FISH.
FISH & RICHARDSON

Street Address
Fish & Richardson P.C.
3200 RBC Plaza
60 South Sixth Street
Minneapolis, MN 55402

Mail Address
P.O. Box 1022
Minneapolis, MN 55440-1022

612 335 5070 main
877 769 7945 fax

March 22, 2021

Attorney Docket No.: 46440-0006007

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Presented for filing is a new continuation patent application of:

Inventor(s): MOSHEH T. MOSKOWITZ AND NATHAN C. MOSKOWITZ

Title: BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION

Enclosed are the following papers, including those required to receive a filing date under 37 CFR 1.53(b):

	Pages
Specification	14
Claims	3
Abstract	1
Declaration	2
Drawing(s)	25

Enclosures:

— Application Data Sheet, 9 pages.
— Power of Attorney, 2 pages.

The applicant claims small entity status under 37 CFR 1.27.

Basic Filing Fee			$80
Search Fee			$350
Examination Fee			$400
Total Claims 20	over 20	**0 x $50**	$0
Independent Claims 1	over 3	**0 x $240**	$0

Fee for Multiple Dependent claims	$0
Application size fee for each 50 pages over 100 Total Sheets: 43 x .75 - 100/50 = 0 x	$0
Total Filing fee	$830

No filing fee is being paid now.

I hereby authorize the USPTO to communicate in response to email communications from the undersigned and practitioners under Customer No. 26191 in accordance with 37 CFR 1.33 and 37 CFR 1.34 concerning any subject matter of this application via email. I understand that a copy of these communications will be made of record in the application file. (MPEP 502.03).

If this application is considered to be incomplete, or if a telephone conference would otherwise be helpful, call the undersigned at (612) 337-2538.

Send all correspondence to:

26191
Customer Number

Respectfully submitted,

/Stuart A. Nelson/

Stuart A. Nelson
Registration No. 63,947

Enclosures

SWN/euw
100381399.doc

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
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 displays a valid OMB control number.

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

Title of Invention	BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION

As the below named inventor, I hereby declare that:

This declaration is directed to:

[ ] The attached application, or

[X] United States application or PCT international application number 15/934,622

filed on March 23, 2018.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

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.

WARNING:

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.

LEGAL NAME OF INVENTOR

Inventor: Mosheh T. Moskowitz Date (Optional): 8/24/18

Signature:

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.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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.

61741380.doc

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
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 displays a valid OMB control number.

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

Title of Invention	BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION

As the below named inventor, I hereby declare that:

This declaration is directed to:

[ ] The attached application, or

[X] United States application or PCT international application number 15/934,622

filed on March 23, 2018.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

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.

WARNING:

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.

LEGAL NAME OF INVENTOR

Inventor: Nathan C. Moskowitz Date (Optional): 8/24/18

Signature:

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.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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.

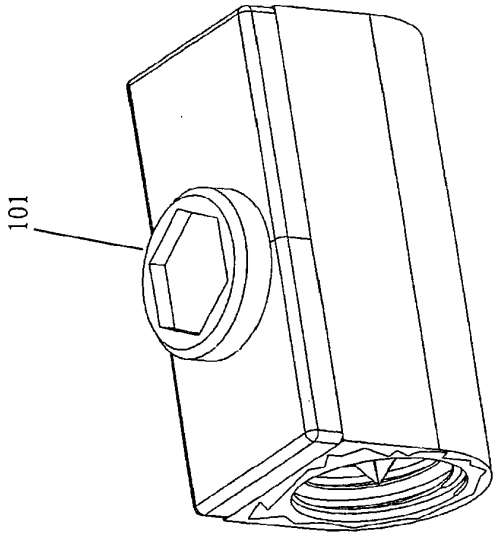


FIG. 1A

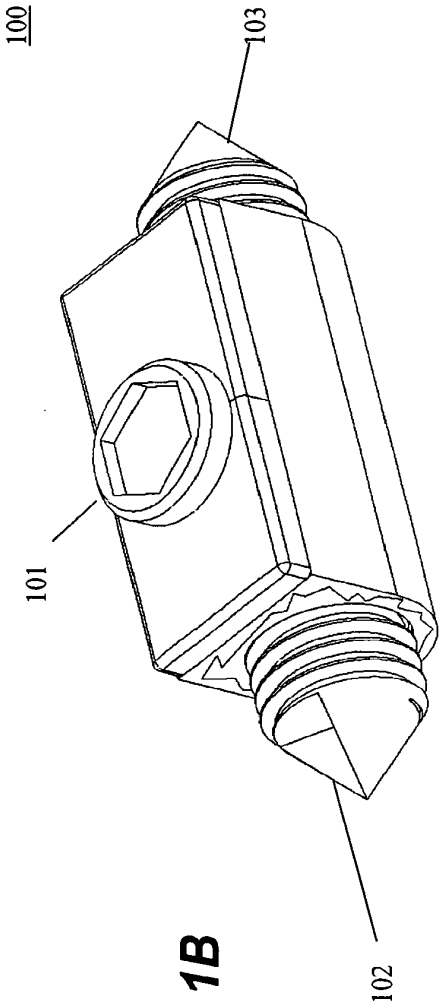


FIG. 1B

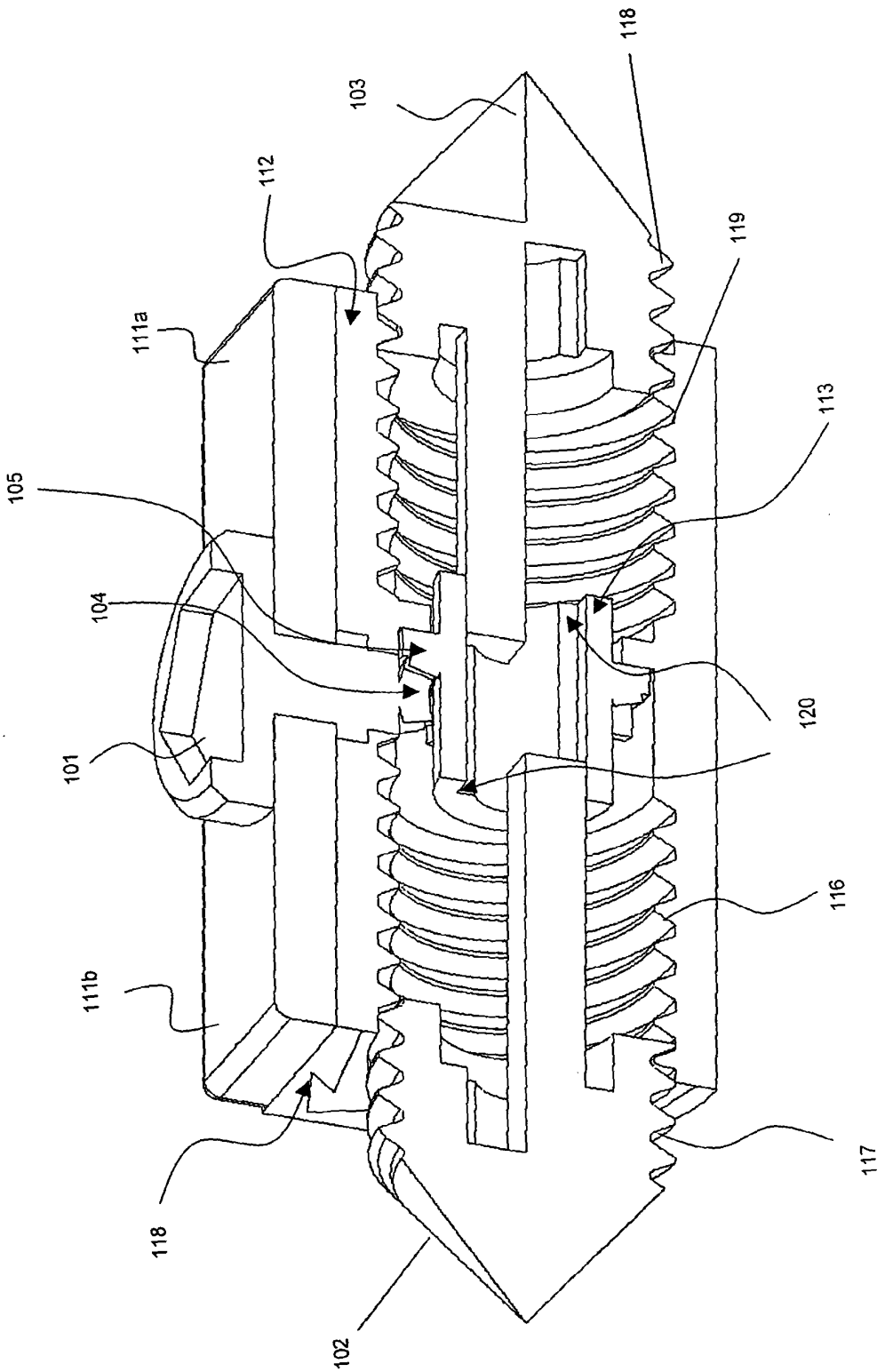


FIG. 1C

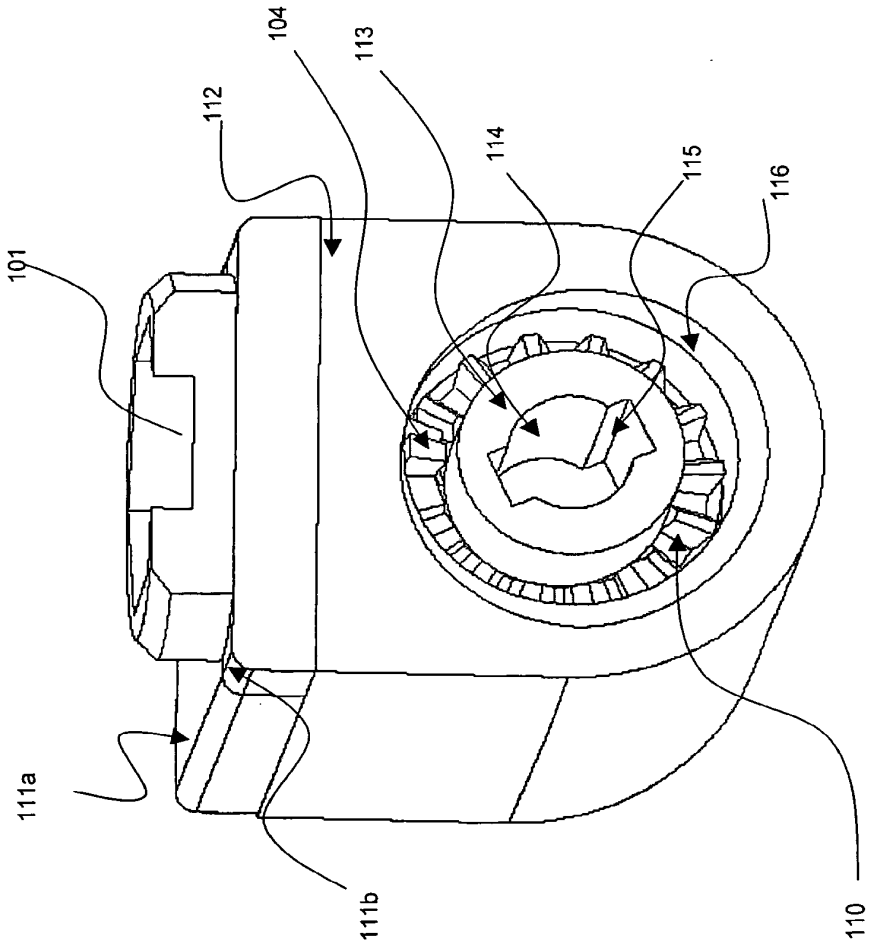


FIG. 1D

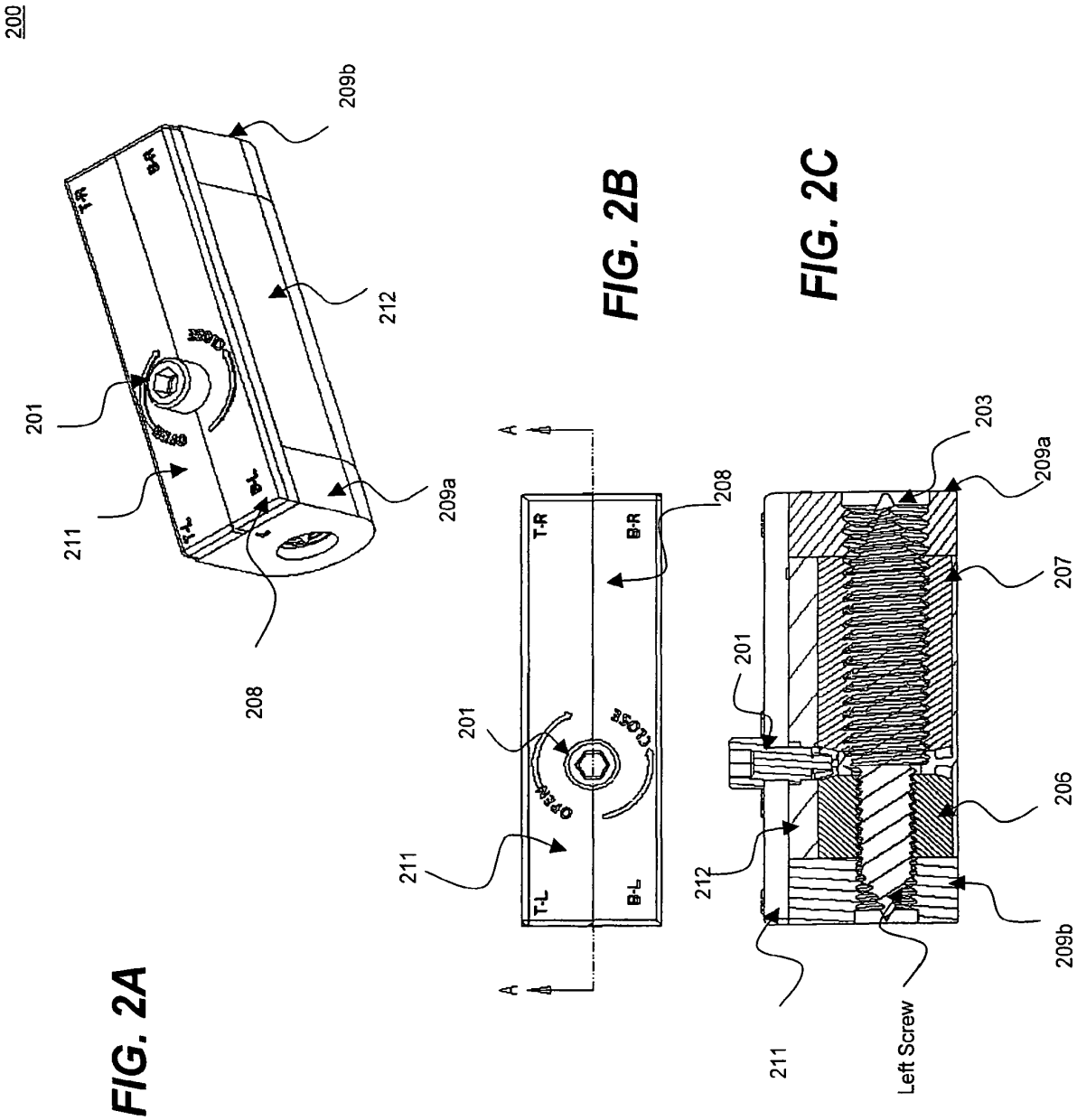


FIG. 2A

FIG. 2B

FIG. 2C

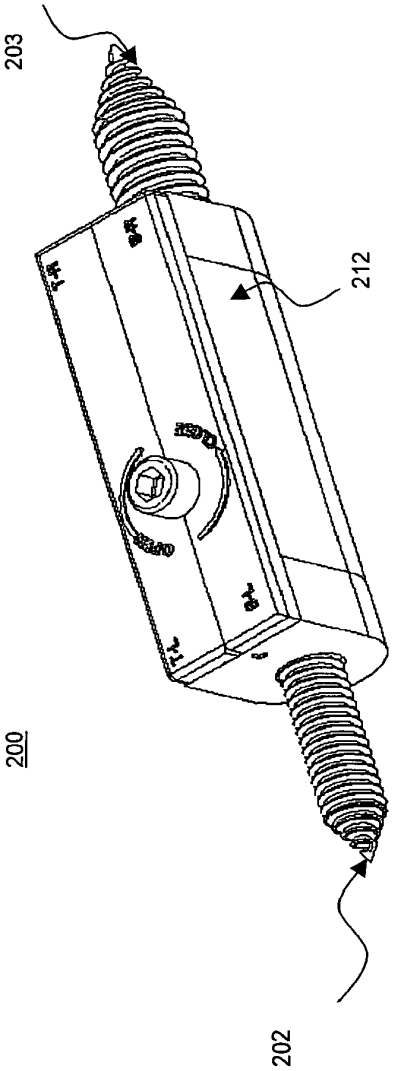


FIG. 2D

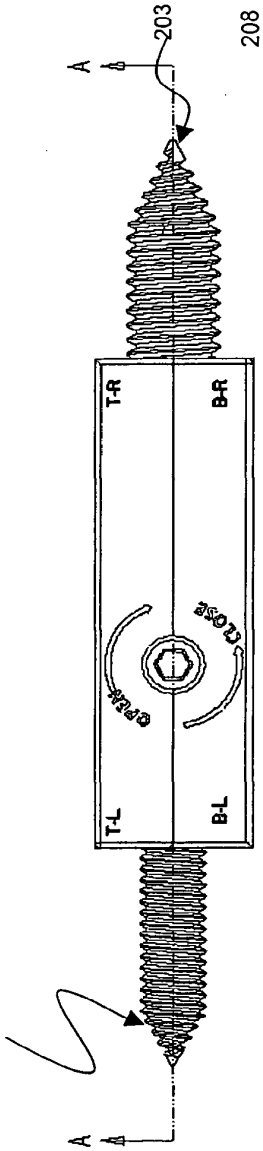


FIG. 2E

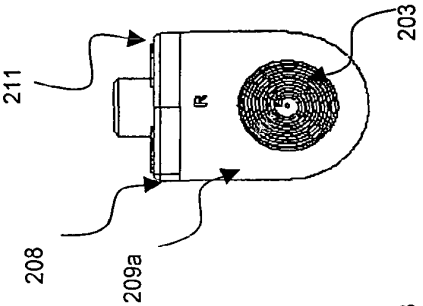


FIG. 2G

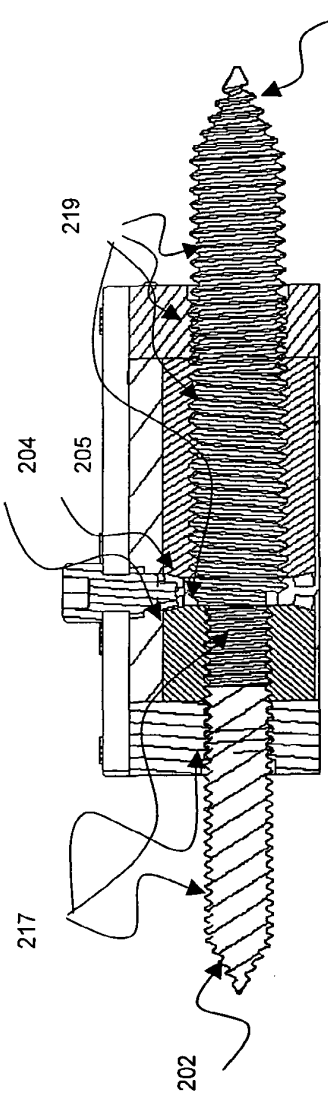


FIG. 2F

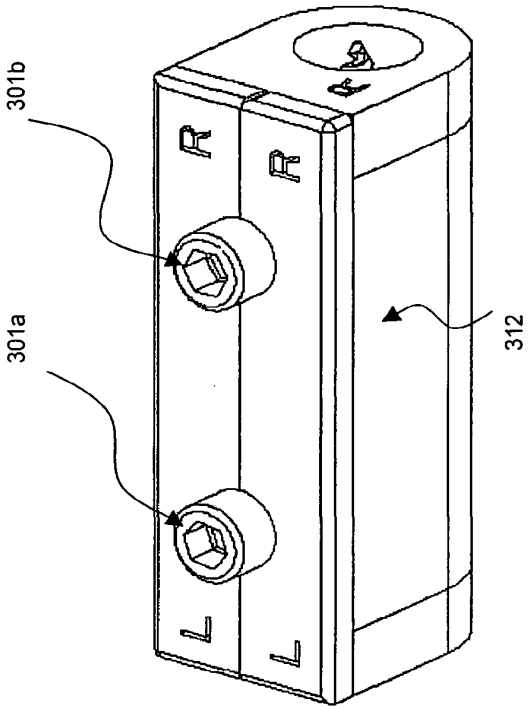


FIG. 3A

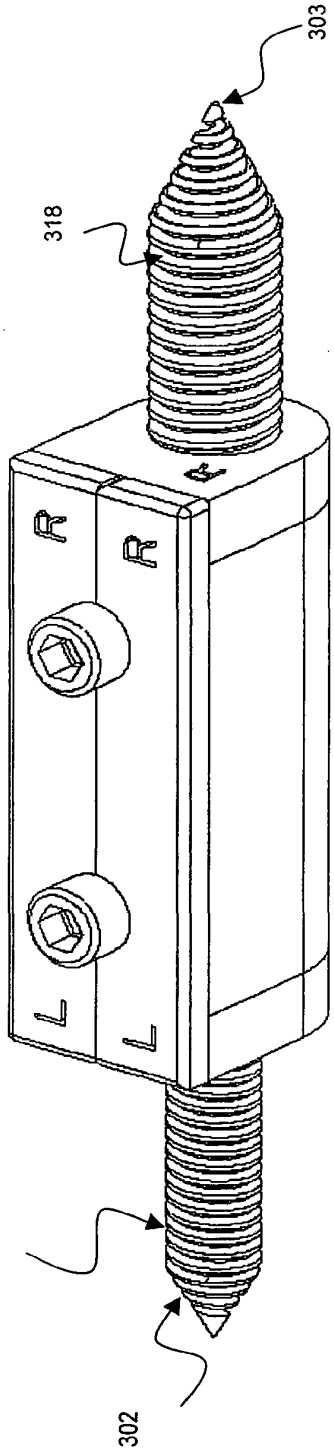


FIG. 3B

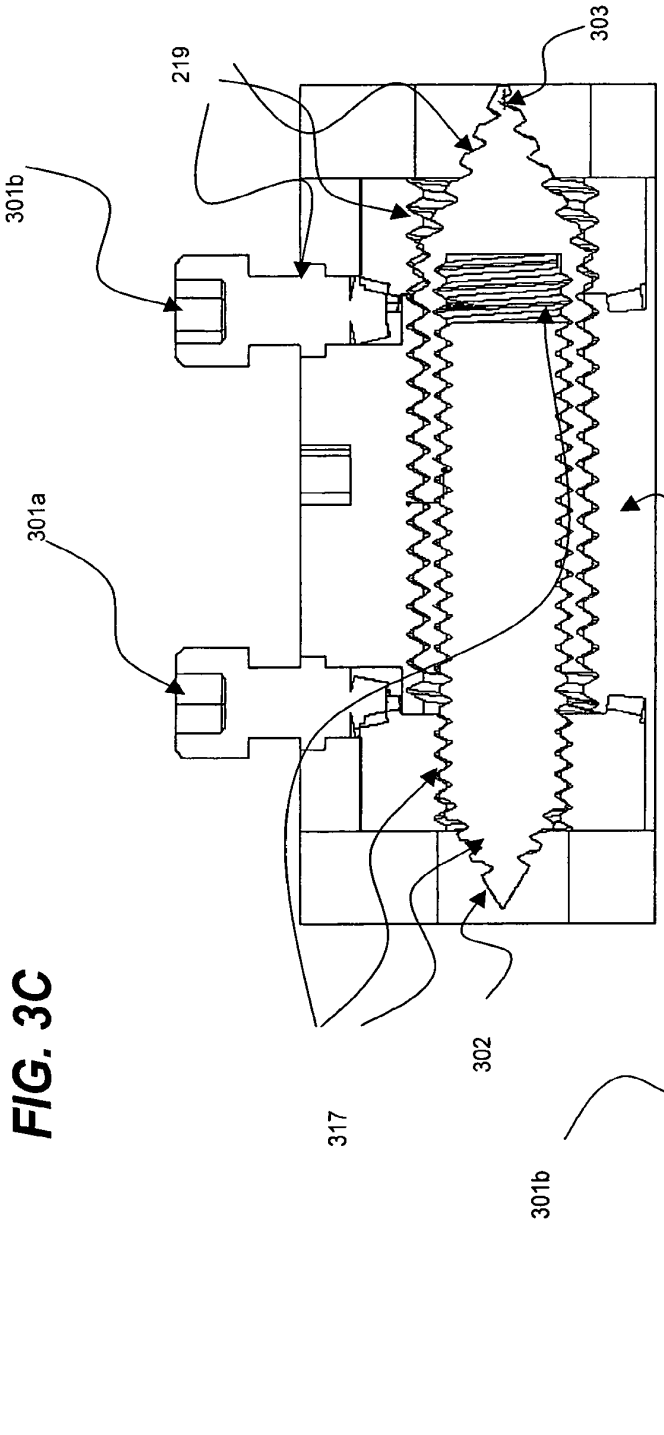


FIG. 3C

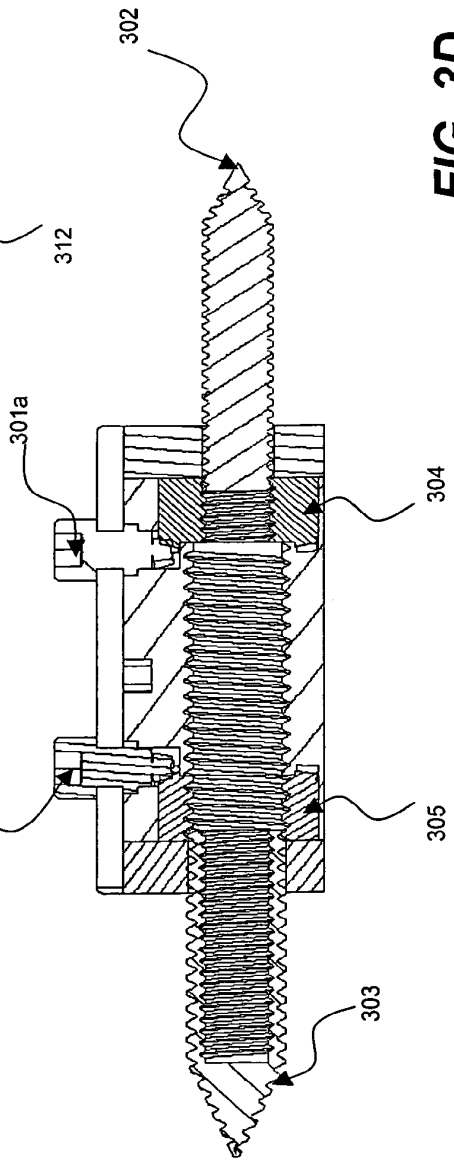


FIG. 3D

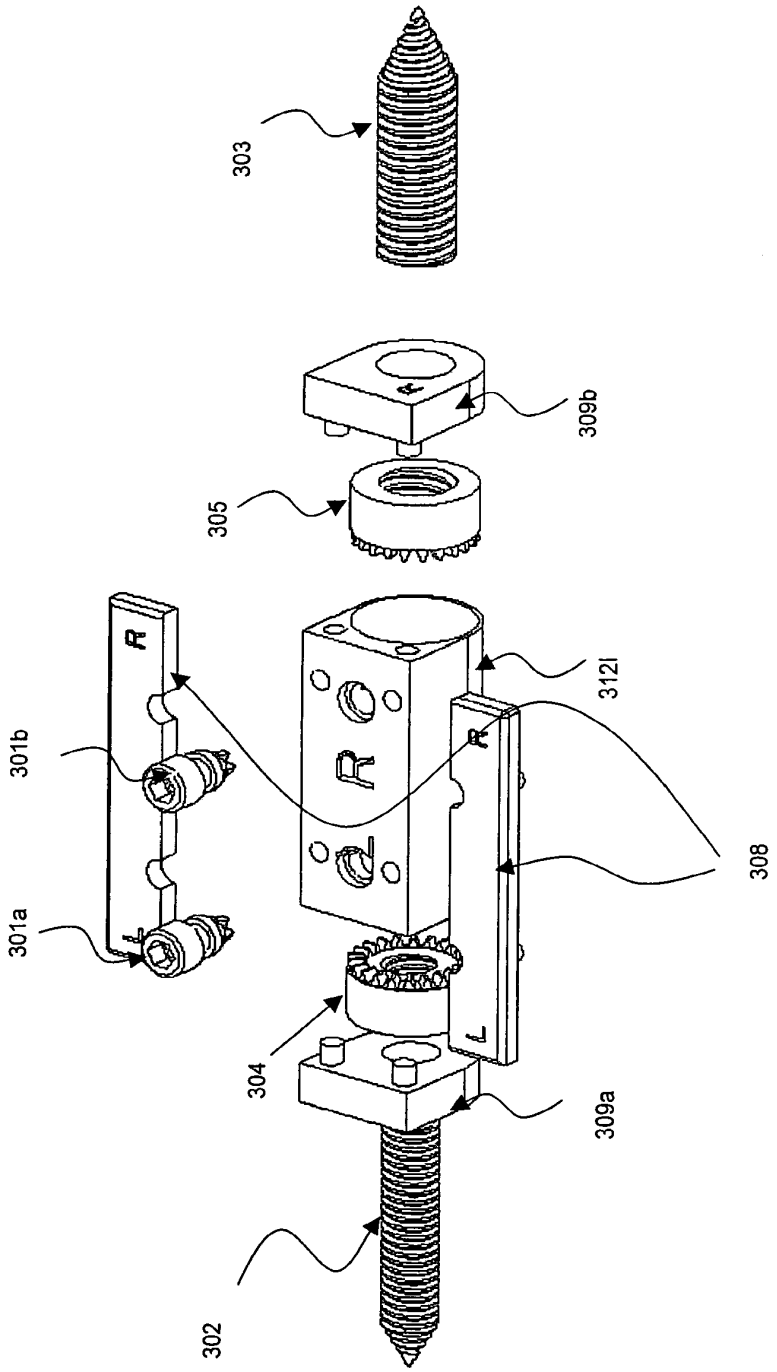


FIG. 3E

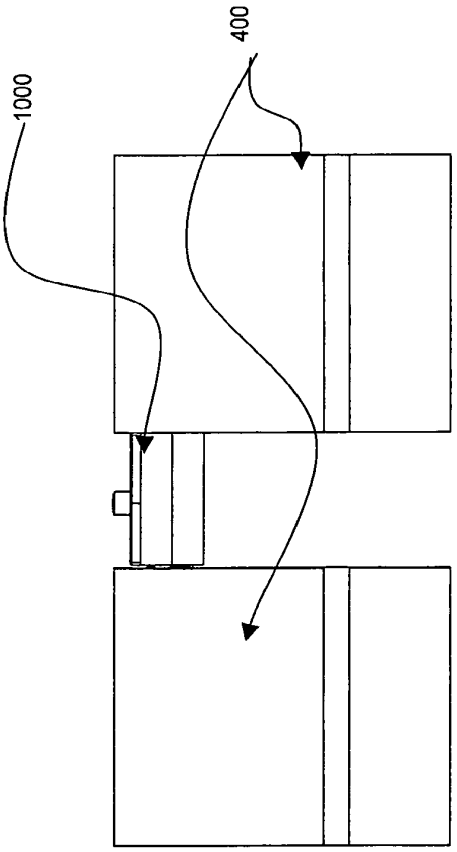


FIG. 4A

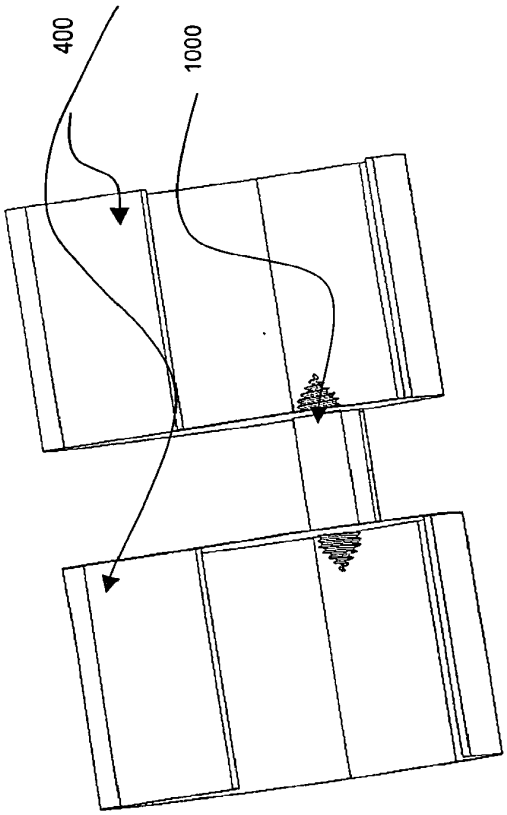


FIG. 4B

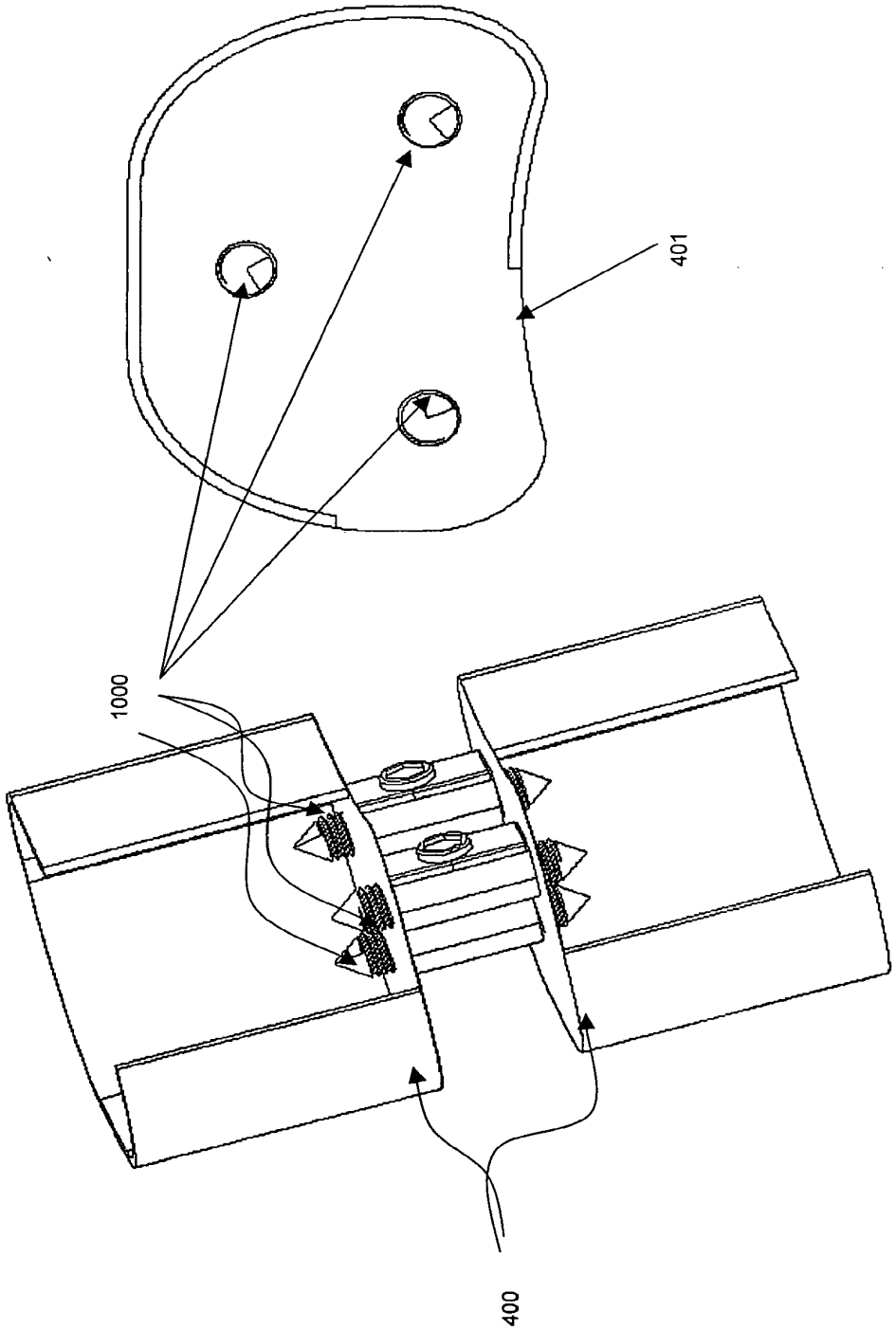


FIG. 4C

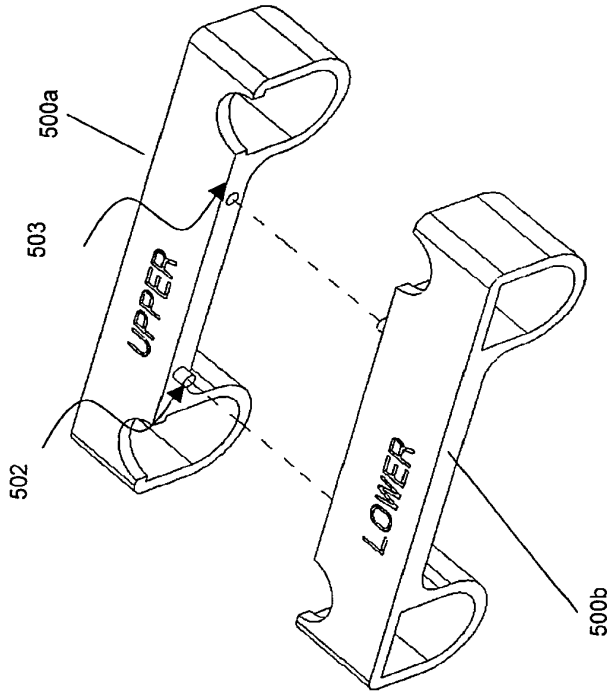


FIG. 5B

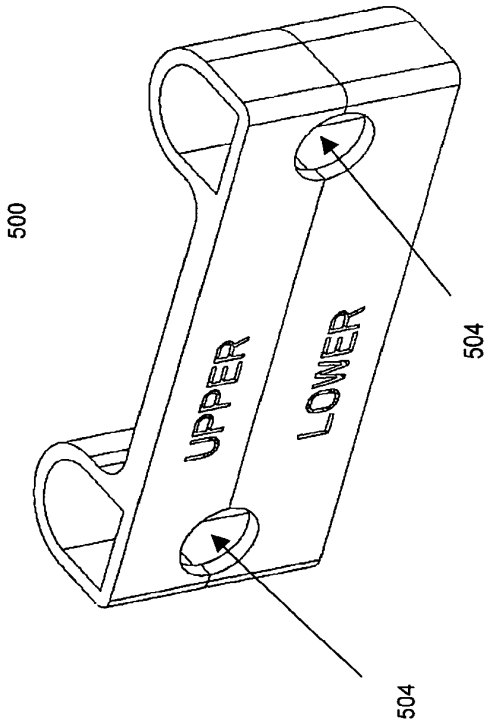


FIG. 5A

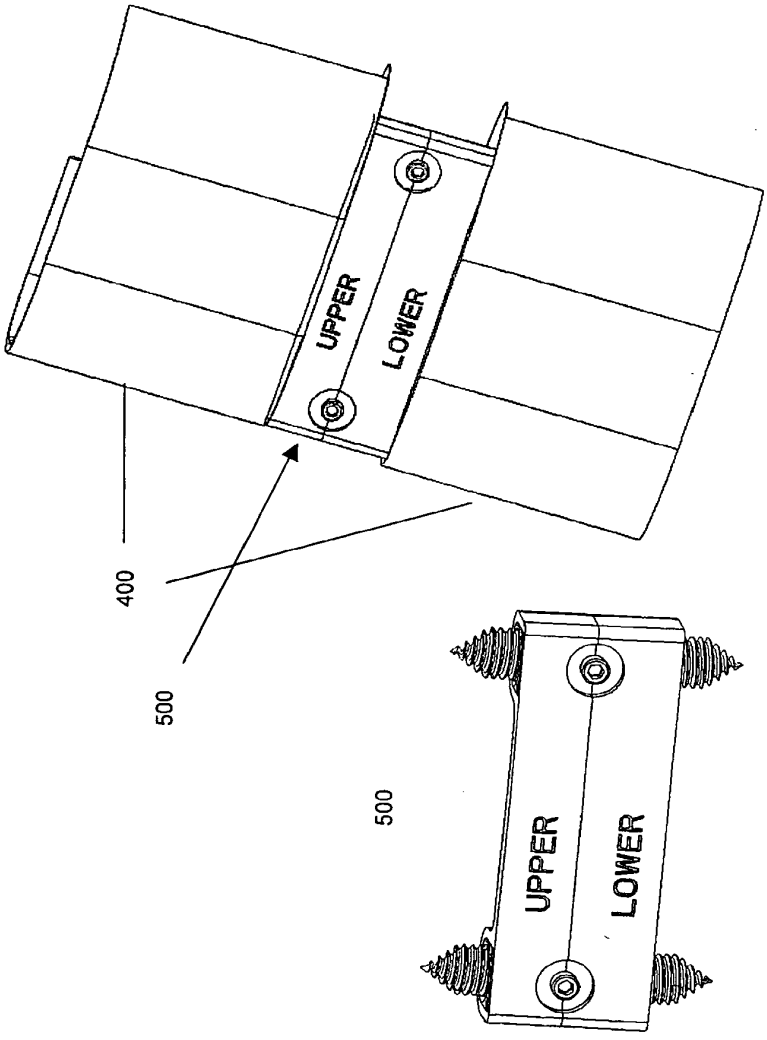


FIG. 5D

FIG. 5C

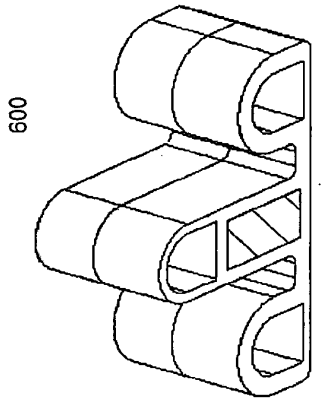


FIG. 6B

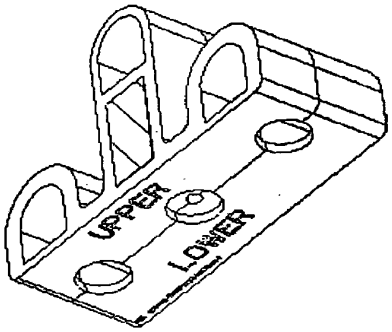


FIG. 6A

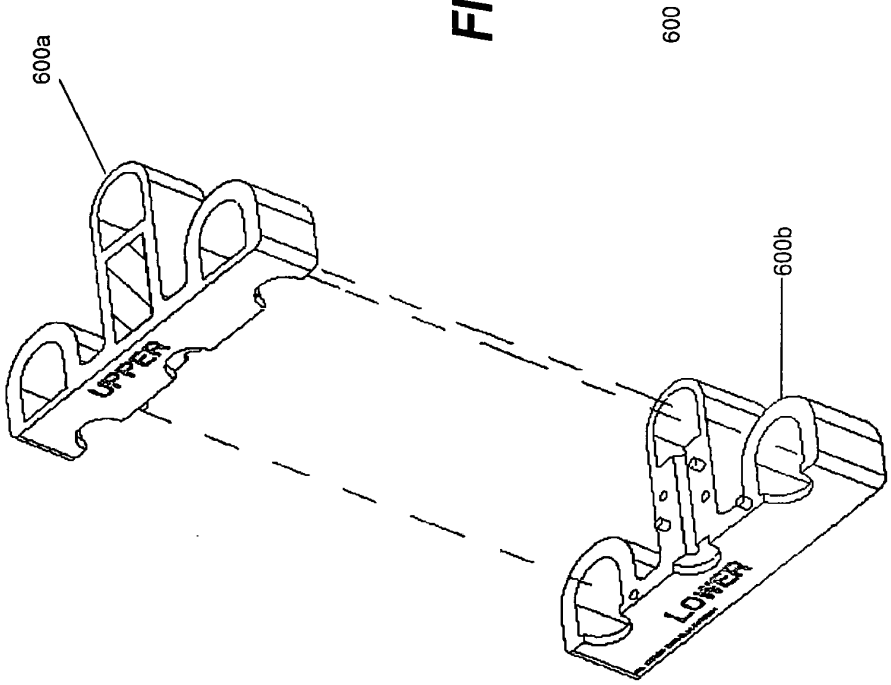


FIG. 6C

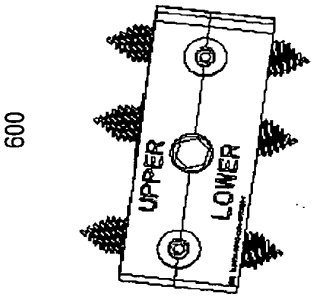


FIG. 6F

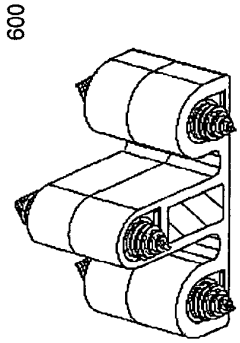


FIG. 6D

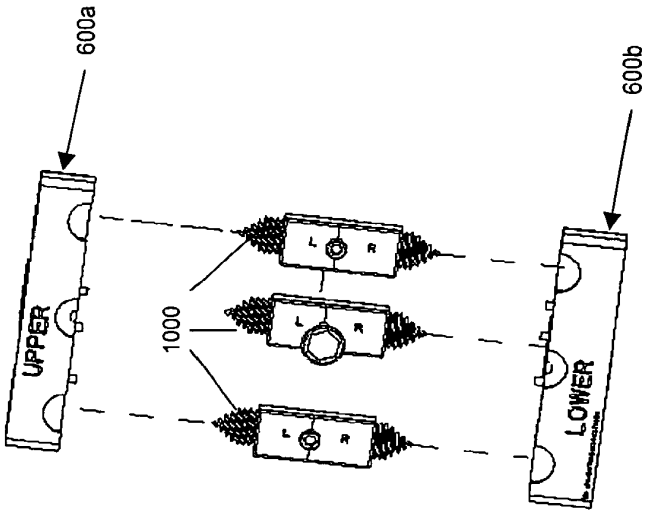


FIG. 6E

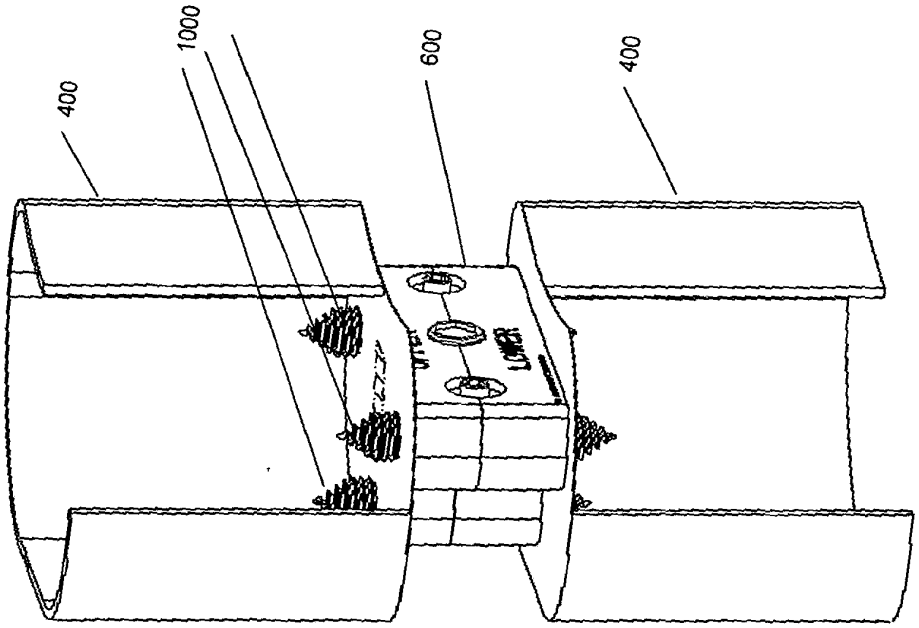


FIG. 6G

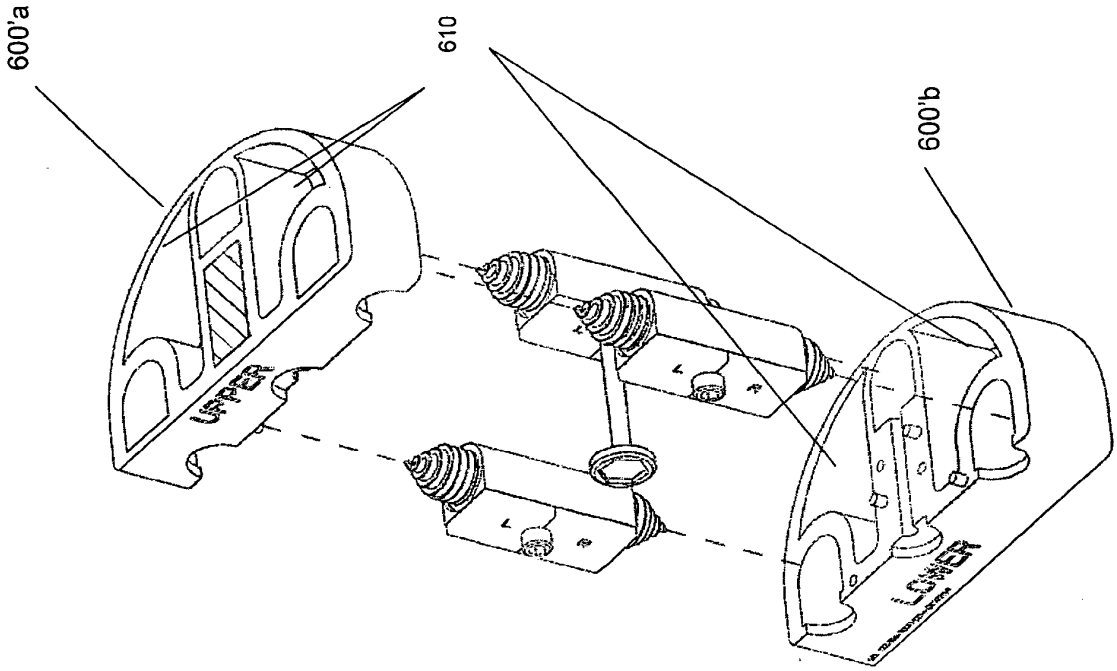
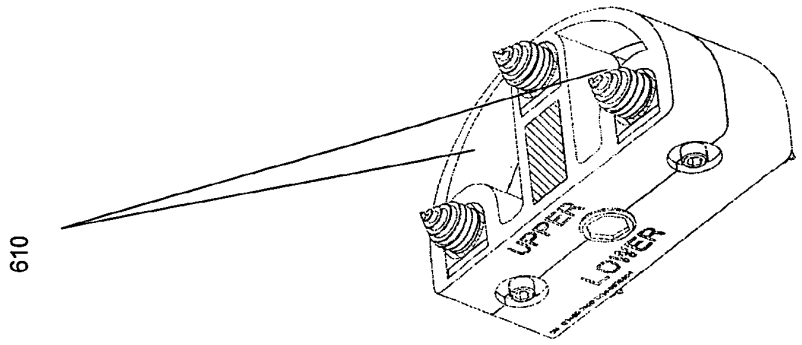


FIG. 6I



600'

FIG. 6H

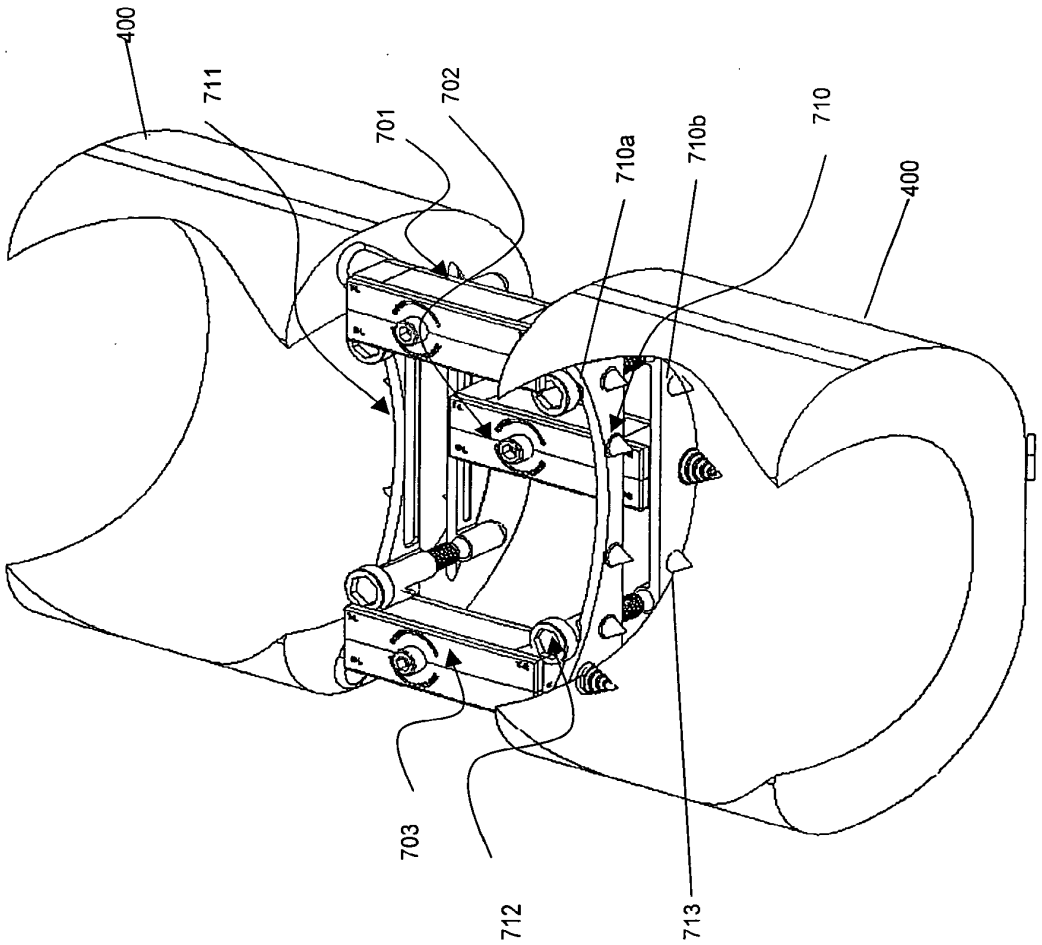


FIG. 7A

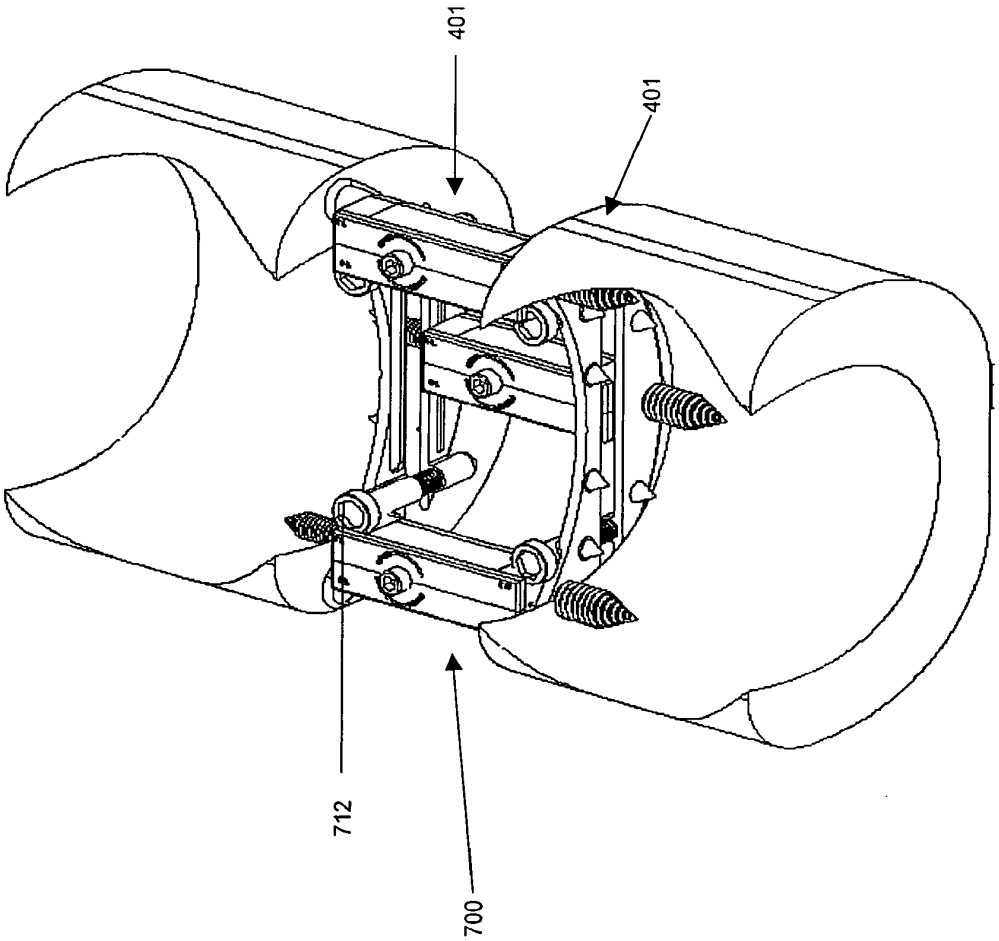


FIG. 7B

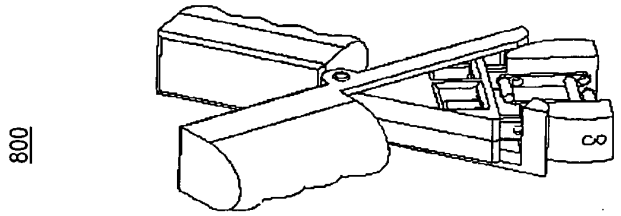


FIG. 8C

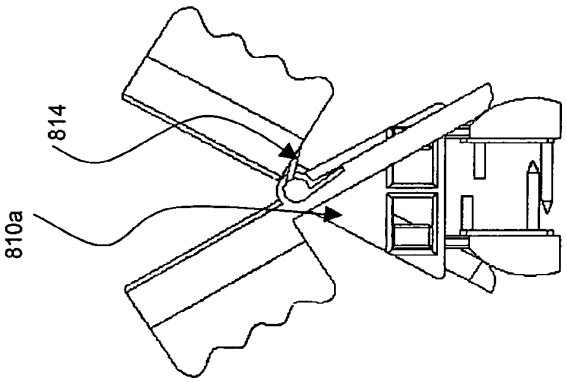


FIG. 8B

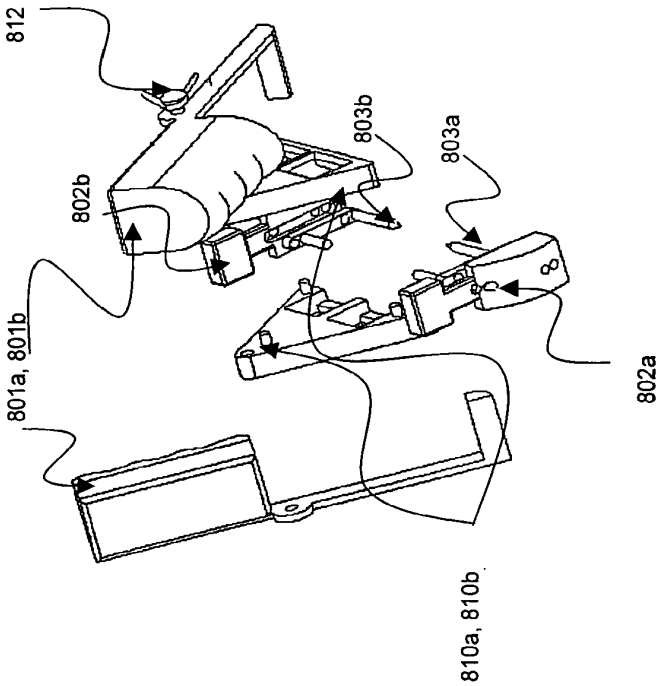


FIG. 8A

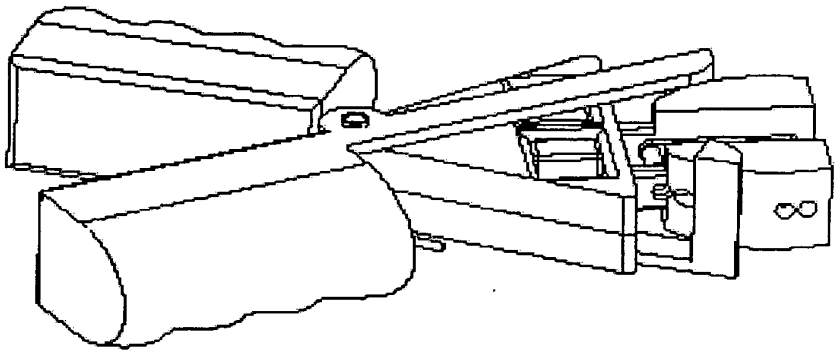


FIG. 8E

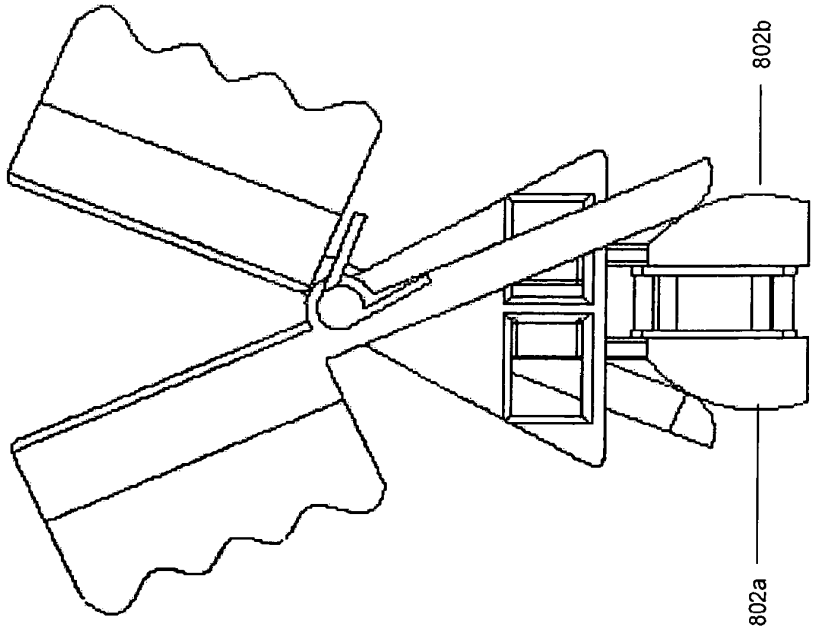


FIG. 8D

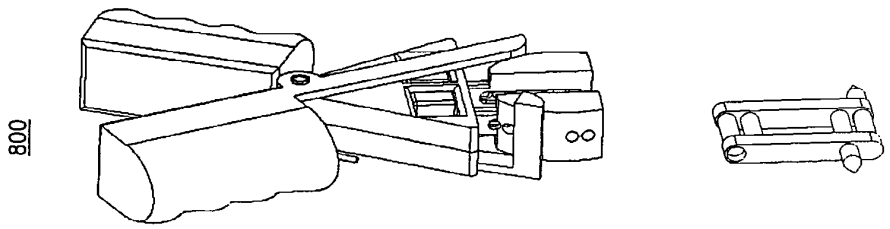


FIG. 8G

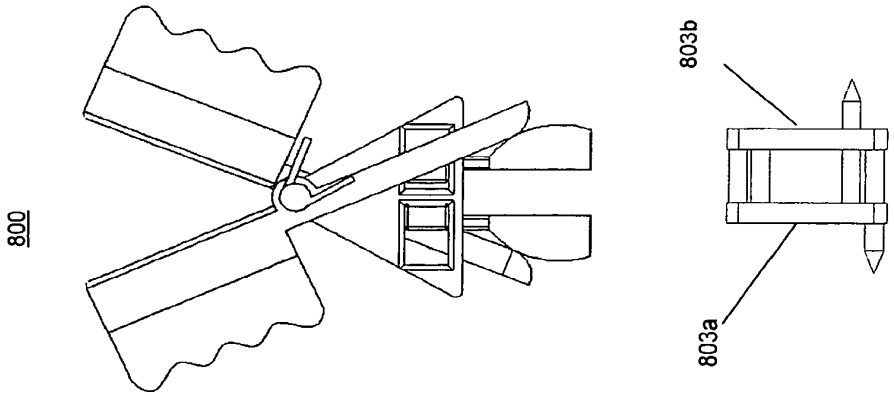


FIG. 8F

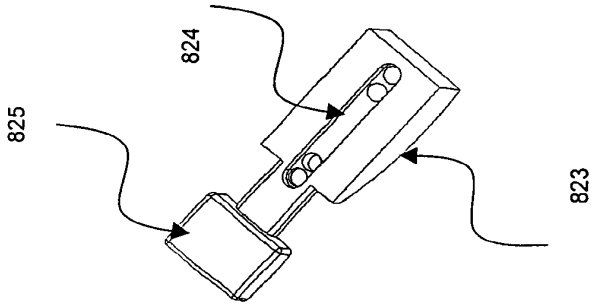


FIG. 8L

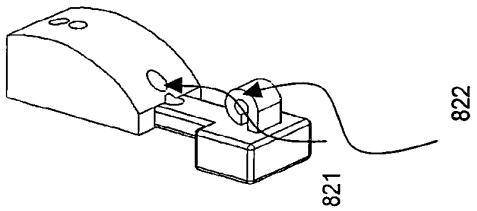


FIG. 8K

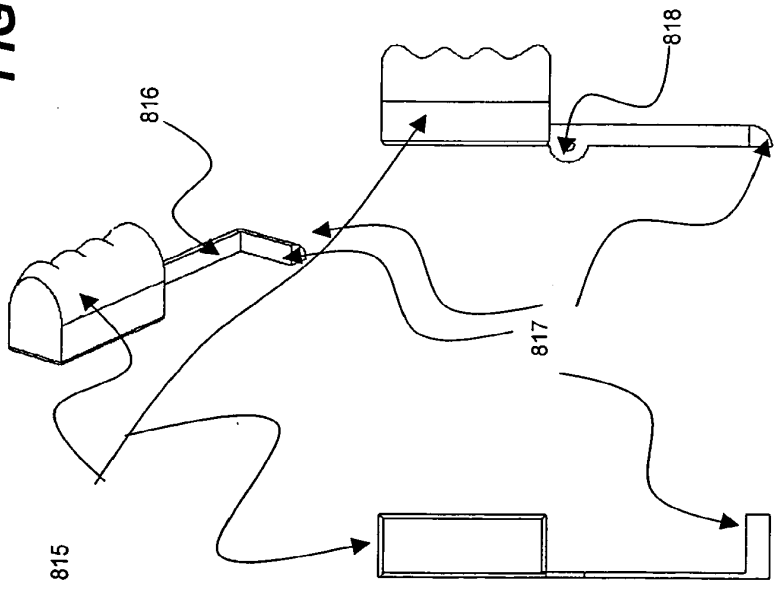


FIG. 8J

FIG. 8H

FIG. 8I

FIG. 8N

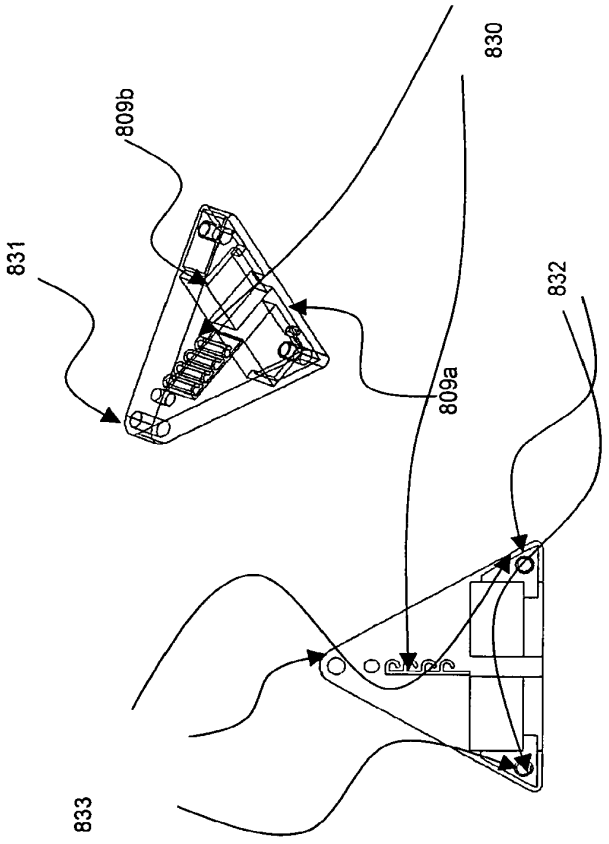


FIG. 8M

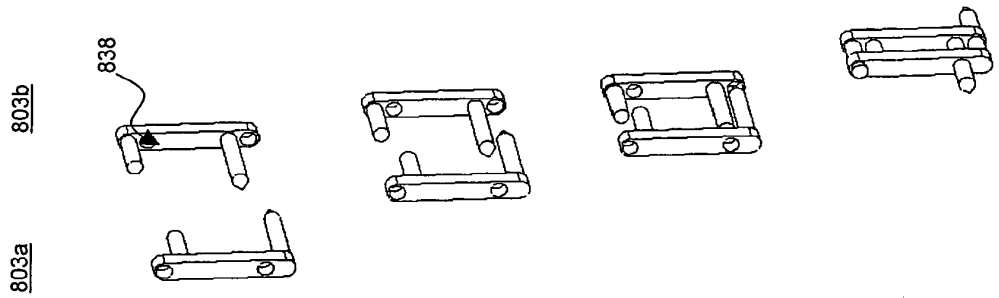


FIG. 8P

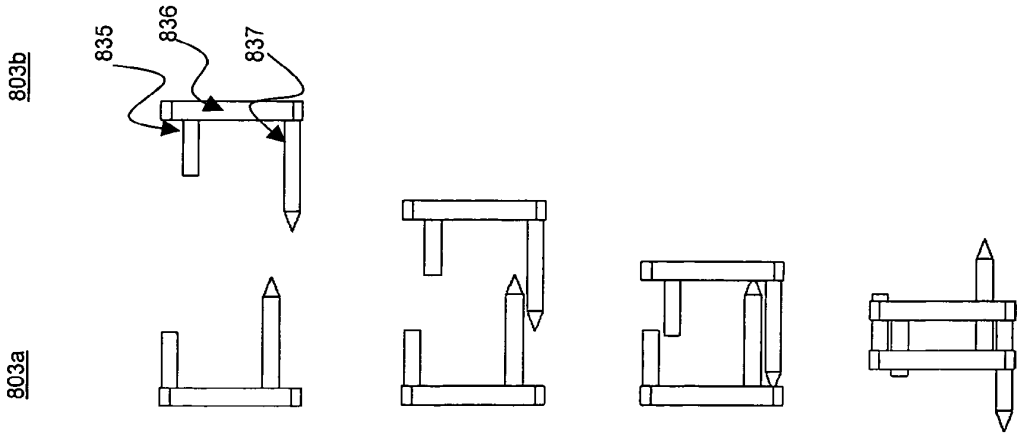


FIG. 8O

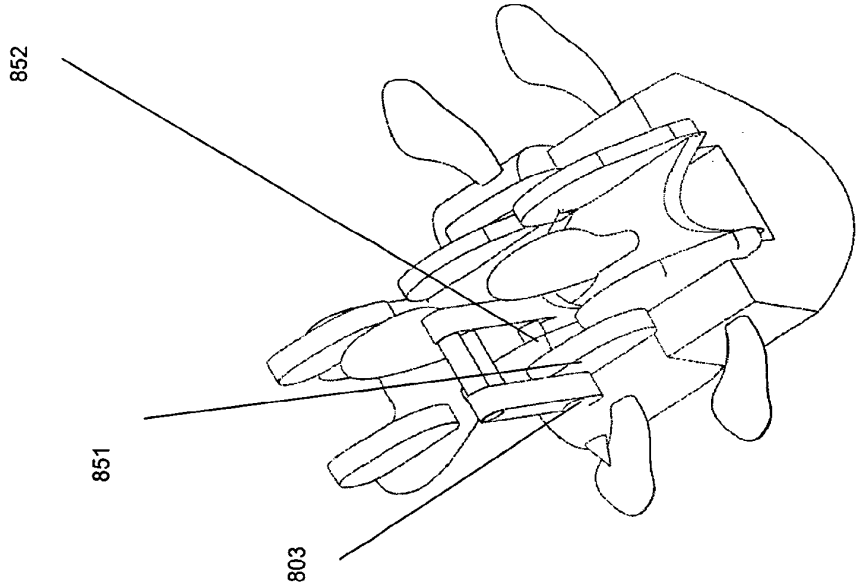


FIG. 8R

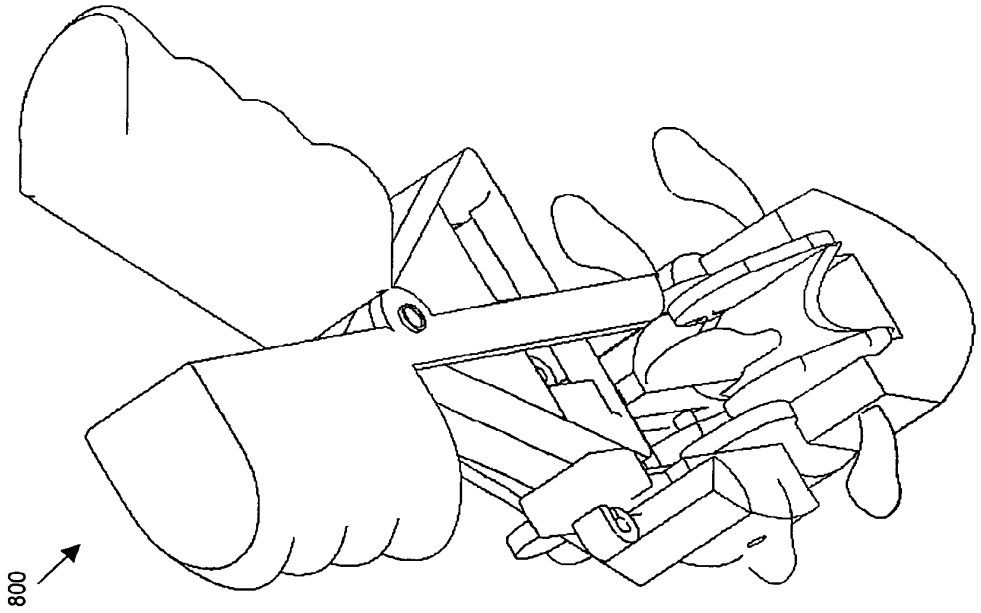


FIG. 8Q

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

Application Number	
Filing Date	
First Named Inventor	Mosheh T. Moskowitz
Title	BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION
Art Unit	
Examiner Name	
Attorney Docket Number	46440-0006007

SIGNATURE of Applicant or Patent Practitioner

Signature	/Stuart A. Nelson/	Date (Optional)	3/22/2021
Name	Stuart A. Nelson	Registration Number	63,947
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ *Total of _____ forms are submitted.

