IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Milwaukee Electric Tool Corporation
Title:	UTILITY ASSEMBLY AND COUPLING MECHANISM
Appl. No.:	16/216,724
Filing Date:	December 11, 2018
Examiner:	Weinerth, Gideon R.
Art Unit:	3736
Confirmation No:	1402

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

AMENDMENT AND REPLY UNDER 37 C.F.R. § 1.116

This communication is responsive to the Non-Final Office Action dated January 24, 2019, concerning the above-referenced patent application.

Amendments to the Claims begin on page 2 of this document.

Remarks begin on page 8 of this document.

Amendments to the Claims:

The claims are amended as follows.

1. (Currently amended) A container assembly comprising:

a first container comprising:

a first coupler extending from a first face of the first container, the first coupler ~~including a~~ comprises two sidewalls, a back wall, and a rib, the back wall extends between the two sidewalls, the two sidewalls and the back wall project from a depressed surface of the first face, and the rib ~~that is offset from the first face and extending~~ extends from the back wall in a first direction above the depressed surface; and

a latch recess; and

a second container comprising:

a second coupler extending from a second face of the second container, the second coupler ~~including~~ includes a tongue that is offset from the second face and ~~extending~~ extends in a second direction opposite the first direction, the tongue of the second container is engageable with the rib of the first container; and

a latch coupled to the second container, the latch positionable in a locked position in which the latch prevents disengagement of the first container and the second container when the tongue and rib are engaged.

2. (Currently amended) The container assembly of claim 1, wherein the first and second couplers on the first and second containers, respectively, ~~engaging~~ engage when the first and second containers are slid along a sliding path defined by the rib and the tongue.

3. (Original) The container assembly of claim 1, wherein when the tongue and rib are engaged:

a first side wall of the first coupler and a second side wall of the second coupler interface to restrict displacement between the first container and the second container in a third direction perpendicular to the first direction and parallel to the first face of the first container.

4. (Cancelled)

5. (Currently Amended) The container assembly of claim 1,

the second container comprising a single second coupler, the single second coupler comprising a single rib; and

the first container further comprising:

a third coupler extending from a ~~third~~ second face of the first container, the third coupler including a tongue that is offset from the second face of the first container and extending in the second direction, the tongue of the first container configured to engage a rib of a third container, the first and third containers entering an engaged position by the third container sliding with respect to the first container; and

a latch coupled to the first container, the latch positionable in a locked position in which the latch prevents disengagement of the first container and the third container when the tongue of the first container and the rib of the third container are engaged.

6. (Original) The first container of claim 1, wherein the first coupler extends from a bottom face of the first container, and the second coupler extends from a top face of the second container.

7. (Currently Amended) A coupling mechanism configured for detachably attaching a first utility module to a second utility module, the coupling mechanism comprising:

a first coupler extending from a first face of the first utility module, ~~the first face being one of a top face of the first utility module and a bottom face of the first utility module,~~ the first coupler ~~comprising a~~ comprises a back wall, two sidewalls, and a rib, the back wall and the two sidewalls project from a depressed surface of the first face, and the rib ~~that is offset from the first face and extending~~ extends from the back wall and the two sidewalls in a first direction above the depressed surface;

a second coupler extending from a second face of the second utility module, the second face being one of a top face of the second utility module and a bottom face of the second utility module, the second coupler ~~comprising~~ comprises a tongue engageable with the rib, the first and second utility modules ~~entering~~ enter an engaged position by the second utility module sliding with respect to the first utility module along a sliding path defined by the rib and the tongue;

a latch recess defined by one of the first utility module and the second utility module; and

a latch coupled to the other of the first utility module and the second utility module the latch recess is not defined by, the latch being positionable in a locked position in which the latch prevents disengagement of the first container and the second container when the tongue and rib are engaged.

8. (Original) The coupling mechanism of claim 7, the second utility module comprising a single second coupler with a tongue extending in the second direction, the single second coupler comprising a single tongue.

9. (Original) The coupling mechanism of claim 7, the first face of the first utility module comprising multiple couplers, the first face configured to detachably engage with multiple utility modules simultaneously.

10. (Currently amended) The coupling mechanism of claim 7, the first utility module ~~comprising~~ comprises a single first coupler, the single first coupler comprising a single rib.

11. (Original) The coupling mechanism of claim 7, wherein the first face of the first container is a top face of the first container, and wherein the second face of the second container is a bottom face of the second container.

12. (Original) The coupling mechanism of claim 7, wherein when the tongue and rib are engaged:

a first side wall of the first coupler and a second side wall of the second coupler interface to restrict displacement between the first container and the second container in a third direction perpendicular to the first direction and parallel to the first face of the first container.

13. (Cancelled)

14. (Currently amended) A first container configured to be removably coupled to a second container, the first container comprising:

a top face;

a bottom face; and

a first coupler extending from a first face of the first container that is one of the top face and the bottom face, the first coupler ~~including~~ comprises a tongue that is offset from the first face and ~~extending~~ extends in a first direction;

a second coupler extending from a second face of the first container that is the other of the top face and the bottom face, the second coupler ~~including~~ comprises a back wall, two sidewalls, and a rib, the back wall and the two sidewalls project from a depressed surface of the second face, the rib offset from the second face and ~~extending~~ extends above the depressed surface in a second direction opposing the first direction, the rib engageable with a second tongue coupled to a second container, the first container ~~entering~~ enters an engaged position with the second container by the first and second containers sliding with respect to each other, wherein the depressed surface of the second face covers at least 50% of the second face;

a latch recess; and

a latch, the latch positionable in a locked position in which the latch interlocks with a second latch recess in the second container restricting displacement between the first container and the second container.

15. (Currently Amended) The first container of claim 14, the rib ~~engageable~~ engaged between the second tongue of the second container and a first face of the second container, when the first container is removably coupled to the second container.

16. (Original) The first container of claim 14, the first coupler of the first container engageable with a second rib of a third container.

17. (Original) The first container of claim 16, the latch recess of the first container engageable with a second latch of the third container.

18. (Original) The first container of claim 14, the first container comprising a single second coupler, the single second coupler comprising a single rib.

19. (Original) The first container of claim 14, the first container comprising a single first coupler, the single first coupler comprising a single tongue.

20. (Original) The first container of claim 14, wherein the first face of the first container is the bottom face of the first container, and the second face of the first container is the top face of the first container.

21. (New) The first container of claim 1, wherein the depressed surface of the first face comprises at least 50% of the area of the first face.

22. (New) The coupling mechanism of claim 7, wherein the depressed surface of the first face comprises at least 50% of the area of the first face.

REMARKS

This reply is intended to be completely responsive to the Non-Final Office Action dated January 24, 2019.

Status

Claims 1-20 are pending in this application.

Claims 1-20 were rejected.

With this submission claims 1, 2, 5, 7, 10, 14, and 15 are amended, claims 4 and 13 are cancelled, and claims 21 and 22 are added.

Applicant believes that each of the rejections raised by the Examiner has been addressed and the application is in condition for allowance. Reconsideration and allowance of the application is respectfully requested.

Examiner Interview

Applicant thanks Examiner Weinerth for the opportunity to conduct an Examiner Interview to discuss the pending and proposed claims. No formal agreement was reached.

Applicant respectfully disagrees with the characterization in the Examiner's summary of the Interview that "Applicant could also not identify what comprises the claimed 'single second coupler comprising a single rib' as put forth in the original disclosure of the application." *Examiner's Interview Summary*, page 2. The Examiner requested Applicant to identify the feature and before a response was provided the Examiner asked another question requesting different information. Applicant has since reviewed the disclosure and provides the following requested identification.

To disclose the feature of a "single second coupler", Applicant submits that this feature is described in the specification by virtue of the following phrases: "one or more female couplers",

"at least one female coupler", "one or more depressed locking locations", and "at least one locking location." For exemplary purposes only and without limitation Applicant submits that these descriptions can be found in the specification as originally filed at least at paragraphs 8, 10, 12, 15, 106, 120, 148, 149, and 158.

To disclose the feature of a female coupler comprising a single rib, Applicant submits that this feature is described in the specification by virtue of the following phrases: "one or more ribs", "at least one rib", "one or more locking ribs", and "at least one locking rib." For exemplary purposes only and without limitation, Applicant submits that these descriptions can be found in the specification as originally filed at least at paragraphs 5, 6, 11, 13-17, 99, 103, 106-108, 120, and 126-128. Additionally, paragraph 33 recites "a single locking rib can extend at a rear end of a depressed locking location", paragraph 109 recites "a single locking rib extends at rear end of a depressed locking location", and paragraph 129 recites "a single locking rib extends at rear end of a depressed locking location".

Applicant submits that at least these paragraphs provide the description requested by the Examiner.

Claim Rejections - 35 U.S.C. § 112

I. Rejection of claims 2, 5, and 15 under 35 U.S.C. § 112(b)

On pages 2-3 of the Office Action, the Examiner rejected claims 2, 5, and 15 under 35 U.S.C. § 112(b) for allegedly being indefinite. Without conceding the propriety of these rejections, to expedite prosecution of this application Applicant has amended each of claims 2, 5, and 15 to address the issues identified by the Office Action. Accordingly, Applicant submits these rejections are overcome and should be withdrawn.

Claim Rejections - 35 U.S.C. § 102

I. Rejection of claims 1-8 and 10-20 under 35 U.S.C. § 102 as being anticipated by Madsen

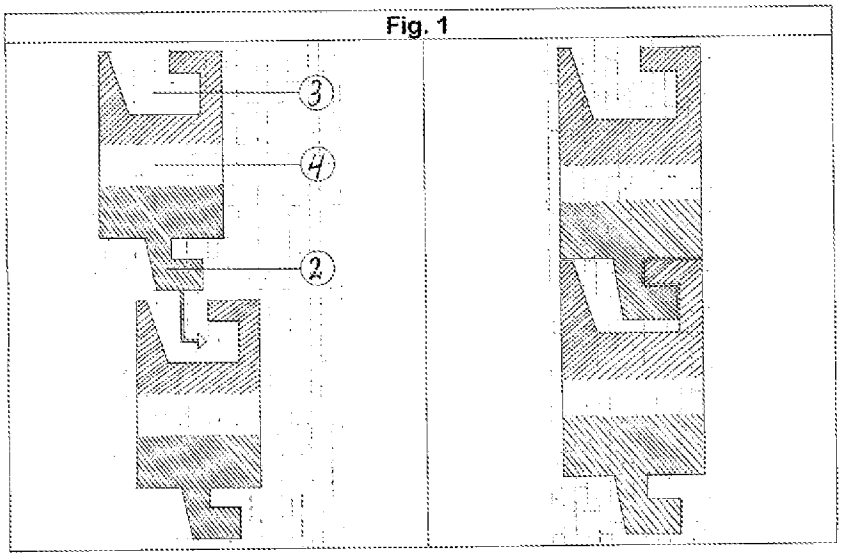
On pages 5-9 of the Office Action, the Examiner rejected claims 1-8 and 10-20 under 35 U.S.C. § 102 as being anticipated by Madsen, U.S. Patent Publication No. 2011/0139665 ("Madsen").

Claim 1:

Applicant submits that Madsen fails to disclose two sidewalls and a back wall extending therebetween, the two sidewalls and the back wall projecting from a depressed surface, and a rib that extends from the back wall in a first direction above the depressed surface. Claim 1, as amended, recites in relevant part as follows.

> a first coupler extending from a first face of the first container, the first coupler comprises two sidewalls, a back wall, and a rib, the back wall extends between the two sidewalls, the two sidewalls and the back wall project from a depressed surface of the first face, and the rib extends from the back wall in a first direction above the depressed surface.

Instead of disclosing two sidewalls and a back wall projecting from a depressed surface, and a rib extending from the back wall above the depressed surface, Madsen discloses a cavity with a projection extending into the cavity. Madsen fails to show or describe three walls projecting from a depressed surface. Fig. 1 in Madsen illustrates the typical embodiment in Madsen.



Madsen's cavity is different than two sidewalls and a back wall projecting from a depressed surface of a first face, as recited in claim 1. For at least this reason, Applicant submits that the rejection of claim 1 under § 102 for Madsen allegedly anticipating claim 1 should be withdrawn.

Claim 7:

Applicant submits that Madsen fails to disclose a back wall and two sidewalls projecting from a depressed surface, and a rib extending from the backwall and the two sidewalls in a first direction above the depressed surface. Claim 7, as amended, recites in relevant part as follows.

> a first coupler extending from a first face of the first utility module, the first coupler comprises a back wall, two sidewalls, and a rib, the back wall and the two sidewalls project from a depressed surface of the first face, and the rib extends from the back wall and the two sidewalls in a first direction above the depressed surface.

Applicant submits that claim 7 is allowable over Madsen for at least the same or similar reasons as exist for claim 1. Additionally, claim 7 further recites that the rib extends from the two sidewalls and the back wall. Madsen fails to disclose or describe a rib extending from two sidewalls and a back wall.

For at least this additional reason Applicant submits that the rejection of claim 7 under § 102 for Madsen allegedly anticipating claim 7 should be withdrawn.

Claim 14:

Applicant submits that Madsen fails to anticipate claim 14 for at least the same or similar reasons as exist for claim 7. Additionally, Madsen fails to disclose or suggest the depressed surface of the second face covering most of the second face, as recited in claim 14.

> a second coupler extending from a second face of the first container that is the other of the top face and the bottom face, the second coupler comprises a back wall, two sidewalls, and a rib, the back wall and the two sidewalls projecting from a depressed surface of the second face, the rib offset from the second face and extends above the depressed surface in a second direction opposing the first direction, the rib engageable with a second tongue coupled to a second container, the first container enters an engaged position with the second container by the first and second containers sliding with respect to each other, wherein the depressed surface of the second face covers most of the second face.

Applicant submits that Madsen fails to disclose or suggest the back wall and the two sidewalls projecting from a depressed surface of the second face, wherein the depressed surface of the second face covers most of the second face. Without limitation and for exemplary purposes only, this feature is supported in the specification and figures as originally filed at least at Fig. 12C, which is copied below.

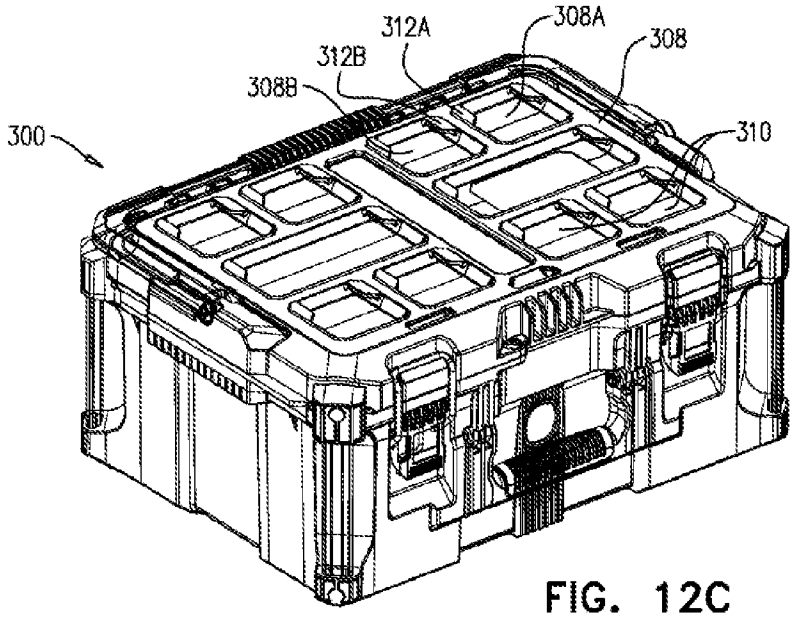
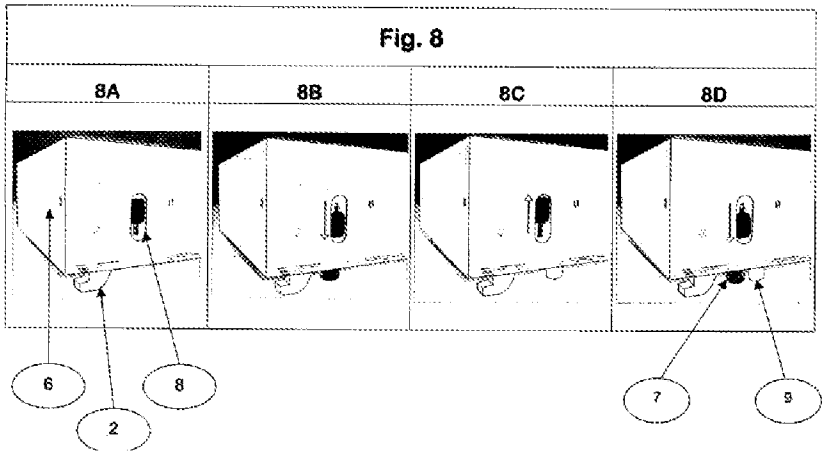


FIG. 12C

Applicant submits that Madsen fails to disclose or even suggest the feature of the back wall and the two sidewalls projecting from a depressed surface of the second face, wherein the depressed surface of the second face covers most of the second face. First, Madsen fails to provide a perspective view of the relevant face that depicts this feature. Second, one of the few perspecive views of the projecting surface in Madsen, copied below, suggests that the cavities in Madsen comprise a very small portion of the surface area – far less than most.



Accordingly, Applicant submits that claim 14 is allowable over Madsen for at least these additional reasons.

Remaining claims 2-6, 8, 10-13, and 15-20:

Claims 4 and 13 are cancelled, and therefore their rejection is moot. Applicant submits that claims 2-3, 5-6, 8, 10-12, and 15-20 are allowable over Madsen for at least the same reasons as exist for claims 1, 7, and and 14, from which they depend.

Claim Rejections - 35 U.S.C. § 103

I. Rejection of claim 9 under 35 U.S.C. § 103 as being obvious over Madsen in view of Zelinsky

On pages 10-11 of the Office Action, the Examiner rejected claim 9 under 35 U.S.C. § 103 as being obvious over Madsen in view of Zelinsky, U.S. Patent Publication No. 2011/0073516 ("Zelinsky").

Applicant submits that Zelinsky fails to remedy the deficiencies of Madsen. Zelinsky fails to disclose or even suggest a back wall and two sidewalls projecting from a depressed surface, and a rib extending from the backwall and the two sidewalls in a first direction above the depressed surface, which is recited in claim 7 from which claim 9 depends.

For at least this reason Applicant submits that claim 9 is allowable over Madsen in view of Zelinsky for at least the same reasons as exist for claim 7.

New Claims

Claims 21 and 22 were added. Both claims 21 and 22 recite in relevant part as follows:

> wherein the depressed surface of the first face comprises at least 50% of the area of the first face.

Without limitation and for exemplary purposes only, this feature is supported in the specification and figures as originally filed at least at Fig. 12C, which is copied below. Applicant submits that depressed locking locations of female coupler members 310 in Fig. 12C comprise at least 50% of the area of the top surface of cover/lid 308.

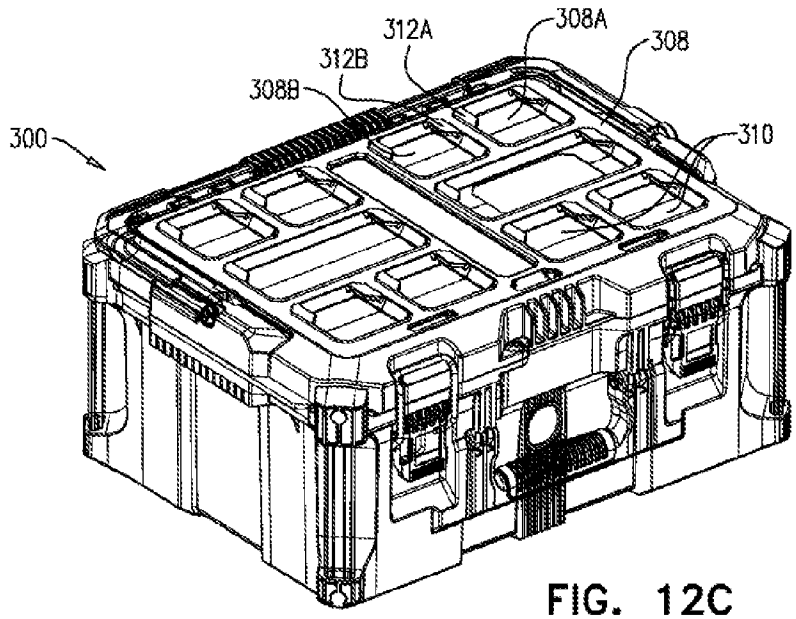


FIG. 12C

Applicant submits that Madsen and Zelinsky fail to disclose or suggest a depressed surface comprising at least 50% of the area of the face, wherein two sidewalls and a back wall extend from the depressed surface and a rib projects from the back wall over the depressed surface.

Accordingly, Applicant submits that claims 21 and 22 are allowable over the cited references for at least these reasons, in addition to the reasons that exist for claims 1 and 7, from which claims 21 and 22 depend, respectively.

Conclusion

Applicant believes that the present application is in condition for allowance. Favorable reconsideration of the application is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

It should be noted that, for the sake of clarity and simplicity, Applicant's remarks have focused on the rejections of the independent claims set forth in the Office Action with the understanding that the dependent claims are patentable for at least the same reasons as the independent claims. Further, in addressing the Examiner's rejections, Applicant's remarks have set forth only some of the available arguments for patentability of the rejected claims. Applicant expressly reserves the right to argue the patentability of all claims separately and to provide new, different, and/or additional arguments for patentability not set forth herein, including, but not limited to, the failure of cited references to disclose, teach, or suggest other elements of the claims, the lack of motivation to combine cited references, teachings away from the combination of cited references, the failure of references to qualify as prior art or improper combination of the cited references, in this or any future proceedings.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 18-0882. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 18-0882.

Respectfully submitted,

Date April 23, 2019

By /Derek H. Campbell/

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U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A1	2006/0186624	08-24-2006	Kady, Darren	
	A2	2008/0115312	05-22-2005	DiPasquale et al.	
	A3	2012/0207571	08-16-2012	Scott, Charles Shay	
	A4	2016/0023349	01-28-2016	Milwaukee Electric Tool Corporation	

UNPUBLISHED U.S. PATENT APPLICATION DOCUMENTS

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	A5	WO 2005/045886	05-19-2005	Brooks Automation, Inc.		

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]
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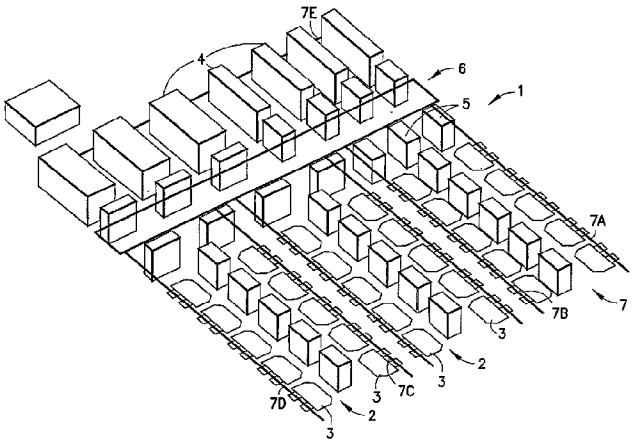
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[Continued on next page]

(54) Title: AUTOMATED MATERIAL HANDLING SYSTEM



(57) Abstract: A semiconductor workpiece processing system comprising at least one processing tool, a container, a first transport section, and a second transport section. The processing tool is used for processing semiconductor workpieces. The container is used for holding at least one semiconductor workpiece therein for transporting to and from the processing tool. The first transport section is connected to the processing tool for transporting the container to and from the processing tool. The second transport section is connected to the first transport section for transporting the container to and from the processing tool. The first transport section is vehicle based having a transport vehicle capable of holding the container and moving along a first track of the first transport section. The second transport section is not vehicle based and has a second track with at least one support element thereon adapted to interface with the container for movably supporting the container from the second track and allowing the container to move relative to the first track. The first track and second track are disposed proximate to each other to allow the container to moved therebetween in one move.

WO 2005/045886 A2

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

AUTOMATED MATERIAL HANDLING SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to material handling systems and, more particularly, to a automated material handling systems for transporting semiconductor workpiece holding canisters or containers in processing facilities.

2. Earlier Related Developments

Consumers continue to manifest a desire for ever more sophisticated electronic and electrical devices that are smaller in size and cheaper than current models. Manufacturers of microelectronic devices are thus under increased pressure to provide more capabilities to the devices while at the same time reducing the cost of the devices. The potential for reduction in cost of the materials used in fabricating the microelectronic devices, or in the cost related to actual fabrication of the devices is limited. However, significant cost reductions may be achieved by increasing the efficiency of the whole manufacturing process. Referring to Fig. 1, there is shown a perspective view of a representative conventional semiconductor fabrication facility 1. The fabrication or fab facility 1 has a number of fab bays 2 arranged in the facility in a desired array. The fab bays 2 include vacuum and atmospheric processing tools 3, 4 where the semiconductor devices are manufactured. The fab facility 1 also has an automated material handling system installed therein for transporting the semiconductor material to and from the semiconductor devices. The conventional material handling system in

the fab facility shown in Fig. 1, generally includes stockers 5, interbay transport system 6, and intrabay transport system 7. In this arrangement, the stockers 5, used to store the semiconductor devices between various processing evolutions, are located adjacent the opening of the fab bays 2 on a common passage linking the fab bays 2. The interbay transport system 6 is installed in the common passage and connects the stockers 5. This allows semiconductor devices to be transported, by suitable vehicles traveling on the interbay transport system 5 between stockers 5. The intrabay transport system 7, as seen in Fig. 1, has sections 7A-7B disposed in the fab bays linking the stockers 5 adjacent the opening of a given bay to the processing tools 3, 4 in that bay. Thus, semiconductor devices can be transported between the stockers 5 of a bay and the processing tools in that bay with suitable vehicles traveling on the corresponding section 7A-7F of the intrabay transport system.

As can be realized from Fig. 1, the automated material handling system is one of the significant factors in the efficient fabrication process in the fab facility. A significant amount of time is consumed transporting the semiconductor material with the material handling system, to and from the processing tools. Indeed, the larger the processing facility, in order to achieve economies of scale, the greater the time consumed transporting semiconductor material with the material handling system to and from processing tools within the facility. Thus, the size of the facility itself becomes limited by the speed and efficiency with which the material handling system is capable of delivering semiconductor material to the processing tools for processing, and removing the

processed workpieces to stockers for ultimate completion and shipping. Attempts to increase efficiency by reducing transport time have been made, and have achieved success in cases. For example, the Aeroloader™ automated material handling system from Brooks Automation, Inc. employs overhead transport vehicles or shuttles on overhead tracks to transport semiconductor workpiece container over the interface of the processing tools. Further increases in speed, and hence efficiency, at which semiconductor workpieces are transported around the facility have been sought. Some conventional material handling systems, have used a conveyor or mass transport system alone or as part of the system. Fig. 1A is a partial perspective view of a portion of a conventional conveyor system such as for example disclosed in international patent publication WO 03/038,869, for transporting a conventional semiconductor workpiece container. The container F shown in Fig. 1A is conventional container such as a conventional FOUP or SMIF container. As noted before, Fig. 1A shows a portion of a conveyor track CT of the conventional system. The track CT in Fig. 1A may be representative of one or more of the tracks 7A-7F of the system in Fig. 1. The conventional conveyor track CT in Fig. 1A comprises a pair of rails R1, GR. The conventional conveyor system uses a pallet P as shown to support the conventional container F on the conveyor track CT. The pallet P has a support area on which the container F may be seated. The pallet P may also have runners P1, P2 to allow the pallet P to ride over the conveyor rails R1, GR. One runner P1 may be flat, defining a rolling surface for rollers RR in rail R1. The other runner P2, may have a guide slot, or guide key mated to the rail GR to guide the pallet P

along the rails during transport. Rail R1 of the conventional conveyor track shown in Fig. 1A may include powered rollers RR to drive the pallet P on the rails. The rollers RR are coupled by a suitable transmission, such as an endless belt, to a drive motor capable of turning the rollers. To move the pallet P, and hence the container seated thereon, in the conventional system shown in Fig. 1A, the motor rotates the rollers RR and the frictional contact between rollers and pallet runner P1 causes the pallet to move. The other runner P2 of the pallet P, slidably mated to rail GR, guides the pallet as it is moved down the rails maintaining alignment between the pallet runner P1 and drive rollers RR. As can be realized from Fig. 1A, alignment between the pallet runner, and hence between rail GR, and the contact line of the line of rollers RR in rail R1, should be highly accurate in the conventional mechanical driven conveyor track to allow the pallet to be driven true to the track. The conventional system is not misalignment tolerant. Misalignment, may generate a force on the pallet orthogonal to the track, resulting in undesired friction, possible binding, between runner P2 and rail GR and in increased potential for particulate contamination on the container. In addition, alignment between rollers RR on rail R1 should be precise to avoid a contact/drive line between rollers and runner P1 that is angled relative to the track. Accordingly, precise alignment between the rails R1 and GR is achieved in the conventional system by fabricating extended sections of track CT in a jig prior to installation in the processing facility. However, such extended sections of track are difficult and time consuming to install in the processing facility. An additional shortfall of the conventional conveyor system is its poor ability to position a container at a desired

location along the track. The conventional conveyor system may include a position locating system for the pallet. The conventional locating system includes providing one of the rails R1 with sensors (e.g. electronic, electro-optical) capable of detecting a feature on the pallet P when the pallet is in a predetermined area relative to the sensors. The sensors are equally distributed along the rails. The rollers RR, alone or in combination with the drive motors may have an encoder identifying the rotation of the rollers. The position of the pallet P at any time is established using the combination of data from the rail sensors and rollers. As can be realized, the conventional locating system is subject to inaccuracies because of possible slippage between rollers RR and pallet during acceleration/deceleration, as well as that locating the pallet between sensors is dependent merely on counting roller revolutions. The combination of the limitations of frictional drive and the conventional position location system deprive the conventional conveyor track of effective fine position control. A further problem of the convention conveyor system is that movement of semiconductor material containers on the transport system is dependent on availability of transport pallets. The present invention provides the desired efficiency for the material handling system, as will be described in greater detail below.

SUMMARY OF THE EMBODIMENTS

In accordance with the first embodiment, a semiconductor workpiece processing system is provided. The system comprises at least one processing tool for processing semiconductor workpieces, a container, a first transport

section, and a second transport section. The container is used for holding at least one semiconductor workpiece therein for transport to and from the processing tool. The first transport section is connected to the processing tool for transporting the container to and from the processing tool. The second transport section is connected to the first transport section for transporting the container to and from the processing tool. The first transport section is a vehicle base section having a transport vehicle capable of holding the container and moving along a first track of the first transport section. The second transport section is not a vehicle base section and has a second track with at least one supporting element thereon. The support element is adapted to interface with the container for movably supporting the container from the second track and allowing the container to move relative to the first track. The first track and second track are disposed proximate to each other to allow the container to be moved therebetween in one move.

In accordance with another embodiment, a semiconductor workpiece container transport system is provided. The system comprises at least one semiconductor workpiece container, a track for movably supporting the at least one semiconductor workpiece container, and a motor. The semiconductor workpiece container is adapted for holding at least one semiconductor workpiece therein. The semiconductor workpiece container has a one piece frame assembly. The track movably supports the semiconductor workpiece container so that the container is capable of moving along the track. The motor is connected to the track for driving the container along the track. At

least part of the motor is mounted to the frame assembly of the container.

In accordance with still another embodiment, a semiconductor workpiece transport container is provided. The container comprises a frame, and a motor portion mounted to the frame. The frame defines a chamber for holding therein at least one semiconductor workpiece. The frame is sized and shaped for interfacing with an interfacing portion of a semiconductor workpiece processing tool to allow the at least one semiconductor workpiece to be transported between the chamber and the processing tool. The frame defines at least one surface for seating against the track of a transport system for transporting the container between the processing tool and another location. The motor portion mounted to the frame is adapted to cooperate with another motor portion of the transport system for driving the container along the track.

In accordance with yet another embodiment, a semiconductor workpiece processing system is provided. The system comprises at least one processing tool, a first transport section, and a second transport section. The processing tool is used for processing semiconductor workpieces. The first transport section is connected to the processing tool for transporting a container holding semiconductor workpieces to and from the processing tool. The second transport section is connected to the first transport section for transporting the containers to and from the processing tool. The first transport section is a vehicle based section having a transport vehicle capable of holding at least one of the containers and moving along a first track of the first transport

section. The second transport section is not vehicle based and has a second track with support elements thereon adapted to interface the containers for movably supporting the containers from the second track and allowing the containers to move bidirectionally relative to the track. The second transport section has a motor connected to the second track capable of bidirectionally driving containers substantially simultaneously on at least one portion of the second track.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing aspects and other features of the present invention are explained in the following description, taken in connection with the accompanying drawings, wherein:

Fig. 1 is a schematic perspective view of a semiconductor fabrication facility with a conventional material handling system;

Fig. 1A is a partial respective view of a portion of the conventional handling system in Fig. 1;

Fig. 2 is a schematic plan view of an automated material handling system incorporating features of the present invention and processing tools P in a processing facility;

Fig. 3 is a partial perspective view of a portion of the automated material handling system in Fig. 1, showing track sections, a transport vehicle and semiconductor workpiece containers of the automated material handling system;

Fig. 4 is another partial perspective view of a portion of one of the track sections in Fig. 3 and a transport vehicle of the automated material handling system;

Fig. 5 is still another partial perspective view of a portion of another one of the track sections in Fig. 3 and a semiconductor workpiece container of the automated material handling system;

Figs. 6A-6B are respectively front and side elevation views of the track sections in Fig. 3, a transport vehicle and semiconductor workpiece container of the automated material handling system;

Fig. 7 is an exploded perspective view of the workpiece container and Fig. 7A is a bottom view of the workpiece container; and

Figs. 7B-7C respectively are bottom perspective views of a lower part of the workpiece container housing in accordance with other embodiments.

DETAILED DESCRIPTION OF THE EMBODIMENT

Referring to Fig. 2, there is shown a schematic plan view of an automated material handling system 10 incorporating features of the present invention and processing tools P in a processing facility. Although the present invention will be described with reference to the single embodiment shown in the drawings, it should be understood that the present invention can be embodied in many alternate forms of embodiments. In addition, any suitable size, shape or type of elements or materials could be used.

The automated material handling system 10 generally includes a first transport system section 12 and a second

transport system section 14. The transport system sections 12, 14 of the automated material handling system 10 are generally arranged to allow transportation of semiconductor workpieces, such as for example, 200 mm wafers, 300 mm wafers, flat display panels and similar such items, to and from processing tools P in the processing facility. The processing tools P, and the facility are generally similar to the facility 1 and tools 4 described before and shown in Fig. 1. The configuration of the automated material handling system 10 shown in Fig. 2 is a representative configuration, and the automated material handling system 10 may be disposed in any suitable configuration to accommodate any desired layout of process tools in a processing facility. One transport system section 12 of the automated material handling system 10 is a vehicle based system. The transport system section 12 comprises tracks 16 and transport vehicles 200 (see also Fig. 4). The transport vehicles 200, as will be described in greater detail below, are capable of holding a semiconductor workpiece container (not shown in Fig. 1) and travel along the tracks 16 of transport section 12. The transport vehicles 200 thus move the workpiece containers along tracks 16 between processing tools, or between processing tools and stockers (not shown) similar to stockers 5 shown in Fig. 1. The other transport system section 14 of the automated material handling system 10 is not a vehicle based transport system. Transport system section 14 is a conveyor based or high speed (relative to a vehicle based system) mass delivery system. Transport system section 14 comprises a track or run 18 capable of directly conveying, without the use of intermediate transport vehicles, semiconductor workpiece containers at high speed as will also be described in greater detail

below. The track 18, as shown schematically in Fig. 2, may extend along at least some portions of track 16 of the other transport system section 12. The track 18 of transport system section 14 may also span between different portions of track 16 of transport system section 12. The semiconductor workpiece containers may be transferred as desired between the track 18 of section 14 and transport vehicles 200 (see Fig. 3) on track 16 of section 12. The automated material handling system 10 may transport semiconductor workpiece containers using any desired combination of the first and second transport system sections 12, 14 in order to achieve the most efficient delivery and return of semiconductor workpiece containers from the processing tools. As seen in Fig. 2, a suitable controller C is connected to the first and second transport system sections 12, 14 to control operation of the sections. The second transport system section 14 may also provide a distributed storage or buffer for the automated material handling system as will be described in greater detail below.

In greater detail now, and with reference to Figs. 3 and 4, the first system section 12 of the automated material handling system 10 generally includes track 16 and transport vehicles 200, as noted above. System section 12 may be generally similar to the automated material handling system described in U.S. Patent Application Serial No. 10/393,728, filed March 21, 2003 incorporated by reference herein in its entirety. As seen in Fig. 2, the track 16 of system section 12 may be arranged into interbay 20, 22, 24 and intrabay 26, 28, 30 portions or branches. The intrabay branches 26, 28, 30 of the track may extend within individual fabrication bays (similar to the bays shown in Fig. 1) of the fab facility. The

interbay branches 20, 22, 24 may extend within corridors or passages connecting the fabrication bays, and interconnect two or more intrabay branches 26, 28, 30 to each other. In the embodiment shown in Fig. 2, there are three intrabay branches 26, 28, 30 and three interbay portions 20, 22, 24. Each of the three interbay branches 20, 22, 24 extends to connect all three intrabay branches 26, 28, 30. In alternate embodiment, the first system section of the automated material handling system may have any suitable number of interbay and intrabay transport portions.

The interbay transport branches 20, 22, 24 of the embodiment shown in Fig. 3 are substantially parallel to each other, though in alternate embodiments different interbay branches may not be parallel. Indeed, interbay transport branches may not connect all fab bays and may have any shape. The present invention encompasses any interbay transport system arranged in any desired manner to connect any desired number of fab bays. In this embodiment, the interbay transport branches 20, 22, 24 are generally similar to each other, and will be described below with specific reference to the central portions 20. The interbay transport branch 20 may be made up of interbay transport segments or elements 20A-20B. In the embodiment shown in Fig. 2, there are two segments 20A-20B for example purposes only, and in alternate embodiments the interbay transport branch may have any desired number of segments. Each segment 20A-20B is of sufficient length to span between two adjoining fab bays and specifically between adjacent portions of the intrabay transport system. For example, segment 20A spans between adjoining intrabay portions 26, 28. In

alternate embodiments, the span of each segment may be different.

As seen in Fig. 2, each segment 20A-20B may have multiple transport paths 19A-21A, 19B-21B, 19C-21C provided by any suitable table means (as will be described below) for transport vehicles (not shown), allowing the vehicles to traverse the segment. The transport paths of each segment are arranged to allow substantially simultaneous bi-directional travel of the transport vehicles on the segment (in directions indicated by arrows X1, X2). In this embodiment, each segment 20A-20B may have two transport paths 19A-21A, 19B-21B extending between the ends of the segment. One path, such as for example 19A, 19B, may be used by transport vehicles to travel in one direction (indicated by arrow X_1) and the other path, 21A-21B, may be used for travel in the opposite direction (indicated by arrow X_2). The travel paths may be dedicated to a given direction of travel or the direction of travel may be switched as desired according to a transport algorithm to suit transport loading conditions. For example, in the non-dedicated case, transport path 19A of segment 20A may at first be used for vehicles traveling in the direction indicated by arrow X_1 in Fig. 2. At that time, path 21A provides for travel in direction X_2. However, if at some later time it is anticipated that some number of transport vehicles are situated in the facility and are going to a location where it would be more efficient to move over path 19A in direction X_2, then the travel direction for path 19A may be changed to direction X_2, path 21A then becoming used for X_1 travel. It is noted, that in this embodiment travel direction need not be the same for similar paths 19A-19B, 21A-21C of each segment. For example, transport

path 21A may be used for travel direction X_2, but transport path 21B may be used for the opposite travel direction X_1. This ability is provided by the interbay transport segments 22A-22C in this embodiment because as seen in Fig. 2, the corresponding transport paths of each segment converge towards each other at opposite ends 32A-32B and 32C-32D of each segment 20A-20B. As seen in Fig. 2, each segment 20A-20B has a junction 34, 36, 38 at corresponding opposite ends of the segment. For example, in the embodiment shown in Fig. 2 segment 20A has a junction 34 at one end 32A and another junction 36 at the opposite end 32B. The respective travel paths 19A-19B, 21A-21B of each segment 20A-20B substantially intersect at each corresponding junction 34, 36, 38. As seen in Fig. 2, the junctions 36 between segments are used to connect the adjoining segments to each other. Junction 36 connects adjoining ends 32B-32C of segments 20A, 20B. Junction 36 may further allow ties between same or different transport paths of the connected segments. For example, junction 36 may be used to tie transport path 19A of segment 20A to the transport path 21B of segment 20B thereby allowing transport vehicles to cross between paths 21B and 19A of the adjoining segments. In alternate embodiments any other suitable configuration of segments and junctions interconnecting segments may be used.

In this embodiment, the intrabay branches 26, 28, 30 are substantially similar to the interbay branches 20, 22, 24. Still referring to Fig. 2 as noted before, the intrabay transport is also made up of three branches for example purposes. Each branch may comprise a single transport segment or element, or may comprise a number of interlinked segments. In the embodiment shown in Fig. 2,

each branch has two segments 26A-26B, 28A-28B, 30A-30B. Each branch segment 26A-30B may extend within a single fab bay or may be further branched to other fab bays. The intrabay transport segments 26A-26B, 28A-28B and 30A-30B are generally similar to each other and hence are schematically illustrated the same in Fig. 2. Each of the segments 26A-26B, 28A-28B, 30A-30B has multiple transport paths, similar to the interbay segments 20A, 20B described before, allowing substantially simultaneous bidirectional travel of transport vehicles along each segment. The transport paths of each segment, for example, paths 25A, 27A of segment 26A, may converge towards each other at opposite ends 40A, 42A of the segment. At the near end 40A the transport paths terminate in junction 34. As noted before, junction 34 is the terminus of interbay transport paths 19A, 21A of an interbay transport segment 20A. Thus, the interbay transport paths 19A, 21A may be unified with the intrabay transport paths 25A, 27A of the intrabay transport segment 26A. In this embodiment, the transport paths, such as for example, paths 26A, 27A of segment 26A, terminate in a junction 44 at the far end 42A. Junction 44 ties in the transport paths to interbay transport segment 22A. In a similar manner, junctions may tie the transport paths of intrabay segments 26B-30B to the outer interbay transport segments 24A-24B. In alternate embodiments, the intrabay transport segments may have any other suitable arrangement.

The interbay and intrabay branches of first transport system 12 are shown in Fig. 2 and have been described above in the context of a representative configuration that can be provided by any number of suitable types of material handling systems. Fig. 4 is a partial

perspective view of a representative portion of an interbay or intrabay transport branch showing one suitable example of the types of handling system materials that may be used for the automated material handling system 10. As seen in Fig. 4, the interbay transport segments 20A-20B (only parts of segments 20A, 20B are shown in Fig. 4 for example purposes) are formed using an overhead rail system such as the Aeroloader™ system available from Brooks Automation, Inc. In this case, each transport path 19A-19B, 21A-21B is provided by a corresponding rail or track. The tracks may be mounted to the fab facility overhead. Referring also to Figs. 6A-6B, there are shown respectively partial front and side elevation views of tracks 20A and a transport vehicle 200.

Fig. 4 shows a third track 23A, 23B for each segment (not shown in Fig. 2 for clarity) which provides a high speed or "fly-through" transport path for each segment. As described before, the tracks converge at the junction 36 between the adjoining segments. In the embodiment shown in Fig. 4 junction 32 includes a turntable 202, though any suitable track switching device may be used. In this case the turntable has three positions to tie the diametrically opposed track ends of the respective transport paths 21A-19B, 23A-23B, 19A-21B. When the turntable is positioned in one of these positions, a transport vehicle 200 may cross between diametrically opposed track ends without moving the turntable. Otherwise, the transport vehicle may be positioned onto the turntable, and the turntable may be rotated as desired to allow the transport vehicle to move from any track 19A, 23A, 21A of one segment to any other track 19B, 23B, 21B of the connected segment. The movement of

the turntable may be automated, controlled by a suitable program from the central processor of the system.

Automated overhead transport vehicles 200 (only one is shown in Figs. 4 and 6A-6B for example) such as the Aeroloader™ system shuttles are mounted on one of the tracks. The transport vehicle 200 may be self propelled to autonomously travel on the corresponding rail forming each of the travel paths. Each vehicle travels on the desired transport paths according to a transport algorithm which may be preprogrammed into vehicle memory (not shown) or loaded from a central processor (not shown) operating the automated material handling system. In this embodiment, though any other suitable type of transport vehicle may be used. The transport vehicle 200 may have a transport section 204 (see Figs. 6A-6B) and a payload section 206. The transport section 240 includes suitable wheels/rollers (not shown) to support and move the vehicle on the track. The transport section may also include a power source and motor for driving the vehicle along the track. The payload section 206 is mounted or otherwise supported from the transport section, and in this embodiment is suspended below the transport section (see Figs. 6A-6B). The payload section 206 may include a hoist 208, in this embodiment schematically depicted as having gripper arms, capable of capturing and raising/lowering a workpiece holding container 151. Figs. 6A-6B show a representative workpiece storage container 151 that may be used with the handling system 10 (and which will be described in greater detail below) located in a position where the hoist 208 of the transport vehicle is capable of engaging the container 151. The storage container 151 may be in a storage area (not shown), such as a uniformly distributed storage

area, under a track of any desired interbay or intrabay transport segment (representative segment 22A is shown for example purposes), or may be on the interface of a processing tool P (see Fig. 2) located below the track. As seen in Fig. 2, the tracks of the interbay and intrabay branches may be located over the tool interface of the processing tools P. Accordingly, transport vehicle 200 is capable of delivering and picking up workpiece container directly from the processing tools P.

Referring again to Fig. 2, the transport system section 14, as noted before, is a conveyor based system, and unlike transport system section 12, does not use transport vehicles for holding and transporting the workpiece holding containers. Rather, transport system section 14 has a conveyor or mass delivery system arranged in conveyor runs, as will be described in greater detail below, that effect direct transport of the workpiece holding containers along the conveyor runs. As will also be described in greater detail below, the workpiece holding containers may be placed directly onto the conveyor runs, and are transported along the runs without using a transport vehicle or carriage interface between the holding container and run. As seen in Fig. 2, in this embodiment the transport system section 14 has four runs 52-58. In this embodiment, the conveyor runs 52-58 are located around the perimeter of the transport system section 12. In alternate embodiments, the conveyor runs may be arranged in any suitable configuration. In this embodiment, two conveyor runs 52, 54 extend alongside intrabay transport branches 26, 30, and two conveyor runs 56, 58 extend alongside interbay transport branches 22, 24. Conveyor runs 52, 54 span between interbay branches 22, 24, and conveyor runs 56,

58 span between intrabay branches 26, 30. As seen in Fig. 2, each conveyor run 52-58 is proximate to a track of a interbay or intrabay transport branch. In this embodiment, each conveyor run 52-58 is substantially parallel with a corresponding interbay or intrabay transport branch 22, 24, 26, 30. Hence, for example, conveyor run 52 is proximate track 27A, 27B of intrabay branch 26 for substantially the length of branch 26. Conveyor runs 54-58 are similarly positioned relative to corresponding transport branches. Although the conveyor branches 52-58 are shown in Fig. 2 positioned proximate the outermost track of the respective interbay/intrabay branches, in alternate embodiments the conveyor runs may be proximate any suitable track of any desired interbay/intrabay transport branches. In other alternate embodiments, the conveyor runs may extend along any desired length of a interbay/intrabay transport branch. In still other alternate embodiments, the transport system section may have conveyor runs that are not located alongside an interbay/intrabay transport branch, such as for example conveyor runs effecting short circuits within the transport system section. As seen in Fig. 2, the conveyor runs 52-58, may each be interconnected at the ends to intersecting conveyor runs by a suitable junction device allowing a workpiece holding container to transit directly between runs. For example, one end 52T of conveyor run 52 is connected by junction 61A to end 58R of conveyor run 58. The other end 52B of conveyor run 52 is connected by junction 61B to end 56R of conveyor run 56. The other conveyor runs of transport system section 14 may be similarly interconnected. As can be seen from Fig. 2, the conveyor runs 52-58 of section 14 form a circuit enabling high speed transport of workpiece holding containers from any

point of the adjoining transport system section 12 to any other desired point of section 12. This is highly advantageous compared to conventional transport systems.

