 94, and the legs 130 of the crank hub 94 are received in the recesses 150 of the drum portion 138, the crank hub 94 transmits rotation from the output reel 22 to the drum portion 138. As the drum portion 138 of the fish tape drum 30 rotates, the moving end 34 of the fish tape 32 is forced to move away from tool 10 and through, e.g., a conduit or wall.

[0060] As described above, if the operator completely depresses the trigger 58, the controller 65 causes the motor 18, and thus the fish tape 32, to move at a first, maximum speed. If the operator partially depresses the trigger 58, the controller 65 causes the motor 18, and thus the fish tape 32, to move at a second speed that is slower than the first speed. While the operator is depressing the trigger 58 and the fish tape 32 is being dispensed, the light 64 is illuminated to indicate to the operator that fish tape is being dispensed. When the predetermined amount of fish tape 32 has been dispensed out from the fish tape tool 10, the magnet on the fish tape 32 passes by the hall effect sensor 72, which sends a signal to the controller 65. In response to the signal, the controller 65 alerts, e.g. via the light 64, the operator that the predetermined amount of fish tape 32 has been dispensed. With this notification, the operator releases the trigger 58, thus stopping the motor 18.

[0061] In order to retract the fish tape 32 back into the tool 10 and fish tape drum 30, the operator may slide the shuttle 62 to the retracting position, thus switching the rotational direction of motor 18 and fish tape drum 30, and operate the motor 18 to reel in the fish tape 32 by depressing the trigger 58. At some point during retraction, it is possible that the fish tape 32 may become entangled within a conduit or wall, or the moving end 34 may become caught or snagged. To prevent damage to the motor 18 and transmission 86, the controller 65 is capable of determining that the fish tape 32 has become entangled or snagged and in response, deactivates the motor 18. In some embodiments, the controller 65 monitors the current drawn by the motor 18 from the battery 26 during operation. If and when the fish tape 32 becomes snagged or entangled, the amount of current that the motor 18 draws will be above a predetermined threshold. The controller 65 detects that the current drawn is above the predetermined threshold, and in response deactivate the motor 18.

[0062] Instead of powered retraction, as some point the operator may switch the lever 118 to the extended position, as shown in FIG. 1, and crank the fish tape 32 back into the tool 10 manually, via the crank hub 94. Specifically, as the operator rotates the lever 118, and thus the crank hub 94, with respect to the housing 14, the drum portion 138 of the fish tape drum 30 is also caused to rotate because the legs 130 of the crank hub 94 are locked in the recesses 150 of the drum portion 138. Rotation of the crank hub 94 also causes rotation of the output reel 22, because the legs 78 of the output reel 22 are arranged in the recesses 134 of the crank hub 94. In the illustrated embodiment, the lever 118 is used to overcome the cogging torque of the motor 18. In other words, as the crank hub 94 is manually rotated, the output reel 22 rotates and transfers torque back through the transmission 86.

[0063] In other embodiments, however, a clutch mechanism is included to decouple the output reel 22 from the transmission 86, allowing the output reel 22 to spin freely with respect to the transmission 86 when the crank hub 94 manually rotates the output reel 22. Thus, in embodiments with a clutch, torque is not transmitted back from the output reel 22 to the transmission 86 as the operator manually cranks the crank hub 94 with the lever 118. For instance, upon the lever 118 being moved to the extended position, the crank hub 94 may push the key 90 out of the keyway recess 82, such that the output reel 22 may rotate relative to the transmission 86 when it receives torque from manual rota-

tion of the crank hub 94. Though manual operation of the tool 10 via the crank hub 94 is described here with respect to retracting the fish tape 32 into the tool 10, manual operation via the crank hub 94 can also be used to dispense fish tape 32 from the tool 10.

[0064] Once the fish tape 32 has been retracted into the tool 10, the operator may need to use a new fish tape drum 30 with a new type of fish tape 32 that is different from the current fish tape 32. For instance, the operator may need to change between conductive and non-conductive fish tape 32. Thus, the operator must remove the currently-installed fish tape drum 30.