100381395.doc

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 the Transmittal.)

☒ 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, which may be an application filed after the date of this power of attorney, or identified above:

26191

OR

☐ I hereby appoint Practitioner(s) named in the attached list 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, which may be an application filed after the date of this power of attorney, or identified above.

Please recognize or change the correspondence address for the application identified in the attached transmittal letter to:

☐ The address associated with the above-mentioned Customer Number

OR

☒ The address associated with Customer Number: **26191**

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):

Moskowitz Family LLC

☐ 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	Nathan C. Moskowitz	Date (Optional)	9/17/18
Name	Nathan C. Moskowitz		
Title	Manager, Moskowitz Family LLC		

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 _____ forms are submitted.

61666868.doc

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
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.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	46440-0007005
	Application Number	
Title of Invention	ELECTRONICALLY ASSISTED MEDICAL DEVICE	

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.
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:

☐ 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:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Mosheh	T.	Moskowitz	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	Rockville	State/Province	MD	Country of Residence	US

Mailing Address of Inventor:

Address 1	212 North Adams Street		
Address 2			
City	Rockville	State/Province	MD
Postal Code	20850	Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Nathan	C.	Moskowitz	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

City	Rockville	State/Province	MD	Country of Residence	US

Mailing Address of Inventor:

Address 1	212 North Adams Street		
Address 2			
City	Rockville	State/Province	MD
Postal Code	20850	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
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.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	46440-0007005
	Application Number	
Title of Invention	ELECTRONICALLY ASSISTED MEDICAL DEVICE	

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	26191		
Email Address	apsi@fr.com	Add Email	Remove Email

Application Information:

Title of the Invention	ELECTRONICALLY ASSISTED MEDICAL DEVICE		
Attorney Docket Number	46440-0007005	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	12	**Suggested Figure for Publication (if any)**	

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:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	26191		

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	46440-0007005
	Application Number	
Title of Invention	ELECTRONICALLY ASSISTED MEDICAL DEVICE	

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	Pending			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)	
	Continuation of	16/134364	2018-09-18	

Prior Application Status	Patented			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16/134364	Continuation of	15/350352	2016-11-14	10123881	2018-11-13

Prior Application Status	Patented			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15/350352	Continuation of	12945835	2010-11-13	9492282	2016-11-15

Prior Application Status	Patented			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12945835	Division of	11737846	2007-04-20	7854765	2010-12-21

Prior Application Status	Expired			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)	
11737846	Claims benefit of provisional	60793329	2006-04-20	

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

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)[i] 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).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	46440-0007005
	Application Number	
Title of Invention	ELECTRONICALLY ASSISTED MEDICAL DEVICE	

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

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

☐ 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.
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.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
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.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	46440-0007005
	Application Number	
Title of Invention	ELECTRONICALLY ASSISTED MEDICAL DEVICE	

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.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
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.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	46440-0007005
	Application Number	
Title of Invention	ELECTRONICALLY ASSISTED MEDICAL DEVICE	

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.

Applicant 1 Remove

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.

Clear

● Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	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:

If the Applicant is an Organization check here. ☒

Organization Name	Moskowitz Family LLC		
Mailing Address Information For Applicant:			
Address 1	212 North Adams Street		
Address 2			
City	Rockville	**State/Province**	MD
Country	US	Postal Code	20850
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

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.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
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.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	46440-0007005
	Application Number	
Title of Invention	ELECTRONICALLY ASSISTED MEDICAL DEVICE	

Assignee 1

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.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

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.

Signature	/Stuart A. Nelson/			Date (YYYY-MM-DD)	2021-03-22
First Name	Stuart A.	Last Name	Nelson	Registration Number	63,947

Additional Signature may be generated within this form by selecting the Add button. Add

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
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.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	46440-0007005
	Application Number	
Title of Invention	ELECTRONICALLY ASSISTED MEDICAL DEVICE	

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

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 the Freedom of Information Act requires disclosure of these records.

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 CooperationTreaty.

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 inspections 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.

BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION

Cross-Reference To Related Applications

[0001] This application is a continuation of U.S. Application No. 16/362,152, filed March 22, 2019, which is a continuation of U.S. Application No. 15/934,622, filed March 23, 2018, (now U.S. Patent No. 10,251,643) which is a continuation of U.S. Application No. 13/093,812, filed April 25, 2011 (now U.S. Patent No. 9,924,940), which is a continuation of U.S. Application No. 12/347,990, filed December 31, 2008 (now U.S. Patent No. 7,951,180), which is a divisional of U.S. Application No. 11/208,644, filed August 23, 2005 (now U.S. Patent No. 7,704,279), which claims the benefit of Provisional Application No. 60/670,231, filed on April 12, 2005, the entire contents of which is incorporated herein by reference.

Field of invention

[0002] The present invention relates to bi-directional fixating transvertebral (BDFT) screws which can be used to supplement other intervertebral spacers and/or bone fusion materials. BDFT screws can be incorporated into anterior and/or posterior cervical and lumbosacral novel zero-profile horizontal and triangular intervertebral mini-plates.ln addition BDFT screws can be incorporated into two dimensional, expansile intervertebral body fusion devices (IBFDs) transforming them into stand-alone posteriorly and/or anteriorly placed cervical, thoracic and lumbar spinal fusion devices. In the lumbosacral and thoracic spine BDFT screws may obviate the need for supplemental pedicle screw fixation. In the cervical spine it obviates the need for supplemental vertically oriented anterior plating. The present invention also relates to a stand-alone or supplemental, calibrating interarticular joint stapling device which can incrementally fine-tune posterior interarticular joint motion.

Description of the Relevant Art

[0003] Segmental spinal fusions which stabilize two or more adjacent segments of the spine are

performed for painful degenerative disc disease, recurrent disc herniations, spinal stenosis, spondylolysis and spondylolisthesis. Over the past several decades a wide variety of fusion techniques and instrumentation have evolved. One of the earliest posterior fusion techniques entails non-instrumented in-situ on-lay posteriolateral fusion utilizing autologous iliac crest bone. Because of the high rate of imperfect fusions i.e. pseudoarthroses, transpedicular pedicle screw fixation which utilizes a variety of rods and interconnectors were developed to achieve less interbody motion and hence higher fusion rates. Pedicle screw fixation was initially combined with on-lay posteriolateral fusion. Because of the poor blood supply of the transverse processes, issues still remained with pseudoarthroses. In an attempt to address this problem, pedicle screw fixation has been supplemented with a variety of interbody fusion devices. This is based on the concept that axial loading enhances fusion and that the vertebral endplates have a better blood supply. Interbody lumbar fusion devices can be placed anteriorly via an anterior lumbar interbody fusion technique (ALIF) or posteriorly via a posterior lumbar interbody fusion technique (PLIF). Material options for interbody fusion devices have included autologous iliac crest/laminar bone, cylindrical threaded titanium interbody cages, cylindrical threaded cortical bone dowels, vertebral interbody rings or boxes, carbon fiber cages, or femoral ring allograft. To lessen the complication of prolonged nerve root retraction the technique of circumferential tansforaminal lumbar interbody fusion technique (TLIF) has been introduced. This employs the transforaminal placement of an interbody spacer such as one kidney bean shaped allograft, two circular allografts, one or two titanium circular cages, a single titanium or Peek (poly-ether-ketone) boomerang spacer. The threaded spacers are usually supplemented with autologous bone and /or bone morphogenic protein (BMP), demineralized bone matrix (DBM) in the form of paste or cement, rh-BMP with collagen sponges, or similar osteoinductive biological agents which are known to enhance fusion.

[0004] Currently all lumbosacral fusion techniques, ALIF, PLIF and TLIF, are typically supplemented by pedicle screw placement. In addition posterior transfacet screws also have been used to supplement ALIF procedures. Complications of pedicle screw placement include duration of procedure, significant tissue dissection and muscle retraction, misplaced screws with neural and/or vascular injury, excessive blood loss, need for transfusions, prolonged recovery, incomplete return to work, excess rigidity leading to adjacent segmental disease requiring further fusions and re-operations. Further advances of pedicle screw fixation including minimally

invasive and image-guided technology, and the development of flexible rods have imperfectly addressed some but not all of these issues. Transfacet screws entail the use of long screws which provide a static facet alignment without motion calibration.

[0005] Complications of all current interbody fusion devices is their lack of coverage of the majority of the cross sectional area of the vertebral endplates and their potential for extrusion. The recently described flexible fusion system which consists of flexible rods attached to transpedicular screws (Dionysis, Zimmer) suffers from a high pull-out rate, higher rate of re-operation than standard fusions, and does not rank high with patient satisfaction. See for example, Clinical experience with the Dynesys semirigid fixation system for the lumbar spine: Surgical and patient-oriented outcome in 50 cases after an average of 2 years; D, Grob, A. Benini and A. F. Mannion. Spine Volume 30, number 3, Feb 1, 2005.

[0006] Single or multiple level anterior cervical spinal fusions typically employ the replacement of the cervical disc or discs with autologous or allograft bone, or an intervertebral spacer filled with autologous or allograft bone, demineralized bone matrix, BMP or rh-BMP etc. Currently these anterior cervical fusions are augmented with anterior vertical titanium plates which cross the intervertebral space or spaces and are secured to the vertebral bodies above and below the disc space or spaces with perpendicularly penetrating vertebral body screws. The purpose of these plates is to serve as a barrier to prevent extrusion of the intervertebral disc replacement. Recently anterior vertical plating has also been employed in anterior lumbar fusion.

[0007] Complications of anterior spinal plating include the potential for neurovascular injury with screw misplacement, screw and/or plate pull-out, and screw and/or plate breakage. Other complications include potential esophageal compression/injury in the cervical spine secondary to high plate profile or pullout, and to potential devastating vascular injury in the lumbar spine with plate movement and/or dislodgement into anterior iliac vasculature. Recent advances in cervical plating have therefore concentrated on the creation of lower profile plates and even resorbable plates. These advances, however, have not eliminated the-possibility of plate dislodgement and screw back out/breakage.

[0008] To achieve segmental fusion applicants propose the use of novel bidirectional fixating transvertebral (BDFT) screws which can be strategically inserted via anterior or posterior surgical spinal approaches into the anterior and middle columns of the intervertebral disc space. The BDFT mechanism employs turning one or two pinions which then turns one or two central

gears which in turn simultaneously controls expansile movement of right and-left-handed bi-directional screws. The vertebral bodies above and below the disc space by virtue of their engagement and penetration by the BDFT screws are thus linked and eventually fused. The casings of the BDFT screws prevent vertebral body subsidence. The inside of the denuded intervertebral space can then be packed with autologous or allograft bone, BMP, DBX or similar osteoinductive material. Alternatively an intervertebral spacer filled with either of these substances can be inserted.

[0009] Applicants postulate that BDFT screws provide as strong or stronger segmental fusion as pedicle screws without the complications arising from pedicle screw placement which include screw misplacement with potential nerve and/or vascular injury, violation of some healthy facets, possible pedicle destruction and blood loss. By placing screws across the intervertebral space from vertebral body to vertebral body engaging anterior and middle spinal columns, and not into the vertebral bodies via the transpedicular route, some of the healthy facet joints are preserved. Because this technique accomplishes both anterior and middle column fusion, without rigidly fixing the posterior column, it in essence creates a flexible fusion. This device therefore is a flexible fusion device because the preserved posterior joints retain their function achieving at least a modicum of mobility and hence a less rigid (flexible) fusion.

[0010] The very advantage of trans-pedicular screws which facilitate a strong solid fusion by rigidly engaging all three spinal columns (anterior, middle and posterior), is the same mechanical mechanism whereby complete inflexibility of all columns is incurred thereby leading to increasing rostral and caudal segmental stress which leads to an increased rate of re-operation.

[0011] Transvertebral fusion also leads to far less muscle retraction, blood loss, and significant reduction in O.R. time. Thus the complication of pedicular screw pull-out and hence high re - operation rate associated with the current embodiment of flexible fusion pedicle screws/rods is obviated. The lumbosacral BDFT screws can be introduced via PLIF, TLIF or ALIF operative techniques. Although one can opt to supplement these screws with transpedicular screws there would be no absolute need for supplemental pedicle screw fixation with these operative techniques.

[0012] Bi-directional fixating transvertebral (BDFT) screws can also be combined with novel zero-profile horizontal cervical and lumbar mini-plates. They can also be combined with mini-plates and a cage with slots for bone material insertion. Thus this is in essence a three-in-one

device; 1) cage which can be filled with bone, 2) a plate and 3) BDFT screws.

[0013] For the performance of anterior cervical, and lumbar anterior or posterior fusions one or two centrally placed BDFT screws anterior to an interverterbal graft or spacer, may be a sufficient barrier by itself to prevent device/graft extrusion. However, to further safeguard against graft/spacer extrusion applicants have devised horizontal linear mini-plates which can be incorporated into two anteriorly placed BDFT screws, as well as a linear triangulating mini-plate which can be incorporated into two anteriorly placed, and one posteriorly placed BDFT screws. The horizontal linear mini-plates or horizontal triangular mini-plate traverse the diameter of the disc space and most of the disc space height. Thus a horizontal mini-plate placed anteriorly immediately beneath the rostra! and caudal ventral vertebral body surfaces which is secured by BDFT screws which are also beneath the vertebral body surfaces, would prevent intervertebral device/graft extrusion. This mini-plate is essentially a zero- to subzero –profile plate in that it is either flush with the vertebral body surfaces or below them.

[0014] Because the BDFT screws engage a small percentage of the rostra! and caudal vertebral bodies, this plating system could be performed at multiple levels. This plating system which utilizes BDFT screws does not lead to any esophageal compression or injury in the cervical spine or vascular iliac vein injury in the lumbar spine. For the performance of two or three level intervertebral fusion with horizontal mini-plates there is virtually no possibility of plate breakage which can occur in long vertical anterior plates which are in current usage. Similarly, screw dislodgement, if it occurs would lead to minimal esophageal compression or injury compared to large vertical plate/screw dislodgement. In addition, in the cervical spine BDFT screw placement closer to the midline would avert any possibility of lateral neural or vertebral artery injury.

[0015] In copending PCT Patent Application PCT/US2005/016493, filed May 11, 2005, the entire contents of which are incorporated by reference, applicants developed an interbody expansile artificial disc device composed of an inner core artificial disc surrounded by expansile titanium shells with spikes which can expand in two or three dimensions. In yet another embodiment of tranvertebral fixation applicants propose a novel cervical and thoracic/lumbosacral intervertebral fusion device (IBFD) which combines the expansile titanium or PEEK shells or our previous artificial disc design with BDFT screws which can be inserted into the disc space.

[0016] Yet another embodiment incorporates a core expansile elastometric porous balloon sheath

vulcanized to the expandable external shells which can then be filled with bone fusion material. Balloon porosity would allow fusion to occur from vertebral endplate to endplate. Bony material can be injected into this porous balloon through a port directly or through a silastic catheter (see previous patent).

[0017] If one were inclined to further enhance posterior column thoracolumbosacral fixation, applicants introduce an optional novel calibrated facet stapling device which staples the inferior articulating facet of the superior segment to the superior articulating facet of the caudal vertebral segment unilaterally or bilaterally, further minimizing motion until interbody fusion occurs. The degree of flexibility can be further modulated by varying the calibration strength and torque of facet stapling. This would be dictated by the need for greater or lesser degrees of motion preservation.

[0018] Currently, failed anterior lumbar arthoplasties are salvaged by combined anterior and posterior fusions. BDFT screws and/or IBFDs could be utilized as a one-step salvage operation for failed /extruded anteriorly placed lumbar artificial discs obviating the above salvage procedures which have greater morbidity. Likewise, for anterior cervical fusion, applying cervical BDFT screws alone or in combination with cervical mini-plates addresses the deficiencies and complications of current cervical plating technology as mentioned above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] Figures 1A-D illustrate three-dimensional and cross-sectional views of the BDFT screw and its mechanism of operation (Embodiment I).

[0020] Figures 2A -G illustrate three-dimensional and cross-sectional views of the BDFT screw and its mechanism of operation (Embodiment II).

[0021] Figures 3A –E illustrate three dimensional, cross-sectional and exploded views of the BDFT screw and its mechanism of operation (Embodiment III).

[0022] Figures 4A-C illustrate a single or three BDFT screws inserted into adjacent vertebral bodies.

[0023] Figures 5A and 5B illustrate three-dimensional views of the zero—profile linear mini-plate.

[0024] Figures 5C and 5D illustrate the integration of BDFT screws in the zero-profile linear mini-plate.

[0025] Figures 6A through 6G illustrate different views of the zero-profile triangular mini-plate, its integration with BDFT screws and incorporation into the vertebral bodies.

[0026] Figures 6H and 61 illustrate different views of the three-in-one device combining a zero-profile horizontal mini-plate, a cage with incorporated slots for the placement of bone material, and BDFT screws

[0027] Figures 7 A and 7B illustrate the lumbar two-dimensionally expanding intervertebral fusion device (IBFD) with incorporated BDFT screws.

[0028] Figures 8A-N illustrate the facet joint calibrated stapling device which staples the inferior articulating facet with the superior articulating facet. Increasing degrees of torque calibration leads to increasing posterior column rigidity, whereas decreasing degrees of calibration leads to increasing flexibility.

[0029] Figures 80 and 8P illustrate four frontal and perspective views of the facet staple with sequential increasing calibrated positions leading to decreasing increments of joint motion/flexibility.

[0030] Figures 8Q and 8R illustrate the stapled inferior and superior interarticulating facets by the facet stapler.

DETAILED DESCRIPTION OF THE INVENTION

1. THE MEDICAL DEVICE

[0031] Referring to figures 1A-D the above described problem can be solved in the cervical, thoracic and lumbar spine by insertion into the denuded intervertebral disc space an expansile bi-directional fixating transvertebral (BDFT) screw 100 or screws.

[0032] Figures 1A and 1B illustrate three-dimensional views of the screw 100 in closed and opened positions, respectively, upon its insertion into the intervertebral disc space. The screw 100 is self-drilling. The mechanism of its action entails the turning of a midline drive screw 100/pinion 104 in a clock-wise direction. This motion is bi-directionally translated via an interposing gear mechanism 105 enabling the simultaneous outward movement of left and right handed screws 102, 103 in equal and opposite directions. When the drive screw 101 and its accompanying drive screw shaft are turned clock-wise, the driving pinion 104 is likewise rotated. This motion is then translated to the driven gear 105 which is interposed between the drive screw 101 and two opposing self-drilling screws 102, 103, one left-handed and the other right-handed.

The gear ring 110 has screw coupling slots (Figures IC and 1D). There are also symmetric keyways 120 and an alignment cylinder 113. The left handed screw 102 fits into one half of the slots 114, 115 and the right handed screw 103 into the other half of the slots. This is clearly illustrated in cross sections of the screw and gear in Figures IC and ID, respectively.

[0033] Figures 1A-C also illustrate the external casing 111 of the device which contains the external screw threads 117, 118, against which the left and right handed internal threads interact 116, 119 with. The casing includes an upper left casing 111b and an upper right casing 111a. Below the upper casing 111b there is a surface serration pattern 118 which is part of a retaining outer shell 112.

[0034] Figures 2A-G illustrate Embodiment II of the BDFT 200. This design differs in two fundamental ways from Embodiment I. Firstly the driving pinion 201 accomplishes bi-directional movement by engaging left and right gears 204, 205 which simultaneously turn left and right screws 202, 203 (Figures 2C-G). Secondly, in it's resting closed position the solid left screw 202 with a narrower diameter is buried within the right wider diameter hollow right screw 203. This mechanism allows for greater length of screw expansion compared to Embodiment I. Maintaining alignment of screws 202, 203 and pinions201 is accomplished by upper casings 211, outer shells 212, and left and right screw caps 209a, 209b (Figures 2A-G).

[0035] Figures 3A –E illustrate Embodiment III of the BDFT 300. This is similar to Embodiment II. The major difference is the use of two separate driving screws pinions 301a, 301b for the two separate gears 304, 305. There is one pinion 301a for the left screw 302 and another pinion 301b for the right screw 303. The left screw 302 engages the left gear 304 which engages the left screw 302. The right pinion 301a engages the right gear 305 which engages the right screw 303. Because the left and right screws 302, 303 have separate controls and are not linked by one common pinion, separate distinct motions of the screws 302, 303 can be obtained, as opposed to equal and simultaneous screw movements of Embodiments I and II. Like Embodiment II, Embodiment III consists of a smaller diameter solid left screw 302 which fits into a larger diameter hollow right screw 303. This can achieve significant screw extension length as in Embodiment II.

[0036] Figures 4A and 4B illustrates the placement of a single BTFD 1000 screw anteriorly into the intervertebral space between adjacent lumbar vertebrae 400. Figure 4A illustrates the closed position. Figure 4B illustrates the opened position. The illustrations are of a generic BDFT screw

1000 i.e. it applies to Embodiments I-Ill. Placement of a single BDFT anterior to an intervertbral spacer may be sufficient to prevent interspacer/device extrusion, and enhance spinal stability.

[0037] Figure 4C illustrates the placement of three BTFD screws 1000 in a triangulating manner covering anterior and middle columns. The presence of three screws so situated would prevent subsidence of the screws 1000. Hence they act as a very open IBFD 1000. Bone material in the form of DBX or BMP etc. could be inserted into the intervertebral space in between the three screws 1000. This construct could be used as a supplemental or stand aloneintervertebral fusion device. Also illustrated is a cross-section of a vertebral endplate 401 demonstrating the triangular placement of screws 1000 engaging anterior and middle columns.

[0038] Figure 5A illustrates the zero-profile horizontal linear mini-plate 500. Note the slots for placement of the BDFT screws 1000. On the anterior surface are slots 504 for the driving pinion screws. Figure 5B illustrates that the plate 500 consists of upper and lower portions 500a, 500b which articulate with each other via interdigitation of alignment pins 502 and recesses 503. Figure 5C illustrates the integration of the BDFT screws 1000 into the mini-plate 500. Figure 5D illustrates the placement of the plate-BDFT construct into the intervertebral space. After the construct is placed into the intervertebral space, the screws 1000 are expanded bi-directionally in order to engage the vertebral bodies 400. This construct can be surgically placed via anterior or posterior approaches.

[0039] Figures 6A-G illustrate a zero-profile triangular mini-plate 600. In this embodiment the plate encompasses all three triangularly situated BDFT screws 1000. The posteriorly placed BDFT screw 1000 is expanded with a centrally placed drive screw/pinion with a long stem which extends posteriorly.

[0040] As illustrated in Figures 6H and 61 this embodiment 600' could be made hollow to accommodate the packing of bone material and can actually function as a combined three-in-one fusion cage/plate/BDFT screw construct. Note that this plate embodiment 600' also has upper and lower components similar to 600a, 600b (Figures 6A-C). Preferably, plates 600'a and 600'b, however, include slots 610 for placement of bone material. Figures 6D-F illustrate the incorporation of the BDFT screws 1000 into the triangular mini-plate 600. Figure 6G illustrates the positioning of the triangular mini-plate 600 with incorporated expanded screws 1000 into adjacent vertebral bodies 400.

[0041] Figures 7A and 7B illustrate a boomerang shaped thoracolumbar IBFD 700 with

ratchetable titanium or PEEK shells 710, 711 which can expand geometrically in two dimensions. Figure 7A illustrates the BDFT screws 701, 702, 703 in partially expanded position. Figure 7B illustrates the BDFT screws 701, 702, 703 in fully expanded position. The outer shells 710, 711 themselves when ratcheted width-wise have titanium or PEEK spikes713 inserting themselves into and purchasing the endplates 401, thus securing permanent integration into the vertebral endplates 401. The outer shell 710, 711 surfaces can be treated with hydroxyappetite to facilitate bone incorporation. These shells are fully described in our previous PCT Patent Application PCT/US2005/016493, filed May 11, 2005.

[0042] The IBFD device 700 has four shells and a plurality of spikes 713. The height can be modified by adjusting four fixed height screws 712. Sequential turning of these screws 712 leads to height expansion between the rostra! and caudal shells 710, 711 by widening the distance between their superior and inferior shells 710a, 710b. Once the IBFD 700 is properly positioned in the interspace the spikes 713 engage and purchase the vertebral endplates 401. The three incorporated BDFT screws 701, 702, 703 are turned clockwise leading to anterior and middle column engagement of the vertebral bodies 400 above and below the disc space. The BDFT screws 701, 702, 703 are strategically placed; one on each side of the superior shell 710a and one centrally on the inferior shell 710b. This captures anterior and middle columns of the vertebral column increasing spinal stability. After the BDFT screws 701, 702, 703 are successfully purchased within the vertebral bodies 400, bone fusion substances are placed/packed or poured, into the inner aspects of the device 700 and its surrounding intervertebral space.

[0043] An alternative thoracolumbar IBFD embodiment not illustrated expands in two dimensions and has the additional feature of an incorporated expansile porous elastometric sheath molded to the inner aspects of the titanium shells. Within the balloon is a port with or without an attached microsilastic catheter through which bone fusion material can be injected. Supplemental bone fusion material can be added to the surrounding area of the device to further enhance fusion. Furthermore for certain patients where applicable, a rapid fusion can be effected by the instillation of methyl-methacrylate A similar embodiment for a cervical IBFD is based on our previously described two- dimensional cervical expansion device in PCT Patent Application PCT/US2005/016493, filed May 11, 2005.

[0044] The engagement of the IBFD shell spikes 713 and the BDFT screws 701, 702, 703 into the vertebral bodies 400 above and below the device would obviate the need for any kind of

anterior plating system.

[0045] Figures 8A-N illustrate a calibrated facet joint stapler 800 which can be used to staple the thoracolumbar inferior and superior articulating facets with incremental torquedegrees. Incrementally increasing the degrees of calibration modulates the extent of facet joint flexibility. This can be used as an option to provide posterior column support and can be used in an open, or percutaneous, endoscopic or fluoroscopic approach. Depending on the operative approach and the individual patient, facet stapling can be performed unilaterally or bilaterally.

[0046] The stapling device 800 consists of two orthogonally placed levers 801a, 801b which open and close over a triangular fulcrum 810. The edges of the levers 801a, 801b are attached to left sand right staple cartridges 802a, 802b. Each cartridge 802a, 802b holds a titanium staple 803a, 803b in its slots. Figure 8A illustrates an exploded view of the joint stapler 800 and its essential components. Figures 8B and 8C illustrate the stapler 800 in open position. Figures 8D and 8E illustrate the stapling device 800 and staples 803a, 803b in closed position. Figures 8F and 8G illustrate the stapling device 800 and 803a, 803b staples in closed, staple released, position. Figure 8H-J illustrate the components of the lever 801a, 801b which includes the grip handle 815, arm 816, rounded wedge 817 and fulcrum screw hole 818. Figures 8K and 8L illustrate the details of the cartridge 802a, 802b including its slot for the fulcrum 810 and staples 803a, 803b. Figures 8M and 8N illustrate the details of the fulcrum 810 which include right and left cartridge slots 820a, 820b and fulcrum screw 812 and mating alignments. Most importantly it has four incremental calibration slots for incremental degrees of facet joint stapling. Also illustrated are spring anchors 814.

[0047] Figures 80 and 8P illustrate frontal and perspective views, respectively of the two opposing titanium facet staples 803a, 803b. Each staple 803a, 803b consists of a bracket 836, a nail 837 and an alignment pin 835. Illustrated are four sequential calibrated tightening positions of the opposing staples 803a, 803b. Increasing the calibrated opposition of the two staples 803a, 803b leads to increasing opposition of the facet joints and hence increasing rigidity, and decreasing flexibility. Each staple 803a, 803b has two alignment recesses 838. The opposition of these staples 803a, 803b around the facet joint forms a rectangular facet joint enclosure.

[0048] Figures 8Q ad 8R illustrate the stapled inferior and superior articulating facets 851, 852. Figure 8R illustrates the application of the facet stapler 800 on the facets 851, 852 introducing the facet staple 803. The facet staple is used to join the exterior articulating facet 851 and the

interior articulating facet 852.

2. THE SURGICAL METHOD

[0049] The surgical steps necessary to practice the present invention will now be described.

[0050] The posterior lumbar spine implantation of the BDFT screws 1000, plate and IBFD can be implanted via a previously described posterior lumbar interbody fusion procedure (PLIF) or posterior transforaminal lumbar interbody fusion procedure (TLIF). The procedure can be performed open, microscopic, closed, tubular or endoscopic. Fluoroscopic guidance can be used with any of these procedures.

[0051] After the adequate induction of anesthesia, the patient is placed in the prone position.

[0052] A midline incision is made for a PLIF, and one or two parallel paramedian incisions or a midline incision is made for a TLIF. For the PLIF a unilateral or bilateral facet sparing hemi-laminotomy is created to introduce the BDFT screws 1000, plates or IBFD into the disc space after it is adequately prepared. For the TLIF procedure, after a unilateral dissection and drilling of the inferior articulating surface and the medial superior articulating facet, the far lateral disc space is entered and a circumferential discectomy is performed. The disc space is prepared and the endplates exposed.

[0053] There are then multiple embodiments to choose from for an intervertebral body fusion. With the first and simplest choice, under direct or endoscopic guidance one BDFT screw 1000 or three BDFT screws 1000 can be placed in a triangulating manner encompassing the anterior and middle vertebral columns (Figures 4A-C). The screws 1000 are then maximally expanded purchasing and uniting the vertebral bodies above and below the disc space. Bone material or an alternative intervertebral fusion device can then be packed into the disc space. The casing of the screws 1000 prevents subsidence of the vertebral bodies. An additional option in the posterior lumbar spine is to place a mini-plate dorsally underneath the thecal sac to prevent bone migration into the nerves. In addition via a TLIF approach a triangular mini-plate/ cage construct can be inserted, and then the BDFT screws 1000 maximally expanded. This is a very simple and practical supplemental or stand-alone intervertebral fusion device.

[0054] Using an alternative IBFD option, utilizing specialized forceps the two-dimensional expanding thoracolumbar expandable IBFD 700 (Figures 7A and 7B) is introduced into the disc space. The final dimension expansion in all embodiments leads to purchasing of the spikes into

the vertebral endplates. The BDFT screws 1000 are then driven directly into rostral and caudal vertebral bodies across the intervertebral space. Then bone fusion material; autologous, allograft, bone matrix protein, BMP, rh-BMP, paste or other similar currently available or specially designed osteoconductive substances can be placed into the device and the surrounding intervertebral space. In embodiments with an incorporated viscoelastic balloon sheath, prior to engaging the screws the expandable elastometric sheath/balloon is filled with bone fusion material as mentioned above. If desirable, further material, can be placed outside its confines within the intervertebral space.

[0055] If further posterior column stability or rigidity is required, unilateral or bilateral, single level or multiple level facet screw stapling can be performed under open, microscopic flouroscopiq or endoscopic vision. Radiographic confirmation of staple position is obtained. Calibrated stapling leads to opposition of the facet joints with incremental degrees of joint opposition. This can lead to variable degrees of posterior column rigidity and/or flexibility.

[0056] The anterior lumbar spine implantation of solitary BDFT screw(s) 1000, BDFT screws incorporated into a horizontal linear or triangular mini-plate, or the IBFD/BDFT screw embodiment for L4/5 and L5/S1 interspaces can be performed on the supine anesthetized patient via previously described open micropscopic or endoscopic techniques. Once the disc space is exposed and discectomy and space preparation is performed, placement of one, two or three BDFT screws 1000 with or without a ventral mini-plate, or placement of two dimensionally expanding IBFD with or without expansile elastometric sheaths and their incorporation is identical to that performed for the posterior approach.

[0057] The posterior placement of the BDFT screws 1000 alone or combined with mini-plates or with IBFD embodiments into the thoracic spine can be performed via previously described transpedicular approaches; open or endoscopic. The anterior placement of the IBFD 700 into the thoracic spine can be accomplished via a trans-thoracic approach. Once disc space exposure is obtained via either approach, all of the above mentioned embodiments can be inserted. Engagement of the devices is identical to what was mentioned above.

[0058] For anterior placement of the cervical embodiments of the BDFT screw(s) 1000 with or without the horizontal linear or triangular cervical mini-plate, and the IBFD embodiments the anterior spine is exposed in the anesthetized patient as previously described for anterior cervical discectomies. Once the disc space is identified, discectomy is performed and the disc space

prepared. Implantation and engagement of all devices is identical to that described for the anterior lumbar and thoracic spines.

[0059] The present invention may provide an effective and safe technique that overcomes the problems associated with current tanspedicular-based thoracic and lumbar fusion technology, and with current vertical cervical plating technology, and for many degenerative stable and unstable spine diseases, and could replace many pedicle screw-based and anterior vertical-plate based instrumentation in many but not all degenerative spinal conditions. Calibrated facet joint screw staples can facilitate flexible fusions and could replace current static trans-facet screws.

[0060] To our knowledge there has not been any other previously described bidirectional screw for use in the spine, other joints, or for any commercial or carpentry application. The bi-directional screw 1000 described herein may indeed have applications in general commercial, industrial and carpentry industries. To our knowledge the description of zero to subzero profile anterior or posterior horizontal spinal plates which traverse the diameter of the disc space has not been previously described. To our knowledge an intervertebral three-inone construct combining bone cage, plate and screws has not been previously reported. To our knowledge calibrated facet joint staples 803a, 803b have not been previously described.

We claim:

1. A self-drilling screw apparatus, which comprises:

a shell;

a first screw member having a tapered end and a threaded body disposed within the shell;

a second screw member having a tapered end and a threaded body disposed within the shell; and

a drive mechanism for driving the first and second screw members from the shell.

2. An apparatus according to claim 1 wherein the shell includes a first aperture threaded in a first direction for the first screw member and a second aperture threaded in the opposition direction for the second screw member.

3. An apparatus according to claim 1 wherein the drive mechanism includes;

a drive screw disposed at least partially within the shell;

a pinion responsive to the rotation of the drive screw;

a gear rotated by the pinion, and the rotation of the gear imparts rotation to the first screw member and the second screw member.

4. An apparatus according to claim 3 wherein the drive screw includes an accessible head that is rotated in order to drive the first and second screw members from the shell.

5. An apparatus according to claim 3 where in the gear includes keyways for the first screw member and the second screw member.

6. An apparatus according to claim 3 which further includes end caps and a top for enclosing the shell.

7. An apparatus according to claim 1 wherein the drive mechanism includes:

a drive screw disposed at least partially within the shell; and

a pinion that is responsive to the rotation of the drive screw and that drives at least one of the screw members.

8. An apparatus according to claim 7 wherein the first screw member is of a diameter smaller than the diameter of the second screw member; and wherein the second screw member includes a hollow threaded portion that receives a portion of the threaded body of the first screw member.

9. An apparatus according to claim 8 wherein the threaded body of the first screw member is threaded in a first direction and the threaded body of the second screw member is threaded in the opposite direction.

10. An apparatus according to claim 9 wherein the drive screw includes an accessible head that is rotated in order to drive the first and second screw members from the shell.

11. An apparatus according to claim 1 wherein the drive mechanism includes:

a first drive screw disposed at least partially within the shell;

a first pinion that is responsive to the rotation of the first drive screw and that drives the first screw member;

a second drive screw disposed at least partially within the shell; and a second pinion that is responsive to the rotation of the second drive screw and that drives the second screw member.

12. An apparatus according to claim 11 wherein the first and second drive screws include accessible heads that are rotated in order to drive the first and second screw members from the shell.

13. An apparatus according to claim 11 wherein the first screw member is of a diameter smaller than the diameter of the second screw member; and wherein the second screw member includes a hollow threaded portion that receives a portion of the threaded body of the first screw member.

14. An apparatus according to claim 11 which further includes end caps and a top for enclosing the shell.

15. An apparatus according to claim 1 wherein the apparatus is used to join together two members, wherein the members are selected from the group which includes bones, portions of the spinal column, vertebral bodies, wood, building materials, metal, masonry or plastics.

16. An apparatus which includes a plurality of screw apparatuses of claim 1 arranged in a predetermined pattern to join at least two vertebral bodies.

17. An apparatus according to claim 1 wherein the first screw member and the second screw member extend bi-directionally from opposite ends of the shell.

18. An apparatus which includes a plurality of screw apparatuses of claim 1 and which further includes:

a first plate with a predetermined pattern of apertures for the screw apparatuses; and

a second plate with a predetermined pattern of apertures for the screw apparatuses.

19. An apparatus according to claim 18 where in the plurality of screw apparatuses and plates are used to join together a pair of vertebral bodies.

20. An apparatus according to claim 18 wherein the plates include slots for at least two screw apparatuses.

ABSTRACT OF THE DISCLOSURE

An apparatus and method for joining members together using a self-drilling screw apparatus or stapling apparatus are disclosed. The screw apparatus includes a shell and first and second first screw members having tapered ends and threaded bodies that are disposed within the shell. A drive mechanism rotatably drives the first and second screw members from the shell in opposite directions and causes the screw members to embed themselves in the members to be joined. The screw apparatus can be used to join members such as bones, portions of the spinal column, vertebral bodies, wood, building materials, metals, masonry, or plastics. The stapling apparatus includes first and second lever arms rotatably joined together at a fulcrum, and the lever arms rotate in opposite directions. First and second cartridges are disposed at the ends of the lever arms. Each cartridge is capable of holding a staple including a bracket, a nail member and an alignment slot. When the ends of the lever arms are rotated towards each other the staples from the cartridges are interlocked. The staples can be also be used to join members such as bones, portions of the spinal column, or vertebral bodies.

100381389.docx

Electronic Acknowledgement Receipt	
EFS ID:	42246244
Application Number:	17208640
International Application Number:	
Confirmation Number:	6013
Title of Invention:	BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz
Customer Number:	26191
Filer:	Stuart A. Nelson/Emily Whitcomb
Filer Authorized By:	Stuart A. Nelson
Attorney Docket Number:	46440-0006007
Receipt Date:	22-MAR-2021
Filing Date:	
Time Stamp:	17:03:27
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)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	AppTrans.PDF	114238 e4d82d1803a45adf33e058a267931c22711 1a2bc	no	2

Warnings:

Information:					
2	Oath or Declaration filed	DEC.pdf	2080172 4c4efa895df23dc612cf491ea8367e390aee9b7d	no	2
Warnings:					
Information:					
3	Drawings-only black and white line drawings	Drawings.pdf	2353310 265eab030fa0786cea96232c1c99ee22a87ab3cb	no	25
Warnings:					
Information:					
4	Power of Attorney	POA.pdf	744045 4c9134b382da7a405c455379f1cee9c05da23b54	no	2
Warnings:					
Information:					
5	Application Data Sheet	ADS.pdf	1256431 f9266d145d50f6b6823a2de37b9e17f4a1605931	no	9
Warnings:					
Information:					
6		Application.PDF	198336 2a3676af4df6f6d62d43c8e069be6a4d52033bf8	yes	18

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Specification	1	14
	Claims	15	17
	Abstract	18	18

Warnings:	
Information:	
Total Files Size (in bytes):	6746532

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	Unknown
Application No.	:	17/208,640	Examiner	:	Unknown
Filed	:	March 22, 2021	Conf. No.	:	6013
Title	:	BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION			

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Please consider the documents listed on the disclosure form submitted with this statement. Copies of the documents are being submitted with this statement to the extent required under 37 C.F.R. § 1.98(a)(2).

Under 35 U.S.C. § 120, this application relies on the earlier filing date of application number 16/362,152, filed on 3/22/2019. The documents corresponding to Desig. ID Nos. 130, 132, 150, and 157 have not been submitted to and/or cited by the Office in the prior application. All other listed documents were submitted to and/or cited by the Office in the prior application, and so copies of those documents are not provided in this application.

This statement is being filed within three months of the filing date of the application.

Apply any necessary charges or credits applicable under 37 C.F.R. § 1.17(p) to deposit account 06-1050, referencing the above attorney docket number.

Please contact the undersigned if there are any questions regarding this statement.

Respectfully submitted,

Date: 3/29/2021

/Stuart A. Nelson/
Stuart A. Nelson
Reg. No. 63,947

Customer Number 26191
Fish & Richardson P.C.
Telephone: (612) 337-2538
Facsimile: (877) 769-7945

62596493.doc

Electronic Acknowledgement Receipt

EFS ID:	42310587
Application Number:	17208640
International Application Number:	
Confirmation Number:	6013
Title of Invention:	ELECTRONICALLY ASSISTED MEDICAL DEVICE
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz
Customer Number:	26191
Filer:	Stuart A. Nelson/Kirsten Neuman
Filer Authorized By:	Stuart A. Nelson
Attorney Docket Number:	46440-0007005
Receipt Date:	29-MAR-2021
Filing Date:	
Time Stamp:	16:30:44
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)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	Transmittal.pdf	75628 550e754447cae354d6cba18aea51787ca81d0344	no	2
Warnings:					

Information:					
This is not an USPTO supplied IDS fillable form					
2	Non Patent Literature	Boakye_2005_1304X.pdf	3077375 9961ae695438f8cecd84f9ebdd1bc3d5b3789e34	no	6
Warnings:					
Information:					
3	Non Patent Literature	Cheung_2004Chapter26_1304.pdf	1059197 ac76b4f7c023075a0f33f2c7cbc162f1d89baecd	no	8
Warnings:					
Information:					
4	Non Patent Literature	SYNFIXEVOLUTIONSystem_1304X.pdf	261809 c334acd6833319b81bb60fa21abd9c80368c8b02	no	1
Warnings:					
Information:					
5	Non Patent Literature	Wiseman_2005Chapter39_01305X.pdf	3141716 94308cde0dffde6997b3d4b2f2f899329bc8f11a	no	24
Warnings:					
Information:					
6	Non Patent Literature	PTO.pdf	167449 16b611c4af75d133f8d23f5ac9b7b1270ab5581e	no	7
Warnings:					
Information:					
			Total Files Size (in bytes):	7783174	

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.

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 NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/208,640	03/22/2021		0.00	46440-0007005	20	1

CONFIRMATION NO. 6013

26191
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

FILING RECEIPT

OC000000124978850

Date Mailed: 04/20/2021

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)

Mosheh T. Moskowitz, Rockville, MD;
Nathan C. Moskowitz, Rockville, MD;

Applicant(s)

Moskowitz Family LLC, Rockville, MD;

Power of Attorney: The patent practitioners associated with Customer Number 26191

Domestic Priority data as claimed by applicant

This application is a CON of 16/134,364 09/18/2018 PAT 10952867
which is a CON of 15/350,352 11/14/2016 PAT 10123881
which is a CON of 12/945,835 11/13/2010 PAT 9492282
which is a DIV of 11/737,846 04/20/2007 PAT 7854765
which claims benefit of 60/793,329 04/20/2006

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: 04/19/2021
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/208,640**
Projected Publication Date: To Be Determined - pending completion of Missing Parts
Non-Publication Request: No
Early Publication Request: No
**** SMALL ENTITY ****
Title

Bi-directional fixating transvertebral body screws, zero-profile horizontal intervertebral miniplates, expansile intervertebral body fusion devices, and posterior motion-calibrating interarticulating joint stapling device for spinal fusion

Preliminary Class

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

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).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 17/208,640

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	80		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	350		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	400		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*	x 50 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*	x 240 =	0.00			
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).			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	830		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** 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 found in the appropriate box in column 1.

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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0007005

CONFIRMATION NO. 6013

26191
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

FORMALITIES LETTER

OC000000124978851

Date Mailed: 04/20/2021

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
- The application search fee must be submitted.
- The application examination fee must be submitted.
- Surcharge as set forth in 37 CFR 1.16(f) must be submitted.
  The surcharge is due for any one of:
  - late submission of the basic filing fee, search fee, or examination fee,
  - late submission of inventor's oath or declaration,
  - filing an application that does not contain at least one claim on filing, or
  - submission of an application filed by reference to a previously filed application.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of this Notice to avoid abandonment is/are itemized below. Small entity discount is in effect. If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- $ **80** basic filing fee.
- $ **80** surcharge.
- $ **350** search fee.
- $ **400** examination fee.
- $(**0**) previous unapplied payment amount.
- $ **910** TOTAL FEE BALANCE DUE.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

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**.

/qtran/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	Unknown
Application No.	:	17/208,640	Examiner	:	Unknown
Filed	:	March 22, 2021	Conf. No.	:	6013
Title	:	BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION			

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR CORRECTED OFFICIAL FILING RECEIPT

Please correct the Filing Receipt for the above-referenced application to reflect the changes made in the supplemental application data sheet.

Please supply a corrected Filing Receipt to the undersigned with respect to this application.

No fee is believed to be due. If, however, there are any necessary charges or credits, please apply them to Deposit Account No. 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: 5/26/2021

/Stuart A. Nelson/
Stuart A. Nelson
Reg. No. 63,947

Customer Number 26191
Fish & Richardson P.C.
Telephone: (612) 337-2538
Facsimile: (877) 769-7945

100405181.doc

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	46440-0006007
	Application Number	17/208,640
Title of Invention	BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION	
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.		

Secrecy Order 37 CFR 5.2

☐ 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.)

Application Information:

Title of the Invention	~~ELECTRONICALLY ASSISTED MEDICAL DEVICE~~ BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION		
Attorney Docket Number	~~46440-0007005~~ 46440-0006007	**Small Entity Status Claimed** ▨	
Application Type	Utility		
Subject Matter	Nonprovisional		
Total Number of Drawing Sheets (if any)	~~12~~ 25	**Suggested Figure for Publication (if any)**	

Filing By Reference:

Only compete 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	Intellectual Property Authority or Country

Publication Information:

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

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	46440-0006007
	Application Number	17/208,640
Title of Invention	BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION	

☐ **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 been and will not be the subject of an application filed in another country, or under a multilateral 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). Enter either 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:	☒ Customer Number	☐ U.S. Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	26191		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this 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	Pending		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY/MM/DD)
	Continuation of	~~16/143,364~~ 16/362,152	~~2018-09-18~~ 2019-03-22

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this 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	Patented				
Application Number	Continuity Type	Prior Application Number	Filing Date (**YYYY/MM/DD**)	Patent Number	Issue Date ((YYY/MM/DD)
~~16/143,364~~ 16/362,152	Continuation of	~~15/350,352~~ 15/934,622	~~2016-11-14~~ 2018-03-23	~~10123881~~ 10251643	~~2018-11-13~~ 2019-04-09

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	46440-0006007
	Application Number	17/208,640
Title of Invention	BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION	

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this 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	Patented				
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY/MM/DD)	Patent Number	Issue Date (YYYY/MM/DD)
~~15/350,352~~ 15/934,622	Continuation of	~~12945835~~ 13/093,812	~~2010-11-13~~ 2011-04-25	~~9492282~~ 9924940	~~2016-11-15~~ 2018-03-27

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this 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	Patented				
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY/MM/DD)	Patent Number	Issue Date (YYYY/MM/DD)
~~12945835~~ 13/093,812	~~Division of~~ Continuation of	~~11737846~~ 12/347,990	~~2007-04-20~~ 2008-12-31	~~7854765~~ 7951180	~~2010-12-21~~ 2011-05-31

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this 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	~~Expired~~ Patented				
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY/MM/DD)	Patent Number	Issue Date (YYYY/MM/DD)
~~11737846~~ 12/347,990	~~Claims benefit of provisional~~ Division of	~~60793329~~ 11/208,644	~~2006-04-20~~ 2005-08-23	7704279	2010-04-27

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	46440-0006007
	Application Number	17/208,640
Title of Invention	BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION	

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this 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	Expired		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY/MM/DD)
11/208,644	Claims benefit of provisional	60/670,231	2005-04-12

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/Stuart A. Nelson/			Date (**MM/DD/YYYY**)	5/26/2021
First Name	Stuart	Last Name	Nelson	Registration Number	63,947

100405155.doc

Electronic Acknowledgement Receipt

EFS ID:	42827363
Application Number:	17208640
International Application Number:	
Confirmation Number:	6013
Title of Invention:	Bi-directional fixating transvertebral body screws, zero-profile horizontal intervertebral miniplates, expansile intervertebral body fusion devices, and posterior motion-calibrating interarticulating joint stapling device for spinal fusion
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz
Customer Number:	26191
Filer:	Stuart A. Nelson/Emily Whitcomb
Filer Authorized By:	Stuart A. Nelson
Attorney Docket Number:	46440-0007005
Receipt Date:	26-MAY-2021
Filing Date:	22-MAR-2021
Time Stamp:	15:16:33
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)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Corrected Filing Receipt	RequestforCorrectFilingReceipt.PDF	41071 46cfb092e631cebac07172ae6a8e9b238a8f935e	no	1

Warnings:

Information:					
2	Application Data Sheet	SupplementalADS.PDF	132076 b466df4a34cb6bc155a347606fe20108a50d3e85	no	4
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
			Total Files Size (in bytes):	173147	

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.

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 NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/208,640	03/22/2021		0.00	46440-0007005	20	1

CONFIRMATION NO. 6013

CORRECTED FILING RECEIPT

26191
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

OC000000125943900

Date Mailed: 05/28/2021

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)

Mosheh T. Moskowitz, Rockville, MD;
Nathan C. Moskowitz, Rockville, MD;

Applicant(s)

Moskowitz Family LLC, Rockville, MD;

Power of Attorney: The patent practitioners associated with Customer Number 26191

Domestic Priority data as claimed by applicant

This application is a CON of 16/362,152 03/22/2019 PAT 10952723
which is a CON of 15/934,622 03/23/2018 PAT 10251643
which is a CON of 13/093,812 04/25/2011 PAT 9924940
which is a CON of 12/347,990 12/31/2008 PAT 7951180
which is a DIV of 11/208,644 08/23/2005 PAT 7704279
which claims benefit of 60/670,231 04/12/2005

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: 04/19/2021

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/208,640**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION

Preliminary Class

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 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).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor

community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	Unknown
Application No.	:	17/208,640	Examiner	:	Unknown
Filed	:	March 22, 2021	Conf. No.	:	6013

Title : BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION

MAIL STOP MISSING PARTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO NOTICE TO FILE MISSING PARTS OF APPLICATION

In response to the Notice to File Missing Parts of Application under 37 CFR §1.53(b) dated April 20, 2021, applicant claims small entity status (see 37 CFR §1.27) and submits herewith the following:

- ☒ Payment of the basic filing fee of $80;
- ☒ Payment of the search fee of $350;
- ☒ Payment of the examination fee of $400; and
- ☒ Payment of the surcharge of $80 for late filing of the basic filing fee and/or declaration.

The fees in the amount of $910 are being paid with this reply on the Electronic Filing System. Apply any necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: 6/8/2021

/Stuart A. Nelson/

Stuart A. Nelson
Reg. No. 63,947

Customer Number 26191
Fish & Richardson P.C.
Telephone: (612) 337-2538
Facsimile: (877) 769-7945

100443319.doc

Electronic Patent Application Fee Transmittal

Application Number:	17208640
Filing Date:	22-Mar-2021
Title of Invention:	BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz
Filer:	Stuart A. Nelson/Emily Whitcomb
Attorney Docket Number:	46440-0007005

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	80	80
UTILITY SEARCH FEE	2111	1	350	350
UTILITY EXAMINATION FEE	2311	1	400	400
Pages:				
Claims:				
Miscellaneous-Filing:				
LATE FILING FEE FOR OATH OR DECLARATION	2051	1	80	80
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**910**

Electronic Acknowledgement Receipt	
EFS ID:	42928657
Application Number:	17208640
International Application Number:	
Confirmation Number:	6013
Title of Invention:	BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz
Customer Number:	26191
Filer:	Stuart A. Nelson/Emily Whitcomb
Filer Authorized By:	Stuart A. Nelson
Attorney Docket Number:	46440-0007005
Receipt Date:	08-JUN-2021
Filing Date:	22-MAR-2021
Time Stamp:	14:28:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$910
RAM confirmation Number	E202168E29094879
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	MissingParts.pdf	78745 105ec5672f857ce6077de01f2124421a763abb25	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	37646 01c26f5b176512ebecc7dfe02fccbfa6cb3a0032	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	116391		

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.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 17/208,640

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	80		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	350		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	400		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*	x 50 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*	x 240 =	0.00			
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).			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	830		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** 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 found in the appropriate box in column 1.

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 NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/208,640	03/22/2021		910	46440-0007005	20	1

CONFIRMATION NO. 6013

UPDATED FILING RECEIPT

26191
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

OC000000126203614

Date Mailed: 06/10/2021

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)

Mosheh T. Moskowitz, Rockville, MD;
Nathan C. Moskowitz, Rockville, MD;

Applicant(s)

Moskowitz Family LLC, Rockville, MD;

Power of Attorney: The patent practitioners associated with Customer Number 26191

Domestic Priority data as claimed by applicant

This application is a CON of 16/362,152 03/22/2019 PAT 10952723
which is a CON of 15/934,622 03/23/2018 PAT 10251643
which is a CON of 13/093,812 04/25/2011 PAT 9924940
which is a CON of 12/347,990 12/31/2008 PAT 7951180
which is a DIV of 11/208,644 08/23/2005 PAT 7704279
which claims benefit of 60/670,231 04/12/2005

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: 04/19/2021

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/208,640**

Projected Publication Date: 09/16/2021

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION

Preliminary Class

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 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).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor

community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0007005

CONFIRMATION NO. 6013

26191
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

PUBLICATION NOTICE

OC00000128456775

Title:BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION

Publication No.US-2021-0282768-A1
Publication Date:09/16/2021

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. 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.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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 displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/208,640	Filing Date 03/22/2021	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $240 =	
☐ 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).				
☐ 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	

APPLICATION AS AMENDED - PART II

AMENDMENT	02/01/2022	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $240 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ 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".	/TRACEY T BELL/
*** 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.**

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	Unknown
Application No.	:	17/208,640	Examiner	:	Unknown
Filed	:	March 22, 2021	Conf. No.	:	6013
Title	:	BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION			

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

Prior to examination, please amend the application as indicated on the following pages.

Amendments to the Specification:

Please replace the title with the following new title:

ARTIFICIAL EXPANSILE IMPLANT SYSTEMS

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1-20. (Cancelled)

21. (New) An artificial spinal implant system comprising:

an artificial expansile spinal implant comprising:

a first shell having a first vertebral-engaging surface and a first opposite surface, the first shell comprising a first set of engagement features extending from the first vertebral-engaging surface;

a second shell having a second vertebral-engaging surface and a second opposite surface, the second shell comprising a second set of engagement features extending from the second vertebral-engaging surface; and

an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface and a turning mechanism;

wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the turning mechanism;

wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features of the first vertebral-engaging surface and the second set of engagement features of the second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place;

wherein the tool-engagement surface of the expansion mechanism is positioned and configured to be engaged by the tool extending along a direction of insertion; and

wherein the first shell comprises a first cavity extending from the first vertebral-engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features are positioned on the first vertebral-engaging surface circumferentially about the first cavity.

22. (New) The artificial spinal implant system of claim 21, wherein the first set of engagement features have substantially conical tips configured for piercing endplates of the opposing vertebral bodies when introduced into the spine and expanded.

23. (New) The artificial spinal implant system of claim 22, wherein the first set of engagement features and the second set of engagement features extend from the first vertebral-engaging surface and the second vertebral-engaging surface in directions substantially perpendicular to the first and second vertebral-engaging surfaces.

24. (New) The artificial spinal implant system of claim 23, wherein the second shell comprises a second cavity extending from the second vertebral-engaging surface through the second shell to the second opposite surface and wherein the second set of engagement features are positioned on the second vertebral-engaging surface circumferentially about the second cavity.

25. (New) The artificial spinal implant system of claim 24, wherein the first shell curves substantially continuously around a first perimeter of the first shell and the second shell curves substantially continuously around a second perimeter of the second shell.

26. (New) The artificial spinal implant system of claim 25, wherein the first shell comprises a first perimeter shaped to correspond to a shape of a vertebral body.

27. (New) The artificial spinal implant system of claim 21, wherein the expansion mechanism further comprises a ratcheting mechanism.

28. (New) The artificial spinal implant system of claim 21, wherein the expansion mechanism further comprises a rotatable gear.

29. (New) The artificial spinal implant system of claim 21, wherein the first shell and the second shell each comprise titanium.