The transport system section 14 of automated material handling system 10, is shown in Fig. 2, and described above in the context of a representative configuration that can be provided by any number of suitable types of conveyor systems. Referring now also to Figs. 3 and 5, there is shown respectively a partial perspective view of a portion of transport branch 22A of the transport system section 12 and a portion of a conveyor run 56 of the transport system section 14, and another partial perspective view of a portion of conveyor run 56. The portions of transport branch 22A and conveyor run 56 are representative of the transport branches and conveyor runs of transport system sections 12, 14. In Fig. 3, only one track 23A (see also Fig. 2) of the branch segment 22A is shown for example purposes. As seen in Fig. 3, the conveyor run 56 is mounted with mounting system 64 (which will be described in greater detail below) to the overhead mounts 300 of the track 23A making up the interbay branch segment 22A. Conveyor runs 52, 54, and 58 are mounted in a similar manner from the overhead mounts of adjacent interbay/intrabay transport branches. Conveyor run 56 generally comprises a rail system 60. The rail system 60 supports workpiece holding containers 151 and allows the containers to move freely along the length of the run 56. Conveyor run 56 also has a motor 62 for driving the containers 151 on rail system 60 back and forth (in the direction indicated by arrows X3, X4 in Fig. 3) along the rails. In this embodiment, the motor 62 is a linear motor with an unlimited stroke.

As seen best in Fig. 5, the rail system 60 in this embodiment has two outer runs 66O, 66I and a central rail. In alternate embodiments, the rail system of the conveyor runs may have any other suitable rail arrangement. The outer rails 66O, 66I are similar but opposite hand. Accordingly, the outer rails 66O, 66I will be described with specific reference to rail 66I. Rail 66I may have a general angle structural member 70, though any suitable structural shape member may be used. The angle 70 has horizontal and vertical flanges 70H, 70V. The angle 70 is oriented with the horizontal flange 70H on the bottom and the vertical flange 70V extending upwards. The horizontal flange 70H may define a support surface for the workpiece holding containers 151 placed on the conveyor run. The vertical flange 70V defines the outer edge 61E of the rail 66, and hence of the rail system. The vertical flange may also define a guide surface 66G of rail 66 containing the side of the container 151 for directional stability when the container 151 is moving along the rails 66O, 66I in the directions indicated by arrows X3, X4 in Fig. 5. Accordingly, the opposing guide surface 66G stably guide the container 151 when it moves on the rails 66O, 66I. As seen in Fig. 5, each rail 66O, 66I may be provided with roller bearings or bushings 72 that are mounted to the rail to provide the rail with an enhanced sliding surface on which the container may slide over the rails. By way of example, when seated on the conveyor run 56, the container 151 rests on roller bearings 72 and may thus move without substantial resistance over the rollers. In alternate embodiment, the enhanced sliding surface of the rails may be provided by any other suitable means including for example ball bearings (mounted in one or both flanges) or a lubricious layer

attached to the flanges of the rail member. Roller bearings 72 may be tapered for added directional stability when the container 151 is moving over the rollers in directions indicated by arrows X3, X4.

Center rail 68 of rail system 60 forms part of the linear motor 62 of the conveyor run 56. As noted before, linear motor 62 may be any suitable type of linear motor with an unlimited stroke capable of moving containers 151 on rails 660, 66I in directions X3, X4 to the ends of the conveyor run (see Fig. 2). The linear motor 62 is in general a solid state motor without moving parts. For example, the linear motor 62 may be a brushed or brushless AC or DC linear motor, a linear induction motor, or linear stepper motor. Suitable linear motors are available from Baldor Motion Products or MagneMotion Inc. The linear motor 62 generally has two components, a primary or forcer component and a secondary, reaction or platen component. In this embodiment, the forcer component 74 is in the center rail 68 of the conveyor run 56, and the reaction component 76 is integrated, as will be described in greater detail below, into the workpiece holding container 151. In alternate embodiments, the reaction component may be mounted to the conveyor rails and the forcer component may be incorporated into the container. By way of example, if a linear induction motor is used for linear motor 62 in the embodiment shown in Figs. 3 and 5, the center rail 68 may have a generally U-shaped structural member defining a groove 69. The forcer component 74 of the motor 62 is located in the groove. In the case of a linear induction motor, forcer 74 may be a coil assembly comprised of steel laminations and phase windings. The forcer 74 is connected by suitable wiring (not shown) to a power source (not shown)

and controller C (see Fig. 2) that controls the traveling magnetic field generated by the forcer 74. The motor 62 may be a closed loop motor with suitable commutation devices 74C, such as Hall effect devices mounted for example on rail 68 and in communication with controller C. As will be described further below, the commutation devices 74C serve as a position sensor, sensing the exact position of the container 151 on the conveyor run 56.

As seen in Fig. 5, the rails 66I, 660, 68 of the rail system 60 may have a modular construction. For example, rail 660 may include modules 6601, 6602 (only rail modules 6601, 6602 are shown in Fig. 5 for example purposes). The rail modules 6601, 6602 are joined at the intermediate joint 660I. The rail modules 6601, 6602 are provided with any suitable mating means, (e.g. interlocking facets, mechanical, fasteners) allowing the modules to be joined together end to end as shown in Fig. 5. The center rail 68, and outer rail 66I have a similar modular construction. The rail modules similar to modules 6601, 6602 may be provided in any suitable length, such as a few feet, for ease of handling during installation. The rail modules may be joined together during installation to form the rails 660, 66I, 68 of the rail system of the conveyor run 56. By way of example, rail modules similar to modules 6601, 6602 may be assembled during installation in the facility to form rail 66 from one end 56L (see Fig. 2) of run 56 to the other end 56R. The center rail 68, and other outer rail 66I may be similarly installed to form conveyor run 56. The rail modules, such as modules 6601, 6602, may otherwise be installed to modularly install the conveyor run 56. For example, modules for all rails 66I, 660, 68 may be installed to form one or more conveyor run modules

56M1, 56M2 (see Fig. 2). The conveyor run 56 installation then proceeds module by module. Modules 56M1, 56M2 of conveyor run 56 are described above as being installed first for example purposes only, and in alternate embodiments the center modules of the conveyor run may be installed first. The conveyor modules 56M1, 56M2 are joined at intermediate run joints 56I. Once installed, each conveyor run module 56M1, 56M2 may become operational as soon as desired and before completion of the entire run 56. This is allowed in part by the use of the solid state motor 62 which unlike conventional conveyor systems does not employ a mechanical transmission that is coupled to all the drive rollers before the conveyor run may become operational. Further, unlike conventional systems, motor 62 is capable of precisely starting and stopping the container transported by the conveyor run 56 as will be seen further below. Yet another advantage arising from transport system section 14 using a solid state motor, similar to linear motor 62, is that the solid state motor by its very nature can readily accommodate, without noticeable performance degradation, misalignment between rail modules. The linear motor 62 of section 14 is capable of operating with misalignment between modules of the center rail 68 commensurate with modular structural assembly tolerances under field conditions. In marked contrast, a conventional mechanical conveyor drive system (such as illustrated in Fig. 1A) is restricted to the much tighter mechanical tolerances of the drive. Consequently, the drive rails for a conventional conveyor run must be fabricated in one piece offsite for substantially the entire length of the run, and then installed as one piece in the facility. Hence, the transport system section 14

has much greater flexibility in both installation and use during start up compared to conventional systems.

As noted above, the reaction component of platen 76 of the linear motor is incorporated into the workpiece holding container 151. Referring now also to Fig. 7, which shows a bottom view of the container 151, the workpiece holding container 151 is depicted as a Front Opening Unified Pod. (FOUP) container, but can be any suitable container such as a SMIF pod or a bottom opening container. The FOUP container 151 has a container housing 154 (see Fig. 5) sized to hold a number of semiconductor workpieces such as 200 mm, 300 mm wafers, or flat panel displays or any other desired kind of workpieces. The housing 154 is capable of interfacing directly with the interface of processing tools P (see Fig. 2). The housing 154 may include engagement surfaces 156, such as detents or recesses to allow the hoist 206 (see Figs. 6A-6B) of the transport vehicle 200 to capture and hold the container 151. For example, the engagement surface 156 may be arranged to allow the capture arms 208 of the hoist 206 to pick the container from either sides 154R, 154F or front/back sides 154R, 154L (see Fig. 5). Hence, the hoist 206 of vehicle 200 may pick the container 151 regardless of the orientation of the container under the hoist.

Referring now to Fig. 7, there is shown an exploded perspective view of the container 151. As seen in Fig. 7, the container housing 154 may include an upper part 154U and a lower part 154L. Container door 155, which is removably latched to the housing, is shown covering the opening in the front 154F of the housing. The upper part 154U of the housing may be a one-piece molding made from

plastic or any other suitable material capable of being used to hold semiconductor workpieces without contamination. The material for the housing is capable of being subjected to a full immersion bath during periodic cleaning of the container The lower part 154L of the housing is also a plastic molding. In the embodiment shown in Fig. 7, the lower housing part 154L has a general flat shape forming the bottom of the container. The lower part 154L may be joined to the upper part 154U using any suitable process, such as chemical bonding, ultrasonic welding or others resulting in a substantially seamless interface between the lower and upper housing parts. In the embodiment shown in Fig. 7, the reaction component 76 of the linear motor 62 (disclosed in greater detail below) is molded within the lower part 154L.

The lower housing part 154L has a lower surface 152, shown in Fig. 7A. The lower surface 152 has seating surfaces 158, 160 disposed in a biaxial arrangement on the lower surface. In this embodiment, the seating surfaces 158, 160 are located around the perimeter of the lower surface 152, to allow the container to seat against the rollers 72 of rails 660 66I (see Fig. 6). The biaxial arrangement of the seating surfaces allows the container to be properly seated on the rails with either axis A, B oriented with the rails. Fig. 7A also shows an exemplary distribution of the reaction component 76 of linear motor 62 in this embodiment. As noted above, the reaction component 76 is molded in the lower container housing molding 154L. Hence, the reaction component 76 is sealed within the lower housing part 154L. This eliminates seams between the reaction component and surrounding housing structure thereby eliminating areas

where contaminants may collect. Further, by enclosing the reaction component 76 within the housing adverse interaction between the reaction component and cleaning bath is avoided. The reaction component 76, comprises, in this embodiment, reaction elements 162, 164, 166, 168 which are schematically illustrated in Fig. 7A. The reaction elements 162, 164, 166, 168 are also arranged biaxially on the container housing 154. The reaction elements may be permanent magnets or plates made from magnetic material capable of reacting with the magnetic fields generated by the forcer 74 to drive or thrust the containers along the rails 660, 66I. Reaction elements 162, 164 (two elements, each possibly being made up of sub-elements, are shown on opposite sides of the lower surface for example purposes, and in alternate embodiments the reaction elements may be provided in any suitable number and any suitable arrangement) are aligned along axis B in order to provide drive forces (in cooperation with forcer 74 or other forcers aligned with axis B) in the axis B direction. Reaction elements 166, 168 are arranged to provide drive forces in a similar manner along the A axis. The container 151 is shown in Fig. 5 placed on the rails 660, 66I in an orientation where axis A (see also Fig. 7) is aligned with forcer 74. As can be realized, the container 151 may be placed on the rails in an orientation rotated 90° from that shown in Fig. 5. In that case, the container 151 axis B would be aligned with the forcer 74. The biaxial drive configuration effectively reduces the time used to place or pick the container from the conveyor run 56 in comparison to conventional transport systems (i.e. smaller rotation to find usable drive axis compared to conventional systems).

Fig. 7B is a bottom perspective view of the lower housing part 154L' in accordance with another embodiment. The lower housing part 154L' in this embodiment is generally similar to lower housing part 154L described before and shown in Figs. 7-7A, and similar features are similarly numbered. Lower housing part 154L' has recesses 167', 169' formed therein for mounting the reaction component 76' to the container housing. In the embodiment shown in Fig. 7B, two recesses, 167', 169' are shown for example purposes, generally aligned with axis of symmetry A'. The recess 1167', 169' are formed in the bottom surface 152'. This leaves the bottom surface of the reaction component elements exposed when installed. In alternate embodiments, the recesses may be formed into the upper surface 152U' of the lower housing part so that when installed the reaction component elements are not exposed on the outer surface of the housing. The recesses, 169', 167' are blind as shown and do not extend through the lower housing part, though in alternate embodiments, apertures through the lower part may be used in place of the recesses. The recesses 169', 167' may be formed during molding of the lower housing part 154L' or may be machined into the lower housing part after fabrication of the housing part. The recesses 169', 167' are substantially conformal to the reaction component elements (only reaction component element 168' is shown for example purposes) and are sufficiently deep so that when positioned into the corresponding recesses, the bottom surface of the reaction component elements is substantially flush or somewhat inwardly displaced from the bottom surface 152' of the housing. The reaction component elements 168' may be mounted to the lower housing part using any suitable bonding or fastening means including mechanical fasteners. Suitable seals

(not shown) may be used to eliminate gaps/crevices that may collect contaminants. In other alternate embodiments, the bottom of the housing may not include recesses or pockets, and the reaction component elements may be surface mounted to the bottom. In still other alternate embodiments, the reaction component elements may be assembled in a frame, and the frame may be mounted to the bottom of the container housing, or positioned into a recess in the housing. In this case, the reaction component may be replaceable.

Referring now also to Fig. 7C, there is shown another bottom perspective view of the lower part 154L" of the container housing in accordance with yet another embodiment. Except as otherwise noted, the lower housing part 154L" is generally similar to the housing part 154L described before and shown in Fig. 7. Similar features are similarly numbered. In this embodiment, the reaction component 76" is mounted in a turn table assembly 170". The turn table assembly 170" may be mechanically mounted or otherwise connected to the bottom 152" of the housing lower part. The assembly 170" may be surface mounted or may be located in a recess 167" as shown in Fig. 7C. If desired, the turn table assembly 170" may be replaceable. The turntable 170" may have any suitable configuration, but in general it includes a base 172" and pivot section 174". The base 172" provides the interface for attaching the turn table 170" to the housing part 154L". The pivot section 174" is movably mounted to the base section 172" by any suitable means to allow the pivot section 174" to rotate relative to the base section in the direction indicated by arrow R. The reaction component 76", schematically shown in Fig. 7C having representative elements 166", 168" is attached to the pivot section

174". Hence, by pivoting section 174", the orientation of the reaction component 76" may be changed as desired. For instance, rotating the turntable may move elements initially oriented along axis A" to any desired orientation such as alignment with axis B". The turntable may be provided with appropriate interlocks (not shown) to fix the turntable in any orientation. The interlocks may be activated with the forcer 74 of the linear motor. The forcer of the linear motor may also be used in cooperation with reaction component 76" to effect rotation of the turntable.

When the container 151 is placed on the conveyor run 56, the controller C (see Fig. 2) controls the traveling magnetic field generated by forcer 74 to move the container as desired. The controller C registers the position of the container 151 during movement on the conveyor run 56 via for example, the commutation sensors 74C. In the case where the linear motor is a brushed motor, the controller may register the location of the container by detecting the direct commutation in the motor. The controller C may move container 151 along the conveyor run 56, in either direction indicated by arrows X3, X4 in Fig. 3 at any desired speed and to any desired position. The controller C is capable of accurately placing the container 151 at any desired position along the run 56. This is possible for all the conveyor runs 52, 54, 56, 58 of transport section 14, unlike conventional conveyor systems, because sensors 74C detect the true position of the container anywhere along runs 52, 54, 56, 58 and send data to controller C indicating the container's true position. Further, the direct interaction between forcer 74 and reaction component 76' of the linear motor provide high fidelity control of the

motion of the container. Accordingly, the controller C is capable of commanding the motor to stop the container precisely, and can accurately detect if the container is actually located at the precise location commanded. This is not possible with conventional conveyor systems, such as illustrated in Fig. 1A because of inaccuracies generated by the frictional drive system, susceptible to some slippage between container and drive, as well as variances in the conventional sensor system that in effect estimates container position between data points. For example, any deviation between the drive line, (aligned with the plane) of the roller in a conventional drive and the general direction of movement of the container will result in some slippage between drive roller and contact surface of the container. This in turn will generate a variance between rotation distance of the roller used to determine container position in the conventional system and actual travel of the container on the conveyor. Further slippage may occur during acceleration/deceleration increasing the margin of error between true position and calculated position in conventional systems. The conveyor runs 52, 54, 56, 58 of transport section 14 in Fig. 3 eliminate these problems of conventional systems. Construction tolerances due not influence the drive speed or accuracy in positioning the containers 151 on the conveyor runs. Maximum acceleration/deceleration rates can be achieved (unlike conventional systems where acceleration/deceleration rates are slip limited) thereby increasing efficiency of the transport section 14 and hence of the whole handling system. Moreover, controller C is capable of controlling forcer 74 to drive any desired number of containers along the conveyor run 56. Also the controller is capable of controlling the forcer

74 to move containers on the same conveyor run in opposite directions substantially at the same time. For example, as seen in Fig. 3, container 151 may be moved in direction X3 by the linear motor, while container 151A is being moved in direction X4.

The accuracy in controlling movement and placement of containers on conveyor runs 52, 54, 56, 58, allows any location on the conveyor runs to become a pick location O from which transport vehicle 200 can pick a container 15' off the conveyor runs. By way of example, and with reference again to Figs. 6A-6B, the transport vehicle 200 may be at a given position α on a track 22A of transport system section 12. For instance, the transport vehicle may be at location α having just released a container on conveyor run 56. Position α can be any position along track 22A. The vehicle hoist is shown in Figs. 6A-6B as being in the retracted position, though the hoist may be in its extended position (not shown) in which it can pick/release containers 151 from run 56. If in the extended position, the hoist 208 may be in the orientation shown in Fig. 6B, rotated 90° from that shown in Fig. 6A. In Fig. 6B, the gripper arms of the hoist are disposed astride the rails of the run 56. The controller C (see Fig. 2) controls the linear motor to bring a desired container 151 along run 56. The controller registers the position α of the transport vehicle 200 on track 22A and matches the position O of the container 151 so that the container is aligned, in this case under vehicle 200. Controller C controls position O on run 56 so that the vehicle hoist 208 may be merely extended to pick container 151 without further re-positioning of the vehicle 200 on track 22A. In the case

where the hoist 208 is extended (position E1 in Fig. 6B), the container is driven on run 56 to position O where the grip portion on the container 151 is between the gripping arms of the hoist 208. To effect the pick, the gripping arms of the hoist 208 are merely closed. This "drive in" capability provided by transport system section 14 greatly enhances the efficiency of handling system 10 by providing a maximum number of pick places on section 14. Although, the above has been described with respect to the vehicle 200 being in a static position α, a similar process may be used with the vehicle 200 in a dynamic position. In that case, the container 151 may be driven along run 56 to match both position and velocity with the vehicle 200 on track 22A.

As seen in Fig. 2, conveyor runs, for example runs 52, 56 of the transport system section 14, may be provided with shunts or run buffer sections 52B, 56B. The run buffer sections 52B, 56B are depicted schematically in Fig. 2, on one side of the conveyor runs, but may be located on either side of the runs. Fig. 5 shows a portion of a representative buffer section 56B on run 56. The buffer section has a support platform 90, which for example may be made from one or more rails 92. The support platform 90, intersects at least one of the conveyor run rails 660. The vertical flange 66V of the conveyor run rails 660 may be removed locally in way of platform 90. The support platform 90 may include omnidirectional supports such as ball bearings 93 (see Fig. 5) allowing the container 151 to move freely in any desired direction over the supports. The buffer section 56B may also include a suitable linear forcer component 94 capable of cooperating with the reaction elements 162, 164, 166, 168 on the container 151 (see Fig. 7) to move the container

in the directions indicated by arrows X5, X6 in Fig. 5 into and out of the buffer section 56B. As can be realized from Figs. 5 and 7, the container 151 can be moved from the conveyor run 56 to the buffer section 56B and vice versa without reorienting the container. For example, in the orientation shown in Fig. 5, the container 151 is moved in direction X4 until substantially aligned with buffer section 56B. In that position, the reaction elements 164, 162 arranged to operate along axis B of the container, are capable of cooperating with the forcer 94. Hence, if desired, (such as in the case where a container is traveling in an opposite direction on conveyor run 56), the controller C (see also Fig. 2) activates forcer 94 to move container 151 in direction X5 into the buffer section 56B. When desired to return container 151 back to the conveyor run 56, forcer 94 is operated to move the container in direction X6 onto the rails 660, 66I. The container 151 can then be moved almost instantaneously thereafter in any desired direction along conveyor run 56. A similar approach is used to transit the containers at junctions between conveyor runs. In an alternate embodiment, any suitable type of junction device such as for example, using a turntable, may be used to direct the container from the conveyor run into the buffer section. As can be realized from Fig. 5, the switching system enabling container transfer between conveyor run and buffer section is equally applicable to effecting transfer between any joining conveyor runs (see Fig. 2).

Still referring to Fig. 5, the buffer section 56B may be sized to hold as many containers 151 as desired. In the case of a one container buffer section, a single linear forcer component 94 may be provided with a pair of

support rails 92. To expand the buffer section, additional linear forcer rails 94L and support rails 92L may be added in a general grid pattern as shown in Fig. 5. The pattern of outwardly extending rails 92, 94 and lateral extending rails 92L, 94L form the grid pattern which enables a container to move two dimensionally (in the directions indicated by arrows X5, X6, X7) to any location in the buffer section 56B. In Fig. 5, a single set of outward rails 92, 94 and a single set of lateral rails 92L, 94L is shown for example purposes. The rail pattern shown can be repeated as desired to provide a buffer section of any desired size.

Referring again to Fig. 3, mounting system 64 may include any suitable structural members to support the rails 660, 66I, 68 of the conveyor run 56 substantially under the track 23A of the corresponding interbay or intrabay transport branch. This allows the transport vehicles 200 on at least some portion of the tracks of the interbay or intrabay branches to pick or place containers 151 directly on the conveyor runs. Unlike conventional systems, the containers 151 an be placed by transport vehicles 200 on the conveyor runs at any time, and be moving on the conveyor runs immediately thereafter. Accordingly, seamless integration between the transport system section 12 and transport system section 14 (as no time is lost to coordinate between transport vehicles 200 on system section 12 on transport panels used in conventional conveyor systems). This in turn increases workpiece traveling density of the automated material handling system 10 and reliability (a defective container is readily removed from the system, and unlike a palletized system the impact is limited to only to that container without any loss in system transport capacity).

It should be understood that the foregoing description is only illustrative of the invention. Various alternatives and modifications can be devised by those skilled in the art without departing from the invention. Accordingly, the present invention is intended to embrace all such alternatives, modifications and variances which fall within the scope of the appended claims.

CLAIMS

What is claimed is:

1. A semiconductor workpiece processing system comprising:

at least one processing tool for processing semiconductor workpieces;

a container for holding at least one semiconductor workpiece therein for transport to and from the processing tool;

a first transport section connected to the processing tool for transporting the container to and from the processing tool; and

a second transport section connected to the first transport section for transporting the container to and from the processing tool;

wherein the first transport section is a vehicle based section having a transport vehicle capable of holding the container and moving along a first track of the first transport section, and the second transport section is not a vehicle based section and has a second track with at least one support element of the second track adapted to interface with the container for movably supporting the container from the second track and allowing the container to move relative to the first track, and wherein the second transport section has a motor connected to the second track for aligning the container on the

second track with the transport vehicle on the first track.

2. The system according to Claim 1, wherein the motor is connected to the second track for driving the container along the second track, at least a portion of the motor being mounted to the container.

3. The system according to Claim 2, wherein the container has a one-piece frame assembly, the at least a portion of the motor being integral to the frame assembly of the container.

4. The system according to claim 2, wherein at least a portion of the motor is molded in a portion of the frame assembly.

5. The system according to claim 2, wherein at least a portion of the motor is removably mounted to the frame assembly.

6. The system according to Claim 2, wherein at least another portion of the motor is fixedly connected to the track.

7. The system according to Claim 2, wherein the motor is a linear motor.

8. The system according to Claim 2, wherein the motor is a brushless motor.

9. The system according to claim 2, wherein the motor is a solid state motor without moving parts.

10. The system according to Claim 2, wherein the at least a portion of the motor mounted to the container includes a permanent magnet mounted to the container.

11. The system according to Claim 2, wherein the at least a portion of the motor mounted to the container includes at least two permanent magnets, the permanent magnets being arranged on the container so that an axis connecting poles of one of the two magnets is oriented at an angle relative to another axis connecting poles of another of the two magnets.

12. The system according to Claim 2, wherein the motor is adapted for bi-directionally driving the container along the second track.

13. The system according to Claim 2, wherein the motor is adapted for bi-directionally driving the container so that the container is capable of moving bi-directionally along two different axes.

14. The system according to Claim 13, wherein the two different axes are crossing axes.

15. The system according to Claim 1, wherein the second track has a longitudinal portion with at least one shunt portion extending laterally from the longitudinal portion.

16. The system according to Claim 15, wherein the at least one shunt portion provides for track buffering.

17. The system according to Claim 1, wherein at least a portion of the first transport section is disposed between the at least one processing tool and the second transport section.

18. The system according to Claim 1, wherein at least a portion of the second track of the second transport

section extends substantially alongside a portion of the first track of the first transport section.

19. The system according to Claim 1, wherein at least a portion of the second track of the second transport section spans between at least two portions of the first track of the first transport section.

20. The system according to claim 1, wherein the first track and second track are disposed proximate to each other to allow the container to be moved therebetween in one move.

21 A semiconductor workpiece container transport system comprising:

at least one semiconductor workpiece container adapted for holding at least one semiconductor workpiece therein, the semiconductor workpiece container having a one-piece frame assembly;

a track for movably supporting the at least one semiconductor workpiece container so that the at least one semiconductor workpiece container is capable of moving along the track; and

a motor connected to the track for driving the at least one container along the track, wherein at least part of the motor is mounted to the frame assembly of the at least one container.

22. The system according to Claim 21, wherein the frame assembly has an interface section for mating with a load port section of a processing tool and allowing the at least one semiconductor workpiece to be transferred between the at least one container and load port section.

23. The system according to Claim 21, wherein the motor is a linear motor having a primary coil assembly connected to the track, and wherein the at least one part of the motor mounted to the frame assembly is a reaction portion of the linear motor reacting with the primary coil assembly for driving the at least one container along the track.

24. The system according to Claim 23, wherein the reaction portion of the linear motor comprises a reaction plate mounted to the frame assembly, the reaction plate including a magnetic plate capable of reacting with the primary coil assembly.

25. The system according to Claim 23, wherein the reaction portion of the linear motor comprises permanent magnets mounted to the frame assembly.

26. The system according to Claim 23, wherein the reaction plate is arranged for bi-directionally driving the at least one container along two crossing axes.

27. The system according to Claim 21, further comprising another track and a vehicle adapted for traveling on the other track and for holding the at least one container thereon, the vehicle having a transport mechanism for transporting the container between the track and the other track.

28. A semiconductor workpiece transport container comprising:

a frame defining a chamber for holding therein at least one semiconductor workpiece, the frame being sized and shaped for interfacing with an interfacing portion of a semiconductor

workpiece processing tool to allow the at least one semiconductor workpiece to be transported between the chamber and processing tool, wherein the frame defines at least one surface for seating against a track of a transport system for transporting the container between the processing tool and another location; and

a motor portion mounted to the frame, the motor portion being adapted to cooperate with another motor portion of the transport system for driving the container along the track.

29. The container according to claim 28, wherein the motor portion is adapted to cooperate with the other motor portion for driving the container in opposite directions along the track.

30. The container according to claim 28, wherein the motor portion is adapted to cooperate with the other motor portion for driving the container in crossing directions relative to the track.

31. The container according to claim 28, wherein the frame and the motor portion mounted thereto form a one-piece assembly.

32. The container according to claim 28, wherein the motor portion is a reaction portion of a linear motor, and the other motor portion is a coil assembly of the linear motor connected to the track.

33. The container according to claim 28, wherein the frame includes engagement surfaces for enabling a transport vehicle to capture and carry the container from the track.

34. A semiconductor workpiece processing system comprising:

at least one processing tool for processing semiconductor workpieces;

a first transport section connected to the processing tool for transporting containers holding semiconductor workpieces to and from the processing tool; and

a second transport section connected to the first transport section for transporting the containers to and from the processing tool;

wherein the first transport section is a vehicle based section having a transport vehicle capable of holding at least one of the containers and moving along a first track of the first transport section, and the second transport section is not a vehicle based section and has a second track with support elements thereon adapted to interface the containers for movably supporting the containers from the second track and allowing the containers to move bi-directionally relative to the track, and wherein the second transport section has a motor connected to the second track capable of bi-directionally driving the containers substantially simultaneously on at least one portion of the second track.

35. The processing system according to Claim 34, wherein the at least one portion of the second track is an

intermediate portion of the second track at a distance from an end portion of the second track.

36. The processing system according to Claim 34, wherein the at least one portion is any portion of the second track.

37. The processing system according to Claim 34, wherein the motor is a linear motor.

38. The processing system according to Claim 34, wherein the motor includes at least one motor portion mounted on at least one of the containers.

39. A semiconductor workpiece processing system comprising:

at least one processing tool for processing semiconductor workpieces;

a container for holding at least one semiconductor workpiece therein for transport to and from the processing tool;

a first transport section connected to the processing tool for transporting the container to and from the processing tool, the first transport section having a first track and a transport vehicle movably supported from the first track and capable of picking the container; and

a second transport section connected to the first transport section for transporting the container to and from the processing tool, the second transport section having a conveyor track with a track surface adapted to interface

with the container, and a motor connected to the conveyor track for moving the container on the conveyor track;

wherein the motor is adapted for stopping the container at any location along a portion of the conveyor track so that the container is in a predetermined position relative to the transport vehicle for providing a pickplace for the vehicle to pick the container.

40. The system according to Claim 39, wherein the portion of the conveyor track extends along the first track.

41. The system according to Claim 39, wherein the conveyor track has track segments joined to each other at intermediate connections of the conveyor track to form the conveyor track, the track segments being adapted for being joined to each other during installation of the conveyor track.

42. The system according to Claim 39, further comprising a position sensor connected to the second transport section, the position sensor being adapted to sense the position of the container at any location along the conveyor track.

43. The system according to Claim 43, wherein at least a portion of the motor provides the position sensor.

44. A material handling system for transporting a container capable of holding at least one workpiece and transporting the at least one workpiece in a controlled environment between a workpiece processing tool and another location, the system comprising:

a conveyor transport section including a drive track for driving the container, the track having track elements interfacing with the container for driving the container, wherein the drive track is modular with modules adapted to be joined together to form extended lengths of the drive track during drive track installation, wherein each module has at least one of the track elements thereon.

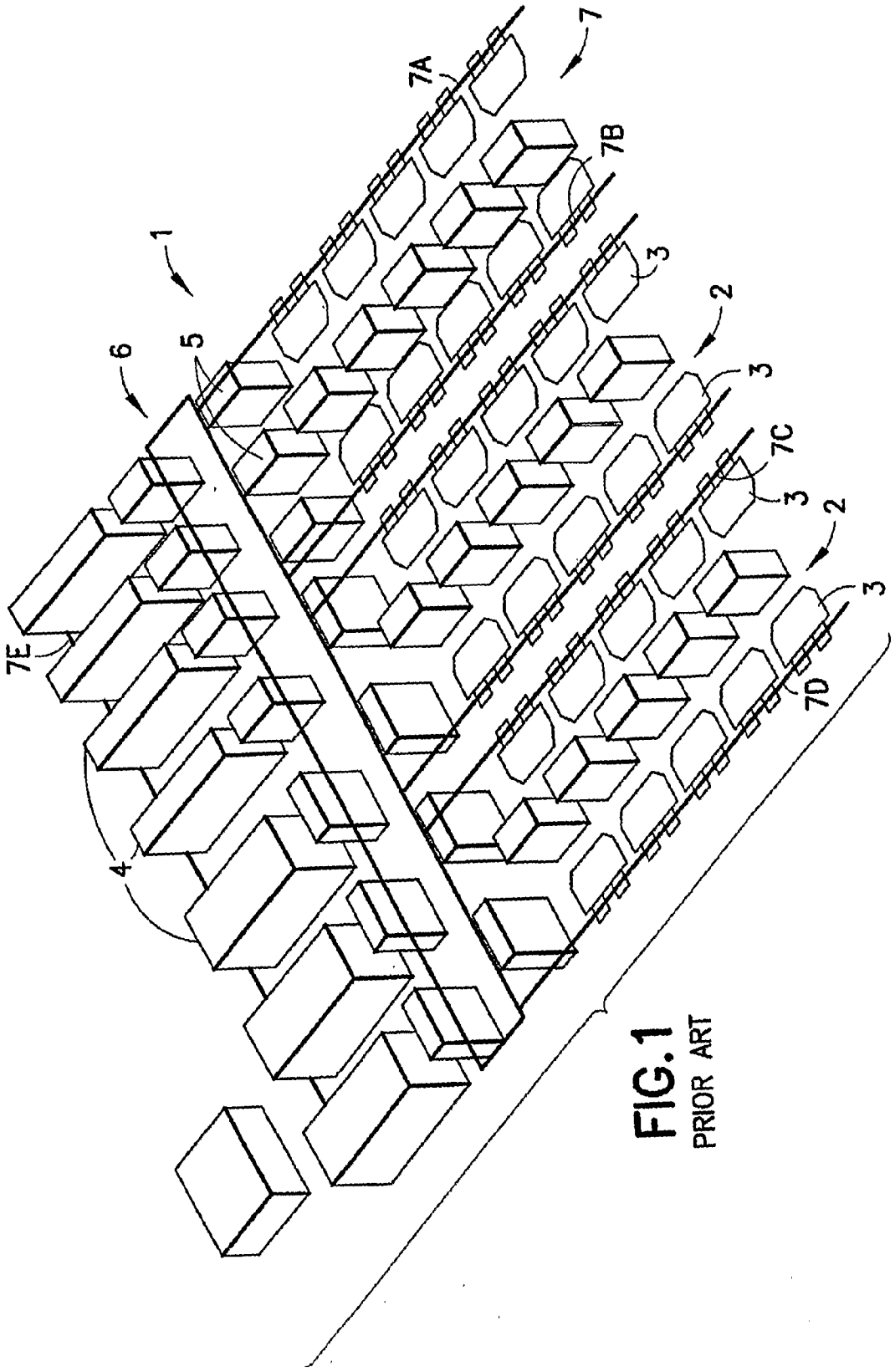


FIG.1
PRIOR ART

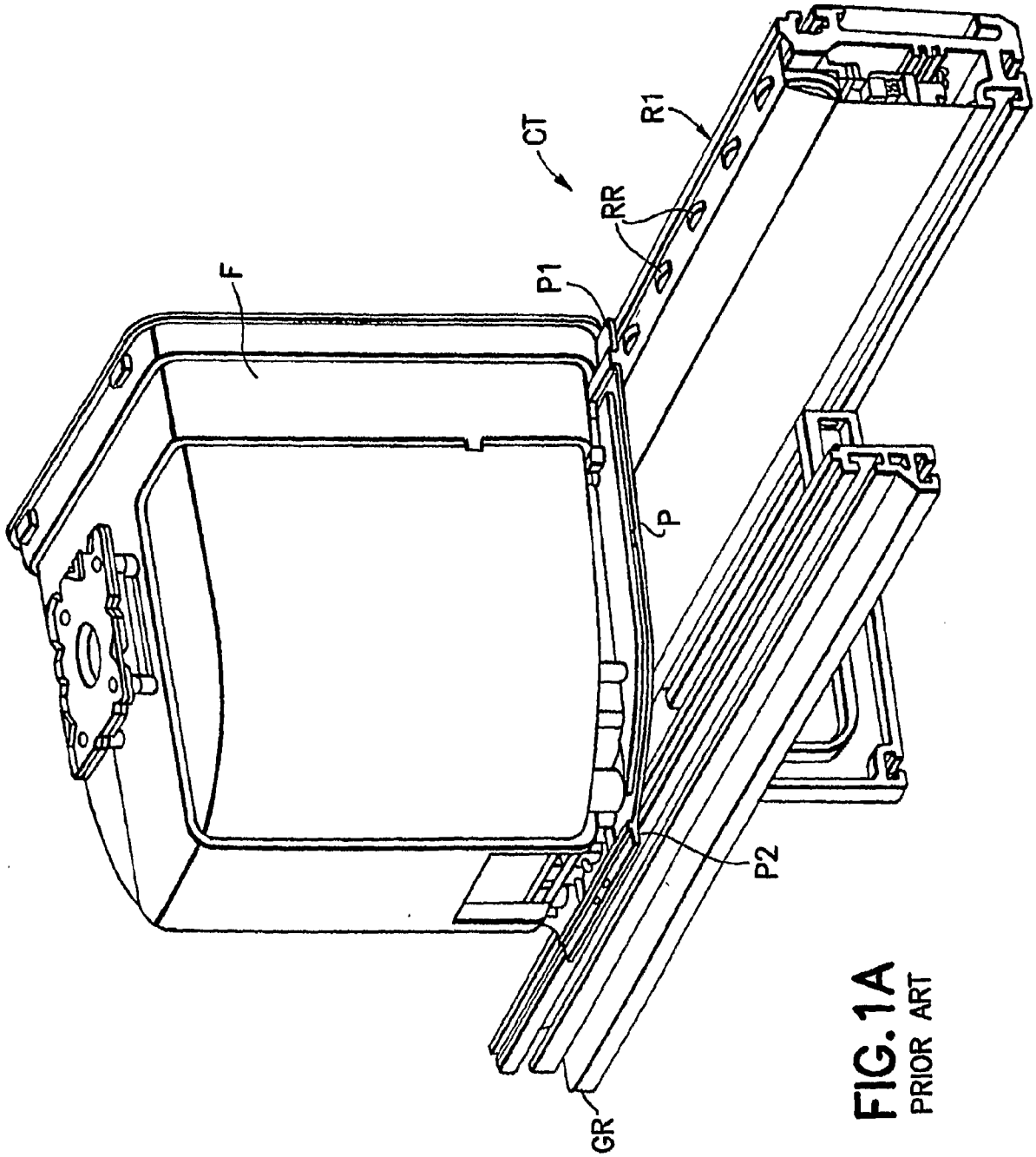


FIG. 1A
PRIOR ART

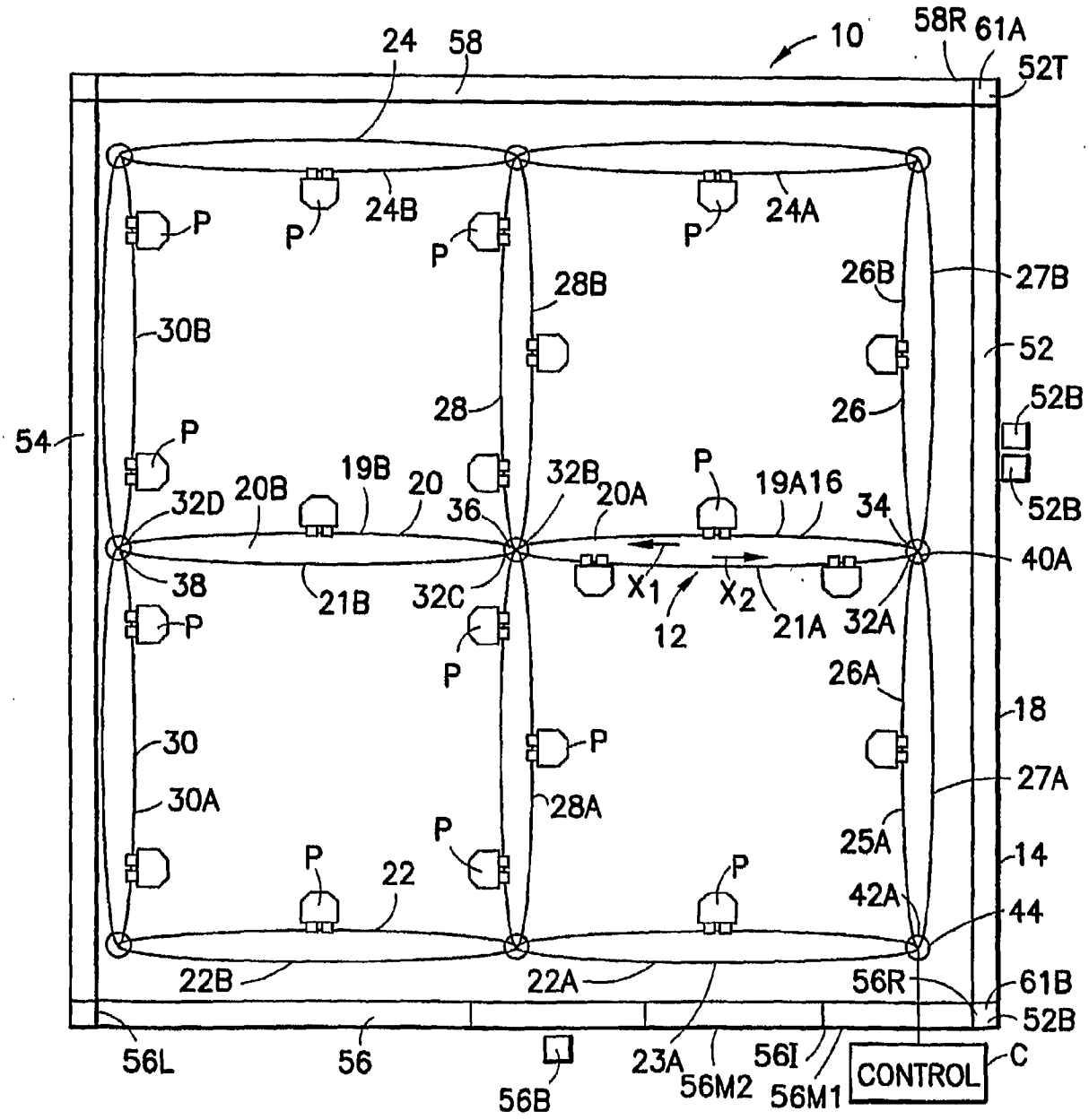


FIG. 2

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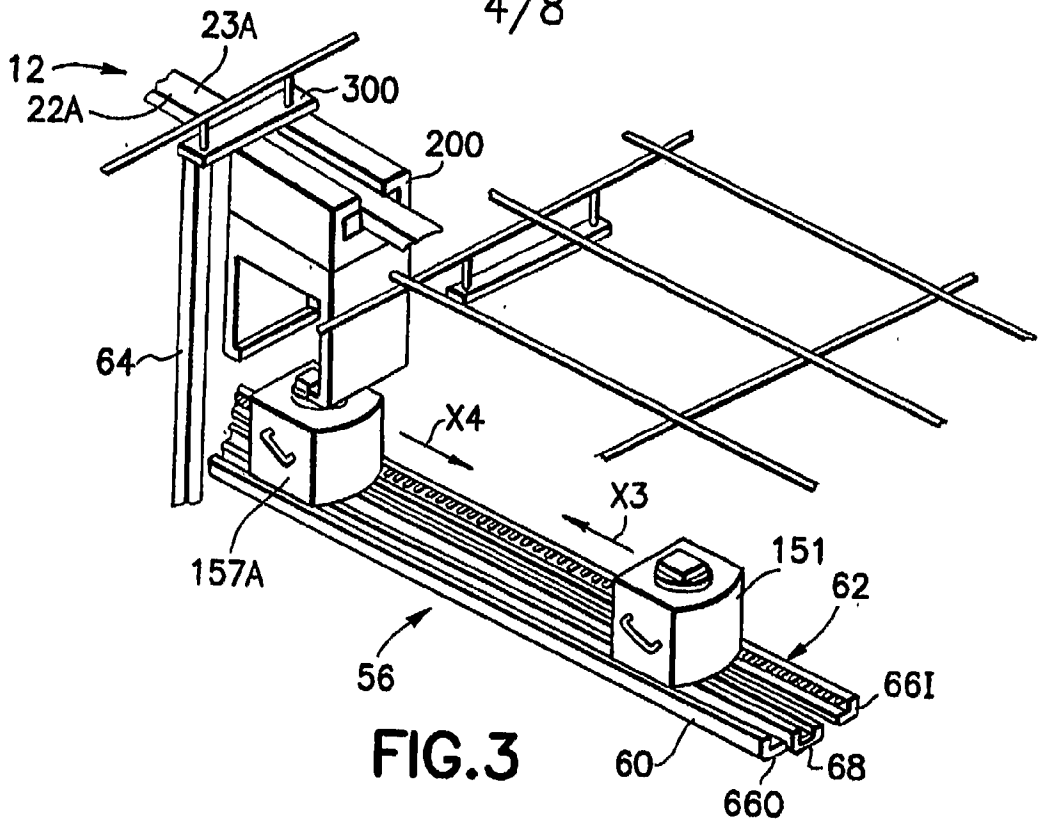


FIG.3

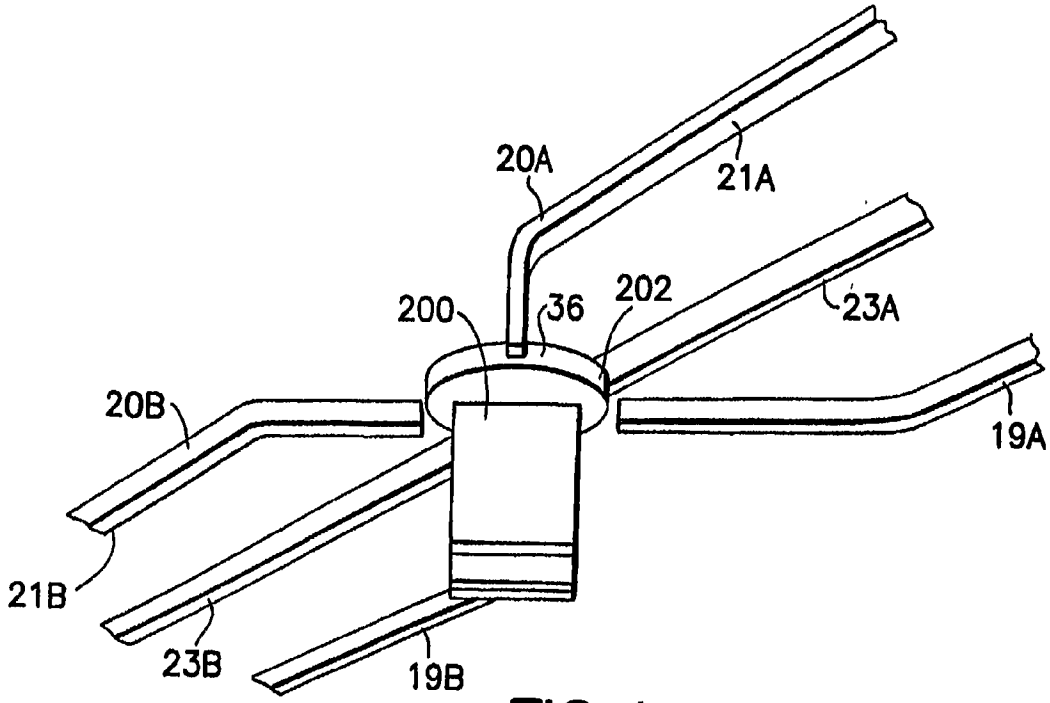
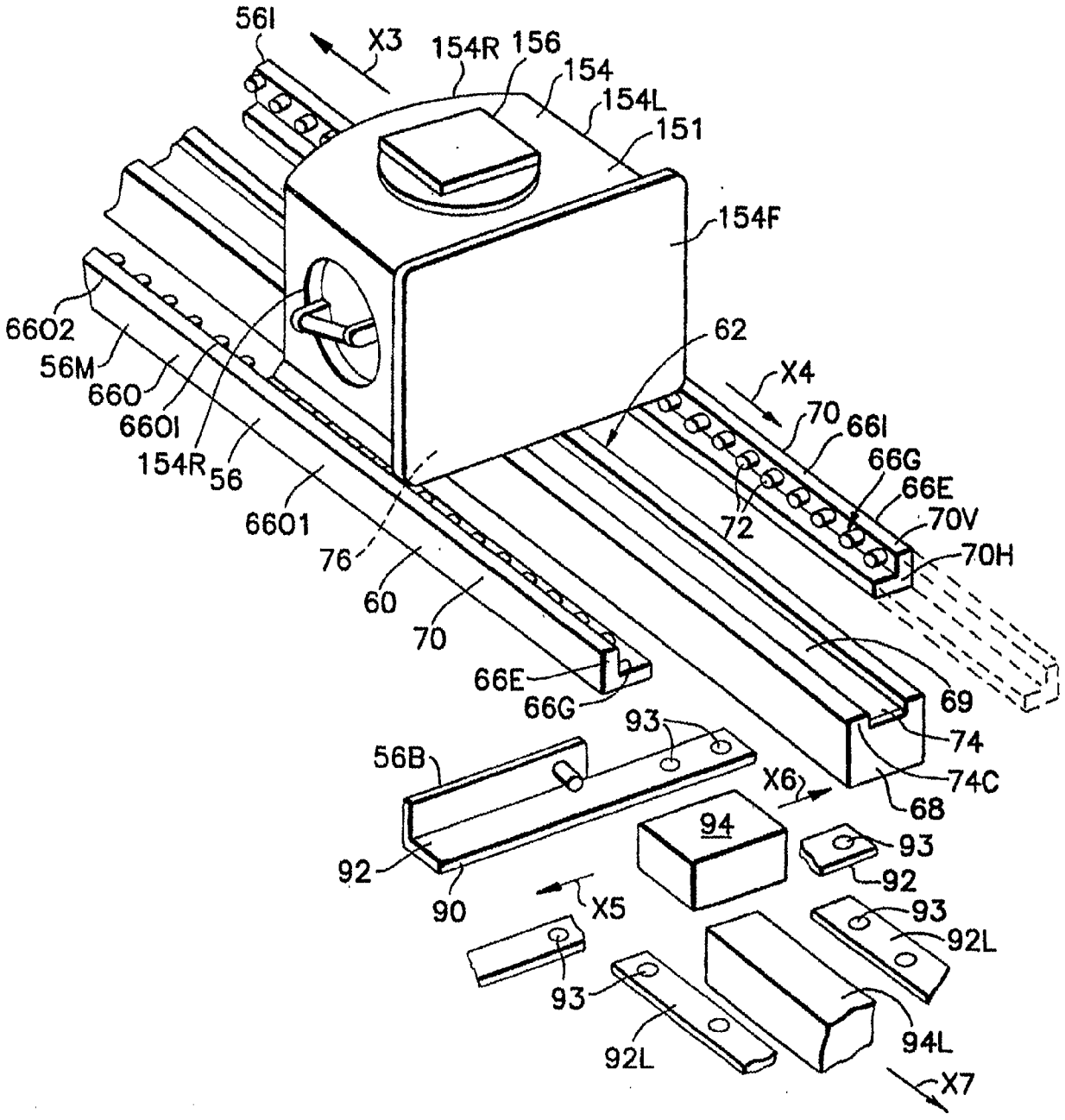