[0065] To remove the fish tape drum 30, the operator moves the tabs 114 of the detent members 106 of the crank hub 94 radially inward, causing the detent members 106 to be held in a radially inward position, as shown in FIG. 10. The lips 110 of the detent members 106 are thus moved radially inward of edge 44, allowing the crank hub 94 to be removed from the aperture 46 of the door 42, as shown in FIG. 11. The latch 54 is then moved to the unlocked position, allowing the door 42 to be moved to the open position, as shown in FIG. 12. The operator is then able to remove the fish tape drum 30, as shown in FIG. 13, and replace it with a different fish tape drum 30, as described above.

[0066] FIGS. 14-17, 19, 31 and 33 illustrate a different embodiment of a fish tape drum 182. The fish tape drum 182 includes a drum portion 186 including first and second clamshells 190, 194. The first and second clamshells 190, 194 are each separately and rotatably supported by a frame 202 of the fish tape drum 182. A length of fish tape 196 (omitted in FIGS. 15-17 and FIG. 33 for clarity) is retained between the first and second clamshells 190, 194 of the drum portion 186. Each of the first and second clamshells 190, 194 of the drum portion 186 defines radially outward-extending recesses 198 that serve the same function as the recesses 150 of the drum portion 138 of fish tape drum 30. The first and second clamshells 190, 194 of the drum portion 186 are jointly rotatable relative to the frame 202 in the same manner as the drum portion 138 is rotatable relative to the frame 158 of the fish tape drum 30, as explained above, in order to dispense or retract the fish tape 196 from or into the fish tape drum 182.

[0067] As shown in FIGS. 14, 19 and 31 and 33 the frame 202 may include a shelf portion 204. Thus, in the embodiments of FIGS. 14-17 and 19 and 31-33, the fish tape tool 10 omits door 42 as shown in FIG. 32 and instead, when the fish tape drum 182 is received in the interior chamber 50, the shelf portion 204 of the frame 202 rests on the base 38 of the housing 14 of the tool 10, as shown in FIG. 31. Latches 205 on the fish tape tool 10, such as over-center latches, are used to secure the shelf portion 204 to the base 38 in order to prevent the fish tape drum 182 from slipping out of the base 38. As shown in the embodiment of FIGS. 31-33, the shelf portion 204 includes hooks 207 engagable by the latches 205 and gripping recesses 208 graspable by the operator to insert or remove the fish tape drum 182 into the interior chamber 50 of the fish tape tool 10. Also, in the embodiments of FIGS. 14-17 and 19 and 31-33, the crank hub 94 is omitted and thus, the output reel 22 rotates the drum portion 186 of the fish tape drum 182 directly, via the arrangement of legs 78 of the output reel 22 in the recesses 198 of the drum portion 186.

[0068] With reference to FIGS. 14, 15 and 17, the frame 202 includes a nozzle 206 extending from an external

surface 210 of the frame 202 and including a nozzle channel 214 defining an exit 216 for the fish tape 196. With reference to FIGS. 14 and 17, the exit 216 of the nozzle channel 214 has an exit width EW and an exit height EH. At least one of the exit width EW and the exit height EH are respectively less than a moving end height MH and a moving end width MW of a moving end 218 of the fish tape 196, which is arranged outside the fish tape drum 182. Thus, the moving end 218 is prevented from entering exit 216. The frame 202 also defines a plurality of radially inward-extending recesses 220 at the external surface 210, which serve the same function as the recesses 166 of frame 158 of fish tape drum 30.

[0069] With reference to FIGS. 15-17 and 33, the frame 202 includes a separator rib 222 extending radially inward from an inner surface 226 of the frame 202. The separator rib 222 includes a rib channel 230 extending through the rib 222 and leading to the nozzle channel 214, thus providing a passage for the fish tape 196 to exit and enter the drum portion 186. In some embodiments, the fish tape 196 is not provided in a single layer design. In other words, the fish tape 196 is not stacked one revolution on top of the next in a single column stack, such that multiple revolutions of the fish tape 196 are arranged approximately on the same plane as one another between the first and second clamshells 190, 194. Instead, the fish tape is freely located throughout the space in between the first and second clamshells 190, 194. In order to prevent the fish tape 196 from tangling and binding as the fish tape 196 is being dispensed from or retracted into the drum portion 186, the fish tape 196 in the drum portion 186 is prevented by the separating rib 222 from applying pressure against the portion of the fish tape 196 that is exiting or entering the rib channel 230, nozzle channel 214, and exit 216.