30. (New) The artificial spinal implant system of claim 21, wherein the artificial expansile spinal implant further comprises means for placement of a bone fusion material.

31. (New) An artificial spinal implant system comprising:

an artificial expansile spinal implant comprising:

a first shell having a first vertebral-engaging surface and a first opposite surface, the first shell comprising a first set of engagement features extending from the first vertebral-engaging surface; and

a second shell having a second vertebral-engaging surface and a second opposite surface, the second shell comprising a second set of engagement features extending from the second vertebral-engaging surface; and

an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface and at least one rotating gear;

wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the at least one rotating gear;

wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features of the first vertebral-engaging surface and the second set of engagement features of the second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place;

wherein the tool-engagement surface of the expansion mechanism is positioned and configured to be engaged by the tool extending along a direction of insertion; and

wherein the first shell comprises a first cavity extending from the first vertebral-engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features are positioned on the first vertebral-engaging surface circumferentially about the first cavity.

32. (New) The artificial spinal implant system of claim 31, the expansion mechanism further comprising at least one threaded body, wherein the rotating of the tool or the rotation of the at least one rotating gear causes a rotation of the at least one threaded body.

33. (New) The artificial spinal implant system of claim 32, wherein the rotating of the tool is configured to rotate the at least one rotating gear with respect to the at least one threaded body to drive expansion between the first shell and the second shell.

34. (New) The artificial spinal implant system of claim 32, wherein the rotating of the tool leads to a height expansion between the first shell and the second shell.

35. (New) The artificial spinal implant system of claim 34, wherein the artificial expansile spinal implant can be adjusted in at least two directions in order to engage the opposing vertebral bodies.

36. (New) The artificial spinal implant system of claim 31, wherein the first set of engagement features and the second set of engagement features extend from the first

vertebral-engaging surface and the second vertebral-engaging surface in directions substantially perpendicular to the first and second vertebral-engaging surfaces.

37. (New) The artificial spinal implant system of claim 31, wherein the first shell curves substantially continuously around a first perimeter of the first shell.

38. (New) The artificial spinal implant system of claim 37, wherein the first shell comprises a first perimeter shaped to correspond to a shape of a vertebral body.

39. (New) The artificial spinal implant system of claim 31, wherein the first shell and the second shell each comprise titanium.

40. (New) The artificial spinal implant system of claim 31, wherein the artificial expansile spinal implant is configured to be used with a bone fusion material.

REMARKS

With this amendment, the title of the application has been amended to be descriptive of the claimed subject matter. All amendments to the title are supported by the originally filed application and figures, and no new matter is added.

Claims 1-20 are cancelled and new claims 21-40 are added. Support for these amendments can be found throughout the specification and figures. Applicant asks that all claims be examined in view of the amendment to the claims.

Please apply any necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: February 1, 2022

/Kiersten M. Batzli/
Kiersten M. Batzli, Reg. No. 75,476

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 766-2015
Facsimile: (877) 769-7945

100594040.doc

Electronic Acknowledgement Receipt	
EFS ID:	44892022
Application Number:	17208640
International Application Number:	
Confirmation Number:	6013
Title of Invention:	BI-DIRECTIONAL FIXATING TRANSVERTEBRAL BODY SCREWS, ZERO-PROFILE HORIZONTAL INTERVERTEBRAL MINIPLATES, EXPANSILE INTERVERTEBRAL BODY FUSION DEVICES, AND POSTERIOR MOTION-CALIBRATING INTERARTICULATING JOINT STAPLING DEVICE FOR SPINAL FUSION
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz
Customer Number:	26191
Filer:	Kiersten M. Batzli/Emily Whitcomb
Filer Authorized By:	Kiersten M. Batzli
Attorney Docket Number:	46440-0006007
Receipt Date:	01-FEB-2022
Filing Date:	22-MAR-2021
Time Stamp:	16:27:12
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)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		PrelimAmend.PDF	86812 6820d37298c2e2ce6e45f55495a6a9f65d8ce748	yes	8

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	1
	Specification	2	2
	Claims	3	7
	Applicant Arguments/Remarks Made in an Amendment	8	8
Warnings:			
Information:			
	Total Files Size (in bytes):	86812	

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.

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.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

26191 7590 04/27/2022

FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
SHIRSAT, MARCELA	

ART UNIT	PAPER NUMBER
3775	

NOTIFICATION DATE	DELIVERY MODE
04/27/2022	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):

PATDOCTC@fr.com

Office Action Summary	Application No. 17/208,640	Applicant(s) Moskowitz et al.	
	Examiner MARCELA I SHIRSAT	Art Unit 3775	AIA (FITF) Status No

-- 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 2 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 2/1/22.

☐ 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) 21-40 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) _____ is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☑ Claim(s) 21-40 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 or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 3/22/21 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) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Election/Restriction

2. This application contains claims directed to the following patentably distinct species. Applicant must choose one of the screws and plate configurations.

Species of Bi-directional fixating transvertebral (BDFT) screws

a. Species A: Fig. 1a-1d

b. Species B: Fig. 2a-2g

c. Species C: Fig. 3a-3e.

Species of Mini Plates for use with BDFT screws

a. Species AA: Fig. 5a-5d

b. Species BB: Fig. 6a-6g

c. Species CC: Fig. 6h-6i.

d. Species DD: Fig. 7a-7b

2. The species are independent or distinct because: **For the BDFT Screws**: Species A discloses a screw having a casing with a centrally placed single drive screw to drive a pinion which causes the expansion and contraction of a left and right handed screws; Species B discloses a screw having a casing with an off-center single drive screw to drive a pinion to

accomplishe bi-directional movement by engaging left and right gears which simultaneously turn left and right screws and in its resting closed position the solid left screw with a narrower diameter is buried within the right wider diameter hollow right screw; Species C is a screw with two separate dive pinion screws which each drive a different gear one each for the left and right screw and because the left and right screws have separate controls and are not linked by one common pinion, separate distinct motions of the screws can be obtained, and this embodiment also consists of a smaller diameter solid left screw which fits into a larger diameter hollow right screw. **For the Mini Plates**: Species AA consists of upper and lower plate portions that are joined together two house two BDFT screws, that when joined it creates two slots adjacent to each slot adjacent to an end into which the pinion the single pinion screw can fit; Species BB discloses upper and lower plates joined together to house three BDFT screws in a triangular configuration and has slots for the three pinion screws; Species CC discloses upper and lower plates joined together to house three BDFT screws in a triangular configuration and has slots for the three pinion screws and wherein the plate is in the form of a cage with incorporated slots for the placement of bone material; and Species DD is a plate in the shape of a lumbar two-dimensionally expanding intervertebral fusion device (IBFD)that can expand in two directions and can incorporate three BDFT screws.

3. In addition, these species are not obvious variants of each other based on the current record.

4. Applicant is required under 35 U.S.C. 121 to elect a single disclosed species, or a single grouping of patentably indistinct species, for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claim appears to be generic.

There is a search and/or examination burden for the patentably distinct species as set forth above because at least the following reason(s) apply: the species or groupings of patentably indistinct species require a different field of search (e.g., searching different classes/subclasses or electronic resources, or employing different search strategies or search queries).

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected species or grouping of patentably indistinct species**, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

The election may be made with or without traverse. To preserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the election of species requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected species or grouping of patentably indistinct species.

Should applicant traverse on the ground that the species, or groupings of patentably indistinct species from which election is required, are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing them to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of

the species unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other species.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be corrected in compliance with 37 CFR 1.48(a) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. A request to correct inventorship under 37 CFR 1.48(a) must be accompanied by an application data sheet in accordance with 37 CFR 1.76 that identifies each inventor by his or her legal name and by the processing fee required under 37 CFR 1.17(i).

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARCELA I SHIRSAT whose telephone number is (571)270-5269. The examiner can normally be reached M-F 9:00am-5:30pm EST.

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, Kevin Truong can be reached on 571-272-4705. 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.

/MARCELA I. SHIRSAT/
Primary Examiner, Art Unit 3775

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	3775
Application No.	:	17/208,640	Examiner	:	Marcela Shirsat
Filed	:	March 22, 2021	Conf. No.	:	6013
Title	:	ARTIFICIAL EXPANSILE IMPLANT SYSTEMS			

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO RESTRICTION REQUIREMENT

In response to the restriction requirement made in the action dated April 27, 2022, identified Species A and Species DD (encompassing claims 21-40) are elected for examination. The election is made without traverse.

Please apply any necessary charges or credits to Deposit Account No. 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: May 13, 2022

/Kiersten M. Batzli/
Kiersten M. Batzli, Reg. No. 75,476

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 766-2015
Facsimile: (877) 769-7945

100650734.doc

Electronic Acknowledgement Receipt	
EFS ID:	45705875
Application Number:	17208640
International Application Number:	
Confirmation Number:	6013
Title of Invention:	ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz
Customer Number:	26191
Filer:	Kiersten M. Batzli/Emily Whitcomb
Filer Authorized By:	Kiersten M. Batzli
Attorney Docket Number:	46440-0006007
Receipt Date:	13-MAY-2022
Filing Date:	22-MAR-2021
Time Stamp:	11:22:08
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)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response to Election / Restriction Filed	ReplytoRR.PDF	51932 3b1b621faeda2ee62290b35b3870fb39a96bc9ce	no	1

Warnings:

Information:	
Total Files Size (in bytes):	51932

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.

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.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

26191 7590 08/16/2022

FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
SHIRSAT, MARCELA	

ART UNIT	PAPER NUMBER
3775	

NOTIFICATION DATE	DELIVERY MODE
08/16/2022	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):

PATDOCTC@fr.com

Office Action Summary	Application No. 17/208,640	Applicant(s) Moskowitz et al.	
	Examiner MARCELA I SHIRSAT	Art Unit 3775	AIA (FITF) Status No

-- 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 5/13/22.

☐ 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) 21-40 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) 21-40 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 or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 3/22/21 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) ☑ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Election/Restrictions

2. Applicant's election without traverse of Species A and DD (claims 21-40) in the reply filed on 05/13/2022 is acknowledged.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting

provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP § 2146 *et seq.* for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

4. Claims 21, 23-26, 28, 30 rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1,2,9, 19, 22,24, of U.S. Patent No. 10251643B2 (referenced herein as Pat. '643) in view of Biedermann et al (US Patent 6176882B1).

a. **Claims 21 and 24** are rejected over claim 1 of Pat. '643 over Biedermann as being unpatentable. Pat. '643 specifically recites n artificial spinal implant system comprising: an artificial expansile spinal implant comprising: a first shell having a first vertebral-engaging surface and a first opposite surface, the first shell comprising a first set of engagement features extending from the first vertebral-engaging surface; a second shell having a second vertebral-engaging surface and a second opposite surface, the second shell comprising a second set of engagement features extending from the second

vertebral-engaging surface [claim 1 lines 1-4 and 17-25]; and an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface and a turning mechanism; wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool- engagement surface, and wherein the rotating of the tool causes a rotation of the turning mechanism [claim 1 lines 4-10]; wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features of the first vertebral-engaging surface and the second set of engagement features of the second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place [claim 1 lines 10-13 and 17-21]; wherein the tool-engagement surface of the expansion mechanism is positioned and configured to be engaged by the tool extending along a direction of insertion [claim 1 line 14-17]. However, Pat. '643 is silent as to the implant having a first and second cavity each in the first and second shell. Biedermann discloses an artificial implant (Fig. 1) having a first and second shell (60,61); and wherein the first shell (60) comprises a first cavity (69) extending from the first vertebral- engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features (68) are positioned on the first vertebral-engaging surface circumferentially about the first cavity (69); and wherein the second shell (61) comprises a second cavity (shown in Fig. 1) extending from the second vertebral-engaging surface through the second shell to the second opposite surface and wherein the second set of engagement

(68) features are positioned on the second vertebral-engaging surface circumferentially about the second cavity (Fig. 1; and Col. 2 lines 27-37, Col. 3 line 57 to Col. 4 line 11).

b. **Claims 23, 25-26, 28, 30** are rejected as being unpatentable for reciting substantially similar subject matter as claims 2,9, 19, 22,24, of Pat. 643.

Claim Interpretation

5. The following is a quotation of 35 U.S.C. 112(f):

> (f) Element in Claim for a Combination. – An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The following is a quotation of pre-AIA 35 U.S.C. 112, sixth paragraph:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

6. The claims in this application are given their broadest reasonable interpretation using the plain meaning of the claim language in light of the specification as it would be understood by one of ordinary skill in the art. The broadest reasonable interpretation of a claim element (also commonly referred to as a claim limitation) is limited by the description in the specification when 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is invoked.

As explained in MPEP § 2181, subsection I, claim limitations that meet the following three-prong test will be interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph:

(A) the claim limitation uses the term "means" or "step" or a term used as a substitute for "means" that is a generic placeholder (also called a nonce term or a non-structural term having no specific structural meaning) for performing the claimed function;

(B) the term "means" or "step" or the generic placeholder is modified by functional language, typically, but not always linked by the transition word "for" (e.g., "means for") or another linking word or phrase, such as "configured to" or "so that"; and

(C) the term "means" or "step" or the generic placeholder is not modified by sufficient structure, material, or acts for performing the claimed function.

Use of the word "means" (or "step") in a claim with functional language creates a rebuttable presumption that the claim limitation is to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites sufficient structure, material, or acts to entirely perform the recited function.

Absence of the word "means" (or "step") in a claim creates a rebuttable presumption that the claim limitation is not to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is not interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites function without reciting sufficient structure, material or acts to entirely perform the recited function.

Claim limitations in this application that use the word "means" (or "step") are being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action. Conversely, claim limitations in this application that do

not use the word "means" (or "step") are not being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action.

7. This application includes one or more claim limitations that do not use the word "means," but are nonetheless being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, because the claim limitation(s) uses a generic placeholder that is coupled with functional language without reciting sufficient structure to perform the recited function and the generic placeholder is not preceded by a structural modifier. ***Such claim limitation(s) is/are: "expansion mechanism" in claim 21 and 31 and "means for placement of a bone fusion material" in claim 30.***

Because this/these claim limitation(s) is/are being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, it/they is/are being interpreted to cover the corresponding structure described in the specification as performing the claimed function, and equivalents thereof.

If applicant does not intend to have this/these limitation(s) interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, applicant may: (1) amend the claim limitation(s) to avoid it/them being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph (e.g., by reciting sufficient structure to perform the claimed function); or (2) present a sufficient showing that the claim limitation(s) recite(s) sufficient structure to perform the claimed function so as to avoid it/them being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph.

Claim Rejections - 35 USC § 112

8. The following is a quotation of 35 U.S.C. 112(b):

(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. **Claims 23-26, 36-38** are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

10. The term "substantially" in **claim line 4 of claim 23, lines 2 and 3 of claim 25, line 3 of claim 36, and line 2 of claim 37** is a relative term which renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

11. **Claims 24-26 and 38** are rejected as indefinite for depending upon an indefinite claim.

12. **Claims 26 and 38** are rejected as indefinite for the recitation of "a first perimeter" in lines 1-2. It is unclear if this is meant to be the same perimeter recited in claim 25 and 37 from which they depend or a new perimeter. In the interest in compact prosecution the claim will be treated as the same perimeter.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. **Claim(s) 21-24, 28-36, 39-40** is/are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Biedermann.

15. Biedermann discloses an artificial spinal implant system (intervertebral implant). Specifically in regards to **claim 21**, Biedermann discloses an artificial expansile spinal implant comprising: a first shell (60) having a first vertebral-engaging surface (surface with 68) and a first opposite surface, the first shell (60) comprising a first set of engagement features (68) extending from the first vertebral-engaging surface; a second shell (61) having a second vertebral-engaging surface (surface with 68) and a second opposite surface, the second shell (61) comprising a second set of engagement features (68) extending from the second vertebral-engaging surface (Fig. 1 and 4; and Col. 2 lines 27-37, Col. 3 line 57 to Col. 4 line 11). Biedermann also discloses an expansion mechanism (15, 25, 45-46, 26) positioned between the first and second shells (60,61) and configured to expand the artificial expansile spinal implant (See Fig. 7-8), the expansion mechanism (15, 25, 45-46, 26) coupled to the first and second opposite surfaces (see Fig. 7 by means of 26,25), the expansion mechanism (15, 25, 45-46, 26) comprising a tool-engagement surface (bores 38,38' which allow axis to 16,17) and a turning mechanism (15); wherein the expansion mechanism (15, 25, 45-46, 26) is configured to drive expansion between the first and second shell (60,61) in response to rotating of a tool engaged with the tool- engagement surface (38,38' with 16,17), and wherein the rotating of the tool causes a rotation of the turning mechanism (15) (Fig. 1 and 7-8; and Col. 2 line 56 to Col. 3 line 56, Col. 4 line 37-65). Biedermann also discloses wherein the artificial expansile spinal implant

is configured to be introduced into a spine with the first set of engagement features (68) of the first vertebral-engaging surface and the second set of engagement features (68) of the second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place (Fig. 2-3). The tool-engagement surface (bores 38,38' which allow axis to 16,17) of the expansion mechanism (15, 25, 45-46, 26) is positioned and configured to be engaged by the tool extending along a direction of insertion (Fig. 2). Biedermann also discloses wherein the first shell comprises a first cavity (69) extending from the first vertebral- engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features (68) are positioned on the first vertebral-engaging surface circumferentially about the first cavity (69)(Fig. 1; and Col. 2 lines 27-37, Col. 3 line 57 to Col. 4 line 11).

16. In regards to **claim 22**, Biedermann discloses wherein the first set of engagement features (68) have substantially conical tips configured for piercing endplates of the opposing vertebral bodies when introduced into the spine and expanded (As can be seen in Fig. 7-8, the teeth 68 have a conical cross section.) (Fig. 7-8).

17. In regards to **claim 23**, Biedermann discloses wherein the first set of engagement features (68) and the second set of engagement features (68) extend from the first vertebral-engaging surface and the second vertebral-engaging surface in directions substantially perpendicular to the first and second vertebral-engaging surfaces (Fig. 7-8 and 1).

18. In regards to **claim 24**, Biedermann discloses wherein the second shell (61) comprises a second cavity (69) extending from the second vertebral-engaging surface through the second shell to the second opposite surface and wherein the second set of engagement features (68) are positioned on the second vertebral-engaging surface circumferentially about the second cavity (69) (Fig. 1; and Col. 2 lines 27-37, Col. 3 line 57 to Col. 4 line 11).

19. In regards to **claim 28**, Biedermann discloses wherein the expansion mechanism (15, 25, 45-46, 26) further comprises a rotatable gear (45,46) (Wedges 45,46 behave like a gear in that they mesh with the threads of the spindle 15 and are moved by the spindle.) (Fig. 1, 7-8; and Col. 2 line 56 to Col. 3 line 56, Col. 4 line 37-65).

20. In regards to **claim 29**, Biedermann discloses wherein the first shell and the second shell (60,61) each comprise titanium (Col. 4 lines 35-36).

21. In regards to **claim 30**, Biedermann discloses wherein the artificial expansile spinal implant further comprises means for placement of a bone fusion material (Biedermann discloses wherein an opening 69 within both elements 60,61 which is capable of allowing bone fusion material to be inserted into the implant.) (Fig. 1).

22. In regards to **claim 31**, Biedermann discloses an artificial spinal implant system (intervertebral implant). Specifically, Biedermann discloses an artificial expansile spinal implant comprising: a first shell (60) having a first vertebral-engaging surface (surface with 68) and a first opposite surface, the first shell (60) comprising a first set of engagement features (68) extending from the first vertebral-engaging surface; a second shell (61) having a second vertebral-engaging surface (surface with 68) and a second opposite surface, the second shell (61) comprising a second set of engagement features (68) extending from the second vertebral-engaging surface (Fig. 1 and 4; and Col. 2 lines 27-37, Col. 3 line 57 to Col. 4 line 11). Biedermann also discloses an expansion mechanism (15, 25, 45-46, 26) positioned between the first and second shells (60,61) and configured to expand the artificial expansile spinal implant (See Fig. 7-8), the expansion mechanism (15, 25, 45-46, 26) coupled to the first and second opposite surfaces (see Fig. 7 by means of 26,25), the expansion mechanism (15, 25, 45-46, 26)

comprising a tool-engagement surface (bores 38,38' which allow axis to 16,17) and at least one rotating gear (45,46); wherein the expansion mechanism (15, 25, 45-46, 26) is configured to drive expansion between the first and second shell (60,61) in response to rotating of a tool engaged with the tool- engagement surface (38,38' with 16,17), and wherein the rotating of the tool causes a rotation of at least one rotating gear (45,46) (Wedges 45,46 behave like a gear in that they mesh with the threads of the spindle 15 and are moved by the spindle.) (Fig. 1 and 7-8; and Col. 2 line 56 to Col. 3 line 56, Col. 4 line 37-65). Biedermann also discloses wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features (68) of the first vertebral-engaging surface and the second set of engagement features (68) of the second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place (Fig. 2-3). The tool-engagement surface (bores 38,38' which allow axis to 16,17) of the expansion mechanism (15, 25, 45-46, 26) is positioned and configured to be engaged by the tool extending along a direction of insertion (Fig. 2). Biedermann also discloses wherein the first shell comprises a first cavity (69) extending from the first vertebral- engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features (68) are positioned on the first vertebral-engaging surface circumferentially about the first cavity (69)(Fig. 1; and Col. 2 lines 27-37, Col. 3 line 57 to Col. 4 line 11).

23. In regards to **claim 32**, Biedermann discloses the expansion mechanism further comprising at least one threaded body (15), wherein the rotating of the tool or the rotation of the at least one rotating gear (45,46) causes a rotation of the at least one threaded body (15) (Fig. 1 and 7-8; and Col. 2 line 56 to Col. 3 line 56, Col. 4 line 37-65).

24. In regards to **claim 33**, Biedermann discloses, wherein the rotating of the tool is configured to rotate the at least one rotating gear (45,46) with respect to the at least one threaded body (15) to drive expansion between the first and second shells (60,61) (Fig. 7-8).

25. In regards to **claim 34**, Biedermann discloses wherein the rotating of the tool leads to a height expansion between the first shell and the second shell (Fig. 7-8).

26. In regards to **claim 35**, Biedermann discloses wherein the artificial expansile spinal implant can be adjusted in at least two directions in order to engage the opposing vertebral bodies (As can be seen in Fig. 7-8, the elements 60,61 each expand outwardly in opposite directions from each other thereby meeting the two directions limitation.) (Fig. 7-8).

27. In regards to **claim 36**, Biedermann discloses wherein the first set of engagement features (68) and the second set of engagement features (68) extend from the first vertebral-engaging surface and the second vertebral-engaging surface in directions substantially perpendicular to the first and second vertebral-engaging surfaces (Fig. 7-8 and 1).

28. In regards to **claim 39**, Biedermann discloses wherein the first shell and the second shell (60,61) each comprise titanium (Col. 4 lines 35-36).

29. In regards to **claim 40**, Biedermann discloses wherein the artificial expansile spinal implant further comprises means for placement of a bone fusion material (Biedermann discloses wherein an opening 69 within both elements 60,61 which is capable of allowing bone fusion material to be inserted into the implant.) (Fig. 1).

Claim Rejections - 35 USC § 103

30. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

31. **Claim 25-26 and 37-38** is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Biedermann in view of Suddaby (US Patent 6395034B1).

32. Biedermann discloses a system comprising an artificial expansile implant having a first and second shell each having first and second engagement features thereon, an expansion mechanism comprising a tool engagement surface, a turning mechanism and a gear wherein the rotation mechanism allows for the implant to be expanded to stay in place between the vertebral bodies. However, Biedermann is silent as to the shells having a curved perimeter to match the vertebral body shape. Suddaby discloses an artificial expansile implant. Specifically in regards to **claims 25-26 and 37-38**, Suddaby discloses an expansile implant (Fig. 1a,1b) having a first and second shell (14) wherein the first shell curves (14) substantially continuously around a first perimeter of the first shell (14) and the second shell curves (14) substantially continuously around a second perimeter of the second shell (14); and wherein the first shell (14) comprises a first perimeter shaped to correspond to a shape of a vertebral body (Suddaby discloses wherein each broad head 14 has a convex surface 16 facing outwardly, and is partially spherical chosen to match that of the vertebral endplate against which it will bear. Those vertebral endplate surfaces are normally concave.) (Fig. 1a-1b; and Col. 3 line 64 to Col. 4 line 7). It would have been obvious to a person of skill in the art at the time the invention was made to modify the shells (60,61) of Biedermann to have a convex surface as taught in Suddaby in order to have surfaces that better match the vertebral endplates (Col. 4 lines 1-7).

33. **Claim 27** is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Biedermann in view of Heggeness et al (US Patent 5514180).

34. Biedermann discloses a system comprising an artificial expansile implant having a first and second shell each having first and second engagement features thereon, an expansion mechanism comprising a tool engagement surface, a turning mechanism and a gear wherein the rotation mechanism allows for the implant to be expanded to stay in place between the vertebral bodies. However, Biedermann is silent as to the expansion mechanism comprising a ratcheting mechanism. Heggeness discloses an artificial expansile implant. Specifically in regards to **claim 27**, Heggeness discloses an expansile implant (60) having a first and second shell (61,62) and an expansion mechanism (central portion 65) wherein the expansion mechanism further comprises a ratcheting mechanism (As can be seen in Fig. 22-23, the central portion 65 houses a ratchet mechanism as a means to expand the ends 61,62 away from one another. (Fig. 22-23; and Col. 10 lines 21-36). It would have been obvious to a person of skill in the art at the time the invention was made to modify the expansion mechanism of Biedermann to have a ratcheting mechanism as taught in Heggeness in order to allow for a more controlled and incremental expansion of the implant.

Conclusion

35. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARCELA I SHIRSAT whose telephone number is (571)270-5269. The examiner can normally be reached M-F 9:00am-5:30pm EST.

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, Kevin Truong can be reached on 571-272-4705. 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.

/MARCELA I. SHIRSAT/
Primary Examiner, Art Unit 3775

Notice of References Cited	Application/Control No. 17/208,640	Applicant(s)/Patent Under Reexamination Moskowitz et al.	
	Examiner MARCELA I SHIRSAT	Art Unit 3775	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-10251643-B2	04-2019	Moskowitz; Mosheh T.	A61F2/4455	1/1
*	B	US-6176882-B1	01-2001	Biedermann; Lutz	A61F2/447	623/17.11
*	C	US-6395034-B1	05-2002	Suddaby; Loubert	A61F2/442	623/17.15
*	D	US-5514180-A	05-1996	Heggeness; Michael H.	A61F2/30942	606/247
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/208,640	Moskowitz et al.
	Examiner	Art Unit
	MARCELA I SHIRSAT	3775

CPC - Searched*		
Symbol	**Date**	**Examiner**
a61b17/0642,0643,0682,7064	08/10/2022	mis
a61b2017/0648	08/10/2022	mis
a61f2/4455	08/10/2022	mis
a61f2002/30525,30579,30849,2835,3085,448	08/10/2022	mis

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

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
623	17.11-17.16	08/10/2022	mis
606	246-289,300-328,86r	08/10/2022	mis

* 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**
Performed applicant and inventor name search, reviewed parent case 15/934622, text and date limited classes, bkwd/fwd references	08/10/2022	mis

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

/MARCELA I. SHIRSAT/ Primary Examiner, Art Unit 3775	

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	44	("20020068977" OR "20020143338" OR "20050177235" OR "20070213820" OR "4636217" OR "5290312" OR "20040088054" OR "20040177531" OR "20040254644" OR "20050027362" OR "20050049590" OR "20050216084" OR "20050273170" OR "20050278026" OR "4997432" OR "5123926" OR "5514180" OR "5667472" OR "5782832" OR "6126689" OR "6368350" OR "6375682" OR "6419704" OR "6458159" OR "6527804" OR "6533818" OR "6572653" OR "6579318" OR "6582468" OR "6641614" OR "6719794" OR "6723126" OR "6733532" OR "6764491" OR "6770094" OR "6904308" OR "6955671" OR "7030904" OR "7037258" OR "7097615" OR "4554914" OR "4960420" OR "5660188" OR "5960522").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/09 03:20 PM
L2	1	"7704279".pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:23 PM
L3	172	("4554914" | "4599086" | "4636217" | "4960420" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:23 PM

		| "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7704279").urpn. AND (PGPB | USPT | USOC).dbnm.					
L4	8	(12/347990|15/934622|16/018904|16/362152).app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:28 PM
L5	114	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:29 PM

		| "7776047" | "8268000" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10238383").urpn. AND (PGPB | USPT | USOC).dbnm.					
L6	115	("4554914" | "4599086"	(US-PGPUB; USPAT;	OR	ON	ON	2022/08/09

		| "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279" | "7776047" | "8268000" | "9924940" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" |	USOCR)				03:29 PM

		"20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10251643").urpn. AND (PGPB | USPT | USOC).dbnm.					
L7	129	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5236460" | "5290312" | "5458641" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5702455" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6113638" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6432106" | "6454806" | "6454807" | "6458159" | "6527803" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6730088" | "6733532" | "6752832" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7226480" | "7232464" | "7238203" | "7442209"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:30 PM

		| "7641693" | "7674296" | "7691147" | "7704279" | "7753958" | "7776047" | "8268000" | "9924940" | "10238383" | "10251643" | "20020068977" | "20020143338" | "20020143399" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050177236" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" |					

		"20150148847" | "20160374830" | "20170252178").pn. OR ("10952723").urpn. AND (PGPB | USPT | USOC).dbnm.					
L8	2	(20050049590|5800547).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:00 PM
L9	4	(4554914|4636217|6723126|5062850).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:02 PM
L10	671	("3867728" | "4085744" | "4349921" | "4361141" | "4401112" | "4422451" | "4433677" | "4502473" | "4502475" | "4502483" | "4553273" | "4554914").pn. OR ("4636217").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:03 PM
L11	172	("4554914" | "4599086" | "4636217" | "4960420" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832" | "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7704279").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:50 PM
L12	146	("4554914" | "4599086" | "4636217" | "4960420" | "4997432" | "5062850"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 07:11 PM

		| "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832" | "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7846188").urpn. AND (PGPB | USPT | USOC).dbnm.					
L13	2	15/934622.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 07:27 PM
L14	48	("4636217" | "7846188" | "20050049590" | "20060069436" | "20100160984" | "20100161057").pn. OR ("8257443").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 08:24 PM
L15	8	(8353913|9889022|10028740|10076367|10307268|10251643|10376386|10478319).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 11:48 AM
L16	365	("2799196" | "3426364" | "3486505" | "4309777" | "4401112" | "4522200" | "4545374" | "4553273" | "4599086" | "4636217" | "4657550" | "4733665" | "4863476" | "4878915" | "4932375" | "4932969" | "4936851" | "4946378" | "5059193" | "5171278" | "5192327" | "5236460" | "5344252" | "5390683" | "5425772" | "5484437"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:00 PM

		"5522899" | "5554191" | "5562736" | "5571190" | "5571192" | "5593409" | "5609635" | "5653762" | "5653763" | "5658335" | "5665122" | "5693100" | "5702453" | "5772661" | "5776197" | "5776199" | "5782832" | "5865848" | "5888228" | "5893889" | "5893890" | "5972015" | "5980522" | "6015436" | "6039761" | "6045579" | "6080155" | "6080193" | "6083225" | "6083228" | "6090143" | "6093207" | "6102949" | "6102950" | "6113638" | "6117174" | "6127597" | "6156037" | "6159244" | "6159245" | "6174334" | "6176882" | "6183517" | "6190414" | "6193756" | "6193757" | "6206923" | "6210412" | "6217579" | "6224604" | "6245107" | "6280456" | "6287308" | "6302914" | "6328738" | "6332895" | "6344057" | "6368351" | "6395031" | "6395032" | "6395034" | "6402750" | "6409766" | "6432140" | "6436103" | "6436140" | "6443989" | "6443990" | "6447544" | "6447547" | "6451052" | "6454806" | "6454807" | "6478823" | "6491724" | "6527803" | "D472632" | "D472633" | "6562074" | "6576016" | "6582431" | "6582451" | "6582461" | "6582467" | "6592625" | "6595998" | "6610089" | "6626905" | "6641614" | "6648917" | "6666891" | "6679915" | "6685742" | "6706070" | "6719796" | "6723126" | "6733535" | "6743255" | "6758849" | "6773460" | "6814754" | "6814756" | "6821298" | "6833006" | "6835206" | "6837850" | "6840944" | "6843804" | "6852129" | "6863673" | "6875173" | "6893464" | "6902568" | "6923810" | "6953477" |					

		"6955691" | "6962606" | "7018415" | "7066961" | "7070598" | "7083650" | "7087055" | "7094257" | "7097648" | "7128760" | "7204853" | "7214243" | "7217291" | "7220280" | "D553742" | "7282063" | "7306626" | "7311733" | "7316714" | "7326250" | "7326251" | "7331996" | "7503933" | "7569074" | "7618456" | "7618458" | "7621951" | "7655042" | "7674297" | "7678148" | "7708778" | "7708779" | "7727280" | "7731751" | "7731752" | "7753958" | "7780732" | "7789914" | "7794501" | "7824445" | "7837734" | "7850733" | "7909830" | "7909869" | "7985256" | "8021430" | "8062375" | "8070813" | "8096994" | "8105358" | "8105382" | "8118870" | "8118871" | "8123810" | "8147550" | "8172903" | "8187331" | "D664252" | "8257440" | "8267939" | "8273124" | "8273126" | "8303662" | "8303663" | "8328818" | "8337558" | "8366777" | "8394143" | "8435296" | "8454695" | "8480741" | "8568481" | "20010032020" | "20020052656" | "20020068974" | "20020068977" | "20020082696" | "20020128716" | "20020138146" | "20030040798" | "20030065396" | "20030135279" | "20030149482" | "20030171813" | "20030195630" | "20030208263" | "20030208270" | "20030208272" | "20030208275" | "20030220650" | "20030236520" | "20040010312" | "20040010315" | "20040024460" |				

		"20040024463" | "20040030387" | "20040044411" | "20040078080" | "20040087947" | "20040087948" | "20040102774" | "20040153156" | "20040199252" | "20040215342" | "20040225360" | "20040243240" | "20040254643" | "20040254644" | "20050004673" | "20050015149" | "20050015150" | "20050027358" | "20050038512" | "20050049590" | "20050060036" | "20050070911" | "20050071007" | "20050113920" | "20050273171" | "20050278026" | "20060022180" | "20060064169" | "20060116767" | "20060122701" | "20060129244" | "20060149385" | "20060224241" | "20060241643" | "20060241764" | "20060247770" | "20060253201" | "20080058931" | "20080071279" | "20080082173" | "20080140207" | "20090222100" | "20100017965" | "20100049325" | "20100145455" | "20100211176" | "20100280616" | "20100286779" | "20100292796" | "20100331985" | "20110130838" | "20110172774" | "20120035729" | "20120071982" | "20120191194" | "20120290094" | "20120310349" | "20120316652").pn. OR					

		("9320610").urpn. AND (PGPB | USPT | USOC).dbnm.					
L17	1139	("4657550").pn. OR ("4863476").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:29 PM
L18	855	("4401112" | "5522899" | "5609635" | "5658335" | "5665122" | "5893889").pn. OR ("6176882").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:38 PM
L19	2	15/934622.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 05:35 PM
L20	115	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279" | "7776047" | "8268000" | "9924940" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050256576" | "20050261769" |	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 05:35 PM

		"20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10251643").urpn. AND (PGPB | USPT | USOC).dbnm.					
L22	84	((("MOSKOWITZ") near3 ("FAMILY") near3 ("LLC"))).AS,AANM.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:10 PM
L24	177	((("MOSKOWITZ") near3 ("Mosheh")) OR (("MOSKOWITZ") near3 ("Nathan"))).INV.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:10 PM
L25	2	(L22 OR L23) AND ((first NEAR shell) SAME (second NEAR shell))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:11 PM
L26	465	(a61b17/0642.cpc.) AND @ad<"20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM

L27	465	(a61b17/0642.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L28	584	(a61b17/0643.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L30	267	(a61b17/0682.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L31	155	(a61b17/7064.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L32	257	(a61b2017/0648.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L33	1116	(a61f2/4455.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L34	48	(a61f2002/30525.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L35	576	(a61f2002/30579.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L36	1010	(a61f2002/30841.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L37	1770	(a61f2002/2835.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L38	672	(a61f2002/3085.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L39	819	(a61f2002/448.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L40	6293	(606/246-289,300-328,86r.ccls.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:14 PM
L41	2683	(623/17.11-17.16.ccls.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:14 PM
L42	232	(L26 OR L27 OR L28 OR L30 OR L31 OR L32 OR L33 OR L34 OR L35 OR L36 OR L37 OR L38 OR L39 OR L40 OR L41) AND ((expandable OR expansible) SAME ((vertebral OR intervertebral) SAME (implant OR cage)))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:16 PM
L43	1	(61786882|6395034).pn	(US-PGPUB; USPAT;	OR	ON	ON	2022/08/10

		.	USOCR)				06:17 PM
L44	2	(6176882|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:17 PM
L45	3	(6176882|6395034|10251643).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:52 PM
L46	22	((US-10238383-B2 OR US-10251643-B2 OR US-5800547-A OR US-6723126-B1 OR US-5062850-A OR US-4636217-A OR US-4554914-A OR US-4892545-A OR US-6113638-A OR US-7704279-B2 OR US-9924940-B2 OR US-7846188-B2 OR US-8257443-B2 OR US-8377140-B2 OR US-9320610-B2 OR US-4863476-A OR US-6176882-B1 OR US-6395034-B1 OR US-3848601-A).did. AND USPT.dbnm.) OR ((US-20050049590-A1 OR US-20050256576-A1 OR US-20060241621-A1).did. AND PGPB.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, 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, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/10 08:24 PM
L47	3	L46 AND ratchet	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:24 PM
L48	23	L42 AND (ratchet SAME (expand OR expansion OR expansible))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:25 PM
L49	64	L42 AND (ratchet)	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:29 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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 displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/208,640	Filing Date 03/22/2021	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $240 =	
☐ 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).				
☐ 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	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	11/07/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 21	Minus	** 20	= 1		x $50 =	50
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $240 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	50

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ 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".	/ANGELONA D JONES/
*** 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.**

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	3775
Application No.	:	17/208,640	Examiner	:	Marcela Shirsat
Filed	:	March 22, 2021	Conf. No.	:	6013
Title	:	ARTIFICIAL EXPANSILE IMPLANT SYSTEMS			

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO ACTION OF AUGUST 16, 2022

Please consider the following reply.

Amendments to Claims:
Listing of Claims.

1-20. (Cancelled)

21. (Currently Amended) An artificial spinal implant system comprising:

an artificial expansile spinal implant comprising:

a first shell having a first vertebral-engaging surface and a first opposite surface, the first shell comprising a first set of engagement features extending from the first vertebral-engaging surface;

a second shell having a second vertebral-engaging surface and a second opposite surface, the second shell comprising a second set of engagement features extending from the second vertebral-engaging surface; and

an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface, a threaded body, and a turning mechanism;

wherein the threaded body has a first end, and a second end, and a longitudinal axis between the first end and the second end extends in a direction from the first shell to the second shell;

wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the turning mechanism;

wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features of the first vertebral-engaging surface and the second set of engagement features of the second vertebral-engaging surface

engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place;

wherein the tool-engagement surface of the expansion mechanism is positioned and configured to be engaged by the tool extending along a direction of insertion; and

wherein the first shell comprises a first cavity extending from the first vertebral-engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features are positioned on the first vertebral-engaging surface circumferentially about the first cavity.

22. (Previously Presented) The artificial spinal implant system of claim 21, wherein the first set of engagement features have substantially conical tips configured for piercing endplates of the opposing vertebral bodies when introduced into the spine and expanded.

23. (Currently Amended) The artificial spinal implant system of claim 22, wherein the first set of engagement features and the second set of engagement features extend from the first vertebral-engaging surface and the second vertebral-engaging surface in directions ~~substantially~~ perpendicular to the first and second vertebral-engaging surfaces.

24. (Previously Presented) The artificial spinal implant system of claim 23, wherein the second shell comprises a second cavity extending from the second vertebral-engaging surface through the second shell to the second opposite surface and wherein the second set of engagement features are positioned on the second vertebral-engaging surface circumferentially about the second cavity.

25. (Currently Amended) The artificial spinal implant system of claim 24, wherein the first shell curves ~~substantially~~ continuously around a first perimeter of the first shell and the second shell curves ~~substantially~~ continuously around a second perimeter of the second shell.

26. (Currently Amended) The artificial spinal implant system of claim 25, wherein the first ~~shell comprises a first~~ perimeter is shaped to correspond to a shape of a vertebral body.

27. (Previously Presented) The artificial spinal implant system of claim 21, wherein the expansion mechanism further comprises a ratcheting mechanism.

28. (Previously Presented) The artificial spinal implant system of claim 21, wherein the expansion mechanism further comprises a rotatable gear.

29. (Previously Presented) The artificial spinal implant system of claim 21, wherein the first shell and the second shell each comprise titanium.

30. (Previously Presented) The artificial spinal implant system of claim 21, wherein the artificial expansile spinal implant further comprises means for placement of a bone fusion material.

31. (Previously Presented) An artificial spinal implant system comprising:

an artificial expansile spinal implant comprising:

a first shell having a first vertebral-engaging surface and a first opposite surface, the first shell comprising a first set of engagement features extending from the first vertebral-engaging surface; and

a second shell having a second vertebral-engaging surface and a second opposite surface, the second shell comprising a second set of engagement features extending from the second vertebral-engaging surface; and

an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface and at least one rotating gear;

wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the at least one rotating gear;

wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features of the first vertebral-engaging surface and the second set of engagement features of the second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place;

wherein the tool-engagement surface of the expansion mechanism is positioned and configured to be engaged by the tool extending along a direction of insertion; and

wherein the first shell comprises a first cavity extending from the first vertebral-engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features are positioned on the first vertebral-engaging surface circumferentially about the first cavity.

32. (Previously Presented) The artificial spinal implant system of claim 31, the expansion mechanism further comprising at least one threaded body, wherein the rotating of the tool or the rotation of the at least one rotating gear causes a rotation of the at least one threaded body.

33. (Previously Presented) The artificial spinal implant system of claim 32, wherein the rotating of the tool is configured to rotate the at least one rotating gear with respect to the at least one threaded body to drive expansion between the first shell and the second shell.

34. (Previously Presented) The artificial spinal implant system of claim 32, wherein the rotating of the tool leads to a height expansion between the first shell and the second shell.

35. (Previously Presented) The artificial spinal implant system of claim 34, wherein the artificial expansile spinal implant can be adjusted in at least two directions in order to engage the opposing vertebral bodies.

36. (Currently Amended) The artificial spinal implant system of claim 31, wherein the first set of engagement features and the second set of engagement features extend from the first vertebral-engaging surface and the second vertebral-engaging surface in directions ~~substantially~~ perpendicular to the first and second vertebral-engaging surfaces.

37. (Currently Amended) The artificial spinal implant system of claim 31, wherein the first shell curves ~~substantially~~ continuously around a first perimeter of the first shell.

38. (Currently Amended) The artificial spinal implant system of claim 37, wherein the first ~~shell comprises a first~~ perimeter is shaped to correspond to a shape of a vertebral body.

39. (Previously Presented) The artificial spinal implant system of claim 31, wherein the first shell and the second shell each comprise titanium.

40. (Previously Presented) The artificial spinal implant system of claim 31, wherein the artificial expansile spinal implant is configured to be used with a bone fusion material.

41. (New) The artificial spinal implant system of claim 21, wherein the first end of the threaded body is coupled to the first shell and the second end of the threaded body is coupled to the second shell, and the turning mechanism engages threads of the threaded body.

REMARKS

Claims 21-41 are pending in this application, and claims 21 and 31 are independent. Claims 21, 23, 25, 26 and 36-38 are amended. New claim 41 is added. All claim amendments and new claims are supported by the patent specification as filed, and no new matter is added.

Double Patenting

Claims 21, 23-26, 28, and 30 were rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 2, 9, 19, 22, and 24, of U.S. Patent No. 10,251,643 in view of U.S. Patent No. 6,176,882 ("Biedermann"). Applicant has amended claim 21 and submits that amended claim 21 recites subject matter distinct from the claims of U.S. Patent No. 10,251,643, and not obvious over Biedermann (see reasons described below).

In view of the amendments to claim 21, and the arguments presented below, Applicant respectfully requests withdrawal of the double patenting rejection.

Claim Interpretation

The Office Action states that claims 21, 31, and 30 are interpreted under 35 U.S.C. § 112(f) because the claim recites "expansion mechanism" (claims 21 and 31) and "means for placement of a bone fusion material" (claim 30). *See* Office Action at p. 7.

Applicant concedes that it is appropriate to interpret the claim term "means for placement of a bone fusion material" in claim 30 under 35 U.S.C. § 112(f).

However, Applicant submits that interpretation under 35 U.S.C. § 112(f) of the claim term "expansion mechanism," recited in claims 21 and 31, is not appropriate in view of the additional structure previously recited in the claims, and the additional structure added in the amendment to claim 21. In particular, claim 21 recites "an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface, a threaded body, and a turning mechanism; wherein the threaded body has a first end, and a second end, and

a longitudinal axis between the first end and the second end extends in a direction from the first shell to the second shell; wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the turning mechanism." Claim 31 recites "an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface and at least one rotating gear; wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the at least one rotating gear."

Moreover, the contrast between claim 30 which recites "means for…" and the claims that do not recite "means for…" further supports the conclusion that claims 21 and 31 should not be interpreted under 35 U.S.C. § 112(f).

Accordingly, Applicant submits that the claim term "expansion mechanism" in claims 21 and 31 should not be interpreted under 35 U.S.C. § 112(f).

Claim Rejections - 35 U.S.C. § 112

Claims 23-26, 36-38 were rejected under 35 U.S.C. § 112(b) as being indefinite. Applicant believes the amendments to claims 23, 25, 26 and 36-38 render moot the rejection under 35 U.S.C. § 112(b), and respectfully requests withdrawal of the rejections.

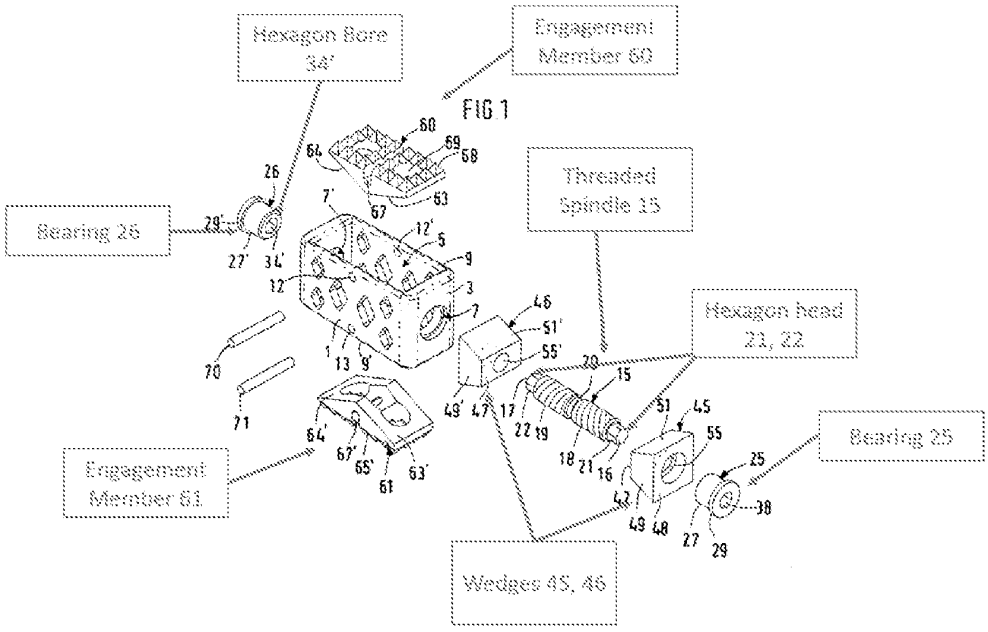
Claim Rejections - 35 U.S.C. §§ 102 and 103

Claims 21-24, 28-36, 39-40 were rejected under 35 U.S.C. § 102 as being anticipated by Biedermann; Claims 25-26 and 37-38 were rejected under 35 U.S.C. § 103 as being unpatentable over Biedermann in view of U.S. Patent No. 6,395,034 ("Suddaby"). Applicant overcomes the rejections for at least the following reasons.

A. Claim 21

Claim 21 recites, *inter alia*, "the expansion mechanism comprising a tool-engagement surface, ***a threaded body***, and a turning mechanism; wherein ***the threaded body has a first end, and a second end, and a longitudinal axis between the first end and the second end extends in a direction from the first shell to the second shell***." (Emphasis added). Biedermann fails to teach or suggest at least this feature of claim 21.

Biedermann describes an intervertebrae implant with engagement members that can be moved to contact a surface of a vertebrae, the implant having a threaded spindle extending within the walls of the implant and "wedge member 45 and 46 provided on each threaded portion 18, 19 of the threaded spindle 15." Biedermann, 3:33-34. As illustrated in annotated FIG. 1 below, Biedermann's threaded spindle 15 is rotated by use of a hexagon screwdriver in a hexagon bore 38 of the bearing 25, 26 to move the wedge members 45 and 46 along the threaded spindle to move the engagement members 60, 61 (the alleged first and second shells). *See* Biedermann 3:27-31.



Biedermann, FIG. 1 (annotations added).

However, as can be seen in FIG. 1 above, Biedermann's intervertebrae implant does not include any components analogous to "a threaded body" having "a first end, and a second end, and a longitudinal axis between the first end and the second end extends in a direction from the first shell to the second shell," as claim 21 recites.

Accordingly, Biedermann fails to disclose, much less teach or suggest, "the expansion mechanism comprising a tool-engagement surface, ***a threaded body***, and a turning mechanism, ***the turning mechanism engaging threads of the threaded body***; ***wherein the threaded body has a first end, and a second end, and a longitudinal axis between the first end and the second end extends in a direction from the first shell to the second shell***" as claim 21 recites, and claim 21 is patentable over Biedermann. Suddaby, cited with regard to various other claims, fails to remedy the deficiencies of Biedermann, and claim 21 is patentable over the prior art of record. Claims 22-30 depend, directly or indirectly, from claim 21 and are patentable over the prior art of record for at least the same reasons.

B. Claim 31

Claim 31 recites, *inter alia*, "an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface and ***at least one rotating gear***; wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, and ***wherein the rotating of the tool causes a rotation of the at least one rotating gear***." (Emphasis added).

As described above, Biedermann describes an intervertebrae implant with raisable engagement members for contacting a surface of a vertebrae, the implant having a threaded spindle extending within the walled implant and "wedge member 45 and 46 provided on each threaded portion 18, 19 of the threaded spindle 15." Biedermann, 3:33-34. Biedermann's "two wedge members 45, 46 are moved toward each other by rotating the threaded spindle 15" causing faces of the wedge members to exert a force on counterpart surfaces of engagement members 60, 61. Biedermann, 4:48-51.

The Office contends that the wedges 45, 46 are analogous to the claimed "at least one rotating gear," and states "Wedges 45,46 behave like a gear in that they mesh with the threads of the spindle 15 and are moved by the spindle." Office Action, p. 12. Applicant respectfully disagrees. The wedges are moved back and forth along the spindle without any rotation of the wedges themselves. Biedermann, 4:48-51. Even if Biedermann's wedges could be considered to be "rotating gears," the rotation of the screwdriver causes a rotation of the threaded spindle, and horizontal motion of the wedges along the length of the spindle. Accordingly, Biedermann does not teach or suggest at least "the expansion mechanism comprising a tool-engagement surface and at least one rotating gear;" where "the rotating of the tool causes a rotation of the at least one rotating gear," as claim 31 recites.

Accordingly, Biedermann fails to teach or suggest this feature of claim 31. Further, Suddaby does not remedy the deficiencies of Biedermann. Accordingly, claim 31 is patentable over the prior art of record. Claims 32-40 depend, directly or indirectly, from claim 31 and are patentable over the prior art of record for at least the same reasons.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the rejections under 35 U.S.C. §§ 102 and 103.

New Claim

New claim 41 depends from claim 21 and is patentable over the prior art of record for at least the same reasons, as well as for the combinations recited therein.

CONCLUSION

By responding in the foregoing remarks only to particular positions taken in the action, Applicant does not acquiesce with other positions that have not been explicitly addressed. In addition, Applicant's selecting some particular arguments for the patentability of a claim should not be understood as implying that no other reasons for the patentability of that claim exist. Finally, Applicant's decision to amend or cancel any claim should not be understood as implying that Applicant agrees with any positions taken in the action with reference to that claim or other claims, or that Applicant adopts or agrees with any position except as specifically stated in this paper. In particular, by amending a claim, Applicant does not necessarily concede that the claim prior to amendment was unpatentable.

Applicant believes no fees are due with this reply. However, if a fee is due, please apply those fees and any other necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: November 7, 2022

/Kiersten M. Batzli/
Kiersten M. Batzli, Reg. No. 75,476

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 766-2015
Facsimile: (877) 769-7945

100717175.doc

Electronic Patent Application Fee Transmittal					
Application Number:	17208640				
Filing Date:	22-Mar-2021				
Title of Invention:	ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS				
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz				
Filer:	Kiersten M. Batzli/Emily Whitcomb				
Attorney Docket Number:	46440-0006007				
Filed as Small Entity					
Filing Fees for Utility under 35 USC 111(a)					
Description		**Fee Code**	**Quantity**	**Amount**	**Sub-Total in USD($)**
Basic Filing:					
Pages:					
Claims:					
CLAIMS IN EXCESS OF 20		2202	1	50	50
Miscellaneous-Filing:					
Petition:					
Patent-Appeals-and-Interference:					
Post-Allowance-and-Post-Issuance:					

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**50**

Electronic Acknowledgement Receipt	
EFS ID:	46971054
Application Number:	17208640
International Application Number:	
Confirmation Number:	6013
Title of Invention:	ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz
Customer Number:	26191
Filer:	Kiersten M. Batzli/Emily Whitcomb
Filer Authorized By:	Kiersten M. Batzli
Attorney Docket Number:	46440-0006007
Receipt Date:	07-NOV-2022
Filing Date:	22-MAR-2021
Time Stamp:	11:45:30
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$50
RAM confirmation Number	E2022A7B46090117
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Corrected Filing Receipt	RequestforOFR.PDF	42487 55b5c93463c9b78525579f6b9362564745ea5c9d	no	1
Warnings:					
Information:					
2		ReplytoOA.PDF	3199321 c40fac1fc094f0bdd322a512acc5a83622cf0154	yes	12

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment/Request for Reconsideration-After Non-Final Rejection	1	1
Claims	2	6
Applicant Arguments/Remarks Made in an Amendment	7	12

Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	37795 8f4692b40912981d658bd678a0b376b89907a2a9	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	3279603		

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	3775
Application No.	:	17/208,640	Examiner	:	Marcela Shirsat
Filed	:	March 22, 2021	Conf. No.	:	6013
Title	:	ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS			

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR CORRECTED OFFICIAL FILING RECEIPT

Please correct the Filing Receipt for the above-referenced application to include the correct attorney docket number; 46440-0006007.

Please supply a corrected Filing Receipt to the undersigned with respect to this application.

No fee is believed to be due. If, however, there are any necessary charges or credits, please apply them to Deposit Account No. 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: November 7, 2022

/Kiersten M. Batzli/
Kiersten M. Batzli, Reg. No. 75,476

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 766-2015
Facsimile: (877) 769-7945

100763754.doc

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 46440-0006007	Application No. 17/208,640
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Moskowitz Family LLC	
(37 CFR §1.98(b))		Filing Date March 22, 2021	Group Art Unit 3775

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass
	1.	4554914	11/26/1985	Kapp			
	2.	4599086	7/8/1986	Doty			
	3.	4636217	1/13/1987	Ogilvie			
	4.	4960420	10/2/1990	Goble			
	5.	4994063	2/19/1991	Garner			
	6.	4997432	3/5/1991	Keller			
	7.	5062850	11/5/1991	Macmillan			
	8.	5123926	6/23/1992	Pisharodi			
	9.	5236460	8/17/1993	Barber			
	10.	5290312	3/1/1994	Kojimoto			
	11.	5458641	10/17/1995	Ramirez Jimenez			
	12.	5572653	11/5/1996	DeTemple			
	13.	5660188	8/26/1997	Groiso			
	14.	5667472	9/7/1997	Finn			
	15.	5669912	9/23/1997	Spetzler			
	16.	5702455	12/30/1997	Saggar			
	17.	5722976	3/3/1998	Brown			
	18.	5782832	7/21/1998	Larsen			
	19.	5800547	9/1/1998	Schafer			
	20.	5960522	10/5/1999	Boe			
	21.	6106556	8/22/2000	Demopulos			
	22.	6113638	9/5/2000	Williams et al.			
	23.	6126689	10/3/2000	Brett			
	24.	6224602	5/1/2001	Hayes			
	25.	6235034	5/22/2001	Bray			
	26.	6322562	11/27/2001	Wolter			
	27.	6342074	1/29/2002	Simpson			

Examiner Signature	Date Considered

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 46440-0006007	Application No. 17/208,640
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Moskowitz Family LLC	
(37 CFR §1.98(b))		Filing Date March 22, 2021	Group Art Unit 3775

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass
	28.	6368350	4/9/2002	Erickson			
	29.	6375682	4/23/2002	Fleischmann			
	30.	6419704	7/16/2002	Ferree			
	31.	6432106	8/13/2002	Fraser			
	32.	6454806	9/24/2002	Cohen et al.			
	33.	6454807	9/24/2002	Jackson			
	34.	6458159	10/1/2002	Thalgott			
	35.	6527803	3/4/2003	Crozet et al.			
	36.	6527804	3/4/2003	Gauchet			
	37.	6533818	3/18/2003	Weber			
	38.	6572653	6/3/2003	Simonson			
	39.	6579318	6/17/2003	Varga			
	40.	6582468	6/24/2003	Gauchet			
	41.	6629998	10/7/2003	Lin			
	42.	6641614	11/4/2003	Wagner			
	43.	6716247	4/6/2004	Michelson			
	44.	6719794	4/13/2004	Gerber			
	45.	6723126	4/20/2004	Berry			
	46.	6730088	5/4/2004	Yeh			
	47.	6733532	5/11/2004	Gauchet			
	48.	6752832	6/22/2004	Neumann			
	49.	6764491	7/20/2004	Frey			
	50.	6770094	8/3/2004	Fehling			
	51.	6890355	5/10/2005	Michelson			
	52.	6904308	6/7/2005	Frisch			
	53.	6953477	10/11/2005	Berry			
	54.	6955671	10/18/2005	Uchikubo			

Examiner Signature	Date Considered

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 46440-0006007	Application No. 17/208,640
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Moskowitz Family LLC	
(37 CFR §1.98(b))		Filing Date March 22, 2021	Group Art Unit 3775

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass
	55.	7028878	4/18/2006	Bauer			
	56.	7030904	4/18/2006	Adair			
	57.	7037258	5/2/2006	Chatenever			
	58.	7097615	8/29/2006	Banik			
	59.	7211112	5/1/2007	Baynham et al.			
	60.	7226480	6/5/2007	Thalgott			
	61.	7232464	6/19/2007	Mathieu et al.			
	62.	7238203	7/3/2007	Bagga et al.			
	63.	7442209	10/28/2008	Michelson			
	64.	7641693	5/11/2006	Gutlin et al.			
	65.	7674296	3/9/2010	Rhoda et al.			
	66.	7691147	4/6/2010	Gutlin et al.			
	67.	7704279	4/27/2010	Moskowitz			
	68.	7753958	7/13/2010	Gordon et al.			
	69.	7776047	8/17/2010	Fanger et al.			
	70.	8268000	9/18/2012	Waugh et al.			
	71.	20020068977	6/6/2002	Jackson			
	72.	20020143338	10/3/2002	Orbay			
	73.	20020143399	10/3/2002	Sutcliffe			
	74.	20040088054	5/6/2004	Berry			
	75.	20040177531	9/16/2004	DiBenedetto			
	76.	20040186569	9/23/2004	Berry			
	77.	20040254644	12/16/2004	Taylor			
	78.	20050027362	2/3/2005	Williams			
	79.	20050049590	3/3/2005	Alleyne			
	80.	20050177235	8/11/2005	Baynham			
	81.	20050177236	8/11/2005	Mathieu et al.			

Examiner Signature	Date Considered

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 46440-0006007	Application No. 17/208,640
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Moskowitz Family LLC	
(37 CFR §1.98(b))		Filing Date March 22, 2021	Group Art Unit 3775

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass
	82.	20050216084	9/29/2005	Fleischmann			
	83.	20050256576	11/17/2005	Moskowitz et al.			
	84.	20050261769	11/24/2005	Moskowitz et al.			
	85.	20050273170	12/8/2005	Navarro			
	86.	20050278026	12/15/2005	Gordon			
	87.	20060241621	10/26/2006	Moskowitz et al.			
	88.	20070049943	3/1/2007	Moskowitz et al.			
	89.	20070167678	7/19/2007	Moskowitz et al.			
	90.	20070198089	8/23/2007	Moskowitz et al.			
	91.	20070213820	9/13/2007	Magerl			
	92.	20070250172	10/25/2007	Moskowitz et al.			
	93.	20080033440	2/7/2008	Moskowitz et al.			
	94.	20080177307	7/24/2008	Moskowitz et al.			
	95.	20080281424	11/13/2008	Parry et al.			
	96.	20090105831	4/23/2009	Jones et al.			
	97.	20090112271	4/30/2009	Moskowitz et al.			
	98.	20090224023	9/10/2009	Moskowitz et al.			
	99.	20090234455	9/17/2009	Moskowitz et al.			
	100.	20100145460	6/10/2010	McDonough et al.			
	101.	20100324606	12/23/2010	Moskowitz et al.			
	102.	20110125269	5/26/2011	Moskowitz et al.			
	103.	20110137349	6/9/2011	Moskowitz et al.			
	104.	20110178600	7/21/2011	Moskowitz et al.			
	105.	20110208312	8/25/2011	Moskowitz et al.			
	106.	20110288646	11/24/2011	Moskowitz et al.			
	107.	20110295327	12/1/2011	Moskowitz et al.			
	108.	20110295371	12/1/2011	Moskowitz et al.			

Examiner Signature	Date Considered

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 46440-0006007	Application No. 17/208,640
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Moskowitz Family LLC	
(37 CFR §1.98(b))		Filing Date March 22, 2021	Group Art Unit 3775

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass
	109.	20110307011	12/15/2011	Moskowitz et al.			
	110.	20110319935	12/29/2011	Moskowitz et al.			
	111.	20120010714	1/12/2012	Moskowitz et al.			
	112.	20120330419	12/27/2012	Moskowitz et al.			
	113.	20130018468	1/17/2013	Moskowitz et al.			
	114.	20130018469	1/17/2013	Moskowitz et al.			
	115.	20130018470	1/17/2013	Moskowitz et al.			
	116.	20130023992	1/24/2013	Moskowitz et al.			
	117.	20130053962	2/28/2013	Moskowitz et al.			
	118.	20130173002	7/4/2013	Moskowitz et al.			
	119.	20130282017	10/24/2013	Moskowitz et al.			
	120.	20140249629	9/4/2014	Moskowitz et al.			
	121.	20150025637	1/22/2015	Moskowitz et al.			
	122.	20150105824	4/16/2015	Moskowitz et al.			
	123.	20150148847	5/28/2015	Moskowitz et al.			
	124.	20160374830	12/29/2016	Moskowitz et al.			
	125.	20170252178	9/7/2017	Moskowitz et al.			