FIG.4

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FIG.5



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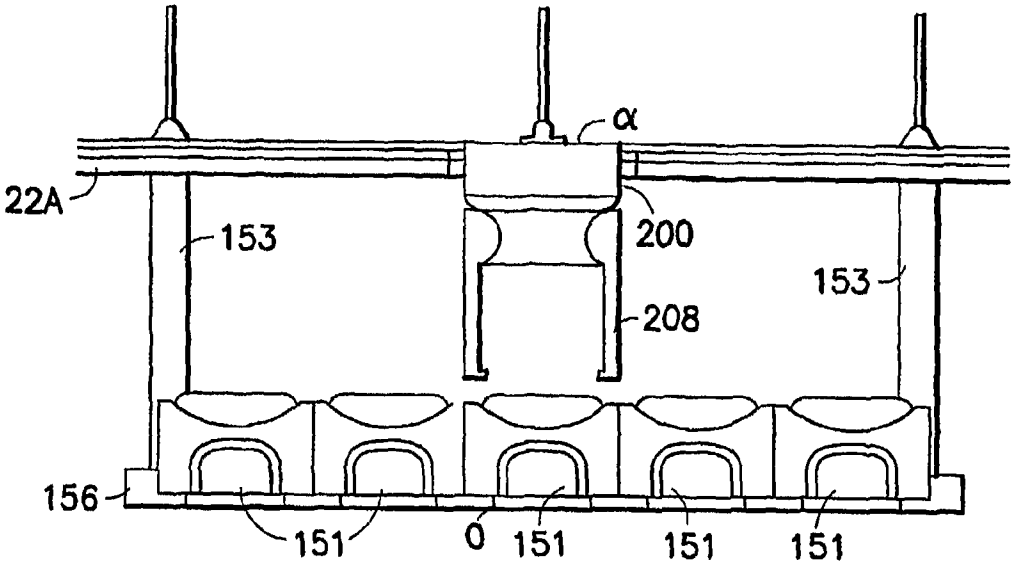

α
22A
153
200
153
208
156
151
0
151
151
151

FIG.6A

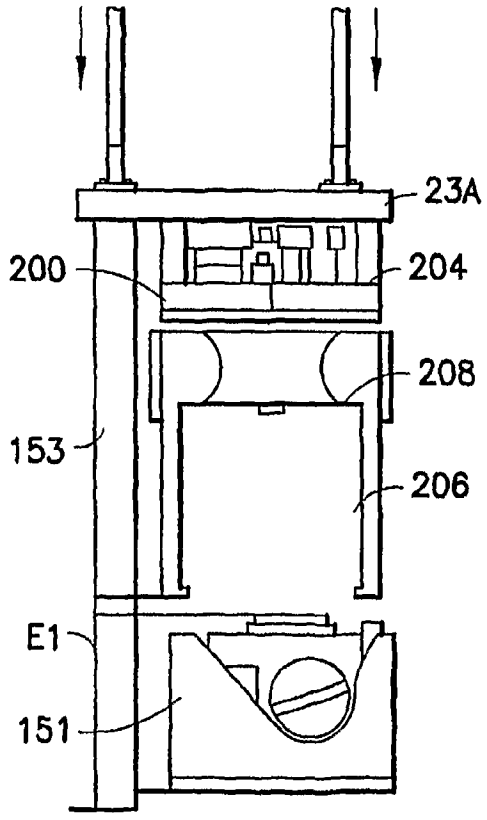

23A
200
204
208
153
206
E1
151

FIG.6B

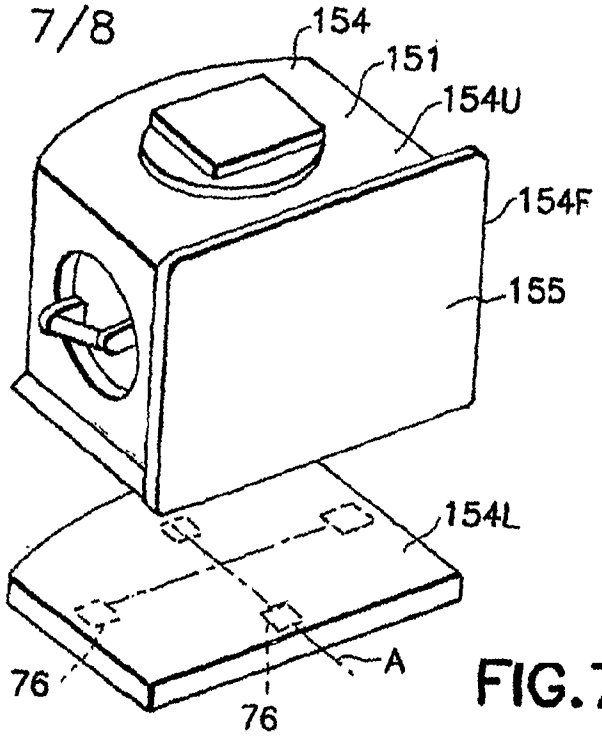


FIG.7

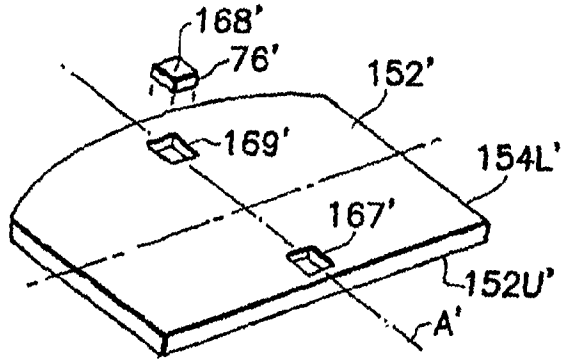


FIG.7B

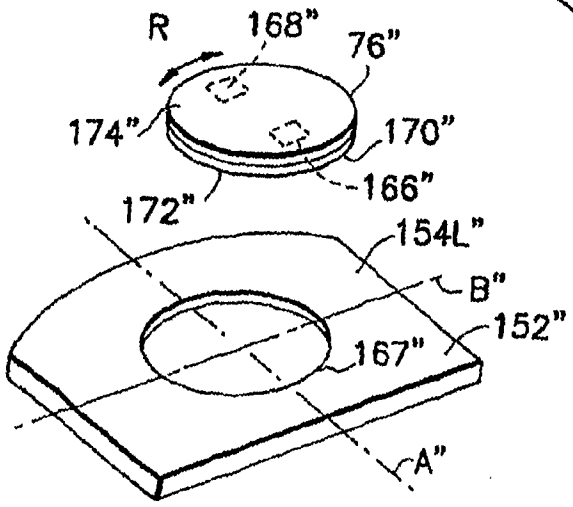


FIG.7C

Klein Tools Ex. 1021, Page 73 of 313

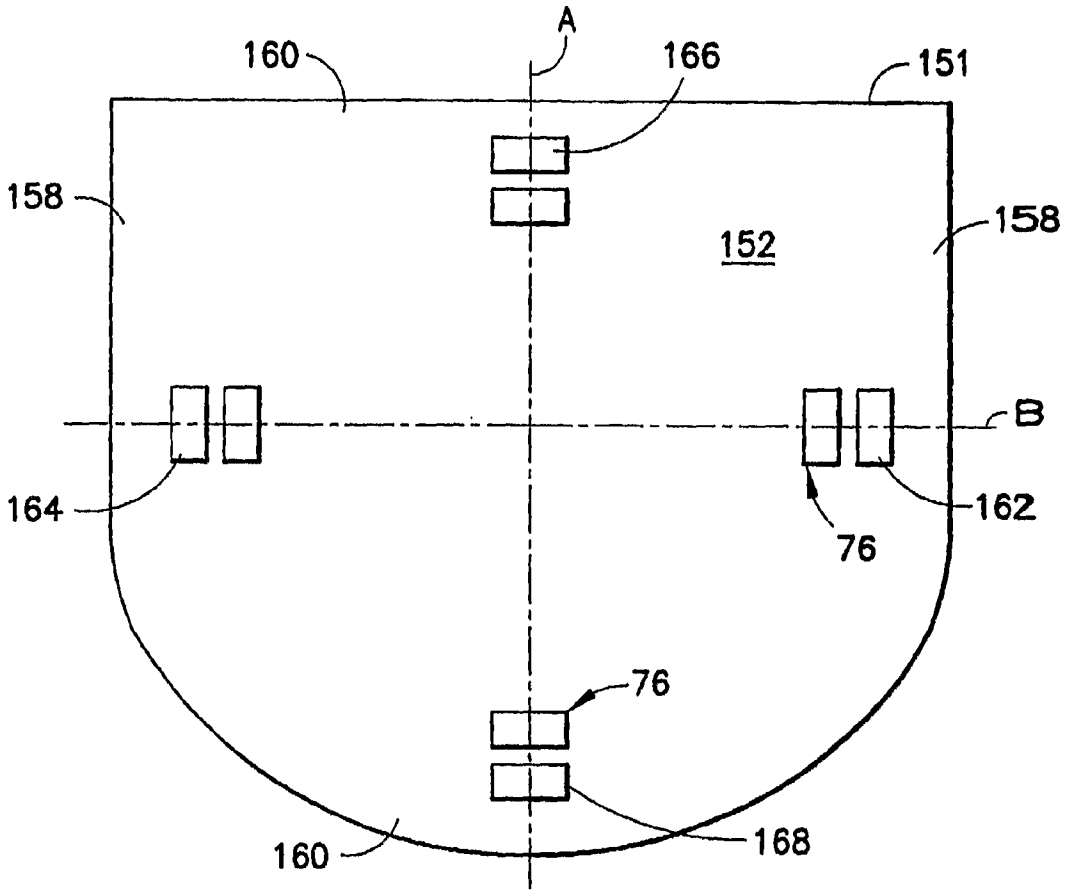


FIG.7A

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
BORCHARDT, James D.

Reinhart Boerner Van Deuren s.c. 1000 North Water Street, Suite 1700 Milwaukee, Wisconsin 53202 USA

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing *(day/month/year)*	09 January 2019 (09.01.2019)
Applicant's or agent's file reference 066749-1803	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. **PCT/US2018/044629**	International filing date *(day/month/year)* **31 July 2018 (31.07.2018)**

Applicant
MILWAUKEE ELECTRIC TOOL CORPORATION

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

How? Directly to the International Bureau of WIPO preferably through ePCT or on paper to, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 , 9-011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. These comments will be made available to the public after international publication. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established.

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90*bis*.1 and 90*bis*.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices. In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months. For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the *PCT Applicant's Guide*, National Chapters.

Within **22 months** from the priority date, the applicant may request that a supplementary international search be carried out by a different International Searching Authority that offers this service (Rule 45*bis*.1). The procedure for requesting supplementary international search is described in the *PCT Applicant's Guide*, International Phase, paragraphs 8.006-8.032.

Name and mailing address of the ISA/KR International Application Division Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea	Authorized officer COMMISSIONER
Facsimile No. 82-42-481-8578	Telephone No. 82-42-481-5875

Form PCT/ISA/220 (July 2017)

* Attention

Copies of the documents cited in the international search report can be searched in the following Korean Intellectual Property Office English website for six months(expire date : **2019.07.09**) from the date of mailing of the international search report.

http://www.kipo.go.kr/en/ => PCT ISA Portal => PCT Status

ID : PCT international application number

PW : **RDNLFBF3**

Inquiries related to PCT International Search Report or Written Opinion prepared by KIPO as an International Searching Authority can be answered not only by KIPO but also through IPKC (Intellectual Property Korea Center), located in Vienna, VA, which functions as a PCT Help Desk for PCT applicants.

Homepage: http://www.ipkcenter.com

Email: ipkc@ipkcenter.com

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 066749-1803	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. **PCT/US2018/044629**	International filing date *(day/month/year)* **31 July 2018 (31.07.2018)**	(Earliest) Priority Date *(day/month/year)* 31 July 2017 (31.07.2017)

Applicant

MILWAUKEE ELECTRIC TOOL CORPORATION

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of:

☒ the international application in the language in which it was filed

☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).

c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box No. II)

3. ☒ **Unity of invention is lacking** (See Box No. III)

4. With regard to the **title,**

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

a. the figure of the **drawings** to be published with the abstract is Figure No. 41

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2018/044629

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Group I, claims 1-11, 41-53, and 56-69, suggests a storage container comprising first and second mounting rails for mounting a variety of accessories.
Group II, claims 12-15, suggests a modular attachment plate comprising a plate body including a cleat receptacle opening and a latch receptacle opening for coupling a storage container to a variety of accessories.
Group III, claims 16-27, suggests a collapsible storage crate, which comprises a crate bottom and a cleat, coupled to a storage container for receiving a variety of accessories.
Group IV, claims 28-33, suggests a stack lock assembly comprising a cleat and a rail for accommodating a plurality of containers by a lock mechanism.
Group V, claims 34-38, suggests a cleat assembly comprising a cleat receptacle receiving a cleat.
Group VI, claims 39 and 40, suggests an accessory holder comprising a holder body and an accessory attachment rail for holding an accessory.
Group VII, claims 54-55 and 70-87, suggests a storage container comprising

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of any additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-11, 41-53, and 56-69

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2018/044629

A. CLASSIFICATION OF SUBJECT MATTER

B25H 3/02(2006.01)i, B62B 5/06(2006.01)i, A45F 5/02(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B25H 3/02; A47L 9/24; B62B 1/00; B62B 1/12; B62B 1/14; B62B 1/16; H01L ; B62B 5/06; A45F 5/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: storage container, first mounting rail, second mounting rail, mount, cleat receptacle

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2012-0207571 A1 (SCOTT, CHARLES SHAY) 16 August 2012 See paragraphs [0038]-[0058]; claims 1-13; and figures 1, 2A-2C, 3A-3D.	1-7,41-53,64-66
Y		8-11,56-63,67-69
Y	WO 2005-045886 A2 (BROOKS AUTOMATION, INC.) 19 May 2005 See claims 1-20; and figure 5.	8-11
Y	US 2008-0115312 A1 (DIPASQUALE et al.) 22 May 2008 See paragraphs [0064]-[0067]; and figures 27-31.	11,56-63,67-69
A	US 2016-0023349 A1 (MILWAUKEE ELECTRIC TOOL CORPORATION) 28 January 2016 See claims 1-24; and figures 20-31.	1-11,41-53,56-69
A	US 2006-0186624 A1 (KADY, DARREN) 24 August 2006 See paragraphs [0081]-[0089]; and figures 1-3.	1-11,41-53,56-69

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
09 January 2019 (09.01.2019)	**09 January 2019 (09.01.2019)**

Name and mailing address of the ISA/KR
International Application Division
Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea
Facsimile No. +82-42-481-8578

Authorized officer
LEE, Jong Kyung
Telephone No. +82-42-481-3360

Form PCT/ISA/210 (second sheet) (January 2015)

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2012-0207571 A1	16/08/2012	US 2016-0207553 A1	21/07/2016
		US 9242662 B2	26/01/2016
WO 2005-045886 A2	19/05/2005	CN 101175682 A	07/05/2008
		CN 101175682 B	11/07/2012
		EP 1685598 A2	02/08/2006
		EP 1685598 A4	12/01/2011
		EP 1685598 B1	06/06/2012
		JP 2007-521662 A	02/08/2007
		KR 10-1233301 B1	14/02/2013
		KR 10-2006-0116827 A	15/11/2006
		US 2005-0095087 A1	05/05/2005
		WO 2005-045886 A3	11/10/2007
US 2008-0115312 A1	22/05/2008	EP 1922969 A2	21/05/2008
		EP 1922969 A3	02/07/2008
		EP 1922969 B1	03/08/2011
		US 7716783 B2	18/05/2010
US 2016-0023349 A1	28/01/2016	CN 205968920 U	22/02/2017
		CN 207189614 U	06/04/2018
		US 10086508 B2	02/10/2018
		US 2017-0239808 A1	24/08/2017
		US 9616562 B2	11/04/2017
US 2006-0186624 A1	24/08/2006	AU 2001-287167 A1	25/11/2002
		CA 2450948 A1	21/11/2002
		CN 100361851 C	16/01/2008
		CN 1529669 A	15/09/2004
		EP 1399347 A2	24/03/2004
		MX PA03011786 A	07/03/2005
		US 2002-0171228 A1	21/11/2002
		US 2006-0186642 A1	24/08/2006
		US 7147243 B2	12/12/2006
		WO 02-092412 A2	21/11/2002
		WO 02-092412 A3	23/01/2003

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
BORCHARDT, James D.

Reinhart Boerner Van Deuren s.c. 1000 North Water Street, Suite 1700 Milwaukee, Wisconsin 53202 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)*	09 January 2019 (09.01.2019)
Applicant's or agent's file reference: 066749-1803	FOR FURTHER ACTION: See paragraph 2 below
International application No.: **PCT/US2018/044629**	International filing date *(day/month/year)*: 31 July 2018 (31.07.2018)
	Priority date *(day/month/year)*: 31 July 2017 (31.07.2017)

International Patent Classification (IPC) or both national classification and IPC

B25H 3/02(2006.01)i, B62B 5/06(2006.01)i, A45F 5/02(2006.01)i

Applicant

MILWAUKEE ELECTRIC TOOL CORPORATION

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
International Application Division Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea Facsimile No. +82-42-481-8578	09 January 2019 (09.01.2019)	LEE, Jong Kyung Telephone No. +82-42-481-3360

Form PCT/ISA/237 (cover sheet) (January 2015)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2018/044629

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:

   a. ☐ forming part of the international application as filed:
      ☐ in the form of an Annex C/ST.25 text file.
      ☐ on paper or in the form of an image file.

   b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.

   c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
      ☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
      ☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2018/044629

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has, within the applicable time limit:
   - ☐ paid additional fees
   - ☐ paid additional fees under protest and, where applicable, the protest fee
   - ☐ paid additional fees under protest but the applicable protest fee was not paid
   - ☒ not paid additional fees
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
   - ☐ complied with
   - ☒ not complied with for the following reasons:

Group Ⅰ, claims 1-11, 41-53, and 56-69, suggests a storage container comprising first and second mounting rails for mounting a variety of accessories.

Group Ⅱ, claims 12-15, suggests a modular attachment plate comprising a plate body including a cleat receptacle opening and a latch receptacle opening for coupling a storage container to a variety of accessories.

Group Ⅲ, claims 16-27, suggests a collapsible storage crate, which comprises a crate bottom and a cleat, coupled to a storage container for receiving a variety of accessories.

Group Ⅳ, claims 28-33, suggests a stack lock assembly comprising a cleat and a rail for accommodating a plurality of containers by a lock mechanism.

Group Ⅴ, claims 34-38, suggests a cleat assembly comprising a cleat receptacle receiving a cleat.

Group Ⅵ, claims 39 and 40, suggests an accessory holder comprising a holder body and an accessory attachment rail for holding an accessory.

Group Ⅶ, claims 54-55 and 70-87, suggests a storage container comprising a container body, an upright member, and a handle for moving the container body.

The inventions listed as Group Ⅰ, Ⅱ, Ⅲ, Ⅳ, Ⅴ, Ⅵ, and Ⅶ do not relate to a single general inventive concept under PCT Rule 13.1, because under PCT Rule 13.2 they lack the same or corresponding special technical features for the following reason; they are separate inventions with distinct fields of search.

4. Consequently, this opinion has been established in respect of the following parts of the international application:
   - ☐ all parts.
   - ☒ the parts relating to claims Nos. 1-11, 41-53, and 56-69

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-11,41-53,56-69	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	NONE	YES
	Claims	1-11,41-53,56-69	NO
Industrial applicability (IA)	Claims	1-11,41-53,56-69	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: US 2012-0207571 A1 (SCOTT, CHARLES SHAY) 16 August 2012
D2: WO 2005-045886 A2 (BROOKS AUTOMATION, INC.) 19 May 2005
D3: US 2008-0115312 A1 (DIPASQUALE et al.) 22 May 2008

1. Novelty and Inventive Step

1.1 Independent Claim 1

D1, which is considered to be the closest prior art to the subject matter of claim 1, discloses a dumpster (170) comprising: a left rail (111a) and a right rail (111b) spaced apart from the left rail (111a); and a carriage frame (124) detachably connected to the left rail (111a) and the right rail (111b) (see paragraphs [0038]-[0039], [0041], [0053]; and figures 1, 3A).

The subject matter of claim 1 differs from D1 in that a storage container comprises a mount including at least one cleat receptacle defined therein.

However, this feature would be easily conceived from the disclosure of D1 considering that a holder assembly (104) including a carriage assembly (120) having the carriage frame (124) may hold a container (108) (see paragraphs [0038], [0041]; and figure 1).

Accordingly, claim 1 would have been obvious over D1. Therefore, claim 1 does not involve an inventive step under PCT Article 33(3).

1.2 Dependent Claims 2-7

1.2.1 Concerning Claim 2

The additional feature of claim 2, characterized in that a first mounting rail and a second

Continued on Supplemental Box

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box No. V

mounting rail are disposed at respective corners of the storage container, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that a system (100) including the left rail (111a) and the right rail (111b) is engaged on the dumpster (170) (see paragraph [0053]; claim 1; and figures 1, 3A). Accordingly, claim 2 would have been obvious over D1. Therefore, claim 2 does not involve an inventive step under PCT Article 33(3).

1.2.2 Concerning Claim 3

The additional feature of claim 3, characterized in that the mount spans across an entire side of the storage container, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the system (100) comprising the holder assembly (104) including the carriage assembly (120) having the carriage frame (124) is engaged on the dumpster (170) (see paragraphs [0041], [0053]; claim 1; and figures 1, 3A). Accordingly, claim 3 would have been obvious over D1. Therefore, claim 3 does not involve an inventive step under PCT Article 33(3).

1.2.3 Concerning Claim 4

The additional feature of claim 4, characterized in that the mount includes a first mount end and a second mount end, and at least one of the first and second mount ends includes a closure latch, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the carriage frame (124) may be latched to be held in a raised position on the frame (110) including the left rail (111a) and the right rail (111b) (see paragraphs [0039], [0050]; and figure 1). Accordingly, claim 4 would have been obvious over D1. Therefore, claim 4 does not involve an inventive step under PCT Article 33(3).

1.2.4 Concerning Claim 5

The additional feature of claim 5, characterized in that the mount is configured to resiliently snap on and off of the respective first and second mounting rails, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the carriage frame (124) may be latched to be held in the raised position on the frame (110) including the left rail (111a) and the right rail (111b) (see paragraphs [0039], [0050]; and figure 1). Accordingly, claim 5 would have been obvious over D1. Therefore, claim 5 does not involve an inventive step under PCT Article 33(3).

Continued on The Next Page

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of : Previous Page

1.2.5 Concerning Claim 6

The additional feature of claim 6, characterized in that a cleat is slidably received in the cleat receptacle, and an attachment accessory is connected to the cleat, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the holder assembly (104) including the carriage assembly (120) having the carriage frame (124) may hold the container (108) (see paragraphs [0038], [0041]; and figure 1). Accordingly, claim 6 would have been obvious over D1. Therefore, claim 6 does not involve an inventive step under PCT Article 33(3).

1.2.6 Concerning Claim 7

The additional feature of claim 7, characterized in that the mount includes a rigid plate member, and the at least one cleat receptacle is defined in the rigid plate member, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the holder assembly (104) including the carriage assembly (120) having the carriage frame (124) may hold the container (108) (see paragraphs [0038], [0041]; and figure 1). Accordingly, claim 7 would have been obvious over D1. Therefore, claim 7 does not involve an inventive step under PCT Article 33(3).

1.3 Independent Claim 8

D1, which is considered to be the closest prior art to the subject matter of claim 8, discloses a dumpster (170) comprising: a left rail (111a) and a right rail (111b) spaced apart from the left rail (111a); and a container (108) mounted to the left rail (111a) and the right rail (111b) (see paragraphs [0038]-[0039], [0041], [0053]; and figures 1, 3A).

The subject matter of claim 8 differs from D1 in that a storage container comprises: a tiedown rail disposed between first and second mounting rails; and an auxiliary storage container including a receiving sleeve, wherein the tiedown rail is disposed in the receiving sleeve.

However, this feature would be easily conceived from the disclosure of D2 considering that a workpiece holding container (151) is connected to a center rail (68) disposed between outer rails (660-661) (see figure 5).

Accordingly, it would be obvious to a person skilled in the art to apply the feature of D2 to the dumpster of D1 to arrive at the storage container of claim 8. Therefore, claim 8 does not involve an inventive step under PCT Article 33(3).

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1.4 Dependent Claims 9-11

1.4.1 Concerning Claim 9

The additional feature of claim 9, characterized in that the auxiliary storage container includes a soft-sided bag, is not explicitly disclosed in either D1 or D2. However, this feature is merely a matter of design option in view of the disclosure of D1 such as the kind of the container (108) connected to a holder assembly (104) (see paragraph [0038]; and figure 1). Accordingly, claim 9 would have been obvious over D1 in view of D2. Therefore, claim 9 does not involve an inventive step under PCT Article 33(3).

1.4.2 Concerning Claim 10

The additional feature of claim 10, characterized in that the auxiliary storage container is removably connected to the first mounting rail, the second mounting rail, and the tiedown rail, is not explicitly disclosed in either D1 or D2. However, this feature would be easily conceived from the disclosure of D2 considering that the workpiece holding container (151) is connected to the outer rails (660-661) and the center rail (68) disposed between the outer rails (660-661) (see figure 5). Accordingly, claim 10 would have been obvious over D1 in view of D2. Therefore, claim 10 does not involve an inventive step under PCT Article 33(3).

1.4.3 Concerning Claim 11

The additional feature of claim 11, characterized in that the auxiliary storage container includes a first resilient mounting clip removably connected to the first mounting rail, and a second resilient mounting clip removably connected to the second mounting rail, is not explicitly disclosed in either D1 or D2. However, this feature would be easily conceived from the disclosures of D1 considering that a frame (110) includes the left rail (111a) and the right rail (111b) connected to the container (108) (see paragraph [0039]; and figure 1) and D3 considering that a vacuum (200) can be provided with a pair of cord wrap ears (230, 232) (see paragraph [0064]; and figure 29). Accordingly, it would be obvious to a person skilled in the art to combine the features of D1-D3 to arrive at the storage container of claim 11. Therefore, claim 11 does not involve an inventive step under PCT Article 33(3).

1.5 Independent Claim 41

D1, which is considered to be the closest prior art to the subject matter of claim 41,

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discloses a dumpster (170) comprising a left rail (111a) and a right rail (111b) spaced apart from the left rail (111a) (see paragraphs [0039], [0053]; and figures 1, 3A).

The subject matter of claim 41 differs from D1 in that a storage container comprises a bin connected to a first mounting rail and a second mounting rail.

However, this feature is merely a matter of design option in view of the disclosure of D1 such as the kind of a container (108) connected to the left rail (111a) and the right rail (111b) (see figure 1).

Accordingly, claim 41 would have been obvious over D1. Therefore, claim 41 does not involve an inventive step under PCT Article 33(3).

1.6 Dependent Claims 42-45

1.6.1 Concerning Claim 42

The additional feature of claim 42, characterized in that the bin is removably connected to the first and second mounting rails, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the container (108) is connected to the left rail (111a) and the right rail (111b) (see figure 1). Accordingly, claim 42 would have been obvious over D1. Therefore, claim 42 does not involve an inventive step under PCT Article 33(3).

1.6.2 Concerning Claim 43

The additional feature of claim 43, characterized in that the first mounting rail and the second mounting rail are disposed at respective corners of the storage container, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that a system (100) including the left rail (111a) and the right rail (111b) is engaged on the dumpster (170) (see paragraph [0053]; claim 1; and figures 1, 3A). Accordingly, claim 43 would have been obvious over D1. Therefore, claim 43 does not involve an inventive step under PCT Article 33(3).

1.6.3 Concerning Claim 44

The additional feature of claim 44, characterized in that the bin spans across an entire side of the storage container, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the system (100) including the container (108) is engaged on the dumpster (170) (see paragraph [0053]; and figures 1, 3A).

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Accordingly, claim 44 would have been obvious over D1. Therefore, claim 44 does not involve an inventive step under PCT Article 33(3).

1.6.4 Concerning Claim 45

The additional feature of claim 45, characterized in that the bin is configured to resiliently snap on and off of the respective first and second mounting rails, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the container (108) is connected to the left rail (111a) and the right rail (111b) (see figure 1). Accordingly, claim 45 would have been obvious over D1. Therefore, claim 45 does not involve an inventive step under PCT Article 33(3).

1.7 Independent Claim 46

D1, which is considered to be the closest prior art to the subject matter of claim 46, discloses a dumpster (170) comprising a left rail (111a) and a right rail (111b) spaced apart from the left rail (111a) (see paragraphs [0039], [0053]; and figures 1, 3A).

The subject matter of claim 46 differs from D1 in that a storage container comprises a table assembly connected to a first mounting rail and a second mounting rail.

However, this feature is merely a matter of design option in view of the disclosure of D1 such as the kind of a container (108) connected to the left rail (111a) and the right rail (111b) (see figure 1).

Accordingly, claim 46 would have been obvious over D1. Therefore, claim 46 does not involve an inventive step under PCT Article 33(3).

1.8 Dependent Claims 47 and 48

1.8.1 Concerning Claim 47

The additional feature of claim 47, characterized in that the table assembly includes a platform, wherein the platform of the table assembly is rotatable relative to the first and second mounting rails, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that a holder (122) may continue to be rotated until the contents of the container (108) are dumped into the dumpster (170) (see paragraph [0049]; and figures 1, 3A). Accordingly, claim 47 would have been obvious over D1. Therefore, claim 47 does not involve an inventive step under PCT Article 33(3).

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1.8.2 Concerning Claim 48

The additional feature of claim 48, characterized in that the table assembly is configured to resiliently snap on and off of the respective first and second mounting rails, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the container (108) is connected to the left rail (111a) and the right rail (111b) (see figure 1). Accordingly, claim 48 would have been obvious over D1. Therefore, claim 48 does not involve an inventive step under PCT Article 33(3).

1.9 Independent Claim 49

D1, which is considered to be the closest prior art to the subject matter of claim 49, discloses a dumpster (170) comprising a left rail (111a) and a right rail (111b) spaced apart from the left rail (111a) (see paragraphs [0039], [0053]; and figures 1, 3A).

The subject matter of claim 49 differs from D1 in that a storage container comprises a bag holder assembly connected to a first mounting rail and a second mounting rail.

However, this feature is merely a matter of design option in view of the disclosure of D1 such as the kind of a container (108) connected to the left rail (111a) and the right rail (111b) (see figure 1).

Accordingly, claim 49 would have been obvious over D1. Therefore, claim 49 does not involve an inventive step under PCT Article 33(3).

1.10 Dependent Claims 50-53

1.10.1 Concerning Claim 50

The additional feature of claim 50, characterized in that a wheeled cart supports the storage container, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that a frame assembly (102) supporting the container (108) includes a frame (110) and wheels (112) (see paragraph [0039]; and figure 1). Accordingly, claim 50 would have been obvious over D1. Therefore, claim 50 does not involve an inventive step under PCT Article 33(3).

1.10.2 Concerning Claim 51

The additional feature of claim 51, characterized in that the bag holder assembly includes a bag receiving rod spanning across an entire side of the storage container, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1

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considering that a system (100) including the container (108) is engaged on the dumpster (170) (see paragraph [0053]; and figures 1, 3A). Accordingly, claim 51 would have been obvious over D1. Therefore, claim 51 does not involve an inventive step under PCT Article 33(3).

1.10.3 Concerning Claim 52

The additional feature of claim 52, characterized in that the bag receiving rod is formed into a semi-circle spanning from the first mounting rail to the second mounting rail, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the container (108) is connected to the left rail (111a) and the right rail (111b) (see figure 1). Accordingly, claim 52 would have been obvious over D1. Therefore, claim 52 does not involve an inventive step under PCT Article 33(3).

1.10.4 Concerning Claim 53

The additional feature of claim 53, characterized in that the bag holder assembly is configured to resiliently snap on and off of the respective first and second mounting rails, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the container (108) is connected to the left rail (111a) and the right rail (111b) (see figure 1). Accordingly, claim 53 would have been obvious over D1. Therefore, claim 53 does not involve an inventive step under PCT Article 33(3).

1.11 Independent Claim 56

D1, which is considered to be the closest prior art to the subject matter of claim 56, discloses a dumpster (170) comprising a left rail (111a) and a right rail (111b) spaced apart from the left rail (111a) (see paragraphs [0039], [0053]; and figures 1, 3A).

The subject matter of claim 56 differs from D1 in that a storage container comprises: a first clip removably mounted to a first mounting rail, the first clip including a first accessory hook; and a second clip removably mounted to a second mounting rail, the second clip including a second accessory hook, wherein the first and second clips are arranged with the first and second accessory hooks facing outwardly from the storage container to receive an accessory.

However, these features would be easily conceived from the disclosures of D1 considering that a container (108) is connected to the left rail (111a) and the right rail (111b) of a frame (110) (see paragraph [0039]; and figure 1), and D3 considering that a vacuum (200) can be

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provided with a pair of cord wrap ears (230, 232) (see paragraph [0064]; and figure 29)

Accordingly, it would be obvious to a person skilled in the art to apply the feature of D3 to the dumpster of D1 to arrive at the storage container of claim 56. Therefore, claim 56 does not involve an inventive step under PCT Article 33(3).

1.12 Dependent Claims 57-63

1.12.1 Concerning Claim 57

The additional feature of claim 57, characterized in that the accessory includes a first loop and a second loop, and the first accessory hook is received in the first loop and the second accessory hook is received in the second loop, is not explicitly disclosed in either D1 or D3. However, this feature would be easily conceived from the disclosure of D3 considering that a cord (236) is wrapped around the cord wrap ears (230, 232) (see paragraph [0065]; and figure 29). Accordingly, claim 57 would have been obvious over D1 in view of D3. Therefore, claim 57 does not involve an inventive step under PCT Article 33(3).

1.12.2 Concerning Claim 58

The additional feature of claim 58, characterized in that the accessory includes a plurality of hooks disposed between the first mounting rail and the second mounting rail, is not explicitly disclosed in either D1 or D3. However, this feature would be easily conceived from the disclosures of D1 considering that the frame (110) includes the left rail (111a) and the right rail (111b) (see paragraph [0039]; and figure 1), and D3 considering that the cord (236) is wrapped around the cord wrap ears (230, 232) (see paragraph [0065]; and figure 29). Accordingly, claim 58 would have been obvious over D1 in view of D3. Therefore, claim 58 does not involve an inventive step under PCT Article 33(3).

1.12.3 Concerning Claim 59

The additional feature of claim 59, characterized in that the plurality of hooks are integrally formed as a unitary part with the first and second loops, is not explicitly disclosed in either D1 or D3. However, this feature would be easily conceived from the disclosure of D3 considering that the cord (236) is wrapped around the cord wrap ears (230, 232) (see paragraph [0065]; and figure 29). Accordingly, claim 59 would have been obvious over D1 in view of D3. Therefore, claim 59 does not involve an inventive step under PCT Article 33(3).

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1.12.4 Concerning Claim 60

The additional feature of claim 60, characterized in that the accessory includes a storage bin disposed between the first mounting rail and the second mounting rail, is not explicitly disclosed in either D1 or D3. However, this feature is merely a matter of design option in view of the disclosure of D1 such as the kind of the container (108) connected to the left rail (111a) and the right rail (111b) (see figure 1). Accordingly, claim 60 would have been obvious over D1 in view of D3. Therefore, claim 60 does not involve an inventive step under PCT Article 33(3).

1.12.5 Concerning Claim 61

The additional feature of claim 61, characterized in that the storage bin is integrally formed as a unitary part with the first and second loops, is not explicitly disclosed in either D1 or D3. However, this feature would be easily conceived from the disclosures of D1 considering that the container (108) is connected to the left rail (111a) and the right rail (111b) (see figure 1), and D3 considering that the cord (236) is wrapped around the cord wrap ears (230, 232) (see paragraph [0065]; and figure 29). Accordingly, claim 61 would have been obvious over D1 in view of D3. Therefore, claim 61 does not involve an inventive step under PCT Article 33(3).

1.12.6 Concerning Claim 62

The additional feature of claim 62, characterized in that the first clip is resiliency snapped onto the first mounting rail and the second clip is resiliently snapped onto the second mounting rail, is not explicitly disclosed in either D1 or D3. However, this feature would be easily conceived from the disclosures of D1 considering that the container (108) is connected to the left rail (111a) and the right rail (111b) (see figure 1), and D3 considering that the vacuum (200) can be provided with the pair of cord wrap ears (230, 232) (see paragraph [0064]; and figure 29). Accordingly, claim 62 would have been obvious over D1 in view of D3. Therefore, claim 62 does not involve an inventive step under PCT Article 33(3).

1.12.7 Concerning Claim 63

The additional feature of claim 63, characterized in that a length of cord is removably wrapped about the first and second accessory hooks, is not explicitly disclosed in either D1 or D3. However, this feature would be easily conceived from the disclosure of D3 considering that the cord (236) is wrapped around the cord wrap ears (230, 232) (see

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paragraph [0065]; and figure 29). Accordingly, claim 63 would have been obvious over D1 in view of D3. Therefore, claim 63 does not involve an inventive step under PCT Article 33(3).

1.13 Independent Claim 64

D1, which is considered to be the closest prior art to the subject matter of claim 64, discloses a dumpster (170) comprising: a left rail (111a) and a right rail (111b) spaced apart from the left rail (111a); and a carriage frame (124) detachably connected to the left rail (111A) and the right rail (111b) (see paragraphs [0038]-[0039], [0041], [0053]; and figures 1, 3A).

The subject matter of claim 64 differs from D1 in that a storage container comprises at least one bin removably disposed on a mount.

However, this feature is merely a matter of design option in view of the disclosure of D1 such as the kind of a container (108) disposed on the carriage frame (124) (see figure 1).

Accordingly, claim 64 would have been obvious over D1. Therefore, claim 64 does not involve an inventive step under PCT Article 33(3).

1.14 Dependent Claims 65 and 66

1.14.1 Concerning Claim 65

The additional feature of claim 65, characterized in that the mount is configured to resiliently snap on and off of the first and second mounting rails, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the carriage frame (124) may be latched to be held in a raised position on a frame (110) including the left rail (111a) and the right rail (111b) (see paragraphs [0039], [0050]; and figure 1). Accordingly, claim 65 would have been obvious over D1. Therefore, claim 65 does not involve an inventive step under PCT Article 33(3).

1.14.2 Concerning Claim 66

The additional feature of claim 66, characterized in that the at least one bin is slidably received on the mount, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the container (108) is disposed on the carriage frame (124) (see figure 1). Accordingly, claim 66 would have been obvious over D1. Therefore, claim 66 does not involve an inventive step under PCT Article 33(3).

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1.15 Independent Claim 67

D1, which is considered to be the closest prior art to the subject matter of claim 67, discloses a dumpster (170) comprising: a container body; a left rail (111a) connected to the container body; a holder (122) hingedly connected to the container body; and a container (108) disposed on the holder (122) of the dumpster (170), wherein the container (108) includes a right rail (111b) (see paragraphs [0039], [0049], [0053]; and figures 1, 3A)

The subject matter of claim 67 differs from D1 in that a storage container comprises: a first clip removably mounted to a first mounting rail, the first clip including a first accessory hook; and a second clip removably mounted to a supplemental mounting rail, the second clip including a second accessory hook.

However, these features would be easily conceived from the disclosures of D1 considering that a frame (110) includes the left rail (111a) and the right rail (111b) connected to the container (108) (see paragraph [0039]; and figure 1), and D3 considering that a vacuum (200) can be provided with a pair of cord wrap ears (230, 232) (see paragraph [0064]; and figure 29)

Accordingly, it would be obvious to a person skilled in the art to apply the feature of D3 to the dumpster of D1 to arrive at the storage container of claim 67. Therefore, claim 67 does not involve an inventive step under PCT Article 33(3).

1.16 Dependent Claims 68 and 69

1.16.1 Concerning Claim 68

The additional feature of claim 68, characterized in that a length of cord is removably wrapped about the first and second accessory hooks, is not explicitly disclosed in either D1 or D3. However, this feature would be easily conceived from the disclosure of D3 considering that a cord (236) is wrapped around the cord wrap ears (230, 232) (see paragraph [0065]; and figure 29). Accordingly, claim 68 would have been obvious over D1 in view of D3. Therefore, claim 68 does not involve an inventive step under PCT Article 33(3).

1.16.2 Concerning Claim 69

The additional feature of claim 69, characterized in that the first mounting rail and the supplemental mounting rail are substantially aligned, is not explicitly disclosed in either D1 or D3. However, this feature would be easily conceived from the disclosure of D1 considering that the frame (110) includes the left rail (111a) and the right rail (111b) (see paragraph

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[0039]; and figure 1). Accordingly, claim 69 would have been obvious over D1 in view of D3. Therefore, claim 69 does not involve an inventive step under PCT Article 33(3).

2. Industrial Applicability

Claims 1-11, 41-53, and 56-69 are industrially applicable under PCT Article 33(4).

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Milwaukee Electric Tool Corporation
Title:	Utility Assembly and Coupling Mechanism
Appl. No.:	16/216,724
Filing Date:	December 11, 2018
Examiner:	WEINERTH, GIDEON R
Art Unit:	3736
Confirmation Number:	1402

INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR §1.56

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

Submitted herewith on Form PTO/SB/08 is a listing of the documents known to Applicants in order to comply with Applicants' duty of disclosure pursuant to 37 CFR § 1.56.

A copy of each non-U.S. patent document and each non-patent document is being submitted to comply with the provisions of 37 CFR § 1.97 and §1.98.

The submission of any document herewith, which is not a statutory bar, is not intended as an admission that such document constitutes prior art against the claims of the present application or that such document is considered material to patentability as defined in 37 CFR §1.56(b). Applicants do not waive any rights to take any action which would be appropriate to antedate or otherwise remove as a competent reference any document which is determined to be a *prima facie* art reference against the claims of the present application.

TIMING OF THE DISCLOSURE

The listed documents are being submitted in compliance with 37 CFR §1.97(c), before the mailing date of any of a final action under 37 CFR § 1.113, a notice of allowance under 37 CFR §1.311, or an action that otherwise closes prosecution in the application.

FEES

The IDS Fee of $240.00 under 37 CFR 1.17(p) is being paid via Deposit Account No. 18-0882 via EFS-web.

RELEVANCE OF EACH DOCUMENT

All of the documents are in English.

Applicants respectfully request that each listed document be considered by the Examiner and be made of record in the present application and that an initialed copy of Form PTO/SB/08 be returned in accordance with MPEP §609.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 18-0882. If any extensions of time are needed for timely acceptance of papers submitted herewith, applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 18-0882.

Respectfully submitted,

Date April 23, 2019

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Electronic Patent Application Fee Transmittal

Application Number:	16216724
Filing Date:	11-Dec-2018
Title of Invention:	Utility Assembly and Coupling Mechanism
First Named Inventor/Applicant Name:	Yaron Brunner
Filer:	Derek Howard Campbell/Andrea Dietzel
Attorney Docket Number:	066749-2270

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	240	240
		Total in USD ($)		**240**

Electronic Acknowledgement Receipt

EFS ID:	35808605
Application Number:	16216724
International Application Number:	
Confirmation Number:	1402
Title of Invention:	Utility Assembly and Coupling Mechanism
First Named Inventor/Applicant Name:	Yaron Brunner
Customer Number:	142078
Filer:	Derek Howard Campbell/Andrea Dietzel
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Deposit Account	180882
Authorized User	Andrea Dietzel

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		066749-2270_Amendment.pdf	327594 41b1de44af8bf5256627c4606186589b1b004aad	yes	17
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	7	
	Applicant Arguments/Remarks Made in an Amendment		8	17	
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	066749-2270_SB08.pdf	95329 675b4aaa92b1598ed83fb0ddff18105113e68c64	no	1
Warnings:					
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3	Foreign Reference	WO2005045886.pdf	9601468 189f7dfd3b05bbd77e014af9daab6ccbc4c5b4f4	no	56
Warnings:					
Information:					
4	Other Reference-Patent/App/Search documents	ISR_WO.pdf	2043290 2589655a42b418ceb7673fd44573b326eb49dad5	no	22
Warnings:					
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5	Transmittal Letter	066749-2270_IDS_Transmittal.pdf	84415 72cef9687fe2685f6345c27887a034052bb6f95e	no	2
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	30544 391879fa97bbfb70eb8b63f85b3c6abe759d87b1	no	2
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		Total Files Size (in bytes):	12182640		

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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.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/216,724	12/11/2018	Yaron Brunner	066749-2270

CONFIRMATION NO. 1402

142078
Reinhart (Milwaukee Tool)
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1000 NORTH WATER STREET
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PUBLICATION NOTICE

OC000000107337153

Title: Utility Assembly and Coupling Mechanism

Publication No.US-2019-0106244-A1
Publication Date:04/11/2019

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/216,724	12/11/2018	Yaron Brunner	066749-2270	1402

142078 7590 04/02/2019

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EXAMINER	
WEINERTH, GIDEON R	

ART UNIT	PAPER NUMBER
3736	

NOTIFICATION DATE	DELIVERY MODE
04/02/2019	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):

IPAdmin@reinhartlaw.com

Applicant-Initiated Interview Summary	Application No. 16/216,724	Applicant(s) Brunner et al.	
	Examiner GIDEON R WEINERTH	Art Unit 3736	AIA (FITF) Status Yes

All participants (applicant, applicants representative, PTO personnel):

(1) GIDEON R.. WEINERTH. (3) _____.

(2) DEREK CAMPBELL. (4) _____.

Date of Interview: 28 March 2019.

Type: ☑ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☑ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☑103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 7.

Identification of prior art discussed: MADSEN (US 2011/0139665).

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Applicant wished to discuss claim amendments attempting to overcome MADSEN. Applicant also wished to discuss the citations of MADSEN as applied to claim 5. The Examiner noted that Claim 5 was under a 112 rejection. Applicant could also not identify what comprises the claimed 'single second coupler comprising a single rib' as put forth in the original disclosure of the application. Three proposed claim amendments to Claim 7 were drafted. The Examiner noted that each of these three proposed claims would require further consideration and search. The Examiner also noted possible double patenting rejections over Applications 15826201 and 15826232 which had allowable subject matter. No agreement was reached..

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.

☑ Attachment

/GIDEON R WEINERTH/ Examiner, Art Unit 3736	

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiners responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicants correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,-
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicants record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiners version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, Interview Record OK on the paper recording the substance of the interview along with the date and the examiners initials.

Appl. No. 16/216,724
Atty. Docket No. 066749-2270

Listed below are several versions of proposed claim amendments provided for discussion purposes only.