[0070] With continued reference to FIGS. 15-17 and 33, the frame 202 includes a diverter rib 234 extending approximately 290° around the circumference of the inner surface 226 of the frame 202. As shown in FIGS. 15 and 16, the diverter rib 234 includes a nose 238 having a first angled face 242 that is not parallel to the first clamshell 190 and a second angled face 246 that is not parallel to the second clamshell 194. As shown in FIG. 16, the nose 238 is arranged proximate to and on the same circumferential plane as the rib channel 230. As the fish tape 196 is retracted into the fish tape drum 182, instead of becoming frictionally locked on the diverter rib 234, the fish tape 196 is deflected away from the diverter rib 234 by one of the first or second angled faces 242, 246, such that the fish tape 196 is moved towards and into contact with one of the first or second clamshells 190, 194, which are rotating with respect to the frame 202 during the retraction operation.

[0071] In the embodiment of FIGS. 14, 15 and 17 and 19, the first clamshell 190 includes first slots 250 and the second clamshell 194 includes second slots 254 that are arranged in locations that correspond to the first slots 250, such that the first and second slots 250, 254 are aligned. The first and second slots 250, 254 extend between an inner wall 258 defining an inner diameter and an outer wall 262 defining an outer diameter of the first and second clamshells 190, 194, and thus the drum portion 186. An anchor member, such as pin 266, is arranged within a first slot 250 and a corresponding second slot 254. The pin 266 is moveable along the slots 250, 254, between a first position, in which the pin 266 is proximate the inner wall 258, and a second position, in

which the pin 266 is proximate the outer wall 262. In other embodiments, such as the embodiment of FIGS. 31-33, the first clamshell 190 includes just one first slot 250 and the second clamshell 194 includes just one second slot 254.

[0072] The fish tape 196 includes an anchor end that is opposite of the moving end 218 and secured to the pin 266. In a retracting operation, when an operator is retracting the fish tape 196 into the drum portion 186, the pin 266 will automatically move towards the first position in response to the retracting rotation of the drum portion 186 until the pin 266 arrives at the first position. As the drum portion 186 continues its retracting rotation, the pin 266 will remain in the first position until the retracting operation is completed or the operator stops the retracting operation. Then, if an operator switches to a dispensing operation, as the fish tape 196 is dispensed from the drum portion 186, the pin 266 will move from the first position towards the second position in response to the dispensing rotation of the drum portion 186 until the pin 266 arrives at the second position. As the drum portion 186 continues its dispensing rotation, the pin 266 will remain in the second position until the dispensing operation is completed or the operator stops the dispensing operation.

[0073] In another embodiment of fish tape drum 182 shown in FIG. 18, the anchor end of the fish tape 196 is secured at a fastening point 270 proximate the outer wall 262 of the drum portion 186. Thus, in the embodiment of FIG. 18, when the fish tape drum 182 includes a non-single layer tape, locating the fastening point 270 proximate the outer wall 262 of the drum portion eliminates "back-wind" and prevents the fish tape 196 from fouling when the fish tape 196 is dispensed under load.

[0074] In a different embodiment of the fish tape drum 182 shown in FIG. 20, the drum portion 186 includes an inner annular wall 274 to separate the drum portion 186 into an outer annular chamber 278 and an inner annular chamber 282. The inner annular wall 274 can be used to limit space inside the drum portion 186 for different types of fish tape. For instance, steel fish tape takes up less volume than the non-conductive fish tape. Thus, an operator can load the steel tape into the outer annular chamber 278, allowing the steel tape to fit more snugly within the drum portion 186 than in embodiments where the inner annular wall 274 is omitted. In this manner, the time it takes to dispense the steel tape can be reduced after the operator has pulled the trigger 58 for a dispensing operation.