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Translation	Class	Subclass
	126.	FR 2727003	5/24/1996	FR			
	127.	WO 2004052245	6/24/2004	WO			
	128.	WO 2004093749	11/4/2004	WO			
	129.	WO 2006091503	8/31/2006	WO			

Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document

Examiner Signature	Date Considered

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

Substitute Disclosure Form U.S. Department of Commerce Patent and Trademark Office **Information Disclosure Statement by Applicant** (Use several sheets if necessary) (37 CFR §1.98(b))	Attorney Docket No. 46440-0006007	Application No. 17/208,640
	Applicant Moskowitz Family LLC	
	Filing Date March 22, 2021	Group Art Unit 3775

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	130.	Auguste et al., "Expandable cylindrical cages in the cervical spine: a review of 22 cases," J. Neurosurg. Spine, 4:285–291, 2006, Exhibit No. 1006 in Case IPR2020-01310, U.S. Patent 10,251,643
	131.	Boakye et al., "The Poly-ether-ether-ketone (PEEK) Spacer," Thieme Medical Publishers, Inc., 2005, 6 pages, IPR2020-01310, U.S. Patent 10,251,643 (Exhibit No. 1007)
	132.	Centinel Spine, [https://www.centinelspine.com/corp_producthistory.php, Retrieved on 6/4/2020 11:48:58 PM], 7 pages, Exhibit No. 1009 in Case IPR2020-01310, U.S. Patent 10,251,643
	133.	Cheung and Leong, "Spinal Instrumentation Overview in Lumbar Degenerative Disorders: Cages," Spinal Instrumentation Overview, June 2004, Ch. 26, 8 pages, IPR2020-01310, U.S. Patent 10,251,643 (Exhibit No. 1008)
	134.	Dickman, "Internal Fixation and Fusion of the Lumbar Spine Using Threaded Interbody Cages," [https://www.barrowneuro.org/education/grand-rounds-publications-and-media/barrow-quarterly/, Retrieved on 6/20/2020], 41 pages, Exhibit No. 1010 in Case IPR2020-01310, U.S. Patent 10,251,643
	135.	Dryer, "Affinity Anterior Cervical Cage System," Thieme Medical Publisher, Inc., New York, New York, 2005, 9 pages, Exhibit No. 1011 in Case IPR2020-01310, U.S. Patent 10,251,643
	136.	Folman et al., "Posterior Lumbar Interbody Fusion for Degenerative Disc Disease Using a Minimally Invasive B-Twin Expandable Spinal Spacer," Journal of Spinal Disorders & Techniques, October 2003, 16(5):455-60, Exhibit No. 1012 in Case IPR2020-01310, U.S. Patent 10,251,643
	137.	GLOBUS MEDICAL, INC., Petitioner v. MOSKOWITZ FAMILY LLC, Patent Owner PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 10,251,643 PURSUANT TO 35 U.S.C. §§ 311–319 AND 37 C.F.R. § 42, dated July 21, 2020, 51 pages
	138.	GLOBUS MEDICAL, INC., v. MOSKOWITZ FAMILY LLC, "DECLARATION OF JORGE A. OCHOA, PH.D., P.E.," Case IPR2020-01310, U.S. Patent 10,251,643, dated July 21, 2020, 57 pages (Exhibit No. 1003)
	139.	Grob, et al., "Clinical Experience With the Dynesys Semirigid Fixation System for the Lumbar Spine," Spine, 2005, 30(3):324-331
	140.	Guyer and Ohnmeiss, "Degenerative Disc Disease: Fusion Cages and Dowels," Lippincott Williams & Wilkins, Philadelphia, PA, 2004, Ch. 35, 12 pages, Exhibit No. 1013 in Case IPR2020-01310, U.S. Patent 10,251,643
	141.	Guyer, et al., "Intervertebral Disc Prostheses," Spine, Volume 28, Number 15S, Supp. To 8/1/03, pages S15-S23
	142.	Holte et al., "Anterior lumbar fusion using a hybrid interbody graft," Eur. Spine J., 3:32-38, 1994, Exhibit No. 1014 in Case IPR2020-01310, U.S. Patent 10,251,643
	143.	International Search Report and Written Opinion of the International Searching Authority, 03 December 2007, International Application No. PCT/US 07/05005
	144.	International Search Report and Written Opinion of the International Searching Authority, 09 July 2008, International Application No. PCT/US2007021013
	145.	International Search Report and Written Opinion of the International Searching Authority, 21 May 2008, International Application No. PCT/US2007/021015
	146.	Lane et al., "Transperitoneal Approach to the Intervertebral Disc in the Lumbar Area," Annals of Surgery, March 1948, 127(3):537, Exhibit No. 1015 in Case IPR2020-01310, U.S. Patent 10,251,643

Examiner Signature	Date Considered

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 46440-0006007	Application No. 17/208,640
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant Moskowitz Family LLC	
		Filing Date March 22, 2021	Group Art Unit 3775

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	147.	Michelson et al., "BAK/C Interbody Fusion System: A Threaded Cylindrical Cage for Cervical Fusion," Thieme Medical Publisher, Inc., New York, New York, 2005, 10 pages, Exhibit No. 1016 in Case IPR2020-01310, U.S. Patent 10,251,643
	148.	Prpa et al., "Lumbar Interbody Cages," Sug. Pro., Ch. 41, pp. 489-502, 2005, Exhibit No. 1017 in Case IPR2020-01310, U.S. Patent 10,251,643
	149.	Ryu and Kim, "Cervical Carbon Fiber Interbody Fusion Cage: Bengal System," Thieme Medical Publisher, Inc., New York, New York, 2005, 8 pages, Exhibit No. 1018 in Case IPR2020-01310, U.S. Patent 10,251,643
	150.	Schimmel et al., "PEEK Cages in Lumbar Fusion," Clin. Spine Surg., 29(5):E252-E258, June 2016, Exhibit No. 1019 in Case IPR2020-01310, U.S. Patent 10,251,643
	151.	Synfix, "EVOLUTION System," Online Product, 2004, 1 page, IPR2020-01310, U.S. Patent 10,251,643 (Exhibit No. 1021)
	152.	Synthes "SynFix-LR. Implant and instrumentation for stand alone anterior lumbar interbody fusion (ALIF)," 2006, 26 pages, Exhibit No. 1020 in Case IPR2020-01310, U.S. Patent 10,251,643
	153.	Traynelis, "Prosthetics and Biologics: The Wave of the Future," CLINICAL NEUROSURGERY, Volume 50, Proceedings of the Congress of Neurological Surgeons, Philadelphia, PA 2002, Chapter 9, pages 207-219
	154.	Wagner et al., "Surgical Stabilization of the Equine Cervical Spine," Veterinary Surg., 8:1-6, January-March 1979, Exhibit No. 1023 in Case IPR2020-01310, U.S. Patent 10,251,643
	155.	Wai, et al., "Disk Replacement Arthroplasties: Can The Success of Hip and Knee Replacements be Repeated in the Spine?," Seminars in Spine Surgery, Vol. 15, No. 4 (December) 2003, pp 473-482
	156.	Weiner and Fraser, "Spine Update Lumbar Interbody Cages," Spine, 23(5):634-640, 1998, Exhibit No. 1024 in Case IPR2020-01310, U.S. Patent 10,251,643
	157.	Wilke et al., "Primary stabilizing effect of interbody fusion devices for the cervical spine: an in vitro comparison between three different cage types and bone cement," Eur. Spine J., 2000, 9:410-416, Exhibit No. 1025 in Case IPR2020-01310, U.S. Patent 10,251,643
	158.	Wiseman et al., "Posterior Lumbar Interbody Fusion," Surgical Procedures, September 2004, Ch. 39, 24 pages, Case IPR2020-01310, U.S. Patent 10,251,643 (Exhibit No. 1026)

Examiner Signature	Date Considered

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	3775
Application No.	:	17/208,640	Examiner	:	Marcela Shirsat
Filed	:	March 22, 2021	Conf. No.	:	6013
Title	:	ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS			

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Please consider the documents listed on the disclosure form submitted with this statement. Copies of the documents are being submitted with this statement to the extent required under 37 C.F.R. § 1.98(a)(2).

This application relies on the earlier filing date of application number 16/362,152, filed on March 22, 2019. Under 37 C.F.R. § 1.98 (a)(2) and 37 C.F.R. § 1.98(d), the earlier application is properly identified and is relied on for an earlier effective filing date under 35 U.S.C. § 120 and therefore copies of foreign and non-patent literature documents cited in the earlier application are not provided. Copies of U.S. patents and U.S. patent application publications also are not provided. The documents corresponding to Desig. ID Nos. 131, 133, 151, and 158 have not been submitted to and/or cited by the Office in the earlier application.

This statement is being filed after a first action on the merits, but before receipt of a final action or a notice of allowance.

Apply any necessary charges or credits applicable under 37 C.F.R. § 1.17(p) to deposit account 06-1050, referencing the above attorney docket number.

Please contact the undersigned if there are any questions regarding this statement.

Respectfully submitted,

Date: November 7, 2022

/Kiersten M. Batzli/

Kiersten M. Batzli, Reg. No. 75,476

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 766-2015
Facsimile: (877) 769-7945

63100547.doc

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/208,640	11/07/2022 05:43:09 PM ET	46440-0006007

Title of Invention

ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	6013	FILED BY	Callie Benge
PATENT CENTER #	61152339	AUTHORIZED BY	Kiersten Batzli
CUSTOMER #	26191	FILING DATE	03/22/2021
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Mosheh T. Moskowitz

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
DA / 061050	E2022A7H45294017	Callie Benge

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2806	SUBMISSION OF AN INFORMATION DISCLOSURE STATEMENT	130.00	1	130.00
			TOTAL AMOUNT:	$130.00

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 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.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/208,640	**11/07/2022 05:43:09 PM ET**	**46440-0006007**

Title of Invention

ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	6013	FILED BY	Callie Benge
PATENT CENTER #	61152339	FILING DATE	03/22/2021
CUSTOMER #	26191	FIRST NAMED INVENTOR	Mosheh T. Moskowitz
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Kiersten Batzli

Documents

TOTAL DOCUMENTS: 5

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
IDS.pdf	9	Information Disclosure Statement (IDS) Form (SB08)	234 KB
Warning: This is not a USPTO supplied IDS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.			
NPL_Boakye_ThePolyEtherEther.pdf	6	Non Patent Literature	2199 KB
NPL_Cheung_SpinalInstrumentationOverview.pdf	8	Non Patent Literature	5159 KB
NPL_Synfix_EvolutionSystem.pdf	1	Non Patent Literature	769 KB

NPL_Wiseman_PosteriorLumbarInterbody.pdf	24	Non Patent Literature	20174 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
IDS.pdf	09F96446F936C59285FE2B16768EA4AFB8ACF1B258745A4F488ABF4F140A4F2AC34D5C8AE4AAD370382793AF12C00251D9BD78ECB97CC1BB82F691804F18C42F
NPL_Boakye_ThePolyEtherEther.pdf	E1BDBF328ED3C77800D1CE8FDA53EA8043FDEBC7D27977109FC046B52098BA7900E4B7066045948E093FFF89E48F415D99A95CEB70568EB2BCB1EB1B82075FD9
NPL_Cheung_SpinalInstrumentationOverview.pdf	8E91DD05A6DCAD54B06912E48404E87C0017106D7DBCE4B29D052CDC146A45D28084B62B1B6B7B89A9CA632E6C9836DB7A3A601F52CDD550A92CAF2BFC02116E
NPL_Synfix_EvolutionSystem.pdf	05AB2F1657CFF13D726F233822FC2C7160D88745417835E2599DEB2750B24470383337D0CB78BCA9A8FDC055968EF2F8F0F59AB20277814BD3199D77C1C8F0D4
NPL_Wiseman_PosteriorLumbarInterbody.pdf	5A349A67A0B62E3FBEE2D48646A56C8201A5E59F0634FCD98910E3D839D930466799ED98BEAA7F8091B3F635FF822AC13C6DCB3299A4844E8F7B64C251B7F0D5

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 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.

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 NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/208,640	03/22/2021	3775	960	46440-0006007	20	1

CONFIRMATION NO. 6013

CORRECTED FILING RECEIPT

26191
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

OC000000136787150

Date Mailed: 11/09/2022

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)

Mosheh T. Moskowitz, Rockville, MD;
Nathan C. Moskowitz, Rockville, MD;

Applicant(s)

Moskowitz Family LLC, Rockville, MD;

Power of Attorney: The patent practitioners associated with Customer Number 26191

Domestic Priority data as claimed by applicant

This application is a CON of 16/362,152 03/22/2019 PAT 10952723
which is a CON of 15/934,622 03/23/2018 PAT 10251643
which is a CON of 13/093,812 04/25/2011 PAT 9924940
which is a CON of 12/347,990 12/31/2008 PAT 7951180
which is a DIV of 11/208,644 08/23/2005 PAT 7704279
which claims benefit of 60/670,231 04/12/2005

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: 04/19/2021
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/208,640**
Projected Publication Date: Not Applicable
Non-Publication Request: No
Early Publication Request: No
**** SMALL ENTITY ****
Title

ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS

Preliminary Class

623

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 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).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

Notice of References Cited	Application/Control No. 17/208,640	Applicant(s)/Patent Under Reexamination Moskowitz et al.	
	Examiner MARCELA I SHIRSAT	Art Unit 3775	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-4657550-A	04-1987	Daher; Youssef H.	A61F2/44	623/17.11
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/208,640	Moskowitz et al.
	Examiner	Art Unit
	MARCELA I SHIRSAT	3775

CPC - Searched*		
Symbol	**Date**	**Examiner**
a61b17/0642,0643,0682,7064	08/10/2022	mis
a61b2017/0648	08/10/2022	mis
a61f2/4455	08/10/2022	mis
a61f2002/30525,30579,30849,2835,3085,448	08/10/2022	mis

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

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
623	17.11-17.16	08/10/2022	mis
606	246-289,300-328,86r	08/10/2022	mis

* 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**
Performed applicant and inventor name search, reviewed parent case 15/934622, text and date limited classes, bkwd/fwd references	08/10/2022	mis
updated search history and reviewed IDS	02/15/2023	mis

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

/MARCELA I. SHIRSAT/ Primary Examiner, Art Unit 3775	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/208,640	Moskowitz et al.
	Examiner	Art Unit
	MARCELA I SHIRSAT	3775

/MARCELA I. SHIRSAT/ Primary Examiner, Art Unit 3775	

Sheet 1 of 7

Substitute Disclosure Form / U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No.	Application No.
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))	46440-0006007	17/208,640
	Applicant: Moskowitz Family LLC	
	Filing Date: March 22, 2021	Group Art Unit: 3775

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass
	1.	4554914	11/26/1985	Kapp			
	2.	4599086	7/8/1986	Doty			
	3.	4636217	1/13/1987	Ogilvie			
	4.	4960420	10/2/1990	Goble			
	5.	4994063	2/19/1991	Garner			
	6.	4997432	3/5/1991	Keller			
	7.	5062850	11/5/1991	Macmillan			
	8.	5123926	6/23/1992	Pisharodi			
	9.	5236460	8/17/1993	Barber			
	10.	5290312	3/1/1994	Kojimoto			
	11.	5458641	10/17/1995	Ramirez Jimenez			
	12.	5572653	11/5/1996	DeTemple			
	13.	5660188	8/26/1997	Groiso			
	14.	5667472	9/7/1997	Finn			
	15.	5669912	9/23/1997	Spetzler			
	16.	5702455	12/30/1997	Saggar			
	17.	5722976	3/3/1998	Brown			
	18.	5782832	7/21/1998	Larsen			
	19.	5800547	9/1/1998	Schafer			
	20.	5960522	10/5/1999	Boe			
	21.	6106556	8/22/2000	Demopulos			
	22.	6113638	9/5/2000	Williams et al.			
	23.	6126689	10/3/2000	Brett			
	24.	6224602	5/1/2001	Hayes			
	25.	6235034	5/22/2001	Bray			
	26.	6322562	11/27/2001	Wolter			
	27.	6342074	1/29/2002	Simpson			

Examiner Signature	Date Considered
/MARCELA I. SHIRSAT/	02/14/2023

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.I.S./

Substitute Disclosure Form / U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No.	Application No.
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))	46440-0006007	17/208,640
	Applicant: Moskowitz Family LLC	
	Filing Date: March 22, 2021	Group Art Unit: 3775

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass
	28.	6368350	4/9/2002	Erickson			
	29.	6375682	4/23/2002	Fleischmann			
	30.	6419704	7/16/2002	Ferree			
	31.	6432106	8/13/2002	Fraser			
	32.	6454806	9/24/2002	Cohen et al.			
	33.	6454807	9/24/2002	Jackson			
	34.	6458159	10/1/2002	Thalgott			
	35.	6527803	3/4/2003	Crozet et al.			
	36.	6527804	3/4/2003	Gauchet			
	37.	6533818	3/18/2003	Weber			
	38.	6572653	6/3/2003	Simonson			
	39.	6579318	6/17/2003	Varga			
	40.	6582468	6/24/2003	Gauchet			
	41.	6629998	10/7/2003	Lin			
	42.	6641614	11/4/2003	Wagner			
	43.	6716247	4/6/2004	Michelson			
	44.	6719794	4/13/2004	Gerber			
	45.	6723126	4/20/2004	Berry			
	46.	6730088	5/4/2004	Yeh			
	47.	6733532	5/11/2004	Gauchet			
	48.	6752832	6/22/2004	Neumann			
	49.	6764491	7/20/2004	Frey			
	50.	6770094	8/3/2004	Fehling			
	51.	6890355	5/10/2005	Michelson			
	52.	6904308	6/7/2005	Frisch			
	53.	6953477	10/11/2005	Berry			
	54.	6955671	10/18/2005	Uchikubo			

Examiner Signature	Date Considered
/MARCELA I. SHIRSAT/	02/14/2023

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.I.S./

Substitute Disclosure Form / U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No.	Application No.
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))	46440-0006007	17/208,640
	Applicant: Moskowitz Family LLC	
	Filing Date: March 22, 2021	Group Art Unit: 3775

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass
	55.	7028878	4/18/2006	Bauer			
	56.	7030904	4/18/2006	Adair			
	57.	7037258	5/2/2006	Chatenever			
	58.	7097615	8/29/2006	Banik			
	59.	7211112	5/1/2007	Baynham et al.			
	60.	7226480	6/5/2007	Thalgott			
	61.	7232464	6/19/2007	Mathieu et al.			
	62.	7238203	7/3/2007	Bagga et al.			
	63.	7442209	10/28/2008	Michelson			
	64.	7641693	5/11/2006	Gutlin et al.			
	65.	7674296	3/9/2010	Rhoda et al.			
	66.	7691147	4/6/2010	Gutlin et al.			
	67.	7704279	4/27/2010	Moskowitz			
	68.	7753958	7/13/2010	Gordon et al.			
	69.	7776047	8/17/2010	Fanger et al.			
	70.	8268000	9/18/2012	Waugh et al.			
	71.	20020068977	6/6/2002	Jackson			
	72.	20020143338	10/3/2002	Orbay			
	73.	20020143399	10/3/2002	Sutcliffe			
	74.	20040088054	5/6/2004	Berry			
	75.	20040177531	9/16/2004	DiBenedetto			
	76.	20040186569	9/23/2004	Berry			
	77.	20040254644	12/16/2004	Taylor			
	78.	20050027362	2/3/2005	Williams			
	79.	20050049590	3/3/2005	Alleyne			
	80.	20050177235	8/11/2005	Baynham			
	81.	20050177236	8/11/2005	Mathieu et al.			

Examiner Signature	Date Considered
/MARCELA I. SHIRSAT/	02/14/2023

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.I.S./

Substitute Disclosure Form / U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 46440-0006007	Application No. 17/208,640
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))	Applicant Moskowitz Family LLC	
	Filing Date March 22, 2021	Group Art Unit 3775

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass
	82.	20050216084	9/29/2005	Fleischmann			
	83.	20050256576	11/17/2005	Moskowitz et al.			
	84.	20050261769	11/24/2005	Moskowitz et al.			
	85.	20050273170	12/8/2005	Navarro			
	86.	20050278026	12/15/2005	Gordon			
	87.	20060241621	10/26/2006	Moskowitz et al.			
	88.	20070049943	3/1/2007	Moskowitz et al.			
	89.	20070167678	7/19/2007	Moskowitz et al.			
	90.	20070198089	8/23/2007	Moskowitz et al.			
	91.	20070213820	9/13/2007	Magerl			
	92.	20070250172	10/25/2007	Moskowitz et al.			
	93.	20080033440	2/7/2008	Moskowitz et al.			
	94.	20080177307	7/24/2008	Moskowitz et al.			
	95.	20080281424	11/13/2008	Parry et al.			
	96.	20090105831	4/23/2009	Jones et al.			
	97.	20090112271	4/30/2009	Moskowitz et al.			
	98.	20090224023	9/10/2009	Moskowitz et al.			
	99.	20090234455	9/17/2009	Moskowitz et al.			
	100.	20100145460	6/10/2010	McDonough et al.			
	101.	20100324606	12/23/2010	Moskowitz et al.			
	102.	20110125269	5/26/2011	Moskowitz et al.			
	103.	20110137349	6/9/2011	Moskowitz et al.			
	104.	20110178600	7/21/2011	Moskowitz et al.			
	105.	20110208312	8/25/2011	Moskowitz et al.			
	106.	20110288646	11/24/2011	Moskowitz et al.			
	107.	20110295327	12/1/2011	Moskowitz et al.			
	108.	20110295371	12/1/2011	Moskowitz et al.			

Examiner Signature	Date Considered
/MARCELA I. SHIRSAT/	02/14/2023

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.I.S./

Substitute Disclosure Form / U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No.	Application No.
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))	46440-0006007	17/208,640
	Applicant: Moskowitz Family LLC	
	Filing Date: March 22, 2021	Group Art Unit: 3775

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass
	109.	20110307011	12/15/2011	Moskowitz et al.			
	110.	20110319935	12/29/2011	Moskowitz et al.			
	111.	20120010714	1/12/2012	Moskowitz et al.			
	112.	20120330419	12/27/2012	Moskowitz et al.			
	113.	20130018468	1/17/2013	Moskowitz et al.			
	114.	20130018469	1/17/2013	Moskowitz et al.			
	115.	20130018470	1/17/2013	Moskowitz et al.			
	116.	20130023992	1/24/2013	Moskowitz et al.			
	117.	20130053962	2/28/2013	Moskowitz et al.			
	118.	20130173002	7/4/2013	Moskowitz et al.			
	119.	20130282017	10/24/2013	Moskowitz et al.			
	120.	20140249629	9/4/2014	Moskowitz et al.			
	121.	20150025637	1/22/2015	Moskowitz et al.			
	122.	20150105824	4/16/2015	Moskowitz et al.			
	123.	20150148847	5/28/2015	Moskowitz et al.			
	124.	20160374830	12/29/2016	Moskowitz et al.			
	125.	20170252178	9/7/2017	Moskowitz et al.			

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Translation	Class	Subclass
	126.	FR 2727003	5/24/1996	FR			
	127.	WO 2004052245	6/24/2004	WO			
	128.	WO 2004093749	11/4/2004	WO			
	129.	WO 2006091503	8/31/2006	WO			

Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document

Examiner Signature	Date Considered
/MARCELA I. SHIRSAT/	02/14/2023

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.I.S./

Substitute Disclosure Form / U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No.	Application No.
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))	46440-0006007	17/208,640
	Applicant: Moskowitz Family LLC	
	Filing Date: March 22, 2021	Group Art Unit: 3775

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	130.	Auguste et al., "Expandable cylindrical cages in the cervical spine: a review of 22 cases," J. Neurosurg. Spine, 4:285–291, 2006, Exhibit No. 1006 in Case IPR2020-01310, U.S. Patent 10,251,643
	131.	Boakye et al., "The Poly-ether-ether-ketone (PEEK) Spacer," Thieme Medical Publishers, Inc., 2005, 6 pages, IPR2020-01310, U.S. Patent 10,251,643 (Exhibit No. 1007)
	132.	Centinel Spine, [https://www.centinelspine.com/corp_producthistory.php, Retrieved on 6/4/2020 11:48:58 PM], 7 pages, Exhibit No. 1009 in Case IPR2020-01310, U.S. Patent 10,251,643
	133.	Cheung and Leong, "Spinal Instrumentation Overview in Lumbar Degenerative Disorders: Cages," Spinal Instrumentation Overview, June 2004, Ch. 26, 8 pages, IPR2020-01310, U.S. Patent 10,251,643 (Exhibit No. 1008)
	134.	Dickman, "Internal Fixation and Fusion of the Lumbar Spine Using Threaded Interbody Cages," [https://www.barrowneuro.org/education/grand-rounds-publications-and-media/barrow-quarterly/, Retrieved on 6/20/2020], 41 pages, Exhibit No. 1010 in Case IPR2020-01310, U.S. Patent 10,251,643
	135.	Dryer, "Affinity Anterior Cervical Cage System," Thieme Medical Publisher, Inc., New York, New York, 2005, 9 pages, Exhibit No. 1011 in Case IPR2020-01310, U.S. Patent 10,251,643
	136.	Folman et al., "Posterior Lumbar Interbody Fusion for Degenerative Disc Disease Using a Minimally Invasive B-Twin Expandable Spinal Spacer," Journal of Spinal Disorders & Techniques, October 2003, 16(5):455-60, Exhibit No. 1012 in Case IPR2020-01310, U.S. Patent 10,251,643
	137.	GLOBUS MEDICAL, INC., Petitioner v. MOSKOWITZ FAMILY LLC, Patent Owner PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 10,251,643 PURSUANT TO 35 U.S.C. §§ 311–319 AND 37 C.F.R. § 42, dated July 21, 2020, 51 pages
	138.	GLOBUS MEDICAL, INC., v. MOSKOWITZ FAMILY LLC, "DECLARATION OF JORGE A. OCHOA, PH.D., P.E.," Case IPR2020-01310, U.S. Patent 10,251,643, dated July 21, 2020, 57 pages (Exhibit No. 1003)
	139.	Grob, et al., "Clinical Experience With the Dynesys Semirigid Fixation System for the Lumbar Spine," Spine, 2005, 30(3):324-331
	140.	Guyer and Ohnmeiss, "Degenerative Disc Disease: Fusion Cages and Dowels," Lippincott Williams & Wilkins, Philadelphia, PA, 2004, Ch. 35, 12 pages, Exhibit No. 1013 in Case IPR2020-01310, U.S. Patent 10,251,643
	141.	Guyer, et al., "Intervertebral Disc Prostheses," Spine, Volume 28, Number 15S, Supp. To 8/1/03, pages S15-S23
	142.	Holte et al., "Anterior lumbar fusion using a hybrid interbody graft," Eur. Spine J., 3:32-38, 1994, Exhibit No. 1014 in Case IPR2020-01310, U.S. Patent 10,251,643
	143.	International Search Report and Written Opinion of the International Searching Authority, 03 December 2007, International Application No. PCT/US 07/05005
	144.	International Search Report and Written Opinion of the International Searching Authority, 09 July 2008, International Application No. PCT/US2007021013
	145.	International Search Report and Written Opinion of the International Searching Authority, 21 May 2008, International Application No. PCT/US2007/021015
	146.	Lane et al., "Transperitoneal Approach to the Intervertebral Disc in the Lumbar Area," Annals of Surgery, March 1948, 127(3):537, Exhibit No. 1015 in Case IPR2020-01310, U.S. Patent 10,251,643

Examiner Signature	Date Considered
/MARCELA I. SHIRSAT/	02/14/2023

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.I.S./

Substitute Disclosure Form / U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No.	Application No.
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))	46440-0006007	17/208,640
	Applicant: Moskowitz Family LLC	
	Filing Date: March 22, 2021	Group Art Unit: 3775

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	147.	Michelson et al., "BAK/C Interbody Fusion System: A Threaded Cylindrical Cage for Cervical Fusion," Thieme Medical Publisher, Inc., New York, New York, 2005, 10 pages, Exhibit No. 1016 in Case IPR2020-01310, U.S. Patent 10,251,643
	148.	Prpa et al., "Lumbar Interbody Cages," Sug. Pro., Ch. 41, pp. 489-502, 2005, Exhibit No. 1017 in Case IPR2020-01310, U.S. Patent 10,251,643
	149.	Ryu and Kim, "Cervical Carbon Fiber Interbody Fusion Cage: Bengal System," Thieme Medical Publisher, Inc., New York, New York, 2005, 8 pages, Exhibit No. 1018 in Case IPR2020-01310, U.S. Patent 10,251,643
	150.	Schimmel et al., "PEEK Cages in Lumbar Fusion," Clin. Spine Surg., 29(5):E252-E258, June 2016, Exhibit No. 1019 in Case IPR2020-01310, U.S. Patent 10,251,643
	151.	Synfix, "EVOLUTION System," Online Product, 2004, 1 page, IPR2020-01310, U.S. Patent 10,251,643 (Exhibit No. 1021)
	152.	Synthes "SynFix-LR. Implant and instrumentation for stand alone anterior lumbar interbody fusion (ALIF)," 2006, 26 pages, Exhibit No. 1020 in Case IPR2020-01310, U.S. Patent 10,251,643
	153.	Traynelis, "Prosthetics and Biologics: The Wave of the Future," CLINICAL NEUROSURGERY, Volume 50, Proceedings of the Congress of Neurological Surgeons, Philadelphia, PA 2002, Chapter 9, pages 207-219
	154.	Wagner et al., "Surgical Stabilization of the Equine Cervical Spine," Veterinary Surg., 8:1-6, January-March 1979, Exhibit No. 1023 in Case IPR2020-01310, U.S. Patent 10,251,643
	155.	Wai, et al., "Disk Replacement Arthroplasties: Can The Success of Hip and Knee Replacements be Repeated in the Spine?," Seminars in Spine Surgery, Vol. 15, No. 4 (December) 2003, pp 473-482
	156.	Weiner and Fraser, "Spine Update Lumbar Interbody Cages," Spine, 23(5):634-640, 1998, Exhibit No. 1024 in Case IPR2020-01310, U.S. Patent 10,251,643
	157.	Wilke et al., "Primary stabilizing effect of interbody fusion devices for the cervical spine: an in vitro comparison between three different cage types and bone cement," Eur. Spine J., 2000, 9:410-416, Exhibit No. 1025 in Case IPR2020-01310, U.S. Patent 10,251,643
	158.	Wiseman et al., "Posterior Lumbar Interbody Fusion," Surgical Procedures, September 2004, Ch. 39, 24 pages, Case IPR2020-01310, U.S. Patent 10,251,643 (Exhibit No. 1026)

Examiner Signature	Date Considered
/MARCELA I. SHIRSAT/	02/14/2023

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.I.S./

Attorney Docket No.: 46440-0006007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	3775
Application No.	:	17/208,640	Examiner	:	Marcela Shirsat
Filed	:	March 22, 2021	Conf. No.	:	6013
Title	:	ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS			

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Please consider the documents listed on the disclosure form submitted with this statement. Copies of the documents are being submitted with this statement to the extent required under 37 C.F.R. § 1.98(a)(2).

This application relies on the earlier filing date of application number 16/362,152, filed on March 22, 2019. Under 37 C.F.R. § 1.98 (a)(2) and 37 C.F.R. § 1.98(d), the earlier application is properly identified and is relied on for an earlier effective filing date under 35 U.S.C. § 120 and therefore copies of foreign and non-patent literature documents cited in the earlier application are not provided. Copies of U.S. patents and U.S. patent application publications also are not provided. The documents corresponding to Desig. ID Nos. 131, 133, 151, and 158 have not been submitted to and/or cited by the Office in the earlier application.

This statement is being filed after a first action on the merits, but before receipt of a final action or a notice of allowance.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.I.S./

Apply any necessary charges or credits applicable under 37 C.F.R. § 1.17(p) to deposit account 06-1050, referencing the above attorney docket number.

Please contact the undersigned if there are any questions regarding this statement.

Respectfully submitted,

Date: November 7, 2022 /Kiersten M. Batzli/

Kiersten M. Batzli, Reg. No. 75,476

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 766-2015
Facsimile: (877) 769-7945

63100547.doc

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.I.S./

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	44	("20020068977" OR "20020143338" OR "20050177235" OR "20070213820" OR "4636217" OR "5290312" OR "20040088054" OR "20040177531" OR "20040254644" OR "20050027362" OR "20050049590" OR "20050216084" OR "20050273170" OR "20050278026" OR "4997432" OR "5123926" OR "5514180" OR "5667472" OR "5782832" OR "6126689" OR "6368350" OR "6375682" OR "6419704" OR "6458159" OR "6527804" OR "6533818" OR "6572653" OR "6579318" OR "6582468" OR "6641614" OR "6719794" OR "6723126" OR "6733532" OR "6764491" OR "6770094" OR "6904308" OR "6955671" OR "7030904" OR "7037258" OR "7097615" OR "4554914" OR "4960420" OR "5660188" OR "5960522").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/09 03:20 PM
L2	1	"7704279".pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:23 PM
L3	172	("4554914" | "4599086" | "4636217" | "4960420" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:23 PM

		| "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7704279").urpn. AND (PGPB | USPT | USOC).dbnm.					
L4	8	(12/347990|15/934622|16/018904|16/362152).app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:28 PM
L5	114	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:29 PM

		| "7776047" | "8268000" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10238383").urpn. AND (PGPB | USPT | USOC).dbnm.					

L6	115	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279" | "7776047" | "8268000" | "9924940" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" |	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:29 PM

		"20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10251643").urpn. AND (PGPB | USPT | USOC).dbnm.					
L7	129	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5236460" | "5290312" | "5458641" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5702455" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6113638" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6432106" | "6454806" | "6454807" | "6458159" | "6527803" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6730088" | "6733532" | "6752832" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:30 PM

		| "7226480" | "7232464" | "7238203" | "7442209" | "7641693" | "7674296" | "7691147" | "7704279" | "7753958" | "7776047" | "8268000" | "9924940" | "10238383" | "10251643" | "20020068977" | "20020143338" | "20020143399" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050177236" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" |					

		"20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10952723").urpn. AND (PGPB | USPT | USOC).dbnm.					
L8	2	(20050049590|5800547).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:00 PM
L9	4	(4554914|4636217|6723126|5062850).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:02 PM
L10	671	("3867728" | "4085744" | "4349921" | "4361141" | "4401112" | "4422451" | "4433677" | "4502473" | "4502475" | "4502483" | "4553273" | "4554914").pn. OR ("4636217").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:03 PM
L11	172	("4554914" | "4599086" | "4636217" | "4960420" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832" | "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7704279").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:50 PM
L12	146	("4554914" | "4599086"	(US-PGPUB; USPAT;	OR	ON	ON	2022/08/09

		| "4636217" | "4960420" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832" | "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7846188").urpn. AND (PGPB | USPT | USOC).dbnm.	USOCR)				07:11 PM
L13	2	15/934622.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 07:27 PM
L14	48	("4636217" | "7846188" | "20050049590" | "20060069436" | "20100160984" | "20100161057").pn. OR ("8257443").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 08:24 PM
L15	8	(8353913|9889022|10028740|10076367|10307268|10251643|10376386|10478319).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 11:48 AM
L16	365	("2799196" | "3426364" | "3486505" | "4309777" | "4401112" | "4522200" | "4545374" | "4553273" | "4599086" | "4636217" | "4657550" | "4733665" | "4863476" | "4878915" | "4932375" | "4932969" | "4936851" | "4946378" | "5059193" | "5171278"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:00 PM

		| "5192327" | "5236460" | "5344252" | "5390683" | "5425772" | "5484437" | "5522899" | "5554191" | "5562736" | "5571190" | "5571192" | "5593409" | "5609635" | "5653762" | "5653763" | "5658335" | "5665122" | "5693100" | "5702453" | "5772661" | "5776197" | "5776199" | "5782832" | "5865848" | "5888228" | "5893889" | "5893890" | "5972015" | "5980522" | "6015436" | "6039761" | "6045579" | "6080155" | "6080193" | "6083225" | "6083228" | "6090143" | "6093207" | "6102949" | "6102950" | "6113638" | "6117174" | "6127597" | "6156037" | "6159244" | "6159245" | "6174334" | "6176882" | "6183517" | "6190414" | "6193756" | "6193757" | "6206923" | "6210412" | "6217579" | "6224604" | "6245107" | "6280456" | "6287308" | "6302914" | "6328738" | "6332895" | "6344057" | "6368351" | "6395031" | "6395032" | "6395034" | "6402750" | "6409766" | "6432140" | "6436103" | "6436140" | "6443989" | "6443990" | "6447544" | "6447547" | "6451052" | "6454806" | "6454807" | "6478823" | "6491724" | "6527803" | "D472632" | "D472633" | "6562074" | "6576016" | "6582431" | "6582451" | "6582461" | "6582467" | "6592625" | "6595998" | "6610089" | "6626905" | "6641614" | "6648917" | "6666891" | "6679915" | "6685742" | "6706070" | "6719796" | "6723126" | "6733535" | "6743255" | "6758849" | "6773460" | "6814754" | "6814756" | "6821298" | "6833006" | "6835206" | "6837850" | "6840944" | "6843804" | "6852129" |				

		"6863673" | "6875173" | "6893464" | "6902568" | "6923810" | "6953477" | "6955691" | "6962606" | "7018415" | "7066961" | "7070598" | "7083650" | "7087055" | "7094257" | "7097648" | "7128760" | "7204853" | "7214243" | "7217291" | "7220280" | "D553742" | "7282063" | "7306626" | "7311733" | "7316714" | "7326250" | "7326251" | "7331996" | "7503933" | "7569074" | "7618456" | "7618458" | "7621951" | "7655042" | "7674297" | "7678148" | "7708778" | "7708779" | "7727280" | "7731751" | "7731752" | "7753958" | "7780732" | "7789914" | "7794501" | "7824445" | "7837734" | "7850733" | "7909830" | "7909869" | "7985256" | "8021430" | "8062375" | "8070813" | "8096994" | "8105358" | "8105382" | "8118870" | "8118871" | "8123810" | "8147550" | "8172903" | "8187331" | "D664252" | "8257440" | "8267939" | "8273124" | "8273126" | "8303662" | "8303663" | "8328818" | "8337558" | "8366777" | "8394143" | "8435296" | "8454695" | "8480741" | "8568481" | "20010032020" | "20020052656" | "20020068974" | "20020068977" | "20020082696" | "20020128716" | "20020138146" | "20030040798" | "20030065396" | "20030135279" | "20030149482" | "20030171813" | "20030195630" | "20030208263" | "20030208270" | "20030208272" | "20030208275" | "20030220650" | "20030236520" |				

		"20040010312" | "20040010315" | "20040024460" | "20040024463" | "20040030387" | "20040044411" | "20040078080" | "20040087947" | "20040087948" | "20040102774" | "20040153156" | "20040199252" | "20040215342" | "20040225360" | "20040243240" | "20040254643" | "20040254644" | "20050004673" | "20050015149" | "20050015150" | "20050027358" | "20050038512" | "20050049590" | "20050060036" | "20050070911" | "20050071007" | "20050113920" | "20050273171" | "20050278026" | "20060022180" | "20060064169" | "20060116767" | "20060122701" | "20060129244" | "20060149385" | "20060224241" | "20060241643" | "20060241764" | "20060247770" | "20060253201" | "20080058931" | "20080071279" | "20080082173" | "20080140207" | "20090222100" | "20100017965" | "20100049325" | "20100145455" | "20100211176" | "20100280616" | "20100286779" | "20100292796" | "20100331985" | "20110130838" | "20110172774" | "20120035729" | "20120071982" | "20120191194" |				

		"20120290094" | "20120310349" | "20120316652").pn. OR ("9320610").urpn. AND (PGPB | USPT | USOC).dbnm.					
L17	1139	("4657550").pn. OR ("4863476").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:29 PM
L18	855	("4401112" | "5522899" | "5609635" | "5658335" | "5665122" | "5893889").pn. OR ("6176882").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:38 PM
L19	2	15/934622.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 05:35 PM
L20	115	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279" | "7776047" | "8268000" | "9924940" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" |	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 05:35 PM

		"20050177235" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10251643").urpn. AND (PGPB | USPT | USOC).dbnm.					
L22	84	((("MOSKOWITZ") near3 ("FAMILY") near3 ("LLC"))).AS,AANM.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:10 PM
L24	177	((("MOSKOWITZ") near3 ("Mosheh")) OR (("MOSKOWITZ") near3 ("Nathan"))).INV.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:10 PM
L25	2	(L22 OR L23) AND ((first NEAR shell)	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:11 PM

		SAME (second NEAR shell))					
L26	465	(a61b17/0642.cpc.) AND @ad<"20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L27	465	(a61b17/0642.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L28	584	(a61b17/0643.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L30	267	(a61b17/0682.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L31	155	(a61b17/7064.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L32	257	(a61b2017/0648.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L33	1116	(a61f2/4455.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L34	48	(a61f2002/30525.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L35	576	(a61f2002/30579.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L36	1010	(a61f2002/30841.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L37	1770	(a61f2002/2835.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L38	672	(a61f2002/3085.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L39	819	(a61f2002/448.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L40	6293	(606/246-289,300-328,86r.ccls.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:14 PM
L41	2683	(623/17.11-17.16.ccls.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:14 PM
L42	232	(L26 OR L27 OR L28 OR L30 OR L31 OR L32 OR L33 OR L34 OR L35 OR L36 OR L37 OR L38 OR L39 OR L40 OR L41) AND	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:16 PM

		((expandable OR expansible) SAME ((vertebral OR intervertebral) SAME (implant OR cage)))					
L43	1	(61786882|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:17 PM
L44	2	(6176882|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:17 PM
L45	3	(6176882|6395034|10251643).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:52 PM
L46	22	((US-10238383-B2 OR US-10251643-B2 OR US-5800547-A OR US-6723126-B1 OR US-5062850-A OR US-4636217-A OR US-4554914-A OR US-4892545-A OR US-6113638-A OR US-7704279-B2 OR US-9924940-B2 OR US-7846188-B2 OR US-8257443-B2 OR US-8377140-B2 OR US-9320610-B2 OR US-4863476-A OR US-6176882-B1 OR US-6395034-B1 OR US-3848601-A).did. AND USPT.dbnm.) OR ((US-20050049590-A1 OR US-20050256576-A1 OR US-20060241621-A1).did. AND PGPB.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, 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, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/10 08:24 PM
L47	3	L46 AND ratchet	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:24 PM
L48	23	L42 AND (ratchet SAME (expand OR expansion OR expansible))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:25 PM
L49	64	L42 AND (ratchet)	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:29 PM
L50	125	("20020068977" OR "20020143338" OR "20020143399" OR "20040088054" OR "20040177531" OR "20040186569" OR "20040254644" OR "20050027362" OR "20050049590" OR "20050177235" OR "20050177236" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/02/14 04:22 PM

		"20050216084" OR "20050256576" OR "20050261769" OR "20050273170" OR "20050278026" OR "20060241621" OR "20070049943" OR "20070167678" OR "20070198089" OR "20070213820" OR "20070250172" OR "20080033440" OR "20080177307" OR "20080281424" OR "20090105831" OR "20090112271" OR "20090224023" OR "20090234455" OR "20100145460" OR "20100324606" OR "20110125269" OR "20110137349" OR "20110178600" OR "20110208312" OR "20110288646" OR "20110295327" OR "20110295371" OR "20110307011" OR "20110319935" OR "20120010714" OR "20120330419" OR "20130018468" OR "20130018469" OR "20130018470" OR "20130023992" OR "20130053962" OR "20130173002" OR "20130282017" OR "20140249629" OR "20150025637" OR "20150105824" OR "20150148847" OR "20160374830" OR "20170252178" OR "4554914" OR "4599086" OR "4636217" OR "4960420" OR "4994063" OR "4997432" OR "5062850" OR "5123926" OR "5236460" OR "5290312" OR "5458641" OR "5572653" OR "5660188" OR "5667472" OR					

		"5669912" OR "5702455" OR "5722976" OR "5782832" OR "5800547" OR "5960522" OR "6106556" OR "6113638" OR "6126689" OR "6224602" OR "6235034" OR "6322562" OR "6342074" OR "6368350" OR "6375682" OR "6419704" OR "6432106" OR "6454806" OR "6454807" OR "6458159" OR "6527803" OR "6527804" OR "6533818" OR "6572653" OR "6579318" OR "6582468" OR "6629998" OR "6641614" OR "6716247" OR "6719794" OR "6723126" OR "6730088" OR "6733532" OR "6752832" OR "6764491" OR "6770094" OR "6890355" OR "6904308" OR "6953477" OR "6955671" OR "7028878" OR "7030904" OR "7037258" OR "7097615" OR "7211112" OR "7226480" OR "7232464" OR "7238203" OR "7442209" OR "7641693" OR "7674296" OR "7691147" OR "7704279" OR "7753958" OR "7776047" OR "8268000").pn.					
L51	1	"6176882".pn.	(US-PGPUB; USPAT;	OR	ON	ON	2023/02/14

			USOCR)				04:36 PM
L52	894	("4401112" | "5522899" | "5609635" | "5658335" | "5665122" | "5893889").pn. OR ("6176882").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 04:52 PM
L53	332	("4309777" | "4599086" | "4636217" | "4657550" | "4759769" | "4874389" | "4932975").pn. OR ("5062850").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 04:53 PM
L54	639	("4401112" | "4553273" | "4657550" | "4834757" | "4878915" | "4936848" | "5015247" | "5059193" | "5171278" | "5306310" | "5336223" | "5458641" | "5534029").pn. OR ("5702455").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:19 PM
L55	586	("4349921" | "4401112" | "4553273" | "4863476" | "5336223" | "5397364" | "5554191" | "5653763" | "5693100" | "6008431" | "6039761" | "6080193" | "6110210" | "6176882" | "6190414" | "6193757" | "6206923" | "6419705" | "6451057" | "6468311" | "6478823" | "20010020186" | "20020040243").pn. OR ("6723126").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:23 PM
L56	598	("3741205" | "4289123" | "4309777").pn. OR ("4401112").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:42 PM
L57	23	("5723013" | "6176882" | "20030045877" | "20040049271" | "20050125061" | "20060200244").pn. OR ("8157864").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:59 PM
L58	21	("5658335" | "6176882"	(US-PGPUB; USPAT;	OR	ON	ON	2023/02/14

		| "6723126" | "6953477" | "20060224241" | "20070198089" | "20120310350").pn. OR ("9271777").urpn. AND (PGPB | USPT | USOC).dbnm.	USOCR)				06:11 PM
L59	507	(L58 OR L57 OR L56 OR L55 OR L54 OR L53 OR L52) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 06:28 PM
L60	2	(4657550|6176882).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 06:57 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

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.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

26191 7590 02/22/2023

FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
SHIRSAT, MARCELA	

ART UNIT	PAPER NUMBER
3775	

NOTIFICATION DATE	DELIVERY MODE
02/22/2023	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):

PATDOCTC@fr.com

Office Action Summary	Application No. 17/208,640	Applicant(s) Moskowitz et al.	
	Examiner MARCELA I SHIRSAT	Art Unit 3775	AIA (FITF) Status No

-- 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 11/7/22.

☐ 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) 21-41 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) 21-41 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 or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 3/22/21 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) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Claim Interpretation

2. The following is a quotation of 35 U.S.C. 112(f):

> (f) Element in Claim for a Combination. – An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The following is a quotation of pre-AIA 35 U.S.C. 112, sixth paragraph:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

3. The claims in this application are given their broadest reasonable interpretation using the plain meaning of the claim language in light of the specification as it would be understood by one of ordinary skill in the art. The broadest reasonable interpretation of a claim element (also commonly referred to as a claim limitation) is limited by the description in the specification when 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is invoked.

As explained in MPEP § 2181, subsection I, claim limitations that meet the following three-prong test will be interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph:

(A) the claim limitation uses the term "means" or "step" or a term used as a substitute for "means" that is a generic placeholder (also called a nonce term or a non-structural term having no specific structural meaning) for performing the claimed function;

(B) the term "means" or "step" or the generic placeholder is modified by functional language, typically, but not always linked by the transition word "for" (e.g., "means for") or another linking word or phrase, such as "configured to" or "so that"; and

(C) the term "means" or "step" or the generic placeholder is not modified by sufficient structure, material, or acts for performing the claimed function.

Use of the word "means" (or "step") in a claim with functional language creates a rebuttable presumption that the claim limitation is to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites sufficient structure, material, or acts to entirely perform the recited function.

Absence of the word "means" (or "step") in a claim creates a rebuttable presumption that the claim limitation is not to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is not interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites function without reciting sufficient structure, material or acts to entirely perform the recited function.

Claim limitations in this application that use the word "means" (or "step") are being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action. Conversely, claim limitations in this application that do

not use the word "means" (or "step") are not being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action.

4. This application includes one or more claim limitations that do not use the word "means," but are nonetheless being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, because the claim limitation(s) uses a generic placeholder that is coupled with functional language without reciting sufficient structure to perform the recited function and the generic placeholder is not preceded by a structural modifier. ***Such claim limitation(s) is/are: "means for placement of a bone fusion material" in claim 30.***

Because this/these claim limitation(s) is/are being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, it/they is/are being interpreted to cover the corresponding structure described in the specification as performing the claimed function, and equivalents thereof.

If applicant does not intend to have this/these limitation(s) interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, applicant may: (1) amend the claim limitation(s) to avoid it/them being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph (e.g., by reciting sufficient structure to perform the claimed function); or (2) present a sufficient showing that the claim limitation(s) recite(s) sufficient structure to perform the claimed function so as to avoid it/them being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph.

Claim Rejections - 35 USC § 112

5. The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

> The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. **Claims 21-30 and 41** are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

7. **Claim 21** is rejected as indefinite for the recitation of "the threaded body has a first end, and a second end, and a longitudinal axis between the first end and the second end extends in a direction from the first shell to the second shell" (emphasis added) in lines 14-16. The claim as it is currently written makes it unclear as to what is meant to extend in the direction of the two shells a person could interpret the claim as referring to either the second end of the longitudinal axis. In the interest in compact the claim will be interpreted as pertaining to the longitudinal axis.

8. **Claims 22-30 and 41** are rejected as indefinite for depending upon an indefinite claim.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. **Claim(s) 31, 36 and 39-40** is/are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Biedermann et al (US Patent 6176882B1).

11. Biedermann discloses an artificial spinal implant system (intervertebral implant). Specifically in regards to **claim 31**, Biedermann discloses an artificial expansile spinal implant comprising: a first shell (60) having a first vertebral-engaging surface (surface with 68) and a first opposite surface, the first shell (60) comprising a first set of engagement features (68) extending from the first vertebral-engaging surface; a second shell (61) having a second vertebral-engaging surface (surface with 68) and a second opposite surface, the second shell (61) comprising a second set of engagement features (68) extending from the second vertebral-engaging surface (Fig. 1 and 4; and Col. 2 lines 27-37, Col. 3 line 57 to Col. 4 line 11). Biedermann also discloses an expansion mechanism (15, 25, 45-46, 26) positioned between the first and second shells (60,61) and configured to expand the artificial expansile spinal implant (See Fig. 7-8), the expansion mechanism (15, 25, 45-46, 26) coupled to the first and second opposite surfaces (see Fig. 7 by means of 26,25), the expansion mechanism (15, 25, 45-46, 26) comprising a tool-engagement surface (bores 38,38' which allow axis to 16,17) and at least one rotating gear (15); wherein the expansion mechanism (15, 25, 45-46, 26) is configured to drive expansion between the first and second shell (60,61) in response to rotating of a tool engaged with the tool- engagement surface (38,38' with 16,17), and wherein the rotating of the tool causes a rotation of at least one rotating gear (15) (The spindle 15 is being interpreted as the gear since it meshes with the threads within the wedges 45,46 and is turned by means of a driver.) (Fig. 1 and 7-8; and Col. 2 line 56 to Col. 3 line 56, Col. 4 line 37-65). Biedermann also discloses wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features (68) of the first vertebral-engaging surface and the second set of engagement features (68) of the second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place (Fig. 2-3). The

tool-engagement surface (bores 38,38' which allow axis to 16,17) of the expansion mechanism (15, 25, 45-46, 26) is positioned and configured to be engaged by the tool extending along a direction of insertion (Fig. 2). Biedermann also discloses wherein the first shell comprises a first cavity (69) extending from the first vertebral- engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features (68) are positioned on the first vertebral-engaging surface circumferentially about the first cavity (69)(Fig. 1; and Col. 2 lines 27-37, Col. 3 line 57 to Col. 4 line 11).

12. In regards to **claim 36**, Biedermann discloses wherein the first set of engagement features (68) and the second set of engagement features (68) extend from the first vertebral-engaging surface and the second vertebral-engaging surface in directions substantially perpendicular to the first and second vertebral-engaging surfaces (Fig. 7-8 and 1).

13. In regards to **claim 39**, Biedermann discloses wherein the first shell and the second shell (60,61) each comprise titanium (Col. 4 lines 35-36).

14. In regards to **claim 40**, Biedermann discloses wherein the artificial expansile spinal implant further comprises means for placement of a bone fusion material (Biedermann discloses wherein an opening 69 within both elements 60,61 which is capable of allowing bone fusion material to be inserted into the implant.) (Fig. 1).

Claim Rejections - 35 USC § 103

15. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

16. **Claim(s) 21-26, 28-35, and 41** is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Daher (US Patent 4657550) in view of Biedermann.

17. Daher discloses an artificial spinal implant system (buttressing device usable in a vertebral prosthesis). Specifically in regards to **claim 21 and 24**, Daher discloses an artificial expansile spinal implant comprising: a first shell (10) having a first vertebral-engaging surface (surface with 16) and a first opposite surface (surface with 14), the first shell (10) comprising a first set of engagement features (16) extending from the first vertebral-engaging surface; a second shell (11) having a second vertebral-engaging surface (surface with 16) and a second opposite surface (surface with 15), the second shell (11) comprising a second set of engagement features (16) extending from the second vertebral-engaging surface (Fig. 1-2; and Col. 2 line 55 to Col. 3 line 21). Daher also discloses an expansion mechanism (1,8,9) positioned between the first and second shells (10,11) and configured to expand the artificial expansile spinal implant, the expansion mechanism (1,8,9) coupled to the first and second opposite surfaces (surfaces with 14,15), the expansion mechanism (1,8,9) comprising a tool-engagement surface (orifices 22 for use with rod 23), threaded body (8), and a turning mechanism (1); wherein the threaded body (8) has a first end (end with 12) and a second end (end opposite 12) and a longitudinal axis (axis through center of 1) between the first and second ends extends in a direction from the first shell (10) to the second shell (11); wherein the expansion mechanism (1,8,9) is configured to drive expansion between the first and second shells (10,11) in response to rotating of a tool (23) engaged with the tool- engagement surface (22), and wherein the rotating of the tool (23) causes a rotation of the turning mechanism (1) (Fig. 1-2; and Col. 2 line 64-67, Col. 3 lines 25 to Col. 4 line 6). Daher also discloses wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features (16) of the first vertebral-

engaging surface and the second set of engagement features (16) of the second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place (Fig. 1). The tool-engagement surface (22) of the expansion mechanism (1,8.9) is positioned and configured to be engaged by the tool (23) extending along a direction of insertion (Fig. 1-2). However, Daher is silent as to the first and second shells having a cavity that extends therethrough.

18. Biedermann discloses an artificial spinal implant system (intervertebral implant). Specifically in regards to **claim 21**, Biedermann discloses an artificial expansile spinal implant comprising: a first shell (60) having a first vertebral-engaging surface (surface with 68) and a first opposite surface, the first shell (60) comprising a first set of engagement features (68) extending from the first vertebral-engaging surface; a second shell (61) having a second vertebral-engaging surface (surface with 68) and a second opposite surface, the second shell (61) comprising a second set of engagement features (68) extending from the second vertebral-engaging surface, and wherein the implant comprises an expansion mechanism (15, 25, 45-46, 26)) (Fig. 1, 4, and 7-8; and Col. 2 lines 27-37, Col. 2 line 56 to Col. 3 line 56, Col. 3 line 57 to Col. 4 line 11, Col. 4 line 37-65). Biedermann also discloses wherein the first shell comprises a first cavity (69) extending from the first vertebral- engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features (68) are positioned on the first vertebral-engaging surface circumferentially about the first cavity (69)(Fig. 1; and Col. 2 lines 27-37, Col. 3 line 57 to Col. 4 line 11). In regards to **claim 24**, Biedermann discloses wherein the second shell (61) comprises a second cavity (69) extending from the second vertebral-engaging surface through the second shell to the second opposite surface and wherein the second set of engagement features (68) are positioned on the second vertebral-engaging

surface circumferentially about the second cavity (69) (Fig. 1; and Col. 2 lines 27-37, Col. 3 line 57 to Col. 4 line 11). It would have been obvious to a person of skill in the art at the time the invention was made to modify the shells (10,11) of Daher to have a cavity extending therethrough as taught in Biedermann in order to allow for bone growth material to be inserted therein.

19. In regards to **claim 22**, Daher in view of Biedermann disclose a spinal implant having two shells and an expansion mechanism therein. However, they are silent as to the engagement features having a conical tip. Biedermann discloses wherein the first set of engagement features (68) have substantially conical tips configured for piercing endplates of the opposing vertebral bodies when introduced into the spine and expanded (As can be seen in Fig. 7-8, the teeth 68 have a conical cross section.) (Fig. 7-8). It would have been obvious to a person of skill in the art at the time the invention was made to modify the engagement features (16) of Daher to have a conical shape as taught in Biedermann since a person of ordinary skill in the art would have found it obvious absent persuasive evidence that the particular configuration of the claimed shape was significant.

20. In regards to **claim 23**, Daher discloses wherein the first set of engagement features (16) and the second set of engagement features (16) extend from the first vertebral-engaging surface and the second vertebral-engaging surface in directions substantially perpendicular to the first and second vertebral-engaging surfaces (Fig. 1-2).

21. In regards to **claim 25-26**, Daher discloses wherein the first shell curves (10) continuously around a first perimeter of the first shell (10) and the second shell (11) curves continuously around a second perimeter of the second shell (11); and wherein the first perimeter shaped to correspond to a shape of a vertebral body(Fig. 1-2).

22. In regards to **claim 28**, Daher discloses wherein the expansion mechanism (1,8,9) further comprises a rotatable gear (9) (Fig. 1-2; and Col. 2 line 64-67, Col. 3 lines 25 to Col. 4 line 6).

23. In regards to **claim 29**, Daher in view of Biedermann disclose a spinal implant having two shells and an expansion mechanism therein. However, they are silent as to the material the implant is made from. Biedermann discloses wherein the first shell and the second shell (60,61) each comprise titanium (Col. 4 lines 35-36). It would have been obvious to a person of skill in the art at the time the invention was made to modify the spinal implant of Daher to be made of titanium as taught in Biedermann in order for the implant to be manufactured from a physically compatible material (Col. 4 lines 35-36).

24. In regards to **claim 30**, Daher discloses wherein the artificial expansile spinal implant further comprises means for placement of a bone fusion material (Orifices 22 and 21 are fully capable of allowing bone fusion material to be inserted into the implant.) (Fig. 1-2).

25. In regards to **claim 41**, Daher discloses wherein the first end of the threaded body (8) is coupled to the first shell (10) and the second end of the threaded body is coupled to the second shell (11), and the turning mechanism (1) engages the threads of the threaded body (8) (The element 8 is connected to the first end 10 by means of the tenon 12 and is coupled to the second end 11 by means of the connecting piece 5 which joins elements 8,9 and element 9 which is connected to end 11 by means of tenon 13.) (Fig. 1-2; Col. 2 line 55 to Col. 3 line 15, Col. 3 line 35 to Col. 4 line 6).

26. In regards to **claim 31**, Daher discloses an artificial spinal implant system (buttressing device usable in a vertebral prosthesis). Specifically, Daher discloses an artificial expansile spinal implant comprising: a first shell (10) having a first vertebral-engaging surface (surface

with 16) and a first opposite surface (surface with 14), the first shell (10) comprising a first set of engagement features (16) extending from the first vertebral-engaging surface; a second shell (11) having a second vertebral-engaging surface (surface with 16) and a second opposite surface (surface with 15), the second shell (11) comprising a second set of engagement features (16) extending from the second vertebral-engaging surface (Fig. 1-2; and Col. 2 line 55 to Col. 3 line 21). Daher also discloses an expansion mechanism (1,8,9) positioned between the first and second shells (10,11) and configured to expand the artificial expansile spinal implant, the expansion mechanism (1,8,9) coupled to the first and second opposite surfaces (surfaces with 14,15), the expansion mechanism (1,8,9) comprising a tool-engagement surface (orifices 22 for use with rod 23), and at least on rotating gear (1); wherein the expansion mechanism (1,8,9) is configured to drive expansion between the first and second shells (10,11) in response to rotating of a tool (23) engaged with the tool- engagement surface (22), and wherein the rotating of the tool (23) causes a rotation of the at least one rotating gear (1) (Fig. 1-2; and Col. 2 line 64-67, Col. 3 lines 25 to Col. 4 line 6). Daher also discloses wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features (16) of the first vertebral-engaging surface and the second set of engagement features (16) of the second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place (Fig. 1). The tool-engagement surface (22) of the expansion mechanism (1,8.9) is positioned and configured to be engaged by the tool (23) extending along a direction of insertion (Fig. 1-2). However, Daher is silent as to the first and second shells having a cavity that extends therethrough.

27. Biedermann discloses an artificial spinal implant system (intervertebral implant). Specifically in regards to **claim 31**, Biedermann discloses an artificial expansile spinal implant

comprising: a first shell (60) having a first vertebral-engaging surface (surface with 68) and a first opposite surface, the first shell (60) comprising a first set of engagement features (68) extending from the first vertebral-engaging surface; a second shell (61) having a second vertebral-engaging surface (surface with 68) and a second opposite surface, the second shell (61) comprising a second set of engagement features (68) extending from the second vertebral-engaging surface, and wherein the implant comprises an expansion mechanism (15, 25, 45-46, 26)) (Fig. 1, 4, and 7-8; and Col. 2 lines 27-37, Col. 2 line 56 to Col. 3 line 56, Col. 3 line 57 to Col. 4 line 11, Col. 4 line 37-65). Biedermann also discloses wherein the first shell comprises a first cavity (69) extending from the first vertebral- engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features (68) are positioned on the first vertebral-engaging surface circumferentially about the first cavity (69)(Fig. 1; and Col. 2 lines 27-37, Col. 3 line 57 to Col. 4 line 11). It would have been obvious to a person of skill in the art at the time the invention was made to modify the shell (10) of Daher to have a cavity extending therethrough as taught in Biedermann in order to allow for bone growth material to be inserted therein.

28. In regards to **claim 32**, Daher discloses the expansion mechanism (1,8,9) further comprising at least one threaded body (8,9), wherein the rotating of the tool (23) or the rotation of the at least one rotating gear (1) causes a rotation of the at least one threaded body (1) (Fig. 1-2; and Col. 2 line 64-67, Col. 3 lines 25 to Col. 4 line 6).

29. In regards to **claim 33**, Daher discloses, wherein the rotating of the tool (23) is configured to rotate the at least one rotating gear (1) with respect to the at least one threaded body (8,9) to drive expansion between the first and second shells (10,11)) (Fig. 1-2; and Col. 2 line 64-67, Col. 3 lines 25 to Col. 4 line 6).

30. In regards to **claim 34**, Daher discloses wherein the rotating of the tool (23) leads to a height expansion between the first shell and the second shell (10,11)) (Fig. 1-2; and Col. 2 line 64-67, Col. 3 lines 25 to Col. 4 line 6).

31. In regards to **claim 35**, Daher discloses wherein the artificial expansile spinal implant can be adjusted in at least two directions in order to engage the opposing vertebral bodies (Fig. 1-2)

32. **Claim 27** is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Daher in view of Biedermann as applied to claim 21, and further in view of Heggeness et al (US Patent 5514180).

33. Daher in view of Biedermann discloses a system comprising an artificial expansile implant having a first and second shell each having first and second engagement features thereon, an expansion mechanism comprising a tool engagement surface, a turning mechanism and a gear wherein the rotation mechanism allows for the implant to be expanded to stay in place between the vertebral bodies. However, the combination is silent as to the expansion mechanism comprising a ratcheting mechanism. Heggeness discloses an artificial expansile implant. Specifically in regards to **claim 27**, Heggeness discloses an expansile implant (60) having a first and second shell (61,62) and an expansion mechanism (central portion 65) wherein the expansion mechanism further comprises a ratcheting mechanism (As can be seen in Fig. 22-23, the central portion 65 houses a ratchet mechanism as a means to expand the ends 61,62 away from one another. (Fig. 22-23; and Col. 10 lines 21-36). It would have been obvious to a person of skill in the art at the time the invention was made to modify the combination by modifying the

expansion mechanism of Daher to have a ratcheting mechanism as taught in Heggeness in order to allow for a more controlled and incremental expansion of the implant.

34. **Claim 37-38** is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Biedermann in view of Suddaby (US Patent 6395034B1).

35. Biedermann discloses a system comprising an artificial expansile implant having a first and second shell each having first and second engagement features thereon, an expansion mechanism comprising a tool engagement surface, a turning mechanism and a gear wherein the rotation mechanism allows for the implant to be expanded to stay in place between the vertebral bodies. However, Biedermann is silent as to the shells having a curved perimeter to match the vertebral body shape. Suddaby discloses an artificial expansile implant. Specifically in regards to **claims 37-38**, Suddaby discloses an expansile implant (Fig. 1a,1b) having a first and second shell (14) wherein the first shell curves (14) substantially continuously around a first perimeter of the first shell (14) and the second shell curves (14) substantially continuously around a second perimeter of the second shell (14); and wherein the first shell (14) comprises a first perimeter shaped to correspond to a shape of a vertebral body (Suddaby discloses wherein each broad head 14 has a convex surface 16 facing outwardly, and is partially spherical chosen to match that of the vertebral endplate against which it will bear. Those vertebral endplate surfaces are normally concave.) (Fig. 1a-1b; and Col. 3 line 64 to Col. 4 line 7). It would have been obvious to a person of skill in the art at the time the invention was made to modify the shells (60,61) of Biedermann to have a convex surface as taught in Suddaby in order to have surfaces that better match the vertebral endplates (Col. 4 lines 1-7).

Response to Arguments

36. Applicant's amendments filed on 11/7/22 have overcome the previous double patenting rejection and the previous 112 rejections which are hereby withdrawn.

37. As to the 112f interpretation of claims 21 and 31, applicant is correct and those have been withdrawn.

38. Applicant's arguments with respect to **claims 21-30** have been considered but are moot because the arguments do not apply to the new combination of references being used in the current rejection.

39. Applicant's arguments with respect to **claim(s) 31** over the Biedermann reference have been considered but are not persuasive over the new interpretation of the reference. The expansion mechanism has been reinterpreted and the rotating gear is now being interpreted as the screw 15 which is rotated by means of a tool and thereby meets the limitations of the claims.

Conclusion

40. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). 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 date of this final action.

41. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARCELA I SHIRSAT whose telephone number is (571)270-5269. The examiner can normally be reached M-F 9:00am-5:30pm EST.

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, Kevin Truong can be reached on 571-272-4705. 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.

/MARCELA I. SHIRSAT/
Primary Examiner, Art Unit 3775

Doc Code: A.NE.AFCP
Document Description: After Final Consideration Pilot Program Request

PTO/SB/434 (05-13)

CERTIFICATION AND REQUEST FOR CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0

Practitioner Docket No.:	Application No.:	Filing Date:
46440-0006007	17/208,640	March 22, 2021
First Named Inventor:	**Title:**	
Mosheh T. Moskowitz	ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS	

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0 (AFCP 2.0) OF THE ACCOMPANYING RESPONSE UNDER 37 CFR 1.116.