Derek H. Campbell
Reg. No. 70,608
Email: DCampbell@reinhartlaw.com
Phone: 414-298-8374

7. (Proposed Version A) A coupling mechanism configured for detachably attaching a first utility module to a second utility module, the coupling mechanism comprising:

a first coupler ~~extending from~~ at a first face of the first utility module, ~~the first face being one of a top face of the first utility module and a bottom face of the first utility module,~~ the first coupler comprising a depressed locking location comprising sloped side walls and configured with a rib that is offset from the first face and extending in a first direction above a depressed surface;

a second coupler extending from a ~~second~~ first face of the second utility module, ~~the second face being one of a top face of the second utility module and a bottom face of the second utility module,~~ the second coupler comprising a tongue engageable with the rib, the first and second utility modules entering an engaged position by the second utility module sliding with respect to the first utility module along a sliding path defined by the rib and the tongue;

a latch recess defined by one of the first utility module and the second utility module; and

a latch coupled to the other of the first utility module and the second utility module the latch recess is not defined by, the latch being positionable in a locked position in which the latch ~~prevents~~ restricts disengagement of the first container and the second container when the tongue and rib are engaged.

7. (Proposed Version B) A coupling mechanism configured for detachably attaching a first

utility module to a second utility module, the coupling mechanism comprising:

a first coupler extending from a depressed locking location of a first face of the first utility module, ~~the first face being one of a top face of the first utility module and a bottom face of the first utility module,~~ the first coupler comprising a rib that is offset from the first face and extending between opposing sidewalls and in a first direction;

a second coupler extending from a second face of the second utility module, the second face being one of a top face of the second utility module and a bottom face of the second utility module, the second coupler comprising a tongue engageable with the rib, the first and second utility modules entering an engaged position by the second utility module sliding with respect to the first utility module along a sliding path defined by the rib and the tongue;

a latch recess defined by one of the first utility module and the second utility module; and

a latch coupled to the other of the first utility module and the second utility module the latch recess is not defined by, the latch being positionable in a locked position in which the latch ~~prevents~~ restricts disengagement of the first container and the second container when the tongue and rib are engaged.

7. (Proposed Version C) A coupling mechanism configured for detachably attaching a first utility module to a second utility module, the coupling mechanism comprising:

a first coupler ~~extending from~~ at a first face of the first utility module, ~~the first face being one of a top face of the first utility module and a bottom face of the first utility module,~~ the first coupler comprising a back wall, two sidewalls and a rib, the back wall and the two sidewalls projecting from a depressed surface and the rib ~~that is offset from the first face and~~ extending from the back wall and the two sidewalls in a first direction above the depressed surface;

a second coupler extending from a second face of the second utility module, the second face being one of a top face of the second utility module and a bottom face of the second utility module, the second coupler comprising a tongue engageable with the rib, the first and second utility modules entering an engaged position by the second utility module sliding with respect to the first utility module along a sliding path defined by the rib and the tongue;

a latch recess defined by one of the first utility module and the second utility module; and

a latch coupled to the other of the first utility module and the second utility module the latch recess is not defined by, the latch being positionable in a locked position in which the latch

~~prevents~~ restricts disengagement of the first container and the second container when the tongue and rib are engaged.

1. A container assembly comprising:

a first container comprising:

a first coupler extending from a first face of the first container, the first coupler including a rib that is offset from the first face and extending in a first direction; and

a latch recess; and

a second container comprising:

a second coupler extending from a second face of the second container, the second coupler including a tongue that is offset from the second face and extending in a second direction opposite the first direction, the tongue of the second container engageable with the rib of the first container; and

a latch coupled to the second container, the latch positionable in a locked position in which the latch prevents disengagement of the first container and the second container when the tongue and rib are engaged.

2. The container assembly of claim 1, wherein the first and second couplers on the first and second containers, respectively, ~~engaging~~ engage when the first and second containers are slid along a sliding path defined by the rib and the tongue.

3. The container assembly of claim 1, wherein when the tongue and rib are engaged:

a first side wall of the first coupler and a second side wall of the second coupler interface to restrict displacement between the first container and the second container in a third direction perpendicular to the first direction and parallel to the first face of the first container.

4. The container assembly of claim 3, wherein when the tongue and rib are engaged:

a third side wall of the first coupler and a fourth side wall of the second coupler interface to restrict displacement between the first container and the second container in a fourth direction opposite the third direction.

5. The container assembly of claim 1,

the second container comprising a single second coupler, the single second coupler

comprising a single rib; and

the first container further comprising:

a third coupler extending from a ~~third~~ second face of the first container, the third coupler including a tongue that is offset from the second face of the first container and extending in the second direction, the tongue of the first container configured to engage a rib of a third container, the first and third containers entering an engaged position by the third container sliding with respect to the first container; and

a latch coupled to the first container, the latch positionable in a locked position in which the latch prevents disengagement of the first container and the third container when the tongue of the first container and the rib of the third container are engaged.

6. The first container of claim 1, wherein the first coupler extends from a bottom face of the first container, and the second coupler extends from a top face of the second container.

7. A coupling mechanism configured for detachably attaching a first utility module to a second utility module, the coupling mechanism comprising:

a first coupler extending from a first face of the first utility module, the first face being one of a top face of the first utility module and a bottom face of the first utility module, the first coupler comprising a rib that is offset from the first face and extending in a first direction;

a second coupler extending from a second face of the second utility module, the second face being one of a top face of the second utility module and a bottom face of the second utility module, the second coupler comprising a tongue engageable with the rib, the first and second utility modules entering an engaged position by the second utility module sliding with respect to the first utility module along a sliding path defined by the rib and the tongue;

a latch recess defined by one of the first utility module and the second utility module; and

a latch coupled to the other of the first utility module and the second utility module the latch recess is not defined by, the latch being positionable in a locked position in which the latch prevents disengagement of the first container and the second container when the tongue and rib are engaged.

8. The coupling mechanism of claim 7, the second utility module comprising a single second coupler with a tongue extending in the second direction, the single second coupler comprising a single tongue.

9. The coupling mechanism of claim 7, the first face of the first utility module comprising multiple couplers, the first face configured to detachably engage with multiple utility modules simultaneously.

10. The coupling mechanism of claim 7, the first utility module comprising a single first coupler, the single first coupler comprising a single rib.

11. The coupling mechanism of claim 7, wherein the first face of the first container is a top face of the first container, and wherein the second face of the second container is a bottom face of the second container.

12. The coupling mechanism of claim 7, wherein when the tongue and rib are engaged:

a first side wall of the first coupler and a second side wall of the second coupler interface to restrict displacement between the first container and the second container in a third direction perpendicular to the first direction and parallel to the first face of the first container.

13. The coupling mechanism of claim 12, wherein when the tongue and rib are engaged:

a third side wall of the first coupler and a fourth side wall of the second coupler interface to restrict displacement between the first container and the second container in a fourth direction opposite the third direction.

14. A first container configured to be removably coupled to a second container, the first container comprising:

a top face;

a bottom face; and

a first coupler extending from a first face of the first container that is one of the top face and the bottom face, the first coupler including a tongue offset from the first face and extending in a first direction;

a second coupler extending from a second face of the first container that is the other of the top face and the bottom face, the second coupler including a rib offset from the second face and extending in a second direction opposing the first direction, the rib engageable with a second tongue coupled to a second container, the first container entering an engaged position with the second container by the first and second containers sliding with respect to each other;

a latch recess; and

a latch, the latch positionable in a locked position in which the latch interlocks with a second latch recess in the second container restricting displacement between the first container and the second container.

15. The first container of claim 14, the rib engageable between the second tongue of the second container and a first face of the second container.

Commented [DC1]: Examiner suggestion: "is or may be"

16. The first container of claim 14, the first coupler of the first container engageable with a second rib of a third container.

17. The first container of claim 16, the latch recess of the first container engageable with a second latch of the third container.

18. The first container of claim 14, the first container comprising a single second coupler, the single second coupler comprising a single rib.

19. The first container of claim 14, the first container comprising a single first coupler, the single first coupler comprising a single tongue.

20. The first container of claim 14, wherein the first face of the first container is the bottom face of the first container, and the second face of the first container is the top face of the first container.

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16/216,724	12/11/2018	Yaron Brunner	066749-2270	1402

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EXAMINER
WEINERTH, GIDEON R

ART UNIT	PAPER NUMBER
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NOTIFICATION DATE	DELIVERY MODE
01/24/2019	ELECTRONIC

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

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

IPAdmin@reinhartlaw.com

Office Action Summary	Application No. 16/216,724	Applicant(s) Brunner et al.	
	Examiner GIDEON R WEINERTH	Art Unit 3736	AIA Status Yes

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

Period for Reply

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

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

Status

1)☐ Responsive to communication(s) filed on _____.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

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

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-20 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-20 is/are rejected.

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

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp 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 11 December 2018 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 12/11/2018.

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

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

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

Information Disclosure Statement

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered. In particular, copies of foreign references should be included.

Claim Rejections - 35 USC § 112

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.

1. Claims 2, 5, and 15 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 pre-AIA the applicant regards as the invention.

2. Regarding Claim 2, the claim appears to be inaccurately drafted, lacks any 'wherein' transition word, and appears to mix verb tenses. Claim 2 reads as follows: "2.

The container assembly of claim 1, the first and second couplers on the first and second containers, respectively, engaging when the first and second containers are slid along a sliding path defined by the rib and the tongue." This is confusingly worded and does not set forth proper relations between the elements.

3. For the purposes of Examination, it will be assumed that Claim 2 refers to "The container of claim 1, **wherein** the first and second couplers on the first and second containers, respectively, ~~engaging~~ **engage** when the first and second containers are slid along a sliding path defined by the rib and the tongue."

4. Regarding Claim 5, the claim present a number of ambiguities that make the claim indefinite.

5. Claim 5 is presented below with numbered lines:

1 5. The container assembly of claim 1,

2 the second container comprising a single second coupler, the single second coupler
3 comprising a single rib; and

4 the first container further comprising:

5 a third coupler extending from a third face of the first container, the third coupler
6 including a tongue that is offset from the second face of the first container and
7 extending in the second direction, the tongue of the first container configured to
8 engage a rib of a third container, the first and third containers entering an engaged
9 position by the third container sliding with respect to the first container; and

10 a latch coupled to the first container, the latch positionable in a locked position in
11 which the latch prevents disengagement of the first container and the third container
12 when the tongue of the first container and the rib of the third container are engaged.

6. On Line 5 above, the claim defines a third coupler extending from a third face of the first container. As Claim 1 only defines the first container as having a first coupler extending from a first face of the first container, there is no second face of the first

container previously set forth. It is unclear whether there is an undefined second face of the first container or if the third face of the first container is simply the face opposite the defined first face.

7. Secondly, Line 6 presents an antecedent basis issue by introducing "the second face of the first container". Claim 1 does NOT define a second face of the first container. Claim 1 only sets forth a second face of the SECOND container. There is no independent second face of the first container defined in Claim 1. There is insufficient antecedent basis for this limitation in the claim.

8. In short, Claim 5 defines the second container as comprising a single rib, and the first container having a third coupler (but lacking a second coupler) of a tongue offset from a second face of the first container (though it is unclear what comprises this second face) that is configured to engage a rib of a third container.

9. For the purposes of examination, it will be assumed that claim 5 defines that the coupling mechanism of Claim 1 may also be used with similar third containers having similar tongue and rib latching members.

10. Claim 15 recites: "The first container of claim 14, the rib engageable between the second tongue of the second container and a first face of the second container." It is believed that the rib **is or may be** engageable between the second tongue of the second container and a first face of the second container.

Claim Rejections - 35 USC § 102

11. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of

rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

12. The following is a quotation of the appropriate paragraphs of 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 –
>
> (a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

13. Claims 1-8 and 10-20 are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Madsen (US 2011/0139665).

14. Regarding Claim 1, Madsen discloses a container assembly comprising: a first container (10) comprising: a first coupler (2) extending from a first face of the first container, the first coupler including a rib (38, 39, and 40) that is offset from the first face and extending in a first direction; and a latch recess (at Element 16 in Figure 3); and a second container (11) comprising: a second coupler (3) extending from a second face of the second container, the second coupler including a tongue (defined at faces of Elements 14 and 16) that is offset from the second face and extending in a second direction opposite the first direction, the tongue of the second container engageable with the rib of the first container; and a latch (7) coupled to the second container, the latch positionable in a locked position in which the latch prevents disengagement of the first container and the second container when the tongue and rib are engaged. Please see Diagrams 1-3 below which further illustrate the sliding rib and tongue connection as well as the vertically sliding latch in the recess of Madsen Element 16. Also, please note the discussion in Madsen Paragraphs 0009 and 0051-52.

15. Regarding Claim 2, Madsen discloses the first and second couplers on the first and second containers engage when the first and second containers are slid along a sliding path defined by the rib and the tongue.

16. Regarding Claim 3, Madsen discloses that when the tongue and rib are engaged, a first side wall of the first coupler and a second side wall of the second coupler interface to restrict displacement between the first container and the second container in a third direction perpendicular to the first direction and parallel to the first face of the first container. "When the top case (10) is placed on top of the lower case (11) the direct frame (1) and the conical catch flange (40) will automatically bring the coupling parts in gear. A slight sideward push will bring the connecting bridges (4) in tight gear and as shown in FIG. 5 the transport lock (7) will block for disassembly and keep the connecting bridges in tight and compact coupling."- Paragraph 0051.

17. Regarding Claim 4, Madsen discloses that when the tongue and rib are engaged a third side wall of the first coupler and a fourth side wall of the second coupler interface to restrict displacement between the first container and the second container in a fourth direction opposite the third direction. Please note that all directions are blocked when the tongue and groove interface is locked in position as discussed in Madsen.

18. Regarding Claim 5, Madsen discloses that single connectors are provided on the containers and a third similar container having identical coupling means may also interface with the coupling members.

19. Regarding Claim 6, Madsen discloses the first coupler extends from a bottom face of the first container, and the second coupler extends from a top face of the second container.

20. Regarding Claim 7, Madsen discloses a coupling mechanism configured for detachably attaching a first utility module to a second utility module, the coupling mechanism comprising: a first coupler extending from a first face of the first utility module, the first face being one of a top face of the first utility module and a bottom face of the first utility module, the first coupler comprising a rib that is offset from the first face and extending in a first direction; a second coupler extending from a second face of the second utility module, the second face being one of a top face of the second utility module and a bottom face of the second utility module, the second coupler comprising a tongue engageable with the rib, the first and second utility modules entering an engaged position by the second utility module sliding with respect to the first utility module along a sliding path defined by the rib and the tongue; a latch recess (at Element 16 shown in Figure 3) defined by one of the first utility module and the second utility module; and a latch (9) coupled to the other of the first utility module and the second utility module the latch recess is not defined by, the latch being positionable in a locked position in which the latch prevents disengagement of the first container and the second container when the tongue and rib are engaged.

21. Regarding Claim 8, Madsen discloses the second utility module comprising a single second coupler with a tongue extending in the second direction, the single second coupler comprising a single tongue.

22. Regarding Claim 10, Madsen discloses the first utility module comprising a single first coupler, the single first coupler comprising a single rib.

23. Regarding Claim 11, Madsen discloses the first face of the first container is a top face of the first container, and wherein the second face of the second container is a bottom face of the second container.

24. Regarding Claim 12, Madsen discloses that when the tongue and rib are engaged, a first side wall of the first coupler and a second side wall of the second coupler interface to restrict displacement between the first container and the second container in a third direction perpendicular to the first direction and parallel to the first face of the first container.

25. Regarding Claim 13, Madsen discloses that when the tongue and rib are engaged a third side wall of the first coupler and a fourth side wall of the second coupler interface to restrict displacement between the first container and the second container in a fourth direction opposite the third direction.

26. Regarding Claim 14, Madsen discloses a first container configured to be removably coupled to a second container, the first container comprising a top face; a bottom face; and a first coupler extending from a first face of the first container that is one of the top face and the bottom face, the first coupler including a tongue offset from the first face and extending in a first direction; a second coupler extending from a second face of the first container that is the other of the top face and the bottom face, the second coupler including a rib offset from the second face and extending in a second direction opposing the first direction, the rib engageable with a second tongue coupled to a second container, the first container entering an engaged position with the second container by the first and second containers sliding with respect to each other; a latch recess; and a latch, the latch positionable in a locked position in which the latch

interlocks with a second latch recess in the second container restricting displacement between the first container and the second container.

27. Regarding Claim 15, Madsen discloses the rib is engageable between the second tongue of the second container and a first face of the second container.

28. Regarding Claim 16, Madsen discloses the first coupler of the first container is engageable with a second rib of a third container.

29. Regarding Claim 17, Madsen discloses the latch recess of the first container is engageable with a second latch of the third container.

30. Regarding Claim 18, Madsen discloses the first container comprising a single second coupler, the single second coupler comprising a single rib.

31. Regarding Claim 19, Madsen discloses the first container comprises a single first coupler, the single first coupler comprising a single tongue.

32. Regarding Claim 20, Madsen discloses the first face of the first container is the bottom face of the first container, and the second face of the first container is the top face of the first container.

Claim Rejections - 35 USC § 103

33. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

34. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

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

35. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

36. Claim 9 is rejected under 35 U.S.C. 103 as being unpatentable over Madsen (US 2011/0139665) as applied to claim 7 above, and further in view of Zelinskiy (US 2011/0073516).

37. Regarding Claim 1, Madsen discloses the limitations of Claim 7 as discussed above. Madsen does not disclose the first face of the first utility module comprising multiple couplers, the first face configured to detachably engage with multiple utility modules simultaneously. Rather, Madsen discloses a single coupler which allows for connecting a single first face of the module with a single first face of a second module.

38. Zelinskiy discloses a similar connecting utility toolbox comprising a plurality of connectors (25, 35, 45) that allows for a plurality of utility toolboxes to be simultaneously connected. Madsen and Zelinskiy are analogous inventions in the art of connectible stacking toolboxes.

39. It would have been obvious for one having ordinary skill in the art before the effective filing date of the claimed invention to modify the single coupling means shown in Madsen with the multiple connecting means shown in Zelinskiy allowing for a simultaneous connection of a top face of a bottom module with the bottom face of a plurality of top modules to allow for the simultaneous connection of a parent toolbox with a plurality of smaller child toolboxes (Paragraph 0006). Also, one of ordinary skill in the art would recognize and find obvious duplicating the tongue and rib connection of Madsen as an obvious variation in the duplication of a part which would provide the expected result of allowing alternate coupling locations and improving stability. Please see MPEP 2144.04 VI. Part B.

Conclusion

40. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

41. Any inquiry concerning this communication or earlier communications from the examiner should be directed to GIDEON R. WEINERTH whose telephone number is (571)270-5121. The examiner can normally be reached on Monday-Friday 10AM-6PM 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, Greg Pickett can be reached on (571) 272-4560. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/GIDEON R WEINERTH/
Examiner, Art Unit 3736

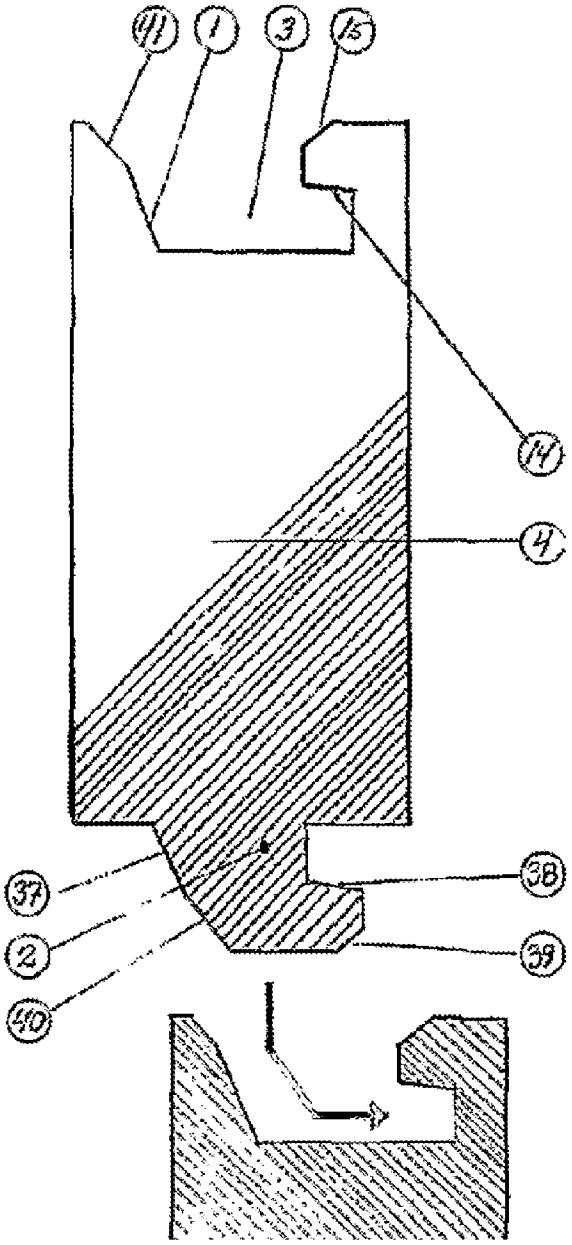


Diagram 1 - Detail from Madsen (US 2011/0139665) Figure 1 showing depressed locking location (3) with rib/catch flange (15) and projecting portion (2) with locking tongue/flange (38)

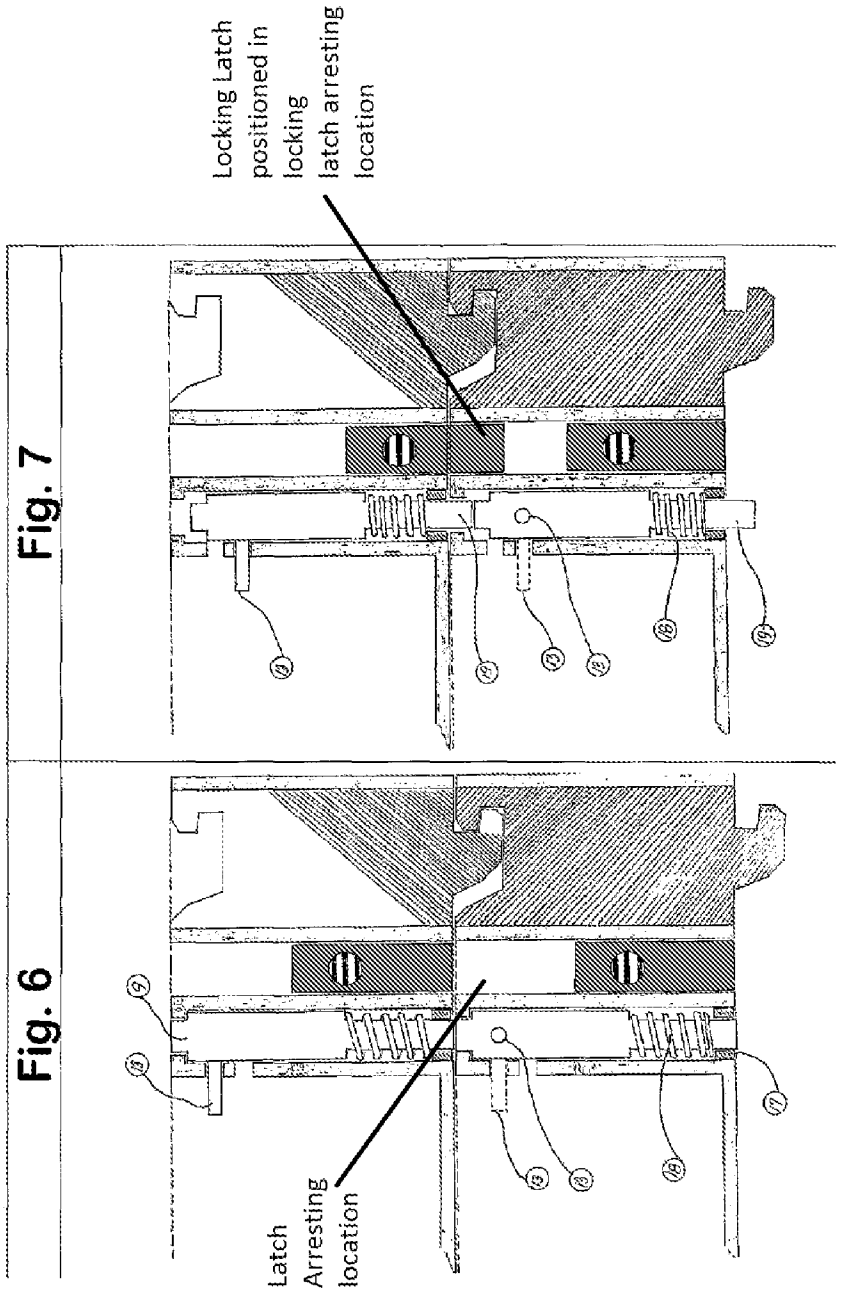


Diagram 2 - Madsen (US 2011/0139665) Figures 6 and 7 showing transport lock (7) moving into recess

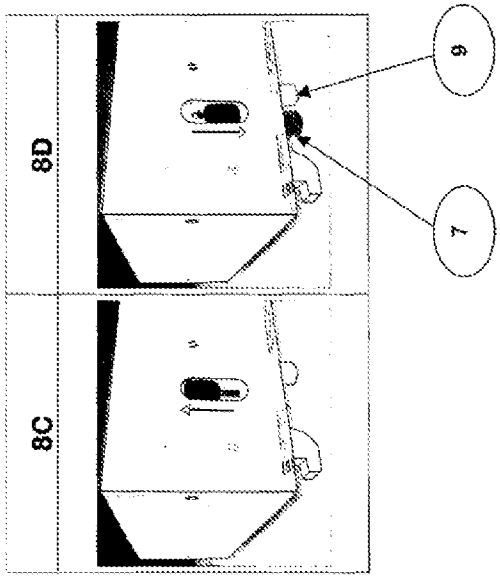


Diagram 3 - Madsen (US 2011/0139565) showing channel (16) in Figure 3 where transport lock (7) can be manipulated by locking knob (8) to extend into the locking latch arrestingt location as seen in Figures 8c and 8d.

Fig. 4

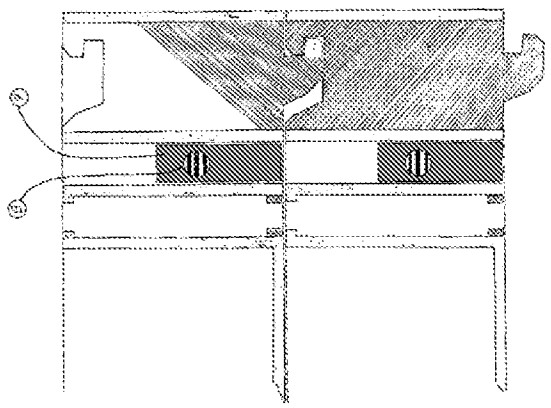
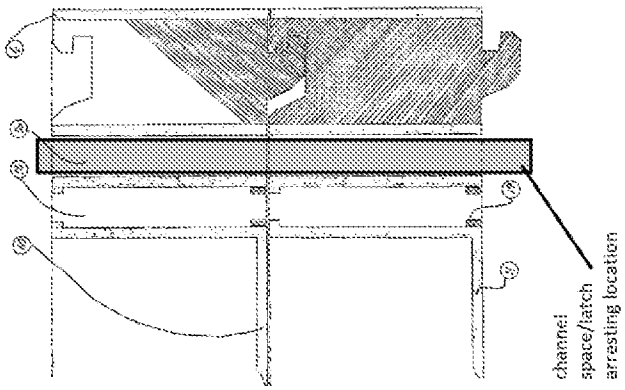


Fig. 3



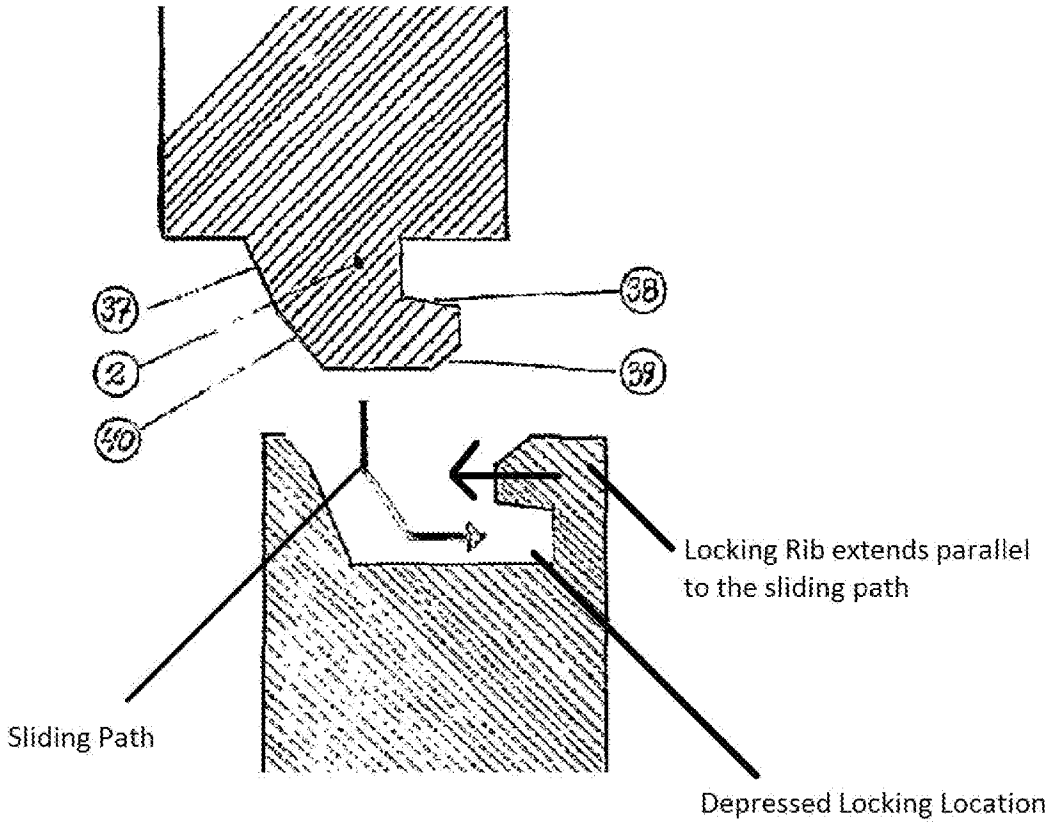


Diagram 4 - Detail from Madsen (US 20110139665) Figure 2 showing Female Coupler as applied to claim limitations of Claim 2

Notice of References Cited	Application/Control No. 16/216,724	Applicant(s)/Patent Under Reexamination	
	Examiner GIDEON R WEINERTH	Art Unit 3736	Page 1 of 2

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Notice of References Cited	Application/Control No. 16/216,724	Applicant(s)/Patent Under Reexamination	
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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/216,724	Brunner et al.
	Examiner	Art Unit
	GIDEON R WEINERTH	3736

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant					☐ CPA		☐ T.D.		☐ R.1.47	
CLAIM		DATE								
Final	Original									

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/216,724	Brunner et al.
	Examiner	Art Unit
	GIDEON R WEINERTH	3736

CPC - Searched*		
Symbol	**Date**	**Examiner**
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Symbol	**Date**	**Examiner**

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
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Search Notes		
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Interference Search			
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	To be determined
Date Submitted: December 11, 2018				**Filing Date**	December 11, 2018
				First Named Inventor	Yaron Brunner
(use as many sheets as necessary)				Art Unit	To be determined
				Examiner Name	To be determined
Sheet	1	of	3	Attorney Docket Number	066749-2270

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Examiner Signature	/GIDEON R WEINERTH/	Date Considered	01/16/2019

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. 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 2 hours 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, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

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				Art Unit	To be determined
(use as many sheets as necessary)				Examiner Name	To be determined
Sheet	2	of	3	Attorney Docket Number	066749-2270

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/G.R.W/	A51	2017/0166352	06-15-2017	Hoppe; Christopher S.	

UNPUBLISHED U.S. PATENT APPLICATION DOCUMENTS

Examiner Initials*	Cite No.[1]	U.S. Patent Application Document Serial Number-Kind Code[2] (*if known*)	Filing Date of Cited Document MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

Examiner Signature	/GIDEON R WEINERTH/	Date Considered	01/16/2019

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Substitute for form 1449/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	To be determined
				Filing Date	December 11, 2018
Date Submitted: December 11, 2018				**First Named Inventor**	Yaron Brunner
				Art Unit	To be determined
(use as many sheets as necessary)				Examiner Name	To be determined
Sheet	3	of	3	Attorney Docket Number	066749-2270

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Documents	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	~~A52~~	~~JP 1276744~~	~~07-18-2006~~	~~Hirofumi Kishimoto~~		
	A53	JP 1477050	08-19-2013	Ryosuke Omachi		
	~~A54~~	~~KR 30-0271616~~	~~02-09-2000~~	~~Joong Chui Ahm~~		
	~~A55~~	~~KR 30-0320243~~	~~06-10-2002~~	~~Joung Gu Kang~~		
	~~A56~~	~~TW 135074~~	~~06-01-2010~~	~~Yi Hua Wu~~		
	~~A57~~	~~TW 168686~~	~~07-01-2015~~	~~Kang Delun Business Co., Ltd.~~		
	A58	TW 174412	03-21-2016	Lee Hsin Chang		
	~~A59~~	~~DE 202015105053~~	~~10-31-2016~~	~~AUER PACKAGING GMBH~~		
	~~A60~~	~~DE 202015005752~~	~~11-21-2016~~	~~PLASTON AG~~		
	~~A61~~	~~CN 2668238~~	~~03-31-2004~~	~~BAO JIANGANG~~		
	~~A62~~	~~WO 2016142935~~	~~09-15-2016~~	~~BRUNNER, Yaron et al.~~		
	A63	WO 2017028845	02-23-2017	ROTHENBERGER AG		

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]
	A64	Non-Final Rejection issued April 12, 2018, in United States Application No. 15/826,201. (16 Pages) (Docket No. J69950TJS01 446373-419).	

Examiner Signature	/GIDEON R WEINERTH/	Date Considered	01/16/2019

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This collection of information is required by 37 CFR 1.97 and 1.98. 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 2 hours 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, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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S61	44	("20040007574" | "20050036847" | "20050199459" | "20070130731" | "20090178946" | "20120292867" | "3419184" | "3987829" | "4287997" | "4452555" | "5058746" | "5085448" | "5186330" | "5564805" | "5709008" | "5785328" | "6116390" | "6983946" | "7011214" | "7044528" | "7163122" | "7350789" | "7482928" | "7530580" | "7537119" | "7714708" | "7780026" | "7854321" | "7883096" | "7938412" | "8132819" | "8146771" | "8256242" | "8561769" | "8567796" | "D358765" | "D401412" | "D467424" | "D467425" | "D467426" | "RE44656").PN. OR ("9550605").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 21:59
S62	10	("20050199623" | "5765707" | "5829595" | "6024223" | "7337908").PN. OR ("8146771").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:03
S63	42	("0621601" | "2761582" | "3113690" | "3616943" | "3643993" | "3823973" | "3828964" | "3977558" | "4000704" | "4042111" | "4416374" | "4678084" | "4887731" | "5011036" | "5022546" | "5105967").PN. OR ("5186330").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:05
S64	74	("0879455" | "2849151" | "3005282" | "3371816" | "3393858" | "3481502").PN. OR ("3616943").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:08
S65	36	("1234730" | "20020145022" | "20030010799" | "20040207225" | "20090212584" | "2578238" | "2883764" | "3002650" | "3131829" | "3351228" | "3374914" | "3616943" | "4754883" | "4838745" | "4941784" | "5025964" | "5392945" | "5469999" | "5538153" | "5671511" | "5676251" | "5687895" | "5855310" | "6471278" | "7159730" | "7329451" | "7537119" | "D264014" | "D333094").PN. OR ("9738198").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:09
S66	75	("0879455" | "20040178208" | "20060254947" | "2695115" | "2849151" | "2939603" | "3103278" | "3117692" | "3383009" | "3391824" | "3419184" | "3481502" | "3616943" | "3754645" | "3756396" | "3759416" | "3811747" | "3968879" | "4287997" | "4655360" | "4671411" | "4765252" | "4832200" | "4848605" | "5042674" | "5203494" | "5392945" | "5454477" | "5566824" | "5641090" | "5718350" | "5769230" | "5779051" | "6021916" | "6085467" | "6186345" | "6237758" | "6308858" | "6367630" | "6371364" | "6457599" | "6585090" | "6662950" | "7163122" | "D333094" | "D361715" | "D446017" | "D500924").PN. OR ("7537119").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:10
S67	45	("0491865" | "1142932" | "1665238" |	US-PGPUB;	OR	OFF	2018/04/05

		"20060016812" | "20070108080" | "20080264820" | "20100084119" | "3144016" | "3259263" | "3369691" | "3384259" | "3828964" | "4109789" | "4655360" | "4760921" | "4901380" | "5086926" | "5203494" | "5461755" | "5564583" | "5671856" | "5699925" | "5769230" | "6024223" | "6085467" | "6186345" | "6237758" | "6273258" | "6457599" | "6715627" | "6840378" | "6851566" | "7510096" | "7537119" | "8056722" | "RE37518").PN. OR ("8813960").URPN.	USPAT; USOCR			22:11
S68	32	("4506798" | "4626155" | "4741449" | "5109985" | "5123541" | "5190179" | "5722328" | "5862917").PN. OR ("6024223").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:12
S69	4	("1665238").URPN.	USPAT	OR	OFF	2018/04/05 22:15
S70	39	("2885135" | "3376046" | "3539071" | "3568879" | "3987829" | "4174950" | "4765252" | "4844263" | "D248015").PN. OR ("D333094").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:17
S71	53	("2761582" | "3117692" | "3360162" | "3379341" | "3392875" | "3419184" | "3675815" | "3759416" | "3979016" | "4093071" | "4106624" | "4189052" | "4379508").PN. OR ("4832200").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:19
S72	79	("3117692").URPN.	USPAT	OR	OFF	2018/04/05 22:22
S73	45	("1762635" | "2531671" | "2614399" | "3117692" | "3498494" | "3501044" | "3502241" | "3667647" | "3751852").PN. OR ("4279354").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:24
S74	13	("20060186186" | "20070209962" | "20080202976" | "2328689" | "2828059" | "3811566" | "4279354" | "4293071" | "6315126").PN. OR ("8684222").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:25
S75	45	("1762635" | "2531671" | "2614399" | "3117692" | "3498494" | "3501044" | "3502241" | "3667647" | "3751852").PN. OR ("4279354").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:26
S76	110	("2457842" | "2483464" | "2664219" | "2702142" | "3073466" | "3130855" | "3140007" | "3586204" | "3828964").PN. OR ("4287997").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:30
S77	63	("2461526" | "3078484" | "3114486" | "3233803" | "3749294" | "3902640" | "3915189" | "4082208" | "4287997" | "4307826" | "4366922" | "4424841" | "4491258" | "4545414" | "4673070" | "4790432" | "4813542" | "4884731" | "5131576" | "5184763" | "5321904" | "5419473").PN. OR ("5628443").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:33
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		"20040211634" | "20040238303" | "20050077133" | "20050077706" | "20050098402" | "20050103590" | "20050150733" | "20050258621" | "20050285359" | "20060010644" | "20060086583" | "20060102677" | "20060163305" | "20060175170" | "20060196743" | "20060207848" | "20080060953" | "20080136133" | "20080223679" | "20080236972" | "20080308369" | "20080308370" | "20090057082" | "20090139813" | "20090160147" | "20090218187" | "20100000805" | "20100025174" | "20100095480" | "20100108452" | "20100147642" | "20100263977" | "20100307879" | "20100308563" | "20110247910" | "20120160617" | "20120261223" | "20150091264" | "20160045000" | "2454438" | "2602675" | "3131829" | "3178197" | "3317081" | "3659867" | "3842953" | "3891230" | "3974898" | "4087102" | "4314624" | "4335895" | "4575109" | "4588055" | "4673070" | "4917392" | "4953257" | "4969660" | "5072958" | "5105962" | "5127662" | "5263727" | "5310071" | "5348325" | "5533231" | "5628443" | "5630601" | "5749503" | "5803471" | "5815843" | "5873145" | "5984154" | "5984327" | "6016893" | "6042127" | "6047442" | "6141841" | "6179176" | "6182981" | "6186295" | "6196366" | "6196560" | "6213266" | "6213267" | "6237734" | "6260871" | "6279705" | "6289554" | "6305587" | "6360400" | "6367602" | "6401888" | "6401890" | "6409412" | "6454065" | "6471019" | "6474524").PN. OR ("6484362" | "6530507" | "6533086" | "6575493" | "6591950" | "6604617" | "6609271" | "6736073" | "6769701" | "6832670" | "6880685" | "6923352" | "6961976" | "6964420" | "7066311" | "7070190" | "7073694" | "7093700" | "7097181" | "7097183" | "7143912" | "7226073" | "7232018" | "7237660" | "7281616" | "7284304" | "7318507" | "7328779" | "7350648" | "7374183" | "7426985" | "7441785" | "7478803" | "7594569" | "7597341" | "7780026" | "8607947").PN. OR ("9888752").URPN.				
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S80	45	("0672173" | "1084360" | "20020144376" | "20040084269" | "20040173427" | "20040238241" | "20050077136" | "20050092568" | "20080308369" | "20090095588" | "20090101461" | "20100059322" | "20100170761" | "20100236886" | "20100270116" | "20110168507" | "20130037364" | "20130175129" | "20130213753" | "20130220754" | "2581417" | "4836343" |	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:36

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S81	35	("0922567" | "1084360" | "1567461" | "2372845" | "2428906" | "2801666" | "2858957" | "3837447" | "4098312" | "4122925" | "4142563" | "4257463" | "4286639" | "4673070" | "4744446").PN. OR ("4836343").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:39
S82	51	("0778785" | "1567461" | "2372845" | "2428906" | "2989998" | "3631572" | "3696850" | "4122925" | "4128194" | "4256245" | "4424841").PN. OR ("4673070").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:40
S83	33	("0842498" | "1689399" | "3114486" | "3698045" | "4231135" | "4673070" | "4799298" | "4934573" | "5205448" | "5259093" | "5465425" | "5604958" | "5632071" | "5724707" | "5815843" | "6108816" | "7080430" | "7251867").PN. OR ("7526842").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:41
S84	23	("2428906" | "2707035" | "3225951" | "3319744" | "3696850" | "3958731").PN. OR ("4122925").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:43
S85	33	("1973819" | "2007696" | "3373911").PN. OR ("4142563").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:46
S86	12	("2858957").URPN.	USPAT	OR	OFF	2018/04/05 22:48
S87	12	("20060071581" | "20080060964" | "2858957" | "3346137" | "3568879" | "4258847" | "4592601" | "4685565" | "4863222" | "7311202").PN. OR ("9724820").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:49
S88	43	("2128854" | "3743372").PN. OR ("4863222").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:49
S89	73	("2842420" | "2998128" | "3032381" | "3294463" | "3501044" | "3552817").PN. OR ("3743372").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:51
S90	36	("2011962" | "3514170" | "3552817" | "3743372" | "3851936" | "3999818" | "4198777" | "4238032" | "4353470" | "4589546" | "4744612" | "4782619" | "4874210" | "4907703" | "5046789" | "5137340" | "5176435" | "5191983" | "5344024" | "5399004" | "5454634").PN. OR ("6050657").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:53
S91	17	("3131829" | "3429632" | "3552579" | "3707023" | "4062302" | "4239306" | "5246284").PN. OR ("5454634").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:55
S92	55	("0511617" | "1890000" | "2492697" | "2557630" | "2807387" | "3203744" | "3283915" | "3514170" | "3743372" | "3758181" | "3918781" | "3999818" | "4026615" | "4056295" | "4120549").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 22:59

		OR ("4243279").URPN.				
S93	45	("2593998" | "2653072" | "2730423" | "3131829" | "3219400" | "3514170" | "3552817" | "3563624" | "3743372" | "3814489").PN. OR ("3999818").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 23:03
S94	14	("2593998").URPN.	USPAT	OR	OFF	2018/04/05 23:06
S95	52	("4081061" | "4621716" | "5316159" | "6213266" | "6213267" | "7976024" | "1084360" | "3749273" | "4570799" | "4995436" | "5779051" | "D447944" | "3103278" | "3374917" | "5000713" | "6585090" | "5098328" | "D359315" | "20030132184" | "20050199459" | "4813542" | "0480709" | "5062539" | "5186290" | "6276550" | "D346627" | "5310071" | "20040222059" | "3583590" | "3836043" | "4287997" | "4656840" | "5167336" | "5392945" | "6257381" | "20040000458" | "4573595" | "7644828" | "D483200" | "7648407" | "3811747" | "20010027902" | "5099968" | "5485920" | "5709304" | "5735422" | "3346137").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 23:14
S96	22	("3131829" | "3194426" | "3338452" | "4258847" | "4328902" | "4428479" | "5016946" | "5050755" | "5310071" | "5316159" | "5503288" | "5845790").PN. OR ("6276550").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 23:16
S97	41	("2454438" | "2495132" | "3131829" | "3194426" | "3297196" | "3317081" | "3343705" | "3404805" | "3851936" | "4192422").PN. OR ("4328902").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 23:18
S98	43	("1092651" | "2565969" | "2891639" | "3028207" | "3032381" | "3506321").PN. OR ("3974898").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 23:29
S99	11	("0907507" | "1626482" | "2343525" | "3974898" | "4065014").PN. OR ("4423687").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/05 23:30
S100	32	("3481502").URPN.	USPAT	OR	OFF	2018/04/05 23:38
S101	8	(("1112943") or ("2255513") or ("2849151") or ("3371816")).PN.	USPAT; USOCR	OR	OFF	2018/04/05 23:41
S102	16	("2849151").URPN.	USPAT	OR	OFF	2018/04/05 23:41
S103	8	(("0993866") or ("1342909") or ("1514512") or ("1640368")).PN.	USPAT; USOCR	OR	OFF	2018/04/05 23:42
S104	21	("1112943").URPN.	USPAT	OR	OFF	2018/04/05 23:43
S105	16	("2849151").URPN.	USPAT	OR	OFF	2018/04/06 12:32
S106	8	(("0993866") or ("1342909") or ("1514512") or ("1640368")).PN.	USPAT; USOCR	OR	OFF	2018/04/06 12:33
S107	22	("879455").URPN.	USPAT	OR	OFF	2018/04/06 12:34
S108	16	("2849151").URPN.	USPAT	OR	OFF	2018/04/06 13:10
S109	8	(("0993866") or ("1342909") or ("1514512") or ("1640368")).PN.	USPAT; USOCR	OR	OFF	2018/04/06 13:11

S110	37	("3899229" | "4431237" | "4519655" | "4828341" | "4889254" | "5191983").PN. OR ("5469961").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 13:11
S111	25	("20030155267" | "20050224494" | "20080308641" | "20090139892" | "20090178989" | "20090236255" | "2634020" | "3182856" | "3387732" | "3581928" | "4351448" | "5353948" | "5469961" | "5606820" | "5699925" | "5755180" | "6761266" | "6959507" | "7246718").PN. OR ("8677661").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 13:12
S112	24	("1226708" | "2833137" | "2834121" | "2843943" | "3139744" | "3220229" | "3545235" | "3824813" | "4507942" | "4551996" | "4663948" | "4680948" | "4821535" | "4972687" | "4989426" | "5469961" | "5653416").PN. OR ("5951130").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 13:13
S113	118	(US-20130127129-$ or US-20110155613-$ or US-20110139665-$ or US-20040195793-$ or US-20020000440-$ or US-20120292213-$ or US-20070012694-$ or US-20150336710-$ or US-20020134700-$ or US-20100270764-$ or US-20100000893-$ or US-20050062244-$ or US-20040183266-$ or US-20020014488-$ or US-20020113386-$ or US-20030196860-$ or US-20170259956-$ or US-20160144500-$ or US-20160130034-$ or US-20150274362-$ or US-20110168599-$ or US-20090178989-$ or US-20100219193-$ or US-20060254946-$ or US-20070068757-$ or US-20090178946-$).did. or (US-20050199459-$ or US-20080308369-$ or US-20050077136-$).did. or (US-7503569-$ or US-9022234-$ or US-8875888-$ or US-8657307-$ or US-8590704-$ or US-3182856-$ or US-8459495-$ or US-7097036-$ or US-6193062-$ or US-9393684-$ or US-6637592-$ or US-D730088-$ or US-5833065-$ or US-5482162-$ or US-5244265-$ or US-4244509-$ or US-9643629-$ or US-7780026-$ or US-9132543-$ or US-8567796-$ or US-8226092-$ or US-8201837-$ or US-8132819-$ or US-7997594-$ or US-3010775-$ or US-9669930-$).did. or (US-4813542-$ or US-6585090-$ or US-6085925-$ or US-D776106-$ or US-6839238-$ or US-9609964-$ or US-7152752-$ or US-9506489-$ or US-3944282-$ or US-5241765-$ or US-4389078-$ or US-1849659-$ or US-4405057-$ or US-9802741-$ or US-8851287-$ or US-8763836-$ or US-8561769-$ or US-D808164-$ or US-9550605-$ or US-4887731-$ or US-9738198-$ or US-7537119-$ or US-8813960-$ or US-9669968-$ or US-6024223-$ or US-1665238-$ or US-D333094-$).did. or (US-3376046-$ or US-4832200-$ or US-	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 18:03