[0075] In some embodiments, a first insert 286 and a second insert 290 are removably arranged between the first and second clamshells 190, 194 of the drum portion 186, such that a channel 294 is defined between the first and second inserts 286, 290, as shown in FIG. 21. In some embodiments, the first insert is removably coupled to the first clamshell 190 and the second insert 290 is removably coupled to the second clamshell 194, such that the first and second inserts 286, 290 are respectively coupled for rotation with the first and second clamshells 190, 194, which are coupled for co-rotation themselves. By arranging the first and second inserts 286, 290 within the drum portion 186, the axial spacing between the first and second clamshells 190, 194 is limited to the channel 294. Thus, when using single layer fish tape (omitted from FIG. 21 for clarity), the fish tape is limited to align itself, revolution upon revolution, within the channel 294. By forcing the single layer fish tape



to be a single stacked column of tape within the channel 294, friction between the revolutions of fish tape is reduced.

[0076] In some embodiments, a third insert 298 is removably arranged in the drum portion 186 between the inner and outer walls 258, 262 of the drum portion 186, as shown in FIG. 22. The first clamshell 190 is clear plastic in FIG. 22 to illustrate the position of the third insert 298 relative to the inner and outer walls 258, 262. The fish tape 196 is arranged in a circumferential channel 300 between the third insert 298 and the outer wall 258. A first radial distance D1 is defined between the inner and outer walls 258, 262 of the drum portion 186 and a second radial distance D2 is defined between the third insert 298 and the outer wall 262. The second radial distance D2 is less than the first radial distance D1, such that the third insert 298 functions to limit the radial space in which the fish tape 196 is arranged in the drum portion 186, i.e. the channel 300 between the third insert 298 an effective addition for shorter-length fish tape 196. Specifically, by inserting the third insert 298 into the drum portion 186, the lag time between initiating a feeding operation with trigger 58 and the point at which the moving end 218 of the fish tape 196 begins dispensing is reduced for shorter-length fish tape 196.

[0077] In some embodiments, instead of a diverter rib 234, the frame 202 includes bearings 302 on an inner edge 306 adjacent the inner surface 226, as shown in FIG. 23. Specifically, the bearings 302 are arranged in bores 310 in the inner edge 310 and are configured to rotate with respect to the inner edge 310. In some embodiments, the bearings 302 are needle bearings. The outer wall 258 of the drum portion 186 is configured to move along the bearings 302 as the drum portion 186 rotates relative to the frame 202, thus reducing friction between the outer wall 258 and the frame 202.

[0078] In some embodiments, the exit 216 for the fish tape 196 is modified such that the exit width EW is wider than the moving end width MW, while the exit height EH still remains less than the moving height MH of the moving end 218 of the fish tape, as shown in FIG. 24. The exit width EW is much greater than the exit height EH, such that the fish tape 196 is not restricted as it is dispensed or retracted into the exit 216. In some embodiments, the length of the exit width EW is more than four times the length than the exit height EH. Also, because the exit height EH is less than the moving height MH of the moving end 218, the moving end 218 is prevented from being retracted into the exit 216.

[0079] In some embodiments, a fourth insert 314 is removably arranged in the drum portion 186, as shown in FIG. 25. The fourth insert 314 has a first wall 318 and a second wall 322 forming a cross-sectional V-shape. An acute angle  $\alpha$  is defined between the first and second walls 318, 322. The fourth insert 314 also includes a joining portion 326 that joins the first and second walls 318, 322. The joining portion 326 is approximately parallel to an axis of rotation 330 about which the drum portion 186 rotates. In the illustrated embodiment, the joining portion 326 is spaced from the inner wall 258 of the drum portion 186. In the illustrated embodiment, a plurality of ribs 332 enable the fourth insert 314 to be removably coupled to the first and second clamshells 190, 194 of the drum portion 186. A channel 334 is defined between the first and second walls 318, 322 and in operation, the fish tape 196 is arranged in the channel 334 (but is omitted from FIG. 25 for clarity).