1. The above-identified application is (i) an original utility, plant, or design nonprovisional application filed under 35 U.S.C. 111(a) [a continuing application (*e.g.*, a continuation or divisional application) is filed under 35 U.S.C. 111(a) and is eligible under (i)], or (ii) an international application that has entered the national stage in compliance with 35 U.S.C. 371(c).
2. The above-identified application contains an outstanding final rejection.
3. Submitted herewith is a response under 37 CFR 1.116 to the outstanding final rejection. The response includes an amendment to at least one independent claim, and the amendment does not broaden the scope of the independent claim in any aspect.
4. This certification and request for consideration under AFCP 2.0 is the only AFCP 2.0 certification and request filed in response to the outstanding final rejection.
5. Applicant is willing and available to participate in any interview requested by the examiner concerning the present response.
6. This certification and request is being filed electronically using the Office's electronic filing system (EFS-Web).
7. Any fees that would be necessary consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, extension of time fees, are being concurrently filed herewith. [There is no additional fee required to request consideration under AFCP 2.0.]
8. By filing this certification and request, applicant acknowledges the following:

- Reissue applications and reexamination proceedings are not eligible to participate in AFCP 2.0.
- The examiner will verify that the AFCP 2.0 submission is compliant, *i.e.*, that the requirements of the program have been met (see items 1 to 7 above). For compliant submissions:
  - The examiner will review the response under 37 CFR 1.116 to determine if additional search and/or consideration (i) is necessitated by the amendment and (ii) could be completed within the time allotted under AFCP 2.0. If additional search and/or consideration is required but cannot be completed within the allotted time, the examiner will process the submission consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, by mailing an advisory action.
  - If the examiner determines that the amendment does not necessitate additional search and/or consideration, or if the examiner determines that additional search and/or consideration is required and could be completed within the allotted time, then the examiner will consider whether the amendment places the application in condition for allowance (after completing the additional search and/or consideration, if required). If the examiner determines that the amendment does not place the application in condition for allowance, then the examiner will contact the applicant and request an interview.
    - The interview will be conducted by the examiner, and if the examiner does not have negotiation authority, a primary examiner and/or supervisory patent examiner will also participate.
    - If the applicant declines the interview, or if the interview cannot be scheduled within ten (10) calendar days from the date that the examiner first contacts the applicant, then the examiner will proceed consistent with current practice concerning responses after final rejection under 37 CFR 1.116.

Signature	Date
/Kiersten M. Batzli/	May 18, 2023
Name (Print/Typed) Kiersten M. Batzli	Practitioner Registration No. 75,476

***Note**: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.*

☐ * Total of _____ forms are submitted.

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	3775
Application No.	:	17/208,640	Examiner	:	Marcela Shirsat
Filed	:	March 22, 2021	Conf. No.	:	6013

Title : ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS

MAIL STOP AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO ACTION OF FEBRUARY 22, 2023

Please consider the following reply.

Amendments to Claims:
Listing of Claims.

1-20. (Cancelled)

21. (Currently Amended) An artificial spinal implant system comprising:

an artificial expansile spinal implant comprising:

a first shell having a first vertebral-engaging surface and a first opposite surface, the first shell comprising a first set of engagement features extending from the first vertebral-engaging surface;

a second shell having a second vertebral-engaging surface and a second opposite surface, the second shell comprising a second set of engagement features extending from the second vertebral-engaging surface; and

an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface, a threaded body, and a turning mechanism;

wherein the threaded body has a first end, [[and]] a second end, and a longitudinal axis between the first end and the second end, the longitudinal axis extending ~~extends~~ in a direction from the first shell to the second shell;

wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, wherein rotating the tool comprises rotating the tool about a longitudinal axis of the tool while the tool is engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the turning mechanism;

wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features of the first vertebral-engaging surface and the second set of engagement features of the second vertebral-engaging surface

engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place;

wherein the tool-engagement surface of the expansion mechanism is positioned and configured to be engaged by the tool extending along a direction of insertion; and

wherein the first shell comprises a first cavity extending from the first vertebral-engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features are positioned on the first vertebral-engaging surface circumferentially about the first cavity.

22. (Previously Presented) The artificial spinal implant system of claim 21, wherein the first set of engagement features have substantially conical tips configured for piercing endplates of the opposing vertebral bodies when introduced into the spine and expanded.

23. (Previously Presented) The artificial spinal implant system of claim 22, wherein the first set of engagement features and the second set of engagement features extend from the first vertebral-engaging surface and the second vertebral-engaging surface in directions perpendicular to the first and second vertebral-engaging surfaces.

24. (Previously Presented) The artificial spinal implant system of claim 23, wherein the second shell comprises a second cavity extending from the second vertebral-engaging surface through the second shell to the second opposite surface and wherein the second set of engagement features are positioned on the second vertebral-engaging surface circumferentially about the second cavity.

25. (Previously Presented) The artificial spinal implant system of claim 24, wherein the first shell curves continuously around a first perimeter of the first shell and the second shell curves continuously around a second perimeter of the second shell.

26. (Previously Presented) The artificial spinal implant system of claim 25, wherein the first perimeter is shaped to correspond to a shape of a vertebral body.

27. (Previously Presented) The artificial spinal implant system of claim 21, wherein the expansion mechanism further comprises a ratcheting mechanism.

28. (Previously Presented) The artificial spinal implant system of claim 21, wherein the expansion mechanism further comprises a rotatable gear.

29. (Previously Presented) The artificial spinal implant system of claim 21, wherein the first shell and the second shell each comprise titanium.

30. (Previously Presented) The artificial spinal implant system of claim 21, wherein the artificial expansile spinal implant further comprises means for placement of a bone fusion material.

31. (Previously Presented) An artificial spinal implant system comprising:

an artificial expansile spinal implant comprising:

a first shell having a first vertebral-engaging surface and a first opposite surface, the first shell comprising a first set of engagement features extending from the first vertebral-engaging surface; and

a second shell having a second vertebral-engaging surface and a second opposite surface, the second shell comprising a second set of engagement features extending from the second vertebral-engaging surface; and

an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface and at least one rotating gear;

wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-

engagement surface, and wherein the rotating of the tool causes a rotation of the at least one rotating gear;

wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features of the first vertebral-engaging surface and the second set of engagement features of the second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place;

wherein the tool-engagement surface of the expansion mechanism is positioned and configured to be engaged by the tool extending along a direction of insertion; and

wherein the first shell comprises a first cavity extending from the first vertebral-engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features are positioned on the first vertebral-engaging surface circumferentially about the first cavity.

32. (Previously Presented) The artificial spinal implant system of claim 31, the expansion mechanism further comprising at least one threaded body, wherein the rotating of the tool or the rotation of the at least one rotating gear causes a rotation of the at least one threaded body.

33. (Previously Presented) The artificial spinal implant system of claim 32, wherein the rotating of the tool is configured to rotate the at least one rotating gear with respect to the at least one threaded body to drive expansion between the first shell and the second shell.

34. (Previously Presented) The artificial spinal implant system of claim 32, wherein the rotating of the tool leads to a height expansion between the first shell and the second shell.

35. (Previously Presented) The artificial spinal implant system of claim 34, wherein the artificial expansile spinal implant can be adjusted in at least two directions in order to engage the opposing vertebral bodies.

36. (Previously Presented) The artificial spinal implant system of claim 31, wherein the first set of engagement features and the second set of engagement features extend from the first vertebral-engaging surface and the second vertebral-engaging surface in directions perpendicular to the first and second vertebral-engaging surfaces.

37. (Previously Presented) The artificial spinal implant system of claim 31, wherein the first shell curves continuously around a first perimeter of the first shell.

38. (Previously Presented) The artificial spinal implant system of claim 37, wherein the first perimeter is shaped to correspond to a shape of a vertebral body.

39. (Previously Presented) The artificial spinal implant system of claim 31, wherein the first shell and the second shell each comprise titanium.

40. (Previously Presented) The artificial spinal implant system of claim 31, wherein the artificial expansile spinal implant is configured to be used with a bone fusion material.

41. (Previously Presented) The artificial spinal implant system of claim 21, wherein the first end of the threaded body is coupled to the first shell and the second end of the threaded body is coupled to the second shell, and the turning mechanism engages threads of the threaded body.

REMARKS

Claims 21-41 are pending in this application, and claims 21 and 31 are independent. Claim 21 is amended. All claim amendments are supported by the patent specification as filed, and no new matter is added.

Claim Interpretation

The Office Action states that claim 30 is interpreted under 35 U.S.C. § 112(6) because the claim recites "means for placement of a bone fusion material." *See* Office Action pp. 3-4. Applicant agrees that it is appropriate to interpret this claim term under 35 U.S.C. § 112(f).

Claim Rejections - 35 U.S.C. § 112

Claims 21-30 and 41 were rejected under 35 U.S.C. § 112(b) as being indefinite. Applicant believes the amendments to claim 21 render moot the rejection under 35 U.S.C. § 112(b), and respectfully requests withdrawal of the rejections.

Claim Rejections - 35 U.S.C. §§ 102 and 103

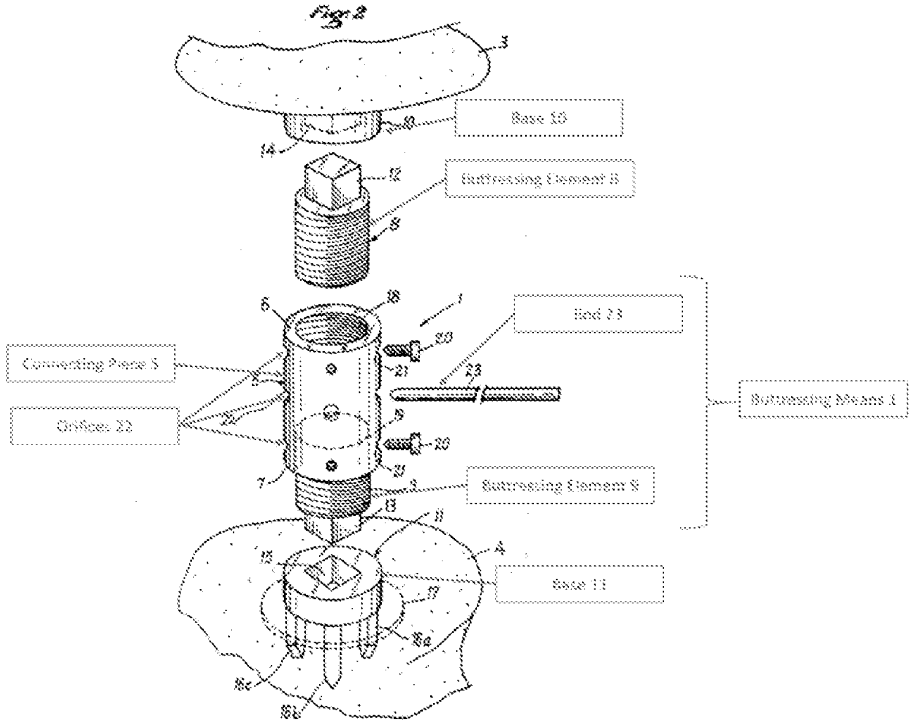
Claims 31, 36 and 39-40 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,176,882 ("Biedermann"); Claims 21-26, 28-35, and 41 were rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 4,657,550 ("Daher") in view of Biedermann; Claim 27 was rejected under 35 U.S.C. § 103 as being unpatentable over Daher and Biedermann in view of U.S. Patent No. 5,514,180 ("Heggeness"); Claims 37 and 38 were rejected under 35 U.S.C. § 103 as being unpatentable over Biedermann in view of U.S. Patent No. 6,395,034 ("Suddaby"). Applicant overcomes the rejections for the following reasons.

A. Claim 21

The prior art of record fails to teach or suggest "wherein rotating the tool comprises rotating the tool about a longitudinal axis of the tool while the tool is engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the turning mechanism"

Claim 21 recites, *inter alia*, "wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, wherein rotating the tool comprises rotating the tool about a longitudinal axis of the tool while the tool is engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the turning mechanism." The prior art of record fails to teach or suggest at least this feature of claim 21.

Daher describes a device "for maintaining the normal spacing between two vertebrae." Daher, 2:57-58. As illustrated in Fig. 2 below, Daher's device includes an "adjustable buttressing means 1" that connects bases 10 and 11 together. Daher, 2:62-63. "The buttressing means 1 comprise more particularly two elements 8, 9 able to be moved with respect to each other parallel to the axis of the vertebral column" connected by a connecting piece 5 having "a certain number of orifices 22." *Id.*, 2:64-66, 3:32-34.



Daher, Fig. 2 (annotations added).

Daher describes that the various "orifices 22 are provided for introducing a rod 23 for facilitating rotation of said piece [connecting piece 5]." *Id.*, 3:32-34. Accordingly, Daher's connecting piece 5 is pushed by the rod 23 in the orifices 22 so that the connecting piece 5 is rotated relative to the two elements 8, 9 to move the elements 8 and 9 apart. Daher's rod 23 (the alleged tool) is not ***rotated about a longitudinal axis of the tool*** to cause a rotating of connecting piece 5 and buttressing elements 8 and 9 (components of the buttressing means 1, the alleged turning mechanism), but rather the rod 23 is inserted into one of the orifices 22 (the alleged tool-engagement surface) and leveraged/pushed sideways to cause rotation of the connecting piece 5 relative to the elements 8 and 9.

Accordingly, there is no rotation about a longitudinal axis of the tool of Daher's rod 23 "caus[ing] a rotation of the turning mechanism," as claim 21 recites. Further, Daher's buttressing means 1 could not be modified to incorporate rotating the rod 23 about a longitudinal axis of the rod to cause rotation of the connecting piece 5 and buttressing elements 8 and 9

without a significant change to the mode of operation of Daher's device. MPEP § 2143.01(VI) ("If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious."). Accordingly, Daher fails to teach or suggest "wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, wherein rotating the tool comprises rotating the tool about a longitudinal axis of the tool while the tool is engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the turning mechanism," as claim 21 recites.

Biedermann, Heggeness and Suddaby, cited with regard to various dependent claims, fail to remedy the deficiencies of Daher, and claim 21 is patentable over the prior art of record for at least this reason. Claims 21-30 and 41 depend, directly or indirectly, from claim 21 and are patentable over the prior art of record for at least the same reasons.

B. Claim 31

(1) The prior art of record fails to teach or suggest "the expansion mechanism comprising… at least one rotating gear"

First, claim 31 recites, *inter alia*, "the expansion mechanism comprising a tool-engagement surface and at least one rotating gear." The prior art of record fails to teach or suggest at least this feature of claim 31. Biedermann describes an intervertebrae implant with a threaded spindle extending within the walls of the implant and "wedge member 45 and 46 provided on each threaded portion 18, 19 of the threaded spindle 15." Biedermann, 3:33-34. Biedermann's threaded spindle 15 (the alleged rotating gear) engages with a threaded bore 55 of the wedge members, but is not "at least one rotating gear" as claim 31 recites. Accordingly, Biedermann fails to disclose or suggest at least "the expansion mechanism comprising… at least one rotating gear," as recited by claim 31.

Daher also fails to disclose or suggest at least "the expansion mechanism comprising… at least one rotating gear." Daher describes a device "for maintaining the normal spacing between two vertebrae." Daher, 2:57-58. Daher's device includes a "buttressing means 1 compris[ing] more particularly two elements 8, 9 able to be moved with respect to each other parallel to the

axis of the vertebral column" connected by a connecting piece 5 having "a certain number of orifices 22." *Id.*, 2:64-66, 3:32-34. However, Daher's buttressing means 1 (the alleged rotating gear) comprises connecting piece 5 and buttressing elements 8 and 9 which are threaded, but are not "at least one rotating gear" as claim 31 recites. Accordingly, Daher fails to disclose or suggest at least "the expansion mechanism comprising… at least one rotating gear," as recited by claim 31.

Heggeness and Suddaby, cited with regard to various dependent claims, fail to remedy the deficiencies of Biedermann and Daher, and claim 31 is patentable over the prior art of record for at least this reason.

(2) *The prior art of record fails to teach or suggest "wherein the rotating of the tool causes a rotation of the at least one rotating gear"*

Second, because Biedermann's threaded spindle 15 and Daher's buttressing means 1 are not the claimed "at least one rotating gear," Biedermann and Daher each also fails to teach or suggest at least "wherein the rotating of the tool causes a rotation of the at least one rotating gear," as recited by claim 31. Furthermore, as described above, Daher describes that the various orifices 22 are used in conjunction with the rod 23 to push the connecting piece 5 to rotate relative to the two elements 8, 9, such that the buttressing means 1 (including connecting piece 5 and elements 8 and 9) is rotated by the sideways leveraging of the rod 23 and not a rotation of the rod 23. Accordingly, there is no rotation of Daher's rod 23 "caus[ing] a rotation of the at least one rotating gear," as claim 31 recites.

Heggeness and Suddaby, cited with regard to various dependent claims, fail to remedy the deficiencies of Biedermann and Daher, and claim 31 is patentable over the prior art of record for at least this reason.

Claims 32-40 depend, directly or indirectly, from claim 31 and are patentable over the prior art of record for at least the same reasons.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the rejections of claim 21-41 under 35 U.S.C. §§ 102 and 103.

CONCLUSION

By responding in the foregoing remarks only to particular positions taken in the action, Applicant does not acquiesce with other positions that have not been explicitly addressed. In addition, Applicant's selecting some particular arguments for the patentability of a claim should not be understood as implying that no other reasons for the patentability of that claim exist. Finally, Applicant's decision to amend or cancel any claim should not be understood as implying that Applicant agrees with any positions taken in the action with reference to that claim or other claims, or that Applicant adopts or agrees with any position except as specifically stated in this paper. In particular, by amending a claim, Applicant does not necessarily concede that the claim prior to amendment was unpatentable.

Applicant believes no fees are due with this reply. However, if a fee is due, please apply those fees and any other necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: May 18, 2023

/Kiersten M. Batzli/
Kiersten M. Batzli, Reg. No. 75,476

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 766-2015
Facsimile: (877) 769-7945

100828980.doc

Electronic Acknowledgement Receipt	
EFS ID:	48023187
Application Number:	17208640
International Application Number:	
Confirmation Number:	6013
Title of Invention:	ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz
Customer Number:	26191
Filer:	Kiersten M. Batzli/Emily Whitcomb
Filer Authorized By:	Kiersten M. Batzli
Attorney Docket Number:	46440-0006007
Receipt Date:	18-MAY-2023
Filing Date:	22-MAR-2021
Time Stamp:	13:08:27
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)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	After Final Consideration Program Request	AFCP.PDF	107279 55612239489c13a3f4a2152cc73f9151c655e0de	no	2

Warnings:

Information:					
2		ResponseOA.PDF	2051044 a05ec460703b3854190957bbe7d0dbb9f4600d24	yes	12

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response after Ex Parte Quayle Action	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	12

Warnings:	
Information:	
Total Files Size (in bytes):	2158323

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.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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 displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/208,640	Filing Date 03/22/2021	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $240 =	
☐ 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).				
☐ 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	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	05/18/2023	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 21	Minus	** 21	= 0		x $40 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $192 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ 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.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/Theresa OKON/
*** 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.**

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

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.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

26191 7590 07/10/2023

FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
SHIRSAT, MARCELA	

ART UNIT	PAPER NUMBER
3775	

NOTIFICATION DATE	DELIVERY MODE
07/10/2023	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):

PATDOCTC@fr.com

Advisory Action Before the Filing of an Appeal Brief	Application No. 17/208,640	Applicant(s) Moskowitz et al.	
	Examiner MARCELA I SHIRSAT	Art Unit 3775	AIA (FITF) Status No

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

THE REPLY FILED 18 May 2023 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☑ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☐ The period for reply expires ____ months from the mailing date of the final rejection.
   b) ☑ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection.The current period for reply expires ____ months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.
   Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANTS FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37CFR 41.37(a).

AMENDMENTS

3. ☑ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☑ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☑ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: See Continuation Sheet (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☑ For purposes of appeal, the proposed amendment(s):(a) ☑ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____
9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☑ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: See Continuation Sheet.
13. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
14. ☑ Other: pto2323.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
    Claim(s) allowed:_____.
    Claim(s) objected to:_____.
    Claim(s) rejected:21-41.
    Claim(s) withdrawn from consideration:_____.

/MARCELA I. SHIRSAT/
Primary Examiner, Art Unit 3775

Continuation of 3. NOTE: See note below

Continuation of REQUEST FOR RECONSIDERATION/OTHER 12. The request for reconsideration has been considered but does NOT place the application in condition for allowance because: Applicant's submitted an amendment for claim 21 and arguments for claim 31 under the AFCP 2.0 program on 5/18/2023. The amendments for claim 21 if entered would overcome the previous rejection over Daher and Biedermann. However, after a brief search it was decided that the consideration time needed is longer than the allotted time under the program. As for the argument against claim 31: The argument is considered unpersuasive as to Daher. To begin the connecting gear 5 should have been listed as the rotating gear not the entire buttressing mechanism since the expansion mechanism is composed of the buttressing mechanism 1 which is made up of the piece 5 and threaded elements 8,9 (fig. 2). The threaded elements 8,9 are used to render obvious the threaded body of the mechanism while the connecting piece 5 acts as the at least one rotational gear since its rotation is what causes elements 8,9 to expand and contract within the device. Therefore, the limitation of claim 31 is met and the rejection of claim 31 over Daher would be maintained if the claims were to be entered. However, applicant would be correct in their arguments in regards to Biedermann over claim 31 therefore if the amendments filed on 5/18/2023 were to be entered they would overcome the rejection.

However, as stated before the claims will not be entered since more time is required than allotted under the program for proper consideration of claim 21 and no decision as to allowability has been reached.

AFCP 2.0 Decision	Application No.	Applicant(s)	
	17/208,640	Moskowitz et al.	
	Examiner	Art Unit	AIA (FITF) Status
	MARCELA I SHIRSAT	3775	No

This is in response to the After Final Consideration Pilot request filed 18 May 2023.

1. **Improper Request** – The AFCP 2.0 request is improper for the following reason(s) and the after final amendment submitted with the request will be treated under pre-pilot procedure.

   ☐ An AFCP 2.0 request form PTO/SB/434 (or equivalent document) was not submitted.

   ☐ A non-broadening amendment to at least one independent claim was not submitted.

   ☐ The request is not the first proper AFCP 2.0 request submitted in response to the most recent final rejection.

   ☐ Other: _____

2. **Proper Request**

   A. After final amendment submitted with the request will not be treated under AFCP 2.0.
   The after final amendment cannot be reviewed and a search conducted within the guidelines of the pilot program.

   ☑ The after final amendment will be treated under pre-pilot procedure.

   B. Updated search and/or completed additional consideration.
   The examiner performed an updated search and/or completed additional consideration of the after final amendment within the time authorized for the pilot program. The result(s) of the updated search and/or completed additional consideration are:

   ☐ 1. All of the rejections in the most recent final Office action are overcome and a Notice of Allowance is issued herewith.

   ☐ 2. The after final amendment would not overcome all of the rejections in the most recent final Office action . See attached interview summary for further details.

   ☐ 3. The after final amendment was reviewed, and it raises a new issue(s). See attached interview summary for further details.

   ☐ 4. The after final amendment raises new issues, but would overcome all of the rejections in the most recent final Office action. A decision on determining allowability could not be made within the guidelines of the pilot. See attached interview summary for further details, including any newly discovered prior art.

   ☐ 5. Other: _____

   Examiner Note: Please attach an interview summary when necessary as described above.

DO NOT ENTER: /M.I.S./

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	3775
Application No.	:	17/208,640	Examiner	:	Marcela Shirsat
Filed	:	March 22, 2021	Conf. No.	:	6013

Title : ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS

MAIL STOP AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO ACTION OF FEBRUARY 22, 2023

Please consider the following reply.

DO NOT ENTER: /M.I.S./

PTO/SB/30 (11-17)
Approved for use through 11/30/2020. OMB 0651-0031
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.

Request for Continued Examination (RCE) Transmittal

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	17/208,640
Filing Date	March 22, 2021
First Named Inventor	Mosheh T. Moskowitz
Art Unit	3775
Examiner Name	
Attorney Docket Number	46440-0006007

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. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. Submission required under 37 CFR 1.114 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).

   a. ☐ 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.

      i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

      ii. ☐ Other _____

   b. ☒ Enclosed

      i. ☒ Amendment/Reply

      ii. ☐ Affidavit(s)/ Declaration(s)

      iii. ☐ Information Disclosure Statement (IDS)

      iv. ☐ Other _____

2. Miscellaneous

   a. ☐ 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)

   b. ☐ Other _____

3. Fees The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.
   The Director is hereby authorized to charge the following fees any underpayment of fees, or credit any overpayments to

   a. ☒ Deposit Account No. 06-1050.

      i. ☒ RCE fee required under 37 CFR 1.17(e)

      ii ☒ Extension of time fee (37 CFR 1.136 and 1.17)

      iii ☒ Other any deficiencies

   b. ☐ Check in the amount of $ _____ enclosed

   c. ☐ Payment by credit card (Form PTO-2038 enclosed)

   d. ☒ Payment by EFS-Web

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.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Signature	/Kiersten M. Batzli/	Date	July 12, 2023
Name (Print/Type)	Kiersten M. Batzli	Registration No.	75,476

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being EFS-Web transmitted to the United States Patent and Trademark Office (USPTO), deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the USPTO on the date shown below.

Signature			
Name (Print/Type)		Date	

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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop RCE, 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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	3775
Application No.	:	17/208,640	Examiner	:	Marcela Shirsat
Filed	:	March 22, 2021	Conf. No.	:	6013
Title	:	ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS			

MAIL STOP AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO ACTION OF FEBRUARY 22, 2023 AND ADVISORY ACTION OF JULY 10, 2023

In response to the Final Office Action mailed February 22, 2023 and the Advisory Action mailed July 10, 2023, please consider the following reply.

Amendments to the Specification:

Please replace the title with the following amended title:

ARTIFICIAL ~~EXPANSIBLE~~ EXPANDABLE IMPLANT SYSTEMS

Amendments to Claims:
Listing of Claims.

1-20. (Cancelled)

21. (Currently Amended) An artificial spinal implant system comprising:

an artificial expansile spinal implant comprising:

a first shell having a first vertebral-engaging surface and a first opposite surface, the first shell comprising a first set of engagement features extending from the first vertebral-engaging surface;

a second shell having a second vertebral-engaging surface and a second opposite surface, the second shell comprising a second set of engagement features extending from the second vertebral-engaging surface; and

an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface, a threaded body, and a turning mechanism;

wherein the threaded body has a first end, [[and]] a second end, and a longitudinal axis between the first end and the second end, the longitudinal axis extending ~~extends~~ in a direction from the first shell to the second shell;

wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, wherein rotating the tool comprises rotating the tool about a longitudinal axis of the tool while the tool is engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the turning mechanism;

wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features of the first vertebral-engaging surface and the second set of engagement features of the second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place;

wherein the tool-engagement surface of the expansion mechanism is positioned and configured to be engaged by the tool extending along a direction of insertion; and

wherein the first shell comprises a first cavity extending from the first vertebral-engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features are positioned on the first vertebral-engaging surface circumferentially about the first cavity.

22. (Previously Presented) The artificial spinal implant system of claim 21, wherein the first set of engagement features have substantially conical tips configured for piercing endplates of the opposing vertebral bodies when introduced into the spine and expanded.

23. (Previously Presented) The artificial spinal implant system of claim 22, wherein the first set of engagement features and the second set of engagement features extend from the first vertebral-engaging surface and the second vertebral-engaging surface in directions perpendicular to the first and second vertebral-engaging surfaces.

24. (Previously Presented) The artificial spinal implant system of claim 23, wherein the second shell comprises a second cavity extending from the second vertebral-engaging surface through the second shell to the second opposite surface and wherein the second set of engagement features are positioned on the second vertebral-engaging surface circumferentially about the second cavity.

25. (Previously Presented) The artificial spinal implant system of claim 24, wherein the first shell curves continuously around a first perimeter of the first shell and the second shell curves continuously around a second perimeter of the second shell.

26. (Previously Presented) The artificial spinal implant system of claim 25, wherein the first perimeter is shaped to correspond to a shape of a vertebral body.

27. (Previously Presented) The artificial spinal implant system of claim 21, wherein the expansion mechanism further comprises a ratcheting mechanism.

28. (Previously Presented) The artificial spinal implant system of claim 21, wherein the expansion mechanism further comprises a rotatable gear.

29. (Previously Presented) The artificial spinal implant system of claim 21, wherein the first shell and the second shell each comprise titanium.

30. (Previously Presented) The artificial spinal implant system of claim 21, wherein the artificial expansile spinal implant further comprises means for placement of a bone fusion material.

31. (Currently Amended) An artificial spinal implant system comprising:

an artificial expansile spinal implant comprising:

a first shell having a first vertebral-engaging surface and a first opposite surface, the first shell comprising a first set of engagement features extending from the first vertebral-engaging surface; and

a second shell having a second vertebral-engaging surface and a second opposite surface, the second shell comprising a second set of engagement features extending from the second vertebral-engaging surface; and

an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface and at least one rotating gear;

wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, <u>wherein rotating the tool comprises rotating the tool about a longitudinal axis of the tool while the tool is engaged with the tool-engagement surface,</u> and wherein the rotating of the tool causes a rotation of the at least one rotating gear;

wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features of the first vertebral-engaging surface and the second set of engagement features of the second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place;

wherein the tool-engagement surface of the expansion mechanism is positioned and configured to be engaged by the tool extending along a direction of insertion; and

wherein the first shell comprises a first cavity extending from the first vertebral-engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features are positioned on the first vertebral-engaging surface circumferentially about the first cavity.

32. (Previously Presented) The artificial spinal implant system of claim 31, the expansion mechanism further comprising at least one threaded body, wherein the rotating of the tool or the rotation of the at least one rotating gear causes a rotation of the at least one threaded body.

33. (Previously Presented) The artificial spinal implant system of claim 32, wherein the rotating of the tool is configured to rotate the at least one rotating gear with respect to the at least one threaded body to drive expansion between the first shell and the second shell.

34. (Previously Presented) The artificial spinal implant system of claim 32, wherein the rotating of the tool leads to a height expansion between the first shell and the second shell.

35. (Previously Presented) The artificial spinal implant system of claim 34, wherein the artificial expansile spinal implant can be adjusted in at least two directions in order to engage the opposing vertebral bodies.

36. (Previously Presented) The artificial spinal implant system of claim 31, wherein the first set of engagement features and the second set of engagement features extend from the first

vertebral-engaging surface and the second vertebral-engaging surface in directions perpendicular to the first and second vertebral-engaging surfaces.

37. (Previously Presented) The artificial spinal implant system of claim 31, wherein the first shell curves continuously around a first perimeter of the first shell.

38. (Previously Presented) The artificial spinal implant system of claim 37, wherein the first perimeter is shaped to correspond to a shape of a vertebral body.

39. (Previously Presented) The artificial spinal implant system of claim 31, wherein the first shell and the second shell each comprise titanium.

40. (Previously Presented) The artificial spinal implant system of claim 31, wherein the artificial expansile spinal implant is configured to be used with a bone fusion material.

41. (Previously Presented) The artificial spinal implant system of claim 21, wherein the first end of the threaded body is coupled to the first shell and the second end of the threaded body is coupled to the second shell, and the turning mechanism engages threads of the threaded body.

REMARKS

Claims 21-41 are pending in this application, and claims 21 and 31 are independent. Claim 21 is amended consistent with the amendments presented in the after-final response submitted May 18, 2023, and claim 31 is newly amended. All claim amendments are supported by the patent specification as filed, and no new matter is added.

The title of the application is also amended. The amendment is supported by the patent specification as filed, and no new matter is added.

Claim Interpretation

The Office Action states that claim 30 is interpreted under 35 U.S.C. § 112(6) because the claim recites "means for placement of a bone fusion material." *See* Office Action pp. 3-4. Applicant agrees that it is appropriate to interpret this claim term under 35 U.S.C. § 112(f).

Claim Rejections - 35 U.S.C. § 112

Claims 21-30 and 41 were rejected under 35 U.S.C. § 112(b) as being indefinite. Applicant believes the amendments to claim 21 render moot the rejection under 35 U.S.C. § 112(b), and respectfully requests withdrawal of the rejections.

Claim Rejections - 35 U.S.C. §§ 102 and 103

Claims 31, 36 and 39-40 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,176,882 ("Biedermann"); Claims 21-26, 28-35, and 41 were rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 4,657,550 ("Daher") in view of Biedermann; Claim 27 was rejected under 35 U.S.C. § 103 as being unpatentable over Daher and Biedermann in view of U.S. Patent No. 5,514,180 ("Heggeness"); Claims 37 and 38 were rejected under 35 U.S.C. § 103 as being unpatentable over Biedermann in view of U.S. Patent No. 6,395,034 ("Suddaby"). Without conceding the merits of the rejection but to further prosecution, claims have been amended. In the Advisory Action mailed July 10, 2023, the Examiner agreed that "[t]he amendments for claim 21 if entered would overcome the previous rejection over Daher and Biedermann." Advisory Action, p. 3. The same amendment of claim 21 is presented herein. Further, claim 31 is amended to recite, *inter alia*, "wherein rotating the

tool comprises rotating the tool about a longitudinal axis of the tool while the tool is engaged with the tool-engagement surface," and is patentable over Daher and Biedermann, alone or in combination, for at least the same reasons as claim 21.

In view of the amendments, Applicant requests reconsideration and withdrawal of the rejections under §§ 102 and 103.

CONCLUSION

By responding in the foregoing remarks only to particular positions taken in the action, Applicant does not acquiesce with other positions that have not been explicitly addressed. In addition, Applicant's selecting some particular arguments for the patentability of a claim should not be understood as implying that no other reasons for the patentability of that claim exist. Finally, Applicant's decision to amend or cancel any claim should not be understood as implying that Applicant agrees with any positions taken in the action with reference to that claim or other claims, or that Applicant adopts or agrees with any position except as specifically stated in this paper. In particular, by amending a claim, Applicant does not necessarily concede that the claim prior to amendment was unpatentable.

Please apply any necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: July 12, 2023

/Kiersten M. Batzli/
Kiersten M. Batzli, Reg. No. 75,476

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 766-2015
Facsimile: (877) 769-7945

100828980.doc

Electronic Patent Application Fee Transmittal					
Application Number:	17208640				
Filing Date:	22-Mar-2021				
Title of Invention:	ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS				
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz				
Filer:	Kiersten M. Batzli/Emily Whitcomb				
Attorney Docket Number:	46440-0006007				
Filed as Small 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 - 1 month with $0 paid	2251	1	88	88
Miscellaneous:				
RCE- 1ST REQUEST	2801	1	544	544
		Total in USD ($)		**632**

Electronic Acknowledgement Receipt	
EFS ID:	48284950
Application Number:	17208640
International Application Number:	
Confirmation Number:	6013
Title of Invention:	ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz
Customer Number:	26191
Filer:	Kiersten M. Batzli/Emily Whitcomb
Filer Authorized By:	Kiersten M. Batzli
Attorney Docket Number:	46440-0006007
Receipt Date:	12-JUL-2023
Filing Date:	22-MAR-2021
Time Stamp:	13:14:42
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$632
RAM confirmation Number	E20237BD15227418
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	RCE.PDF	97032 0441dcae7fbfba84ed166715275f5e2ecbd6d31e	no	1
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
2		ResponsewithRCE.PDF	115528 c112bbef0eaff5cc52476fb470d8a977cfb262f3	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment Submitted/Entered with Filing of Continued Prosecution Application (CPA)/Request for Continued Examination(RCE)	1	1
	Specification	2	2
	Claims	3	7
	Applicant Arguments/Remarks Made in an Amendment	8	9

Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	40496 ce7da669175a32707a0ae0c912e8575836853b76	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	253056		

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.

Notice of References Cited	Application/Control No. 17/208,640	Applicant(s)/Patent Under Reexamination Moskowitz et al.	
	Examiner MARCELA I SHIRSAT	Art Unit 3775	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20040049271-A1	03-2004	Biedermann, Lutz	A61F2/44	623/17.11
*	B	US-20090112324-A1	04-2009	REFAI; Daniel	A61F2/44	623/17.11
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/208,640	Moskowitz et al.
	Examiner	Art Unit
	MARCELA I SHIRSAT	3775

CPC - Searched*		
Symbol	**Date**	**Examiner**
a61b17/0642,0643,0682,7064	08/10/2022	mis
a61b2017/0648	08/10/2022	mis
a61f2/4455	08/10/2022	mis
a61f2002/30525,30579,30849,2835,3085,448	08/10/2022	mis

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

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
623	17.11-17.16	08/10/2022	mis
606	246-289,300-328,86r	08/10/2022	mis

* 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**
Performed applicant and inventor name search, reviewed parent case 15/934622, text and date limited classes, bkwd/fwd references	08/10/2022	mis
updated search history and reviewed IDS	02/15/2023	mis
updated search history	07/27/2023	mis

/MARCELA I. SHIRSAT/ Primary Examiner, Art Unit 3775	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/208,640	Moskowitz et al.
	Examiner	Art Unit
	MARCELA I SHIRSAT	3775

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/MARCELA I. SHIRSAT/ Primary Examiner, Art Unit 3775	

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	44	("20020068977" OR "20020143338" OR "20050177235" OR "20070213820" OR "4636217" OR "5290312" OR "20040088054" OR "20040177531" OR "20040254644" OR "20050027362" OR "20050049590" OR "20050216084" OR "20050273170" OR "20050278026" OR "4997432" OR "5123926" OR "5514180" OR "5667472" OR "5782832" OR "6126689" OR "6368350" OR "6375682" OR "6419704" OR "6458159" OR "6527804" OR "6533818" OR "6572653" OR "6579318" OR "6582468" OR "6641614" OR "6719794" OR "6723126" OR "6733532" OR "6764491" OR "6770094" OR "6904308" OR "6955671" OR "7030904" OR "7037258" OR "7097615" OR "4554914" OR "4960420" OR "5660188" OR "5960522").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/09 03:20 PM
L2	1	"7704279".pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:23 PM
L3	172	("4554914" | "4599086" | "4636217" | "4960420" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:23 PM

		| "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7704279").urpn. AND (PGPB | USPT | USOC).dbnm.					
L4	8	(12/347990|15/934622|16/018904|16/362152).app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:28 PM
L5	114	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:29 PM

		| "7776047" | "8268000" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10238383").urpn. AND (PGPB | USPT | USOC).dbnm.					

L6	115	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279" | "7776047" | "8268000" | "9924940" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" |	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:29 PM

		"20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10251643").urpn. AND (PGPB | USPT | USOC).dbnm.					
L7	129	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5236460" | "5290312" | "5458641" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5702455" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6113638" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6432106" | "6454806" | "6454807" | "6458159" | "6527803" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6730088" | "6733532" | "6752832" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:30 PM

		| "7226480" | "7232464" | "7238203" | "7442209" | "7641693" | "7674296" | "7691147" | "7704279" | "7753958" | "7776047" | "8268000" | "9924940" | "10238383" | "10251643" | "20020068977" | "20020143338" | "20020143399" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050177236" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" |					

		"20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10952723").urpn. AND (PGPB | USPT | USOC).dbnm.					
L8	2	(20050049590|5800547).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:00 PM
L9	4	(4554914|4636217|6723126|5062850).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:02 PM
L10	671	("3867728" | "4085744" | "4349921" | "4361141" | "4401112" | "4422451" | "4433677" | "4502473" | "4502475" | "4502483" | "4553273" | "4554914").pn. OR ("4636217").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:03 PM
L11	172	("4554914" | "4599086" | "4636217" | "4960420" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832" | "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7704279").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:50 PM
L12	146	("4554914" | "4599086"	(US-PGPUB; USPAT;	OR	ON	ON	2022/08/09

		| "4636217" | "4960420" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832" | "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7846188").urpn. AND (PGPB | USPT | USOC).dbnm.	USOCR)				07:11 PM
L13	2	15/934622.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 07:27 PM
L14	48	("4636217" | "7846188" | "20050049590" | "20060069436" | "20100160984" | "20100161057").pn. OR ("8257443").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 08:24 PM
L15	8	(8353913|9889022|10028740|10076367|10307268|10251643|10376386|10478319).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 11:48 AM
L16	365	("2799196" | "3426364" | "3486505" | "4309777" | "4401112" | "4522200" | "4545374" | "4553273" | "4599086" | "4636217" | "4657550" | "4733665" | "4863476" | "4878915" | "4932375" | "4932969" | "4936851" | "4946378" | "5059193" | "5171278"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:00 PM

		| "5192327" | "5236460" | "5344252" | "5390683" | "5425772" | "5484437" | "5522899" | "5554191" | "5562736" | "5571190" | "5571192" | "5593409" | "5609635" | "5653762" | "5653763" | "5658335" | "5665122" | "5693100" | "5702453" | "5772661" | "5776197" | "5776199" | "5782832" | "5865848" | "5888228" | "5893889" | "5893890" | "5972015" | "5980522" | "6015436" | "6039761" | "6045579" | "6080155" | "6080193" | "6083225" | "6083228" | "6090143" | "6093207" | "6102949" | "6102950" | "6113638" | "6117174" | "6127597" | "6156037" | "6159244" | "6159245" | "6174334" | "6176882" | "6183517" | "6190414" | "6193756" | "6193757" | "6206923" | "6210412" | "6217579" | "6224604" | "6245107" | "6280456" | "6287308" | "6302914" | "6328738" | "6332895" | "6344057" | "6368351" | "6395031" | "6395032" | "6395034" | "6402750" | "6409766" | "6432140" | "6436103" | "6436140" | "6443989" | "6443990" | "6447544" | "6447547" | "6451052" | "6454806" | "6454807" | "6478823" | "6491724" | "6527803" | "D472632" | "D472633" | "6562074" | "6576016" | "6582431" | "6582451" | "6582461" | "6582467" | "6592625" | "6595998" | "6610089" | "6626905" | "6641614" | "6648917" | "6666891" | "6679915" | "6685742" | "6706070" | "6719796" | "6723126" | "6733535" | "6743255" | "6758849" | "6773460" | "6814754" | "6814756" | "6821298" | "6833006" | "6835206" | "6837850" | "6840944" | "6843804" | "6852129" |				

		"6863673" | "6875173" | "6893464" | "6902568" | "6923810" | "6953477" | "6955691" | "6962606" | "7018415" | "7066961" | "7070598" | "7083650" | "7087055" | "7094257" | "7097648" | "7128760" | "7204853" | "7214243" | "7217291" | "7220280" | "D553742" | "7282063" | "7306626" | "7311733" | "7316714" | "7326250" | "7326251" | "7331996" | "7503933" | "7569074" | "7618456" | "7618458" | "7621951" | "7655042" | "7674297" | "7678148" | "7708778" | "7708779" | "7727280" | "7731751" | "7731752" | "7753958" | "7780732" | "7789914" | "7794501" | "7824445" | "7837734" | "7850733" | "7909830" | "7909869" | "7985256" | "8021430" | "8062375" | "8070813" | "8096994" | "8105358" | "8105382" | "8118870" | "8118871" | "8123810" | "8147550" | "8172903" | "8187331" | "D664252" | "8257440" | "8267939" | "8273124" | "8273126" | "8303662" | "8303663" | "8328818" | "8337558" | "8366777" | "8394143" | "8435296" | "8454695" | "8480741" | "8568481" | "20010032020" | "20020052656" | "20020068974" | "20020068977" | "20020082696" | "20020128716" | "20020138146" | "20030040798" | "20030065396" | "20030135279" | "20030149482" | "20030171813" | "20030195630" | "20030208263" | "20030208270" | "20030208272" | "20030208275" | "20030220650" | "20030236520" |				

		"20040010312" | "20040010315" | "20040024460" | "20040024463" | "20040030387" | "20040044411" | "20040078080" | "20040087947" | "20040087948" | "20040102774" | "20040153156" | "20040199252" | "20040215342" | "20040225360" | "20040243240" | "20040254643" | "20040254644" | "20050004673" | "20050015149" | "20050015150" | "20050027358" | "20050038512" | "20050049590" | "20050060036" | "20050070911" | "20050071007" | "20050113920" | "20050273171" | "20050278026" | "20060022180" | "20060064169" | "20060116767" | "20060122701" | "20060129244" | "20060149385" | "20060224241" | "20060241643" | "20060241764" | "20060247770" | "20060253201" | "20080058931" | "20080071279" | "20080082173" | "20080140207" | "20090222100" | "20100017965" | "20100049325" | "20100145455" | "20100211176" | "20100280616" | "20100286779" | "20100292796" | "20100331985" | "20110130838" | "20110172774" | "20120035729" | "20120071982" | "20120191194" |				

		"20120290094" | "20120310349" | "20120316652").pn. OR ("9320610").urpn. AND (PGPB | USPT | USOC).dbnm.					
L17	1139	("4657550").pn. OR ("4863476").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:29 PM
L18	855	("4401112" | "5522899" | "5609635" | "5658335" | "5665122" | "5893889").pn. OR ("6176882").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:38 PM
L19	2	15/934622.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 05:35 PM
L20	115	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279" | "7776047" | "8268000" | "9924940" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" |	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 05:35 PM

		"20050177235" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10251643").urpn. AND (PGPB | USPT | USOC).dbnm.					
L22	84	((("MOSKOWITZ") near3 ("FAMILY") near3 ("LLC"))).AS,AANM.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:10 PM
L24	177	((("MOSKOWITZ") near3 ("Mosheh")) OR (("MOSKOWITZ") near3 ("Nathan"))).INV.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:10 PM
L25	2	(L22 OR L23) AND ((first NEAR shell)	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:11 PM

		SAME (second NEAR shell))					
L26	465	(a61b17/0642.cpc.) AND @ad<"20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L27	465	(a61b17/0642.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L28	584	(a61b17/0643.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L30	267	(a61b17/0682.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L31	155	(a61b17/7064.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L32	257	(a61b2017/0648.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L33	1116	(a61f2/4455.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L34	48	(a61f2002/30525.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L35	576	(a61f2002/30579.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L36	1010	(a61f2002/30841.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L37	1770	(a61f2002/2835.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L38	672	(a61f2002/3085.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L39	819	(a61f2002/448.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L40	6293	(606/246-289,300-328,86r.ccls.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:14 PM
L41	2683	(623/17.11-17.16.ccls.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:14 PM
L42	232	(L26 OR L27 OR L28 OR L30 OR L31 OR L32 OR L33 OR L34 OR L35 OR L36 OR L37 OR L38 OR L39 OR L40 OR L41) AND	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:16 PM

		((expandable OR expansible) SAME ((vertebral OR intervertebral) SAME (implant OR cage)))					
L43	1	(61786882|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:17 PM
L44	2	(6176882|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:17 PM
L45	3	(6176882|6395034|10251643).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:52 PM
L46	22	((US-10238383-B2 OR US-10251643-B2 OR US-5800547-A OR US-6723126-B1 OR US-5062850-A OR US-4636217-A OR US-4554914-A OR US-4892545-A OR US-6113638-A OR US-7704279-B2 OR US-9924940-B2 OR US-7846188-B2 OR US-8257443-B2 OR US-8377140-B2 OR US-9320610-B2 OR US-4863476-A OR US-6176882-B1 OR US-6395034-B1 OR US-3848601-A).did. AND USPT.dbnm.) OR ((US-20050049590-A1 OR US-20050256576-A1 OR US-20060241621-A1).did. AND PGPB.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, 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, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/10 08:24 PM
L47	3	L46 AND ratchet	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:24 PM
L48	23	L42 AND (ratchet SAME (expand OR expansion OR expansible))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:25 PM
L49	64	L42 AND (ratchet)	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:29 PM
L50	125	("20020068977" OR "20020143338" OR "20020143399" OR "20040088054" OR "20040177531" OR "20040186569" OR "20040254644" OR "20050027362" OR "20050049590" OR "20050177235" OR "20050177236" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/02/14 04:22 PM

		"20050216084" OR "20050256576" OR "20050261769" OR "20050273170" OR "20050278026" OR "20060241621" OR "20070049943" OR "20070167678" OR "20070198089" OR "20070213820" OR "20070250172" OR "20080033440" OR "20080177307" OR "20080281424" OR "20090105831" OR "20090112271" OR "20090224023" OR "20090234455" OR "20100145460" OR "20100324606" OR "20110125269" OR "20110137349" OR "20110178600" OR "20110208312" OR "20110288646" OR "20110295327" OR "20110295371" OR "20110307011" OR "20110319935" OR "20120010714" OR "20120330419" OR "20130018468" OR "20130018469" OR "20130018470" OR "20130023992" OR "20130053962" OR "20130173002" OR "20130282017" OR "20140249629" OR "20150025637" OR "20150105824" OR "20150148847" OR "20160374830" OR "20170252178" OR "4554914" OR "4599086" OR "4636217" OR "4960420" OR "4994063" OR "4997432" OR "5062850" OR "5123926" OR "5236460" OR "5290312" OR "5458641" OR "5572653" OR "5660188" OR "5667472" OR					

		"5669912" OR "5702455" OR "5722976" OR "5782832" OR "5800547" OR "5960522" OR "6106556" OR "6113638" OR "6126689" OR "6224602" OR "6235034" OR "6322562" OR "6342074" OR "6368350" OR "6375682" OR "6419704" OR "6432106" OR "6454806" OR "6454807" OR "6458159" OR "6527803" OR "6527804" OR "6533818" OR "6572653" OR "6579318" OR "6582468" OR "6629998" OR "6641614" OR "6716247" OR "6719794" OR "6723126" OR "6730088" OR "6733532" OR "6752832" OR "6764491" OR "6770094" OR "6890355" OR "6904308" OR "6953477" OR "6955671" OR "7028878" OR "7030904" OR "7037258" OR "7097615" OR "7211112" OR "7226480" OR "7232464" OR "7238203" OR "7442209" OR "7641693" OR "7674296" OR "7691147" OR "7704279" OR "7753958" OR "7776047" OR "8268000").pn.					
L51	1	"6176882".pn.	(US-PGPUB; USPAT;	OR	ON	ON	2023/02/14

			USOCR)				04:36 PM
L52	894	("4401112" | "5522899" | "5609635" | "5658335" | "5665122" | "5893889").pn. OR ("6176882").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 04:52 PM
L53	332	("4309777" | "4599086" | "4636217" | "4657550" | "4759769" | "4874389" | "4932975").pn. OR ("5062850").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 04:53 PM
L54	639	("4401112" | "4553273" | "4657550" | "4834757" | "4878915" | "4936848" | "5015247" | "5059193" | "5171278" | "5306310" | "5336223" | "5458641" | "5534029").pn. OR ("5702455").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:19 PM
L55	586	("4349921" | "4401112" | "4553273" | "4863476" | "5336223" | "5397364" | "5554191" | "5653763" | "5693100" | "6008431" | "6039761" | "6080193" | "6110210" | "6176882" | "6190414" | "6193757" | "6206923" | "6419705" | "6451057" | "6468311" | "6478823" | "20010020186" | "20020040243").pn. OR ("6723126").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:23 PM
L56	598	("3741205" | "4289123" | "4309777").pn. OR ("4401112").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:42 PM
L57	23	("5723013" | "6176882" | "20030045877" | "20040049271" | "20050125061" | "20060200244").pn. OR ("8157864").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:59 PM
L58	21	("5658335" | "6176882"	(US-PGPUB; USPAT;	OR	ON	ON	2023/02/14

		| "6723126" | "6953477" | "20060224241" | "20070198089" | "20120310350").pn. OR ("9271777").urpn. AND (PGPB | USPT | USOC).dbnm.	USOCR)				06:11 PM
L59	507	(L58 OR L57 OR L56 OR L55 OR L54 OR L53 OR L52) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 06:28 PM
L60	2	(4657550|6176882).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 06:57 PM
L61	4	(6176882|4657550|5514180|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/06/30 06:57 PM
L62	182	((("MOSKOWITZ") near3 ("Mosheh")) OR (("MOSKOWITZ") near3 ("Nathan"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 01:28 PM
L63	2	11/536815.app.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 01:44 PM
L64	3	"6723126".pn.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 01:47 PM
L65	9	(11/208644|12/347990|13/093812|15/362152|17/208640).app.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 02:04 PM
L66	11	(11/208644|12/347990|13/093812|15/934622|16/362152|17/208640).app.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 02:05 PM
L67	2	L66 AND (shell SAME (expansion NEAR mechanism))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/03 02:05 PM
L68	4	L66 AND (shell AND (expansion NEAR mechanism))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/03 02:06 PM
L69	32	((US-10238383-B2 OR US-10251643-B2 OR US-5800547-A OR US-6723126-B1 OR US-5062850-A OR US-4636217-A OR US-4554914-A OR US-4892545-A OR US-6113638-A OR US-7704279-B2 OR US-9924940-B2 OR US-7846188-B2 OR US-8257443-B2 OR US-8377140-B2 OR US-9320610-B2 OR US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, 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, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2023/07/03 02:19 PM

		4863476-A OR US-6176882-B1 OR US-6395034-B1 OR US-5514180-A OR US-5702455-A OR US-7641693-B2 OR US-7691147-B2 OR US-4401112-A OR US-8157864-B2 OR US-9271777-B2 OR US-4553273-A OR US-3848601-A).did. AND USPT.dbnm.) OR ((US-20050049590-A1 OR US-20050256576-A1 OR US-20060241621-A1 OR US-20040186569-A1 OR US-20070049943-A1).did. AND PGPB.dbnm.)	IBM_TDB)				
L70	1	"4657550".pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/03 02:22 PM
L71	2	15/134561.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/03 03:00 PM
L72	4	(20060241621|7704279|7951180|7846188).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/24 05:37 PM
L73	4	(6176882|4657550|5514180|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 12:00 PM
L74	664	("4289123" | "4401112" | "4553273").pn. OR ("4657550").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 12:05 PM
L75	1205	("5108438" | "5123926" | "5147404" | "5171278" | "5171280" | "5171281" | "5192327" | "5314478").pn. OR ("5514180").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 12:11 PM
L76	208	("2333033" | "3701605" | "4157715" | "4289123" | "4386603" | "4401112" | "4553273" | "4554914" | "4599086" | "4636217" | "4657550" | "4892546" | "5002576" | "5236460" | "5281226" | "5290312" | "5336223" | "5405391" | "5413602" | "5458641" | "5480442" | "5571192" | "5658335" | "5702453" | "5702455" | "5723013"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 07:21 PM

		| "5776197" | "5776198" | "5800547" | "5916267" | "5989290" | "6015436" | "6045579" | "6080193" | "6126660" | "6176881" | "6190413" | "6193755" | "6193756" | "6200348" | "6296665" | "6299644" | "6344057" | "6352556" | "6375683" | "6395034" | "6454806" | "6524341" | "6562074" | "6616695" | "6648917" | "6660038" | "6719796" | "6752832" | "6783547" | "6866682" | "6908485" | "20020072801" | "20020082695" | "20020161441" | "20030045877" | "20040049271" | "20040059271" | "20040153160" | "20040162618" | "20040172129" | "20040181283" | "20040186569" | "20050060036" | "20050090898" | "20050113921" | "20050234550" | "20060058879" | "20060241621" | "20060241770").pn. OR ("7758648").urpn. AND (PGPB | USPT | USOC).dbnm.					
L77	242	("2333033" | "4157715" | "4289123" | "4386603" | "4401112" | "4553273" | "4554914" | "4599086" | "4636217" | "4657550" | "4762031" | "4877020" | "4892546" | "4932975" | "4997432" | "5002576" | "5236460" | "5246458" | "5281226" | "5290312" | "5336223" | "5344459" | "5405391" | "5413602" | "5443514" | "5458641" | "5480442" | "5571192" | "5658335" | "5702453" | "5702455" | "5716415" | "5723013" | "5732992" | "5776197" | "5776198" | "5800547" | "5888223" | "5916267" | "5989290"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 07:29 PM

		| "6015436" | "6045579" | "6080193" | "6113605" | "6126660" | "6126674" | "6129763" | "6159215" | "6176881" | "6190413" | "6190414" | "6193755" | "6193756" | "6200348" | "6214050" | "6296665" | "6299644" | "6319257" | "6344057" | "6352556" | "6375682" | "6375683" | "6395032" | "6395034" | "6454806" | "6478800" | "6524341" | "6562074" | "6616695" | "6648917" | "6660038" | "6699246" | "6716218" | "6719796" | "6723126" | "6730088" | "6752832" | "6783547" | "6808538" | "6821298" | "6835206" | "6835207" | "6852129" | "6863673" | "6866682" | "6902579" | "6908485" | "6953477" | "6981989" | "7022138" | "7029498" | "7056343" | "7156874" | "7252673" | "7338526" | "7384431" | "7530982" | "7588573" | "7608078" | "7618423" | "7625379" | "7625380" | "7632281" | "7674296" | "7695478" | "7722622" | "7803162" | "7803191" | "7819921" | "7824427" | "7846210" | "7879096" | "7896884" | "7914581" | "7918888" | "7927373" | "7981157" | "20010005796" | "20020058944" | "20020068978" | "20020082695" | "20020116009" | "20020161441" | "20030045877" | "20030083747" | "20040049271" | "20040059271" | "20040093083" | "20040133280" | "20040153160" | "20040172129" | "20040181283" | "20040186569" | "20040186576" | "20040193158" | "20040210312" |				

		"20050060036" | "20050085910" | "20050090898" | "20050113921" | "20050143749" | "20050165408" | "20050187634" | "20050216084" | "20050234550" | "20060004376" | "20060004447" | "20060058877" | "20060058879" | "20060074488" | "20060074490" | "20060085011" | "20060085073" | "20060100710" | "20060142859" | "20060149371" | "20060200244" | "20060224241" | "20060235521" | "20060241762" | "20060241770" | "20060293755" | "20070093901" | "20070129805" | "20070173855" | "20070191954" | "20070203490" | "20070233152" | "20070233153" | "20070233254" | "20070250171" | "20070255407" | "20070255408" | "20070255410" | "20070255413" | "20070255421" | "20070282372" | "20080004705" | "20080015609" | "20080021555" | "20080021556" | "20080051896" | "20080058931" | "20080077153" | "20080140207" | "20080154305" | "20080167726" | "20080243254" | "20080255574" | "20080262504" | "20080275455" | "20080287957" | "20080288073" | "20090005874" |				

		"20090030421" | "20090030422" | "20090048673" | "20090076610" | "20090105832" | "20090112217" | "20090112220" | "20090112324" | "20090112325" | "20090216331" | "20090240254" | "20090292361" | "20090306672" | "20090326542" | "20100016972" | "20100023019" | "20100114105" | "20100174371" | "20100211119" | "20100249795" | "20110087328" | "20110106261" | "20110202135").pn. OR ("8142441").urpn. AND (PGPB | USPT | USOC).dbnm.					
L78	192	("2333033" | "4157715" | "4289123" | "4386603" | "4401112" | "4553273" | "4554914" | "4599086" | "4636217" | "4657550" | "4892546" | "4932975" | "5002576" | "5236460" | "5246458" | "5281226" | "5290312" | "5336223" | "5344459" | "5405391" | "5413602" | "5458641" | "5480442" | "5571190" | "5571192" | "5658335" | "5702453" | "5702455" | "5723013" | "5776197" | "5776198" | "5800547" | "5888223" | "5916267" | "5989290" | "6015436" | "6045579" | "6080193" | "6113605" | "6126660" | "6126674" | "6129763" | "6159215" | "6176881" | "6190413" | "6190414" | "6193755" | "6193756" | "6200348" | "6214050" | "6296665" | "6299644" | "6344057" | "6352556" | "6375682" | "6375683" | "6395032" | "6395034" | "6454806" | "6478800" | "6524341" | "6562074"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 08:02 PM

		| "6610090" | "6616695" | "6648917" | "6660038" | "6699246" | "6719796" | "6723126" | "6730088" | "6752832" | "6783547" | "6808538" | "6821298" | "6835206" | "6835207" | "6852129" | "6863673" | "6866682" | "6902579" | "6908485" | "6953477" | "6981989" | "7022138" | "7029498" | "7056343" | "7156874" | "7252673" | "7338526" | "7384431" | "7575601" | "7621953" | "20010005796" | "20020068978" | "20020082695" | "20020099443" | "20020161441" | "20030045877" | "20030191531" | "20040049271" | "20040059271" | "20040093083" | "20040133280" | "20040153160" | "20040172129" | "20040181283" | "20040186569" | "20040186576" | "20040210312" | "20050004572" | "20050060036" | "20050085910" | "20050090898" | "20050113921" | "20050143749" | "20050159814" | "20050187634" | "20050234550" | "20060004447" | "20060058877" | "20060058879" | "20060074488" | "20060074490" | "20060085073" | "20060100710" | "20060142859" | "20060149371" | "20060200244" | "20060224241" | "20060235521" | "20060241762" | "20060241770" | "20060293755" | "20070093901" | "20070129805" |					

		"20070173855" | "20070191954" | "20070203490" | "20070233254" | "20070250171" | "20070255407" | "20070255408" | "20070255410" | "20070255413" | "20070255421" | "20080004705" | "20080021555" | "20080021556" | "20080051896" | "20080058931" | "20080140207" | "20080154305" | "20080167726" | "20080243254" | "20080287957" | "20080288073" | "20090076610" | "20090105832" | "20090112324" | "20090112325" | "20090216331").pn. OR ("8182537").urpn. AND (PGPB | USPT | USOC).dbnm.					
L79	611	("4401112" | "4553273" | "4657550" | "5192327").pn. OR ("5571192").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 08:07 PM
L80	103	("0200238" | "1553623" | "2090872" | "2214985" | "4554914" | "4636217" | "4759766" | "4960420" | "4997432" | "5123926" | "5401269" | "5514180" | "5660188" | "5667472" | "5782832" | "5951564" | "5960522" | "5984922" | "6113637" | "6126689" | "6174311" | "6193757" | "6261296" | "6368350" | "6375682" | "6419704" | "6436101" | "6458159" | "6527804" | "6533818" | "6540785" | "6572653" | "6579318" | "6582468" | "6610093" | "6641614" | "6719794" | "6723126" | "6730088" | "6733532" | "6764491" | "6770094" | "6866682" | "6899735"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 12:56 PM

		| "6904308" | "6908484" | "6955671" | "6981989" | "7018415" | "7030904" | "7037258" | "7097615" | "7115144" | "7118580" | "7217293" | "7250060" | "7927373" | "20020045904" | "20030229355" | "20040088054" | "20040088064" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050085910" | "20050165485" | "20050216084" | "20050273170" | "20050273174" | "20050278026" | "20060025777" | "20060025862" | "20060036325" | "20060136062" | "20060155377" | "20060178745" | "20060195192" | "20060276902" | "20070010826" | "20070055378" | "20070072475" | "20070073311" | "20070073400" | "20070093901" | "20070100347" | "20070100453" | "20070100455" | "20070123903" | "20070123904" | "20070233254" | "20070270970" | "20080014719" | "20080015698" | "20090018661" | "20090204219" | "20100137992" | "20100249797" | "20100286784").pn. OR ("11452619").urpn. AND (PGPB | USPT | USOC).dbnm.					
L81	1	"20040049271".pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 02:12 PM
L82	46	((US-10238383-B2 OR US-10251643-B2 OR US-5800547-A OR US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY,	OR	ON	ON	2023/07/27 02:34 PM

		6723126-B1 OR US-5062850-A OR US-4636217-A OR US-4554914-A OR US-4892545-A OR US-6113638-A OR US-7704279-B2 OR US-9924940-B2 OR US-7846188-B2 OR US-8257443-B2 OR US-8377140-B2 OR US-9320610-B2 OR US-4863476-A OR US-6176882-B1 OR US-6395034-B1 OR US-5514180-A OR US-5702455-A OR US-7641693-B2 OR US-7691147-B2 OR US-4401112-A OR US-8157864-B2 OR US-9271777-B2 OR US-4553273-A OR US-4657550-A OR US-7951180-B2 OR US-5989290-A OR US-7238205-B2 OR US-5571192-A OR US-7384431-B2 OR US-8568482-B2 OR US-11452619-B2 OR US-8940049-B1 OR US-3848601-A OR US-8182537-B2).did. AND USPT.dbnm.) OR ((US-20050049590-A1 OR US-20050256576-A1 OR US-20060241621-A1 OR US-20040186569-A1 OR US-20070049943-A1 OR US-20040049271-A1 OR US-20060241770-A1 OR US-20070255407-A1 OR US-20020099443-A1).did. AND PGPB.dbnm.)	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, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L83	2	10/250489.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 02:34 PM
L84	224	("2678226" | "4553273" | "5702455" | "6200348" | "6454806" | "6719796").pn. OR ("7547325").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 02:34 PM

L85	29	L82 AND titanium	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 05:38 PM
L86	5	(20090112324|20040049271|20020099443|6176882|4657550).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 05:43 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

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.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

26191 7590 08/02/2023

FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
SHIRSAT, MARCELA	

ART UNIT	PAPER NUMBER
3775	

NOTIFICATION DATE	DELIVERY MODE
08/02/2023	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):

PATDOCTC@fr.com

Office Action Summary	Application No. 17/208,640	Applicant(s) Moskowitz et al.	
	Examiner MARCELA I SHIRSAT	Art Unit 3775	AIA (FITF) Status No

-- 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 07/12/23.

☐ 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) 21-41 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☑ Claim(s) 21-30 and 41 is/are allowed.

7) ☑ Claim(s) 31-40 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 or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 3/22/21 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) ☑ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Claim Interpretation

2. The following is a quotation of 35 U.S.C. 112(f):

> (f) Element in Claim for a Combination. – An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The following is a quotation of pre-AIA 35 U.S.C. 112, sixth paragraph:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

3. The claims in this application are given their broadest reasonable interpretation using the plain meaning of the claim language in light of the specification as it would be understood by one of ordinary skill in the art. The broadest reasonable interpretation of a claim element (also commonly referred to as a claim limitation) is limited by the description in the specification when 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is invoked.