		D364558-$ or US-3419184-$ or US-3117692-$ or US-8684222-$ or US-2328689-$ or US-4287997-$ or US-5628443-$ or US-9888752-$ or US-9027722-$ or US-4673070-$ or US-7526842-$ or US-5465839-$ or US-9724820-$ or US-4863222-$ or US-3743372-$ or US-6050657-$ or US-5454634-$ or US-3851936-$ or US-5602721-$ or US-3999818-$ or US-5271515-$ or US-4243279-$ or US-6276550-$ or US-4328902-$ or US-7350648-$).did. or (US-5407074-$ or US-3481502-$ or US-2849151-$ or US-3616943-$ or US-5469961-$ or US-8677661-$ or US-5951130-$).did. or (US-3117692-$ or US-2593998-$).did.				
S115	286	B65D21/0223.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 18:05
S116	226	B65D21/0224.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 18:05
S117	2198	B25H3/021,022,023,04,06.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 18:07
S118	436	A47B47/00.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 18:10
S119	1076	A47B87/02,007,0276.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 18:10
S120	550	A47B67/04.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 18:11
S121	770	Y10T403/7045.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 18:12
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S123	102	("0890436" | "2740167" | "3310919" | "3988187" | "5295341" | "5630304" | "6023907" | "1854396" | "2381469" | "20030029116" | "3040388" | "3192574" | "3347048" | "3526420" | "4599841" | "6098365" | "5899038" | "20020112433" | "20030029115" | "2381469" | "3673751" | "4599841" | "4819932" | "5086599" | "5363616" | "6029416" | "6216409" | "6324809" | "6546691" | "6606834" | "6647690" | "20030029115" | "3902291" | "5295341" | "5630304" | "6421970" | "6763643" | "0753791" | "20030029116" | "2430200" | "3579941" | "5283102" | "6209278" | "6647690" | "6854235" | "20030024201" | "3579941" | "3673751" | "4426820" | "4741136" | "5860267" | "6023907" | "6122879" | "6769835" | "0338653" | "1776188" | "1854396" | "20030024201" | "3172508" | "3175476" |	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 18:15

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S133	2	("20080236562" | "7723655").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 18:47
S134	6	(matthew near3 vargo).inv.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 18:49
S135	75	(Hoppe near2 Christopher).inv.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 18:49

S136	14	B65D25/2823.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 18:54
S137	351	B65D25/06.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 18:54
S138	73	(Milwaukee adj Electric).as. and (stack box)	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 19:01
S139	8	(Milwaukee adj Electric).as. and ("220" "206" "215").clas.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 19:02
S140	8	(Milwaukee and tool).as. and ("220" "206" "215").clas.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 19:02
S141	84	(Milwaukee and tool).as. and latch	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 19:03
S142	37	(Milwaukee and tool).as. and (stack stacked stacking)	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 19:04
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"7326428" | "7331454" | "7334680" |
"7357250" | "7357268" | "7367451" |
"7370891" | "7374183" | "7387304" |
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S145	27	("4212415" | "4664283" | "4823955" | "4896926" | "5246105").PN. OR ("5544751").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 19:11
S146	44	("1699130" | "2072672" | "2551814" | "2633285" | "2736487" | "3010638" | "3361322" | "3623650" | "3632037" | "3713579" | "3905478" | "3905541" | "3921896" | "4002261" | "4023617" | "4187977" | "4230233" | "4245773" | "4251006" | "4277015" | "4291830" | "4389013" | "4482074" | "4643314" | "4685610" | "4762270" | "4763833" | "4828894" | "4884739" | "4911356" | "4948039" | "4993623" | "5038998" | "5116290" | "5190213").PN. OR ("5429260").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 19:12
S147	0	("1140005").URPN.	USPAT	OR	OFF	2018/04/06 19:30
S148	119	("1267650" | "1999162" | "3163268" | "3379482" | "3419184" | "3425471" | "3498689" | "3642168" | "3700137" | "3979016" | "3987829" | "4161261" | "4293073" | "4303158" | "4523692" | "4664347" | "4799503" | "4804092" | "4819795" | "4915913" | "4982863" | "4984687" | "5011013" | "5024471" | "5040834" | "5042674" | "5065885" | "5065887" | "5080250" | "5103994" | "5117979" | "5123564" | "5176281" | "5186330" | "5190152" | "5193706" | "5244265" | "5319937" | "D237135" | "D237611" | "D238148" | "D239695" | "D246872" | "D248280" | "D257934" | "D258721" | "D277797" | "D286937" | "D292711" | "D302774" | "D312573" | "D316516" | "D319016" | "D321090" | "D321091" | "D322164" | "D325323" | "D325324" | "D326775" | "D326815" | "D327646" | "D328425" | "D328818" | "D328819" | "D329331" | "D329747" | "D330161" | "D330162" | "D330329" | "D331317" | "D335960" | "D336366" | "D339471" | "D342364").PN. OR ("5564805").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 20:05
S149	62	("0198092" | "0564782" | "1063046" | "1268124" | "1740470" | "1987822" | "2011197" | "2094805" | "2122969" | "2504722" | "2759507" | "2786500" | "2791251" | "2799306" | "3018355" | "3615087" | "3746210" | "3851756" | "4061323" | "4239195" | "4256294" | "4278243" | "4303158" | "4378828" | "4460085" | "4909491" | "4911296" | "5011013" | "5117979" | "5193706" | "D253212" | "D263533" | "D288867").PN. OR ("5595228").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 22:03
S150	15	("2587829" | "2610761" | "2740517" | "4252239" | "4733703" | "5329929" | "5595228").PN. OR ("6206063").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/06 22:04
S151	6	("4466659" | "4967944" | "5207470" |	US-PGPUB;	OR	OFF	2018/04/07

		"6193118" | "6554169" | "7000810").PN.	USPAT; USOCR			00:38
S152	96	("1032326" | "1503894" | "1926162" | "2612200" | "2629644" | "2724595" | "2735597" | "2754079" | "2979190" | "3229946" | "3640423" | "3642168" | "3664704" | "3727971" | "3759416" | "3791547" | "3854621" | "3940009" | "3987829" | "4190281" | "4213539" | "4215896" | "4288011" | "4403786" | "4458570" | "4488669" | "4499998" | "4522326" | "4531774" | "4580827" | "4593816" | "4623071" | "4674665" | "D259413" | "D285673").PN. OR ("4967944").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/07 00:38
S153	25	("2967080" | "2987358" | "4844305" | "4967944" | "5419476" | "5667115").PN. OR ("5988473").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/07 00:40
S154	10	("2987358").URPN.	USPAT	OR	OFF	2018/04/07 00:41
S155	4	("2009/0315285").URPN.	USPAT	OR	OFF	2018/04/07 00:46
S156	223	("5072918" | "5390943" | "5871219" | "6739605" | "0875476" | "6086073" | "4743040" | "6109628" | "1427388" | "20040129658" | "20050023786" | "20050057011" | "20060232033" | "20060237091" | "3472392" | "3999775" | "4699270" | "4786122" | "5072955" | "5743607" | "5876047" | "6123346" | "6545863" | "7232136" | "D396023" | "6497423" | "D153654" | "2155769" | "3313498" | "3870177" | "4391422" | "4763799" | "4923202" | "4998023" | "5509671" | "5915646" | "6073919" | "6095156" | "6170839" | "6264216" | "D188099" | "D460235" | "D461941" | "D469235" | "5921566" | "D415867" | "20030047895" | "20030218308" | "5183372" | "5275349" | "5465988" | "5913528" | "6276471" | "6752281" | "7114733" | "7134673" | "7144020" | "4743040" | "3379431" | "4457527" | "5316232" | "5566961" | "6572123" | "D153654" | "D415867" | "6497423" | "D485037" | "20060066064" | "3698735" | "3908749" | "4895068" | "6138558" | "6251113" | "6267080" | "6471010" | "6497424" | "7207449" | "4901937" | "5308012" | "6270094" | "D463646" | "D474570" | "D485410" | "5921566" | "D273242" | "D474570" | "1149639" | "2413164" | "2575661" | "2819908" | "20050001395" | "20060006621" | "20060157944" | "4099735" | "4688860" | "5048857" | "5224531" | "5452908" | "7017603" | "7156475" | "7204374" | "7296808" | "5887878" | "1126544" | "2705114" | "20050280228" | "20050284697" | "5285981" | "6116533" | "D302064" | "D361187" | "D381168" | "D424321" | "D487604" | "D504000" |	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/07 00:50

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S158	31	("0783059" | "2878928" | "3245528" | "3319685" | "3386607" | "3605374" | "3835992" | "3992810" | "4320846" | "4627595" | "4799590" | "4890741" | "5135823" | "5370255").PN. OR ("5676274").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/07 16:50
S159	26	("1101357" | "1149266" | "1862868" | "2702116" | "3145871" | "4154362" | "4503955" | "4705316" | "4896926" | "4998616").PN. OR ("5415255").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/07 16:53
S160	37	("3182856" | "3565146" | "4951812" | "4998616" | "5036980" | "5040681" | "5060851" | "5117979").PN. OR ("5325966").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/07 16:55
S161	6	("3412888" | "4204609" | "5409126" | "5499715" | "5769229").PN. OR ("6467681").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/07 17:17
S162	173	(US-20130127129-$ or US-20110155613-$ or US-20110139665-$ or US-20040195793-$ or US-20020000440-$ or US-20120292213-$ or US-20070012694-$ or US-20150336710-$ or US-	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/09 01:25

		20020134700-$ or US-20100270764-$ or US-20100000893-$ or US-20050062244-$ or US-20040183266-$ or US-20020014488-$ or US-20020113386-$ or US-20030196860-$ or US-20170259956-$ or US-20160144500-$ or US-20160130034-$ or US-20150274362-$ or US-20110168599-$ or US-20090178989-$ or US-20100219193-$ or US-20060254946-$ or US-20070068757-$ or US-20090178946-$).did. or (US-20050199459-$ or US-20080308369-$ or US-20050077136-$ or US-20080104921-$ or US-20160153200-$ or US-20080134613-$ or US-20080134607-$ or US-20070193178-$ or US-20170266804-$ or US-20140075650-$ or US-20090145866-$ or US-20170217464-$ or US-20170174392-$ or US-20170166352-$ or US-20160023349-$ or US-20140166516-$ or US-20120326406-$ or US-20110121695-$ or US-20070194543-$ or US-20070170671-$ or US-20110049824-$ or US-20130056378-$ or US-20120312812-$ or US-20120187013-$ or US-20120080432-$ or US-20120061930-$ or US-20050280228-$).did. or (US-20060027475-$ or US-20050155889-$ or US-20160168880-$).did. or (US-7503569-$ or US-9022234-$ or US-8875888-$ or US-8657307-$ or US-8590704-$ or US-3182856-$ or US-8459495-$ or US-7097036-$ or US-6193062-$ or US-9393684-$ or US-6637592-$ or US-D730088-$ or US-5833065-$ or US-5482162-$ or US-5244265-$ or US-4244509-$ or US-9643629-$ or US-7780026-$ or US-9132543-$ or US-8567796-$ or US-8226092-$ or US-8201837-$ or US-8132819-$ or US-7997594-$ or US-3010775-$ or US-9669930-$).did. or (US-4813542-$ or US-6585090-$ or US-6085925-$ or US-D776106-$ or US-6839238-$ or US-9609964-$ or US-7152752-$ or US-9506489-$ or US-3944282-$ or US-5241765-$ or US-4389078-$ or US-1849659-$ or US-4405057-$ or US-9802741-$ or US-8851287-$ or US-8763836-$ or US-8561769-$ or US-D808164-$ or US-9550605-$ or US-4887731-$ or US-9738198-$ or US-7537119-$ or US-8813960-$ or US-9669968-$ or US-6024223-$ or US-1665238-$ or US-D333094-$).did. or (US-3376046-$ or US-4832200-$ or US-D364558-$ or US-3419184-$ or US-3117692-$ or US-8684222-$ or US-2328689-$ or US-4287997-$ or US-5628443-$ or US-9888752-$ or US-9027722-$ or US-4673070-$ or US-7526842-$ or US-5465839-$ or US-9724820-$ or US-4863222-$ or US-3743372-$ or US-			

		6050657-$ or US-5454634-$ or US-3851936-$ or US-5602721-$ or US-3999818-$ or US-5271515-$ or US-4243279-$ or US-6276550-$ or US-4328902-$ or US-7350648-$).did. or (US-5407074-$ or US-3481502-$ or US-2849151-$ or US-3616943-$ or US-5469961-$ or US-8677661-$ or US-5951130-$ or US-7451578-$ or US-6122879-$ or US-3526420-$ or US-2740167-$ or US-9803375-$ or US-9663940-$ or US-7841144-$ or US-9616562-$ or US-5544751-$ or US-5429260-$ or US-7946609-$ or US-6578708-$ or US-6176559-$ or US-5927837-$ or US-5564805-$ or US-5595228-$ or US-6206063-$ or US-7000810-$ or US-4967944-$ or US-5988473-$).did. or (US-6641013-$ or US-2987358-$ or US-4576423-$ or US-4756394-$ or US-4896926-$ or US-5325966-$ or US-5697500-$ or US-6467681-$).did. or (US-3117692-$ or US-2593998-$).did.				
S163	3	(("20170166352") or ("20110139665") or ("5628443")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/09 01:26
S164	28	(US-20170166352-$ or US-20110139665-$ or US-20170266804-$ or US-20170217464-$ or US-20170174392-$ or US-20160168880-$ or US-20160144500-$ or US-20160130034-$ or US-20140166516-$ or US-20120326406-$ or US-20100219193-$ or US-20090145866-$ or US-20070194543-$ or US-20070068757-$ or US-20060254946-$ or US-20060027475-$).did. or (US-5628443-$ or US-9132543-$ or US-9506489-$ or US-8813960-$ or US-8677661-$ or US-8459495-$ or US-8132819-$ or US-6641013-$ or US-6085925-$ or US-5988473-$ or US-5595228-$ or US-3117692-$).did.	US-PGPUB; USPAT	OR	OFF	2018/04/09 01:36
S165	7	(("5240264") or ("7503569") or ("20020000440") or ("20040195793") or ("20110139665") or ("20110155613") or ("20130127129")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/09 01:37
S166	27	S164 not S165	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/09 01:37
S167	1	("2011/0139665").URPN.	USPAT	OR	OFF	2018/11/21 18:13
S168	56	("1932429" | "20060016811" | "20060070906" | "20060237341" | "20070080089" | "20080110190" | "20080112782" | "20080121253" | "20080128414" | "20090178989" | "20090184021" | "20110139665" | "2178091" | "2259041" | "5271515" | "5429260" | "5531517" | "5544751" | "5549241" | "5860527" | "6062388" | "6581772" | "6880705" | "6991106" |	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/21 18:13

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S186	868	A47B87/02.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/21 19:02
S187	2232	312/107,111.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/21 19:02
S188	703	A47B88/90.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/21 19:15
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S210	15	("2007/0194543").URPN.	USPAT	OR	OFF	2018/11/22 19:40
S211	56	("1478913" | "20010035704" | "20050159784" | "20050269792" | "20060006621" | "20060144732" | "20070194543" | "20070235959" | "20080128305" | "20090301913" | "20100289236" | "20100295430" | "20110127736" | "20120292870" | "20130118818" | "3861703" | "3874531" | "4435115" | "4726602" | "4822116" | "4846485" | "4858940" | "4976450" | "4993551" | "5174447" | "5378005" | "5452908" | "5573089" | "5743607" | "5799958" | "5893572" | "6027128" | "6170839" | "6439585" | "6446987" | "6702168" | "6935641" | "6945546" | "7044569" | "7083174" | "7314134" | "7328905" | "7431313" | "7434819" | "7503569" | "7661685" | "7905502" | "8226092" | "8376376" | "8668209" | "D182716").PN. OR ("8915504").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/22 19:40
S212	2	("2012/0292870").URPN.	USPAT	OR	OFF	2018/11/22 19:41
S213	52	("6264083" | "6666362" | "7204374" | "20120247044" | "4249684" | "6264220" | "6935641" | "7048320" | "7165702" | "20040194333" | "20040251227" | "20070210021" | "20100300996" | "20120199708" | "4944416" | "7487981" | "6615973" | "6786374" | "20070137532" | "5628534" | "7017254" | "6932406" | "20040051016" | "20050006539" | "20080296245" | "7740329" | "20060021985" | "5913380" | "6736265" | "20020100396" | "20120131872" | "3610429" | "6629654" | "4535897" | "6581920" | "20110107704" | "0332360" | "5406894" | "6474245" | "20050269792" | "5582269" | "20070012636" | "5687856" | "5899544" | "6247720" | "6814362" | "20040222176" | "20110168651" | "4630739" | "4961295" | "5730414").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/22 19:46
S214	39	("2320387" | "3052484" | "3179270" | "3734526" | "4281843" | "4363496" | "4790549" | "5464104" | "5465987" | "5474312" | "5595395" | "5671933").PN. OR ("6131926").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/22 23:52
S215	1	"12736715"	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/23 01:36
S216	1	("2011/0139665").URPN.	USPAT	OR	OFF	2018/11/23 01:36
S217	20	("2807387" | "20060220503" | "3219400" | "3424334" | "4293072" | "4643494" | "4782619" | "4996628" | "5184726" |	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/23 01:37

		"5246105" | "5427394" | "5544751" | "5699925" | "5901998" | "5924778" | "6367631" | "6983946").PN.				
S218	36	("1253546" | "1619761" | "1857640" | "2004900" | "3133771" | "3409162" | "3529878" | "3606506" | "3729242" | "3758181").PN. OR ("5246105").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/23 01:38
S219	13	("3379482").URPN.	USPAT	OR	OFF	2018/11/23 02:28
S220	0	("2012/0152800").URPN.	USPAT	OR	OFF	2018/11/23 02:30
S221	12	("20080060964" | "3568879" | "4592601" | "4685565" | "20060071581" | "4258847" | "4863222" | "2858957" | "7311202" | "3346137").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/23 02:30
S222	1041	B25H3/02.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/23 02:39
S223	140	S222 and (snap)	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/23 02:39
S224	67	(US-20170166352-$ or US-20110139665-$ or US-20170266804-$ or US-20170217464-$ or US-20170174392-$ or US-20160168880-$ or US-20160144500-$ or US-20160130034-$ or US-20140166516-$ or US-20120326406-$ or US-20100219193-$ or US-20090145866-$ or US-20070194543-$ or US-20070068757-$ or US-20060254946-$ or US-20060027475-$ or US-20150274362-$ or US-20110073516-$ or US-20090193748-$ or US-20080134607-$ or US-20080104921-$ or US-20180313094-$ or US-20180213934-$ or US-20150102717-$ or US-20180161975-$ or US-20140305829-$).did. or (US-20120312812-$ or US-20180290288-$ or US-20180162592-$ or US-20170239808-$ or US-20170121056-$ or US-20130127129-$ or US-20060038367-$ or US-20160114822-$ or US-20080308369-$ or US-20080169739-$ or US-20120292870-$).did. or (US-5628443-$ or US-9132543-$ or US-9506489-$ or US-8813960-$ or US-8677661-$ or US-8459495-$ or US-8132819-$ or US-6641013-$ or US-6085925-$ or US-5988473-$ or US-5595228-$ or US-3117692-$ or US-5429260-$ or US-7841144-$ or US-5407074-$ or US-4293072-$ or US-3506321-$ or US-3974898-$ or US-6109707-$ or US-4423687-$ or US-9872562-$ or US-6547347-$ or US-4619363-$ or US-4118048-$ or US-3891230-$ or US-9566990-$).did. or (US-5799958-$ or US-9616562-$ or US-5184726-$).did. or (US-2430200-$).did.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/23 14:36
S225	3	("20080308369" | "8875888" | "9616562").PN.	US-PGPUB; USPAT;	OR	OFF	2018/11/23 14:37

			USOCR			
S226	28	(US-20170266804-$ or US-20170217464-$ or US-20170174392-$ or US-20170166352-$ or US-20160168880-$ or US-20160144500-$ or US-20160130034-$ or US-20140166516-$ or US-20120326406-$ or US-20100219193-$ or US-20090145866-$ or US-20070194543-$ or US-20070068757-$ or US-20060254946-$ or US-20060027475-$ or US-20110139665-$).did. or (US-9506489-$ or US-9132543-$ or US-8813960-$ or US-8677661-$ or US-8459495-$ or US-8132819-$ or US-6641013-$ or US-6085925-$ or US-5988473-$ or US-5628443-$ or US-5595228-$ or US-3117692-$).did.	US-PGPUB; USPAT	OR	OFF	2018/11/23 14:37
S227	37	S224 not (S225 S226)	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/23 14:37
S228	1	"20170174392".pn.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/23 14:54
S229	14	(US-20180290288-$ or US-20180161975-$ or US-20170239808-$ or US-20170121056-$ or US-20080169739-$ or US-20080134607-$ or US-20080104921-$ or US-20060038367-$).did. or (US-9872562-$ or US-9566990-$ or US-7841144-$ or US-6547347-$ or US-5429260-$).did. or (US-2430200-$).did.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/23 21:07
S230	716	((("MILWAUKEE") near3 ("ELECTRIC") near3 ("TOOL") near3 ("CORPORATION"))).AS,AANM.	USPAT	OR	OFF	2019/01/16 16:21
S231	51	((("Brunner") near3 ("Yaron"))).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:21
S232	33	((("Squiers") near3 ("Grant") near3 ("T"))).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:21
S233	56	((("Hoppe") near3 ("Christopher") near3 ("S"))).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:21
S234	114	((("Hyma") near3 ("Steven") near3 ("W"))).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:21
S235	0	("2017/0166352").URPN.	USPAT	OR	OFF	2019/01/16 16:23
S236	1	(("2012312812") or ("4974740")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:25
S237	0	"2012312812".pn.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:26
S238	1	"20120312812".pn.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:26
S239	4	("2012/0312812").URPN.	USPAT	OR	OFF	2019/01/16 16:26

S240	0	("2018/0161975").URPN.	USPAT	OR	OFF	2019/01/16 16:29
S241	0	("2018/0044059").URPN.	USPAT	OR	OFF	2019/01/16 16:29
S242	68	("6082539" | "6874634" | "8875888" | "7503569" | "D462519" | "D467424" | "D753394" | "D753395" | "D753396" | "20010030403" | "20120152944" | "6761366" | "D437484" | "D439407" | "D449738" | "D564216" | "D629607" | "D636994" | "D668048" | "D700777" | "D709697" | "D753397" | "6371320" | "20140102928" | "D415894" | "D520237" | "D613560" | "D643217" | "D701697" | "7905353" | "20110181008" | "D348152" | "D647300" | "D663952" | "D674605" | "D710098" | "D713639" | "20110049824" | "20110139666" | "5022546" | "D467426" | "D527181" | "D572479" | "D630851" | "D701696" | "D711105" | "5437369" | "D693121" | "20070273114" | "20090145790" | "8602217" | "8789699" | "8851282" | "D630435" | "D702044" | "D703437" | "D709287" | "9393684" | "8505729" | "20040134818" | "D493284" | "D600912" | "D649350" | "D653832" | "D694522" | "D703436" | "D710100" | "D719352").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:30
S243	46	("20030062232" | "20040211634" | "20060012139" | "20060027475" | "5011013" | "5209384" | "5240264" | "5664652" | "5833065" | "6126003" | "6176559" | "6347847" | "6371320" | "6601930" | "6761366" | "7004481" | "7210689").PN. OR ("7503569").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:34
S244	23	("1192847" | "1891811" | "2053969" | "2828023").PN. OR ("5022546").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:37
S245	14	("2053969").URPN.	USPAT	OR	OFF	2019/01/16 16:38
S246	19	("2053969" | "3014604" | "3061134" | "3162320" | "3734308" | "4109789" | "4616752" | "6024223").PN. OR ("6840378").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:39
S247	22	("20040000550" | "2705575" | "3346137" | "4293072" | "5628443" | "5704625" | "6840378").PN. OR ("7780026").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:39
S248	21	("3081120" | "3162320" | "3653521").PN. OR ("3734308").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:41
S249	34	("3015407" | "3493258" | "3501193" | "3552557" | "3633777" | "3677599" | "3691595" | "3712661" | "3734308" | "3888536" | "3980185" | "4093090" | "4149747" | "4341495" | "4356145" | "4630856" | "4648645" | "5163726" | "5931617" | "6135524" | "7014234").PN. OR ("8177463").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:41
S250	65	("2053969" | "3014604" | "3691595" | "3712661").PN. OR ("3980185").URPN.	US-PGPUB; USPAT;	OR	OFF	2019/01/16 16:42

			USOCR			
S251	23	("0610816" | "20080099622" | "2357182" | "2431194" | "3380602" | "3765711" | "3980185" | "4128267" | "4341495" | "4881601" | "5161705" | "5328133" | "5344203" | "5593113" | "5836548" | "7014234" | "7549687" | "7887011" | "8177463").PN. OR ("9440741").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:42
S252	28	("2876726" | "3004772" | "3057315" | "3107024" | "3162320" | "3711902" | "3734308" | "3799100" | "3805721" | "3818854" | "3822667" | "3872555" | "3938461" | "3980185" | "4290382" | "4294185").PN. OR ("4695184").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:44
S253	899	B60P7/13,06.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:46
S254	110	410/84.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:47
S255	7	("6077006" | "7056081" | "6490766" | "8342786" | "8523501" | "7056061" | "8523401").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:47
S256	2	("1751571").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:49
S257	38	("3034256" | "3159368" | "3334953" | "3618795" | "4249684" | "4303367" | "4325531" | "4737055" | "4805859" | "4901961" | "5161700" | "5205602" | "5240214" | "5511842" | "5588631" | "5609451" | "5653366" | "5730414" | "5855310" | "5899544").PN. OR ("6666362").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:50
S258	25	("3334953" | "4249684" | "4938398" | "4993771" | "5255832" | "5395019").PN. OR ("5653366").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:51
S259	17	("2696962" | "4929973" | "5035389" | "5040712" | "5129613" | "5282554" | "5332183" | "5356105" | "5653366" | "5730348" | "5730406" | "6036071" | "6315182" | "7225958" | "8020821").PN. OR ("8448829").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:51
S260	37	("1252207" | "20060186290" | "20070097617" | "20070170336" | "20070230102" | "20080105803" | "2174140" | "5730406" | "5833189" | "5850996" | "6173931" | "6315255" | "6371424" | "6431510" | "6702604" | "6758454" | "6877641" | "7261264" | "7334762" | "7455271" | "7499272" | "7673838").PN. OR ("8020821").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:52
S261	10	("20050139745" | "4660793" | "5035389" | "5433416" | "5452874" | "5608603" | "5924790" | "6237886" | "6520463" | "6637707").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:52
S262	10	("5356104" | "5639522" | "5662375" | "5694123" | "5943208" | "5947440" | "6349911" | "6402106" | "6446915" | "6710828").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:53

S263	12	("5284311" | "5428502").PN. OR ("5608603").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:54
S264	788	248/224.7,225.21.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:56
S265	21	("1862466" | "2979300" | "3110467" | "3669035" | "4056250" | "4076204" | "4085867").PN. OR ("4660793").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 16:57
S266	25	("3334953" | "4249684" | "4938398" | "4993771" | "5255832" | "5395019").PN. OR ("5653366").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 17:01
S267	38	("3454250" | "3456929" | "4065092" | "4230248" | "4249684" | "4444427" | "4848629" | "4974766" | "4984837" | "5007568" | "5046652" | "5181639" | "5275320" | "5285942").PN. OR ("5395019").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 17:02
S268	42	("2680000" | "2897928" | "3631572" | "3881677" | "4346868" | "4618081" | "4948085" | "5181774").PN. OR ("5332183").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 17:05
S269	71	("2708088" | "3878589" | "3915189" | "3931893" | "4450989" | "4461445" | "4858869" | "5026016" | "5035389" | "5078279" | "5344032" | "5356038" | "5433416" | "5435511" | "5452874" | "5765699" | "5915572" | "D329192" | "D386298" | "D386304").PN. OR ("6637707").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 17:45
S270	32	("2103106" | "2703912" | "2879561" | "3237779" | "3399374" | "3403641" | "4029038" | "4068332" | "4266882" | "4340199" | "4376593" | "4389133" | "4430947").PN. OR ("4565465").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 17:55
S271	570	220/4.27.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:12
S272	319	B65D21/0223.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:12
S273	1937	A45C5/14.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:12
S274	69	A45C7/005.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:12
S275	2987	A45C13/02.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:13
S277	357	A45F3/10.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:13
S278	850	B25H1/04.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:14
S279	1194	B25H3/02,021.cpc.	US-PGPUB; USPAT;	OR	OFF	2019/01/16 21:14

			USOCR			
S280	1052	B62B1/14.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:14
S281	437	B65D21/0209.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:14
S282	164	B65D21/0228.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:15
S283	320	A45C7/0045.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:15
S284	436	B25H3/023.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:15
S285	752	B62B5/067.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:16
S286	23	B65D2255/00.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:16
S287	177	B65H2701/533.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:16
S288	121	(US-0000440-$ | US-0027475-$ | US-0038367-$ | US-0068757-$ | US-0104921-$ | US-0121056-$ | US-0127129-$ | US-0130034-$ | US-0134607-$ | US-0139665-$ | US-0144500-$ | US-0145866-$ | US-0155613-$ | US-0161975-$ | US-0166352-$ | US-0166516-$ | US-0168880-$ | US-0169739-$ | US-0174392-$ | US-0194543-$ | US-0195793-$ | US-0217464-$ | US-0219193-$ | US-0239808-$ | US-0254946-$ | US-0266804-$ | US-0271616-$ | US-0290288-$ | US-0308369-$ | US-0320243-$ | US-0326406-$ | US-1276744-$ | US-1477050-$ | US-2430200-$ | US-20020000440-$ | US-20040195793-$ | US-20060027475-$ | US-20060038367-$ | US-20060254946-$ | US-20070068757-$ | US-20070194543-$ | US-20080104921-$ | US-20080134607-$ | US-20080169739-$ | US-20080308369-$ | US-20090145866-$ | US-20100219193-$ | US-20110139665-$ | US-20110155613-$ | US-20120326406-$ | US-20130127129-$ | US-20140166516-$ | US-20160130034-$ | US-20160144500-$ | US-20160168880-$ | US-20170121056-$ | US-20170166352-$ | US-20170174392-$ | US-20170217464-$ | US-20170239808-$ | US-20170266804-$ | US-20180161975-$ | US-20180290288-$ | US-2608238-$ | US-3117692-$ | US-5240264-$ | US-5429260-$ | US-5595228-$ | US-5628443-$ | US-5988473-$ | US-6085925-$ | US-6547347-$ | US-6641013-$ | US-7503569-$ | US-7841144-$ | US-8132819-$ | US-8459495-$ | US-8677661-$ | US-8813960-$ | US-8875888-$ | US-9132543-$ | US-9506489-	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:23

		$ | US-9566990-$ | US-9616562-$ | US-9872562-$).DID.				
S289	4	(CN-2608238-$ | JP-1276744-$ | JP-1477050-$ | KR-300271616-$ | KR-300320243-$ | TW-135074-$ | TW-168686-$ | TW-174412-$ | VA-223131450-$ | WO-2016142935-$ | WO-2017028845-$).DID.	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/01/16 21:24
S290	0	(15/826201).APP.	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/01/16 21:25
S291	0	("150826201").APP.	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/01/16 21:25
S292	0	"150826201"	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/01/16 21:25
S293	45	("1699130" | "2072672" | "2551814" | "2633285" | "2736487" | "3010638" | "3361322" | "3623650" | "3632037" | "3713579" | "3905478" | "3905541" | "3921896" | "4002261" | "4023617" | "4187977" | "4230233" | "4245773" | "4251006" | "4277015" | "4291830" | "4389013" | "4482074" | "4643314" | "4685610" | "4762270" | "4763833" | "4828894" | "4884739" | "4911356" | "4948039" | "4993623" | "5038998" | "5116290" | "5190213").PN. OR ("5429260").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:39
S294	2	"2430200".pn.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/01/16 21:43
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		"20070012694" | "6371320").PN.				
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1/ 19/ 2019 9:21:12 PM
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Bibliographic Data

Application No: 16/216,724

Foreign Priority claimed: ○ Yes ◉ No

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

Verified and Acknowledged: /GIDEON R WEINERTH/ (Examiner's Signature) ____ (Initials)

Title: Utility Assembly and Coupling Mechanism

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/11/2018	220	3736	066749-2270
RULE			

APPLICANTS

Milwaukee Electric Tool Corporation, Brookfield, WI,

INVENTORS

Yaron Brunner Kibbutz Gvat, ISRAEL

Grant T. Squiers Cudahy, WI, UNITED STATES

Christopher S. Hoppe Milwaukee, WI, UNITED STATES

Steven W. Hyma Milwaukee, WI, UNITED STATES

CONTINUING DATA

This application is a CON of 15826232 11/29/2017

15826232 is a CON of PCT/IL2017/050481 04/30/2017

PCT/IL2017/050481 has PRO of 62459076 02/15/2017

PCT/IL2017/050481 has PRO of 62330334 05/02/2016

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

01/03/2019

STATE OR COUNTRY

ISRAEL

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Reinhart (Milwaukee Tool)
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1000 NORTH WATER STREET
SUITE 2100
MILWAUKEE, WI 53202
UNITED STATES

FILING FEE RECEIVED

$5,860

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/216,724	12/11/2018	Yaron Brunner	066749-2270	1402

142078 7590 01/10/2019

Reinhart (Milwaukee Tool)
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MILWAUKEE, WI 53202

EXAMINER	
WEINERTH, GIDEON R	

ART UNIT	PAPER NUMBER
3736	

NOTIFICATION DATE	DELIVERY MODE
01/10/2019	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):

IPAdmin@reinhartlaw.com

Decision Granting Request for Prioritized Examination (Track I)	**Application No.** 16/216,724	**Applicant(s)** Brunner et al.	
	Examiner BRIAN W BROWN	**Art Unit** OPET	**AIA (First Inventor to File) Status** Yes

1. THE REQUEST FILED 11 December 2018 IS **GRANTED** .

The above-identified application has met the requirements for prioritized examination
- A. ☑ for an original nonprovisional application (Track I).
- B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination**. The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:
   - A. filing a **petition for extension of time** to extend the time period for filing a reply;
   - B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims** , or a multiple dependent claim;
   - C. filing a **request for continued examination** ;
   - D. filing a notice of appeal;
   - E. filing a request for suspension of action;
   - F. mailing of a notice of allowance;
   - G. mailing of a final Office action;
   - H. completion of examination as defined in 37 CFR 41.102; or
   - I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to BRIAN BROWN at (571)272-5338.

In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/BRIAN W BROWN/ Petitions Examiner, OPET	

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET

Substitute for Form PTO-1360
(For use with Form PTO/SB/06)

Application Number	Filing Date
16216724	

Applicant(s) Yaron Brunner

* May be used for additional claims or amendments

CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT	
	Indep	Depend	Indep	Depend	Indep	Depend
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Total Indep	1		0		0	
Total Depend	0	↵	0	↵	0	↵
Total Claims	1		0		0	

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	Indep	Depend	Indep	Depend	Indep	Depend
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/216,724

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			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*				x 460 =	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			TOTAL	1720

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	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
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
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/216,724	12/11/2018		1720	066749-2270	20	3

CONFIRMATION NO. 1402

142078
Reinhart (Milwaukee Tool)
ATTN: TRAVIS MCDONNELL, PARALEGAL
1000 NORTH WATER STREET
SUITE 2100
MILWAUKEE, WI 53202

FILING RECEIPT

OC000000104861293

Date Mailed: 01/04/2019

Receipt is acknowledged of this non-provisional 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 APPLICANT, 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 Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections 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**

Inventor(s)

Yaron Brunner, Kibbutz Gvat, ISRAEL;
Grant T. Squiers, Cudahy, WI;
Christopher S. Hoppe, Milwaukee, WI;
Steven W. Hyma, Milwaukee, WI;

Applicant(s)

Milwaukee Electric Tool Corporation, Brookfield, WI;

Power of Attorney: The patent practitioners associated with Customer Number 142078

Domestic Priority data as claimed by applicant

This application is a CON of 15/826,232 11/29/2017
which is a CON of PCT/IL2017/050481 04/30/2017
which claims benefit of 62/459,076 02/15/2017
and claims benefit of 62/330,334 05/02/2016

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: No

Permission to Access Search Results: No

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: 01/03/2019
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/216,724**
Projected Publication Date: 04/11/2019
Non-Publication Request: No
Early Publication Request: No
Title

Utility Assembly and Coupling Mechanism

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

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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).

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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.

Doc Code: TRACK1.REQ
Document Description: TrackOne Request

PTO/AIA/424 (04-14)

CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION UNDER 37 CFR 1.102(e) (Page 1 of 1)

First Named Inventor:	Yaron Brunner	Nonprovisional Application Number (if known):	To be determined
Title of Invention:	Utility Assembly and Coupling Mechanism		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently $0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.

2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.

3. The applicable box is checked below:

I. ☑ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.

---OR---

(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.

ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, **or** the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

i. A request for continued examination has been filed with, or prior to, this form.
ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature /Derek H. Campbell/	Date December 11, 2018
Name (Print/Typed) Derek H. Campbell	Practitioner Registration Number 70,608

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.**

☑ *Total of 1 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.

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Substitute for form 1449/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	To be determined
				Filing Date	December 11, 2018
Date Submitted: December 11, 2018				**First Named Inventor**	Yaron Brunner
				Art Unit	To be determined
(use as many sheets as necessary)				Examiner Name	To be determined
Sheet	1	of	3	Attorney Docket Number	066749-2270

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A1	2,430,200	11-04-1947	Wilson Winfred E.	
	A2	3,117,692	01-14-1964	Carpenter et al.	
	A3	5,240,264	08-31-1993	Williams	
	A4	5,429,260	07-041995	Vollers; Gary L.	
	A5	5,595,228	01-21-1997	Meisner et al.	
	A6	5,628,443	05-13-1997	Deutsch	
	A7	5,988,473	11-23-1999	Hagan et al.	
	A8	6,085,925	07-11-2000	Chung	
	A9	6,547,347	04-15-2003	Saito; Yoshiyuki	
	A10	6,641,013	11-04-2003	Oise	
	A11	7,503,569	03-17-2009	Duvigneau	
	A12	7,841,144	11-30-2010	Pervan; Darko	
	A13	8,132,819	03-13-2012	Landau; Eitan	
	A14	8,459,495	06-11-2013	Koenig; Andreas	
	A15	8,677,661	03-25-2014	Michels; Markus	
	A16	8,813,960	08-26-2014	Fjelland; Douglas J.	
	A17	8,875,888	11-04-2014	Koenig; Andreas	
	A18	9,132,543	09-15-2015	Bar-Erez; Sharon	
	A19	9,506,489	11-29-2016	Ko; Kenneth H.	
	A20	9,566,990	02-14-2017	Bar-Erez; Sharon	
	A21	9,616,562	04-11-2017	Hoppe; Christopher S.	
	A22	9,872,562	01-23-2018	Brunner; Yaron	
	A23	2002/0000440	01-03-2002	Sagal et al.	
	A24	2004/0195793	10-07-2004	Sullivan, Hugh C., et al.	
	A25	2006/0027475	02-09-2006	Gleason et al.	
	A26	2006/0038367	02-23-2006	Ferraro; Frank A.	
	A27	2006/0254946	11-16-2006	Becklin	
	A28	2007/0068757	03-29-2007	Tan	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. 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 2 hours 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, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

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Substitute for form 1449/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	To be determined
				Filing Date	December 11, 2018
Date Submitted: December 11, 2018				**First Named Inventor**	Yaron Brunner
				Art Unit	To be determined
(use as many sheets as necessary)				Examiner Name	To be determined
Sheet	2	of	3	Attorney Docket Number	066749-2270

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant
	A29	2007/0194543	08-23-2007	Duvigneau	
	A30	2008/0104921	05-08-2008	Pervan; Darko	
	A31	2008/0134607	06-12-2008	Pervan; Darko	
	A32	2008/0169739	07-17-2008	Goldenberg; Ruth	
	A33	2009/0145866	06-11-2009	Panosian et al.	
	A34	2010/0219193	09-02-2010	Becklin	
	A35	2011/0139665	06-16-2011	Madsen	
	A36	2011/0155613	06-30-2011	Koenig, Andreas et al.	
	A37	2013/0127129	05-23-2013	Bensman, Mark et al.	
	A38	2017/0121056	05-04-2017	Wang; Tzu-Chien	
	A39	2017/0174392	06-22-2017	De Loynes	
	A40	2017/0217464	08-03-2017	Bar-erez et al.	
	A41	2017/0239808	08-24-2017	Hoppe; Christopher S.	
	A42	2017/0266804	09-21-2017	Kinskey	
	A43	2018/0161975	06-14-2018	Brunner; Yaron	
	A44	2018/0290288	10-11-2018	BRUNNER; Yaron	
	A45	2008/0308369	12-18-2008	Louis; Robert D.	
	A46	2012/0326406	12-27-2012	LIFSHITZ; Omri	
	A47	2014/0166516	06-19-2014	Martinez; Mark R.	
	A48	2016/0130034	05-12-2016	Kuhls; Timo	
	A49	2016/0144500	05-26-2016	CHEN; KUN-CHEN	
	A50	2016/0168880	06-16-2016	Phelan; Matthew	
	A51	2017/0166352	06-15-2017	Hoppe; Christopher S.	

UNPUBLISHED U.S. PATENT APPLICATION DOCUMENTS

Examiner Initials*	Cite No.[1]	U.S. Patent Application Document Serial Number-Kind Code[2] (*if known*)	Filing Date of Cited Document MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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Substitute for form 1449/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	To be determined
				Filing Date	December 11, 2018
Date Submitted: December 11, 2018				**First Named Inventor**	Yaron Brunner
				Art Unit	To be determined
(use as many sheets as necessary)				Examiner Name	To be determined
Sheet	3	of	3	Attorney Docket Number	066749-2270

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Documents	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	A52	JP 1276744	07-18-2006	Hirofumi Kishimoto		
	A53	JP 1477050	08-19-2013	Ryosuke Omachi		
	A54	KR 30-0271616	02-09-2000	Joong Chui Ahm		
	A55	KR 30-0320243	06-10-2002	Joung Gu Kang		
	A56	TW 135074	06-01-2010	Yi Hua Wu		
	A57	TW 168686	07-01-2015	Kang Delun Business Co., Ltd.		
	A58	TW 174412	03-21-2016	Lee Hsin Chang		
	A59	DE 202015105053	10-31-2016	AUER PACKAGING GMBH		
	A60	DE 202015005752	11-21-2016	PLASTON AG		
	A61	CN 2608238	03-31-2004	BAO JIANGANG		
	A62	WO 2016142935	09-15-2016	BRUNNER, Yaron et al.		
	A63	WO 2017028845	02-23-2017	ROTHENBERGER AG		

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]
	A64	Non-Final Rejection issued April 12, 2018, in United States Application No. 15/826,201. (16 Pages) (Docket No. J699501JS01 446373-419).	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.97 and 1.98. 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 2 hours 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, 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**.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Utility Assembly and Coupling Mechanism
First Named Inventor/Applicant Name:	Yaron Brunner
Filer:	Derek Howard Campbell/Andrea Dietzel
Attorney Docket Number:	066749-2270

Filed as Large Entity

Filing Fees for Track I Prioritized Examination - Nonprovisional Application under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	300	300
UTILITY SEARCH FEE	1111	1	660	660
UTILITY EXAMINATION FEE	1311	1	760	760
REQUEST FOR PRIORITIZED EXAMINATION	1817	1	4000	4000
Pages:				
Claims:				
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
PROCESSING FEE, EXCEPT PROV. APPLS.	1830	1	140	140

Petition:	
Patent-Appeals-and-Interference:	
Post-Allowance-and-Post-Issuance:	
Extension-of-Time:	
Miscellaneous:	
Total in USD ($)	**5860**

Electronic Acknowledgement Receipt

EFS ID:	34553146
Application Number:	16216724
International Application Number:	
Confirmation Number:	1402
Title of Invention:	Utility Assembly and Coupling Mechanism
First Named Inventor/Applicant Name:	Yaron Brunner
Customer Number:	142078
Filer:	Derek Howard Campbell/Andrea Dietzel
Filer Authorized By:	Derek Howard Campbell
Attorney Docket Number:	066749-2270
Receipt Date:	11-DEC-2018
Filing Date:	
Time Stamp:	18:06:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$5860
RAM confirmation Number	121218INTEFSW00007033180882
Deposit Account	180882
Authorized User	Andrea Dietzel

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	TrackOne Request	066749-2270_Track_1_Form.pdf	116764 a6d536fdfae31443bd6261f251c1e5b76579580e	no	2
Warnings:					
Information:					
2	Transmittal of New Application	066749-2270_App_Transmittal.pdf	63425 abda2fa9114a02b3400bf3cad0b47557d505a7e4	no	2
Warnings:					
Information:					
3	Application Data Sheet	066749-2270_ADS.pdf	67440 5491bf289aa8c22bf6f98bc36e1723be1f2755c7	no	5
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
4		066749-2270_Application.pdf	227340 82b876dfbb770750633814209bf3b7b75cc12148	yes	43

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Abstract	43	43
	Claims	37	42
	Specification	1	36

Warnings:	
Information:	

5	Drawings-only black and white line drawings	066749-2270_Drawings.pdf	5125597 909d595e2a89f2c16738e945264e12b8c323a5e0	no	48
Warnings:					
Information:					
6	Oath or Declaration filed	066749-2270_Declarations.pdf	1540728 de5912ff3d4d3ae3295ebf119a1c896a96d7a63a	no	7
Warnings:					
Information:					
7	Power of Attorney	066749-2270_PoA.pdf	530984 e5149b83575254a67be478b0a007cbd6683454a3	no	2
Warnings:					
Information:					
8	Transmittal Letter	066749-2270_IDS_Transmittal.pdf	84346 e5112ce805b01c1f18c6bac8f0eccea63564e375	no	2
Warnings:					
Information:					
9	Information Disclosure Statement (IDS) Form (SB08)	066749-2270_SB08.pdf	108583 e1d789905157d79b6ae990eaa03e447a266c6068	no	3
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
10	Fee Worksheet (SB06)	fee-info.pdf	40712 bcf3593660da072d293d23e7c13248afde0bd318	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	7905919		

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.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 01/31/2018. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	To be determined
Filing Date	December 11, 2018
First Named Inventor	Yaron Brunner
Title	Utility Assembly and Coupling Mechanism
Art Unit	To be determined
Examiner Name	To be determined
Attorney Docket Number	066749-2270

SIGNATURE of Applicant or Patent Practitioner

Signature	/Derek H. Campbell/	Date (Optional)	December 11, 2018
Name	Derek H. Campbell	Registration Number	70,608
Title (if Applicant is a juristic entity)	Attorney for Applicant		
Applicant Name (if Applicant is a juristic entity)	Milwaukee Electric Tool Corporation		

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 1 forms are submitted.

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

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PTO/AIA/80 (07-12)
Approved for use through 11/30/2014. OMB 0651-0035
U.S. Patent and Trademark Office; U.S DEPARTMENT OF COMMERCE
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

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

I hereby appoint:

■ Practitioners associated with Customer Number: 142078

OR

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

Name	Registration Number	Name	Registration Number

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

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

■ The address associated with Customer Number: 142078

OR

☐

Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address: Milwaukee Electric Tool Corporation
13135 West Lisbon Road
Brookfield, Wisconsin 53002

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

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

Signature	TY	Date	9-6-16
Name	Ty Staviski	Telephone	262-781-3600
Title	Vice President, Secretary and Treasurere		

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

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Milwaukee Electric Tool Corporation
Title:	Utility Assembly and Coupling Mechanism
Appl. No.:	To Be Determined
Filing Date:	December 11, 2018
Examiner:	To Be Determined
Art Unit:	To Be Determined
Confirmation Number:	To Be Determined

INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR §1.56

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

Submitted herewith on Form PTO/SB/08 is a listing of the documents cited by or submitted to the United States Patent & Trademark Office ("USPTO") in parent application Serial No. 15/826,232, filed November 29, 2017. As provided in 37 CFR §1.98(d), copies of documents previously cited in the above-identified patent application are not being provided since they were previously submitted to the USPTO in the above-identified patent application. Otherwise, copies of each newly cited non-U.S. patent document (if any) and each newly cited non-patent document (if any) are being submitted to comply with the provisions of 37 CFR §1.97 and §1.98.