[0080] As shown in FIG. 25, a distance between the first and second walls 318, 322 increases when moving in a direction from the rotational axis 330 toward the outer wall 262 of the drum portion 186. In other words, the channel 334 gets progressively wider when moving in a direction from the rotational axis 330 toward the outer wall 262 of the drum portion 186. The fourth insert 314 thus provides a wider space for the fish tape 196 near the outer wall 262, proximate the channel 230 leading to the exit 216, and a narrower space for the fish tape 196 near joining portion 326. The progressively widening channel 334 helps the fish tape 196 to layer more evenly in the drum portion 186 and prevents the fish tape 196 from tangling during a feeding operation. The progressively widening channel 334 also helps prevent steel fish tape from binding.

[0081] In some embodiments of the separator rib 222, the rib channel 230 arranged in the separator rib 222 is defined by two side walls 338, 342 and a bottom wall 346 of the separator rib 222, as shown in FIGS. 26, 27 and 33. The separator rib 222 further includes an angled protrusion 347 extending inwardly from the bottom wall 346 and having an angled edge 348 that forms an acute angle  $\beta$  with respect to the bottom wall 346. Thus, as the fish tape 196 stacks on itself during a retracting operation, the angled protrusion 347 tends to push the layers of fish tape 196 off to either side of the separator rib 222, in order to inhibit the fish tape 196 from forming in a single column layered on itself.

[0082] In the embodiments of FIGS. 28 and 29 and 31-33 the drum portion 186 includes an intermediate wall 350 coupled between the first and second clamshells 190, 194 and radially arranged between the inner and outer walls 258, 262 of the drum portion 186. Only the intermediate wall 350 is shown in FIGS. 28 and 29, for clarity. However, the intermediate wall 350 is shown in the drum portion 186 in FIG. 33. The fish tape 196 is arranged between the intermediate wall 350 and the outer wall 262 within the drum portion 186. The intermediate wall 350 includes a well 354 that functions as a spring seat for a pair of biasing members, such as springs 358. The springs 358 respectively bias a pair of holding members 362 outwardly from the intermediate wall 350. The holding members 362 each include an aperture 366 in which the movable anchor, such as the pin 266, is retained. Thus, the pin 266, arranged in the slots 250, 254 (FIGS. 14 and 15), is biased by the springs 358 toward the second position of the pin 266, in which the pin 266 is proximate the outer wall 262, such that during a retracting or dispensing operation, an anchor end 370 of the fish tape 196 is biased toward the outer wall 262 of the drum portion 186 to eliminate tangling of the fish tape 196 until the spring force is overcome. In the embodiments of FIGS. 28, 29 and 31-33, the first position of the pin 266 is proximate the intermediate wall 350 rather than the inner wall 258.

[0083] In the embodiment of FIG. 30, the anchor end 370 of the fish tape 196 is looped over the pin 266 and welded to itself at a weld point 374, which provides a high strength connection of the fish tape 196 to the pin 266.

[0084] FIG. 34 illustrates a fish tape tool 10 that is similar to the fish tape tool of FIGS. 31-33, except for the following differences explained below. Specifically, the fish tape tool 10 includes a second motor 378 that is coupled to a drive roller 382 via a belt 386 or second transmission. The drive roller 382 and an adjacent idler roller 390 are arranged proximate the nozzle 206 or rib channel 230 (not shown in FIG. 34 but see FIG. 33). In the embodiment of FIG. 34, the

first motor 18 is used only to retract the fish tape 196. The second motor 378 is included only for dispensing the fish tape 196, which is wedged between the drive roller 382 and idler roller 390 by a clamping force. Thus, in a dispensing operation, the second motor 378 rotates the drive roller 382 and because the fish tape 196 is clamped between the drive and idler rollers 382, 390, rotation of the drive roller 382 forces the fish tape 196 out of the nozzle 206. In the embodiment of FIG. 34, the first transmission 86 has a clutch to clutch out the first motor 18 during a dispensing operation and the second motor 378 also has a clutch mechanism, such as in the second transmission, to clutch out the second motor 378 during a retracting operation. Thus, during the dispensing operation, even though dispensing of the fish tape 196 causes the drum portion 186 to rotate relative to the frame 202, thus causing the output reel 22 to rotate, rotation of the output reel 22 is not translated back through to the first motor 18 because of the clutch in the transmission 86. During a retracting operation, even though retraction of the fish tape 196 causes the drum portion 186 to rotate relative to the frame 202, thus causing the drive roller 382 to rotate as the fish tape 186 moves between the driver roller 382 and the idler roller 390, rotation of the drive roller 382 is not translated to the second motor 378 because of the clutch mechanism, e.g., in the second transmission.