As explained in MPEP § 2181, subsection I, claim limitations that meet the following three-prong test will be interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph:

(A) the claim limitation uses the term "means" or "step" or a term used as a substitute for "means" that is a generic placeholder (also called a nonce term or a non-structural term having no specific structural meaning) for performing the claimed function;

(B) the term "means" or "step" or the generic placeholder is modified by functional language, typically, but not always linked by the transition word "for" (e.g., "means for") or another linking word or phrase, such as "configured to" or "so that"; and

(C) the term "means" or "step" or the generic placeholder is not modified by sufficient structure, material, or acts for performing the claimed function.

Use of the word "means" (or "step") in a claim with functional language creates a rebuttable presumption that the claim limitation is to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites sufficient structure, material, or acts to entirely perform the recited function.

Absence of the word "means" (or "step") in a claim creates a rebuttable presumption that the claim limitation is not to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is not interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites function without reciting sufficient structure, material or acts to entirely perform the recited function.

Claim limitations in this application that use the word "means" (or "step") are being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action. Conversely, claim limitations in this application that do

not use the word "means" (or "step") are not being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action.

4. This application includes one or more claim limitations that do not use the word "means," but are nonetheless being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, because the claim limitation(s) uses a generic placeholder that is coupled with functional language without reciting sufficient structure to perform the recited function and the generic placeholder is not preceded by a structural modifier. ***Such claim limitation(s) is/are: "means for placement of a bone fusion material" in claim 30.***

Because this/these claim limitation(s) is/are being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, it/they is/are being interpreted to cover the corresponding structure described in the specification as performing the claimed function, and equivalents thereof.

If applicant does not intend to have this/these limitation(s) interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, applicant may: (1) amend the claim limitation(s) to avoid it/them being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph (e.g., by reciting sufficient structure to perform the claimed function); or (2) present a sufficient showing that the claim limitation(s) recite(s) sufficient structure to perform the claimed function so as to avoid it/them being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. **Claim(s) 31-37, and 40** is/are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Biedermann et al (US Patent Pub. 20040049271A1).

7. Biedermann discloses an artificial spinal implant system (spacer having a variable axial length). Specifically in regards to **claim 31**, Biedermann discloses an artificial expansile spinal implant (1) comprising: a first shell (3) having a first vertebral-engaging surface (surface with 25) and a first opposite surface, the first shell (3) comprising a first set of engagement features (25) extending from the first vertebral-engaging surface; a second shell (2) having a second vertebral-engaging surface (surface with 26) and a second opposite surface, the second shell (2) comprising a second set of engagement features (16) extending from the second vertebral-engaging surface (Fig. 1-4; and Para. [0014]-[0018]). Biedermann also discloses an expansion mechanism (7,8,9,10) positioned between the first and second shells (3,2) and configured to expand the artificial expansile spinal implant (1), the expansion mechanism (7,8,9,10) coupled to the first and second opposite surfaces, the expansion mechanism (1,8,9) comprising a tool-engagement surface (hexagonal opening in 12, Fig. 1) and at least one rotating gear (10); wherein the expansion mechanism (7,8,9,10) is configured to drive expansion between the first and second shells (3,2) in response to rotating of a tool (screwdriver) about a longitudinal axis of the tool while the tool is engaged with the tool-engagement surface (hexagonal opening in 12, fig. 1), and wherein rotating of the tool causing a rotation of the at least one gear (10) (Fig. 1-4; and Para. [0016]-[0017],[0019]). Biedermann also recites wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features (25) of the first vertebral-engaging surface and the second set of engagement features (26) of the

second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant (1) in place (Para. [0024]). The tool-engagement surface (hexagonal opening in 12) of the expansion mechanism (7,8,9,10) is positioned and configured to be engaged by the tool extending along a direction of insertion (Fig. 1-4); and wherein the first shell (3) comprises a first cavity extending from the first vertebral engaging surface (surface with 25) through the first shell (3) to the first opposite surface, and wherein the first set of engagement features (25) are positioned on the first vertebral-engaging surface circumferentially about the first cavity (Fig. 1-4).

8. In regards to **claim 32**, Biedermann discloses the expansion mechanism (7,8,9,10) further comprising at least one threaded body (9), wherein the rotating of the tool (screwdriver) causes a rotation of the at least one threaded body (9) (Fig. 1-4; and Para. [0016]-[0017],[0019]).

9. In regards to **claim 33**, Biedermann discloses, wherein the rotating of the tool (screwdriver) is configured to rotate the at least one rotating gear (10) with respect to the at least one threaded body (9) to drive expansion between the first and second shells (3,2) (Fig. 1-4; and Para. [0016]-[0017],[0019]).

10. In regards to **claim 34**, Biedermann discloses wherein the rotating of the tool (screwdriver) leads to a height expansion between the first shell and the second shell (3,2) (Fig. 1-4; and Para. [0016]-[0017],[0019]).

11. In regards to **claim 35**, Biedermann discloses wherein the artificial expansile spinal implant (1) can be adjusted in at least two directions in order to engage the opposing vertebral bodies (Fig. 1-4)

12. In regards to **claim 36**, Biedermann discloses wherein the first set of engagement features (25) and the second set of engagement features (26) extend from the first vertebral-engaging

surface and the second vertebral-engaging surface in directions substantially perpendicular to the first and second vertebral-engaging surfaces (Fig. 1-4).

13. In regards to **claim 37**, Biedermann discloses wherein the first shell (3) curves continuously around a first perimeter of the first shell (Fig. 1-4).

14. In regards to **claim 40**, Biedermann discloses wherein the artificial expansile spinal implant (1) further comprises means for placement of a bone fusion material (Biedermann. has cavities 24 that allow for ingrowth and free ends that surround cavities in members 3,2 that are capable of allowing material to be deposited into the device 1.) (Fig. 1-4; and Para. [0024]).

Claim Rejections - 35 USC § 103

15. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

16. **Claim 38** is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Biedermann in view of Suddaby (US Patent 6395034B1).

17. Biedermann discloses a system comprising an artificial expansile implant having a first and second shell each having first and second engagement features thereon, an expansion mechanism comprising a tool engagement surface, a turning mechanism and a gear wherein the rotation mechanism allows for the implant to be expanded to stay in place between the vertebral bodies. However, Biedermann is silent as to the shells having a curved perimeter to match the vertebral body shape. Suddaby discloses an artificial expansile implant. Specifically in regards

to **claim 38**, Suddaby discloses an expansile implant (Fig. 1a,1b) having a first and second shell (14) wherein the first shell curves (14) substantially continuously around a first perimeter of the first shell (14) and the second shell curves (14) substantially continuously around a second perimeter of the second shell (14); and wherein the first shell (14) comprises a first perimeter shaped to correspond to a shape of a vertebral body (Suddaby discloses wherein each broad head 14 has a convex surface 16 facing outwardly, and is partially spherical chosen to match that of the vertebral endplate against which it will bear. Those vertebral endplate surfaces are normally concave.) (Fig. 1a-1b; and Col. 3 line 64 to Col. 4 line 7). It would have been obvious to a person of skill in the art at the time the invention was made to modify the shells (3,2) of Biedermann to have a convex surface as taught in Suddaby in order to have surfaces that better match the vertebral endplates (Col. 4 lines 1-7).

18. **Claim 39** is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Biedermann in view of Biedermann et al (US Patent 6176882B1, referred herein as Biedermann2).

19. Biedermann discloses a system comprising an artificial expansile implant having a first and second shell each having first and second engagement features thereon, an expansion mechanism comprising a tool engagement surface, a turning mechanism and a gear wherein the rotation mechanism allows for the implant to be expanded to stay in place between the vertebral bodies. However, Biedermann is silent as to the shells having a curved perimeter to match the vertebral body shape.

20. Biedermann2 discloses an artificial spinal implant system (intervertebral implant). Specifically, Biedermann2 discloses an artificial expansile spinal implant with first and second

shells (60,61) and an expansile mechanism (15,25,45-46,26) (Fig. 1,4,7-8). In regards to **claim 39**, Biedermann discloses wherein the first shell and the second shell (60,61) each comprise titanium (Col. 4 lines 35-36). It would have been obvious to a person of skill in the art at the time the invention was made to modify the shells (3,2) of Biedermann to be made from titanium as taught in Biedermann2 in order to have the device composed from a biocompatible material.

Allowable Subject Matter

21. Claims 21-30 and 41 are allowed.

22. The closes art of record is Daher (US Patent 4657550); Biedermann et al (US Patent Pub. 20040049271A1); and Refai et al (US Patent Pub. 20090112324A1).

a. The Daher and Biedermann references disclose a device having a first and second shell each having first and second engagement features thereon, an expansion mechanism comprising a tool engagement surface, a threaded body and a turning mechanism, i.e. a gear, wherein the rotation of the expansion mechanism by means of a tool allows for the implant to be expanded to stay in place between the vertebral bodies. However, in Daher the tool does not turn along its longitudinal axis but is rotated about the axis of the device and for Biedermann the threaded body has an axis that is perpendicular to an axis that extends from the first to the second shell. Therefore, the claims of the instant application have not been rejected using prior art because none of the references or reasonable combinations thereof could be found which disclose or suggest all of the features of the claims, and there is no reasonable motivation to modify the art of record to have these features. Furthermore, attempting to modify the references to have all the cited limitations would destroy the proposed inventions.

a. While the Refai reference while disclosing a device having a first and second shell each having first and second engagement features thereon, an expansion mechanism comprising a tool engagement surface, a threaded body and a turning mechanism, i.e. a gear, wherein the rotation of the expansion mechanism by means of a tool along its longitudinal axis allows for the implant to be expanded to stay in place between the vertebral bodies. However, the reference does not have a date that is prior to the priority date of the applicant's invention.

Response to Arguments

23. Applicant's amendments filed on 07/12/23 have overcome the previous 112 rejections which are hereby withdrawn.

24. Applicant's arguments with respect to rejection of the Claims over Daher and Biedermann2 have been considered but are moot because the arguments do not apply to the new combination of references being used in the current rejection.

Conclusion

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARCELA I SHIRSAT whose telephone number is (571)270-5269. The examiner can normally be reached M-F 9:00am-5:30pm EST.

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, Kevin Truong can be reached on 571-272-4705. 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.

/MARCELA I. SHIRSAT/
Primary Examiner, Art Unit 3775

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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 displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/208,640	Filing Date 03/22/2021	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $240 =	
☐ 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).				
☐ 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	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	08/07/2023	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 21	Minus	** 21	= 0		x $40 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $192 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ 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.	PSS
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/CHERYL A CLARK/
*** 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.**

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	3775
Application No.	:	17/208,640	Examiner	:	Unknown
Filed	:	March 22, 2021	Conf. No.	:	6013
Title	:	ARTIFICIAL EXPANDABLE IMPLANT SYSTEMS			

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO ACTION OF AUGUST 2, 2023

Please consider the following reply.

Amendments to Claims:
Listing of Claims.

1-20. (Cancelled)

21. (Previously Presented) An artificial spinal implant system comprising:

an artificial expansile spinal implant comprising:

a first shell having a first vertebral-engaging surface and a first opposite surface, the first shell comprising a first set of engagement features extending from the first vertebral-engaging surface;

a second shell having a second vertebral-engaging surface and a second opposite surface, the second shell comprising a second set of engagement features extending from the second vertebral-engaging surface; and

an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface, a threaded body, and a turning mechanism;

wherein the threaded body has a first end, a second end, and a longitudinal axis between the first end and the second end, the longitudinal axis extending in a direction from the first shell to the second shell;

wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, wherein rotating the tool comprises rotating the tool about a longitudinal axis of the tool while the tool is engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the turning mechanism;

wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features of the first vertebral-engaging surface and the second set of engagement features of the second vertebral-engaging surface

engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place;

wherein the tool-engagement surface of the expansion mechanism is positioned and configured to be engaged by the tool extending along a direction of insertion; and

wherein the first shell comprises a first cavity extending from the first vertebral-engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features are positioned on the first vertebral-engaging surface circumferentially about the first cavity.

22. (Previously Presented) The artificial spinal implant system of claim 21, wherein the first set of engagement features have substantially conical tips configured for piercing endplates of the opposing vertebral bodies when introduced into the spine and expanded.

23. (Previously Presented) The artificial spinal implant system of claim 22, wherein the first set of engagement features and the second set of engagement features extend from the first vertebral-engaging surface and the second vertebral-engaging surface in directions perpendicular to the first and second vertebral-engaging surfaces.

24. (Previously Presented) The artificial spinal implant system of claim 23, wherein the second shell comprises a second cavity extending from the second vertebral-engaging surface through the second shell to the second opposite surface and wherein the second set of engagement features are positioned on the second vertebral-engaging surface circumferentially about the second cavity.

25. (Previously Presented) The artificial spinal implant system of claim 24, wherein the first shell curves continuously around a first perimeter of the first shell and the second shell curves continuously around a second perimeter of the second shell.

26. (Previously Presented) The artificial spinal implant system of claim 25, wherein the first perimeter is shaped to correspond to a shape of a vertebral body.

27. (Previously Presented) The artificial spinal implant system of claim 21, wherein the expansion mechanism further comprises a ratcheting mechanism.

28. (Previously Presented) The artificial spinal implant system of claim 21, wherein the expansion mechanism further comprises a rotatable gear.

29. (Previously Presented) The artificial spinal implant system of claim 21, wherein the first shell and the second shell each comprise titanium.

30. (Previously Presented) The artificial spinal implant system of claim 21, wherein the artificial expansile spinal implant further comprises means for placement of a bone fusion material.

31. (Currently Amended) An artificial spinal implant system comprising:

an artificial expansile spinal implant comprising:

a first shell having a first vertebral-engaging surface and a first opposite surface, the first shell comprising a first set of engagement features extending from the first vertebral-engaging surface; and

a second shell having a second vertebral-engaging surface and a second opposite surface, the second shell comprising a second set of engagement features extending from the second vertebral-engaging surface; and

an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface and at least one rotating gear <u>that is configured to rotate with respect to the first shell and the second shell</u>;

wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, wherein rotating the tool comprises rotating the tool about a

longitudinal axis of the tool while the tool is engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the at least one rotating gear such that the at least one rotating gear rotates with respect to the first shell and the second shell;

wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features of the first vertebral-engaging surface and the second set of engagement features of the second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place;

wherein the tool-engagement surface of the expansion mechanism is positioned and configured to be engaged by the tool extending along a direction of insertion; and

wherein the first shell comprises a first cavity extending from the first vertebral-engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features are positioned on the first vertebral-engaging surface circumferentially about the first cavity.

32. (Currently Amended) The artificial spinal implant system of claim 31, the expansion mechanism further comprising at least one threaded body, wherein the at least one rotating gear comprise a threaded inner surface configured to engage an outer surface of the at least one threaded body, wherein the rotating of the tool and [[or]] the rotation of the at least one rotating gear causes a rotation of the at least one threaded body.

33. (Previously Presented) The artificial spinal implant system of claim 32, wherein the rotating of the tool is configured to rotate the at least one rotating gear with respect to the at least one threaded body to drive expansion between the first shell and the second shell.

34. (Previously Presented) The artificial spinal implant system of claim 32, wherein the rotating of the tool leads to a height expansion between the first shell and the second shell.

35. (Previously Presented) The artificial spinal implant system of claim 34, wherein the artificial expansile spinal implant can be adjusted in at least two directions in order to engage the opposing vertebral bodies.

36. (Currently Amended) The artificial spinal implant system of claim 31, wherein the at least one rotating gear is configured to rotate about an axis that is perpendicular to the longitudinal axis of the tool ~~wherein the first set of engagement features and the second set of engagement features extend from the first vertebral-engaging surface and the second vertebral-engaging surface in directions perpendicular to the first and second vertebral-engaging surfaces~~.

37. (Previously Presented) The artificial spinal implant system of claim 31, wherein the first shell curves continuously around a first perimeter of the first shell.

38. (Previously Presented) The artificial spinal implant system of claim 37, wherein the first perimeter is shaped to correspond to a shape of a vertebral body.

39. (Previously Presented) The artificial spinal implant system of claim 31, wherein the first shell and the second shell each comprise titanium.

40. (Currently Amended) The artificial spinal implant system of claim 31, wherein the at lest one rotating gear comprises first and second rotating gears comprising threaded inner surfaces, smooth outer surfaces, and teeth positioned between the inner and outer surfaces ~~the artificial expansile spinal implant is configured to be used with a bone fusion material~~.

41. (Previously Presented) The artificial spinal implant system of claim 21, wherein the first end of the threaded body is coupled to the first shell and the second end of the threaded body is coupled to the second shell, and the turning mechanism engages threads of the threaded body.

REMARKS

Claims 21-41 are pending. Claims 31, 32, 36, and 40 are amended without prejudice.

Claim Rejections - 35 USC § 102

Claim(s) 31-37, and 40 were rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Biedermann et al (US Patent Pub. 20040049271A1). Claim 38 was rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Biedermann in view of Suddaby (US Patent 6395034B1). Claim 39 was rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Biedermann in view of Biedermann et al (US Patent 6176882B1, referred herein as Biedermann2).

Without conceding the merits of the rejection but to further prosecution, claims have been amended. For example, claim 31 as amended recites:

> an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface and **at least one rotating gear that is configured to rotate with respect to the first shell and the second shell**;
> wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, wherein rotating the tool comprises rotating the tool about a longitudinal axis of the tool while the tool is engaged with the tool-engagement surface, and **wherein the rotating of the tool causes a rotation of the at least one rotating gear such that the at least one rotating gear rotates with respect to the first shell and the second shell**;

The cited references do not teach these features alone or in combination. Accordingly claim 31 is patentable over the cited references for at least this reason. Those claims depending from claim 31 are patentable over the cited references for at least the same reason and for the additional features recited therein.

Allowable Subject Matter

Claims 21-30 and 41 are allowed.

Request for Reconsideration

The Applicant respectfully requests prompt consideration and a Notice of Allowance. In the event that no Notice of Allowance will be provided in the next communication, Applicant requests that the Examiner telephone the undersigned attorney (612-337-2538) prior to the next communication so that prosecution on the merits may be expedited. It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendments herein do not signify concession of unpatentability of any claims prior to this amendment. Applicant hereby specifically reserves the right to prosecute the previously presented subject matter in a continuing application. Also, Applicant expressly reserves the right to prosecute claims of different or broader scope in a continuing application. The Patent Office should infer no (i) adoption of a position with respect to patentability, (ii) change in the Applicant's position with respect to any claim or subject matter of the invention, or (iii) acquiescence in any way to any position taken by the Office Action, based on the amendments made herein.

Please apply any necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: 8/7/2023

/Stuart A. Nelson/
Stuart A. Nelson, Reg. No. 63,947

Customer Number 26191
Fish & Richardson P.C.
Telephone: (612) 337-2538
Facsimile: (877) 769-7945

100926890.doc

Electronic Acknowledgement Receipt	
EFS ID:	48403530
Application Number:	17208640
International Application Number:	
Confirmation Number:	6013
Title of Invention:	ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz
Customer Number:	26191
Filer:	Stuart A. Nelson/Emily Whitcomb
Filer Authorized By:	Stuart A. Nelson
Attorney Docket Number:	46440-0006007
Receipt Date:	07-AUG-2023
Filing Date:	22-MAR-2021
Time Stamp:	14:44:27
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)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		ReplyOA.pdf	112183 8eff1b8d8b34081fcd5deb0e38772628d6c11651	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Request for Reconsideration-After Non-Final Rejection	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	9
Warnings:			
Information:			
	Total Files Size (in bytes):	112183	

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.

<u>New Applications Under 35 U.S.C. 111</u>
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.
<u>National Stage of an International Application under 35 U.S.C. 371</u>
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.
<u>New International Application Filed with the USPTO as a Receiving Office</u>
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.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/208,640	Moskowitz et al.
	Examiner	Art Unit
	MARCELA I SHIRSAT	3775

CPC - Searched*		
Symbol	**Date**	**Examiner**
a61b17/0642,0643,0682,7064	08/10/2022	mis
a61b2017/0648	08/10/2022	mis
a61f2/4455	08/10/2022	mis
a61f2002/30525,30579,30849,2835,3085,448	08/10/2022	mis

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

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
623	17.11-17.16	08/10/2022	mis
606	246-289,300-328,86r	08/10/2022	mis

* 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**
Performed applicant and inventor name search, reviewed parent case 15/934622, text and date limited classes, bkwd/fwd references	08/10/2022	mis
updated search history and reviewed IDS	02/15/2023	mis
updated search history	07/27/2023	mis
updated search	08/11/2023	mis

/MARCELA I. SHIRSAT/ Primary Examiner, Art Unit 3775	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/208,640	Moskowitz et al.
	Examiner	Art Unit
	MARCELA I SHIRSAT	3775

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/MARCELA I. SHIRSAT/ Primary Examiner, Art Unit 3775	

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	44	("20020068977" OR "20020143338" OR "20050177235" OR "20070213820" OR "4636217" OR "5290312" OR "20040088054" OR "20040177531" OR "20040254644" OR "20050027362" OR "20050049590" OR "20050216084" OR "20050273170" OR "20050278026" OR "4997432" OR "5123926" OR "5514180" OR "5667472" OR "5782832" OR "6126689" OR "6368350" OR "6375682" OR "6419704" OR "6458159" OR "6527804" OR "6533818" OR "6572653" OR "6579318" OR "6582468" OR "6641614" OR "6719794" OR "6723126" OR "6733532" OR "6764491" OR "6770094" OR "6904308" OR "6955671" OR "7030904" OR "7037258" OR "7097615" OR "4554914" OR "4960420" OR "5660188" OR "5960522").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/09 03:20 PM
L2	1	"7704279".pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:23 PM
L3	172	("4554914" | "4599086" | "4636217" | "4960420" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:23 PM

		| "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7704279").urpn. AND (PGPB | USPT | USOC).dbnm.					
L4	8	(12/347990|15/934622|16/018904|16/362152).app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:28 PM
L5	114	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:29 PM

		| "7776047" | "8268000" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10238383").urpn. AND (PGPB | USPT | USOC).dbnm.					

L6	115	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279" | "7776047" | "8268000" | "9924940" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" |	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:29 PM

		"20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10251643").urpn. AND (PGPB | USPT | USOC).dbnm.					
L7	129	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5236460" | "5290312" | "5458641" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5702455" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6113638" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6432106" | "6454806" | "6454807" | "6458159" | "6527803" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6730088" | "6733532" | "6752832" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:30 PM

		| "7226480" | "7232464" | "7238203" | "7442209" | "7641693" | "7674296" | "7691147" | "7704279" | "7753958" | "7776047" | "8268000" | "9924940" | "10238383" | "10251643" | "20020068977" | "20020143338" | "20020143399" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050177236" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" |					

		"20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10952723").urpn. AND (PGPB | USPT | USOC).dbnm.					
L8	2	(20050049590|5800547).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:00 PM
L9	4	(4554914|4636217|6723126|5062850).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:02 PM
L10	671	("3867728" | "4085744" | "4349921" | "4361141" | "4401112" | "4422451" | "4433677" | "4502473" | "4502475" | "4502483" | "4553273" | "4554914").pn. OR ("4636217").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:03 PM
L11	172	("4554914" | "4599086" | "4636217" | "4960420" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832" | "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7704279").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:50 PM
L12	146	("4554914" | "4599086"	(US-PGPUB; USPAT;	OR	ON	ON	2022/08/09

		| "4636217" | "4960420" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832" | "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7846188").urpn. AND (PGPB | USPT | USOC).dbnm.	USOCR)				07:11 PM
L13	2	15/934622.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 07:27 PM
L14	48	("4636217" | "7846188" | "20050049590" | "20060069436" | "20100160984" | "20100161057").pn. OR ("8257443").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 08:24 PM
L15	8	(8353913|9889022|10028740|10076367|10307268|10251643|10376386|10478319).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 11:48 AM
L16	365	("2799196" | "3426364" | "3486505" | "4309777" | "4401112" | "4522200" | "4545374" | "4553273" | "4599086" | "4636217" | "4657550" | "4733665" | "4863476" | "4878915" | "4932375" | "4932969" | "4936851" | "4946378" | "5059193" | "5171278"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:00 PM

		| "5192327" | "5236460" | "5344252" | "5390683" | "5425772" | "5484437" | "5522899" | "5554191" | "5562736" | "5571190" | "5571192" | "5593409" | "5609635" | "5653762" | "5653763" | "5658335" | "5665122" | "5693100" | "5702453" | "5772661" | "5776197" | "5776199" | "5782832" | "5865848" | "5888228" | "5893889" | "5893890" | "5972015" | "5980522" | "6015436" | "6039761" | "6045579" | "6080155" | "6080193" | "6083225" | "6083228" | "6090143" | "6093207" | "6102949" | "6102950" | "6113638" | "6117174" | "6127597" | "6156037" | "6159244" | "6159245" | "6174334" | "6176882" | "6183517" | "6190414" | "6193756" | "6193757" | "6206923" | "6210412" | "6217579" | "6224604" | "6245107" | "6280456" | "6287308" | "6302914" | "6328738" | "6332895" | "6344057" | "6368351" | "6395031" | "6395032" | "6395034" | "6402750" | "6409766" | "6432140" | "6436103" | "6436140" | "6443989" | "6443990" | "6447544" | "6447547" | "6451052" | "6454806" | "6454807" | "6478823" | "6491724" | "6527803" | "D472632" | "D472633" | "6562074" | "6576016" | "6582431" | "6582451" | "6582461" | "6582467" | "6592625" | "6595998" | "6610089" | "6626905" | "6641614" | "6648917" | "6666891" | "6679915" | "6685742" | "6706070" | "6719796" | "6723126" | "6733535" | "6743255" | "6758849" | "6773460" | "6814754" | "6814756" | "6821298" | "6833006" | "6835206" | "6837850" | "6840944" | "6843804" | "6852129" |					

		"6863673" | "6875173" | "6893464" | "6902568" | "6923810" | "6953477" | "6955691" | "6962606" | "7018415" | "7066961" | "7070598" | "7083650" | "7087055" | "7094257" | "7097648" | "7128760" | "7204853" | "7214243" | "7217291" | "7220280" | "D553742" | "7282063" | "7306626" | "7311733" | "7316714" | "7326250" | "7326251" | "7331996" | "7503933" | "7569074" | "7618456" | "7618458" | "7621951" | "7655042" | "7674297" | "7678148" | "7708778" | "7708779" | "7727280" | "7731751" | "7731752" | "7753958" | "7780732" | "7789914" | "7794501" | "7824445" | "7837734" | "7850733" | "7909830" | "7909869" | "7985256" | "8021430" | "8062375" | "8070813" | "8096994" | "8105358" | "8105382" | "8118870" | "8118871" | "8123810" | "8147550" | "8172903" | "8187331" | "D664252" | "8257440" | "8267939" | "8273124" | "8273126" | "8303662" | "8303663" | "8328818" | "8337558" | "8366777" | "8394143" | "8435296" | "8454695" | "8480741" | "8568481" | "20010032020" | "20020052656" | "20020068974" | "20020068977" | "20020082696" | "20020128716" | "20020138146" | "20030040798" | "20030065396" | "20030135279" | "20030149482" | "20030171813" | "20030195630" | "20030208263" | "20030208270" | "20030208272" | "20030208275" | "20030220650" | "20030236520" |				

		"20040010312" | "20040010315" | "20040024460" | "20040024463" | "20040030387" | "20040044411" | "20040078080" | "20040087947" | "20040087948" | "20040102774" | "20040153156" | "20040199252" | "20040215342" | "20040225360" | "20040243240" | "20040254643" | "20040254644" | "20050004673" | "20050015149" | "20050015150" | "20050027358" | "20050038512" | "20050049590" | "20050060036" | "20050070911" | "20050071007" | "20050113920" | "20050273171" | "20050278026" | "20060022180" | "20060064169" | "20060116767" | "20060122701" | "20060129244" | "20060149385" | "20060224241" | "20060241643" | "20060241764" | "20060247770" | "20060253201" | "20080058931" | "20080071279" | "20080082173" | "20080140207" | "20090222100" | "20100017965" | "20100049325" | "20100145455" | "20100211176" | "20100280616" | "20100286779" | "20100292796" | "20100331985" | "20110130838" | "20110172774" | "20120035729" | "20120071982" | "20120191194" |				

		"20120290094" | "20120310349" | "20120316652").pn. OR ("9320610").urpn. AND (PGPB | USPT | USOC).dbnm.					
L17	1139	("4657550").pn. OR ("4863476").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:29 PM
L18	855	("4401112" | "5522899" | "5609635" | "5658335" | "5665122" | "5893889").pn. OR ("6176882").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:38 PM
L19	2	15/934622.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 05:35 PM
L20	115	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279" | "7776047" | "8268000" | "9924940" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" |	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 05:35 PM

		"20050177235" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10251643").urpn. AND (PGPB | USPT | USOC).dbnm.					
L22	84	((("MOSKOWITZ") near3 ("FAMILY") near3 ("LLC"))).AS,AANM.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:10 PM
L24	177	((("MOSKOWITZ") near3 ("Mosheh")) OR (("MOSKOWITZ") near3 ("Nathan"))).INV.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:10 PM
L25	2	(L22 OR L23) AND ((first NEAR shell)	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:11 PM

		SAME (second NEAR shell))					
L26	465	(a61b17/0642.cpc.) AND @ad<"20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L27	465	(a61b17/0642.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L28	584	(a61b17/0643.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L30	267	(a61b17/0682.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L31	155	(a61b17/7064.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L32	257	(a61b2017/0648.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L33	1116	(a61f2/4455.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L34	48	(a61f2002/30525.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L35	576	(a61f2002/30579.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L36	1010	(a61f2002/30841.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L37	1770	(a61f2002/2835.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L38	672	(a61f2002/3085.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L39	819	(a61f2002/448.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L40	6293	(606/246-289,300-328,86r.ccls.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:14 PM
L41	2683	(623/17.11-17.16.ccls.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:14 PM
L42	232	(L26 OR L27 OR L28 OR L30 OR L31 OR L32 OR L33 OR L34 OR L35 OR L36 OR L37 OR L38 OR L39 OR L40 OR L41) AND	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:16 PM

		((expandable OR expansible) SAME ((vertebral OR intervertebral) SAME (implant OR cage)))					
L43	1	(61786882|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:17 PM
L44	2	(6176882|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:17 PM
L45	3	(6176882|6395034|10251643).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:52 PM
L46	22	((US-10238383-B2 OR US-10251643-B2 OR US-5800547-A OR US-6723126-B1 OR US-5062850-A OR US-4636217-A OR US-4554914-A OR US-4892545-A OR US-6113638-A OR US-7704279-B2 OR US-9924940-B2 OR US-7846188-B2 OR US-8257443-B2 OR US-8377140-B2 OR US-9320610-B2 OR US-4863476-A OR US-6176882-B1 OR US-6395034-B1 OR US-3848601-A).did. AND USPT.dbnm.) OR ((US-20050049590-A1 OR US-20050256576-A1 OR US-20060241621-A1).did. AND PGPB.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, 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, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/10 08:24 PM
L47	3	L46 AND ratchet	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:24 PM
L48	23	L42 AND (ratchet SAME (expand OR expansion OR expansible))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:25 PM
L49	64	L42 AND (ratchet)	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:29 PM
L50	125	("20020068977" OR "20020143338" OR "20020143399" OR "20040088054" OR "20040177531" OR "20040186569" OR "20040254644" OR "20050027362" OR "20050049590" OR "20050177235" OR "20050177236" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/02/14 04:22 PM

		"20050216084" OR "20050256576" OR "20050261769" OR "20050273170" OR "20050278026" OR "20060241621" OR "20070049943" OR "20070167678" OR "20070198089" OR "20070213820" OR "20070250172" OR "20080033440" OR "20080177307" OR "20080281424" OR "20090105831" OR "20090112271" OR "20090224023" OR "20090234455" OR "20100145460" OR "20100324606" OR "20110125269" OR "20110137349" OR "20110178600" OR "20110208312" OR "20110288646" OR "20110295327" OR "20110295371" OR "20110307011" OR "20110319935" OR "20120010714" OR "20120330419" OR "20130018468" OR "20130018469" OR "20130018470" OR "20130023992" OR "20130053962" OR "20130173002" OR "20130282017" OR "20140249629" OR "20150025637" OR "20150105824" OR "20150148847" OR "20160374830" OR "20170252178" OR "4554914" OR "4599086" OR "4636217" OR "4960420" OR "4994063" OR "4997432" OR "5062850" OR "5123926" OR "5236460" OR "5290312" OR "5458641" OR "5572653" OR "5660188" OR "5667472" OR					

		"5669912" OR "5702455" OR "5722976" OR "5782832" OR "5800547" OR "5960522" OR "6106556" OR "6113638" OR "6126689" OR "6224602" OR "6235034" OR "6322562" OR "6342074" OR "6368350" OR "6375682" OR "6419704" OR "6432106" OR "6454806" OR "6454807" OR "6458159" OR "6527803" OR "6527804" OR "6533818" OR "6572653" OR "6579318" OR "6582468" OR "6629998" OR "6641614" OR "6716247" OR "6719794" OR "6723126" OR "6730088" OR "6733532" OR "6752832" OR "6764491" OR "6770094" OR "6890355" OR "6904308" OR "6953477" OR "6955671" OR "7028878" OR "7030904" OR "7037258" OR "7097615" OR "7211112" OR "7226480" OR "7232464" OR "7238203" OR "7442209" OR "7641693" OR "7674296" OR "7691147" OR "7704279" OR "7753958" OR "7776047" OR "8268000").pn.					
L51	1	"6176882".pn.	(US-PGPUB; USPAT;	OR	ON	ON	2023/02/14

			USOCR)				04:36 PM
L52	894	("4401112" | "5522899" | "5609635" | "5658335" | "5665122" | "5893889").pn. OR ("6176882").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 04:52 PM
L53	332	("4309777" | "4599086" | "4636217" | "4657550" | "4759769" | "4874389" | "4932975").pn. OR ("5062850").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 04:53 PM
L54	639	("4401112" | "4553273" | "4657550" | "4834757" | "4878915" | "4936848" | "5015247" | "5059193" | "5171278" | "5306310" | "5336223" | "5458641" | "5534029").pn. OR ("5702455").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:19 PM
L55	586	("4349921" | "4401112" | "4553273" | "4863476" | "5336223" | "5397364" | "5554191" | "5653763" | "5693100" | "6008431" | "6039761" | "6080193" | "6110210" | "6176882" | "6190414" | "6193757" | "6206923" | "6419705" | "6451057" | "6468311" | "6478823" | "20010020186" | "20020040243").pn. OR ("6723126").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:23 PM
L56	598	("3741205" | "4289123" | "4309777").pn. OR ("4401112").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:42 PM
L57	23	("5723013" | "6176882" | "20030045877" | "20040049271" | "20050125061" | "20060200244").pn. OR ("8157864").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:59 PM
L58	21	("5658335" | "6176882"	(US-PGPUB; USPAT;	OR	ON	ON	2023/02/14

		| "6723126" | "6953477" | "20060224241" | "20070198089" | "20120310350").pn. OR ("9271777").urpn. AND (PGPB | USPT | USOC).dbnm.	USOCR)				06:11 PM
L59	507	(L58 OR L57 OR L56 OR L55 OR L54 OR L53 OR L52) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 06:28 PM
L60	2	(4657550|6176882).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 06:57 PM
L61	4	(6176882|4657550|5514180|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/06/30 06:57 PM
L62	182	((("MOSKOWITZ") near3 ("Mosheh")) OR (("MOSKOWITZ") near3 ("Nathan"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 01:28 PM
L63	2	11/536815.app.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 01:44 PM
L64	3	"6723126".pn.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 01:47 PM
L65	9	(11/208644|12/347990|13/093812|15/362152|17/208640).app.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 02:04 PM
L66	11	(11/208644|12/347990|13/093812|15/934622|16/362152|17/208640).app.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 02:05 PM
L67	2	L66 AND (shell SAME (expansion NEAR mechanism))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/03 02:05 PM
L68	4	L66 AND (shell AND (expansion NEAR mechanism))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/03 02:06 PM
L69	32	((US-10238383-B2 OR US-10251643-B2 OR US-5800547-A OR US-6723126-B1 OR US-5062850-A OR US-4636217-A OR US-4554914-A OR US-4892545-A OR US-6113638-A OR US-7704279-B2 OR US-9924940-B2 OR US-7846188-B2 OR US-8257443-B2 OR US-8377140-B2 OR US-9320610-B2 OR US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, 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, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2023/07/03 02:19 PM

		4863476-A OR US-6176882-B1 OR US-6395034-B1 OR US-5514180-A OR US-5702455-A OR US-7641693-B2 OR US-7691147-B2 OR US-4401112-A OR US-8157864-B2 OR US-9271777-B2 OR US-4553273-A OR US-3848601-A).did. AND USPT.dbnm.) OR ((US-20050049590-A1 OR US-20050256576-A1 OR US-20060241621-A1 OR US-20040186569-A1 OR US-20070049943-A1).did. AND PGPB.dbnm.)	IBM_TDB)				
L70	1	"4657550".pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/03 02:22 PM
L71	2	15/134561.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/03 03:00 PM
L72	4	(20060241621|7704279|7951180|7846188).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/24 05:37 PM
L73	4	(6176882|4657550|5514180|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 12:00 PM
L74	664	("4289123" | "4401112" | "4553273").pn. OR ("4657550").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 12:05 PM
L75	1205	("5108438" | "5123926" | "5147404" | "5171278" | "5171280" | "5171281" | "5192327" | "5314478").pn. OR ("5514180").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 12:11 PM
L76	208	("2333033" | "3701605" | "4157715" | "4289123" | "4386603" | "4401112" | "4553273" | "4554914" | "4599086" | "4636217" | "4657550" | "4892546" | "5002576" | "5236460" | "5281226" | "5290312" | "5336223" | "5405391" | "5413602" | "5458641" | "5480442" | "5571192" | "5658335" | "5702453" | "5702455" | "5723013"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 07:21 PM

		| "5776197" | "5776198" | "5800547" | "5916267" | "5989290" | "6015436" | "6045579" | "6080193" | "6126660" | "6176881" | "6190413" | "6193755" | "6193756" | "6200348" | "6296665" | "6299644" | "6344057" | "6352556" | "6375683" | "6395034" | "6454806" | "6524341" | "6562074" | "6616695" | "6648917" | "6660038" | "6719796" | "6752832" | "6783547" | "6866682" | "6908485" | "20020072801" | "20020082695" | "20020161441" | "20030045877" | "20040049271" | "20040059271" | "20040153160" | "20040162618" | "20040172129" | "20040181283" | "20040186569" | "20050060036" | "20050090898" | "20050113921" | "20050234550" | "20060058879" | "20060241621" | "20060241770").pn. OR ("7758648").urpn. AND (PGPB | USPT | USOC).dbnm.					
L77	242	("2333033" | "4157715" | "4289123" | "4386603" | "4401112" | "4553273" | "4554914" | "4599086" | "4636217" | "4657550" | "4762031" | "4877020" | "4892546" | "4932975" | "4997432" | "5002576" | "5236460" | "5246458" | "5281226" | "5290312" | "5336223" | "5344459" | "5405391" | "5413602" | "5443514" | "5458641" | "5480442" | "5571192" | "5658335" | "5702453" | "5702455" | "5716415" | "5723013" | "5732992" | "5776197" | "5776198" | "5800547" | "5888223" | "5916267" | "5989290"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 07:29 PM

		| "6015436" | "6045579" | "6080193" | "6113605" | "6126660" | "6126674" | "6129763" | "6159215" | "6176881" | "6190413" | "6190414" | "6193755" | "6193756" | "6200348" | "6214050" | "6296665" | "6299644" | "6319257" | "6344057" | "6352556" | "6375682" | "6375683" | "6395032" | "6395034" | "6454806" | "6478800" | "6524341" | "6562074" | "6616695" | "6648917" | "6660038" | "6699246" | "6716218" | "6719796" | "6723126" | "6730088" | "6752832" | "6783547" | "6808538" | "6821298" | "6835206" | "6835207" | "6852129" | "6863673" | "6866682" | "6902579" | "6908485" | "6953477" | "6981989" | "7022138" | "7029498" | "7056343" | "7156874" | "7252673" | "7338526" | "7384431" | "7530982" | "7588573" | "7608078" | "7618423" | "7625379" | "7625380" | "7632281" | "7674296" | "7695478" | "7722622" | "7803162" | "7803191" | "7819921" | "7824427" | "7846210" | "7879096" | "7896884" | "7914581" | "7918888" | "7927373" | "7981157" |				
		"20010005796" | "20020058944" | "20020068978" | "20020082695" | "20020116009" | "20020161441" | "20030045877" | "20030083747" | "20040049271" | "20040059271" | "20040093083" | "20040133280" | "20040153160" | "20040172129" | "20040181283" | "20040186569" | "20040186576" | "20040193158" | "20040210312" |				

		"20050060036" | "20050085910" | "20050090898" | "20050113921" | "20050143749" | "20050165408" | "20050187634" | "20050216084" | "20050234550" | "20060004376" | "20060004447" | "20060058877" | "20060058879" | "20060074488" | "20060074490" | "20060085011" | "20060085073" | "20060100710" | "20060142859" | "20060149371" | "20060200244" | "20060224241" | "20060235521" | "20060241762" | "20060241770" | "20060293755" | "20070093901" | "20070129805" | "20070173855" | "20070191954" | "20070203490" | "20070233152" | "20070233153" | "20070233254" | "20070250171" | "20070255407" | "20070255408" | "20070255410" | "20070255413" | "20070255421" | "20070282372" | "20080004705" | "20080015609" | "20080021555" | "20080021556" | "20080051896" | "20080058931" | "20080077153" | "20080140207" | "20080154305" | "20080167726" | "20080243254" | "20080255574" | "20080262504" | "20080275455" | "20080287957" | "20080288073" | "20090005874" |				

		"20090030421" | "20090030422" | "20090048673" | "20090076610" | "20090105832" | "20090112217" | "20090112220" | "20090112324" | "20090112325" | "20090216331" | "20090240254" | "20090292361" | "20090306672" | "20090326542" | "20100016972" | "20100023019" | "20100114105" | "20100174371" | "20100211119" | "20100249795" | "20110087328" | "20110106261" | "20110202135").pn. OR ("8142441").urpn. AND (PGPB | USPT | USOC).dbnm.					
L78	192	("2333033" | "4157715" | "4289123" | "4386603" | "4401112" | "4553273" | "4554914" | "4599086" | "4636217" | "4657550" | "4892546" | "4932975" | "5002576" | "5236460" | "5246458" | "5281226" | "5290312" | "5336223" | "5344459" | "5405391" | "5413602" | "5458641" | "5480442" | "5571190" | "5571192" | "5658335" | "5702453" | "5702455" | "5723013" | "5776197" | "5776198" | "5800547" | "5888223" | "5916267" | "5989290" | "6015436" | "6045579" | "6080193" | "6113605" | "6126660" | "6126674" | "6129763" | "6159215" | "6176881" | "6190413" | "6190414" | "6193755" | "6193756" | "6200348" | "6214050" | "6296665" | "6299644" | "6344057" | "6352556" | "6375682" | "6375683" | "6395032" | "6395034" | "6454806" | "6478800" | "6524341" | "6562074"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 08:02 PM

		| "6610090" | "6616695" | "6648917" | "6660038" | "6699246" | "6719796" | "6723126" | "6730088" | "6752832" | "6783547" | "6808538" | "6821298" | "6835206" | "6835207" | "6852129" | "6863673" | "6866682" | "6902579" | "6908485" | "6953477" | "6981989" | "7022138" | "7029498" | "7056343" | "7156874" | "7252673" | "7338526" | "7384431" | "7575601" | "7621953" | "20010005796" | "20020068978" | "20020082695" | "20020099443" | "20020161441" | "20030045877" | "20030191531" | "20040049271" | "20040059271" | "20040093083" | "20040133280" | "20040153160" | "20040172129" | "20040181283" | "20040186569" | "20040186576" | "20040210312" | "20050004572" | "20050060036" | "20050085910" | "20050090898" | "20050113921" | "20050143749" | "20050159814" | "20050187634" | "20050234550" | "20060004447" | "20060058877" | "20060058879" | "20060074488" | "20060074490" | "20060085073" | "20060100710" | "20060142859" | "20060149371" | "20060200244" | "20060224241" | "20060235521" | "20060241762" | "20060241770" | "20060293755" | "20070093901" | "20070129805" |					

		"20070173855" | "20070191954" | "20070203490" | "20070233254" | "20070250171" | "20070255407" | "20070255408" | "20070255410" | "20070255413" | "20070255421" | "20080004705" | "20080021555" | "20080021556" | "20080051896" | "20080058931" | "20080140207" | "20080154305" | "20080167726" | "20080243254" | "20080287957" | "20080288073" | "20090076610" | "20090105832" | "20090112324" | "20090112325" | "20090216331").pn. OR ("8182537").urpn. AND (PGPB | USPT | USOC).dbnm.					
L79	611	("4401112" | "4553273" | "4657550" | "5192327").pn. OR ("5571192").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 08:07 PM
L80	103	("0200238" | "1553623" | "2090872" | "2214985" | "4554914" | "4636217" | "4759766" | "4960420" | "4997432" | "5123926" | "5401269" | "5514180" | "5660188" | "5667472" | "5782832" | "5951564" | "5960522" | "5984922" | "6113637" | "6126689" | "6174311" | "6193757" | "6261296" | "6368350" | "6375682" | "6419704" | "6436101" | "6458159" | "6527804" | "6533818" | "6540785" | "6572653" | "6579318" | "6582468" | "6610093" | "6641614" | "6719794" | "6723126" | "6730088" | "6733532" | "6764491" | "6770094" | "6866682" | "6899735"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 12:56 PM

		| "6904308" | "6908484" | "6955671" | "6981989" | "7018415" | "7030904" | "7037258" | "7097615" | "7115144" | "7118580" | "7217293" | "7250060" | "7927373" | "20020045904" | "20030229355" | "20040088054" | "20040088064" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050085910" | "20050165485" | "20050216084" | "20050273170" | "20050273174" | "20050278026" | "20060025777" | "20060025862" | "20060036325" | "20060136062" | "20060155377" | "20060178745" | "20060195192" | "20060276902" | "20070010826" | "20070055378" | "20070072475" | "20070073311" | "20070073400" | "20070093901" | "20070100347" | "20070100453" | "20070100455" | "20070123903" | "20070123904" | "20070233254" | "20070270970" | "20080014719" | "20080015698" | "20090018661" | "20090204219" | "20100137992" | "20100249797" | "20100286784").pn. OR ("11452619").urpn. AND (PGPB | USPT | USOC).dbnm.					
L81	1	"20040049271".pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 02:12 PM
L82	46	((US-10238383-B2 OR US-10251643-B2 OR US-5800547-A OR US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY,	OR	ON	ON	2023/07/27 02:34 PM

		6723126-B1 OR US-5062850-A OR US-4636217-A OR US-4554914-A OR US-4892545-A OR US-6113638-A OR US-7704279-B2 OR US-9924940-B2 OR US-7846188-B2 OR US-8257443-B2 OR US-8377140-B2 OR US-9320610-B2 OR US-4863476-A OR US-6176882-B1 OR US-6395034-B1 OR US-5514180-A OR US-5702455-A OR US-7641693-B2 OR US-7691147-B2 OR US-4401112-A OR US-8157864-B2 OR US-9271777-B2 OR US-4553273-A OR US-4657550-A OR US-7951180-B2 OR US-5989290-A OR US-7238205-B2 OR US-5571192-A OR US-7384431-B2 OR US-8568482-B2 OR US-11452619-B2 OR US-8940049-B1 OR US-3848601-A OR US-8182537-B2).did. AND USPT.dbnm.) OR ((US-20050049590-A1 OR US-20050256576-A1 OR US-20060241621-A1 OR US-20040186569-A1 OR US-20070049943-A1 OR US-20040049271-A1 OR US-20060241770-A1 OR US-20070255407-A1 OR US-20020099443-A1).did. AND PGPB.dbnm.)	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, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L83	2	10/250489.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 02:34 PM
L84	224	("2678226" | "4553273" | "5702455" | "6200348" | "6454806" | "6719796").pn. OR ("7547325").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 02:34 PM

L85	29	L82 AND titanium	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 05:38 PM
L86	5	(20090112324|20040049271|20020099443|6176882|4657550).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 05:43 PM
L87	6	(20090112324|20040049271|20020099443|6176882|4657550|6395034|6176882).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/08/11 01:17 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

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.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

26191 7590 08/16/2023

FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
SHIRSAT, MARCELA	

ART UNIT	PAPER NUMBER
3775	

NOTIFICATION DATE	DELIVERY MODE
08/16/2023	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):

PATDOCTC@fr.com

Office Action Summary	Application No. 17/208,640	Applicant(s) Moskowitz et al.	
	Examiner MARCELA I SHIRSAT	Art Unit 3775	AIA (FITF) Status No

-- 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 8/7/23.

☐ 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) 21-41 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☑ Claim(s) 21-30 and 41 is/are allowed.

7) ☑ Claim(s) 31-40 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 or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 3/22/21 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) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Claim Interpretation

2. The following is a quotation of 35 U.S.C. 112(f):

> (f) Element in Claim for a Combination. – An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The following is a quotation of pre-AIA 35 U.S.C. 112, sixth paragraph:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

3. The claims in this application are given their broadest reasonable interpretation using the plain meaning of the claim language in light of the specification as it would be understood by one of ordinary skill in the art. The broadest reasonable interpretation of a claim element (also commonly referred to as a claim limitation) is limited by the description in the specification when 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is invoked.

As explained in MPEP § 2181, subsection I, claim limitations that meet the following three-prong test will be interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph:

(A) the claim limitation uses the term "means" or "step" or a term used as a substitute for "means" that is a generic placeholder (also called a nonce term or a non-structural term having no specific structural meaning) for performing the claimed function;

(B) the term "means" or "step" or the generic placeholder is modified by functional language, typically, but not always linked by the transition word "for" (e.g., "means for") or another linking word or phrase, such as "configured to" or "so that"; and

(C) the term "means" or "step" or the generic placeholder is not modified by sufficient structure, material, or acts for performing the claimed function.

Use of the word "means" (or "step") in a claim with functional language creates a rebuttable presumption that the claim limitation is to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites sufficient structure, material, or acts to entirely perform the recited function.

Absence of the word "means" (or "step") in a claim creates a rebuttable presumption that the claim limitation is not to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is not interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites function without reciting sufficient structure, material or acts to entirely perform the recited function.

Claim limitations in this application that use the word "means" (or "step") are being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action. Conversely, claim limitations in this application that do

not use the word "means" (or "step") are not being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action.

4. This application includes one or more claim limitations that do not use the word "means," but are nonetheless being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, because the claim limitation(s) uses a generic placeholder that is coupled with functional language without reciting sufficient structure to perform the recited function and the generic placeholder is not preceded by a structural modifier. ***Such claim limitation(s) is/are: "means for placement of a bone fusion material" in claim 30.***

Because this/these claim limitation(s) is/are being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, it/they is/are being interpreted to cover the corresponding structure described in the specification as performing the claimed function, and equivalents thereof.

If applicant does not intend to have this/these limitation(s) interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, applicant may: (1) amend the claim limitation(s) to avoid it/them being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph (e.g., by reciting sufficient structure to perform the claimed function); or (2) present a sufficient showing that the claim limitation(s) recite(s) sufficient structure to perform the claimed function so as to avoid it/them being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph.

Claim Rejections - 35 USC § 112

5. The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. **Claims 31-40** are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

7. **Claim 31** is rejected as indefinite for the recitation of "at least one rotating gear that is configured to rotate with respect to the first and second shells" in lines 12-13 and 19-20. Since the shells 710,711 (see Fig. 7a-7B) are not coaxial with the axis of rotation of the gear it is unclear what applicant means by "with respect to." Therefore, in the interest in compact prosecution the claim will be interpreted as requiring the gear to rotate thereby causing the shells to move as satisfying the claim.

8. **Claims 32-40** are rejected as indefinite for depending upon an indefinite claim.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. **Claim(s) 31-35, and 37** is/are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Biedermann et al (US Patent Pub. 20040049271A1).

11. Biedermann discloses an artificial spinal implant system (spacer having a variable axial length). Specifically in regards to **claim 31**, Biedermann discloses an artificial expansile spinal implant (1) comprising: a first shell (3) having a first vertebral-engaging surface (surface with 25) and a first opposite surface, the first shell (3) comprising a first set of engagement features (25) extending from the first vertebral-engaging surface; a second shell (2) having a second vertebral-engaging surface (surface with 26) and a second opposite surface, the second shell (2) comprising a second set of engagement features (16) extending from the second vertebral-engaging surface (Fig. 1-4; and Para. [0014]-[0018]). Biedermann also discloses an expansion mechanism (7,8,9,10) positioned between the first and second shells (3,2) and configured to expand the artificial expansile spinal implant (1), the expansion mechanism (7,8,9,10) coupled to the first and second opposite surfaces, the expansion mechanism (1,8,9) comprising a tool-engagement surface (hexagonal opening in 12, Fig. 1) and at least one rotating gear (10) that is configured to rotate with respect to the first and second shells (3,2); wherein the expansion mechanism (7,8,9,10) is configured to drive expansion between the first and second shells (3,2) in response to rotating of a tool (screwdriver) about a longitudinal axis of the tool while the tool is engaged with the tool-engagement surface (hexagonal opening in 12, fig. 1), and wherein rotating of the tool causing a rotation of the at least one gear (10) such that the at least one rotating gear (10) rotates with respect to the first and second shells (3,2) (Fig. 1-4; and Para. [0016]-[0017],[0019]). Biedermann also recites wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features (25) of the first vertebral-engaging surface and the second set of engagement features (26) of the second

vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant (1) in place (Para. [0024]). The tool-engagement surface (hexagonal opening in 12) of the expansion mechanism (7,8,9,10) is positioned and configured to be engaged by the tool extending along a direction of insertion (Fig. 1-4); and wherein the first shell (3) comprises a first cavity extending from the first vertebral engaging surface (surface with 25) through the first shell (3) to the first opposite surface, and wherein the first set of engagement features (25) are positioned on the first vertebral-engaging surface circumferentially about the first cavity (Fig. 1-4).

12. In regards to **claim 32**, Biedermann discloses the expansion mechanism (7,8,9,10) further comprising at least one threaded body (9), wherein the at least one rotating gear (10) comprises a threaded inner surface configured to engage an outer surface of the at least one threaded body (9), wherein the rotating of the tool (screwdriver) causes a rotation of the at least one threaded body (9) (Fig. 1-4; and Para. [0016]-[0017],[0019]).

13. In regards to **claim 33**, Biedermann discloses, wherein the rotating of the tool (screwdriver) is configured to rotate the at least one rotating gear (10) with respect to the at least one threaded body (9) to drive expansion between the first and second shells (3,2) (Fig. 1-4; and Para. [0016]-[0017],[0019]).

14. In regards to **claim 34**, Biedermann discloses wherein the rotating of the tool (screwdriver) leads to a height expansion between the first shell and the second shell (3,2) (Fig. 1-4; and Para. [0016]-[0017],[0019]).

15. In regards to **claim 35**, Biedermann discloses wherein the artificial expansile spinal implant (1) can be adjusted in at least two directions in order to engage the opposing vertebral bodies (Fig. 1-4)

16. In regards to **claim 37**, Biedermann discloses wherein the first shell (3) curves continuously around a first perimeter of the first shell (Fig. 1-4).

Claim Rejections - 35 USC § 103

17. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

18. **Claim 38** is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Biedermann in view of Suddaby (US Patent 6395034B1).

19. Biedermann discloses a system comprising an artificial expansile implant having a first and second shell each having first and second engagement features thereon, an expansion mechanism comprising a tool engagement surface, a turning mechanism and a gear wherein the rotation mechanism allows for the implant to be expanded to stay in place between the vertebral bodies. However, Biedermann is silent as to the shells having a curved perimeter to match the vertebral body shape. Suddaby discloses an artificial expansile implant. Specifically in regards to **claim 38**, Suddaby discloses an expansile implant (Fig. 1a,1b) having a first and second shell (14) wherein the first shell curves (14) substantially continuously around a first perimeter of the first shell (14) and the second shell curves (14) substantially continuously around a second perimeter of the second shell (14); and wherein the first shell (14) comprises a first perimeter shaped to correspond to a shape of a vertebral body (Suddaby discloses wherein each broad head 14 has a convex surface 16 facing outwardly, and is partially spherical chosen to match that of

the vertebral endplate against which it will bear. Those vertebral endplate surfaces are normally concave.) (Fig. 1a-1b; and Col. 3 line 64 to Col. 4 line 7). It would have been obvious to a person of skill in the art at the time the invention was made to modify the shells (3,2) of Biedermann to have a convex surface as taught in Suddaby in order to have surfaces that better match the vertebral endplates (Col. 4 lines 1-7).

20. **Claim 39** is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Biedermann in view of Biedermann et al (US Patent 6176882B1, referred herein as Biedermann2).

21. Biedermann discloses a system comprising an artificial expansile implant having a first and second shell each having first and second engagement features thereon, an expansion mechanism comprising a tool engagement surface, a turning mechanism and a gear wherein the rotation mechanism allows for the implant to be expanded to stay in place between the vertebral bodies. However, Biedermann is silent as to the shells having a curved perimeter to match the vertebral body shape.

22. Biedermann2 discloses an artificial spinal implant system (intervertebral implant). Specifically, Biedermann2 discloses an artificial expansile spinal implant with first and second shells (60,61) and an expansile mechanism (15,25,45-46,26) (Fig. 1,4,7-8). In regards to **claim 39**, Biedermann discloses wherein the first shell and the second shell (60,61) each comprise titanium (Col. 4 lines 35-36). It would have been obvious to a person of skill in the art at the time the invention was made to modify the shells (3,2) of Biedermann to be made from titanium as taught in Biedermann2 in order to have the device composed from a biocompatible material.

Allowable Subject Matter

23. **Claims 21-30 and 41** are allowed.

24. The closes art of record is Daher (US Patent 4657550); Biedermann et al (US Patent Pub. 20040049271A1); and Refai et al (US Patent Pub. 20090112324A1).

a. The Daher and Biedermann references disclose a device having a first and second shell each having first and second engagement features thereon, an expansion mechanism comprising a tool engagement surface, a threaded body and a turning mechanism, i.e. a gear, wherein the rotation of the expansion mechanism by means of a tool allows for the implant to be expanded to stay in place between the vertebral bodies. However, in Daher the tool does not turn along its longitudinal axis but is rotated about the axis of the device and for Biedermann the threaded body has an axis that is perpendicular to an axis that extends from the first to the second shell. In addition, neither suggests that the gear rotates perpendicularly to the axis of the tool or wherein the gear has teeth between its inner and outer surfaces. Therefore, the claims of the instant application have not been rejected using prior art because none of the references or reasonable combinations thereof could be found which disclose or suggest all of the features of the claims, and there is no reasonable motivation to modify the art of record to have these features. Furthermore, attempting to modify the references to have all the cited limitations would destroy the proposed inventions.

a. While the Refai reference while disclosing a device having a first and second shell each having first and second engagement features thereon, an expansion mechanism comprising a tool engagement surface, a threaded body and a turning mechanism, i.e. a gear, wherein the rotation of the expansion mechanism by means of a tool along its

longitudinal axis allows for the implant to be expanded to stay in place between the vertebral bodies. However, the reference does not have a date that is prior to the priority date of the applicant's invention.

Response to Arguments

25. Applicant's arguments with respect to rejection of the Claims over Biedermann are not persuasive. Applicant makes conclusory statements that the references do not disclose wherein the gear rotates with respect to the shells (Remarks filed 8/7/2023 Pg. 7). This is incorrect. Newly amended claim 31 recites "at least one rotating gear that is configured to rotate with respect to the first and second shells" in lines 12-13 and 19-20. Since the shells 710,711 (see Fig. 7a-7B) are not coaxial with the axis of rotation of the gear it is unclear what applicant means by "with respect to." Therefore, in the interest in compact prosecution the claim was interpreted as requiring the gear to rotate thereby causing the shells to move as satisfying the claim. In the Biedermann reference the nut 10 moves along the screw 9 and causes the shells 3,2 to move away from one another by means of arms 7,8 thereby meeting the interpretation of the claim.

Conclusion

26. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). 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 date of this final action.

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARCELA I SHIRSAT whose telephone number is (571)270-5269. The examiner can normally be reached M-F 9:00am-5:30pm EST.

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, Kevin Truong can be reached on 571-272-4705. 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.

/MARCELA I. SHIRSAT/
Primary Examiner, Art Unit 3775

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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 displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/208,640	Filing Date 03/22/2021	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $240 =	
☐ 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).				
☐ 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	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	09/14/2023	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 21	Minus	** 21	= 0		x $40 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $192 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ 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".	/POLIN ANG/
*** 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.**

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	3775
Application No.	:	17/208,640	Examiner	:	Marcela Shirsat
Filed	:	March 22, 2021	Conf. No.	:	6013

Title : ARTIFICIAL EXPANDABLE IMPLANT SYSTEMS

MAIL STOP AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO ACTION OF AUGUST 16, 2023

Please consider the following reply.

Amendments to Claims:
Listing of Claims.

1-20. (Cancelled)

21. (Previously Presented) An artificial spinal implant system comprising:

an artificial expansile spinal implant comprising:

a first shell having a first vertebral-engaging surface and a first opposite surface, the first shell comprising a first set of engagement features extending from the first vertebral-engaging surface;

a second shell having a second vertebral-engaging surface and a second opposite surface, the second shell comprising a second set of engagement features extending from the second vertebral-engaging surface; and

an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface, a threaded body, and a turning mechanism;

wherein the threaded body has a first end, a second end, and a longitudinal axis between the first end and the second end, the longitudinal axis extending in a direction from the first shell to the second shell;

wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-engagement surface, wherein rotating the tool comprises rotating the tool about a longitudinal axis of the tool while the tool is engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the turning mechanism;

wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features of the first vertebral-engaging surface and the second set of engagement features of the second vertebral-engaging surface

engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place;

wherein the tool-engagement surface of the expansion mechanism is positioned and configured to be engaged by the tool extending along a direction of insertion; and

wherein the first shell comprises a first cavity extending from the first vertebral-engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features are positioned on the first vertebral-engaging surface circumferentially about the first cavity.

22. (Previously Presented) The artificial spinal implant system of claim 21, wherein the first set of engagement features have substantially conical tips configured for piercing endplates of the opposing vertebral bodies when introduced into the spine and expanded.

23. (Previously Presented) The artificial spinal implant system of claim 22, wherein the first set of engagement features and the second set of engagement features extend from the first vertebral-engaging surface and the second vertebral-engaging surface in directions perpendicular to the first and second vertebral-engaging surfaces.

24. (Previously Presented) The artificial spinal implant system of claim 23, wherein the second shell comprises a second cavity extending from the second vertebral-engaging surface through the second shell to the second opposite surface and wherein the second set of engagement features are positioned on the second vertebral-engaging surface circumferentially about the second cavity.

25. (Previously Presented) The artificial spinal implant system of claim 24, wherein the first shell curves continuously around a first perimeter of the first shell and the second shell curves continuously around a second perimeter of the second shell.

26. (Previously Presented) The artificial spinal implant system of claim 25, wherein the first perimeter is shaped to correspond to a shape of a vertebral body.

27. (Previously Presented) The artificial spinal implant system of claim 21, wherein the expansion mechanism further comprises a ratcheting mechanism.

28. (Previously Presented) The artificial spinal implant system of claim 21, wherein the expansion mechanism further comprises a rotatable gear.

29. (Previously Presented) The artificial spinal implant system of claim 21, wherein the first shell and the second shell each comprise titanium.

30. (Previously Presented) The artificial spinal implant system of claim 21, wherein the artificial expansile spinal implant further comprises means for placement of a bone fusion material.

31. (Currently Amended) An artificial spinal implant system comprising:

an artificial expansile spinal implant comprising:

a first shell having a first vertebral-engaging surface and a first opposite surface, the first shell comprising a first set of engagement features extending from the first vertebral-engaging surface; and

a second shell having a second vertebral-engaging surface and a second opposite surface, the second shell comprising a second set of engagement features extending from the second vertebral-engaging surface; and

an expansion mechanism positioned between the first shell and the second shell and configured to expand the artificial expansile spinal implant, the expansion mechanism coupled to the first opposite surface and the second opposite surface, the expansion mechanism comprising a tool-engagement surface and at least one rotating gear that is configured to rotate <u>about an axis passing through the gear</u> ~~with respect to the first shell and the second shell~~;

wherein the expansion mechanism is configured to drive expansion between the first shell and the second shell in response to rotating of a tool engaged with the tool-

engagement surface, wherein rotating the tool comprises rotating the tool about a longitudinal axis of the tool while the tool is engaged with the tool-engagement surface, and wherein the rotating of the tool causes a rotation of the at least one rotating gear such that the at least one rotating gear rotates about the axis passing through the gear ~~with respect to the first shell and the second shell~~;

wherein the artificial expansile spinal implant is configured to be introduced into a spine with the first set of engagement features of the first vertebral-engaging surface and the second set of engagement features of the second vertebral-engaging surface engaging opposing vertebral bodies to hold the artificial expansile spinal implant in place;

wherein the tool-engagement surface of the expansion mechanism is positioned and configured to be engaged by the tool extending along a direction of insertion; and

wherein the first shell comprises a first cavity extending from the first vertebral-engaging surface through the first shell to the first opposite surface, and wherein the first set of engagement features are positioned on the first vertebral-engaging surface circumferentially about the first cavity.

32. (Previously Presented) The artificial spinal implant system of claim 31, the expansion mechanism further comprising at least one threaded body, wherein the at least one rotating gear comprise a threaded inner surface configured to engage an outer surface of the at least one threaded body, wherein the rotating of the tool and the rotation of the at least one rotating gear causes a rotation of the at least one threaded body.