The submission of any document herewith, which is not a statutory bar, is not intended as an admission that such document constitutes prior art against the claims of the present application or that such document is considered material to patentability as defined in 37 CFR

§1.56(b). Applicants do not waive any rights to take any action which would be appropriate to antedate or otherwise remove as a competent reference any document which is determined to be a *prima facie* art reference against the claims of the present application.

TIMING OF THE DISCLOSURE

The listed documents are being submitted in compliance with 37 CFR §1.97(b)(1), within three (3) months of the filing date of the application.

RELEVANCE OF EACH DOCUMENT

The relevance of the foreign-language document is shown in the figures of the foreign-language documents and/or are described in the English-language abstract submitted in the parent application, where available. An English translation of the foreign-language document is not readily available. However, the absence of such translation does not relieve the PTO from its duty to consider the submitted foreign language document (37 CFR §1.98 and MPEP §609).

Applicants respectfully request that each listed document be considered by the Examiner and be made of record in the present application and that an initialed copy of Form PTO/SB/08 be returned in accordance with MPEP §609.

Although Applicant believes that no fee is required for this Request, the Commissioner is hereby authorized to charge any additional fees which may be required for this Request to Deposit Account No. 18-0882.

Respectfully submitted,

Date December 11, 2018

By /Derek H. Campbell/

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Milwaukee Electric Tool Corporation

Title: Utility Assembly and Coupling Mechanism

Prior Appl. No.: 15/826,232
Prior Appl. Filing Date: November 29, 2017

Examiner: To be determined

Art Unit: To be determined

CONTINUING PATENT APPLICATION TRANSMITTAL LETTER

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

Transmitted herewith for filing under 37 C.F.R. § 1.53(b) is a:

[X] Continuation [ ] Division [ ] Continuation-In-Part (CIP)

of the above-identified copending prior application in which no patenting, abandonment, or termination of proceedings has occurred. Priority to the above-identified prior application is hereby claimed under 35 U.S.C. § 120 for this continuing application. The entire disclosure of the above-identified prior application is considered as being part of the disclosure of the accompanying continuing application and is hereby incorporated by reference therein in its entirety.

Enclosed are:

[**X**] Application Data Sheet (37 CFR 1.76)

[**X**] Description, Claims and Abstract

[**X**] Formal drawings

[**X**] Copy of Inventor Declaration for parent Application No. 15/826,232, filed November 29, 2017

[**X**] Power of Attorney from Assignee/Applicant

[**X**] Information Disclosure Statement

[**X**] Form PTO/SB/08

[**X**] Track 1 Request Form

The specification filed with this application was submitted March 23, 2018, in the parent application, i.e., Application No. 15/826,232 ("the '232 parent application"), and revised on September 12, 2018. In summary, the specification filed with this application is the same specification that is currently pending in the '232 parent application.

The drawings filed with this application were submitted August 31, 2018, in the '232 parent application, and revised on September 12, 2018. In summary, the drawings filed with this application are the same drawings that are currently pending in the '232 parent application.

The requisite fees are being charged to Deposit Account No. 18-0882.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 18-0882.

Please direct all correspondence to the undersigned attorney or agent at the address indicated below.

Respectfully submitted,

Date December 11, 2018

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Application Data Sheet

Application Information

Application Number:	To Be Determined
Application Type:	Nonprovisional
Subject Matter:	Utility
CD-ROM or CD-R:	None
Computer Readable Form (CRF):	No
Title:	Utility Assembly and Coupling Mechanism
Attorney Docket Number:	066749-2270
Request for Early Publication:	No
Request for Non-Publication:	No
Suggested Drawing Figure:	1A
Total Drawing Sheets:	48
Small Entity:	No
Petition included:	No
Secrecy Order in Parent Appl.:	No

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Domestic Priority Information

Application:	Continuity Type:	Prior Application No.:	Parent Filing Date:	Prior Application Status:	Patent No.:
This Application	Is a continuation of	15/826,232	November 29, 2017	Pending	N/A
15/826,232	Is a continuation of	PCT/IL2017/050481	April 30, 2017	Expired	N/A
PCT/IL2017/050481	Claims the benefit under 35 U.S.C. 119(e)	62/459,076	February 15, 2017	Expired	N/A
PCT/IL2017/050481	Claims the benefit under 35 U.S.C. 119(e)	62/330,334	May 2, 2016	Expired	N/A

Foreign Priority Information

Country:	Application number:	Filing Date:	Priority Claimed:

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.

Applicant Information

Applicant 1:

[X] Assignee	[ ] Legal Representative under 35 U.S.C. 117	[ ] 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 Assignee is an Organization check here [X]			

Organization Name:	Milwaukee Electric Tool Corporation
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Signature:	/Derek H. Campbell/		Date:	December 11, 2018
First Name:	Derek H.	Last Name:	Campbell	
Registration No.:	70,608			

ABSTRACT

The present disclosure concerns a coupling mechanism for detachably attaching two or more utility modules to one another, utility assembles, mobile carriers and other attachable modules and articles.

WHAT IS CLAIMED IS:

1. A container assembly comprising:

a first container comprising:

a first coupler extending from a first face of the first container, the first coupler including a rib that is offset from the first face and extending in a first direction; and

a latch recess; and

a second container comprising:

a second coupler extending from a second face of the second container, the second coupler including a tongue that is offset from the second face and extending in a second direction opposite the first direction, the tongue of the second container engageable with the rib of the first container; and

a latch coupled to the second container, the latch positionable in a locked position in which the latch prevents disengagement of the first container and the second container when the tongue and rib are engaged.

2. The container assembly of claim 1, the first and second couplers on the first and second containers, respectively, engaging when the first and second containers are slid along a sliding path defined by the rib and the tongue.

3. The container assembly of claim 1, wherein when the tongue and rib are engaged:

a first side wall of the first coupler and a second side wall of the second coupler interface to restrict displacement between the first container and the second container in a third direction perpendicular to the first direction and parallel to the first face of the first container.

4. The container assembly of claim 3, wherein when the tongue and rib are engaged:

a third side wall of the first coupler and a fourth side wall of the second coupler interface to restrict displacement between the first container and the second container in a fourth direction opposite the third direction.

5. The container assembly of claim 1,

the second container comprising a single second coupler, the single second coupler comprising a single rib; and

the first container further comprising:

a third coupler extending from a third face of the first container, the third coupler including a tongue that is offset from the second face of the first container and extending in the second direction, the tongue of the first container configured to engage a rib of a third container, the first and third containers entering an engaged position by the third container sliding with respect to the first container; and

a latch coupled to the first container, the latch positionable in a locked position in which the latch prevents disengagement of the first container and the third container when the tongue of the first container and the rib of the third container are engaged.

6. The first container of claim 1, wherein the first coupler extends from a bottom face of the first container, and the second coupler extends from a top face of the second container.

7. A coupling mechanism configured for detachably attaching a first utility module to a second utility module, the coupling mechanism comprising:

a first coupler extending from a first face of the first utility module, the first face being one of a top face of the first utility module and a bottom face of the first utility module, the first coupler comprising a rib that is offset from the first face and extending in a first direction;

a second coupler extending from a second face of the second utility module, the second face being one of a top face of the second utility module and a bottom face of the second utility module, the second coupler comprising a tongue engageable with the rib, the first and second utility modules entering an engaged position by the second utility module sliding with respect to the first utility module along a sliding path defined by the rib and the tongue;

a latch recess defined by one of the first utility module and the second utility module; and

a latch coupled to the other of the first utility module and the second utility module the latch recess is not defined by, the latch being positionable in a locked position in which the latch prevents disengagement of the first container and the second container when the tongue and rib are engaged.

8. The coupling mechanism of claim 7, the second utility module comprising a single second coupler with a tongue extending in the second direction, the single second coupler comprising a single tongue.

9. The coupling mechanism of claim 7, the first face of the first utility module comprising multiple couplers, the first face configured to detachably engage with multiple utility modules simultaneously.

10. The coupling mechanism of claim 7, the first utility module comprising a single first coupler, the single first coupler comprising a single rib.

11. The coupling mechanism of claim 7, wherein the first face of the first container is a top face of the first container, and wherein the second face of the second container is a bottom face of the second container.

12. The coupling mechanism of claim 7, wherein when the tongue and rib are engaged:

a first side wall of the first coupler and a second side wall of the second coupler interface to restrict displacement between the first container and the second container in a third direction perpendicular to the first direction and parallel to the first face of the first container.

13. The coupling mechanism of claim 12, wherein when the tongue and rib are engaged:

a third side wall of the first coupler and a fourth side wall of the second coupler interface to restrict displacement between the first container and the second container in a fourth direction opposite the third direction.

14. A first container configured to be removably coupled to a second container, the first container comprising:

a top face;

a bottom face; and

a first coupler extending from a first face of the first container that is one of the top face and the bottom face, the first coupler including a tongue offset from the first face and extending in a first direction;

a second coupler extending from a second face of the first container that is the other of the top face and the bottom face, the second coupler including a rib offset from the second face and extending in a second direction opposing the first direction, the rib engageable with a second tongue coupled to a second container, the first container entering an engaged position with the second container by the first and second containers sliding with respect to each other;

a latch recess; and

a latch, the latch positionable in a locked position in which the latch interlocks with a second latch recess in the second container restricting displacement between the first container and the second container.

15. The first container of claim 14, the rib engageable between the second tongue of the second container and a first face of the second container.

16. The first container of claim 14, the first coupler of the first container engageable with a second rib of a third container.

17. The first container of claim 16, the latch recess of the first container engageable with a second latch of the third container.

18. The first container of claim 14, the first container comprising a single second coupler, the single second coupler comprising a single rib.

19. The first container of claim 14, the first container comprising a single first coupler, the single first coupler comprising a single tongue.

20. The first container of claim 14, wherein the first face of the first container is the bottom face of the first container, and the second face of the first container is the top face of the first container.

UTILITY ASSEMBLY AND COUPLING MECHANISM

CROSS-REFERENCE TO RELATED PATENT APPLICATION

[0001] This application is a continuation of U.S. Application No. 15/826,232, filed November 29, 2017, which is a continuation of International Application No. PCT/IL2017/050481, filed April 30, 2017, which claims priority to U.S. Provisional Application No. 62/459,076, filed February 15, 2017 and to U.S. Provisional Application No. 62/330,334, filed May 2, 2016, which are incorporated herein by reference in their entireties.

TECHNOLOGICAL FIELD

[0002] The present disclosure is directed to a container assembly and more specifically to a utility assembly comprising two or more detachably attachable utility modules. The disclosure is further concerned with a coupling mechanism facilitating detachably attaching the utility modules to one another.

[0003] The term 'utility module' is used hereinafter in its broad meaning and is meant to denote a variety of articles such as, storage containers, travel luggage, tool boxes, organizers, compacted work benches, cable storage, tools (e.g. hand tools, power generators and power sources), communication modules, carrying platforms, locomotion platforms, etc., of any shape and size, and wherein any utility module can be detachably attached to any other utility module.

[0004] The term 'utility assembly' as used herein denotes any set of utility modules configured for articulation to one another, either as a stationary unit or locomotive.

GENERAL DESCRIPTION

[0005] A first aspect of the disclosure concerns a coupling mechanism configured for readily detachably attaching any first article to any second article, wherein any first article and any second article can be any utility module.

[0006] The coupling mechanism comprises a male coupler at a face of one of the first utility module and the second utility module, and a female coupler at a face of the other one of the first utility module and the second utility module, said female coupler has a depressed locking location configured with at least one locking rib extending above a depressed surface and along a

sliding path, and having an open edge facing in a first sense; said male coupler has a projecting locking location disposed in register with said depressed locking location and configured with at least one locking tongue extending along said engaging sliding path at a second sense, opposite to said first sense, and configured for arresting engagement at a space between said locking rib and depressed surface, the coupling mechanism further comprises at least one locking member for arresting the first utility module with respect to said second utility module and preventing sliding displacement along said sliding path.

[0007] The arrangement is such that at a locked position of a utility assembly the at least one locking tongue of the male coupler engages below said at least one locking rib of the female coupler and the at least one locking member is engaged, thus preventing any respective displacement between the first utility module and the second utility module, and retaining the coupling mechanism at an engaged and locked position.

[0008] The term 'first utility module' as used herein denotes any utility module bearing at least one second utility module over a first surface thereof. The second utility module of a utility assembly may comprise three or more stages of utility modules, and functions as first utility module with respect to a third stage utility module mounted thereover and serving in turn as a second utility module.

[0009] According to certain embodiments, one or more female couplers are configured at the top face of the first utility module, and one or more male couplers are configured at the bottom face of the second utility module

[0010] The disclosed subject-matter is directed to a utility module configured with at least one of a male coupling mechanism and a female coupling mechanism of the disclosure, a module assembly comprising one or more utility modules of the aforementioned type and a set of utility modules of the aforementioned type.

[0011] According to a configuration of the first aspect, there is provide a utility assembly comprising at least a first utility module and at least a second utility module, and comprising a coupling mechanism configured between the first utility module and the second utility module; said coupling mechanism comprising at one of a top face of the first utility module and a bottom

face of the second utility module one or more depressed locking locations each configured with a locking rib, and at least one locking latch arresting location; and the other one of said top face of the first utility module and a bottom face of the second utility module comprises one or more projecting portions each configured with a locking tongue disposed in register with said one or more depressed locking locations, and at least one locking latch disposed in register with said at least one locking latch arresting location.

[0012] The arrangement is such that, at a locked position, the bottom face of the second utility module at least partially rests over the top face of the first utility module, and the one or more projecting tongues are arrested by the corresponding one or more locking ribs, and the at least one locking latch is arrested by corresponding at least one locking latch arresting location, thereby preventing sliding displacement between the first utility module and the second utility module, and further wherein disengaging the second utility module from the first utility module is facilitated by disengaging the at least one locking latch from the at least one locking latch arresting location.

[0013] Locking engagement between the second utility module and the first utility module is obtained when the one or more depressed locking locations and the one or more projecting portions are disposed behind one another (though not necessarily aligned).

[0014] According to a particular configuration of the coupling mechanism, the one or more depressed locking locations and the one or more locking latch arresting locations are configured at the top face of the first utility module, and the one or more projecting portions and the at least one locking latch are configured at the bottom face of the second utility module. According to this configuration, locking between the first utility module and the second utility module is obtained by positioning the second utility module over the second utility module such that one or more locking tongues of the projecting portions engages with one or more respective locking ribs of the depressed locking locations, and wherein the locking latch interlocks with the respective locking latch arresting location.

[0015] The arrangement being such that the attaching engagement between the second utility module and the first utility module takes place when the one or more locking tongues and the corresponding one or more respective locking ribs are engaged, thereby preventing vertical

separation between the utility modules (i.e. preventing lifting of the second utility module of the first utility module), and further when the locking latch is arrested by the respective locking latch arresting location, thereby preventing sliding displacement of the utility modules one with respect to the other (i.e. sliding displacement of the second module over the first module).

[0016] Disengaging the second utility module from the first utility module can be facilitated only after disengaging the locking latch from said locking latch arresting location.

[0017] According to a second aspect of the disclosure there is disclosed a coupling mechanism for a utility assembly comprising at least a first utility module and at least a second utility module, said coupling mechanism is configured between the first utility module and the second utility module and comprises at one of a top face of the first utility module and a bottom face of the second utility module with at least one depressed locking location configured with a locking rib, and at least one locking latch arresting location; and the other one of said top face of the first utility module and a bottom face of the second utility module comprises at least one projecting portion with a locking tongue disposed in register with said at least one depressed locking location, and at least one locking latch disposed in register with said at least one locking latch arresting location; and wherein at a locked position the bottom face at least partially rests over the top face, and the at least one projecting tongue is arrested by the corresponding at least one locking rib and the at least one locking latch is arrested by corresponding at least one locking latch arresting location, and further wherein disengaging the second utility module from the first utility module is facilitated by disengaging the at least one locking latch from the at least one locking latch arresting location.

[0018] Engaging the first and second utility modules into the locked position is provided by sliding the second utility module with respect to the first utility module along a sliding path defined by at least one of said at least one locking rib and said at least one locking tongue.

[0019] According to one particular configuration the at least one locking rib extends substantially parallel to the sliding path and according to another configuration the at least one locking rib extends substantially perpendicular and intersects the sliding path. A third aspect of the present disclosure is directed to a utility module being a mobile carrier unit and comprising at

least one carrier engagement surface, compatible for interlocking engagement in a detachable manner with a first engagement surface of a utility module.

[0020] The term carrier unit as used herein denotes any kind of propelled cart configured for detachably attaching and carrying load. The carrier unit may be a hand cart, a mobile tool cart, a mobile workshop, traveling luggage cart, a trolley, etc.

[0021] With particular reference to the third aspect, the carrier engagement surface can be larger than the utility module's first engagement surface corresponding with it. In this case, several utility modules may be interlocked simultaneously upon one carrier unit. According to one configuration there is disclosed a carrier unit comprising a manipulating arrangement, a locomotion system, and an engagement surface comprising one or more engaging elements. The carrier unit is designated for detachable interlocking engagement with one or more utility modules, each comprising a first engagement surface configured with one or more first engaging elements compatible for detachable interlocking engagement with the carrier engaging elements.

[0022] According to yet configuration there is disclosed an assembly comprising a carrier unit comprising an engagement surface comprising one or more engaging elements, and at least one utility module configured with at least one first engagement surface comprising one or more first engaging elements compatible for detachable interlocking engagement with the carrier unit's engaging elements.

[0023] According to a modification of this aspect, there is also provided a container unit comprising a top member configured with a second engagement surface of the utility module, said top member, according to one example constitutes a cover of the utility module.

[0024] The arrangement is such that a container unit can be readily and easily applied over and interlockingly articulated to a carrier unit, or over a utility module configured with a second engagement surface mimicking the first engagement surface second engagement surface mimicking the first engagement surface of the carrier unit.

[0025] Engagement between the carrier unit and the container, and further between two containers, is facilitated by any locking mechanism of the disclosure hereinabove and hereinafter.

[0026] According to a specific example, there is a latching mechanism, wherein the first engaging elements of the carrier unit are configured for interlocking engagement with engaging elements of the mating surface of the respective utility module. The latching mechanism may assume various configurations, e.g. male-female couplings, dovetail couplings, and the like. The arrangement being such that only a minor displacement is required in order to lockingly mount, and respectively detach, a utility module over the carrier unit.

[0027] According to one specific configuration, the detachable interlocking engagement mechanism between the carrier engaging elements and the utility module's first engaging elements is a dovetail engagement mechanism, comprising laterally projecting shoulders configured on one of the carrier engagement surfaces and the first engagement surface of a utility module, and a shoulder receiving recess configured on the other one of one of the carrier engagement surfaces and the first engagement surface of a utility module; where said laterally projecting shoulders are configured for sliding engagement with said shoulder receiving recess.

[0028] According to a particular configuration, one or both of the carrier engagement surfaces and the first engagement surface of a respective utility module are configured with depressions, each accommodating respective laterally projecting locking shoulders. Said dovetail engagement mechanism members constitute said engaging elements, wherein said carrier engaging elements comprise one of said dovetail engagement members, while the utility module's first engaging element comprises the respective said dovetail engagement member.

[0029] According to another configuration, the detachable interlocking engagement mechanism between the carrier engaging elements and the utility module's first engaging elements is an undercut engagement mechanism, comprising lateral projections configured on one of the carrier engagement surfaces and the first engagement surface of a container unit, and a receiving recess configured on the other one of one of the carrier engagement surfaces and the first engagement surface of a utility module; where said lateral projections are configured for engagement with said receiving recess.

[0030] Interlocking engagement of the utility module and the carrier unit takes place by placing the first engagement surface of a utility module over the carrier engagement surface, such that the utility module's first engaging elements are disposed shifted over the respective

carrier engaging elements of the carrier unit, and are then slidingly shifted to obtain sliding interlocking engagement therebetween.

[0031] The detachable interlocking engagement mechanism may further comprise a locking mechanism configured for preventing unintentional detaching of the slidingly engaging elements once they are fully interlocked, i.e. to prevent detaching of the utility module from the carrier unit or from another utility module.

[0032] According to one configuration, the locking mechanism, comprises a locking pin that is configured for snapingly protruding from one of the engagement surfaces into a designated nook on the other engagement surface. This prevents the engaging surfaces from sliding relatively to each other, and by that it prevents said engaging elements from being slidingly separated once interlocked.

[0033] According to one configuration, the carrier engagement surface of the carrier unit constitutes a top wall of the carrier unit, when the carrier unit is balanced horizontally to the ground, and wherein the utility module's first engagement surface constitutes a bottom wall of the container unit, when the utility module is balanced horizontally to the ground. The utility module can further comprise a second engagement surface constituting its top wall, or a cover, when the utility module is balanced horizontally to the ground. The second engagement surface of the utility module simulates the carrier engagement surface as it is compatible for engaging with another utility module's first engagement surface.

[0034] Any one or more of the following features, designs and configurations, can be implemented in a utility module, a utility assembly, locking mechanism, and the carrier unit and assembly according to the present disclosure, individually or in various combinations thereof:

[0035] A single locking rib can extend at rear end of a depressed locking location (i.e. the female coupler may comprise a single locking rib) and substantially perpendicular to the sliding path;

[0036] Two locking ribs can extend at side edges of a depressed locking location (i.e. the female coupler may comprise two locking ribs) and disposed substantially parallel to the sliding path;

[0037] Two locking ribs can each extend at a respective side edge of two neighboring depressed locking locations, said locking ribs disposed substantially parallel to the sliding path;

[0038] The utility assembly can be modular wherein a top face of a first utility module can interlock with a bottom face of a second utility module disposed thereover in a substantially fully overlapping relation, or with a bottom face of at least one second utility module only partially overlapping therewith;

[0039] A second utility module overlapping a significant portion of a first utility module can be configured with a single release latch for displacing several locking latches articulated therewith;

[0040] Two or more second utility modules can be mounted over a first utility module, each being independently detachable attachable over the first utility module;

[0041] The at least one second utility module is configured for snap-type locking over the first utility module;

[0042] A release latch for displacing the locking latch into disengagement from the locking latch arresting location can be disposed at a front face of the respective second utility module;

[0043] The at least one locking latch and the at least one locking latch arresting location can be disposed at a front portion of the respective utility modules;

[0044] At least one of the first utility module and the second utility module are configured with a gliding surface facilitating displacement and positioning the respective second utility module at the locking position with respect to the first utility module;

[0045] The gliding surface reduces tolerances between the projecting portion and the depressed locking location receiving same;

[0046] One or both of the locking tongue and locking rib can be configured with a slanting surface at corresponding orientation, along the sliding path, for reducing or substantially elimination tolerance therebetween;

[0047] One or both of a front edge of the projecting portion and a corresponding front edge of the depressed locking location can be slanted for gliding positioning of the second utility module into true locking position over the first utility module;

[0048] The locking latch can be configured for displacement in a direction substantially normal to a respective face of a utility module;

[0049] The locking latch can be spring biased and configured for normally projecting from a face of the respective first or second utility module;

[0050] The locking latch can be manipulable to be opened through an opening configured at a front wall of the respective utility module;

[0051] Corners of the utility modules can be reinforced;

[0052] One or more of the utility modules can be a container module, and the utility assembly can be a container assembly/tool caddy;

[0053] The container module can be compartmented and can be configured with sub-containers and sub-compartments;

[0054] The top face of the container module can be configured as a lid or as a functional component of the container module;

[0055] A lid of a second container can be opened also when articulated and locked in position over a first container;

[0056] A lid of a first container can be opened also when a second container is articulated and locked in position thereabove;

[0057] At least one of the container modules can be a locomoting container and can be configured with an arrangement for locomoting said container module. Where the locomoting container is attached to other container modules it can facilitate for locomoting the utility assembly;

[0058] The container modules can be configured with carrying arrangement disposed at any one or more of its faces. According to a particular configuration, a front face of the container modules is configured with a carrying handle and according to another configuration side faces of the container modules can be configured with a carrying handle;

[0059] Examples of utility modules can be any one or more of a cooler box, a workpiece grip, a power supply (e.g. power bank, generator), hand tools, power tools, a locomotive platform (e.g. a work dolly), powered or not, a tactical unit (e.g. military gear, scientific equipment, communications equipment, personal gear, outdoor gear, etc.);

[0060] A tool caddy can be configured with a carrying handle (e.g. telescopic);

[0061] A utility module can be a soft-shell container with at least a rigid face portion configured with a male/female coupler;

[0062] The utility module can be an interface coupling module, i.e. functions only as a coupling interface;

[0063] The interface coupling module can be attached to a surface of any element or object and by different arrangements, fixedly or detachably;

[0064] The interface coupling module can be a cargo interface module for a utility vehicle, so as to attach one or more utility modules to the vehicle;

[0065] The cargo interface module can be a bed cargo module, a roof rack module, etc.;

[0066] The interface coupling module can be a surface mount for attaching utility modules, e.g. a floor mount, wall mount, wall rack, etc.;

[0067] The interface coupling module can be a tool mount/rack;

[0068] The interface coupling module can be belt mount for mounting of utility modules (e.g. a hand tool) to a workers belt;

[0069] The interface coupling module can be an interface mount module for coupling two utility modules to one another, e.g. for articulating two utility modules, both configured with a

similar male coupler or a female coupler, and wherein the interface mount module is configured at both faces with another of male coupler or a female coupler;

[0070] The interface coupling module can be a back pack carrying module, for facilitating attachment and carrying of utility modules;

[0071] A top face of a utility module can be configured with a carrying handle, said carrying handle displaceable between a stowed position and a carrying position, wherein at the stowed position said carrying handle at least partially extends within a niche and does not to interfere with the coupling mechanism;

[0072] The carrier unit may include one or more auxiliary engagement surfaces positioned on an exterior face of the carrier unit. For example, an auxiliary engagement surface can be configured at a bottom face of the carrier unit;

[0073] The carrier unit may include a second engagement surface simulating/mimicking the first engagement surface of the utility module;

[0074] A utility module may be configured with one or more auxiliary first and second engagement surfaces;

[0075] The carrier engagement surface may be a connectivity platform detachably attached to the exterior surface of the carrier unit, facilitating a cart unit or a carrier unit according to the present disclosure;

[0076] One or both of the utility module's first and second engagement surfaces may be detachably attached to an exterior surface of the utility module;

[0077] The carrier engagement surface and the utility module's first engagement surface may be like elements;

[0078] The utility module's first and second engagement surfaces may be like elements;

[0079] The carrier unit's engaging elements and the utility module's first engaging elements may be similar elements;

[0080] One engagement surface may include several engaging elements and one locking mechanism;

[0081] The coupling mechanism is configured for spontaneous displacement into locking engagement within a locking receptacle, wherein manual interference is required only for unlocking the locking mechanism and detaching a utility module from a respective utility module or carrier unit;

[0082] The coupling mechanism can be a spring biased locking pin, normally projecting from a respective engagement surface;

[0083] One or both of the carrier unit and the utility module may further include a locking mechanism designated to prevent unintentional separation of the engagement surfaces while they are interlocked;

[0084] The locking mechanism is manipulable between an unlocked position in which said engagement surfaces may slide upon each other, and a locked state in which the engagement surfaces may not slide upon each other;

[0085] The locking mechanism may be configured with a biasing mechanism for snap arresting at least at its locked state;

[0086] The locking mechanism may be configured with a manually operated activating portion for switching between said unlocked and locked positions.

[0087] The carrier unit may be assembled together with other carrier units the same way it's assembled with the utility modules;

[0088] The locomotion system of the carrier unit may comprise a wheel system (e.g. axially fixed roller wheels, swivel wheels, etc.), a sliding platform, caterpillar tracks, etc;

[0089] The locomotion system of the carrier unit comprises, according to a particular example, several fixed axis wheels, wherein the perimeter of said wheels is tangent with a base edge of the carrier unit;

[0090] At an assembled configuration, where one or more utility modules are attached to the carrier unit, the assembly can be positioned vertically wherein a side face of the one or more containers rest over a supporting surface. According to a particular example, at this position the carrier unit and container assembly are configured with stability members for retaining their stability while positioned vertically to the ground;

[0091] The carrier unit may be stable while positioned horizontally to the ground, by a support system projecting from a bottom face thereof. The support system may comprise friction enhancing surfaces to restrict displacement of the assembly while placed over a bearing surface;

[0092] The carrier unit may be foldable to a more compact configuration;

[0093] The carrier unit may comprise an external storage box detachably interconnectable to its exterior walls;

[0094] The carrier unit may comprise a power supply detachably interconnectable to its exterior walls;

[0095] The carrier unit's transporting system may be motorized while powered via said power supply;

[0096] The carrier unit may further include a locking mechanism to insure interlocking connection of the engagement surfaces;

[0097] The container unit may comprise non-rigid portions;

[0098] The carrier unit may comprise at least one manipulating arrangement, configurable between a stowed position in which the manipulating arrangement is retracted, and a manipulating position in which the manipulating arrangement is extracted. The manipulating arrangement may be a telescopic or foldable handle;

[0099] The manipulating arrangement may be a gripping handle, a D-grip handle, a T-grip handle, a flexible strap, etc.

EMBODIMENTS

[00100] The present disclosure also encompasses embodiment as defined in the following numbered phrases. It should be noted that these numbered embodiments intended to add to this disclosure and is not intended in any way to be limiting.

[00101] 1. A coupling mechanism configured for readily detachably attaching a first utility module to a second utility module, the coupling mechanism comprising a male coupler at a face of one of the first utility module and the second utility module, and a female coupler at a face of the other one of the first utility module and the second utility module, said female coupler having a depressed locking location configured with at least one locking rib extending above a depressed surface and along a sliding path, and having an open edge facing in a first sense; said male coupler having a projecting locking location disposed in register with said depressed locking location and configured with at least one locking tongue extending along said engaging sliding path at a second sense, opposite to said first sense, and configured for arresting engagement at a space between said locking rib and depressed surface, the coupling mechanism further comprises at least one locking member for arresting the first utility module with respect to said second utility module and preventing sliding displacement along said sliding path.

[00102] 2. The coupling mechanism of embodiment 1, wherein said female coupler is configured at the top face of the first utility module, and the male coupler is configured at the bottom face of the second utility module.

[00103] 3. The coupling arrangement of embodiment 1 or 2, wherein the at least one locking rib extends substantially parallel to the sliding path.

[00104] 4. The coupling arrangement of embodiment 1 or 2, wherein the at least one locking rib extends substantially perpendicular and intersects the sliding path.

[00105] 5. The coupling arrangement of embodiment 1 or 2, wherein the female coupler comprises a single locking rib extends at rear end of a depressed locking location and substantially perpendicular to the sliding path.

[00106] 6. The coupling arrangement of embodiment 1 or 2, wherein the female coupler comprises two locking ribs extend at side edges of a depressed locking location and disposed substantially parallel to the sliding path.

[00107] 7. The coupling arrangement of embodiment 1 or 2, wherein the female coupler comprises two locking ribs each extend at a respective side edge of two neighboring depressed locking locations, said locking ribs disposed substantially parallel to the sliding path.

[00108] 8. A coupling mechanism for a utility assembly that comprises at least a first utility module and at least a second utility module, said coupling mechanism is configured between the first utility module and the second utility module; one of a top face of the first utility module and a bottom face of the second utility module comprises at least one depressed locking location configured with a locking rib, and at least one locking latch arresting location; and the other one of said top face of the first utility module and a bottom face of the second utility module comprises at least one projecting portion with a locking tongue disposed in register with said at least one depressed locking location, and at least one locking latch disposed in register with said at least one locking latch arresting location; and wherein at a locked position the bottom face at least partially rests over the top face, and the at least one projecting tongue is arrested by the corresponding at least one locking rib and the at least one locking latch is arrested by corresponding at least one locking latch arresting location, and further wherein disengaging the second utility module from the first utility module is facilitated by disengaging the at least one locking latch from the at least one locking latch arresting location, such that engaging the first and second utility modules into the locked position is provided by sliding the second utility module with respect to the first utility module along a sliding path defined by at least one of said at least one locking rib and said at least one locking tongue.

[00109] 9. The coupling arrangement of embodiment 8, wherein the at least one locking rib extends substantially parallel to the sliding path.

[00110] 10. The coupling arrangement of embodiment 8, wherein the at least one locking rib extends substantially perpendicular and intersects the sliding path.

[00111] 11. The coupling arrangement of embodiment 8, wherein a single locking rib extends at rear end of a depressed locking location and substantially perpendicular to the sliding path.

[00112] 12. The coupling arrangement of embodiment 8, wherein two locking ribs extend at side edges of a depressed locking location and disposed substantially parallel to the sliding path.

[00113] 13. The coupling arrangement of embodiment 8, wherein two locking ribs each extend at a respective side edge of two neighboring depressed locking locations, said locking ribs disposed substantially parallel to the sliding path.

[00114] 14. The coupling arrangement of any one of embodiments 8 to 13, further comprising a release latch for displacing the locking latch into disengagement from the locking latch arresting location can be disposed at a front face of the respective second utility module.

[00115] 15. The coupling arrangement of any one of embodiments 8 to 14, wherein the at least one locking latch and the at least one locking latch arresting location are disposed at a front portion of the respective utility modules.

[00116] 16. The coupling arrangement of any one of embodiments 8 to 15, wherein the locking latch is configured for displacement in a direction substantially normal to a respective face of a utility module.

[00117] 17. The coupling arrangement of any one of embodiments 8 to 16, wherein locking latch is spring biased and configured for normally projecting from a face of the respective first or second utility module.

[00118] 18. The coupling arrangement of any one of embodiments 8 to 17, wherein the locking latch is manipulable to be opened through an opening configured at a front wall of the respective utility module.

[00119] 19. The coupling arrangement of any one of embodiments 1 to 18, wherein one or both of the locking tongue and locking rib are configured with a slanting surface at corresponding orientation along the sliding path.

[00120] 20. The coupling arrangement of any one of embodiments 1 to 19, wherein one or both of a front edge of the projecting portion (or the projecting locking location) and a corresponding front edge of the depressed locking location are slanted for gliding positioning of the second utility module into locking position over the first utility module.

[00121] 21. The coupling mechanism of any one of embodiments 1 to 20, wherein the first utility module is configured for detachably attaching one or more second utility modules thereto.

[00122] 22. A coupling mechanism for a utility assembly comprising at least a first utility module and at least a second utility module, said coupling mechanism is configured between the first utility module and the second utility module and comprises at one of a top face of the first utility module and a bottom face of the second utility module with at least one depressed locking location configured with a locking rib, and at least one locking latch arresting location; and the other one of said top face of the first utility module and a bottom face of the second utility module comprises at least one projecting portion with a locking tongue disposed in register with said at least one depressed locking location, and at least one locking latch disposed in register with said at least one locking latch arresting location; and wherein at a locked position the bottom face at least partially rests over the top face, and the at least one projecting tongue is arrested by the corresponding at least one locking rib and the at least one locking latch is arrested by corresponding at least one locking latch arresting location, and further wherein disengaging the second utility module from the first utility module is facilitated by disengaging the at least one locking latch from the at least one locking latch arresting location.

[00123] 23. A utility assembly comprising at least a first utility module and at least a second utility module, and comprising a coupling mechanism according to any one of embodiments 1 to 21, the coupling mechanism being configured between the first utility module and the second utility module.

[00124] 24. A utility assembly comprising at least a first utility module and at least a second utility module, and comprising a coupling mechanism for readily detachably attaching the first and second utility modules, the coupling mechanism being configured between the first utility module and the second utility module; said coupling mechanism comprising at one of a top face of the first utility module and a bottom face of the second utility module one or more depressed

locking locations each configured with a locking rib, and at least one locking latch arresting location; and the other one of said top face of the first utility module and a bottom face of the second utility module comprises one or more projecting portions each configured with a locking tongue disposed in register with said one or more depressed locking locations, and at least one locking latch disposed in register with said at least one locking latch arresting location; such that at a locked position, the bottom face of the second utility module at least partially rests over the top face of the first utility module, and the one or more projecting tongues are arrested by the corresponding one or more locking ribs, and the at least one locking latch is arrested by corresponding at least one locking latch arresting location, thereby preventing sliding displacement between the first utility module and the second utility module, and disengaging the second utility module from the first utility module is facilitated by disengaging the at least one locking latch from the at least one locking latch arresting location.

[00125] 25. The utility assembly of embodiment 24, wherein the first and second utility modules are in a locking engagement when said one or more depressed locking locations and the one or more projecting portions are disposed behind one another.

[00126] 26. The utility assembly of embodiment 24 or 25, wherein said one or more depressed locking locations and said one or more locking latch arresting locations are configured at the top face of the first utility module, and the one or more projecting portions and the at least one locking latch are configured at the bottom face of the second utility module.

[00127] 27. The utility assembly of any one of embodiments 24 to 26, wherein at least one second utility module is configured for snap-type locking over the first utility module.

[00128] 28. The utility assembly of any one of embodiments 24 to 27 wherein engaging the first and second utility modules into the locked position is provided by sliding the second utility module with respect to the first utility module along a sliding path defined by at least one of said at least one locking rib and said at least one locking tongue.

[00129] 29. The utility assembly of any one of embodiments 24 to 28, wherein the at least one locking rib extends substantially parallel to the sliding path.

[00130] 30. The utility assembly of embodiment 29, wherein the at least one locking rib extends substantially perpendicular and intersects the sliding path.

[00131] 31. The utility assembly of embodiment 29, wherein a single locking rib extends at rear end of a depressed locking location and substantially perpendicular to the sliding path.

[00132] 32. The utility assembly of embodiment 29 wherein two locking ribs extend at side edges of a depressed locking location and disposed substantially parallel to the sliding path.

[00133] 33. The utility assembly of embodiment 29, wherein two locking ribs each extend at a respective side edge of two neighboring depressed locking locations, said locking ribs disposed substantially parallel to the sliding path.

[00134] 34. The utility assembly of any one of embodiments 24 to 33, wherein a top face of a first utility module interlocks with a bottom face of a second utility module disposed thereover in a substantially fully overlapping relation, or with a bottom face of at least one second utility module only partially overlapping therewith.

[00135] 35. The utility assembly of any one of embodiments 24 to 33, wherein the second utility module overlaps a significant portion of a first utility module and is configured with a single release latch for displacing several locking latches articulated therewith.

[00136] 36. The utility assembly of any one of embodiments 24 to 35, further comprising a release latch for displacing the locking latch into disengagement from the locking latch arresting location can be disposed at a front face of the respective second utility module.

[00137] 37. The utility assembly of any one of embodiments 24 to 36, wherein the locking latch is configured for displacement in a direction substantially normal to a respective face of a utility module.

[00138] 38. The utility assembly of any one of embodiments 24 to 37, wherein the locking latch is spring biased and configured for normally projecting from a face of the respective first or second utility module.

[00139] 39. The utility assembly of any one of embodiments 24 to 38, wherein two or more second utility modules can be mounted over a first utility module, each being independently detachable attachable over the first utility module.

[00140] 40. The utility assembly of any one of embodiments 24 to 39, wherein at least one of the first utility module and the second utility module are configured with a gliding surface facilitating displacement and positioning the respective second utility module at the locking position with respect to the first utility module.

[00141] 41. The utility assembly of any one of embodiments 24 to 40, wherein one or more of the utility modules is a container module, and the utility assembly is a container assembly or a tool caddy.

[00142] 42. The utility assembly of embodiment 41, wherein the container module is compartmented and optionally configured with sub-containers and sub-compartments.

[00143] 43. The utility assembly of embodiment 41 or 42, wherein a top face of the container module is configured as a lid or as a functional component of the container module.

[00144] 44. The utility assembly of any one of embodiments 41 to 43, wherein the container modules is a locomoting container, configured with an arrangement for locomoting said utility assembly.

[00145] 45. The utility assembly of any one of embodiments 41 to 44, wherein the container modules is configured with a carrying arrangement disposed at any one or more of its faces, optionally being a carrying handle.

[00146] 46. The utility assembly of any one of embodiments 24 to 40, wherein one or more of the utility modules is a soft-shell container with at least a rigid face portion.

[00147] 47. The utility assembly of any one of embodiments 24 to 40, wherein said first utility module is a mobile carrier unit.

[00148] 48. The utility assembly of any one of embodiments 24 to 47, further comprising a locking mechanism for preventing unintentional separation of the modules while they are interlocked.

[00149] 49. The utility assembly of any one of embodiments 24 to 48, wherein the first utility module is configured for detachably attaching at least two second utility modules thereto.

[00150] 50. A mobile carrier unit comprising at least one carrier engagement surface, compatible for interlocking engagement in a detachable manner with a first engagement surface of a utility module, said carrier engagement surface having (i) one or more depressed locking locations each configured with a locking rib and at least one locking latch arresting location, configured for engagement with said first engagement surface of a utility module that comprises at least one locking latch and one or more projecting portions, each projecting portion being configured with a locking tongue, or (ii) at least one locking latch and one or more projecting portions each configured with a locking tongue for engagement with said first engagement surface of a utility module that comprises one or more depressed locking locations, each depressed locking locations configured with a locking rib and at least one locking latch arresting location.

[00151] 51. The mobile carrier unit of embodiment 50, wherein once associated with the utility module, said locking tongue becomes disposed in register with said one or more depressed locking locations, and at least one locking latch become disposed in register with said at least one locking latch arresting location.

[00152] 52. The mobile carrier unit of embodiment 50 or 51, configured for detachable interlocking engagement with one or more utility modules, each utility module comprising a first engagement surface.

[00153] 53. The mobile carrier unit of any one of embodiments 50 to 52, further comprising at least one of a manipulating arrangement and a locomotion system.

[00154] 54. An assembly comprising a mobile carrier unit of any one of embodiments 50 to 53 having at least one carrier engagement surface, and at a least one utility module having a first

engagement surface, the utility module being detachably interlocked with the mobile carrier unit by engaging said first engagement surface with said carrier engagement surface.

[00155] 55. The assembly of embodiment 54, wherein the mobile carrier unit and the at least one utility module are detachably interlocked with one another by a dovetail engagement mechanism, that comprises laterally projecting shoulders configured on one of the carrier engagement surfaces and the first engagement surface of a utility module, and a shoulder receiving recess configured on the other one of one of the carrier engagement surfaces and the first engagement surface of a utility module; where said laterally projecting shoulders are configured for sliding engagement with said shoulder receiving recess.

[00156] 56. The assembly of embodiment 55, wherein one or both of the carrier engagement surfaces and the first engagement surface of a respective utility module are configured with depressions, each accommodating respective laterally projecting locking shoulders.

[00157] 57. The assembly of embodiment 54, wherein the mobile carrier unit and the at least one utility module are detachably interlocked with one another by an undercut engagement mechanism, comprising lateral projections configured on one of the carrier engagement surfaces and the first engagement surface of a container unit, and a receiving recess configured on the other one of one of the carrier engagement surfaces and the first engagement surface of a utility module; where said lateral projections are configured for engagement with said receiving recess, such that interlocking engagement of the utility module and the carrier unit takes place by placing the first engagement surface of a utility module over the carrier engagement surface, such that the utility module's first engaging elements are disposed shifted over the respective carrier engaging elements of the carrier unit, and are then slidingly shifted to obtain sliding interlocking engagement therebetween.

[00158] 58. The assembly of any one of embodiments 54 to 57, further comprising a locking mechanism configured for preventing unintentional detaching of the utility module from the carrier unit.

[00159] 59. The assembly of embodiment 58, wherein the locking mechanism comprises a locking pin that is configured for snapingly protruding from one of the engagement surfaces into a designated nook on the other engagement surface.

[00160] 60. An interface coupling module comprising at least one engagement surface, compatible for interlocking engagement in a detachable manner with a first engagement surface of a utility module, said interface coupling module comprising an engagement surface having (i) one or more depressed locking locations each configured with a locking rib and at least one locking latch arresting location, configured for engagement with said first engagement surface of a utility module that comprises at least one locking latch and one or more projecting portions, each projecting portion being configured with a locking tongue, or (ii) at least one locking latch and one or more projecting portions each configured with a locking tongue for engagement with said first engagement surface of a utility module that comprises one or more depressed locking locations, each depressed locking locations configured with a locking rib and at least one locking latch arresting location

[00161] 61. The interface coupling module of embodiment 60, being configured for detachable or fixed attachment to a surface of an object.

[00162] 62. The interface coupling module of embodiment 60 or 61, being a cargo interface module for a utility vehicle configured for attaching one or more utility modules to the vehicle.

[00163] 63. The interface module of embodiment 60 or 61, being a surface mount for attaching utility modules

[00164] 64. The interface module of embodiment 60 or 61, being a tool mount or a tool rack.

[00165] 65. The interface module of embodiment 60 or 61, being a belt mount for mounting of utility modules to a workers belt;

[00166] 66. The interface module of embodiment 60 or 61, being an interface mount module for coupling two utility modules to one another.

BRIEF DESCRIPTION OF THE DRAWINGS

[00167] In order to better understand the subject matter that is disclosed herein and to exemplify how it may be carried out in practice, embodiments will now be described, by way of non-limiting examples only, with reference to the accompanying drawings, in which: Figs. 1A to 6G are directed to a first example of a locking mechanism, wherein:

[00168] Fig. 1A is a top perspective view of a container assembly according to an example of the present disclosure;

[00169] Fig. 1B is an exploded perspective view of the container assembly of Fig. 1A;

[00170] Fig. 1C is a bottom, front perspective view of Fig. 1B;

[00171] Fig. 1D is a bottom, rear perspective view of Fig. 1B;

[00172] Fig. 2A is a sectioned portion along line A-A in Fig. 1A;

[00173] Fig. 2B is a sectioned portion along line B-B in Fig. 1A;

[00174] Fig. 2C is a sectioned portion along line C-C in Fig. 1A;

[00175] Figs. 3A to 3D are consecutive steps illustrating locking engagement of the locking tongue of the second container with the respective locking rib of the first container;

[00176] Figs. 4A to 4D are consecutive steps illustrating locking engagement of the locking latch of the second container with the respective locking latch arresting location of the first container;

[00177] Figs. 5A to 5E schematically demonstrate modularity of a container assembly according to the disclosure;

[00178] Figs. 6A to 6G are various combinations of a modular container assembly according to examples of the present disclosure.

[00179] Figs 7 to 12 are directed to a carrier unit and another example of a locking mechanism, wherein:

[00180] Fig. 7A is container carrier assembly according to an example of the disclosure, illustrating a top, left perspective view of a container unit, mounted on top of a carrier unit;

[00181] Fig. 7B is a top, left perspective view of a second container unit, mounted on top of a first container unit, which in turn is mounted on top of a carrier unit according to an example of the present disclosure;

[00182] Fig. 8A is a top, left perspective view of a carrier unit, illustrating the carrier engagement surface in further detail;

[00183] Figs. 8B and 8C are a top and a bottom perspective view of a carrier unit, illustrating the container unit's first engagement surface in further detail;

[00184] Fig. 9A is a side section along line F-F in Fig. 7A, illustrating the container unit and the carrier unit unattached;

[00185] Fig. 9B is a side section along line F-F in Fig. 7A illustrating the container unit and the carrier unit attached;

[00186] Fig. 9C is a close-up view of Fig. 9B;

[00187] Fig. 9D is a sectioned view along line F-F in Fig. 7A illustrating the interlocking engagement of the carrier engaging elements together with the container unit's first engaging elements;

[00188] Fig. 10A is a sectioned view along line D-D in Fig. 7A, illustrating the locking mechanism;

[00189] Fig. 10B is an enlarged image of the portion marked M in Fig. 10A;

[00190] Fig. 11A illustrates different sizes of container units forming an assembly, at a tilted orientation;

[00191] Fig. 11B illustrates an assembled configuration balanced vertically relatively to the ground;

[00192] Fig. 12A shows a container assembly wherein the female coupler comprises two locking ribs extending at respective side edges of two neighboring depressed locking locations;

[00193] Fig. 12B is a section along line H-H in Fig. 12A;

[00194] Fig. 12C illustrates the utility module apart from the container and flipped, so as to expose the mating coupling mechanism.

[00195] Figs. 13A-13D, 14A-14C, 15A-15B, 16A-16B, 17, 18A-18C, and 19-24 are different embodiments and configurations of utility modules and utility assemblies according examples of this disclosure.

DETAILED DESCRIPTION OF EMBODIMENTS

[00196] Reference is first being made to Figs. 1A to 6G, directed to a first configuration of a coupling mechanism. For sake of convenience the utility modules are exemplified as containers and respectively the utility assembly is illustrates as a tool caddy. It is however appreciated that the utility modules can be of any type, shape or size, as discussed hereinabove and as will be exemplified below.

[00197] Attention is first directed to Figs. 1A to 4D, illustrating a container assembly generally designated 20, comprising four containers 22, 24, 26 and 28 disposed in a triple stage configuration, the stages designated A, B and C. In the illustrated example containers 24 and 26 of the second stage are half-size and overlap the footprint of the first stage container 22 and the third stage container 28, wherein the first container 22 is for example a hand tool container and containers 24 to 28 are organizers or the like.