[0085] FIG. 35 illustrates a fish tape tool 10 that is similar to the fish tape tool of FIG. 34, except for the following differences explained below. Specifically, the fish tape tool 10 includes the drive roller 382 and idler roller 390 of the embodiment of FIG. 34, but omits the second motor 378 and the belt 386 or second transmission. Instead, a belt 394 or second transmission transmits torque between the motor 18 and the drive roller 382. In the embodiment of FIG. 35, the drive and idler rollers 382, 390 include one way needle bearings. Thus, during the dispensing operation, the drive roller 382 receives torque from the motor 18 via the belt 394 or second transmission and the fish tape 196 is forced out of the nozzle 206 in a similar manner as in the embodiment of FIG. 34. During a retracting operation, as the fish tape 196 is retracted between the drive and idler rollers 382, 390, the drive and idler rollers 382, 390 spin freely via the one way needle bearings, such that rotation of the drive roller 382 does not transmit torque back to the motor 18 via the belt 394 or second transmission.

[0086] FIG. 36 illustrates a fish tape tool 10 that is similar to the fish tape tool of FIG. 35, except for the following differences explained below. Specifically, the fish tape tool 10 includes the drive roller 382 and idler roller 390 of the embodiment of FIG. 34, but omits the belt 394 or second transmission between the motor 18 and the drive roller 382. Instead, the outer wall 262 of the drum portion 186 of the fish tape drum 182 includes a ring gear 398 that meshes with the drive roller 382. Thus, during the dispensing operation, the drum portion 186 is rotated by the output reel 22, causing the ring gear 398 to rotate the drive roller 382, such that the fish tape 196 is forced out of the nozzle 206 in a similar manner as in the embodiment of FIG. 35. During a retracting operation, as the fish tape 196 is retracted between the drive and idler rollers 382, 390, the drive and idler rollers 382, 390 spin freely via the one way needle bearings, such that rotation of the drive roller 382 does not transmit torque back to the motor 18 via the ring gear 398.

[0087] The foregoing description of the embodiments has been provided for purposes of illustration and description. It

is not intended to be exhaustive or to limit the invention. Individual elements or features of a particular embodiment are generally not limited to that particular embodiment, but, where applicable, are interchangeable and can be used in a selected embodiment, even if not specifically shown or described. The same may also be varied in many ways. Such variations are not to be regarded as a departure from the invention, and all such modifications are intended to be included within the scope of the invention.

[0088] Various features of the invention are set forth in the following claims.

1. A fish tape tool comprising:

a housing;

a chamber defined in the housing;

a motor supported by the housing, the motor configured to rotate in a first direction and a second direction that is opposite the first direction;

an output reel disposed in the chamber and rotatable in response to receiving torque from the motor; and

a drum containing a fish tape and including a rotatable drum portion having an inner wall that is engaged by the output reel when the drum is inserted into the chamber of the housing,

wherein when the drum is in the chamber and the motor is rotated in the first direction, the drum portion is rotated by the output reel in the first direction, such that the fish tape is dispensed from the drum, and

wherein when the drum is in the chamber and the motor is rotated in the second direction, the drum portion is rotated by the output reel in the second direction, such that the fish tape is retracted into the drum.

2. The fish tape assembly of claim 1, wherein the inner wall of the drum portion includes a plurality of drum recesses, and wherein the output reel includes a plurality of reel legs that are received in the drum recesses to engage the inner wall of the drum portion with the output reel when the drum is in the chamber.

3. The fish tape assembly of claim 1, further comprising a transmission that transfers torque from the motor to the output reel.