33. (Previously Presented) The artificial spinal implant system of claim 32, wherein the rotating of the tool is configured to rotate the at least one rotating gear with respect to the at least one threaded body to drive expansion between the first shell and the second shell.

34. (Previously Presented) The artificial spinal implant system of claim 32, wherein the rotating of the tool leads to a height expansion between the first shell and the second shell.

35. (Previously Presented) The artificial spinal implant system of claim 34, wherein the artificial expansile spinal implant can be adjusted in at least two directions in order to engage the opposing vertebral bodies.

36. (Currently Amended) The artificial spinal implant system of claim 31, wherein the ~~at least one rotating gear is configured to rotate about an~~ axis passing through the gear [[that]] is perpendicular to the longitudinal axis of the tool.

37. (Previously Presented) The artificial spinal implant system of claim 31, wherein the first shell curves continuously around a first perimeter of the first shell.

38. (Previously Presented) The artificial spinal implant system of claim 37, wherein the first perimeter is shaped to correspond to a shape of a vertebral body.

39. (Previously Presented) The artificial spinal implant system of claim 31, wherein the first shell and the second shell each comprise titanium.

40. (Currently Amended) The artificial spinal implant system of claim 31, wherein the at [[lest]] least one rotating gear comprises first and second rotating gears comprising threaded inner surfaces, smooth outer surfaces, and teeth positioned between the inner and outer surfaces.

41. (Previously Presented) The artificial spinal implant system of claim 21, wherein the first end of the threaded body is coupled to the first shell and the second end of the threaded body is coupled to the second shell, and the turning mechanism engages threads of the threaded body.

REMARKS

Claims 21-41 are pending. Claims 31, 36, and 40 are amended without prejudice.

Examiner Interview

An examiner interview was conducted on 9/13/2023 between Examiner Marcela Shirsat for the USPTO and the undersigned for the Applicant. During the interview, the parties discussed the §112 rejection and the §102 rejection. Applicant argued that language of claim 31 already overcame the §112 rejection and the §102 rejection. Examiner Shirsat agreed regarding the §102 rejection but did not agree regarding the §112 rejection. Examiner Shirsat did agree that the §112 rejection would be overcome if claim 31 were amended to recite an axis as presented in the currently amended claim 31. Applicant agreed, and presents such an amendment herein.

Claim Rejections - 35 USC § 112

Claims 31-40 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite.

Without conceding the merits of the rejection but to further prosecution, claim 31 has been amended. As agreed during the Examiner Interview, this amendment overcomes this rejection. Accordingly, Applicant respectfully requests withdrawal of this rejection for claims 31-40.

Claim Rejections - 35 USC §§ 102 and 103

Claim(s) 31-35, and 37 is/are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Biedermann et al (US Patent Pub. 20040049271A1). Claim 38 is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Biedermann in view of Suddaby (US Patent 6395034B1). Claim 39 is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Biedermann in view of Biedermann et al (US Patent 6176882B1, referred herein as Biedermann2).

As agreed during the Examiner Interview, claim 31 is not taught by the cited references. Accordingly, Applicant respectfully requests withdrawal of this rejection for claims 31-40.

Allowable Subject Matter

Claims 21-30 and 41 are allowed.

Request for Reconsideration

The Applicant respectfully requests prompt consideration and a Notice of Allowance. In the event that no Notice of Allowance will be provided in the next communication, Applicant requests that the Examiner telephone the undersigned attorney (612-337-2538) prior to the next communication so that prosecution on the merits may be expedited. It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendments herein do not signify concession of unpatentability of any claims prior to this amendment. Applicant hereby specifically reserves the right to prosecute the previously presented subject matter in a continuing application. Also, Applicant expressly reserves the right to prosecute claims of different or broader scope in a continuing application. The Patent Office should infer no (i) adoption of a position with respect to patentability, (ii) change in the Applicant's position with respect to any claim or subject matter of the invention, or (iii) acquiescence in any way to any position taken by the Office Action, based on the amendments made herein.

Please apply any necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Attorney Docket No.: 46440-0006007

Respectfully submitted,

Date: 9/14/2023

/Stuart A. Nelson/
Stuart A. Nelson, Reg. No. 63,947

Customer Number 26191
Fish & Richardson P.C.
Telephone: (612) 337-2538
Facsimile: (877) 769-7945

100933278.doc

Electronic Acknowledgement Receipt	
EFS ID:	48587550
Application Number:	17208640
International Application Number:	
Confirmation Number:	6013
Title of Invention:	ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz
Customer Number:	26191
Filer:	Stuart A. Nelson/Emily Whitcomb
Filer Authorized By:	Stuart A. Nelson
Attorney Docket Number:	46440-0006007
Receipt Date:	14-SEP-2023
Filing Date:	22-MAR-2021
Time Stamp:	14:32:34
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)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		ReplytoOA.PDF	107780 a23e3147bdc0173922d3821af75c309d4268664e	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response After Final Action	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	9
Warnings:			
Information:			
	Total Files Size (in bytes):	107780	

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.

<u>New Applications Under 35 U.S.C. 111</u>
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.
<u>National Stage of an International Application under 35 U.S.C. 371</u>
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.
<u>New International Application Filed with the USPTO as a Receiving Office</u>
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.

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.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

26191 7590 09/19/2023

FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
SHIRSAT, MARCELA	

ART UNIT	PAPER NUMBER
3775	

NOTIFICATION DATE	DELIVERY MODE
09/19/2023	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):

PATDOCTC@fr.com

Applicant-Initiated Interview Summary	**Application No.** 17/208,640	**Applicant(s)** Moskowitz et al.		
	Examiner MARCELA I SHIRSAT	**Art Unit** 3775	**AIA (First Inventor to File) Status** No	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
MARCELA I SHIRSAT	Primary Examiner	Telephonic
Stuart Nelson	Attorney of Record	

Date of Interview: 13 September 2023

Issues Discussed:

35 U.S.C. 112

Applicant's representative requested an interview to discuss the 112 rejection of claims 31-40, see attached interview agenda. It was explained that the as shown in Fig. 1c of the specification the gear 105 is turned by means of rotating the screw 101. Examiner suggested reciting an axis through which the gear rotates rather than use of the language "with respect to the first and second shells" in claim 31. Examiner suggested reciting that the gear rotates about an axis that passes through the center of the gear. Since as shown it is the screw in Biedermann that rotates and not the gear. It was agreed that fixing the 112 would overcome the Biedermann reference.

☑ Attachment

/MARCELA I. SHIRSAT/ Primary Examiner, Art Unit 3775	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

From:	Stuart Nelson
To:	Shirsat, Marcela
Cc:	APS Outgoing
Subject:	Examiner Interview 46440-0006007 (17/208,640)
Date:	Thursday, September 7, 2023 4:35:19 PM
Attachments:	image001.png image002.png

CAUTION: This email has originated from a source outside of USPTO. **PLEASE CONSIDER THE SOURCE** before responding, clicking on links, or opening attachments.

Dear Examiner Shirsat,

This email confirms our examiner interview scheduled for September 13, 2023 at 3:00 ET (2:00 CT). During the interview, we would like to discuss the following items:

1. The 112 rejection as compared to Figure 1C. See "gear mechanism 105".

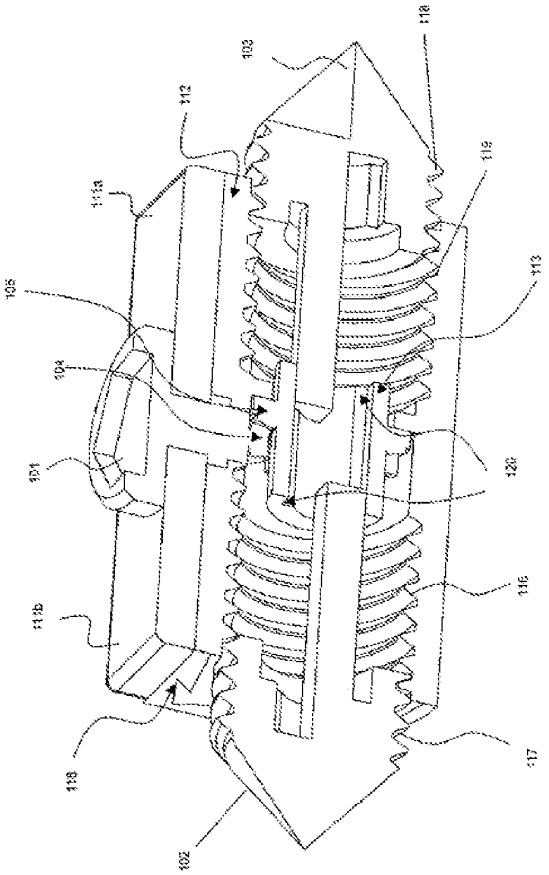


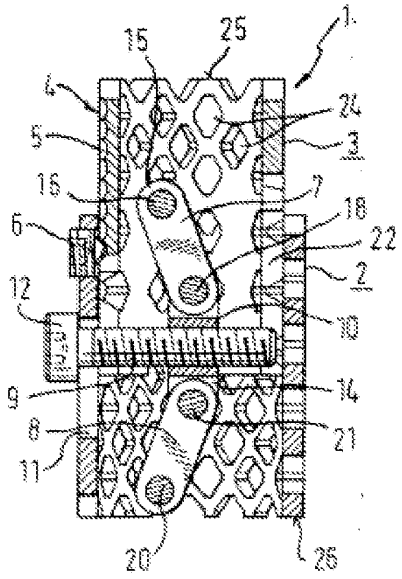
FIG. 1C

2. Interpretation of the following language of **claim 31**, and whether this feature is taught by the cited references. Consider Biedermann's Figure 3 showing "threaded sleeve 10".

"at least one rotating gear that is configured to rotate with respect to the first shell and the second shell"

- "the rotating of the tool causes a rotation of the at least one rotating gear such that the at least one rotating gear rotates with respect to the first shell and the second shell"

Fig. 3



3. Interpretation of the following language of **claim 36**, and whether this feature is taught by the cited references. Consider Biedermann's Figure 3 showing "threaded sleeve 10".

"the at least one rotating gear is configured to rotate about an axis that is perpendicular to the longitudinal axis of the tool"

Sincerely,

Stuart Nelson :: Principal :: Fish & Richardson P.C.
612 337 2538 direct :: snelson@fr.com
fr.com :: Bio :: LinkedIn :: Twitter
This email message is for the sole use of the intended recipient(s) and may contain confidential and privileged information. Any unauthorized use or disclosure is prohibited. If you are not the intended recipient, please contact the sender by reply email and destroy all copies of the original message.

****
This email message is for the sole use of the intended recipient(s) and may contain confidential and privileged information. Any unauthorized use or disclosure is prohibited. If you are not the intended recipient, please contact the sender by reply email and destroy all copies of the original message.
****

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/208,640	Moskowitz et al.
	Examiner	Art Unit
	MARCELA I SHIRSAT	3775

CPC							
Symbol						Type	Version
A61B	/	17	/	0642		F	2013-01-01
A61B	/	17	/	0643		I	2013-01-01
A61B	/	17	/	0682		I	2013-01-01
A61B	/	17	/	7064		I	2013-01-01
A61F	/	2	/	4455		I	2013-01-01
A61B	/	2017	/	0648		A	2013-01-01
A61F	/	2002	/	2835		A	2013-01-01
A61F	/	2002	/	3052		A	2013-01-01
A61F	/	2002	/	30525		A	2013-01-01
A61F	/	2002	/	30579		A	2013-01-01
A61F	/	2002	/	30841		A	2013-01-01
A61F	/	2002	/	3085		A	2013-01-01
A61F	/	2002	/	448		A	2013-01-01
A61F	/	2220	/	0025		A	2013-01-01
A61F	/	2310	/	00796		A	2013-01-01

CPC Combination Sets								
Symbol					Type	Set	Ranking	Version
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	21	
/MARCELA I. SHIRSAT/ Primary Examiner, Art Unit 3775	19 September 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1C and 7B

U.S. Patent and Trademark Office — Part of Paper No.: 20230919

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/208,640	Moskowitz et al.
	Examiner	**Art Unit**
	MARCELA I SHIRSAT	3775

INTERNATIONAL CLASSIFICATION				
CLAIMED				
A61B17/064	/	17	/	064
A61B17/068	/	17	/	068
A61B17/70	/	17	/	70
A61F2/44	/	2	/	44
A61F2/28	/	2	/	28
A61F2/30	/	2	/	30

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**
623	17.16

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 21	
/MARCELA I. SHIRSAT/ Primary Examiner, Art Unit 3775 (Primary Examiner)	19 September 2023 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1C and 7B

U.S. Patent and Trademark Office — Part of Paper No.: 20230919

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/208,640	Moskowitz et al.
	Examiner	**Art Unit**
	MARCELA I SHIRSAT	3775

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	21	10	30	20	39										
2	22	12	31	21	40										
3	23	13	32	11	41										
4	24	14	33												
5	25	15	34												
6	26	16	35												
7	27	17	36												
8	28	18	37												
9	29	19	38												

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	21	
/MARCELA I. SHIRSAT/ Primary Examiner, Art Unit 3775	19 September 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1C and 7B

U.S. Patent and Trademark Office Part of Paper No.: 20230919

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/208,640	Moskowitz et al.
	Examiner	Art Unit
	MARCELA I SHIRSAT	3775

CPC - Searched*		
Symbol	**Date**	**Examiner**
a61b17/0642,0643,0682,7064	08/10/2022	mis
a61b2017/0648	08/10/2022	mis
a61f2/4455	08/10/2022	mis
a61f2002/30525,30579,30849,2835,3085,448	08/10/2022	mis

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

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
623	17.11-17.16	08/10/2022	mis
606	246-289,300-328,86r	08/10/2022	mis

* 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**
Performed applicant and inventor name search, reviewed parent case 15/934622, text and date limited classes, bkwd/fwd references	08/10/2022	mis
updated search history and reviewed IDS	02/15/2023	mis
updated search history	07/27/2023	mis
updated search	08/11/2023	mis
updated search and performed date and text limited interference search	09/19/2023	mis

/MARCELA I. SHIRSAT/ Primary Examiner, Art Unit 3775	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/208,640	Moskowitz et al.
	Examiner	Art Unit
	MARCELA I SHIRSAT	3775

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
623	17.16	09/19/2023	mis
a61b17	0642,7064	09/19/2023	mis
a61f2	4455	09/19/2023	mis
a61f2002	3052,30525,30841,30579,448	09/19/2023	mis

/MARCELA I. SHIRSAT/ Primary Examiner, Art Unit 3775	

OK TO ENTER: /M.I.S./

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	3775
Application No.	:	17/208,640	Examiner	:	Marcela Shirsat
Filed	:	March 22, 2021	Conf. No.	:	6013

Title : ARTIFICIAL EXPANDABLE IMPLANT SYSTEMS

MAIL STOP AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO ACTION OF AUGUST 16, 2023

Please consider the following reply.

OK TO ENTER: /M.I.S./

Bibliographic Data

Application No: 17/208,640

Foreign Priority claimed: ○ Yes ◉ No

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

Verified and Acknowledged: /MARCELA I. SHIRSAT/ Examiner's Signature | Initials

Title: ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
03/22/2021	623	3775	
RULE			

APPLICANTS

Moskowitz Family LLC, Rockville, MD, UNITED STATES

INVENTORS

Mosheh T. Moskowitz, Rockville, MD, UNITED STATES

Nathan C. Moskowitz, Rockville, MD, UNITED STATES

CONTINUING DATA

This application is a CON of 16362152 03/22/2019 PAT 10952723

16362152 is a CON of 15934622 03/23/2018 PAT 10251643

15934622 is a CON of 13093812 04/25/2011 PAT 9924940

13093812 is a CON of 12347990 12/31/2008 PAT 7951180

12347990 is a DIV of 11208644 08/23/2005 PAT 7704279

11208644 has PRO of 60670231 04/12/2005

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

04/19/2021

**** SMALL ENTITY ****

STATE OR COUNTRY

UNITED STATES

ADDRESS

FILING FEE RECEIVED

$910

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	44	("20020068977" OR "20020143338" OR "20050177235" OR "20070213820" OR "4636217" OR "5290312" OR "20040088054" OR "20040177531" OR "20040254644" OR "20050027362" OR "20050049590" OR "20050216084" OR "20050273170" OR "20050278026" OR "4997432" OR "5123926" OR "5514180" OR "5667472" OR "5782832" OR "6126689" OR "6368350" OR "6375682" OR "6419704" OR "6458159" OR "6527804" OR "6533818" OR "6572653" OR "6579318" OR "6582468" OR "6641614" OR "6719794" OR "6723126" OR "6733532" OR "6764491" OR "6770094" OR "6904308" OR "6955671" OR "7030904" OR "7037258" OR "7097615" OR "4554914" OR "4960420" OR "5660188" OR "5960522").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/09 03:20 PM
L2	1	"7704279".pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:23 PM
L3	172	("4554914" | "4599086" | "4636217" | "4960420" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:23 PM

		| "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7704279").urpn. AND (PGPB | USPT | USOC).dbnm.					
L4	8	(12/347990|15/934622|16/018904|16/362152).app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:28 PM
L5	114	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:29 PM

		| "7776047" | "8268000" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10238383").urpn. AND (PGPB | USPT | USOC).dbnm.					

L6	115	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279" | "7776047" | "8268000" | "9924940" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" |	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:29 PM

		"20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10251643").urpn. AND (PGPB | USPT | USOC).dbnm.					
L7	129	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5236460" | "5290312" | "5458641" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5702455" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6113638" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6432106" | "6454806" | "6454807" | "6458159" | "6527803" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6730088" | "6733532" | "6752832" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 03:30 PM

		| "7226480" | "7232464" | "7238203" | "7442209" | "7641693" | "7674296" | "7691147" | "7704279" | "7753958" | "7776047" | "8268000" | "9924940" | "10238383" | "10251643" | "20020068977" | "20020143338" | "20020143399" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050177236" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" |					

		"20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10952723").urpn. AND (PGPB | USPT | USOC).dbnm.					
L8	2	(20050049590|5800547).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:00 PM
L9	4	(4554914|4636217|6723126|5062850).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:02 PM
L10	671	("3867728" | "4085744" | "4349921" | "4361141" | "4401112" | "4422451" | "4433677" | "4502473" | "4502475" | "4502483" | "4553273" | "4554914").pn. OR ("4636217").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:03 PM
L11	172	("4554914" | "4599086" | "4636217" | "4960420" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832" | "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7704279").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 06:50 PM
L12	146	("4554914" | "4599086"	(US-PGPUB; USPAT;	OR	ON	ON	2022/08/09

		| "4636217" | "4960420" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5660188" | "5667472" | "5782832" | "5960522" | "6126689" | "6368350" | "6375682" | "6419704" | "6458159" | "6527804" | "6533818" | "6572653" | "6579318" | "6582468" | "6641614" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6904308" | "6953477" | "6955671" | "7030904" | "7037258" | "7097615" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050177235" | "20050216084" | "20050273170" | "20050278026" | "20070213820").pn. OR ("7846188").urpn. AND (PGPB | USPT | USOC).dbnm.	USOCR)				07:11 PM
L13	2	15/934622.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 07:27 PM
L14	48	("4636217" | "7846188" | "20050049590" | "20060069436" | "20100160984" | "20100161057").pn. OR ("8257443").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/09 08:24 PM
L15	8	(8353913|9889022|10028740|10076367|10307268|10251643|10376386|10478319).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 11:48 AM
L16	365	("2799196" | "3426364" | "3486505" | "4309777" | "4401112" | "4522200" | "4545374" | "4553273" | "4599086" | "4636217" | "4657550" | "4733665" | "4863476" | "4878915" | "4932375" | "4932969" | "4936851" | "4946378" | "5059193" | "5171278"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:00 PM

		| "5192327" | "5236460" | "5344252" | "5390683" | "5425772" | "5484437" | "5522899" | "5554191" | "5562736" | "5571190" | "5571192" | "5593409" | "5609635" | "5653762" | "5653763" | "5658335" | "5665122" | "5693100" | "5702453" | "5772661" | "5776197" | "5776199" | "5782832" | "5865848" | "5888228" | "5893889" | "5893890" | "5972015" | "5980522" | "6015436" | "6039761" | "6045579" | "6080155" | "6080193" | "6083225" | "6083228" | "6090143" | "6093207" | "6102949" | "6102950" | "6113638" | "6117174" | "6127597" | "6156037" | "6159244" | "6159245" | "6174334" | "6176882" | "6183517" | "6190414" | "6193756" | "6193757" | "6206923" | "6210412" | "6217579" | "6224604" | "6245107" | "6280456" | "6287308" | "6302914" | "6328738" | "6332895" | "6344057" | "6368351" | "6395031" | "6395032" | "6395034" | "6402750" | "6409766" | "6432140" | "6436103" | "6436140" | "6443989" | "6443990" | "6447544" | "6447547" | "6451052" | "6454806" | "6454807" | "6478823" | "6491724" | "6527803" | "D472632" | "D472633" | "6562074" | "6576016" | "6582431" | "6582451" | "6582461" | "6582467" | "6592625" | "6595998" | "6610089" | "6626905" | "6641614" | "6648917" | "6666891" | "6679915" | "6685742" | "6706070" | "6719796" | "6723126" | "6733535" | "6743255" | "6758849" | "6773460" | "6814754" | "6814756" | "6821298" | "6833006" | "6835206" | "6837850" | "6840944" | "6843804" | "6852129" |				

		"6863673" | "6875173" | "6893464" | "6902568" | "6923810" | "6953477" | "6955691" | "6962606" | "7018415" | "7066961" | "7070598" | "7083650" | "7087055" | "7094257" | "7097648" | "7128760" | "7204853" | "7214243" | "7217291" | "7220280" | "D553742" | "7282063" | "7306626" | "7311733" | "7316714" | "7326250" | "7326251" | "7331996" | "7503933" | "7569074" | "7618456" | "7618458" | "7621951" | "7655042" | "7674297" | "7678148" | "7708778" | "7708779" | "7727280" | "7731751" | "7731752" | "7753958" | "7780732" | "7789914" | "7794501" | "7824445" | "7837734" | "7850733" | "7909830" | "7909869" | "7985256" | "8021430" | "8062375" | "8070813" | "8096994" | "8105358" | "8105382" | "8118870" | "8118871" | "8123810" | "8147550" | "8172903" | "8187331" | "D664252" | "8257440" | "8267939" | "8273124" | "8273126" | "8303662" | "8303663" | "8328818" | "8337558" | "8366777" | "8394143" | "8435296" | "8454695" | "8480741" | "8568481" | "20010032020" | "20020052656" | "20020068974" | "20020068977" | "20020082696" | "20020128716" | "20020138146" | "20030040798" | "20030065396" | "20030135279" | "20030149482" | "20030171813" | "20030195630" | "20030208263" | "20030208270" | "20030208272" | "20030208275" | "20030220650" | "20030236520" |				

		"20040010312" | "20040010315" | "20040024460" | "20040024463" | "20040030387" | "20040044411" | "20040078080" | "20040087947" | "20040087948" | "20040102774" | "20040153156" | "20040199252" | "20040215342" | "20040225360" | "20040243240" | "20040254643" | "20040254644" | "20050004673" | "20050015149" | "20050015150" | "20050027358" | "20050038512" | "20050049590" | "20050060036" | "20050070911" | "20050071007" | "20050113920" | "20050273171" | "20050278026" | "20060022180" | "20060064169" | "20060116767" | "20060122701" | "20060129244" | "20060149385" | "20060224241" | "20060241643" | "20060241764" | "20060247770" | "20060253201" | "20080058931" | "20080071279" | "20080082173" | "20080140207" | "20090222100" | "20100017965" | "20100049325" | "20100145455" | "20100211176" | "20100280616" | "20100286779" | "20100292796" | "20100331985" | "20110130838" | "20110172774" | "20120035729" | "20120071982" | "20120191194" |				

		"20120290094" | "20120310349" | "20120316652").pn. OR ("9320610").urpn. AND (PGPB | USPT | USOC).dbnm.					
L17	1139	("4657550").pn. OR ("4863476").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:29 PM
L18	855	("4401112" | "5522899" | "5609635" | "5658335" | "5665122" | "5893889").pn. OR ("6176882").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 04:38 PM
L19	2	15/934622.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 05:35 PM
L20	115	("4554914" | "4599086" | "4636217" | "4960420" | "4994063" | "4997432" | "5062850" | "5123926" | "5290312" | "5514180" | "5572653" | "5660188" | "5667472" | "5669912" | "5722976" | "5782832" | "5800547" | "5960522" | "6106556" | "6126689" | "6224602" | "6235034" | "6322562" | "6342074" | "6368350" | "6375682" | "6419704" | "6454807" | "6458159" | "6527804" | "6533818" | "6579318" | "6582468" | "6629998" | "6641614" | "6716247" | "6719794" | "6723126" | "6733532" | "6764491" | "6770094" | "6890355" | "6904308" | "6953477" | "6955671" | "7028878" | "7030904" | "7037258" | "7097615" | "7211112" | "7232464" | "7238203" | "7442209" | "7704279" | "7776047" | "8268000" | "9924940" | "20020068977" | "20020143338" | "20040088054" | "20040177531" | "20040186569" | "20040254644" | "20050027362" | "20050049590" |	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 05:35 PM

		"20050177235" | "20050216084" | "20050256576" | "20050261769" | "20050273170" | "20050278026" | "20060241621" | "20070049943" | "20070167678" | "20070198089" | "20070213820" | "20070250172" | "20080033440" | "20080177307" | "20080281424" | "20090105831" | "20090112271" | "20090224023" | "20090234455" | "20100145460" | "20100324606" | "20110125269" | "20110137349" | "20110178600" | "20110208312" | "20110288646" | "20110295327" | "20110295371" | "20110307011" | "20110319935" | "20120010714" | "20120330419" | "20130018468" | "20130018469" | "20130018470" | "20130023992" | "20130053962" | "20130173002" | "20130282017" | "20140249629" | "20150025637" | "20150105824" | "20150148847" | "20160374830" | "20170252178").pn. OR ("10251643").urpn. AND (PGPB | USPT | USOC).dbnm.					
L22	84	((("MOSKOWITZ") near3 ("FAMILY") near3 ("LLC"))).AS,AANM.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:10 PM
L24	177	((("MOSKOWITZ") near3 ("Mosheh")) OR (("MOSKOWITZ") near3 ("Nathan"))).INV.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:10 PM
L25	2	(L22 OR L23) AND ((first NEAR shell)	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:11 PM

		SAME (second NEAR shell))					
L26	465	(a61b17/0642.cpc.) AND @ad<"20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L27	465	(a61b17/0642.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L28	584	(a61b17/0643.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L30	267	(a61b17/0682.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L31	155	(a61b17/7064.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L32	257	(a61b2017/0648.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:12 PM
L33	1116	(a61f2/4455.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L34	48	(a61f2002/30525.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L35	576	(a61f2002/30579.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L36	1010	(a61f2002/30841.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L37	1770	(a61f2002/2835.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L38	672	(a61f2002/3085.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L39	819	(a61f2002/448.cpc.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:13 PM
L40	6293	(606/246-289,300-328,86r.ccls.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:14 PM
L41	2683	(623/17.11-17.16.ccls.) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:14 PM
L42	232	(L26 OR L27 OR L28 OR L30 OR L31 OR L32 OR L33 OR L34 OR L35 OR L36 OR L37 OR L38 OR L39 OR L40 OR L41) AND	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:16 PM

		((expandable OR expansible) SAME ((vertebral OR intervertebral) SAME (implant OR cage)))					
L43	1	(61786882|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:17 PM
L44	2	(6176882|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:17 PM
L45	3	(6176882|6395034|10251643).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 06:52 PM
L46	22	((US-10238383-B2 OR US-10251643-B2 OR US-5800547-A OR US-6723126-B1 OR US-5062850-A OR US-4636217-A OR US-4554914-A OR US-4892545-A OR US-6113638-A OR US-7704279-B2 OR US-9924940-B2 OR US-7846188-B2 OR US-8257443-B2 OR US-8377140-B2 OR US-9320610-B2 OR US-4863476-A OR US-6176882-B1 OR US-6395034-B1 OR US-3848601-A).did. AND USPT.dbnm.) OR ((US-20050049590-A1 OR US-20050256576-A1 OR US-20060241621-A1).did. AND PGPB.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, 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, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/10 08:24 PM
L47	3	L46 AND ratchet	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:24 PM
L48	23	L42 AND (ratchet SAME (expand OR expansion OR expansible))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:25 PM
L49	64	L42 AND (ratchet)	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/08/10 08:29 PM
L50	125	("20020068977" OR "20020143338" OR "20020143399" OR "20040088054" OR "20040177531" OR "20040186569" OR "20040254644" OR "20050027362" OR "20050049590" OR "20050177235" OR "20050177236" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/02/14 04:22 PM

		"20050216084" OR "20050256576" OR "20050261769" OR "20050273170" OR "20050278026" OR "20060241621" OR "20070049943" OR "20070167678" OR "20070198089" OR "20070213820" OR "20070250172" OR "20080033440" OR "20080177307" OR "20080281424" OR "20090105831" OR "20090112271" OR "20090224023" OR "20090234455" OR "20100145460" OR "20100324606" OR "20110125269" OR "20110137349" OR "20110178600" OR "20110208312" OR "20110288646" OR "20110295327" OR "20110295371" OR "20110307011" OR "20110319935" OR "20120010714" OR "20120330419" OR "20130018468" OR "20130018469" OR "20130018470" OR "20130023992" OR "20130053962" OR "20130173002" OR "20130282017" OR "20140249629" OR "20150025637" OR "20150105824" OR "20150148847" OR "20160374830" OR "20170252178" OR "4554914" OR "4599086" OR "4636217" OR "4960420" OR "4994063" OR "4997432" OR "5062850" OR "5123926" OR "5236460" OR "5290312" OR "5458641" OR "5572653" OR "5660188" OR "5667472" OR					

		"5669912" OR "5702455" OR "5722976" OR "5782832" OR "5800547" OR "5960522" OR "6106556" OR "6113638" OR "6126689" OR "6224602" OR "6235034" OR "6322562" OR "6342074" OR "6368350" OR "6375682" OR "6419704" OR "6432106" OR "6454806" OR "6454807" OR "6458159" OR "6527803" OR "6527804" OR "6533818" OR "6572653" OR "6579318" OR "6582468" OR "6629998" OR "6641614" OR "6716247" OR "6719794" OR "6723126" OR "6730088" OR "6733532" OR "6752832" OR "6764491" OR "6770094" OR "6890355" OR "6904308" OR "6953477" OR "6955671" OR "7028878" OR "7030904" OR "7037258" OR "7097615" OR "7211112" OR "7226480" OR "7232464" OR "7238203" OR "7442209" OR "7641693" OR "7674296" OR "7691147" OR "7704279" OR "7753958" OR "7776047" OR "8268000").pn.					
L51	1	"6176882".pn.	(US-PGPUB; USPAT;	OR	ON	ON	2023/02/14

			USOCR)				04:36 PM
L52	894	("4401112" | "5522899" | "5609635" | "5658335" | "5665122" | "5893889").pn. OR ("6176882").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 04:52 PM
L53	332	("4309777" | "4599086" | "4636217" | "4657550" | "4759769" | "4874389" | "4932975").pn. OR ("5062850").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 04:53 PM
L54	639	("4401112" | "4553273" | "4657550" | "4834757" | "4878915" | "4936848" | "5015247" | "5059193" | "5171278" | "5306310" | "5336223" | "5458641" | "5534029").pn. OR ("5702455").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:19 PM
L55	586	("4349921" | "4401112" | "4553273" | "4863476" | "5336223" | "5397364" | "5554191" | "5653763" | "5693100" | "6008431" | "6039761" | "6080193" | "6110210" | "6176882" | "6190414" | "6193757" | "6206923" | "6419705" | "6451057" | "6468311" | "6478823" | "20010020186" | "20020040243").pn. OR ("6723126").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:23 PM
L56	598	("3741205" | "4289123" | "4309777").pn. OR ("4401112").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:42 PM
L57	23	("5723013" | "6176882" | "20030045877" | "20040049271" | "20050125061" | "20060200244").pn. OR ("8157864").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 05:59 PM
L58	21	("5658335" | "6176882"	(US-PGPUB; USPAT;	OR	ON	ON	2023/02/14

		| "6723126" | "6953477" | "20060224241" | "20070198089" | "20120310350").pn. OR ("9271777").urpn. AND (PGPB | USPT | USOC).dbnm.	USOCR)				06:11 PM
L59	507	(L58 OR L57 OR L56 OR L55 OR L54 OR L53 OR L52) AND @ad<="20050412"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 06:28 PM
L60	2	(4657550|6176882).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/02/14 06:57 PM
L61	4	(6176882|4657550|5514180|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/06/30 06:57 PM
L62	182	((("MOSKOWITZ") near3 ("Mosheh")) OR (("MOSKOWITZ") near3 ("Nathan"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 01:28 PM
L63	2	11/536815.app.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 01:44 PM
L64	3	"6723126".pn.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 01:47 PM
L65	9	(11/208644|12/347990|13/093812|15/362152|17/208640).app.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 02:04 PM
L66	11	(11/208644|12/347990|13/093812|15/934622|16/362152|17/208640).app.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/03 02:05 PM
L67	2	L66 AND (shell SAME (expansion NEAR mechanism))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/03 02:05 PM
L68	4	L66 AND (shell AND (expansion NEAR mechanism))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/03 02:06 PM
L69	32	((US-10238383-B2 OR US-10251643-B2 OR US-5800547-A OR US-6723126-B1 OR US-5062850-A OR US-4636217-A OR US-4554914-A OR US-4892545-A OR US-6113638-A OR US-7704279-B2 OR US-9924940-B2 OR US-7846188-B2 OR US-8257443-B2 OR US-8377140-B2 OR US-9320610-B2 OR US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, 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, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2023/07/03 02:19 PM

		4863476-A OR US-6176882-B1 OR US-6395034-B1 OR US-5514180-A OR US-5702455-A OR US-7641693-B2 OR US-7691147-B2 OR US-4401112-A OR US-8157864-B2 OR US-9271777-B2 OR US-4553273-A OR US-3848601-A).did. AND USPT.dbnm.) OR ((US-20050049590-A1 OR US-20050256576-A1 OR US-20060241621-A1 OR US-20040186569-A1 OR US-20070049943-A1).did. AND PGPB.dbnm.)	IBM_TDB)				
L70	1	"4657550".pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/03 02:22 PM
L71	2	15/134561.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/03 03:00 PM
L72	4	(20060241621|7704279|7951180|7846188).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/24 05:37 PM
L73	4	(6176882|4657550|5514180|6395034).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 12:00 PM
L74	664	("4289123" | "4401112" | "4553273").pn. OR ("4657550").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 12:05 PM
L75	1205	("5108438" | "5123926" | "5147404" | "5171278" | "5171280" | "5171281" | "5192327" | "5314478").pn. OR ("5514180").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 12:11 PM
L76	208	("2333033" | "3701605" | "4157715" | "4289123" | "4386603" | "4401112" | "4553273" | "4554914" | "4599086" | "4636217" | "4657550" | "4892546" | "5002576" | "5236460" | "5281226" | "5290312" | "5336223" | "5405391" | "5413602" | "5458641" | "5480442" | "5571192" | "5658335" | "5702453" | "5702455" | "5723013"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 07:21 PM

		| "5776197" | "5776198" | "5800547" | "5916267" | "5989290" | "6015436" | "6045579" | "6080193" | "6126660" | "6176881" | "6190413" | "6193755" | "6193756" | "6200348" | "6296665" | "6299644" | "6344057" | "6352556" | "6375683" | "6395034" | "6454806" | "6524341" | "6562074" | "6616695" | "6648917" | "6660038" | "6719796" | "6752832" | "6783547" | "6866682" | "6908485" | "20020072801" | "20020082695" | "20020161441" | "20030045877" | "20040049271" | "20040059271" | "20040153160" | "20040162618" | "20040172129" | "20040181283" | "20040186569" | "20050060036" | "20050090898" | "20050113921" | "20050234550" | "20060058879" | "20060241621" | "20060241770").pn. OR ("7758648").urpn. AND (PGPB | USPT | USOC).dbnm.					
L77	242	("2333033" | "4157715" | "4289123" | "4386603" | "4401112" | "4553273" | "4554914" | "4599086" | "4636217" | "4657550" | "4762031" | "4877020" | "4892546" | "4932975" | "4997432" | "5002576" | "5236460" | "5246458" | "5281226" | "5290312" | "5336223" | "5344459" | "5405391" | "5413602" | "5443514" | "5458641" | "5480442" | "5571192" | "5658335" | "5702453" | "5702455" | "5716415" | "5723013" | "5732992" | "5776197" | "5776198" | "5800547" | "5888223" | "5916267" | "5989290"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 07:29 PM

		| "6015436" | "6045579" | "6080193" | "6113605" | "6126660" | "6126674" | "6129763" | "6159215" | "6176881" | "6190413" | "6190414" | "6193755" | "6193756" | "6200348" | "6214050" | "6296665" | "6299644" | "6319257" | "6344057" | "6352556" | "6375682" | "6375683" | "6395032" | "6395034" | "6454806" | "6478800" | "6524341" | "6562074" | "6616695" | "6648917" | "6660038" | "6699246" | "6716218" | "6719796" | "6723126" | "6730088" | "6752832" | "6783547" | "6808538" | "6821298" | "6835206" | "6835207" | "6852129" | "6863673" | "6866682" | "6902579" | "6908485" | "6953477" | "6981989" | "7022138" | "7029498" | "7056343" | "7156874" | "7252673" | "7338526" | "7384431" | "7530982" | "7588573" | "7608078" | "7618423" | "7625379" | "7625380" | "7632281" | "7674296" | "7695478" | "7722622" | "7803162" | "7803191" | "7819921" | "7824427" | "7846210" | "7879096" | "7896884" | "7914581" | "7918888" | "7927373" | "7981157" | "20010005796" | "20020058944" | "20020068978" | "20020082695" | "20020116009" | "20020161441" | "20030045877" | "20030083747" | "20040049271" | "20040059271" | "20040093083" | "20040133280" | "20040153160" | "20040172129" | "20040181283" | "20040186569" | "20040186576" | "20040193158" | "20040210312" |				

		"20050060036" | "20050085910" | "20050090898" | "20050113921" | "20050143749" | "20050165408" | "20050187634" | "20050216084" | "20050234550" | "20060004376" | "20060004447" | "20060058877" | "20060058879" | "20060074488" | "20060074490" | "20060085011" | "20060085073" | "20060100710" | "20060142859" | "20060149371" | "20060200244" | "20060224241" | "20060235521" | "20060241762" | "20060241770" | "20060293755" | "20070093901" | "20070129805" | "20070173855" | "20070191954" | "20070203490" | "20070233152" | "20070233153" | "20070233254" | "20070250171" | "20070255407" | "20070255408" | "20070255410" | "20070255413" | "20070255421" | "20070282372" | "20080004705" | "20080015609" | "20080021555" | "20080021556" | "20080051896" | "20080058931" | "20080077153" | "20080140207" | "20080154305" | "20080167726" | "20080243254" | "20080255574" | "20080262504" | "20080275455" | "20080287957" | "20080288073" | "20090005874" |				

		"20090030421" | "20090030422" | "20090048673" | "20090076610" | "20090105832" | "20090112217" | "20090112220" | "20090112324" | "20090112325" | "20090216331" | "20090240254" | "20090292361" | "20090306672" | "20090326542" | "20100016972" | "20100023019" | "20100114105" | "20100174371" | "20100211119" | "20100249795" | "20110087328" | "20110106261" | "20110202135").pn. OR ("8142441").urpn. AND (PGPB | USPT | USOC).dbnm.					
L78	192	("2333033" | "4157715" | "4289123" | "4386603" | "4401112" | "4553273" | "4554914" | "4599086" | "4636217" | "4657550" | "4892546" | "4932975" | "5002576" | "5236460" | "5246458" | "5281226" | "5290312" | "5336223" | "5344459" | "5405391" | "5413602" | "5458641" | "5480442" | "5571190" | "5571192" | "5658335" | "5702453" | "5702455" | "5723013" | "5776197" | "5776198" | "5800547" | "5888223" | "5916267" | "5989290" | "6015436" | "6045579" | "6080193" | "6113605" | "6126660" | "6126674" | "6129763" | "6159215" | "6176881" | "6190413" | "6190414" | "6193755" | "6193756" | "6200348" | "6214050" | "6296665" | "6299644" | "6344057" | "6352556" | "6375682" | "6375683" | "6395032" | "6395034" | "6454806" | "6478800" | "6524341" | "6562074"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 08:02 PM

		| "6610090" | "6616695" | "6648917" | "6660038" | "6699246" | "6719796" | "6723126" | "6730088" | "6752832" | "6783547" | "6808538" | "6821298" | "6835206" | "6835207" | "6852129" | "6863673" | "6866682" | "6902579" | "6908485" | "6953477" | "6981989" | "7022138" | "7029498" | "7056343" | "7156874" | "7252673" | "7338526" | "7384431" | "7575601" | "7621953" | "20010005796" | "20020068978" | "20020082695" | "20020099443" | "20020161441" | "20030045877" | "20030191531" | "20040049271" | "20040059271" | "20040093083" | "20040133280" | "20040153160" | "20040172129" | "20040181283" | "20040186569" | "20040186576" | "20040210312" | "20050004572" | "20050060036" | "20050085910" | "20050090898" | "20050113921" | "20050143749" | "20050159814" | "20050187634" | "20050234550" | "20060004447" | "20060058877" | "20060058879" | "20060074488" | "20060074490" | "20060085073" | "20060100710" | "20060142859" | "20060149371" | "20060200244" | "20060224241" | "20060235521" | "20060241762" | "20060241770" | "20060293755" | "20070093901" | "20070129805" |					

		"20070173855" | "20070191954" | "20070203490" | "20070233254" | "20070250171" | "20070255407" | "20070255408" | "20070255410" | "20070255413" | "20070255421" | "20080004705" | "20080021555" | "20080021556" | "20080051896" | "20080058931" | "20080140207" | "20080154305" | "20080167726" | "20080243254" | "20080287957" | "20080288073" | "20090076610" | "20090105832" | "20090112324" | "20090112325" | "20090216331").pn. OR ("8182537").urpn. AND (PGPB | USPT | USOC).dbnm.					
L79	611	("4401112" | "4553273" | "4657550" | "5192327").pn. OR ("5571192").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/25 08:07 PM
L80	103	("0200238" | "1553623" | "2090872" | "2214985" | "4554914" | "4636217" | "4759766" | "4960420" | "4997432" | "5123926" | "5401269" | "5514180" | "5660188" | "5667472" | "5782832" | "5951564" | "5960522" | "5984922" | "6113637" | "6126689" | "6174311" | "6193757" | "6261296" | "6368350" | "6375682" | "6419704" | "6436101" | "6458159" | "6527804" | "6533818" | "6540785" | "6572653" | "6579318" | "6582468" | "6610093" | "6641614" | "6719794" | "6723126" | "6730088" | "6733532" | "6764491" | "6770094" | "6866682" | "6899735"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 12:56 PM

		| "6904308" | "6908484" | "6955671" | "6981989" | "7018415" | "7030904" | "7037258" | "7097615" | "7115144" | "7118580" | "7217293" | "7250060" | "7927373" | "20020045904" | "20030229355" | "20040088054" | "20040088064" | "20040177531" | "20040254644" | "20050027362" | "20050049590" | "20050085910" | "20050165485" | "20050216084" | "20050273170" | "20050273174" | "20050278026" | "20060025777" | "20060025862" | "20060036325" | "20060136062" | "20060155377" | "20060178745" | "20060195192" | "20060276902" | "20070010826" | "20070055378" | "20070072475" | "20070073311" | "20070073400" | "20070093901" | "20070100347" | "20070100453" | "20070100455" | "20070123903" | "20070123904" | "20070233254" | "20070270970" | "20080014719" | "20080015698" | "20090018661" | "20090204219" | "20100137992" | "20100249797" | "20100286784").pn. OR ("11452619").urpn. AND (PGPB | USPT | USOC).dbnm.					
L81	1	"20040049271".pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 02:12 PM
L82	46	((US-10238383-B2 OR US-10251643-B2 OR US-5800547-A OR US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY,	OR	ON	ON	2023/07/27 02:34 PM

		6723126-B1 OR US-5062850-A OR US-4636217-A OR US-4554914-A OR US-4892545-A OR US-6113638-A OR US-7704279-B2 OR US-9924940-B2 OR US-7846188-B2 OR US-8257443-B2 OR US-8377140-B2 OR US-9320610-B2 OR US-4863476-A OR US-6176882-B1 OR US-6395034-B1 OR US-5514180-A OR US-5702455-A OR US-7641693-B2 OR US-7691147-B2 OR US-4401112-A OR US-8157864-B2 OR US-9271777-B2 OR US-4553273-A OR US-4657550-A OR US-7951180-B2 OR US-5989290-A OR US-7238205-B2 OR US-5571192-A OR US-7384431-B2 OR US-8568482-B2 OR US-11452619-B2 OR US-8940049-B1 OR US-3848601-A OR US-8182537-B2).did. AND USPT.dbnm.) OR ((US-20050049590-A1 OR US-20050256576-A1 OR US-20060241621-A1 OR US-20040186569-A1 OR US-20070049943-A1 OR US-20040049271-A1 OR US-20060241770-A1 OR US-20070255407-A1 OR US-20020099443-A1).did. AND PGPB.dbnm.)	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, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L83	2	10/250489.app.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 02:34 PM
L84	224	("2678226" | "4553273" | "5702455" | "6200348" | "6454806" | "6719796").pn. OR ("7547325").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 02:34 PM

L85	29	L82 AND titanium	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 05:38 PM
L86	5	(20090112324|20040049271|20020099443|6176882|4657550).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/07/27 05:43 PM
L87	6	(20090112324|20040049271|20020099443|6176882|4657550|6395034|6176882).pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/08/11 01:17 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	13730	((623/17.16.ccls.) OR (a61b17/0642,7046.cpc.) OR (a61f2/4455.cpc.) OR (a61f2002/3052,30525,30841,30579,448.cpc.)) AND @ad>="20050412"	(US-PGPUB; USPAT)	OR	ON	ON	2023/09/19 02:33 PM
N2	77	N1 AND (shell AND (expansion NEAR mechanism))	(US-PGPUB; USPAT)	OR	ON	ON	2023/09/19 02:38 PM
N3	5	N1 AND (shell AND ((expansion NEAR mechanism) SAME gear))	(US-PGPUB; USPAT)	OR	ON	ON	2023/09/19 02:39 PM

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

26191 7590 09/26/2023

FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
SHIRSAT, MARCELA	
ART UNIT	PAPER NUMBER
3775	

DATE MAILED: 09/26/2023

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

TITLE OF INVENTION: ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0.00	$0.00	$480	12/26/2023

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.

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 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. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

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

26191 7590 09/26/2023
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

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.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

TITLE OF INVENTION: ARTIFICIAL EXPANSIBLE IMPLANT SYSTEMS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0.00	$0.00	$480	12/26/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHIRSAT, MARCELA	3775	623-017160

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)

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

❑ Electronic Payment via Patent Center or 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

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.

❑ Applicant asserting small entity status. See 37 CFR 1.27

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.

❑ Applicant changing to regular undiscounted fee 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.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

26191 7590 09/26/2023

FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
SHIRSAT, MARCELA	
ART UNIT	PAPER NUMBER
3775	

DATE MAILED: 09/26/2023

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.

Notice of Allowability	Application No. 17/208,640	Applicant(s) Moskowitz et al.	
	Examiner MARCELA I SHIRSAT	Art Unit 3775	AIA (FITF) Status No

-- 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 amendment filed on 9/14/23.
   ☐ 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 21-41 . 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** 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. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/MARCELA I. SHIRSAT/
Primary Examiner, Art Unit 3775

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Reasons for Allowance

2. The following is an examiner's statement of reasons for allowance: the reasons for allowance were included in the final office action mailed on 8/16/23. In addition, after the interview with applicant on 9/13/23 it was discussed and decided that the movement of the gear of Biedermann and the applicant's gear move in different ways and that by clearing up the axis the reference would be overcome.

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."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARCELA I SHIRSAT whose telephone number is (571)270-5269. The examiner can normally be reached M-F 9:00am-5:30pm EST.

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, Kevin Truong can be reached on 571-272-4705. 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.

/MARCELA I. SHIRSAT/
Primary Examiner, Art Unit 3775

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 22314-1450

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.
Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.

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

26191 7590 09/26/2023

FISH & RICHARDSON P.C.
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

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.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

TITLE OF INVENTION: ARTIFICIAL EXPANDABLE IMPLANT SYSTEMS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0	$0	$480	12/26/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHIRSAT, MARCELA	3775	623-017160

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

[X] Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

[ ] "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 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 Fish & Richardson P.C.

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: Moskowitz Family LLC

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Rockville, MD

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

4a. Fees Submitted: [X] Issue Fee [ ] Publication Fee (if required)

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

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

[X] The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account No. 06-1050

5. **Change of Entity Status** (from status indicated above)

[ ] Applicant certifying micro entity status. See 37 CFR 1.29 — **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.

[ ] Applicant asserting small entity status. See 37 CFR 1.27. — **NOTE**: If the application was previously under micro entity status, checking this box will be taken as a notification of loss of entitlement to micro entity status.

[ ] Applicant changing to regular undiscounted fee status. — **NOTE**: Checking this box will be taken as 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 /Stuart A. Nelson/ Date 9/28/2023

Typed or printed name Stuart A. Nelson Registration No. 63,947

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	3775
			Examiner	:	Marcela Shirsat
Application No.	:	17/208,640	Confirmation No.	:	6013
Filed	:	March 22, 2021	Notice of Allowance Date: September 26, 2023		

Title : ARTIFICIAL EXPANDABLE IMPLANT SYSTEMS

MAIL STOP ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO NOTICE OF ALLOWANCE

In response to the Notice of Allowance dated September 26, 2023, enclosed is a completed Part B - Fee(s) Transmittal.

The issue fee is being paid with this reply on the Electronic Filing System. Apply that fee and any other necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

COMMENTS ON EXAMINER'S REASONS FOR ALLOWANCE

It is recognized that, in accordance with M.P.E.P. § 1302.14, the Examiner's reasons for allowance need not set forth all of the details as to why the claims are allowed. In the above-referenced application, it is not conceded that the Examiner's stated reasons for allowance are the only reasons for which the claims are allowable. The Examiner's reasons for allowance indicate that particular claim elements are not disclosed or suggested by the prior art of record, yet the claims may be patentable for other reasons as well, including the inventive combination of all of the recited claim elements. It is not conceded that the specific limitations identified by the Examiner are necessary to distinguish the art of record or to satisfy the requirements of 35 U.S.C. § 112. Moreover, the Examiner does not assert, and it would not be conceded, that the Examiner's reasons have any bearing on the patentability of claims in any other applications directed to the disclosed subject matter.

In addition, each dependent claim stands on its own and may be allowable on its own merits. In particular, each dependent claim may be allowable on the basis of a combination of some of the features recited in the dependent claim and its base claim(s), which combination of features may not include all of the limitations identified in the Examiner's reasons for allowance.

Respectfully submitted,

Date: 9/28/2023

/Stuart A. Nelson/
Stuart A. Nelson, Reg. No. 63,947

Customer Number 26191
Fish & Richardson P.C.
Telephone: (612) 337-2538
Facsimile: (877) 769-7945

100955494.doc

Electronic Patent Application Fee Transmittal					
Application Number:	17208640				
Filing Date:	22-Mar-2021				
Title of Invention:	ARTIFICIAL EXPANDABLE IMPLANT SYSTEMS				
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz				
Filer:	Stuart A. Nelson/Emily Whitcomb				
Attorney Docket Number:	46440-0006007				
Filed as Small 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		2501	1	480	480

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**480**

Electronic Acknowledgement Receipt	
EFS ID:	48656423
Application Number:	17208640
International Application Number:	
Confirmation Number:	6013
Title of Invention:	ARTIFICIAL EXPANDABLE IMPLANT SYSTEMS
First Named Inventor/Applicant Name:	Mosheh T. Moskowitz
Customer Number:	26191
Filer:	Stuart A. Nelson/Emily Whitcomb
Filer Authorized By:	Stuart A. Nelson
Attorney Docket Number:	46440-0006007
Receipt Date:	28-SEP-2023
Filing Date:	22-MAR-2021
Time Stamp:	16:22:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$480
RAM confirmation Number	E20239RG23158250
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

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)	IssueFee.PDF	140301 2eefd4808b94a7a12604522a8a1cb3fc4fde18ad	no	1
Warnings:					
Information:					
2	Issue Fee Payment (PTO-85B)	ReplytoNOA.PDF	60330 a7515c5314b94591a12f1277ffa446461428b0cf	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	38084 27e8d8ddfea4f9ca0bf16f249fff5c37defe572f	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	238715		

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.

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 NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/208,640	03/22/2021	3775	960	46440-0006007	20	1

CONFIRMATION NO. 6013

REPLACEMENT FILING RECEIPT

26191
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

OC000000062587005

Date Mailed: 09/29/2023

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)

Mosheh T. Moskowitz, Rockville, MD;
Nathan C. Moskowitz, Rockville, MD;

Applicant(s)

Moskowitz Family LLC, Rockville, MD;

Power of Attorney: The patent practitioners associated with Customer Number 26191

Domestic Priority data as claimed by applicant

This application is a CON of 16/362,152 03/22/2019 PAT 10,952,723
which is a CON of 15/934,622 03/23/2018 PAT 10,251,643
which is a CON of 13/093,812 04/25/2011 PAT 9,924,940
which is a CON of 12/347,990 12/31/2008 PAT 7,951,180
which is a DIV of 11/208,644 08/23/2005 PAT 7,704,279
which claims benefit of 60/670,231 04/12/2005

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: 04/19/2021
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/208,640**
Projected Publication Date: 09/16/2021
Non-Publication Request: No
Early Publication Request: No
**** SMALL ENTITY ****
Title

ARTIFICIAL EXPANDABLE IMPLANT SYSTEMS

Preliminary Class

623

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 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).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

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.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

26191 7590 10/04/2023
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
SHIRSAT, MARCELA	

ART UNIT	PAPER NUMBER
3775	

NOTIFICATION DATE	DELIVERY MODE
10/04/2023	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):

PATDOCTC@fr.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 17208640
Applicant : Moskowitz
Filing Date : 03/22/2021
Date Mailed : 10/04/2023

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED.

See attachment(s).

A copy of this notice MUST be returned with the reply. Please address response to "Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450".

/Quang Nguyen/
Publication Branch
Office of Data Management
(571) 272-4200

Application No. 17208640

IDENTIFICATION OF SPECIFICATION/DRAWING INCONSISTENCIES

[X] On Page 7, paragraph [0029] of the specification there is a brief description of FIG. 80, but the drawings filed 03/22/2021 do not include a drawing with that designation. Applicant must respond either by supplying the omitted drawing or by amending the specification to remove all references to that drawing.

[X] The drawings filed 03/22/2021 include FIG. 8O, but the specification's brief description of the drawings does not describe a drawing with that designation. Applicant must respond either by amending the specification to add a brief description of that drawing or by correcting the drawings to remove the drawing in question.

[ ] In the utility application, drawings are present in the application and are referred to in the detailed description of the invention, but the specification does not contain a brief description of the several views as required by 37 CFR 1.74 and 37 CFR 1.77(b)(9).

[ ] The design application does not contain a description of the figure or figures of the drawing as required by 37 CFR 1.153(a) and 37 CFR 1.154(b)(4).

[ ] In the plant application, the specification does not contain a brief description of the drawing as required by 37 CFR 1.163(c)(8).

[ ] Page of the specification refers to FIG. , but no drawing with that designation is described in the brief description of the drawings and no drawing with that designation is present in the application. Applicant must respond either by amending the specification to remove all references to that drawing, or by supplying that drawing and amending the specification to add a brief description of it.

[ ] In the reissue application, FIG. , is labeled as "New" but is not described in the reissue specification's brief description of the drawings. Applicant must respond by amending the reissue specification's brief description of the drawings to add a brief description of the new drawing.

[ ] OTHER:

[ ] COMMENTS:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mosheh T. Moskowitz	Art Unit	:	3775
Application No.	:	17/208,640	Examiner	:	Marcela Shirsat
Filed	:	March 22, 2021	Conf. No.	:	6013
Title	:	ARTIFICIAL EXPANDABLE IMPLANT SYSTEMS			

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO NOTICE TO FILE CORRECTED APPLICATION PAPERS DATED OCTOBER 4, 2023

The applicant as a small entity submits:

☐ Substitute drawings (1 sheet) in compliance with 37 CFR §1.84.

☒ A substitute specification in compliance with 37 CFR §1.52. Paragraphs 0029 and 0047 have been amended to delete "80" and add "8O". No new matter has been added.

☐ A substitute Abstract not exceeding 150 words in length in compliance with 37 CFR §1.72(b). No new matter has been added.

The applicant understands that this perfects the application and no additional papers or filing fees are required.

Please apply any necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: 12/4/23

/Stuart A. Nelson/
Stuart A. Nelson, Reg. No. 63,947

Customer Number 26191
Fish & Richardson P.C.
Telephone: (612) 337-2538
Facsimile: (877) 769-7945

100993226.doc

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.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

26191 7590 10/04/2023
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
SHIRSAT, MARCELA	

ART UNIT	PAPER NUMBER
3775	

NOTIFICATION DATE	DELIVERY MODE
10/04/2023	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):

PATDOCTC@fr.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 17208640
Applicant : Moskowitz
Filing Date : 03/22/2021
Date Mailed : 10/04/2023

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED.

See attachment(s).

A copy of this notice MUST be returned with the reply. Please address response to "Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450".

/Quang Nguyen/
Publication Branch
Office of Data Management
(571) 272-4200

Application No. 17208640

IDENTIFICATION OF SPECIFICATION/DRAWING INCONSISTENCIES

[X] On Page 7, paragraph [0029] of the specification there is a brief description of FIG. 80, but the drawings filed 03/22/2021 do not include a drawing with that designation. Applicant must respond either by supplying the omitted drawing or by amending the specification to remove all references to that drawing.

[X] The drawings filed 03/22/2021 include FIG. 8O, but the specification's brief description of the drawings does not describe a drawing with that designation. Applicant must respond either by amending the specification to add a brief description of that drawing or by correcting the drawings to remove the drawing in question.

[ ] In the utility application, drawings are present in the application and are referred to in the detailed description of the invention, but the specification does not contain a brief description of the several views as required by 37 CFR 1.74 and 37 CFR 1.77(b)(9).

[ ] The design application does not contain a description of the figure or figures of the drawing as required by 37 CFR 1.153(a) and 37 CFR 1.154(b)(4).

[ ] In the plant application, the specification does not contain a brief description of the drawing as required by 37 CFR 1.163(c)(8).

[ ] Page of the specification refers to FIG. , but no drawing with that designation is described in the brief description of the drawings and no drawing with that designation is present in the application. Applicant must respond either by amending the specification to remove all references to that drawing, or by supplying that drawing and amending the specification to add a brief description of it.

[ ] In the reissue application, FIG. , is labeled as "New" but is not described in the reissue specification's brief description of the drawings. Applicant must respond by amending the reissue specification's brief description of the drawings to add a brief description of the new drawing.

[ ] OTHER:

[ ] COMMENTS:

ARTIFICIAL EXPANDABLE IMPLANT SYSTEMS

Cross-Reference To Related Applications

[0001] This application is a continuation of U.S. Application No. 16/362,152, filed March 22, 2019, which is a continuation of U.S. Application No. 15/934,622, filed March 23, 2018, (now U.S. Patent No. 10,251,643) which is a continuation of U.S. Application No. 13/093,812, filed April 25, 2011 (now U.S. Patent No. 9,924,940), which is a continuation of U.S. Application No. 12/347,990, filed December 31, 2008 (now U.S. Patent No. 7,951,180), which is a divisional of U.S. Application No. 11/208,644, filed August 23, 2005 (now U.S. Patent No. 7,704,279), which claims the benefit of Provisional Application No. 60/670,231, filed on April 12, 2005, the entire contents of which is incorporated herein by reference.

Field of invention

[0002] The present invention relates to bi-directional fixating transvertebral (BDFT) screws which can be used to supplement other intervertebral spacers and/or bone fusion materials. BDFT screws can be incorporated into anterior and/or posterior cervical and lumbosacral novel zero-profile horizontal and triangular intervertebral mini-plates.ln addition BDFT screws can be incorporated into two dimensional, expansile intervertebral body fusion devices (IBFDs) transforming them into stand-alone posteriorly and/or anteriorly placed cervical, thoracic and lumbar spinal fusion devices. In the lumbosacral and thoracic spine BDFT screws may obviate the need for supplemental pedicle screw fixation. In the cervical spine it obviates the need for supplemental vertically oriented anterior plating. The present invention also relates to a stand-alone or supplemental, calibrating interarticular joint stapling device which can incrementally fine-tune posterior interarticular joint motion.

Description of the Relevant Art

[0003] Segmental spinal fusions which stabilize two or more adjacent segments of the spine are performed for painful degenerative disc disease, recurrent disc herniations, spinal stenosis, spondylolysis and spondylolisthesis. Over the past several decades a wide variety of fusion techniques and instrumentation have evolved. One of the earliest posterior fusion techniques entails non-instrumented in-situ on-lay posteriolateral fusion utilizing autologous iliac crest

bone. Because of the high rate of imperfect fusions i.e. pseudoarthroses, transpedicular pedicle screw fixation which utilizes a variety of rods and interconnectors were developed to achieve less interbody motion and hence higher fusion rates. Pedicle screw fixation was initially combined with on-lay posteriolateral fusion. Because of the poor blood supply of the transverse processes, issues still remained with pseudoarthroses. In an attempt to address this problem, pedicle screw fixation has been supplemented with a variety of interbody fusion devices. This is based on the concept that axial loading enhances fusion and that the vertebral endplates have a better blood supply. Interbody lumbar fusion devices can be placed anteriorly via an anterior lumbar interbody fusion technique (ALIF) or posteriorly via a posterior lumbar interbody fusion technique (PLIF). Material options for interbody fusion devices have included autologous iliac crest/laminar bone, cylindrical threaded titanium interbody cages, cylindrical threaded cortical bone dowels, vertebral interbody rings or boxes, carbon fiber cages, or femoral ring allograft. To lessen the complication of prolonged nerve root retraction the technique of circumferential tansforaminal lumbar interbody fusion technique (TLIF) has been introduced. This employs the transforaminal placement of an interbody spacer such as one kidney bean shaped allograft, two circular allografts, one or two titanium circular cages, a single titanium or Peek (poly-ether-ketone) boomerang spacer. The threaded spacers are usually supplemented with autologous bone and /or bone morphogenic protein (BMP), demineralized bone matrix (DBM) in the form of paste or cement, rh-BMP with collagen sponges, or similar osteoinductive biological agents which are known to enhance fusion.

[0004] Currently all lumbosacral fusion techniques, ALIF, PLIF and TLIF, are typically supplemented by pedicle screw placement. In addition posterior transfacet screws also have been used to supplement ALIF procedures. Complications of pedicle screw placement include duration of procedure, significant tissue dissection and muscle retraction, misplaced screws with neural and/or vascular injury, excessive blood loss, need for transfusions, prolonged recovery, incomplete return to work, excess rigidity leading to adjacent segmental disease requiring further fusions and re-operations. Further advances of pedicle screw fixation including minimally invasive and image-guided technology, and the development of flexible rods have imperfectly addressed some but not all of these issues. Transfacet screws entail the use of long screws which provide a static facet alignment without motion calibration.

[0005] Complications of all current interbody fusion devices is their lack of coverage of the

majority of the cross sectional area of the vertebral endplates and their potential for extrusion. The recently described flexible fusion system which consists of flexible rods attached to transpedicular screws (Dionysis, Zimmer) suffers from a high pull-out rate, higher rate of re-operation than standard fusions, and does not rank high with patient satisfaction. See for example, Clinical experience with the Dynesys semirigid fixation system for the lumbar spine: Surgical and patient-oriented outcome in 50 cases after an average of 2 years; D, Grob, A. Benini and A. F. Mannion. Spine Volume 30, number 3, Feb 1, 2005.

[0006] Single or multiple level anterior cervical spinal fusions typically employ the replacement of the cervical disc or discs with autologous or allograft bone, or an intervertebral spacer filled with autologous or allograft bone, demineralized bone matrix, BMP or rh-BMP etc. Currently these anterior cervical fusions are augmented with anterior vertical titanium plates which cross the intervertebral space or spaces and are secured to the vertebral bodies above and below the disc space or spaces with perpendicularly penetrating vertebral body screws. The purpose of these plates is to serve as a barrier to prevent extrusion of the intervertebral disc replacement. Recently anterior vertical plating has also been employed in anterior lumbar fusion.

[0007] Complications of anterior spinal plating include the potential for neurovascular injury with screw misplacement, screw and/or plate pull-out, and screw and/or plate breakage. Other complications include potential esophageal compression/injury in the cervical spine secondary to high plate profile or pullout, and to potential devastating vascular injury in the lumbar spine with plate movement and/or dislodgement into anterior iliac vasculature. Recent advances in cervical plating have therefore concentrated on the creation of lower profile plates and even resorbable plates. These advances, however, have not eliminated the-possibility of plate dislodgement and screw back out/breakage.

[0008] To achieve segmental fusion applicants propose the use of novel bidirectional fixating transvertebral (BDFT) screws which can be strategically inserted via anterior or posterior surgical spinal approaches into the anterior and middle columns of the intervertebral disc space. The BDFT mechanism employs turning one or two pinions which then turns one or two central gears which in turn simultaneously controls expansile movement of right and-left-handed bi-directional screws. The vertebral bodies above and below the disc space by virtue of their engagement and penetration by the BDFT screws are thus linked and eventually fused. The casings of the BDFT screws prevent vertebral body subsidence. The inside of the denuded

intervertebral space can then be packed with autologous or allograft bone, BMP, DBX or similar osteoinductive material. Alternatively an intervertebral spacer filled with either of these substances can be inserted.