[00198] The term 'first container' as used herein denotes a container bearing over a top face thereof at least one other container, said at least one other container denoted herein as a 'second container'. It is thus appreciated that a second container of a container assembly comprising three or more stages of containers' serves as second container when referred to the first stage container, and as a first container when referred to a third stage container mounted thereover. Accordingly, in the illustrated example of Figs. 1A-2C, container 22 is a first container and containers 24 and 26 are second containers, whilst they function as first containers when discussing locking arrangement with respect to third stage container 28.

[00199] Each of the containers is configured with a lid L constituting a top face of the respective container, said lids being pivotally attached and securely articulated to the respective container through a toggle locking latch 29. Each top face (see Fig.lB) is configured with several depressed locking locations 32 and it is seen that the at least two depressed locking locations are disposed behind one another along imaginary lines I, II and III (though not necessarily aligned).

[00200] Each such depressed locking location is in turn configured with a laterally projecting locking rib 36 extending from a rear portion of the depressed locking location 32 towards a front face of the container. The locking rib 36 has a flat top surface 38 substantially flush with a top surface of the respective lid L, and a slanting bottom surface 40. A front portion 46 of the depressed locking location 32 is slanted too, in the same orientation as bottom surface 40 (i.e. substantially parallel thereto).

[00201] Furthermore, the top face, namely lid L of the containers, is configured with at least one locking latch arresting location in the form of a recess 50 disposed at a front portion of the respective top face and configured with a slanted rear wall portion 52 and a right angled front wall portion 53.

[00202] A bottom face 54 of each container 22, 24, 26 and 28 is configured with several projecting portions 56, extending in register with the depressed locking locations 32, and it is seen that the at least two projecting portions 56 are disposed behind one another along the imaginary lines I, II and III (though not necessarily aligned).

[00203] Each projecting portions 56 is configured with a locking tongue 60 laterally projecting rearwards and having a slanted surface 62 corresponding with slanting surface 40 of locking rib 36. Also, a front portion 66 of the projecting portions 56 slants substantially parallel to the slanted surface 62 of the locking tongue 60.

[00204] It is essential that the at least two depressed locking locations 32 and the at least two projecting portions 56 be disposed behind one another (though not necessarily aligned), as exemplified by imaginary lines I, II and III (though not necessarily aligned).

[00205] A plunger-like locking latch 70 is disposed at a front portion of each container, said locking latch 70 disposed in register with the recesses 50 and configured with a slanting rear wall

portion 72 and a right angled front wall portion 74, corresponding with the sloping wall portions of the recesses 50. The locking latch 70 has an elongate finger engaging aperture 73 (Fig. 2A) accessible through an aperture 75 formed in register at a front wall face of the respective second container, said locking latch 70 being normally biased to project under force of coiled spring 71, such that the locking latch 70 is axially displaceable between a projecting, locked position and a temporary retracted position during transition into the locked position.

[00206] The locking latch 70 is typically single-handedly manipulable between its locking position and its releasing position, such that manipulation of the locking latch to disengage it from the locking latch arresting location 50 can be easily facilitated using one hand simultaneously with gripping the carrying handle 80. As seen in Figs. 1A-2C, manipulating the finger engaging aperture 73, being part of locking latch 70, is disposed opposite to and at finger-reach distance from the carrying handle 80 when the handle is at its carrying position tilted upwards. This enables a grab, release and go detachment of the second utility module from the first utility module in a simple single-handed operation.

[00207] When it is required to detachably attach a second container over a first container, the former is placed over the later (Fig. 3A), placing the projecting portions 56 within the depressed locking location 32 (Fig. 3B) with the locking tongues 60 engaging below and being gradually arrested by the respective locking ribs 36 arresting is obtained (Fig. 3C) until complete arresting is obtained (Fig. 3D). Simultaneously, as the locking tongues 60 arrest by the locking ribs 36, the locking latch 70 of the second container slides into the locking latch arresting location (recess 50) and finally snaps into locking engagement therewith. It is noted (Figs 4A to 4D) that first (Figs. 4B and 4C) the locking latch 70 displaces upwards against the biasing effect of spring 71, and when the second container reaches the final locking position over the first container, the locking latch 70 plunges into arresting position within the recess 50.

[00208] At the locked position the second container is attached over the top face of the first container, such that they can be moved as an integrated unit. Detaching of a second container from a first container is easily facilitated by unlocking, obtained by displacing the locking latch 70 upwards against the biasing effect of spring 71, whereby the second container can be displaced with respect to the first container and detached therefrom.

[00209] As further seen in Figs. 1A-4D, each of the containers 22, 24, 26 and 28, is configured at a front face thereof with a tiltable carrying handle 80, for carrying a respective container or the entire container assembly 20. Also seen, some of the containers can be configured with fender-like protectors 90 at their corners.

[00210] Further attention is now directed to Figs. 5A to 5E demonstrating examples of modularity of a container assembly according to the disclosure. Fig. 5A is a planner top view of a first container 94 and Figs. 5B to 5E illustrate second containers superimposed over the first container 94. In Fig. 5B a second container 96 is substantially as big as the first container 94, i.e. having the same footprint. In Fig. 5C a second container 98 is as wide as the first container 94, however narrower in depth, and disposed at a front portion of the first container. In Fig. 5D two second containers 99A and 99B are mounted over the first container 94 and occupy substantially the entire footprint thereof, whereby each of containers 99A and 99B is independently attachable and detachable from the first container 94, as exemplified hereinabove. In Fig. 5E two second containers 100A and 100B are positioned over the first container 94, occupying the entire width though narrower in depth and extending from a front portion of the first container 94.

[00211] Turning now to Figs. 6A to 6K, there are illustrated several examples of container assemblies, subassemblies and their components. Fig. 6A illustrates a disassembled container assembly collectively designated 104 and comprising a base container 106, a chest of drawers module 108 comprising three drawers, a tool caddy module 110, a compartmented storage module 112 and a half-sized compartmented storage module 114 (typically two of which). It is noted that the base container is configured for locomoting and comprises at a rear thereof wheels 116 and a telescopic handle 118.

[00212] As can be appreciated from Figs. 6B through 6D, various container assemblies are illustrated, the arrangement is such that in practice any module can constitute either a first container or a second container, as defined hereinabove (though it is more likely that base container 106 serves as a first container).

[00213] Figs. 6E and 6F illustrate a chest of drawers module 108, illustrated separately in Fig. 6E and mounted over a similar drawer module 108 in Fig. 6F. It is appreciated that the drawers of each module can be locked at their closed position to prevent spontaneous opening thereof

whilst carrying a module. Furthermore, each module 108 is configured with a pair of carrying handles 115 disposed at top side wall portions thereof, to facilitate carrying of the module.

[00214] In Fig. 6G there is illustrated a subassembly comprising a first container in the form of a tool caddy module 110 and second container in the form of a compartmented storage module 112 attached thereto, whilst the lid 119 of the first container is open facilitating access to the contents thereof.

[00215] Further attention is now directed to Figs. 7A to 16B, showing a third aspect of the disclosure, namely a utility module being a mobile carrier unit and comprising at least one carrier engagement surface, compatible for interlocking engagement in a detachable manner with a first engagement surface of a second utility module. For sake of example only, the second utility module exemplified in the annexed drawings is in the form of a utility container. It is however appreciated that the utility modules can be of any type, shape or size, as discussed hereinabove and as will be exemplified below. Accordingly, the term container unit as used in the following description denotes any type of a utility module, as discussed herein the specification.

[00216] Attention is first directed to Fig. 7A, illustrating a container carrier assembly generally designated 200 comprising a container unit 202 (utility module) mounted on top of a carrier unit 206. The carrier unit 206 is equipped with a telescopic manipulating handle 210, a pair of rear wheels 208 and a set of horizontally stabilizing support legs 212 at a front portion of the carrier unit 206. The carrier unit 206 and the container unit 202 are engaged in an interlocking engagement via their engagement surfaces, i.e. a carrier engagement surface 216 at a top face of the a carrier unit 206 (best seen in Fig. 8A), and the container unit's first engagement surface 220 (namely its bottom face; best seen in Figs. 8B and 8C). The container unit 202 is configured with yet a second engagement surface 226 (namely the container's top face), simulating the carrier engagement surface 216. The container unit 202 further comprises a locking mechanism 230 configured for arresting within a respective notch 231 at the carrier engagement surface 216, to thereby to prevent displacement and separation of the engagement surfaces 216 and 220 once they are interlocked, as later will be explained.

[00217] The carrier engagement surface 216 seen in greater detail in Fig. 8A, illustrates a top perspective view of a carrier unit 206 with the telescopic handle 210 in a retracted position. The

carrier engagement surface 216 comprises multiple carrier engaging elements 236, depressed from the surface, and designated for interlockingly receiving respective container unit's first engaging elements 240, projecting from the first engagement surface (bottom face) 220 of the container unit 202.

[00218] Each carrier engaging element 236, is a so-called female coupler and has a depressed locking location configured with at least one locking rib extending above a depressed surface and along a sliding path and having an open edge facing in a first sense. As seen in the drawings, it is generally constituted by a receiving recessed depression 244 in the carrier engagement surface 216, configured with a pair of facing locking ribs 248, forming the aforementioned recess. The locking ribs 248 extend substantially parallel to sliding path of the container unit 202 with respect to the carrier unit 206, said path (designated Pin Figs. 7A and 10B). Further noted, side walls 250 of depressions 244 are sloped in order to allow directing of a container unit's first engaging element 240, mounted upon it, to its interlocking position.

[00219] A corresponding coupler configured at the container unit is a so-called male coupler comprising a projecting locking location disposed in register with said depressed locking location and configured with at least one locking tongue extending along said engaging sliding path at a second sense, opposite to said first sense, and configured for arresting engagement at a space between said locking rib and depressed surface. As seen, a single container unit's engaging element 240 is generally constituted a downwardly projecting outwards protrusion 258, projecting from the bottom face 220 of the container 202.

[00220] In order to lock the container 202 over the carrier unit 206, upon placing the container 202 over the carrier engagement surface 216 of carrier unit 206 one must mount the container unit's first engaging elements 240 into the depressions 244 and then slide the container 202 along the sliding path P (i.e. towards the locking ribs 248) so that the engaging elements 240 engage below said projecting ribs/shoulders 248 and the engaging elements 240 are thus arrested at a space between said locking ribs and the depressed surface, as seen in Fig. 9C. Interlocking engagement of the container (or any other utility module) can be facilitated by a single male-female locking mechanism of the aforementioned type, or by a plurality of such locking mechanism, at any location over the carrier unit 206.

[00221] The shape and size of the locking members is modular as far as the depression 244 in the carrier engagement surface 216, can be single or double in size (e.g. 236 and 236A in Fig. 8A, respectively), so it is large enough to accommodate two container unit's first engaging elements 240, or two neighboring container unit's first engaging elements.

[00222] Locking/engaging and detaching of this configuration is similar to a single locking module.

[00223] The engagement and locking mechanism is modular in the sense that any first article can be easily and readily articulated to a surface of any second article, wherein the articulation is strong and firm (i.e. substantially motionless).

[00224] With further reference to Fig. 7B, there are illustrated two containers 202A and 202B articulated over one another, the arrangement being such that the bottom face of the intermediate container 202A serves for engaging with the top face of the carrier unit 206 and likewise, the top face of the intermediate container 202A serves for engaging with the bottom face of the top container 202B, as discussed herein above. The arrangement is such that each stage is lockingly secured by the locking mechanism 230, wherein each stage can be detached from the stage below upon releasing locking engagement of the respective locking mechanism 230.

[00225] The locking mechanism 230 is shown in further detail in Figs. 10A and 10B. The locking mechanism comprises a locking pin 231 normally biased by spring 233 such that a tip 235 projects from a bottom surface of the container 202 (see also Fig. 8B) and is configured for snap arresting within a respective notch 231 configured at the engagement surface 216 of the carrier unit 206 (seen also in Fig. 8A). The locking pin 231 is slidable within a race at the side wall of the container, and comprises a finger manipulating portion at 237 (accessible through an opening at the side wall of the container), for displacing the locking pin, against the biasing effect of spring 233, into its disengaged position, thus facilitating sliding the container along the path P into disengagement from the carrier unit (or respective other container or utility module). The carrier unit 206 is further configured at a bottom end, with a pair of stability supports 264 (Figs. 8A, 1lB), configured for supporting the carrier unit, with or without a container attached thereto, at an upright, i.e. vertical position, thus preventing it from tipping over, in particular with containers or any other utility module articulated thereto. Stability supports 264 can be,

according to a particular configuration, an extension of the telescopic handle 210, whereby the stability supports are functional as such only when the handle is fully contracted. However, in the illustration of Figs. 16A-16B the utility assembly 253 is maintained at its upright position owing to said stability supports 264 and further bearing over a side face 266 of the intermediate container 202A, being substantially flush with a bottom face of the stability supports 264.

[00226] With further reference to Figs. 12A to 12C there is illustrated a modification of articulation between a first utility module (container 300 in the particular example) and a second utility module (two work-piece supports 304 in the particular example). The container 300 is substantially similar to that illustrated in the previous examples, wherein the cover/lid 308 is configured with a plurality of female coupler members 310, each configured with a depressed locking location and a pair of locking ribs extending above the depressed surface and along a sliding path. The opposing locking ribs 312A and 312B have an open edge facing in a first sense (the introducing direction).

[00227] In the examples hereinbefore, engagement with a corresponding male coupler took place within the vicinity of a single coupling element, i.e. over two engaging ribs 312A and 312B of a single depressed locking location facing each other. However, in the example of Figs. 12A-12C engagement of the work-piece supports 304 takes place over two engaging ribs 312A and 312B of two neighboring depressed locking locations 308A and 308B. Accordingly, the male coupler of the two work-piece supports 304 is configured for arresting with the two engaging ribs 312A and 312B by two individual (separate) male couplers 316A and 316B, each configured for arresting one of the respective engaging ribs 312A and 312B. Arresting of the male projections 316 takes place as discussed before, by arresting below the respective engaging ribs, within the space at the depressed locking location. In spite of the relative narrow body structure of the work-piece supports 304, they are each configured with a locking mechanism 330, similar to locking mechanism 230 discussed hereinbefore.

[00228] Turning now to Figs. 13A-13D, 14A-14C, 15A-15B, 16A-16B, 17, 18A-18C, and 19-24, there are illustrated various examples of utility modules, utility assemblies and various configurations according to the disclosure.

[00229] Fig. 13A illustrates a utility module assembly generally designated 400, comprising a wheeled base container 402 supporting an intermediate container 404, bearing in turn a cooler box 406 and a power unit 408 disposed side by side over the intermediate container. At least the intermediate container 404 is configured at a bottom face thereof with a male-type coupling arrangement, for attachment over the cover of the base container, said cover configured with a respective female coupling arrangement. The cover of the intermediate container 404 is configured with a similar female coupling arrangement, and can thus engage with one the utility modules 406 and 408, each configured at its bottom face with a respective male-type coupling arrangement.

[00230] It is seen in Figs. 13B through 13D that the intermediate container 404 is fitted with a pivotal carrying handle 418 articulated at the top side walls thereof. The carrying handle has a thickness t and the arrangement is such that at the stowed/folded position (Figs. 13B, 13D) the handle 418 is received within a peripheral groove 422 extending over a top edge of the intermediate container 404 and a peripheral groove 424 extending at a bottom edge of the utility modules 408 and 406 (cooler box 406 and a power unit 408), such that the handle 418 does not constitute an obstacle in mounting and interlocking a utility module over another utility module. It is also seen that at least some of the utility modules are configured with side handles 428 serving both as carrying handles and as bumpers.

[00231] Figs. 14A to 14C illustrate a first utility module in the form of a container 430 supporting two detachable workpiece-piece supports 432 (attached as discussed herein before with reference to Figs. 12A-12C). Fig. 14C illustrates a utility module in the form of a work surface 436 configured with a vice race 438, so that a vice 440, or other workshop tools can be used. The workpiece-piece supports 432 are configured with a male type coupling having projecting locking locations 444 for engaging with respective female couplers.

[00232] In Figs. 15A and 15B there is illustrated a back-rack 450 being a substantially rigid platform having a carrying handle 451 and configured at one side thereof with a pair of adjustable shoulder harnesses 452, and an adjustable waist harness 454. The other side of the back-rack is configured as a universal utility mounting platform 458, configured with a plurality of attachment locations 460. In the illustrated example all attachment locations 460 are so-called female attachments (as discussed hereinabove in detail), however it is appreciated that the

attachment locations can just as well be male-type attachments, or a combination of male and female attachments. According to yet an example (not shown), one side of the carrying platform can be configured with male- type attachments, and an opposite side of the platform be configured with female-type attachments, wherein a used has the choice of attaching the platform to the harness system at an orientation of choice.

[00233] In Fig. 16A there is illustrated a utility module in the form of a wheeled carrying unit 464 (shown from a bottom side), similar to that disclosed in connection with Figs. 7A to 11B. The carrying unit 464 comprises a rigid platform 466 fitted at a top face thereof with a female/male attaching arrangement in accordance with the disclosure, such that any utility module according to the disclosure can be detachably attached thereto. Also provided is a telescopic manipulating handle 468 and a pair of wheels 466. The carrying unit can be fitted with a collapsible support plate configuring it into a pushcart (not shown).

[00234] Fig. 16B shows a utility assembly 276 comprising a wheeled base container 278 interlocked with a first intermediate container 280 mounted thereover (constituting a second stage of the assembly), and a second intermediate container 282 mounted thereover (constituting a third stage of the assembly 276), there being yet a fourth stage utility module container 284 mounted over the second intermediate container 282.

[00235] Whilst the second intermediate container 282 has a wider footprint than the first intermediate container 280, this does not constitute any difficulty as far as attaching it over the second intermediate container 282, and further, the top face of the second intermediate container 282 has a great surface suited for articulation thereof of several fourth stage utility modules (only one shown).

[00236] Fig. 17 shows a carrying bag 281 having soft side walls 283 (in the example illustrated made of fabric), however fitted with (integrally or detachable) an articulation platform base 284, said articulation platform made of a firm rigid material and is configured with four male-type coupling locations 288 of the type disclosed hereinabove. The carrying bag 281 has a carrying strap 290 useful for hand held or shoulder carrying of the bag.

[00237] Figure 18A shows a rigid coupling platform 300, configured with a plurality of female coupling locations (of the type disclosed herein) and further configured with bolt eyes 298 for securing to any desired surface, and carrying bars 313.

[00238] The coupling platform 300 can be attached for example to a truck bed 306 (Fig. 20), directly over the truck bed or over a cargo container attached to the truck. The coupling platform 300 can be attached to a wall, as in Fig. 18B, wherein a plurality of various utility modules can be articulated thereto. For example, utility modules can be an electric charger 315 of a power tool, a wall mounted sorting container 314, a hand tool rack 318 (Fig. 18C), a tool coupling adaptor 320 (Fig. 18C), etc.

[00239] In Fig. 19 there is illustrated a belt-mount 319 configured as a female coupler according to the disclosure, wherein a tool 321 or a bag/pouch configured with a male coupler can be detachably attached thereto.

[00240] In Fig. 21 there is illustrated a wall rack 326 comprising four utility modules in the form of articulation platforms 328 (mountable at different elevations about the wall supports

[00241] 327) each configured for bearing and attaching thereto any utility module in accordance with the disclosure.

[00242] In Fig. 22 there is illustrated a mobile work stand 340 comprising a wheeled base 342 supporting two racks 344 with four utility modules in the form of articulation platforms 346 (mountable at different elevations about the wall supports 327) each configured for bearing and attaching thereto any utility module (e.g. containers 348) in accordance with the disclosure.

[00243] In Fig. 23 the utility module is in the form of a dolly 352 configured with wheels 354 and having a top surface configured with an array of female type couplings, as discussed.

[00244] In Fig. 24 there is illustrated a utility coupling platform 358 suited for articulation to any desired article (e.g. a bag, a tool, etc.). The utility coupling platform is configured at least at one face thereof with a male coupling locations 360 mimicking the coupling arrangement of the disclosure, rendering it suitable for articulation with a coupling system according to the disclosure.