4. The fish tape assembly of claim 1, wherein the drum portion has an outer wall and an anchor member moveable between a first position, in which the anchor member is arranged closer to the outer wall of the drum portion than the inner wall of the drum portion, and a second position, in which the anchor member is arranged closer to the inner wall of the drum portion than the outer wall of the drum portion, and

wherein the fish tape has an anchor end secured to the anchor member and an opposite moving end.

5. The fish tape assembly of claim 4, wherein the fish tape drum includes a biasing member configured to bias the anchor member toward the first position.

6. The fish tape drum of claim 5, wherein the drum portion includes an intermediate wall arranged in between the inner and outer walls of the drum portion, and

wherein the biasing member is a spring seated within a spring seat coupled to the intermediate wall.

7. The fish tape assembly of claim 1, further comprising a controller configured to determine when the fish tape is entangled when the fish tape is being dispensed from or retracted into the drum, and wherein the fish tape tool includes an indicator configured to provide an indication when the controller detects that the fish tape is entangled.

8. The fish tape assembly of claim 7, wherein the controller is configured to monitor a current drawn by the motor when the fish tape is being dispensed from or retracted into the drum, and wherein in response to the current drawn exceeding a predetermined threshold, the controller deactivates the motor and the indicator provides an indication that the fish tape is entangled.

9. The fish tape assembly of claim 1, further comprising a controller configured to determine when a predetermined length of fish tape has been dispensed from the fish tape drum.

10. The fish tape assembly of claim 9, further comprising an indicator configured to provide an indication that the predetermined length of fish tape has been dispensed from the drum in response to the controller determining that the predetermined length of fish tape has been dispensed from the drum.

11. The fish tape assembly of claim 9, wherein the housing includes a sensor and the length of fish tape includes a detectable element configured to be detected by the sensor, and wherein when the detectable element is detected by the sensor, the controller determines that the predetermined length of fish tape has been dispensed from the housing.

12. The fish tape assembly of claim 11, wherein the sensor is a hall effector sensor, and wherein the detectable element is a magnet.

13. A power tool comprising:

a housing;

a motor supported by the housing, the motor configured to rotate in a first direction and a second direction that is opposite the first direction;

a battery for supplying power to the motor; and

a drum containing a fish tape and including a rotatable drum portion configured to receive torque from the motor,

wherein when the motor is rotated in the first direction, the drum portion is rotated by the motor in the first direction, such that the fish tape is dispensed from the drum, and

wherein when the motor is rotated in a second direction, the drum portion is rotated by the motor in the second direction, such that the fish tape is retracted into the drum.

14. The power tool of claim 13, further comprising an output reel that rotates in response to receiving torque from

the motor, and wherein the drum portion includes an inner wall that is engaged by the output reel, such that when the output reel receives torque from the motor, the drum portion is configured to rotate with the output reel.

15. The power tool of claim 14, wherein the drum portion has an outer wall and an anchor member moveable between a first position, in which the anchor member is arranged closer to the outer wall of the drum portion than the inner wall of the drum portion, and a second position, in which the anchor member is arranged closer to the inner wall of the drum portion than the outer wall of the drum portion, and

wherein the fish tape has an anchor end secured to the anchor member and an opposite moving end.

16. The power tool of claim 13, further comprising a controller configured to determine when the fish tape is entangled while it is being dispensed from or retracted into the drum.

17. The power tool of claim 13, further comprising a controller configured to determine when a predetermined length of fish tape has been dispensed from the drum.

18. A power tool comprising:

a housing;

a chamber defined in the housing;

a motor supported by the housing; and

a drum configured to be inserted into the chamber of the housing, the drum containing a fish tape and including a rotatable drum portion configured to rotate in response to receiving torque from the motor,

wherein the drum is one of a plurality of drums that are insertable into and removable from the chamber of the housing, each drum containing a different type of fish tape.

19. The fish tape assembly of claim 18, further comprising a battery for supplying power to the motor.

20. The fish tape assembly of claim 18, further comprising an output reel that rotates in response to receiving torque from the motor, and wherein the drum portion includes an inner wall that is engaged by the output reel when the drum is received in the chamber, such that when the output reel receives torque from the motor, the drum portion is configured to rotate with the output reel.

21.-31. (canceled)

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