[0009] Applicants postulate that BDFT screws provide as strong or stronger segmental fusion as pedicle screws without the complications arising from pedicle screw placement which include screw misplacement with potential nerve and/or vascular injury, violation of some healthy facets, possible pedicle destruction and blood loss. By placing screws across the intervertebral space from vertebral body to vertebral body engaging anterior and middle spinal columns, and not into the vertebral bodies via the transpedicular route, some of the healthy facet joints are preserved. Because this technique accomplishes both anterior and middle column fusion, without rigidly fixing the posterior column, it in essence creates a flexible fusion. This device therefore is a flexible fusion device because the preserved posterior joints retain their function achieving at least a modicum of mobility and hence a less rigid (flexible) fusion.

[0010] The very advantage of trans-pedicular screws which facilitate a strong solid fusion by rigidly engaging all three spinal columns (anterior, middle and posterior), is the same mechanical mechanism whereby complete inflexibility of all columns is incurred thereby leading to increasing rostral and caudal segmental stress which leads to an increased rate of re-operation.

[0011] Transvertebral fusion also leads to far less muscle retraction, blood loss, and significant reduction in O.R. time. Thus the complication of pedicular screw pull-out and hence high re - operation rate associated with the current embodiment of flexible fusion pedicle screws/rods is obviated. The lumbosacral BDFT screws can be introduced via PLIF, TLIF or ALIF operative techniques. Although one can opt to supplement these screws with transpedicular screws there would be no absolute need for supplemental pedicle screw fixation with these operative techniques.

[0012] Bi-directional fixating transvertebral (BDFT) screws can also be combined with novel zero-profile horizontal cervical and lumbar mini-plates. They can also be combined with mini-plates and a cage with slots for bone material insertion. Thus this is in essence a three-in-one device; 1) cage which can be filled with bone, 2) a plate and 3) BDFT screws.

[0013] For the performance of anterior cervical, and lumbar anterior or posterior fusions one or two centrally placed BDFT screws anterior to an interverterbal graft or spacer, may be a sufficient barrier by itself to prevent device/graft extrusion. However, to further safeguard

against graft/spacer extrusion applicants have devised horizontal linear mini-plates which can be incorporated into two anteriorly placed BDFT screws, as well as a linear triangulating mini-plate which can be incorporated into two anteriorly placed, and one posteriorly placed BDFT screws. The horizontal linear mini-plates or horizontal triangular mini-plate traverse the diameter of the disc space and most of the disc space height. Thus a horizontal mini-plate placed anteriorly immediately beneath the rostra! and caudal ventral vertebral body surfaces which is secured by BDFT screws which are also beneath the vertebral body surfaces, would prevent intervertebral device/graft extrusion. This mini-plate is essentially a zero- to subzero –profile plate in that it is either flush with the vertebral body surfaces or below them.

[0014] Because the BDFT screws engage a small percentage of the rostra! and caudal vertebral bodies, this plating system could be performed at multiple levels. This plating system which utilizes BDFT screws does not lead to any esophageal compression or injury in the cervical spine or vascular iliac vein injury in the lumbar spine. For the performance of two or three level intervertebral fusion with horizontal mini-plates there is virtually no possibility of plate breakage which can occur in long vertical anterior plates which are in current usage. Similarly, screw dislodgement, if it occurs would lead to minimal esophageal compression or injury compared to large vertical plate/screw dislodgement. In addition, in the cervical spine BDFT screw placement closer to the midline would avert any possibility of lateral neural or vertebral artery injury.

[0015] In copending PCT Patent Application PCT/US2005/016493, filed May 11, 2005, the entire contents of which are incorporated by reference, applicants developed an interbody expansile artificial disc device composed of an inner core artificial disc surrounded by expansile titanium shells with spikes which can expand in two or three dimensions. In yet another embodiment of tranvertebral fixation applicants propose a novel cervical and thoracic/lumbosacral intervertebral fusion device (IBFD) which combines the expansile titanium or PEEK shells or our previous artificial disc design with BDFT screws which can be inserted into the disc space.

[0016] Yet another embodiment incorporates a core expansile elastometric porous balloon sheath vulcanized to the expandable external shells which can then be filled with bone fusion material. Balloon porosity would allow fusion to occur from vertebral endplate to endplate. Bony material can be injected into this porous balloon through a port directly or through a silastic catheter (see previous patent).

[0017] If one were inclined to further enhance posterior column thoracolumbosacral fixation, applicants introduce an optional novel calibrated facet stapling device which staples the inferior articulating facet of the superior segment to the superior articulating facet of the caudal vertebral segment unilaterally or bilaterally, further minimizing motion until interbody fusion occurs. The degree of flexibility can be further modulated by varying the calibration strength and torque of facet stapling. This would be dictated by the need for greater or lesser degrees of motion preservation.

[0018] Currently, failed anterior lumbar arthoplasties are salvaged by combined anterior and posterior fusions. BDFT screws and/or IBFDs could be utilized as a one-step salvage operation for failed /extruded anteriorly placed lumbar artificial discs obviating the above salvage procedures which have greater morbidity. Likewise, for anterior cervical fusion, applying cervical BDFT screws alone or in combination with cervical mini-plates addresses the deficiencies and complications of current cervical plating technology as mentioned above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] Figures 1A-D illustrate three-dimensional and cross-sectional views of the BDFT screw and its mechanism of operation (Embodiment I).

[0020] Figures 2A -G illustrate three-dimensional and cross-sectional views of the BDFT screw and its mechanism of operation (Embodiment II).

[0021] Figures 3A –E illustrate three dimensional, cross-sectional and exploded views of the BDFT screw and its mechanism of operation (Embodiment III).

[0022] Figures 4A-C illustrate a single or three BDFT screws inserted into adjacent vertebral bodies.

[0023] Figures 5A and 5B illustrate three-dimensional views of the zero—profile linear mini-plate.

[0024] Figures 5C and 5D illustrate the integration of BDFT screws in the zero-profile linear mini-plate.

[0025] Figures 6A through 6G illustrate different views of the zero-profile triangular mini-plate, its integration with BDFT screws and incorporation into the vertebral bodies.

[0026] Figures 6H and 61 illustrate different views of the three-in-one device combining a zero-profile horizontal mini-plate, a cage with incorporated slots for the placement of bone material,

and BDFT screws

[0027] Figures 7 A and 7B illustrate the lumbar two-dimensionally expanding intervertebral fusion device (IBFD) with incorporated BDFT screws.

[0028] Figures 8A-N illustrate the facet joint calibrated stapling device which staples the inferior articulating facet with the superior articulating facet. Increasing degrees of torque calibration leads to increasing posterior column rigidity, whereas decreasing degrees of calibration leads to increasing flexibility.

[0029] Figures 8O [[80]] and 8P illustrate four frontal and perspective views of the facet staple with sequential increasing calibrated positions leading to decreasing increments of joint motion/flexibility.

[0030] Figures 8Q and 8R illustrate the stapled inferior and superior interarticulating facets by the facet stapler.

DETAILED DESCRIPTION OF THE INVENTION

1. THE MEDICAL DEVICE

[0031] Referring to figures 1A-D the above described problem can be solved in the cervical, thoracic and lumbar spine by insertion into the denuded intervertebral disc space an expansile bi-directional fixating transvertebral (BDFT) screw 100 or screws.

[0032] Figures 1A and 1B illustrate three-dimensional views of the screw 100 in closed and opened positions, respectively, upon its insertion into the intervertebral disc space. The screw 100 is self-drilling. The mechanism of its action entails the turning of a midline drive screw 100/pinion 104 in a clock-wise direction. This motion is bi-directionally translated via an interposing gear mechanism 105 enabling the simultaneous outward movement of left and right handed screws 102, 103 in equal and opposite directions. When the drive screw 101 and its accompanying drive screw shaft are turned clock-wise, the driving pinion 104 is likewise rotated. This motion is then translated to the driven gear 105 which is interposed between the drive screw 101 and two opposing self-drilling screws 102, 103, one left-handed and the other right-handed. The gear ring 110 has screw coupling slots (Figures IC and 1D). There are also symmetric keyways 120 and an alignment cylinder 113. The left handed screw 102 fits into one half of the slots 114, 115 and the right handed screw 103 into the other half of the slots. This is clearly illustrated in cross sections of the screw and gear in Figures IC and ID, respectively.

[0033] Figures 1A-C also illustrate the external casing 111 of the device which contains the external screw threads 117, 118, against which the left and right handed internal threads interact 116, 119 with. The casing includes an upper left casing 111b and an upper right casing 111a. Below the upper casing 111b there is a surface serration pattern 118 which is part of a retaining outer shell 112.

[0034] Figures 2A-G illustrate Embodiment II of the BDFT 200. This design differs in two fundamental ways from Embodiment I. Firstly the driving pinion 201 accomplishes bi-directional movement by engaging left and right gears 204, 205 which simultaneously turn left and right screws 202, 203 (Figures 2C-G). Secondly, in it's resting closed position the solid left screw 202 with a narrower diameter is buried within the right wider diameter hollow right screw 203. This mechanism allows for greater length of screw expansion compared to Embodiment I. Maintaining alignment of screws 202, 203 and pinions201 is accomplished by upper casings 211, outer shells 212, and left and right screw caps 209a, 209b (Figures 2A-G).

[0035] Figures 3A –E illustrate Embodiment III of the BDFT 300. This is similar to Embodiment II. The major difference is the use of two separate driving screws pinions 301a, 301b for the two separate gears 304, 305. There is one pinion 301a for the left screw 302 and another pinion 301b for the right screw 303. The left screw 302 engages the left gear 304 which engages the left screw 302. The right pinion 301a engages the right gear 305 which engages the right screw 303. Because the left and right screws 302, 303 have separate controls and are not linked by one common pinion, separate distinct motions of the screws 302, 303 can be obtained, as opposed to equal and simultaneous screw movements of Embodiments I and II. Like Embodiment II, Embodiment III consists of a smaller diameter solid left screw 302 which fits into a larger diameter hollow right screw 303. This can achieve significant screw extension length as in Embodiment II.

[0036] Figures 4A and 4B illustrates the placement of a single BTFD 1000 screw anteriorly into the intervertebral space between adjacent lumbar vertebrae 400. Figure 4A illustrates the closed position. Figure 4B illustrates the opened position. The illustrations are of a generic BDFT screw 1000 i.e. it applies to Embodiments I-Ill. Placement of a single BDFT anterior to an intervertbral spacer may be sufficient to prevent interspacer/device extrusion, and enhance spinal stability.

[0037] Figure 4C illustrates the placement of three BTFD screws 1000 in a triangulating manner covering anterior and middle columns. The presence of three screws so situated would prevent

subsidence of the screws 1000. Hence they act as a very open IBFD 1000. Bone material in the form of DBX or BMP etc. could be inserted into the intervertebral space in between the three screws 1000. This construct could be used as a supplemental or stand aloneintervertebral fusion device. Also illustrated is a cross-section of a vertebral endplate 401 demonstrating the triangular placement of screws 1000 engaging anterior and middle columns.

[0038] Figure 5A illustrates the zero-profile horizontal linear mini-plate 500. Note the slots for placement of the BDFT screws 1000. On the anterior surface are slots 504 for the driving pinion screws. Figure 5B illustrates that the plate 500 consists of upper and lower portions 500a, 500b which articulate with each other via interdigitation of alignment pins 502 and recesses 503. Figure 5C illustrates the integration of the BDFT screws 1000 into the mini-plate 500. Figure 5D illustrates the placement of the plate-BDFT construct into the intervertebral space. After the construct is placed into the intervertebral space, the screws 1000 are expanded bi-directionally in order to engage the vertebral bodies 400. This construct can be surgically placed via anterior or posterior approaches.

[0039] Figures 6A-G illustrate a zero-profile triangular mini-plate 600. In this embodiment the plate encompasses all three triangularly situated BDFT screws 1000. The posteriorly placed BDFT screw 1000 is expanded with a centrally placed drive screw/pinion with a long stem which extends posteriorly.

[0040] As illustrated in Figures 6H and 61 this embodiment 600' could be made hollow to accommodate the packing of bone material and can actually function as a combined three-in-one fusion cage/plate/BDFT screw construct. Note that this plate embodiment 600' also has upper and lower components similar to 600a, 600b (Figures 6A-C). Preferably, plates 600'a and 600'b, however, include slots 610 for placement of bone material. Figures 6D-F illustrate the incorporation of the BDFT screws 1000 into the triangular mini-plate 600. Figure 6G illustrates the positioning of the triangular mini-plate 600 with incorporated expanded screws 1000 into adjacent vertebral bodies 400.

[0041] Figures 7A and 7B illustrate a boomerang shaped thoracolumbar IBFD 700 with ratchetable titanium or PEEK shells 710, 711 which can expand geometrically in two dimensions. Figure 7A illustrates the BDFT screws 701, 702, 703 in partially expanded position. Figure 7B illustrates the BDFT screws 701, 702, 703 in fully expanded position. The outer shells 710, 711 themselves when ratcheted width-wise have titanium or PEEK spikes713 inserting

themselves into and purchasing the endplates 401, thus securing permanent integration into the vertebral endplates 401. The outer shell 710, 711 surfaces can be treated with hydroxyappetite to facilitate bone incorporation. These shells are fully described in our previous PCT Patent Application PCT/US2005/016493, filed May 11, 2005.

[0042] The IBFD device 700 has four shells and a plurality of spikes 713. The height can be modified by adjusting four fixed height screws 712. Sequential turning of these screws 712 leads to height expansion between the rostra! and caudal shells 710, 711 by widening the distance between their superior and inferior shells 710a, 710b. Once the IBFD 700 is properly positioned in the interspace the spikes 713 engage and purchase the vertebral endplates 401. The three incorporated BDFT screws 701, 702, 703 are turned clockwise leading to anterior and middle column engagement of the vertebral bodies 400 above and below the disc space. The BDFT screws 701, 702, 703 are strategically placed; one on each side of the superior shell 710a and one centrally on the inferior shell 710b. This captures anterior and middle columns of the vertebral column increasing spinal stability. After the BDFT screws 701, 702, 703 are successfully purchased within the vertebral bodies 400, bone fusion substances are placed/packed or poured, into the inner aspects of the device 700 and its surrounding intervertebral space.

[0043] An alternative thoracolumbar IBFD embodiment not illustrated expands in two dimensions and has the additional feature of an incorporated expansile porous elastometric sheath molded to the inner aspects of the titanium shells. Within the balloon is a port with or without an attached microsilastic catheter through which bone fusion material can be injected. Supplemental bone fusion material can be added to the surrounding area of the device to further enhance fusion. Furthermore for certain patients where applicable, a rapid fusion can be effected by the instillation of methyl-methacrylate A similar embodiment for a cervical IBFD is based on our previously described two- dimensional cervical expansion device in PCT Patent Application PCT/US2005/016493, filed May 11, 2005.

[0044] The engagement of the IBFD shell spikes 713 and the BDFT screws 701, 702, 703 into the vertebral bodies 400 above and below the device would obviate the need for any kind of anterior plating system.

[0045] Figures 8A-N illustrate a calibrated facet joint stapler 800 which can be used to staple the thoracolumbar inferior and superior articulating facets with incremental torquedegrees. Incrementally increasing the degrees of calibration modulates the extent of facet joint flexibility.

This can be used as an option to provide posterior column support and can be used in an open, or percutaneous, endoscopic or fluoroscopic approach. Depending on the operative approach and the individual patient, facet stapling can be performed unilaterally or bilaterally.

[0046] The stapling device 800 consists of two orthogonally placed levers 801a, 801b which open and close over a triangular fulcrum 810. The edges of the levers 801a, 801b are attached to left sand right staple cartridges 802a, 802b. Each cartridge 802a, 802b holds a titanium staple 803a, 803b in its slots. Figure 8A illustrates an exploded view of the joint stapler 800 and its essential components. Figures 8B and 8C illustrate the stapler 800 in open position. Figures 8D and 8E illustrate the stapling device 800 and staples 803a, 803b in closed position. Figures 8F and 8G illustrate the stapling device 800 and 803a, 803b staples in closed, staple released, position. Figure 8H-J illustrate the components of the lever 801a, 801b which includes the grip handle 815, arm 816, rounded wedge 817 and fulcrum screw hole 818. Figures 8K and 8L illustrate the details of the cartridge 802a, 802b including its slot for the fulcrum 810 and staples 803a, 803b. Figures 8M and 8N illustrate the details of the fulcrum 810 which include right and left cartridge slots 820a, 820b and fulcrum screw 812 and mating alignments. Most importantly it has four incremental calibration slots for incremental degrees of facet joint stapling. Also illustrated are spring anchors 814.

[0047] Figures 8O [[80]] and 8P illustrate frontal and perspective views, respectively of the two opposing titanium facet staples 803a, 803b. Each staple 803a, 803b consists of a bracket 836, a nail 837 and an alignment pin 835. Illustrated are four sequential calibrated tightening positions of the opposing staples 803a, 803b. Increasing the calibrated opposition of the two staples 803a, 803b leads to increasing opposition of the facet joints and hence increasing rigidity, and decreasing flexibility. Each staple 803a, 803b has two alignment recesses 838. The opposition of these staples 803a, 803b around the facet joint forms a rectangular facet joint enclosure.

[0048] Figures 8Q ad 8R illustrate the stapled inferior and superior articulating facets 851, 852. Figure 8R illustrates the application of the facet stapler 800 on the facets 851, 852 introducing the facet staple 803. The facet staple is used to join the exterior articulating facet 851 and the interior articulating facet 852.

2. THE SURGICAL METHOD

[0049] The surgical steps necessary to practice the present invention will now be described.

[0050] The posterior lumbar spine implantation of the BDFT screws 1000, plate and IBFD can be implanted via a previously described posterior lumbar interbody fusion procedure (PLIF) or posterior transforaminal lumbar interbody fusion procedure (TLIF). The procedure can be performed open, microscopic, closed, tubular or endoscopic. Fluoroscopic guidance can be used with any of these procedures.

[0051] After the adequate induction of anesthesia, the patient is placed in the prone position.

[0052] A midline incision is made for a PLIF, and one or two parallel paramedian incisions or a midline incision is made for a TLIF. For the PLIF a unilateral or bilateral facet sparing hemi-laminotomy is created to introduce the BDFT screws 1000, plates or IBFD into the disc space after it is adequately prepared. For the TLIF procedure, after a unilateral dissection and drilling of the inferior articulating surface and the medial superior articulating facet, the far lateral disc space is entered and a circumferential discectomy is performed. The disc space is prepared and the endplates exposed.

[0053] There are then multiple embodiments to choose from for an intervertebral body fusion. With the first and simplest choice, under direct or endoscopic guidance one BDFT screw 1000 or three BDFT screws 1000 can be placed in a triangulating manner encompassing the anterior and middle vertebral columns (Figures 4A-C). The screws 1000 are then maximally expanded purchasing and uniting the vertebral bodies above and below the disc space. Bone material or an alternative intervertebral fusion device can then be packed into the disc space. The casing of the screws 1000 prevents subsidence of the vertebral bodies. An additional option in the posterior lumbar spine is to place a mini-plate dorsally underneath the thecal sac to prevent bone migration into the nerves. In addition via a TLIF approach a triangular mini-plate/ cage construct can be inserted, and then the BDFT screws 1000 maximally expanded. This is a very simple and practical supplemental or stand-alone intervertebral fusion device.

[0054] Using an alternative IBFD option, utilizing specialized forceps the two-dimensional expanding thoracolumbar expandable IBFD 700 (Figures 7A and 7B) is introduced into the disc space. The final dimension expansion in all embodiments leads to purchasing of the spikes into the vertebral endplates. The BDFT screws 1000 are then driven directly into rostral and caudal vertebral bodies across the intervertebral space. Then bone fusion material; autologous, allograft, bone matrix protein, BMP, rh-BMP, paste or other similar currently available or specially designed osteoconductive substances can be placed into the device and the surrounding

intervertebral space. In embodiments with an incorporated viscoelastic balloon sheath, prior to engaging the screws the expandable elastometric sheath/balloon is filled with bone fusion material as mentioned above. If desirable, further material, can be placed outside its confines within the intervertebral space.

[0055] If further posterior column stability or rigidity is required, unilateral or bilateral, single level or multiple level facet screw stapling can be performed under open, microscopic flouroscopiq or endoscopic vision. Radiographic confirmation of staple position is obtained. Calibrated stapling leads to opposition of the facet joints with incremental degrees of joint opposition. This can lead to variable degrees of posterior column rigidity and/or flexibility.

[0056] The anterior lumbar spine implantation of solitary BDFT screw(s) 1000, BDFT screws incorporated into a horizontal linear or triangular mini-plate, or the IBFD/BDFT screw embodiment for L4/5 and L5/S1 interspaces can be performed on the supine anesthetized patient via previously described open micropscopic or endoscopic techniques. Once the disc space is exposed and discectomy and space preparation is performed, placement of one, two or three BDFT screws 1000 with or without a ventral mini-plate, or placement of two dimensionally expanding IBFD with or without expansile elastometric sheaths and their incorporation is identical to that performed for the posterior approach.

[0057] The posterior placement of the BDFT screws 1000 alone or combined with mini-plates or with IBFD embodiments into the thoracic spine can be performed via previously described transpedicular approaches; open or endoscopic. The anterior placement of the IBFD 700 into the thoracic spine can be accomplished via a trans-thoracic approach. Once disc space exposure is obtained via either approach, all of the above mentioned embodiments can be inserted. Engagement of the devices is identical to what was mentioned above.

[0058] For anterior placement of the cervical embodiments of the BDFT screw(s) 1000 with or without the horizontal linear or triangular cervical mini-plate, and the IBFD embodiments the anterior spine is exposed in the anesthetized patient as previously described for anterior cervical discectomies. Once the disc space is identified, discectomy is performed and the disc space prepared. Implantation and engagement of all devices is identical to that described for the anterior lumbar and thoracic spines.

[0059] The present invention may provide an effective and safe technique that overcomes the problems associated with current tanspedicular-based thoracic and lumbar fusion technology,

and with current vertical cervical plating technology, and for many degenerative stable and unstable spine diseases, and could replace many pedicle screw-based and anterior vertical-plate based instrumentation in many but not all degenerative spinal conditions. Calibrated facet joint screw staples can facilitate flexible fusions and could replace current static trans-facet screws.

[0060] To our knowledge there has not been any other previously described bidirectional screw for use in the spine, other joints, or for any commercial or carpentry application. The bi-directional screw 1000 described herein may indeed have applications in general commercial, industrial and carpentry industries. To our knowledge the description of zero to subzero profile anterior or posterior horizontal spinal plates which traverse the diameter of the disc space has not been previously described. To our knowledge an intervertebral three-inone construct combining bone cage, plate and screws has not been previously reported. To our knowledge calibrated facet joint staples 803a, 803b have not been previously described.

We claim:

1. A self-drilling screw apparatus, which comprises:

a shell;

a first screw member having a tapered end and a threaded body disposed within the shell;

a second screw member having a tapered end and a threaded body disposed within the shell; and

a drive mechanism for driving the first and second screw members from the shell.

2. An apparatus according to claim 1 wherein the shell includes a first aperture threaded in a first direction for the first screw member and a second aperture threaded in the opposition direction for the second screw member.

3. An apparatus according to claim 1 wherein the drive mechanism includes;

a drive screw disposed at least partially within the shell;

a pinion responsive to the rotation of the drive screw;

a gear rotated by the pinion, and the rotation of the gear imparts rotation to the first screw member and the second screw member.

4. An apparatus according to claim 3 wherein the drive screw includes an accessible head that is rotated in order to drive the first and second screw members from the shell.

5. An apparatus according to claim 3 where in the gear includes keyways for the first screw member and the second screw member.

6. An apparatus according to claim 3 which further includes end caps and a top for enclosing the shell.

7. An apparatus according to claim 1 wherein the drive mechanism includes:

a drive screw disposed at least partially within the shell; and

a pinion that is responsive to the rotation of the drive screw and that drives at least one of the screw members.

8. An apparatus according to claim 7 wherein the first screw member is of a diameter smaller than the diameter of the second screw member; and wherein the second screw member includes a hollow threaded portion that receives a portion of the threaded body of the first screw member.

9. An apparatus according to claim 8 wherein the threaded body of the first screw member is threaded in a first direction and the threaded body of the second screw member is threaded in the opposite direction.

10. An apparatus according to claim 9 wherein the drive screw includes an accessible head that is rotated in order to drive the first and second screw members from the shell.

11. An apparatus according to claim 1 wherein the drive mechanism includes:

a first drive screw disposed at least partially within the shell;

a first pinion that is responsive to the rotation of the first drive screw and that drives the first screw member;

a second drive screw disposed at least partially within the shell; and a second pinion that is responsive to the rotation of the second drive screw and that drives the second screw member.

12. An apparatus according to claim 11 wherein the first and second drive screws include accessible heads that are rotated in order to drive the first and second screw members from the shell.

13. An apparatus according to claim 11 wherein the first screw member is of a diameter smaller than the diameter of the second screw member; and wherein the second screw member includes a hollow threaded portion that receives a portion of the threaded body of the first screw member.

14. An apparatus according to claim 11 which further includes end caps and a top for enclosing the shell.

15. An apparatus according to claim 1 wherein the apparatus is used to join together two members, wherein the members are selected from the group which includes bones, portions of the spinal column, vertebral bodies, wood, building materials, metal, masonry or plastics.

16. An apparatus which includes a plurality of screw apparatuses of claim 1 arranged in a predetermined pattern to join at least two vertebral bodies.

17. An apparatus according to claim 1 wherein the first screw member and the second screw member extend bi-directionally from opposite ends of the shell.

18. An apparatus which includes a plurality of screw apparatuses of claim 1 and which further includes:

a first plate with a predetermined pattern of apertures for the screw apparatuses; and

a second plate with a predetermined pattern of apertures for the screw apparatuses.

19. An apparatus according to claim 18 where in the plurality of screw apparatuses and plates are used to join together a pair of vertebral bodies.

20. An apparatus according to claim 18 wherein the plates include slots for at least two screw apparatuses.

ABSTRACT OF THE DISCLOSURE

An apparatus and method for joining members together using a self-drilling screw apparatus or stapling apparatus are disclosed. The screw apparatus includes a shell and first and second first screw members having tapered ends and threaded bodies that are disposed within the shell. A drive mechanism rotatably drives the first and second screw members from the shell in opposite directions and causes the screw members to embed themselves in the members to be joined. The screw apparatus can be used to join members such as bones, portions of the spinal column, vertebral bodies, wood, building materials, metals, masonry, or plastics. The stapling apparatus includes first and second lever arms rotatably joined together at a fulcrum, and the lever arms rotate in opposite directions. First and second cartridges are disposed at the ends of the lever arms. Each cartridge is capable of holding a staple including a bracket, a nail member and an alignment slot. When the ends of the lever arms are rotated towards each other the staples from the cartridges are interlocked. The staples can be also be used to join members such as bones, portions of the spinal column, or vertebral bodies.

100381389.docx

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/208,640	**12/04/2023 02:16:04 PM Z ET**	**46440-0006007**

Title of Invention

ARTIFICIAL EXPANDABLE IMPLANT SYSTEMS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	6013	FILED BY	Emily Whitcomb
PATENT CENTER #	63476010	FILING DATE	03/22/2021
CUSTOMER #	26191	FIRST NAMED INVENTOR	Mosheh T. Moskowitz
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Stuart Nelson

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
MarkedUpSubSpec.pdf	18	Specification	197 KB
CleanSubSpec.pdf	18	Specification	197 KB
ResponsetoNoticetoCorrectAppPappers_.pdf	4	Post Allowance Communication - Incoming	156 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
MarkedUpSubSpec.pdf	10C957B859F28D0686B551969B0604B075AAC93BFF151792C9

	B7CE65F872B5E366ADDD68A4E66F18FEA30C9CF8DAB380D2 6E700379B2391D37EFAAC7FF587586
CleanSubSpec.pdf	642795CC3596FE5F4E60F0FE5EBCFFACE834B972812D60F29 3F1E4B12892F513529BDF8CF25D53853F3F4B6AAAE90B8B36 4851794CAC044F86A72E60812BE41B
ResponsetoNoticetoCorrectApp Pappers_.pdf	F20FEB1F341F24791041C19AF582D0C21633FD54BEBD6CE8B 8D2328C78B191C2D7D2322165CD11C0F21D98F2ECBEA71125 D5F2D4060363B80FAF6191C91A71DC

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 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.

ARTIFICIAL EXPANDABLE IMPLANT SYSTEMS

Cross-Reference To Related Applications

[0001] This application is a continuation of U.S. Application No. 16/362,152, filed March 22, 2019, which is a continuation of U.S. Application No. 15/934,622, filed March 23, 2018, (now U.S. Patent No. 10,251,643) which is a continuation of U.S. Application No. 13/093,812, filed April 25, 2011 (now U.S. Patent No. 9,924,940), which is a continuation of U.S. Application No. 12/347,990, filed December 31, 2008 (now U.S. Patent No. 7,951,180), which is a divisional of U.S. Application No. 11/208,644, filed August 23, 2005 (now U.S. Patent No. 7,704,279), which claims the benefit of Provisional Application No. 60/670,231, filed on April 12, 2005, the entire contents of which is incorporated herein by reference.

Field of invention

[0002] The present invention relates to bi-directional fixating transvertebral (BDFT) screws which can be used to supplement other intervertebral spacers and/or bone fusion materials. BDFT screws can be incorporated into anterior and/or posterior cervical and lumbosacral novel zero-profile horizontal and triangular intervertebral mini-plates.ln addition BDFT screws can be incorporated into two dimensional, expansile intervertebral body fusion devices (IBFDs) transforming them into stand-alone posteriorly and/or anteriorly placed cervical, thoracic and lumbar spinal fusion devices. In the lumbosacral and thoracic spine BDFT screws may obviate the need for supplemental pedicle screw fixation. In the cervical spine it obviates the need for supplemental vertically oriented anterior plating. The present invention also relates to a stand-alone or supplemental, calibrating interarticular joint stapling device which can incrementally fine-tune posterior interarticular joint motion.

Description of the Relevant Art

[0003] Segmental spinal fusions which stabilize two or more adjacent segments of the spine are performed for painful degenerative disc disease, recurrent disc herniations, spinal stenosis, spondylolysis and spondylolisthesis. Over the past several decades a wide variety of fusion techniques and instrumentation have evolved. One of the earliest posterior fusion techniques entails non-instrumented in-situ on-lay posteriolateral fusion utilizing autologous iliac crest

bone. Because of the high rate of imperfect fusions i.e. pseudoarthroses, transpedicular pedicle screw fixation which utilizes a variety of rods and interconnectors were developed to achieve less interbody motion and hence higher fusion rates. Pedicle screw fixation was initially combined with on-lay posteriolateral fusion. Because of the poor blood supply of the transverse processes, issues still remained with pseudoarthroses. In an attempt to address this problem, pedicle screw fixation has been supplemented with a variety of interbody fusion devices. This is based on the concept that axial loading enhances fusion and that the vertebral endplates have a better blood supply. Interbody lumbar fusion devices can be placed anteriorly via an anterior lumbar interbody fusion technique (ALIF) or posteriorly via a posterior lumbar interbody fusion technique (PLIF). Material options for interbody fusion devices have included autologous iliac crest/laminar bone, cylindrical threaded titanium interbody cages, cylindrical threaded cortical bone dowels, vertebral interbody rings or boxes, carbon fiber cages, or femoral ring allograft. To lessen the complication of prolonged nerve root retraction the technique of circumferential tansforaminal lumbar interbody fusion technique (TLIF) has been introduced. This employs the transforaminal placement of an interbody spacer such as one kidney bean shaped allograft, two circular allografts, one or two titanium circular cages, a single titanium or Peek (poly-ether-ketone) boomerang spacer. The threaded spacers are usually supplemented with autologous bone and /or bone morphogenic protein (BMP), demineralized bone matrix (DBM) in the form of paste or cement, rh-BMP with collagen sponges, or similar osteoinductive biological agents which are known to enhance fusion.

[0004] Currently all lumbosacral fusion techniques, ALIF, PLIF and TLIF, are typically supplemented by pedicle screw placement. In addition posterior transfacet screws also have been used to supplement ALIF procedures. Complications of pedicle screw placement include duration of procedure, significant tissue dissection and muscle retraction, misplaced screws with neural and/or vascular injury, excessive blood loss, need for transfusions, prolonged recovery, incomplete return to work, excess rigidity leading to adjacent segmental disease requiring further fusions and re-operations. Further advances of pedicle screw fixation including minimally invasive and image-guided technology, and the development of flexible rods have imperfectly addressed some but not all of these issues. Transfacet screws entail the use of long screws which provide a static facet alignment without motion calibration.

[0005] Complications of all current interbody fusion devices is their lack of coverage of the

majority of the cross sectional area of the vertebral endplates and their potential for extrusion. The recently described flexible fusion system which consists of flexible rods attached to transpedicular screws (Dionysis, Zimmer) suffers from a high pull-out rate, higher rate of re-operation than standard fusions, and does not rank high with patient satisfaction. See for example, Clinical experience with the Dynesys semirigid fixation system for the lumbar spine: Surgical and patient-oriented outcome in 50 cases after an average of 2 years; D, Grob, A. Benini and A. F. Mannion. Spine Volume 30, number 3, Feb 1, 2005.

[0006] Single or multiple level anterior cervical spinal fusions typically employ the replacement of the cervical disc or discs with autologous or allograft bone, or an intervertebral spacer filled with autologous or allograft bone, demineralized bone matrix, BMP or rh-BMP etc. Currently these anterior cervical fusions are augmented with anterior vertical titanium plates which cross the intervertebral space or spaces and are secured to the vertebral bodies above and below the disc space or spaces with perpendicularly penetrating vertebral body screws. The purpose of these plates is to serve as a barrier to prevent extrusion of the intervertebral disc replacement. Recently anterior vertical plating has also been employed in anterior lumbar fusion.

[0007] Complications of anterior spinal plating include the potential for neurovascular injury with screw misplacement, screw and/or plate pull-out, and screw and/or plate breakage. Other complications include potential esophageal compression/injury in the cervical spine secondary to high plate profile or pullout, and to potential devastating vascular injury in the lumbar spine with plate movement and/or dislodgement into anterior iliac vasculature. Recent advances in cervical plating have therefore concentrated on the creation of lower profile plates and even resorbable plates. These advances, however, have not eliminated the-possibility of plate dislodgement and screw back out/breakage.

[0008] To achieve segmental fusion applicants propose the use of novel bidirectional fixating transvertebral (BDFT) screws which can be strategically inserted via anterior or posterior surgical spinal approaches into the anterior and middle columns of the intervertebral disc space. The BDFT mechanism employs turning one or two pinions which then turns one or two central gears which in turn simultaneously controls expansile movement of right and-left-handed bi-directional screws. The vertebral bodies above and below the disc space by virtue of their engagement and penetration by the BDFT screws are thus linked and eventually fused. The casings of the BDFT screws prevent vertebral body subsidence. The inside of the denuded

intervertebral space can then be packed with autologous or allograft bone, BMP, DBX or similar osteoinductive material. Alternatively an intervertebral spacer filled with either of these substances can be inserted.

[0009] Applicants postulate that BDFT screws provide as strong or stronger segmental fusion as pedicle screws without the complications arising from pedicle screw placement which include screw misplacement with potential nerve and/or vascular injury, violation of some healthy facets, possible pedicle destruction and blood loss. By placing screws across the intervertebral space from vertebral body to vertebral body engaging anterior and middle spinal columns, and not into the vertebral bodies via the transpedicular route, some of the healthy facet joints are preserved. Because this technique accomplishes both anterior and middle column fusion, without rigidly fixing the posterior column, it in essence creates a flexible fusion. This device therefore is a flexible fusion device because the preserved posterior joints retain their function achieving at least a modicum of mobility and hence a less rigid (flexible) fusion.

[0010] The very advantage of trans-pedicular screws which facilitate a strong solid fusion by rigidly engaging all three spinal columns (anterior, middle and posterior), is the same mechanical mechanism whereby complete inflexibility of all columns is incurred thereby leading to increasing rostral and caudal segmental stress which leads to an increased rate of re-operation.

[0011] Transvertebral fusion also leads to far less muscle retraction, blood loss, and significant reduction in O.R. time. Thus the complication of pedicular screw pull-out and hence high re - operation rate associated with the current embodiment of flexible fusion pedicle screws/rods is obviated. The lumbosacral BDFT screws can be introduced via PLIF, TLIF or ALIF operative techniques. Although one can opt to supplement these screws with transpedicular screws there would be no absolute need for supplemental pedicle screw fixation with these operative techniques.

[0012] Bi-directional fixating transvertebral (BDFT) screws can also be combined with novel zero-profile horizontal cervical and lumbar mini-plates. They can also be combined with mini-plates and a cage with slots for bone material insertion. Thus this is in essence a three-in-one device; 1) cage which can be filled with bone, 2) a plate and 3) BDFT screws.

[0013] For the performance of anterior cervical, and lumbar anterior or posterior fusions one or two centrally placed BDFT screws anterior to an interverterbal graft or spacer, may be a sufficient barrier by itself to prevent device/graft extrusion. However, to further safeguard

against graft/spacer extrusion applicants have devised horizontal linear mini-plates which can be incorporated into two anteriorly placed BDFT screws, as well as a linear triangulating mini-plate which can be incorporated into two anteriorly placed, and one posteriorly placed BDFT screws. The horizontal linear mini-plates or horizontal triangular mini-plate traverse the diameter of the disc space and most of the disc space height. Thus a horizontal mini-plate placed anteriorly immediately beneath the rostra! and caudal ventral vertebral body surfaces which is secured by BDFT screws which are also beneath the vertebral body surfaces, would prevent intervertebral device/graft extrusion. This mini-plate is essentially a zero- to subzero –profile plate in that it is either flush with the vertebral body surfaces or below them.

[0014] Because the BDFT screws engage a small percentage of the rostra! and caudal vertebral bodies, this plating system could be performed at multiple levels. This plating system which utilizes BDFT screws does not lead to any esophageal compression or injury in the cervical spine or vascular iliac vein injury in the lumbar spine. For the performance of two or three level intervertebral fusion with horizontal mini-plates there is virtually no possibility of plate breakage which can occur in long vertical anterior plates which are in current usage. Similarly, screw dislodgement, if it occurs would lead to minimal esophageal compression or injury compared to large vertical plate/screw dislodgement. In addition, in the cervical spine BDFT screw placement closer to the midline would avert any possibility of lateral neural or vertebral artery injury.

[0015] In copending PCT Patent Application PCT/US2005/016493, filed May 11, 2005, the entire contents of which are incorporated by reference, applicants developed an interbody expansile artificial disc device composed of an inner core artificial disc surrounded by expansile titanium shells with spikes which can expand in two or three dimensions. In yet another embodiment of tranvertebral fixation applicants propose a novel cervical and thoracic/lumbosacral intervertebral fusion device (IBFD) which combines the expansile titanium or PEEK shells or our previous artificial disc design with BDFT screws which can be inserted into the disc space.

[0016] Yet another embodiment incorporates a core expansile elastometric porous balloon sheath vulcanized to the expandable external shells which can then be filled with bone fusion material. Balloon porosity would allow fusion to occur from vertebral endplate to endplate. Bony material can be injected into this porous balloon through a port directly or through a silastic catheter (see previous patent).

[0017] If one were inclined to further enhance posterior column thoracolumbosacral fixation, applicants introduce an optional novel calibrated facet stapling device which staples the inferior articulating facet of the superior segment to the superior articulating facet of the caudal vertebral segment unilaterally or bilaterally, further minimizing motion until interbody fusion occurs. The degree of flexibility can be further modulated by varying the calibration strength and torque of facet stapling. This would be dictated by the need for greater or lesser degrees of motion preservation.

[0018] Currently, failed anterior lumbar arthoplasties are salvaged by combined anterior and posterior fusions. BDFT screws and/or IBFDs could be utilized as a one-step salvage operation for failed /extruded anteriorly placed lumbar artificial discs obviating the above salvage procedures which have greater morbidity. Likewise, for anterior cervical fusion, applying cervical BDFT screws alone or in combination with cervical mini-plates addresses the deficiencies and complications of current cervical plating technology as mentioned above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] Figures 1A-D illustrate three-dimensional and cross-sectional views of the BDFT screw and its mechanism of operation (Embodiment I).

[0020] Figures 2A -G illustrate three-dimensional and cross-sectional views of the BDFT screw and its mechanism of operation (Embodiment II).

[0021] Figures 3A –E illustrate three dimensional, cross-sectional and exploded views of the BDFT screw and its mechanism of operation (Embodiment III).

[0022] Figures 4A-C illustrate a single or three BDFT screws inserted into adjacent vertebral bodies.

[0023] Figures 5A and 5B illustrate three-dimensional views of the zero—profile linear mini-plate.

[0024] Figures 5C and 5D illustrate the integration of BDFT screws in the zero-profile linear mini-plate.

[0025] Figures 6A through 6G illustrate different views of the zero-profile triangular mini-plate, its integration with BDFT screws and incorporation into the vertebral bodies.

[0026] Figures 6H and 61 illustrate different views of the three-in-one device combining a zero-profile horizontal mini-plate, a cage with incorporated slots for the placement of bone material,

and BDFT screws

[0027] Figures 7 A and 7B illustrate the lumbar two-dimensionally expanding intervertebral fusion device (IBFD) with incorporated BDFT screws.

[0028] Figures 8A-N illustrate the facet joint calibrated stapling device which staples the inferior articulating facet with the superior articulating facet. Increasing degrees of torque calibration leads to increasing posterior column rigidity, whereas decreasing degrees of calibration leads to increasing flexibility.

[0029] Figures 8O and 8P illustrate four frontal and perspective views of the facet staple with sequential increasing calibrated positions leading to decreasing increments of joint motion/flexibility.

[0030] Figures 8Q and 8R illustrate the stapled inferior and superior interarticulating facets by the facet stapler.

DETAILED DESCRIPTION OF THE INVENTION

1. THE MEDICAL DEVICE

[0031] Referring to figures 1A-D the above described problem can be solved in the cervical, thoracic and lumbar spine by insertion into the denuded intervertebral disc space an expansile bi-directional fixating transvertebral (BDFT) screw 100 or screws.

[0032] Figures 1A and 1B illustrate three-dimensional views of the screw 100 in closed and opened positions, respectively, upon its insertion into the intervertebral disc space. The screw 100 is self-drilling. The mechanism of its action entails the turning of a midline drive screw 100/pinion 104 in a clock-wise direction. This motion is bi-directionally translated via an interposing gear mechanism 105 enabling the simultaneous outward movement of left and right handed screws 102, 103 in equal and opposite directions. When the drive screw 101 and its accompanying drive screw shaft are turned clock-wise, the driving pinion 104 is likewise rotated. This motion is then translated to the driven gear 105 which is interposed between the drive screw 101 and two opposing self-drilling screws 102, 103, one left-handed and the other right-handed. The gear ring 110 has screw coupling slots (Figures IC and 1D). There are also symmetric keyways 120 and an alignment cylinder 113. The left handed screw 102 fits into one half of the slots 114, 115 and the right handed screw 103 into the other half of the slots. This is clearly illustrated in cross sections of the screw and gear in Figures IC and ID, respectively.

[0033] Figures 1A-C also illustrate the external casing 111 of the device which contains the external screw threads 117, 118, against which the left and right handed internal threads interact 116, 119 with. The casing includes an upper left casing 111b and an upper right casing 111a. Below the upper casing 111b there is a surface serration pattern 118 which is part of a retaining outer shell 112.

[0034] Figures 2A-G illustrate Embodiment II of the BDFT 200. This design differs in two fundamental ways from Embodiment I. Firstly the driving pinion 201 accomplishes bi-directional movement by engaging left and right gears 204, 205 which simultaneously turn left and right screws 202, 203 (Figures 2C-G). Secondly, in it's resting closed position the solid left screw 202 with a narrower diameter is buried within the right wider diameter hollow right screw 203. This mechanism allows for greater length of screw expansion compared to Embodiment I. Maintaining alignment of screws 202, 203 and pinions201 is accomplished by upper casings 211, outer shells 212, and left and right screw caps 209a, 209b (Figures 2A-G).

[0035] Figures 3A –E illustrate Embodiment III of the BDFT 300. This is similar to Embodiment II. The major difference is the use of two separate driving screws pinions 301a, 301b for the two separate gears 304, 305. There is one pinion 301a for the left screw 302 and another pinion 301b for the right screw 303. The left screw 302 engages the left gear 304 which engages the left screw 302. The right pinion 301a engages the right gear 305 which engages the right screw 303. Because the left and right screws 302, 303 have separate controls and are not linked by one common pinion, separate distinct motions of the screws 302, 303 can be obtained, as opposed to equal and simultaneous screw movements of Embodiments I and II. Like Embodiment II, Embodiment III consists of a smaller diameter solid left screw 302 which fits into a larger diameter hollow right screw 303. This can achieve significant screw extension length as in Embodiment II.

[0036] Figures 4A and 4B illustrates the placement of a single BTFD 1000 screw anteriorly into the intervertebral space between adjacent lumbar vertebrae 400. Figure 4A illustrates the closed position. Figure 4B illustrates the opened position. The illustrations are of a generic BDFT screw 1000 i.e. it applies to Embodiments I-Ill. Placement of a single BDFT anterior to an intervertbral spacer may be sufficient to prevent interspacer/device extrusion, and enhance spinal stability.

[0037] Figure 4C illustrates the placement of three BTFD screws 1000 in a triangulating manner covering anterior and middle columns. The presence of three screws so situated would prevent

subsidence of the screws 1000. Hence they act as a very open IBFD 1000. Bone material in the form of DBX or BMP etc. could be inserted into the intervertebral space in between the three screws 1000. This construct could be used as a supplemental or stand aloneintervertebral fusion device. Also illustrated is a cross-section of a vertebral endplate 401 demonstrating the triangular placement of screws 1000 engaging anterior and middle columns.

[0038] Figure 5A illustrates the zero-profile horizontal linear mini-plate 500. Note the slots for placement of the BDFT screws 1000. On the anterior surface are slots 504 for the driving pinion screws. Figure 5B illustrates that the plate 500 consists of upper and lower portions 500a, 500b which articulate with each other via interdigitation of alignment pins 502 and recesses 503. Figure 5C illustrates the integration of the BDFT screws 1000 into the mini-plate 500. Figure 5D illustrates the placement of the plate-BDFT construct into the intervertebral space. After the construct is placed into the intervertebral space, the screws 1000 are expanded bi-directionally in order to engage the vertebral bodies 400. This construct can be surgically placed via anterior or posterior approaches.

[0039] Figures 6A-G illustrate a zero-profile triangular mini-plate 600. In this embodiment the plate encompasses all three triangularly situated BDFT screws 1000. The posteriorly placed BDFT screw 1000 is expanded with a centrally placed drive screw/pinion with a long stem which extends posteriorly.

[0040] As illustrated in Figures 6H and 61 this embodiment 600' could be made hollow to accommodate the packing of bone material and can actually function as a combined three-in-one fusion cage/plate/BDFT screw construct. Note that this plate embodiment 600' also has upper and lower components similar to 600a, 600b (Figures 6A-C). Preferably, plates 600'a and 600'b, however, include slots 610 for placement of bone material. Figures 6D-F illustrate the incorporation of the BDFT screws 1000 into the triangular mini-plate 600. Figure 6G illustrates the positioning of the triangular mini-plate 600 with incorporated expanded screws 1000 into adjacent vertebral bodies 400.

[0041] Figures 7A and 7B illustrate a boomerang shaped thoracolumbar IBFD 700 with ratchetable titanium or PEEK shells 710, 711 which can expand geometrically in two dimensions. Figure 7A illustrates the BDFT screws 701, 702, 703 in partially expanded position. Figure 7B illustrates the BDFT screws 701, 702, 703 in fully expanded position. The outer shells 710, 711 themselves when ratcheted width-wise have titanium or PEEK spikes713 inserting

themselves into and purchasing the endplates 401, thus securing permanent integration into the vertebral endplates 401. The outer shell 710, 711 surfaces can be treated with hydroxyappetite to facilitate bone incorporation. These shells are fully described in our previous PCT Patent Application PCT/US2005/016493, filed May 11, 2005.

[0042] The IBFD device 700 has four shells and a plurality of spikes 713. The height can be modified by adjusting four fixed height screws 712. Sequential turning of these screws 712 leads to height expansion between the rostra! and caudal shells 710, 711 by widening the distance between their superior and inferior shells 710a, 710b. Once the IBFD 700 is properly positioned in the interspace the spikes 713 engage and purchase the vertebral endplates 401. The three incorporated BDFT screws 701, 702, 703 are turned clockwise leading to anterior and middle column engagement of the vertebral bodies 400 above and below the disc space. The BDFT screws 701, 702, 703 are strategically placed; one on each side of the superior shell 710a and one centrally on the inferior shell 710b. This captures anterior and middle columns of the vertebral column increasing spinal stability. After the BDFT screws 701, 702, 703 are successfully purchased within the vertebral bodies 400, bone fusion substances are placed/packed or poured, into the inner aspects of the device 700 and its surrounding intervertebral space.

[0043] An alternative thoracolumbar IBFD embodiment not illustrated expands in two dimensions and has the additional feature of an incorporated expansile porous elastometric sheath molded to the inner aspects of the titanium shells. Within the balloon is a port with or without an attached microsilastic catheter through which bone fusion material can be injected. Supplemental bone fusion material can be added to the surrounding area of the device to further enhance fusion. Furthermore for certain patients where applicable, a rapid fusion can be effected by the instillation of methyl-methacrylate A similar embodiment for a cervical IBFD is based on our previously described two- dimensional cervical expansion device in PCT Patent Application PCT/US2005/016493, filed May 11, 2005.

[0044] The engagement of the IBFD shell spikes 713 and the BDFT screws 701, 702, 703 into the vertebral bodies 400 above and below the device would obviate the need for any kind of anterior plating system.

[0045] Figures 8A-N illustrate a calibrated facet joint stapler 800 which can be used to staple the thoracolumbar inferior and superior articulating facets with incremental torquedegrees. Incrementally increasing the degrees of calibration modulates the extent of facet joint flexibility.

This can be used as an option to provide posterior column support and can be used in an open, or percutaneous, endoscopic or fluoroscopic approach. Depending on the operative approach and the individual patient, facet stapling can be performed unilaterally or bilaterally.

[0046] The stapling device 800 consists of two orthogonally placed levers 801a, 801b which open and close over a triangular fulcrum 810. The edges of the levers 801a, 801b are attached to left sand right staple cartridges 802a, 802b. Each cartridge 802a, 802b holds a titanium staple 803a, 803b in its slots. Figure 8A illustrates an exploded view of the joint stapler 800 and its essential components. Figures 8B and 8C illustrate the stapler 800 in open position. Figures 8D and 8E illustrate the stapling device 800 and staples 803a, 803b in closed position. Figures 8F and 8G illustrate the stapling device 800 and 803a, 803b staples in closed, staple released, position. Figure 8H-J illustrate the components of the lever 801a, 801b which includes the grip handle 815, arm 816, rounded wedge 817 and fulcrum screw hole 818. Figures 8K and 8L illustrate the details of the cartridge 802a, 802b including its slot for the fulcrum 810 and staples 803a, 803b. Figures 8M and 8N illustrate the details of the fulcrum 810 which include right and left cartridge slots 820a, 820b and fulcrum screw 812 and mating alignments. Most importantly it has four incremental calibration slots for incremental degrees of facet joint stapling. Also illustrated are spring anchors 814.

[0047] Figures 8O and 8P illustrate frontal and perspective views, respectively of the two opposing titanium facet staples 803a, 803b. Each staple 803a, 803b consists of a bracket 836, a nail 837 and an alignment pin 835. Illustrated are four sequential calibrated tightening positions of the opposing staples 803a, 803b. Increasing the calibrated opposition of the two staples 803a, 803b leads to increasing opposition of the facet joints and hence increasing rigidity, and decreasing flexibility. Each staple 803a, 803b has two alignment recesses 838. The opposition of these staples 803a, 803b around the facet joint forms a rectangular facet joint enclosure.

[0048] Figures 8Q ad 8R illustrate the stapled inferior and superior articulating facets 851, 852. Figure 8R illustrates the application of the facet stapler 800 on the facets 851, 852 introducing the facet staple 803. The facet staple is used to join the exterior articulating facet 851 and the interior articulating facet 852.

2. THE SURGICAL METHOD

[0049] The surgical steps necessary to practice the present invention will now be described.

[0050] The posterior lumbar spine implantation of the BDFT screws 1000, plate and IBFD can be implanted via a previously described posterior lumbar interbody fusion procedure (PLIF) or posterior transforaminal lumbar interbody fusion procedure (TLIF). The procedure can be performed open, microscopic, closed, tubular or endoscopic. Fluoroscopic guidance can be used with any of these procedures.

[0051] After the adequate induction of anesthesia, the patient is placed in the prone position.

[0052] A midline incision is made for a PLIF, and one or two parallel paramedian incisions or a midline incision is made for a TLIF. For the PLIF a unilateral or bilateral facet sparing hemi-laminotomy is created to introduce the BDFT screws 1000, plates or IBFD into the disc space after it is adequately prepared. For the TLIF procedure, after a unilateral dissection and drilling of the inferior articulating surface and the medial superior articulating facet, the far lateral disc space is entered and a circumferential discectomy is performed. The disc space is prepared and the endplates exposed.

[0053] There are then multiple embodiments to choose from for an intervertebral body fusion. With the first and simplest choice, under direct or endoscopic guidance one BDFT screw 1000 or three BDFT screws 1000 can be placed in a triangulating manner encompassing the anterior and middle vertebral columns (Figures 4A-C). The screws 1000 are then maximally expanded purchasing and uniting the vertebral bodies above and below the disc space. Bone material or an alternative intervertebral fusion device can then be packed into the disc space. The casing of the screws 1000 prevents subsidence of the vertebral bodies. An additional option in the posterior lumbar spine is to place a mini-plate dorsally underneath the thecal sac to prevent bone migration into the nerves. In addition via a TLIF approach a triangular mini-plate/ cage construct can be inserted, and then the BDFT screws 1000 maximally expanded. This is a very simple and practical supplemental or stand-alone intervertebral fusion device.

[0054] Using an alternative IBFD option, utilizing specialized forceps the two-dimensional expanding thoracolumbar expandable IBFD 700 (Figures 7A and 7B) is introduced into the disc space. The final dimension expansion in all embodiments leads to purchasing of the spikes into the vertebral endplates. The BDFT screws 1000 are then driven directly into rostral and caudal vertebral bodies across the intervertebral space. Then bone fusion material; autologous, allograft, bone matrix protein, BMP, rh-BMP, paste or other similar currently available or specially designed osteoconductive substances can be placed into the device and the surrounding

intervertebral space. In embodiments with an incorporated viscoelastic balloon sheath, prior to engaging the screws the expandable elastometric sheath/balloon is filled with bone fusion material as mentioned above. If desirable, further material, can be placed outside its confines within the intervertebral space.

[0055] If further posterior column stability or rigidity is required, unilateral or bilateral, single level or multiple level facet screw stapling can be performed under open, microscopic flouroscopiq or endoscopic vision. Radiographic confirmation of staple position is obtained. Calibrated stapling leads to opposition of the facet joints with incremental degrees of joint opposition. This can lead to variable degrees of posterior column rigidity and/or flexibility.

[0056] The anterior lumbar spine implantation of solitary BDFT screw(s) 1000, BDFT screws incorporated into a horizontal linear or triangular mini-plate, or the IBFD/BDFT screw embodiment for L4/5 and L5/S1 interspaces can be performed on the supine anesthetized patient via previously described open micropscopic or endoscopic techniques. Once the disc space is exposed and discectomy and space preparation is performed, placement of one, two or three BDFT screws 1000 with or without a ventral mini-plate, or placement of two dimensionally expanding IBFD with or without expansile elastometric sheaths and their incorporation is identical to that performed for the posterior approach.

[0057] The posterior placement of the BDFT screws 1000 alone or combined with mini-plates or with IBFD embodiments into the thoracic spine can be performed via previously described transpedicular approaches; open or endoscopic. The anterior placement of the IBFD 700 into the thoracic spine can be accomplished via a trans-thoracic approach. Once disc space exposure is obtained via either approach, all of the above mentioned embodiments can be inserted. Engagement of the devices is identical to what was mentioned above.

[0058] For anterior placement of the cervical embodiments of the BDFT screw(s) 1000 with or without the horizontal linear or triangular cervical mini-plate, and the IBFD embodiments the anterior spine is exposed in the anesthetized patient as previously described for anterior cervical discectomies. Once the disc space is identified, discectomy is performed and the disc space prepared. Implantation and engagement of all devices is identical to that described for the anterior lumbar and thoracic spines.

[0059] The present invention may provide an effective and safe technique that overcomes the problems associated with current tanspedicular-based thoracic and lumbar fusion technology,

and with current vertical cervical plating technology, and for many degenerative stable and unstable spine diseases, and could replace many pedicle screw-based and anterior vertical-plate based instrumentation in many but not all degenerative spinal conditions. Calibrated facet joint screw staples can facilitate flexible fusions and could replace current static trans-facet screws.

[0060] To our knowledge there has not been any other previously described bidirectional screw for use in the spine, other joints, or for any commercial or carpentry application. The bi-directional screw 1000 described herein may indeed have applications in general commercial, industrial and carpentry industries. To our knowledge the description of zero to subzero profile anterior or posterior horizontal spinal plates which traverse the diameter of the disc space has not been previously described. To our knowledge an intervertebral three-inone construct combining bone cage, plate and screws has not been previously reported. To our knowledge calibrated facet joint staples 803a, 803b have not been previously described.

We claim:

1. A self-drilling screw apparatus, which comprises:

a shell;

a first screw member having a tapered end and a threaded body disposed within the shell;

a second screw member having a tapered end and a threaded body disposed within the shell; and

a drive mechanism for driving the first and second screw members from the shell.

2. An apparatus according to claim 1 wherein the shell includes a first aperture threaded in a first direction for the first screw member and a second aperture threaded in the opposition direction for the second screw member.

3. An apparatus according to claim 1 wherein the drive mechanism includes;

a drive screw disposed at least partially within the shell;

a pinion responsive to the rotation of the drive screw;

a gear rotated by the pinion, and the rotation of the gear imparts rotation to the first screw member and the second screw member.

4. An apparatus according to claim 3 wherein the drive screw includes an accessible head that is rotated in order to drive the first and second screw members from the shell.

5. An apparatus according to claim 3 where in the gear includes keyways for the first screw member and the second screw member.

6. An apparatus according to claim 3 which further includes end caps and a top for enclosing the shell.

7. An apparatus according to claim 1 wherein the drive mechanism includes:

a drive screw disposed at least partially within the shell; and

a pinion that is responsive to the rotation of the drive screw and that drives at least one of the screw members.

8. An apparatus according to claim 7 wherein the first screw member is of a diameter smaller than the diameter of the second screw member; and wherein the second screw member includes a hollow threaded portion that receives a portion of the threaded body of the first screw member.

9. An apparatus according to claim 8 wherein the threaded body of the first screw member is threaded in a first direction and the threaded body of the second screw member is threaded in the opposite direction.

10. An apparatus according to claim 9 wherein the drive screw includes an accessible head that is rotated in order to drive the first and second screw members from the shell.

11. An apparatus according to claim 1 wherein the drive mechanism includes:

a first drive screw disposed at least partially within the shell;

a first pinion that is responsive to the rotation of the first drive screw and that drives the first screw member;

a second drive screw disposed at least partially within the shell; and a second pinion that is responsive to the rotation of the second drive screw and that drives the second screw member.

12. An apparatus according to claim 11 wherein the first and second drive screws include accessible heads that are rotated in order to drive the first and second screw members from the shell.

13. An apparatus according to claim 11 wherein the first screw member is of a diameter smaller than the diameter of the second screw member; and wherein the second screw member includes a hollow threaded portion that receives a portion of the threaded body of the first screw member.

14. An apparatus according to claim 11 which further includes end caps and a top for enclosing the shell.

15. An apparatus according to claim 1 wherein the apparatus is used to join together two members, wherein the members are selected from the group which includes bones, portions of the spinal column, vertebral bodies, wood, building materials, metal, masonry or plastics.

16. An apparatus which includes a plurality of screw apparatuses of claim 1 arranged in a predetermined pattern to join at least two vertebral bodies.

17. An apparatus according to claim 1 wherein the first screw member and the second screw member extend bi-directionally from opposite ends of the shell.

18. An apparatus which includes a plurality of screw apparatuses of claim 1 and which further includes:

a first plate with a predetermined pattern of apertures for the screw apparatuses; and

a second plate with a predetermined pattern of apertures for the screw apparatuses.

19. An apparatus according to claim 18 where in the plurality of screw apparatuses and plates are used to join together a pair of vertebral bodies.

20. An apparatus according to claim 18 wherein the plates include slots for at least two screw apparatuses.

ABSTRACT OF THE DISCLOSURE

An apparatus and method for joining members together using a self-drilling screw apparatus or stapling apparatus are disclosed. The screw apparatus includes a shell and first and second first screw members having tapered ends and threaded bodies that are disposed within the shell. A drive mechanism rotatably drives the first and second screw members from the shell in opposite directions and causes the screw members to embed themselves in the members to be joined. The screw apparatus can be used to join members such as bones, portions of the spinal column, vertebral bodies, wood, building materials, metals, masonry, or plastics. The stapling apparatus includes first and second lever arms rotatably joined together at a fulcrum, and the lever arms rotate in opposite directions. First and second cartridges are disposed at the ends of the lever arms. Each cartridge is capable of holding a staple including a bracket, a nail member and an alignment slot. When the ends of the lever arms are rotated towards each other the staples from the cartridges are interlocked. The staples can be also be used to join members such as bones, portions of the spinal column, or vertebral bodies.

100381389.docx

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.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

26191 7590 12/07/2023
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
SHIRSAT, MARCELA	

ART UNIT	PAPER NUMBER
3775	

NOTIFICATION DATE	DELIVERY MODE
12/07/2023	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):

PATDOCTC@fr.com

Response to Rule 312 Communication	Application No. 17/208,640	Applicant(s)
	Examiner	Art Unit

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

1. ☒ The amendment filed on *04 December 2023* under 37 CFR 1.312 has been considered, and has been:

a) ☒ entered.

b) ☐ entered as directed to matters of form not affecting the scope of the invention.

c) ☐ disapproved because the amendment was filed after the payment of the issue fee.
Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.

d) ☐ disapproved. See explanation below.

e) ☐ entered in part. See explanation below.

Kimberly Payne

Publishing Division

Substitute Disclosure Form / U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 46440-0006007	Application No. 17/208,640
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))	Applicant Moskowitz Family LLC	
	Filing Date March 22, 2021	Group Art Unit 3775

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass
	55.	7028878	4/18/2006	Bauer			
	56.	7030904	4/18/2006	Adair			
	57.	7037258	5/2/2006	Chatenever			
	58.	7097615	8/29/2006	Banik			
	59.	7211112	5/1/2007	Baynham et al.			
	60.	7226480	6/5/2007	Thalgott			
	61.	7232464	6/19/2007	Mathieu et al.			
	62.	7238203	7/3/2007	Bagga et al.			
	63.	7442209	10/28/2008	Michelson			
	64.	7641693	~~5/11/2006~~	Gutlin et al.	01/2010		
Change(s) applied to document, /M.E.G./ 10/2/2023	65.	7674296	3/9/2010	Rhoda et al.			
	66.	7691147	4/6/2010	Gutlin et al.			
	67.	7704279	4/27/2010	Moskowitz			
	68.	7753958	7/13/2010	Gordon et al.			
	69.	7776047	8/17/2010	Fanger et al.			
	70.	8268000	9/18/2012	Waugh et al.			
	71.	20020068977	6/6/2002	Jackson			
	72.	20020143338	10/3/2002	Orbay			
	73.	20020143399	10/3/2002	Sutcliffe			
	74.	20040088054	5/6/2004	Berry			
	75.	20040177531	9/16/2004	DiBenedetto			
	76.	20040186569	9/23/2004	Berry			
	77.	20040254644	12/16/2004	Taylor			
	78.	20050027362	2/3/2005	Williams			
	79.	20050049590	3/3/2005	Alleyne			
	80.	20050177235	8/11/2005	Baynham			
	81.	20050177236	8/11/2005	Mathieu et al.			

Examiner Signature	Date Considered
/MARCELA I. SHIRSAT/	02/14/2023

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.I.S./

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.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/208,640	01/09/2024	11864755	46440-0006007	6013

26191 7590 12/20/2023

FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

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.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at https://certifiedcopycenter.uspto.gov/index.html. The Certified Copy Center may be reached at (800)972-6382.

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 0 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 Center (https://patentcenter.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 PATENT CENTER site https://patentcenter.uspto.gov for additional inventors):

Mosheh T. Moskowitz, Rockville, MD;
Nathan C. Moskowitz, Rockville, MD;

APPLICANT(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional applicants):

Moskowitz Family LLC, Rockville, MD;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

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.
17/208,640	03/22/2021	Mosheh T. Moskowitz	46440-0006007	6013

26191 7590 01/09/2024

FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
SHIRSAT, MARCELA	

ART UNIT	PAPER NUMBER
3775	

NOTIFICATION DATE	DELIVERY MODE
01/09/2024	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):

PATDOCTC@fr.com

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.	ISSUE DATE	PATENT NO.
17/208,640	09-Jan-2024	11864755

FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EGRANT NOTIFICATION

Your electronic patent grant (eGrant) is now available, which can be accessed via Patent Center at https://patentcenter.uspto.gov

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