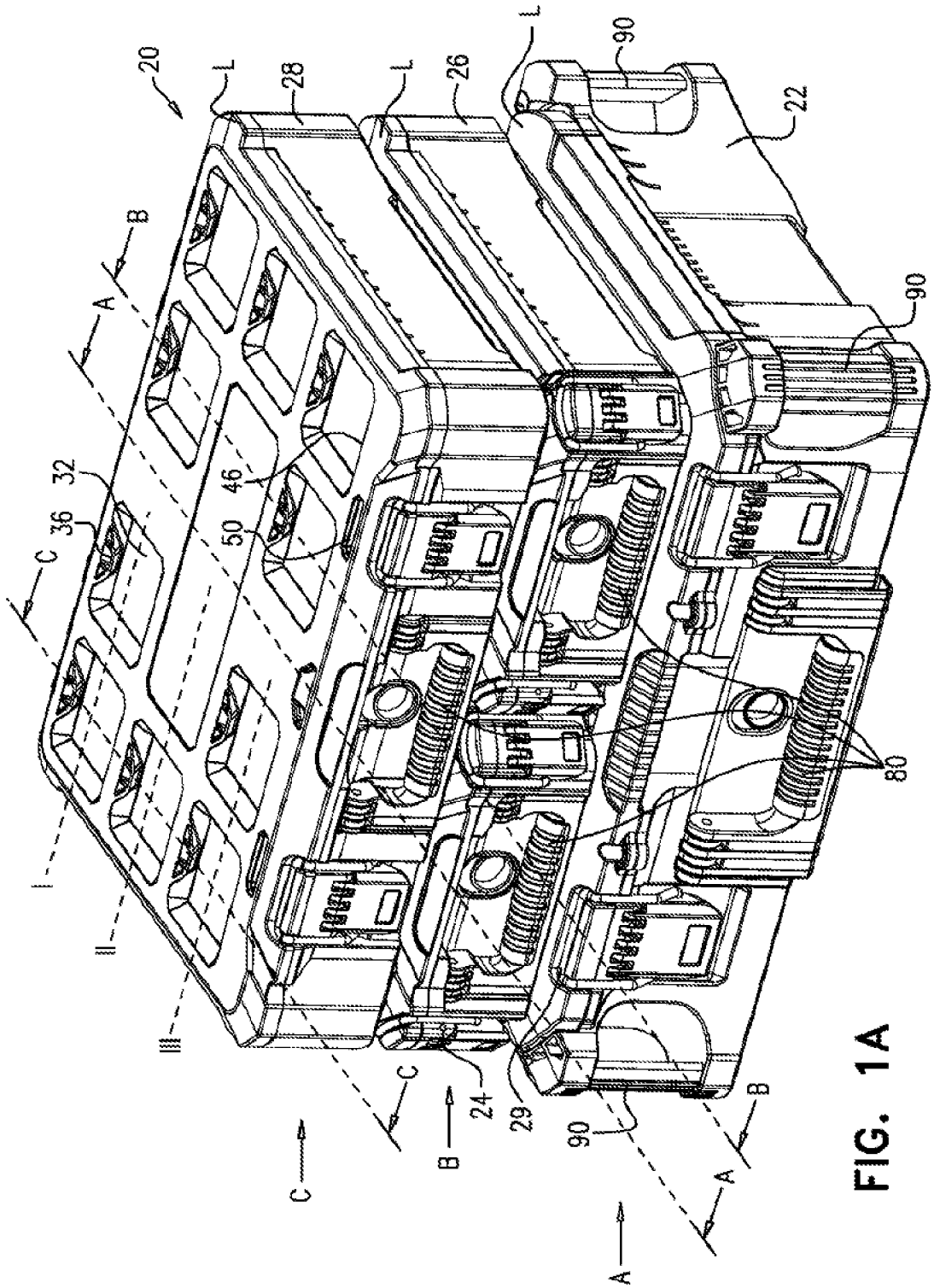


FIG. 1A

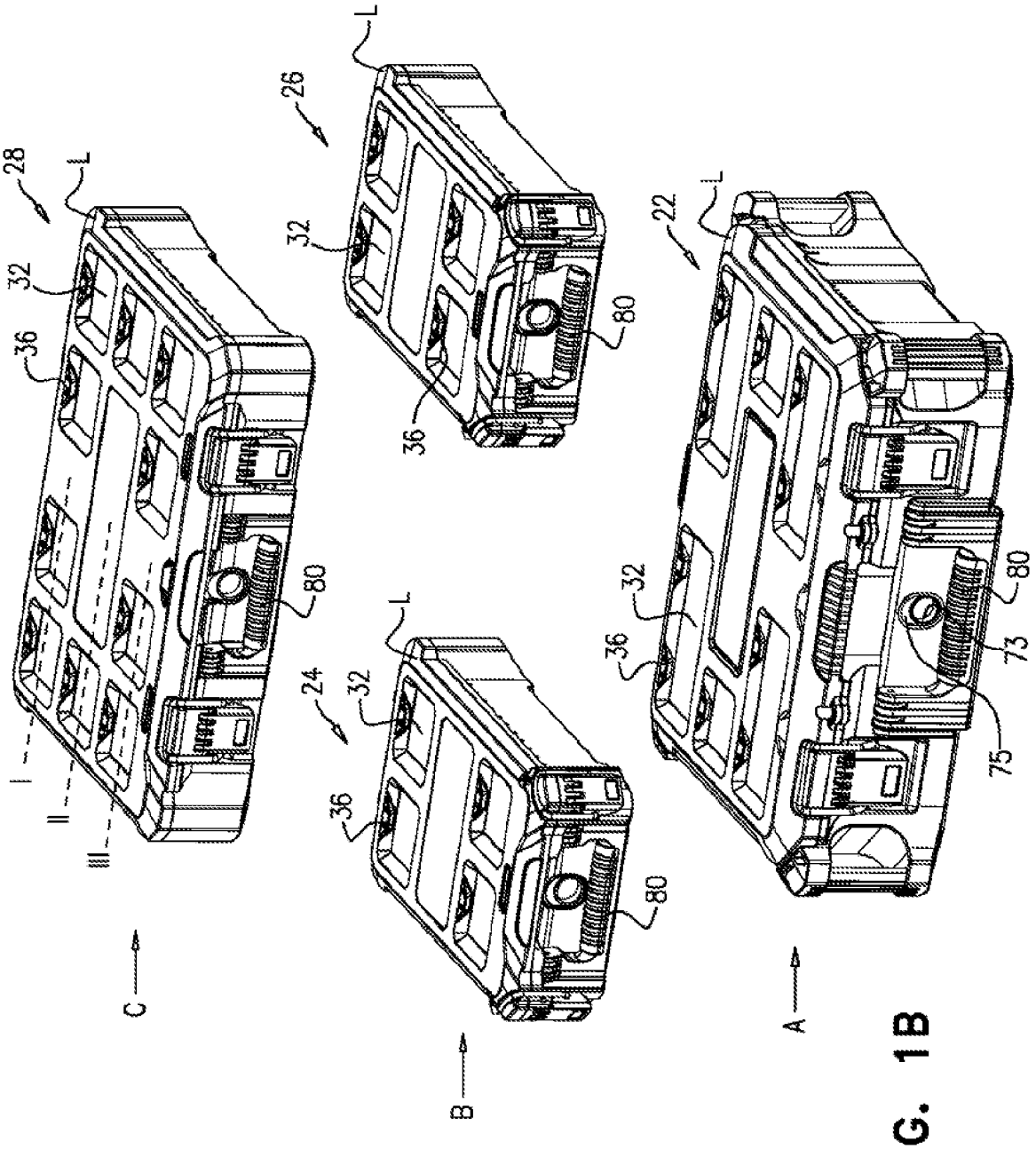


FIG. 1B

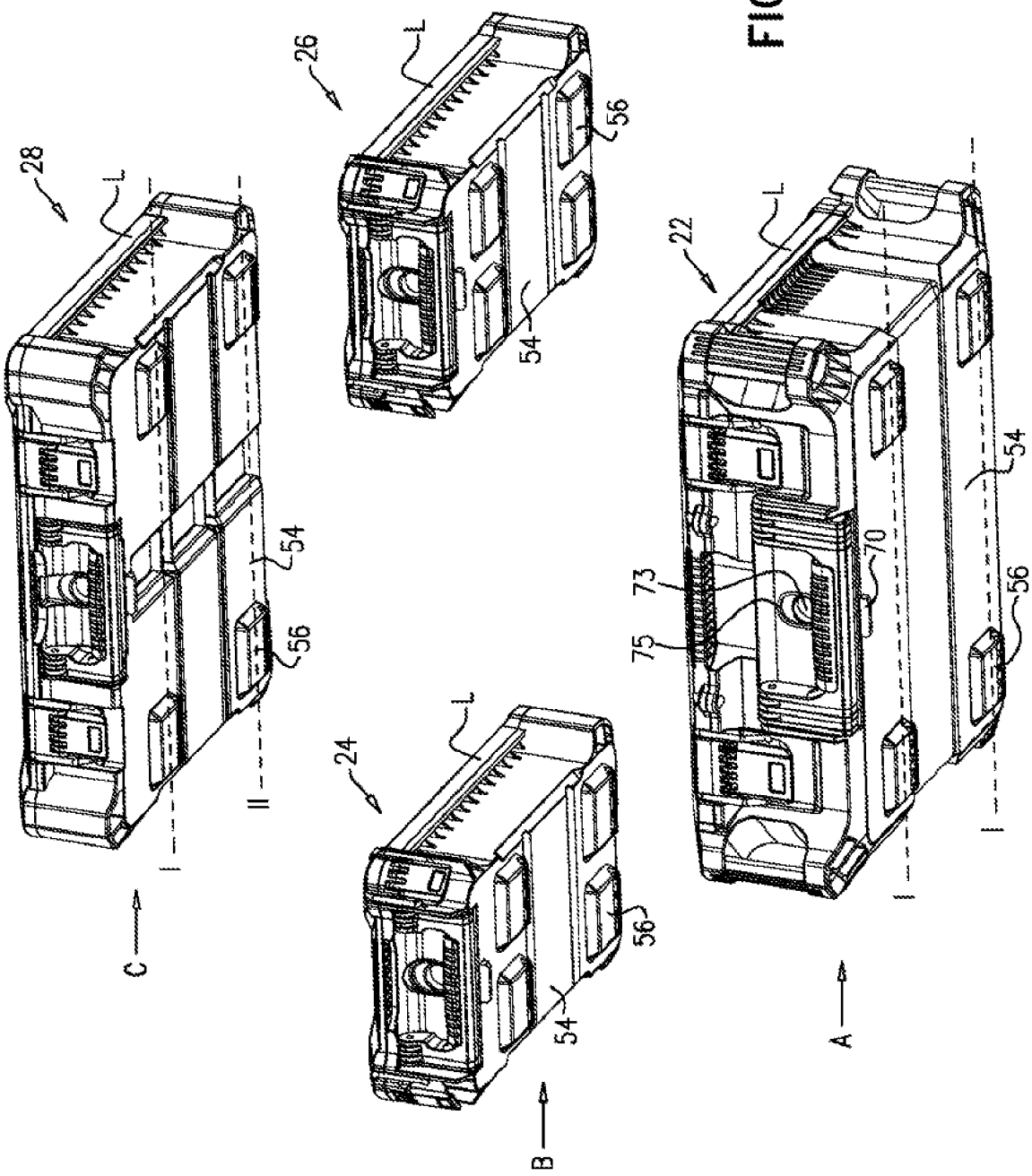


FIG. 1C

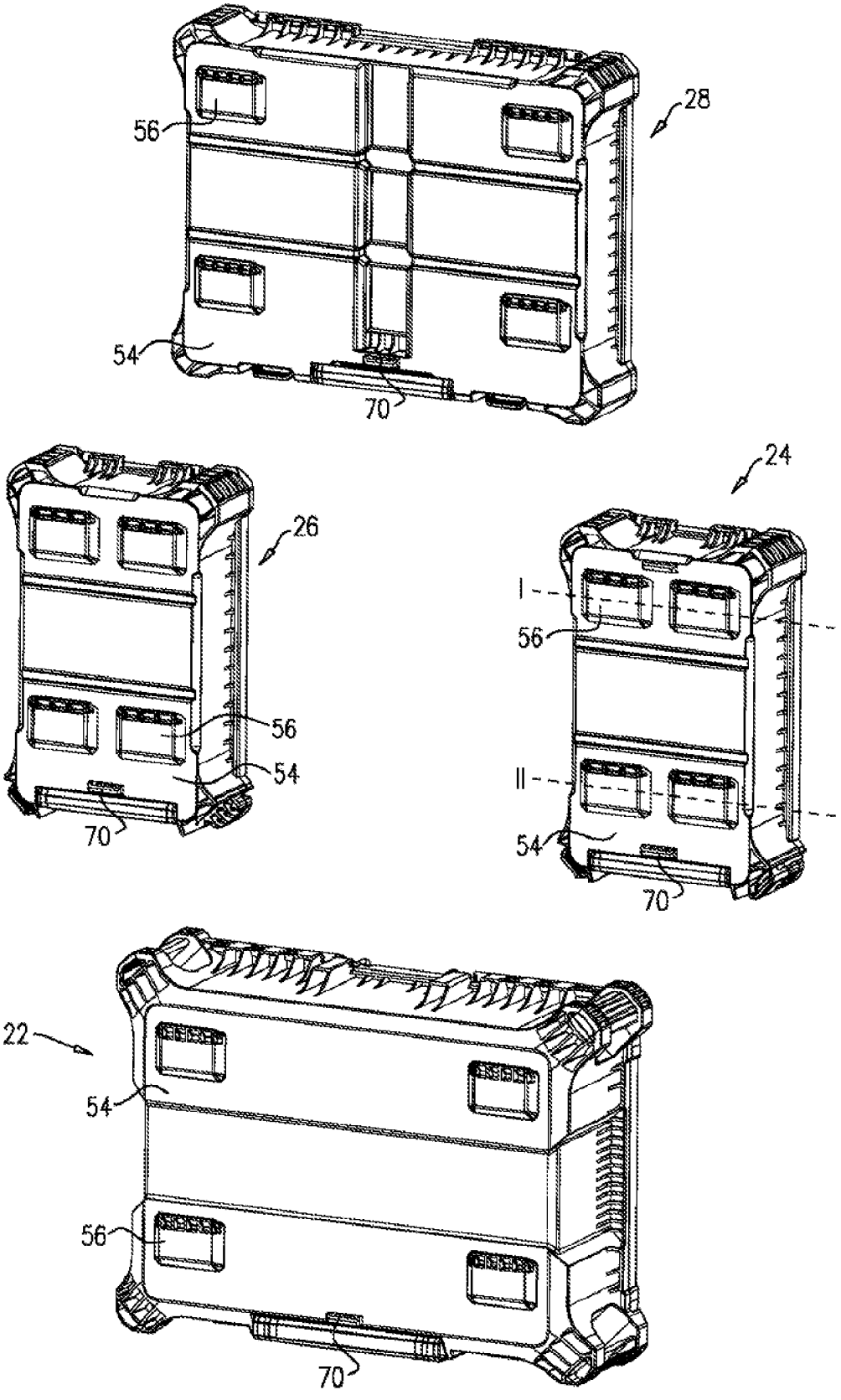


FIG. 1D

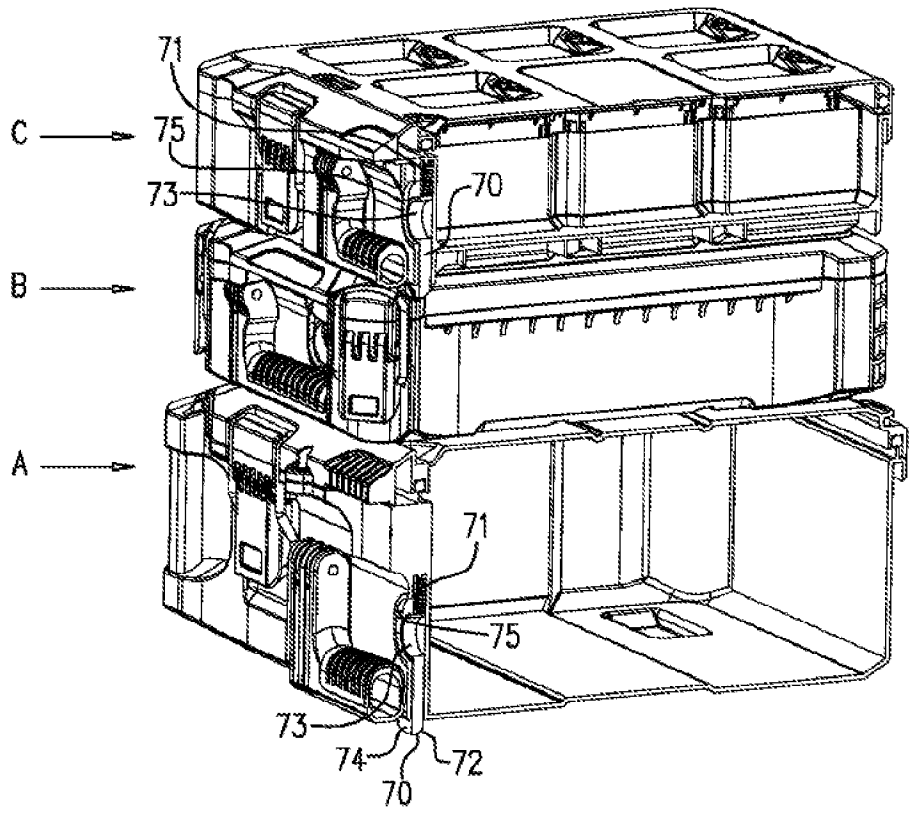


FIG. 2A

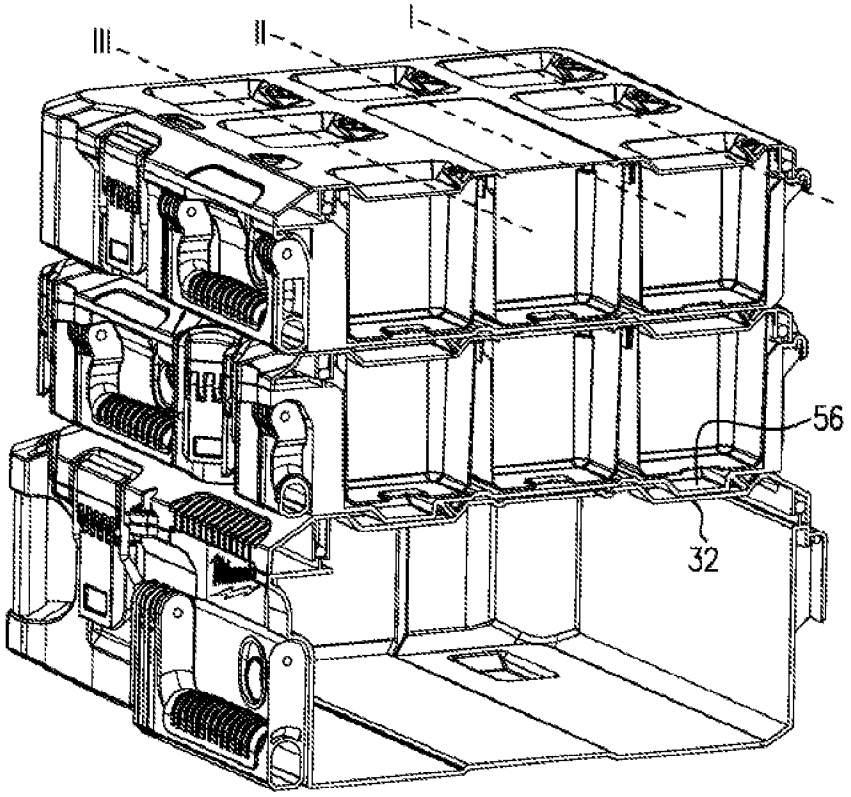


FIG. 2B

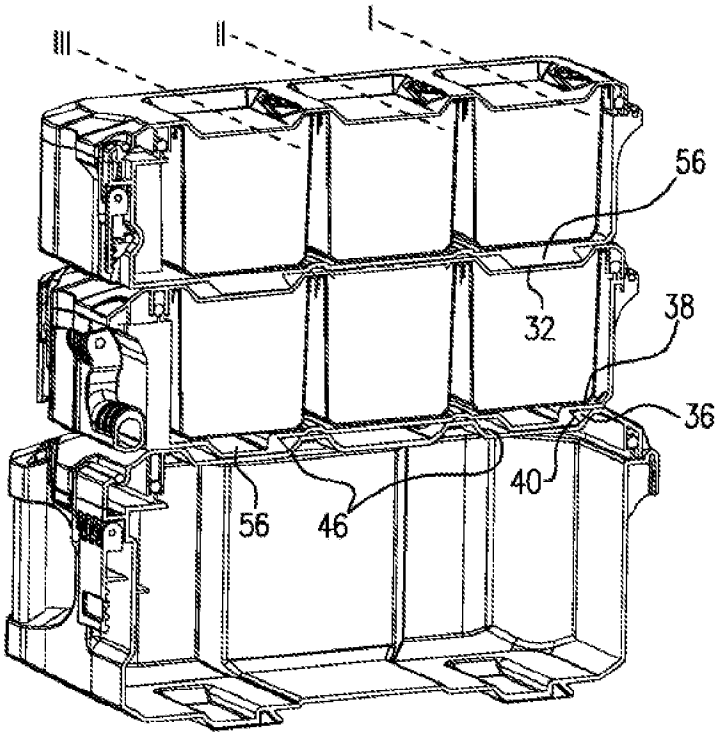


FIG. 2C

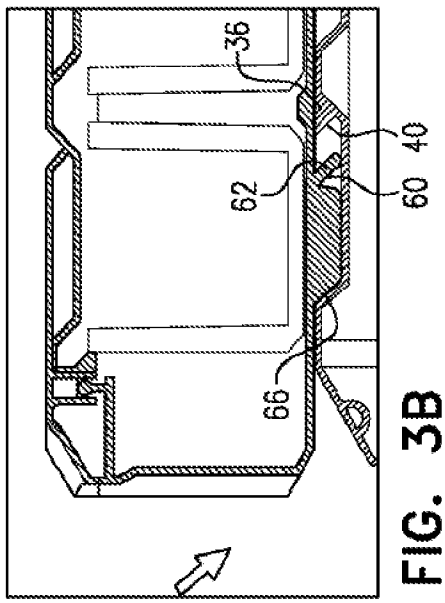


FIG. 3B

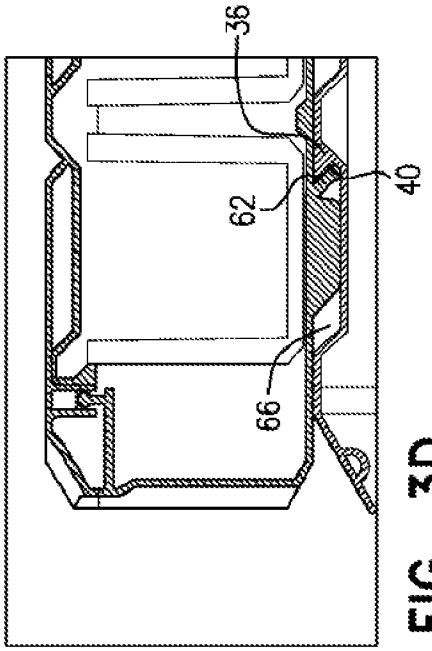


FIG. 3D

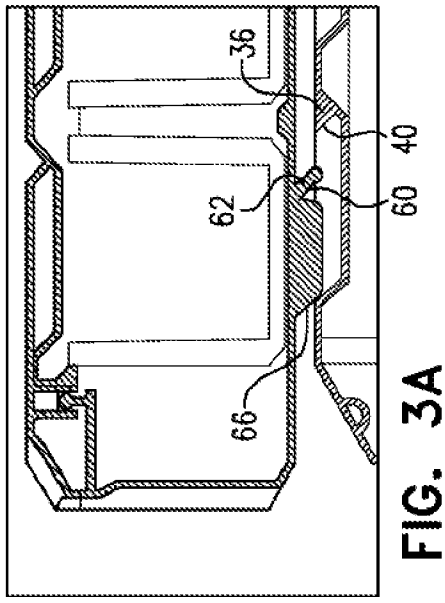


FIG. 3A

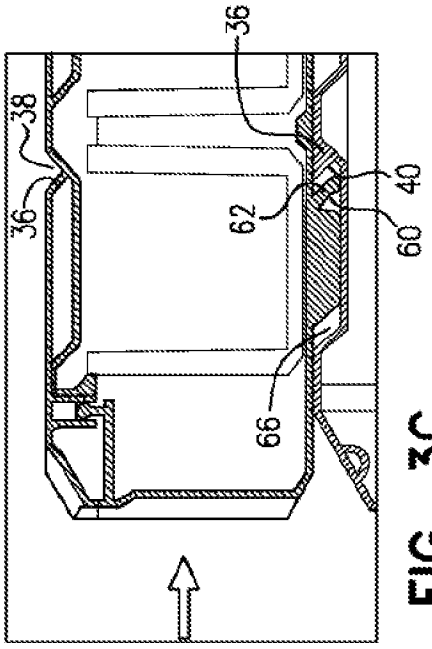


FIG. 3C

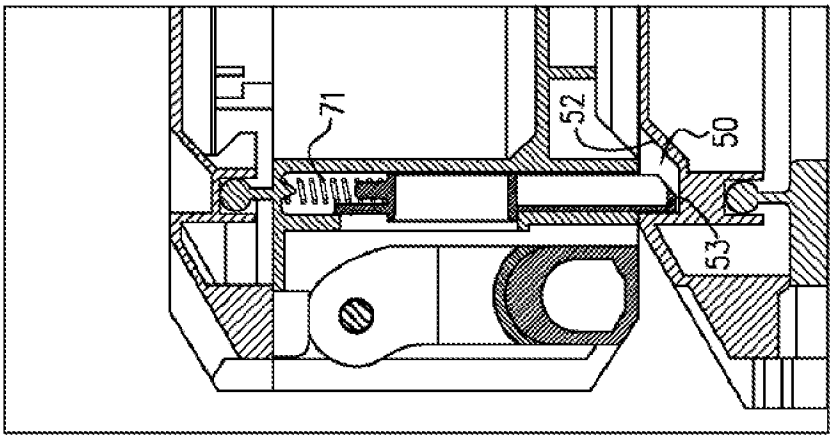


FIG. 4D

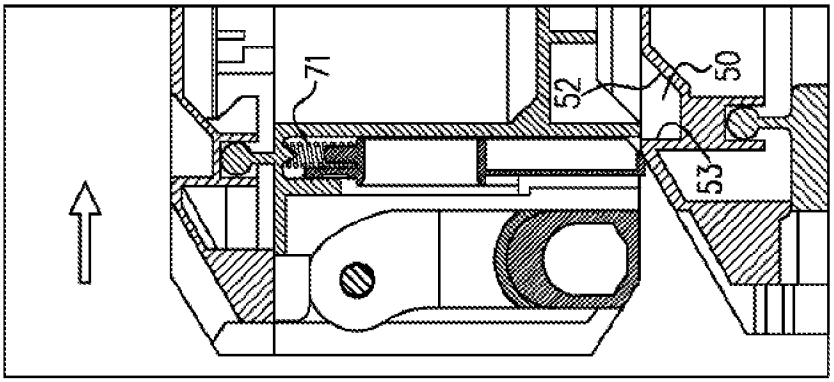


FIG. 4C

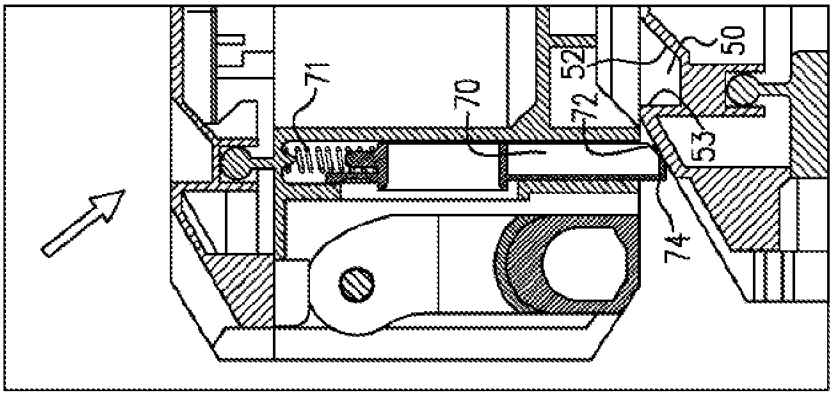


FIG. 4B

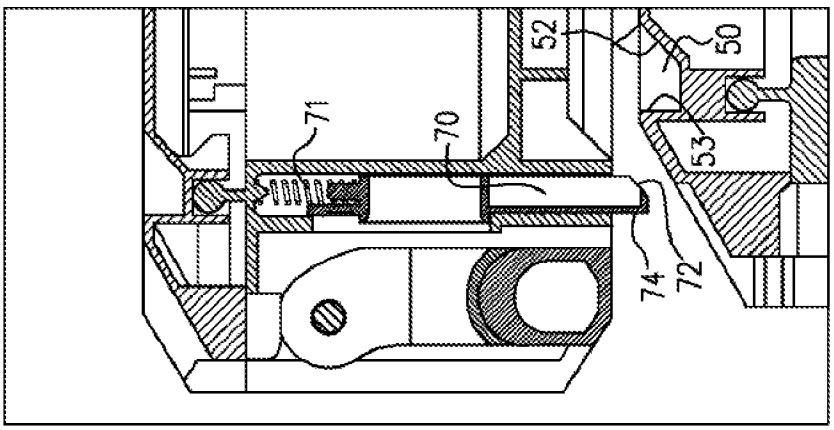


FIG. 4A

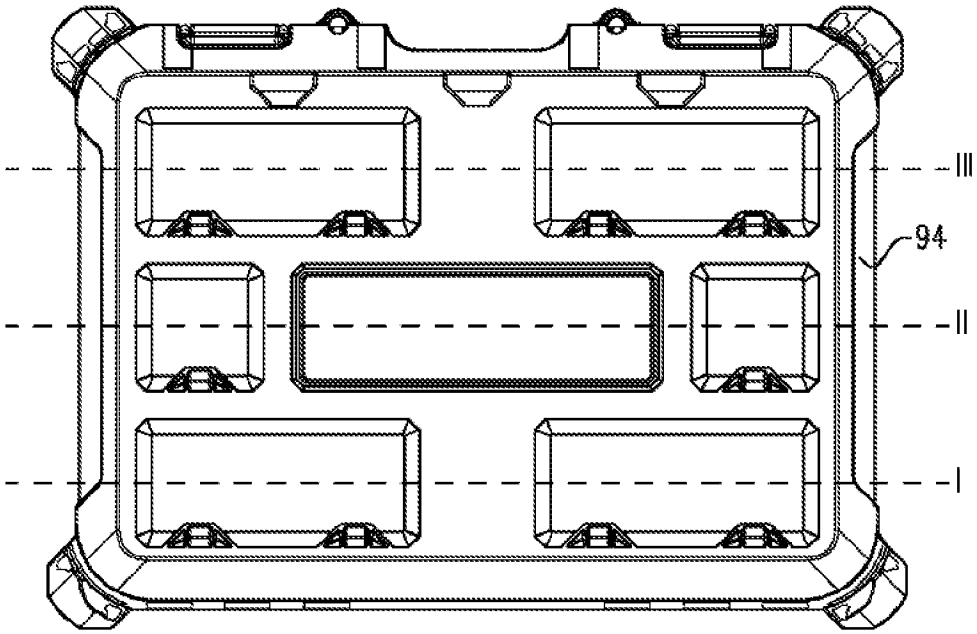


FIG. 5A

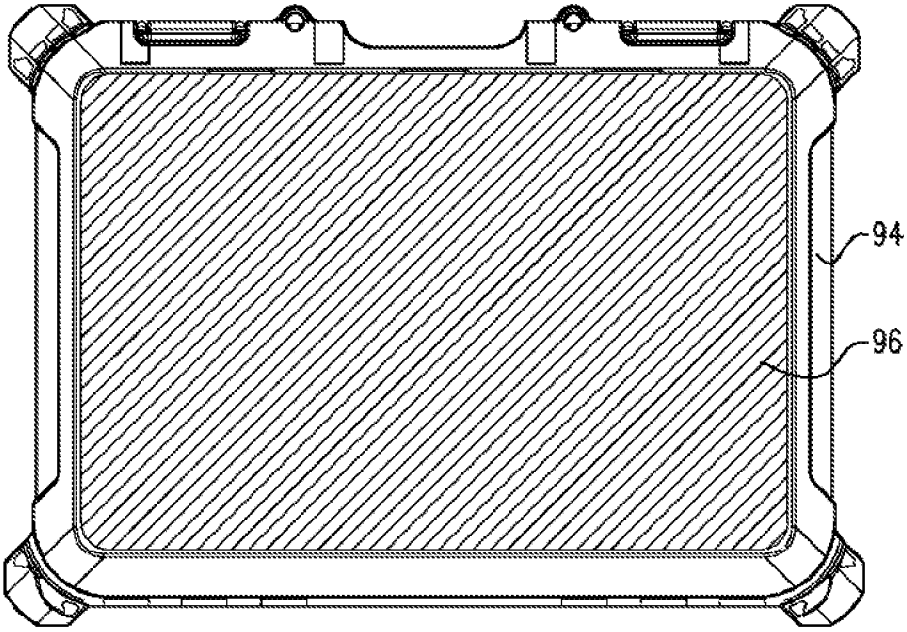


FIG. 5B

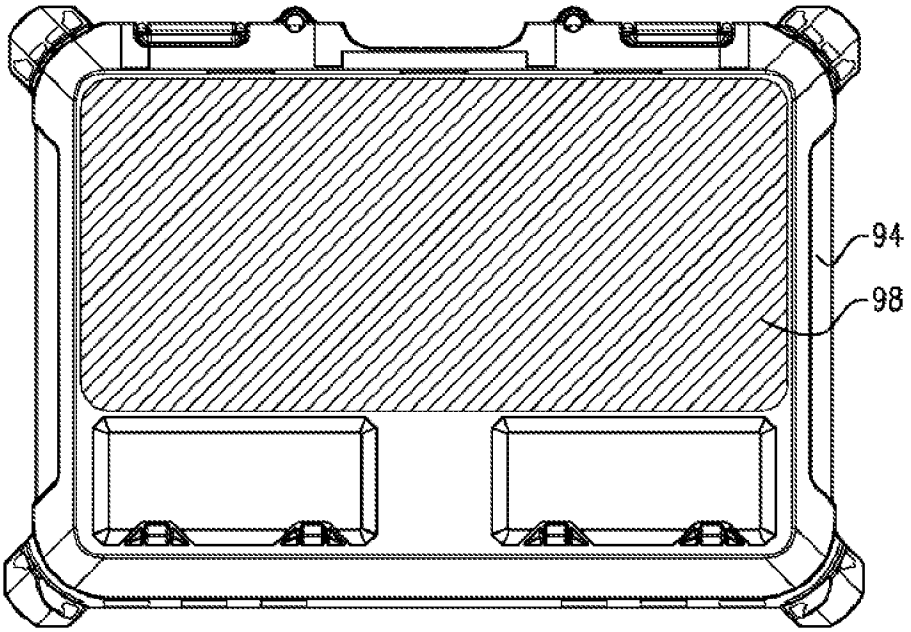


FIG. 5C

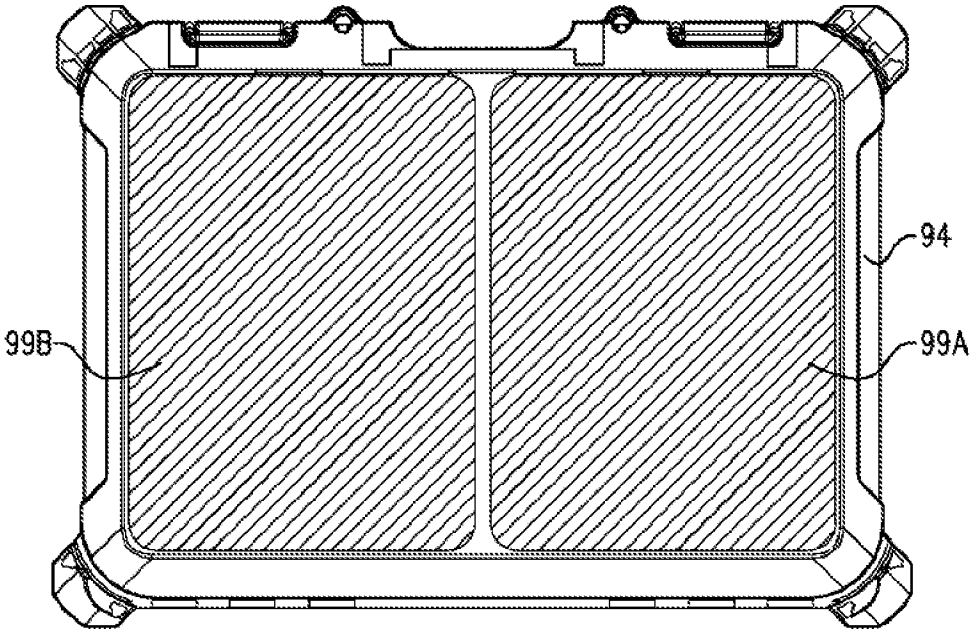


FIG. 5D

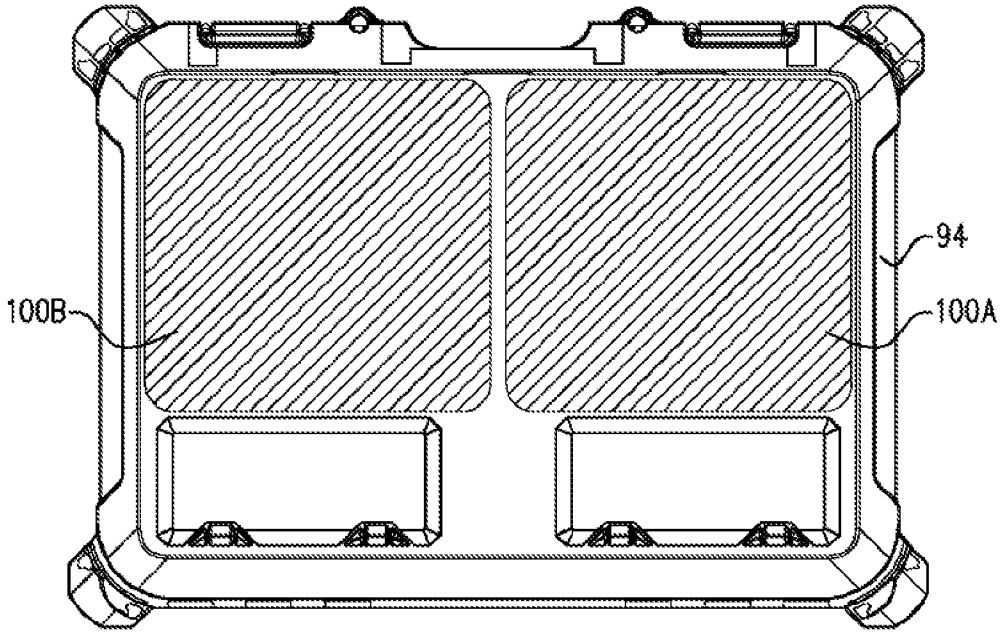


FIG. 5E

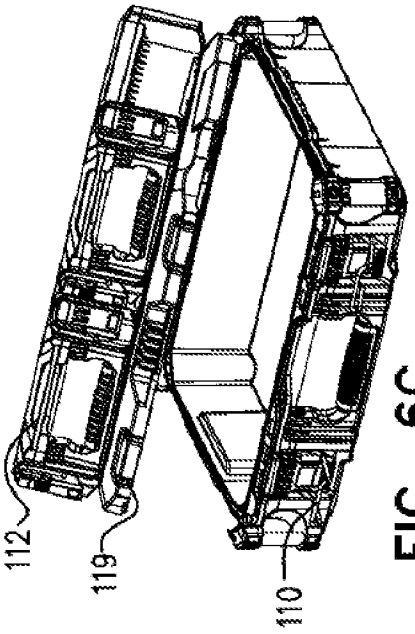


FIG. 6G

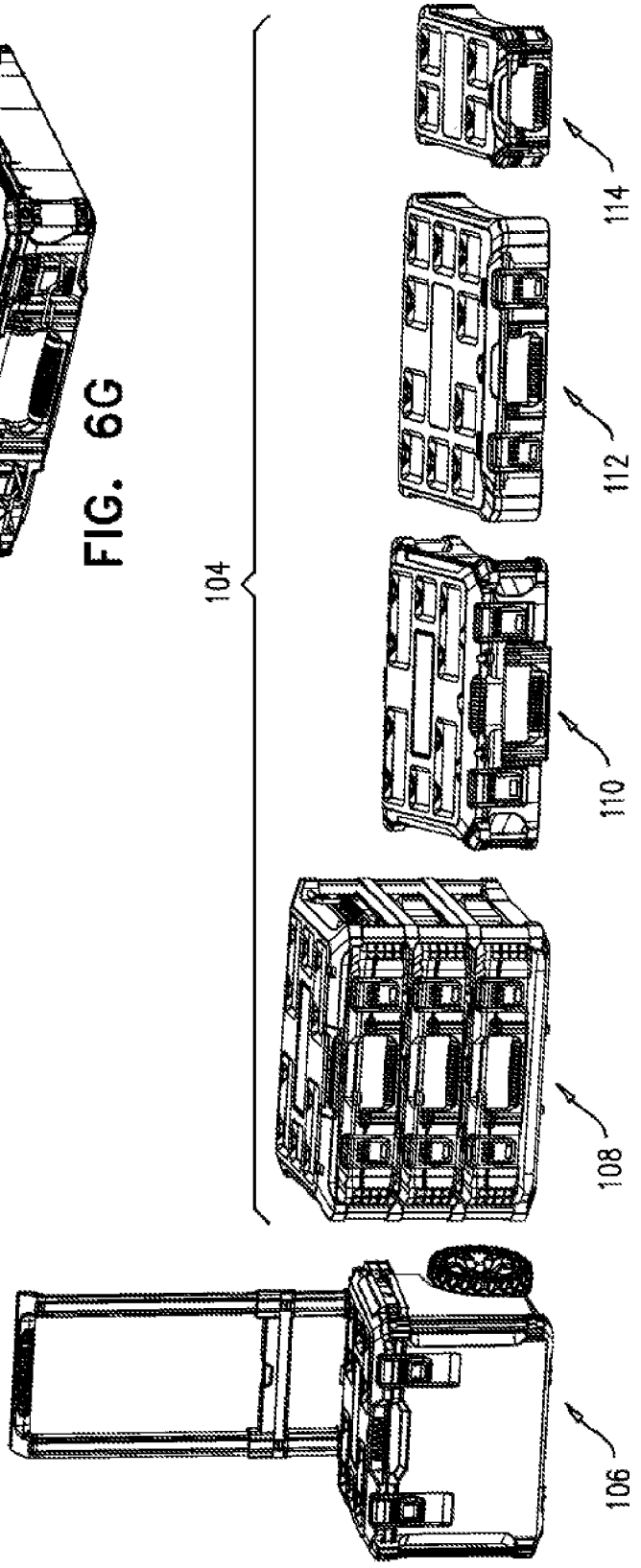


FIG. 6A

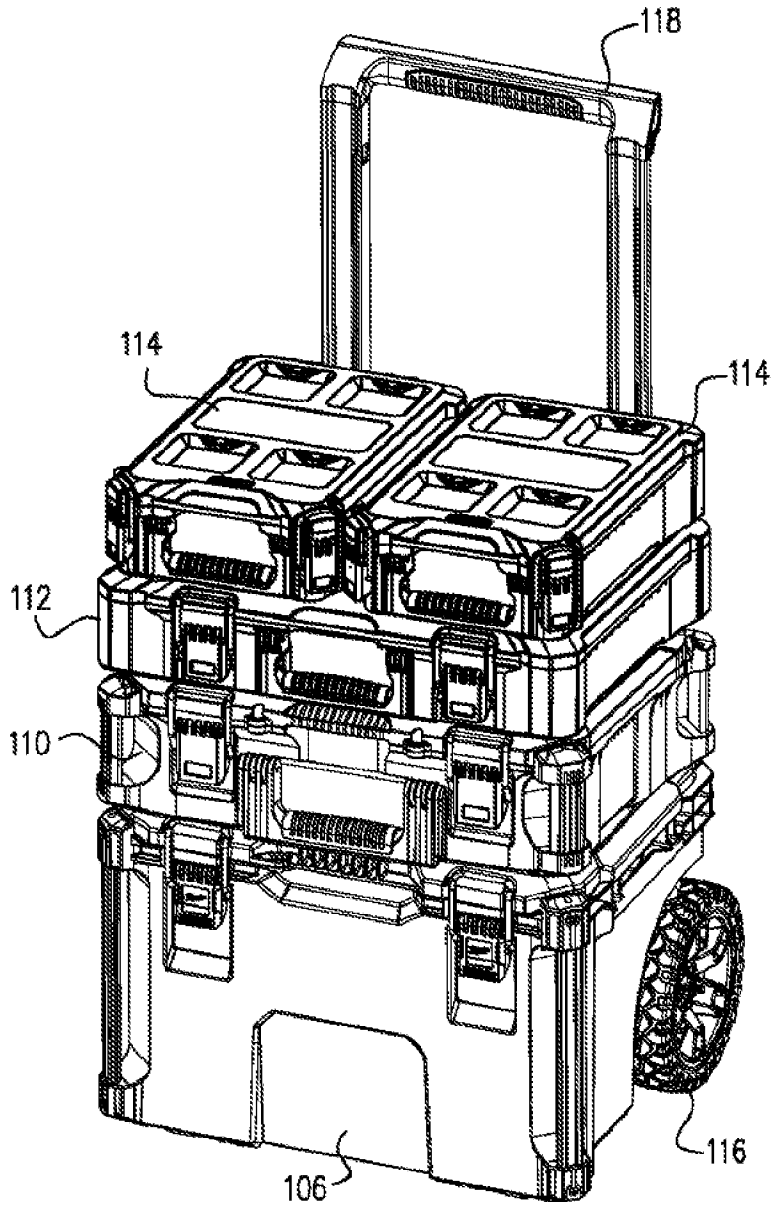


FIG. 6B

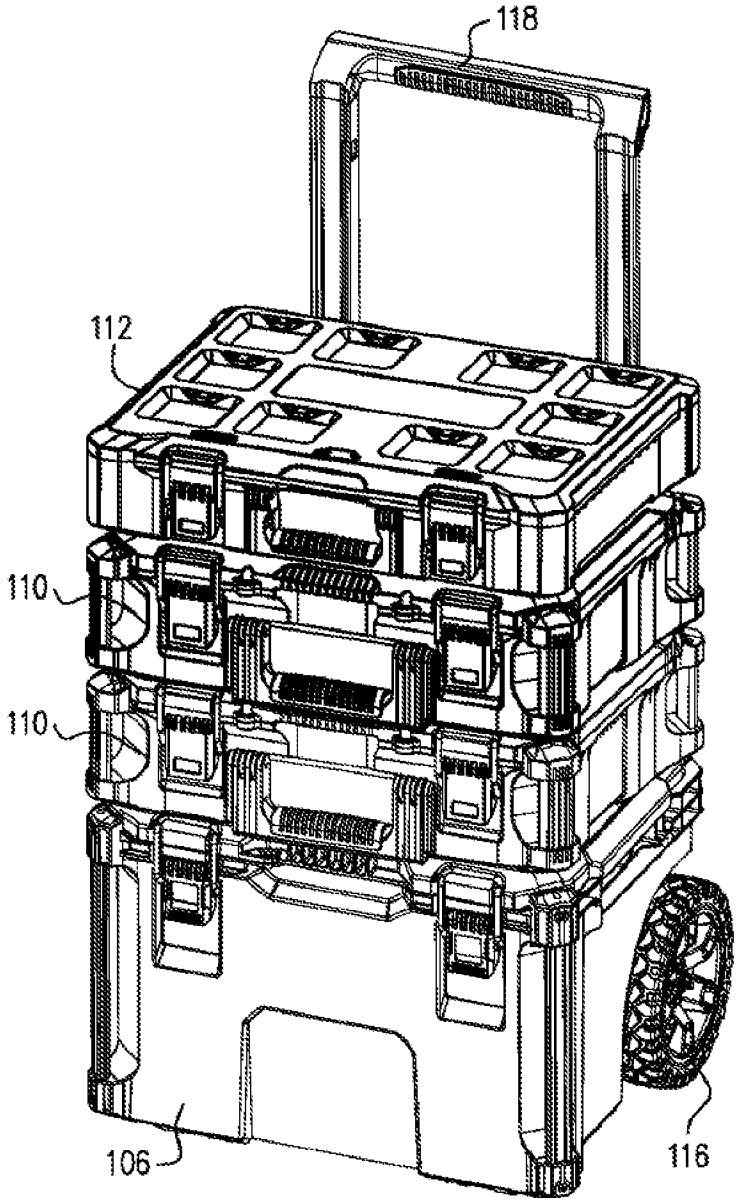


FIG. 6C

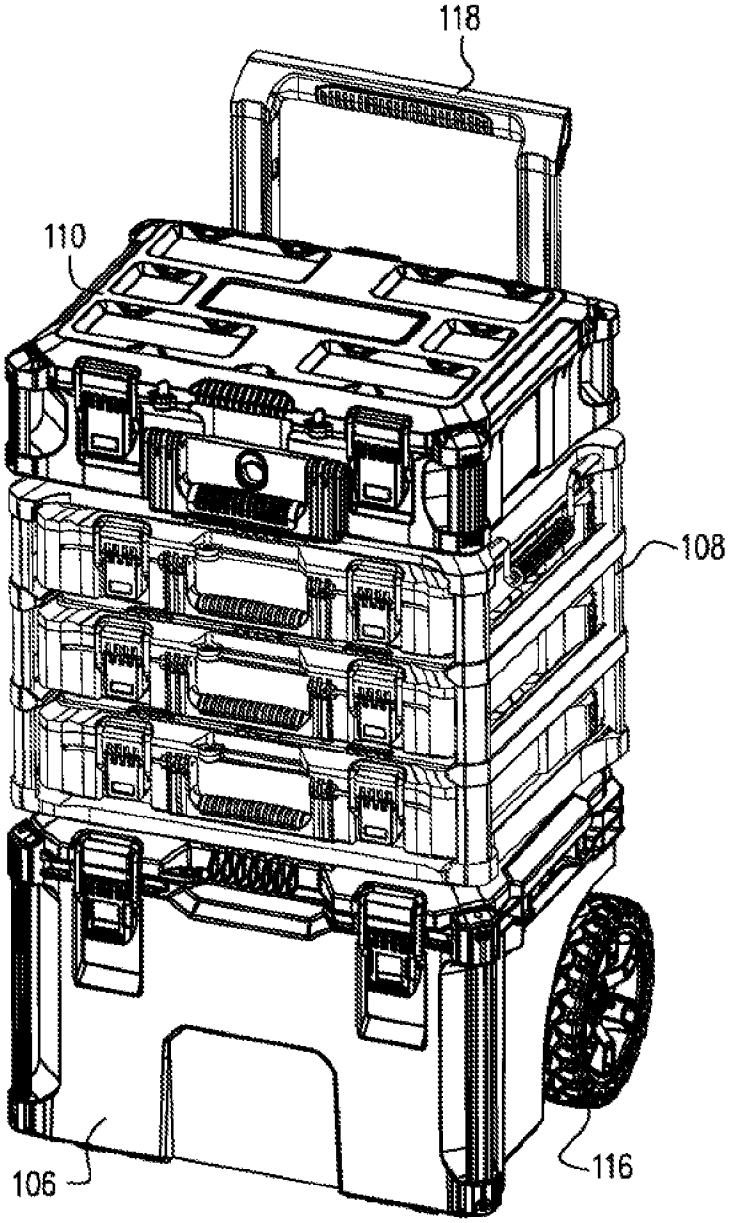


FIG. 6D

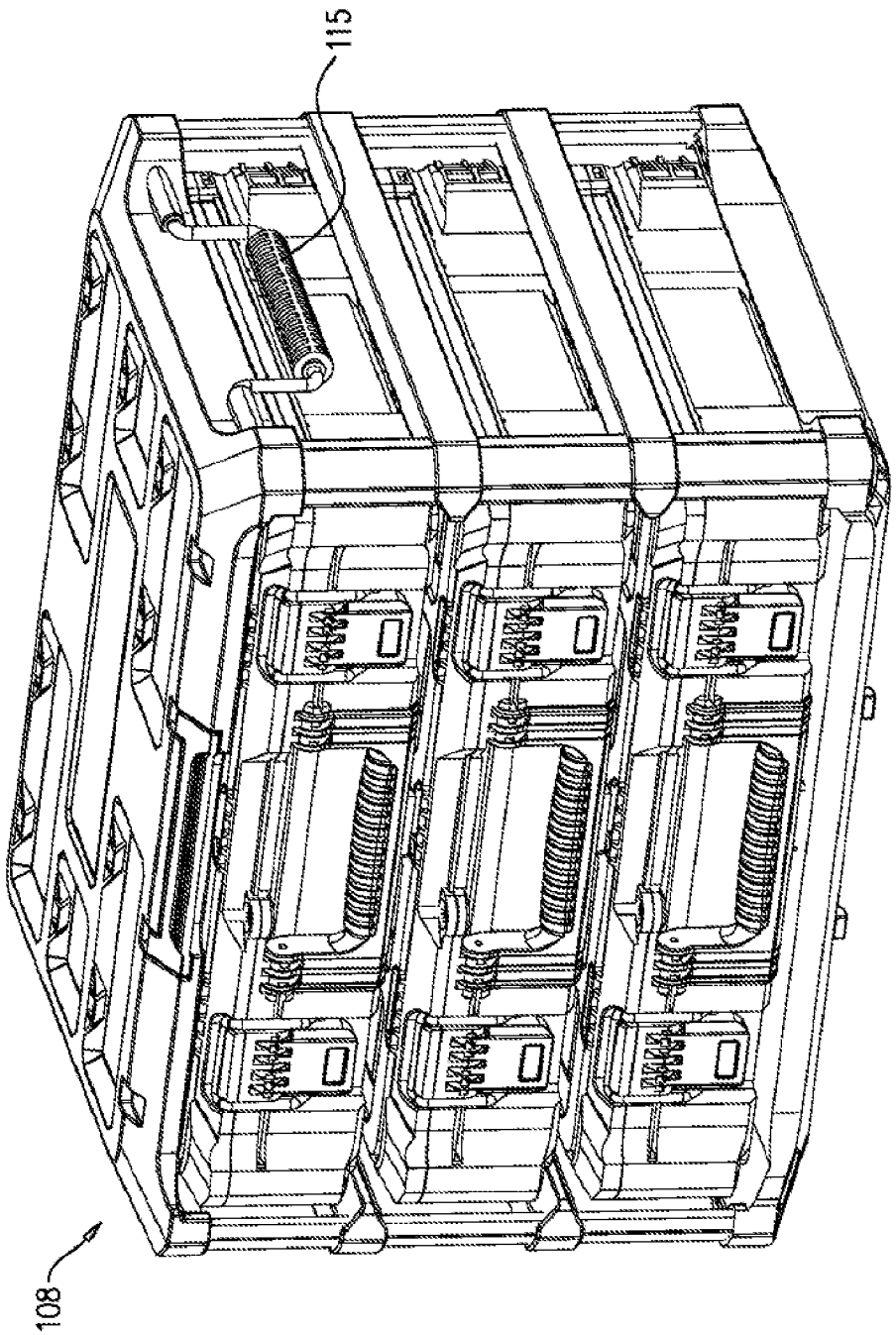


FIG. 6E

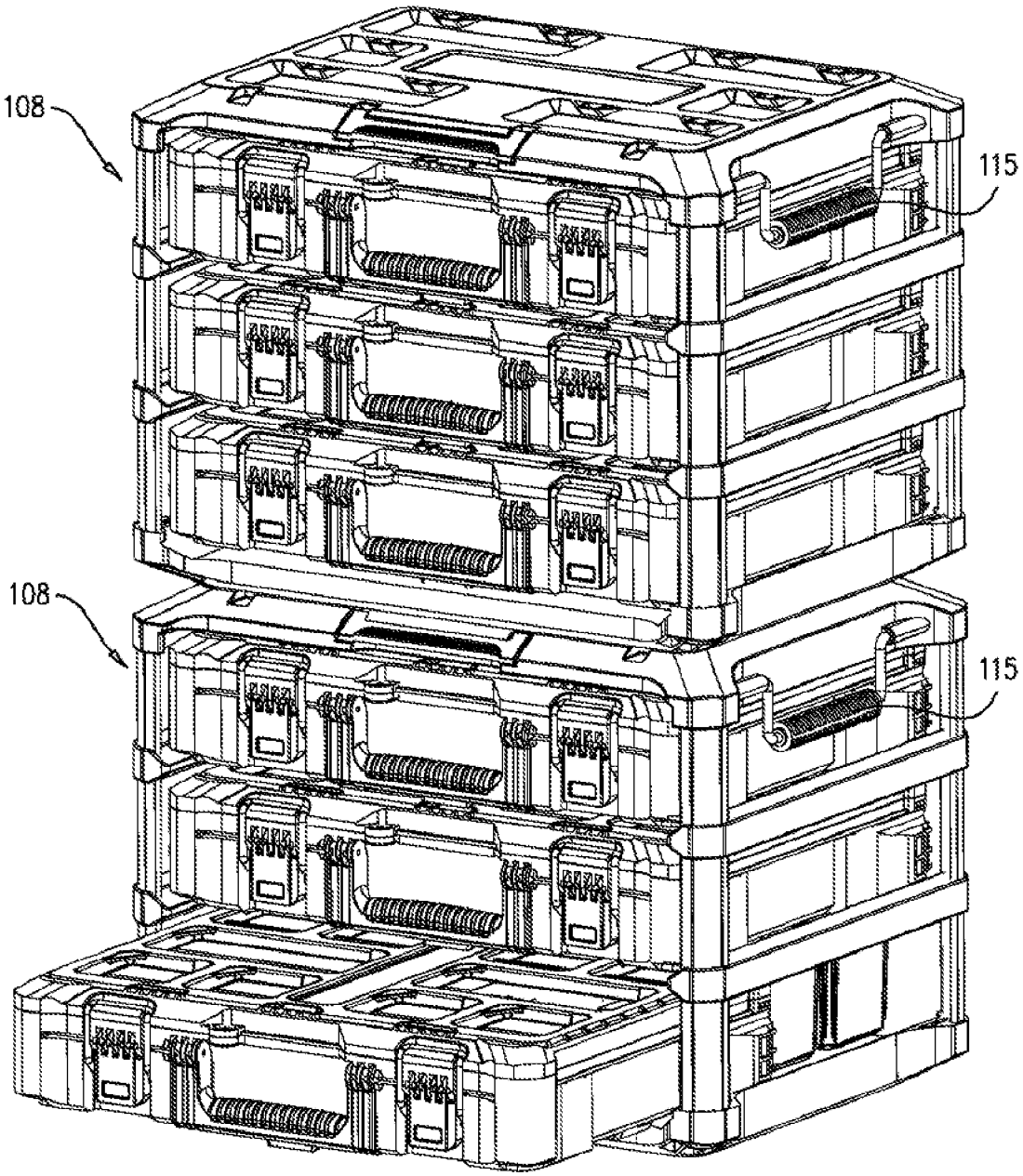


FIG. 6F

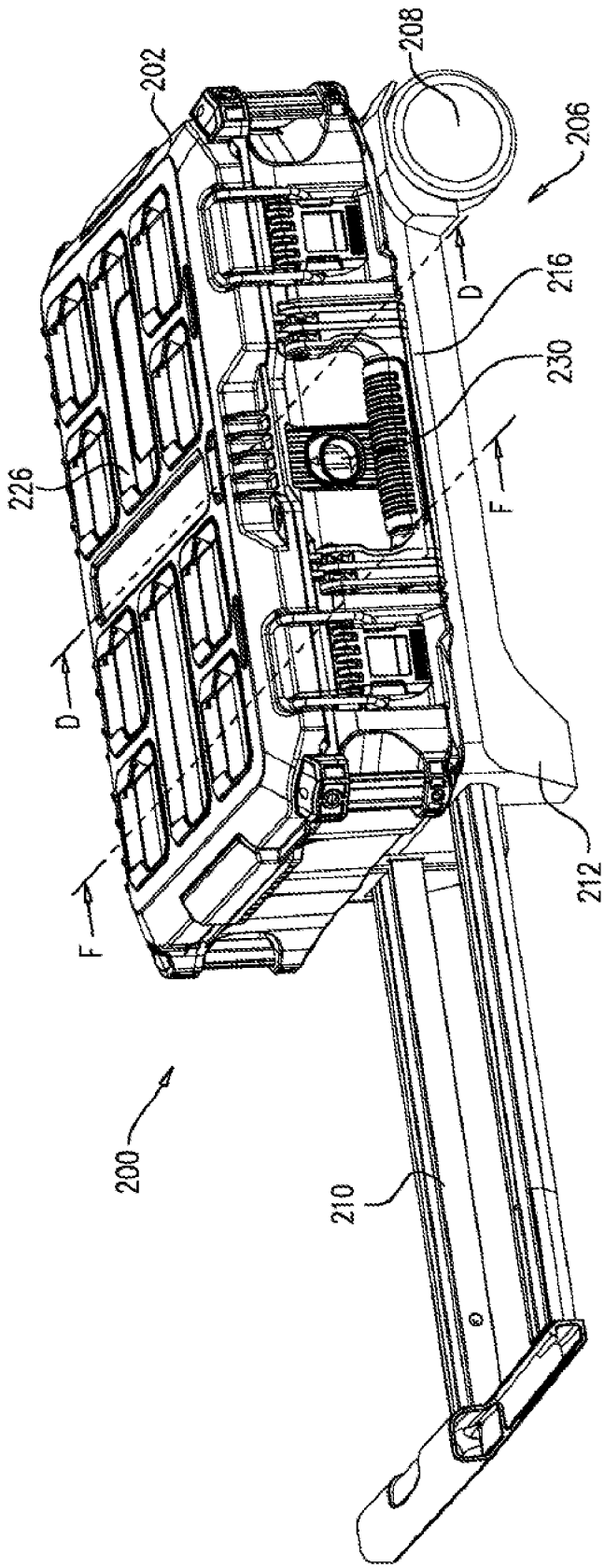


FIG. 7A

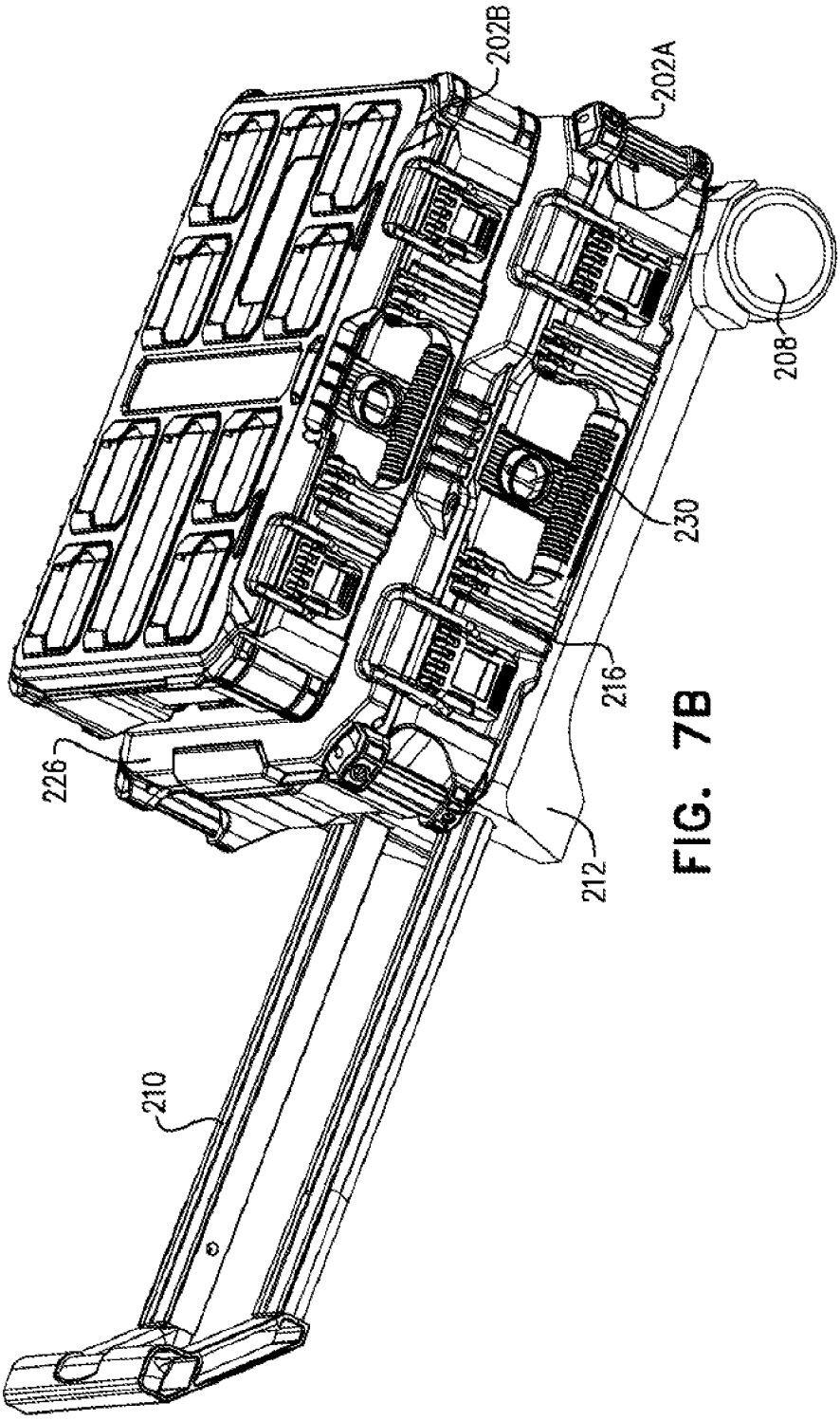


FIG. 7B

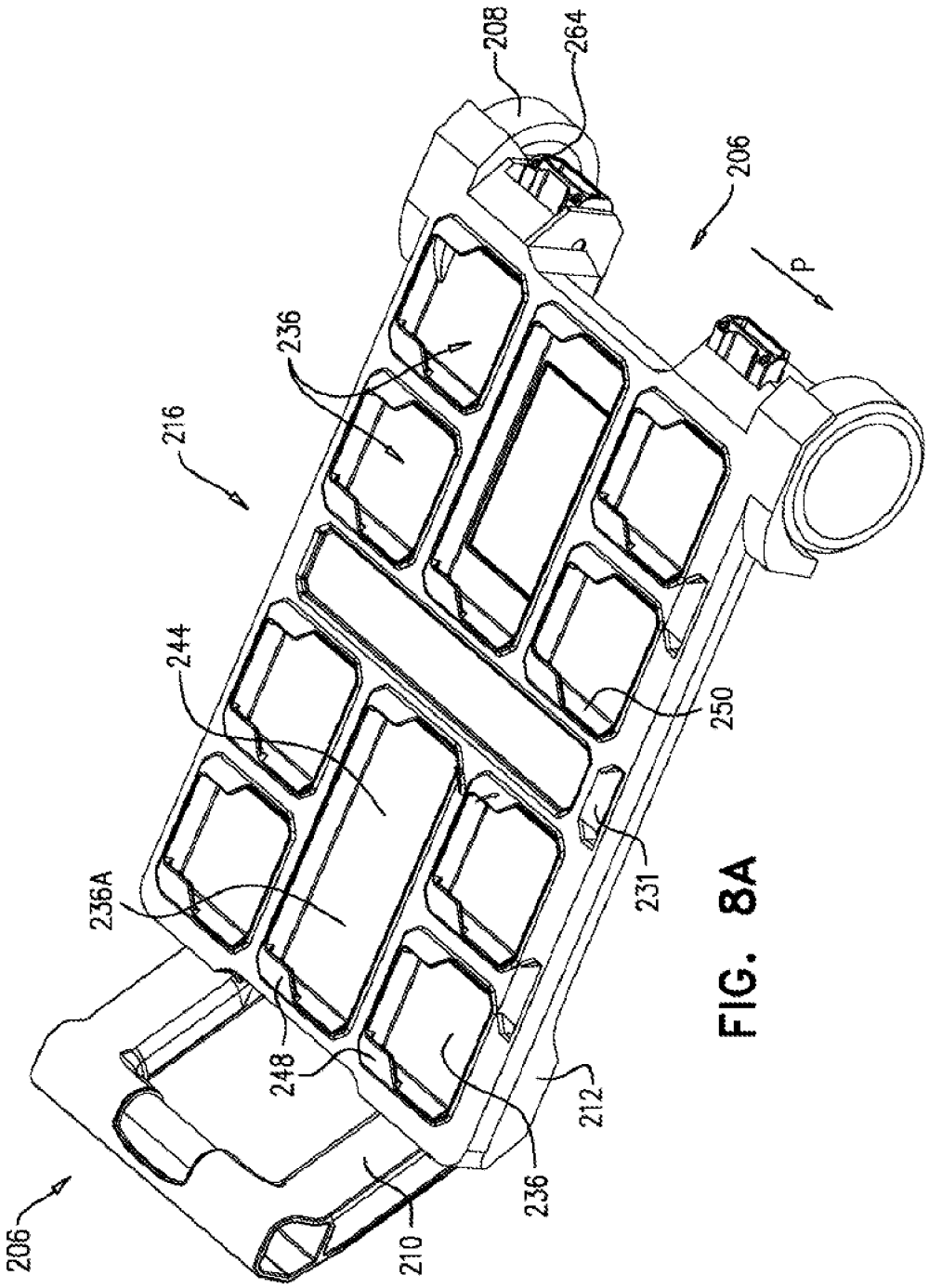


FIG. 8A

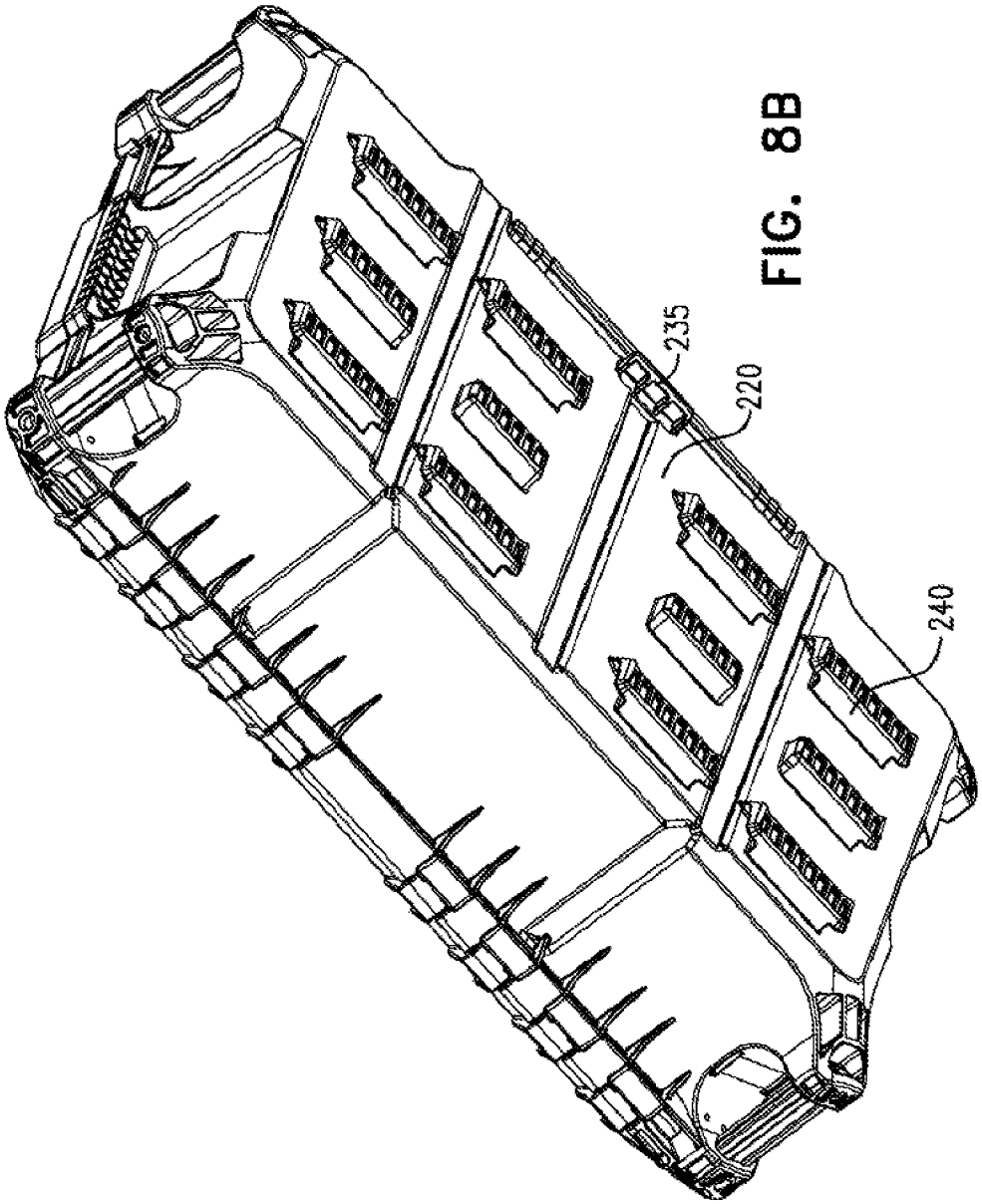


FIG. 8B

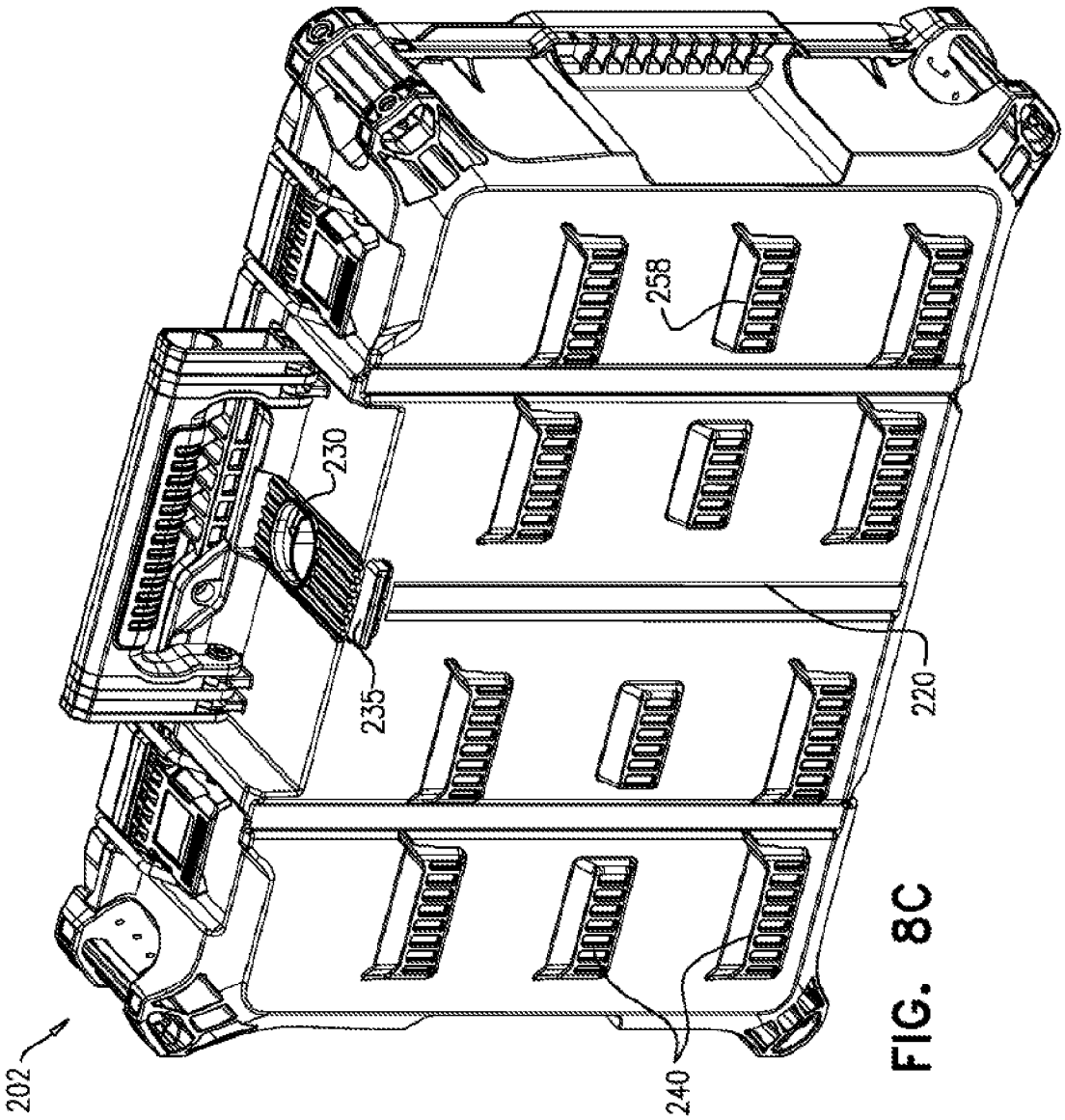


FIG. 8C

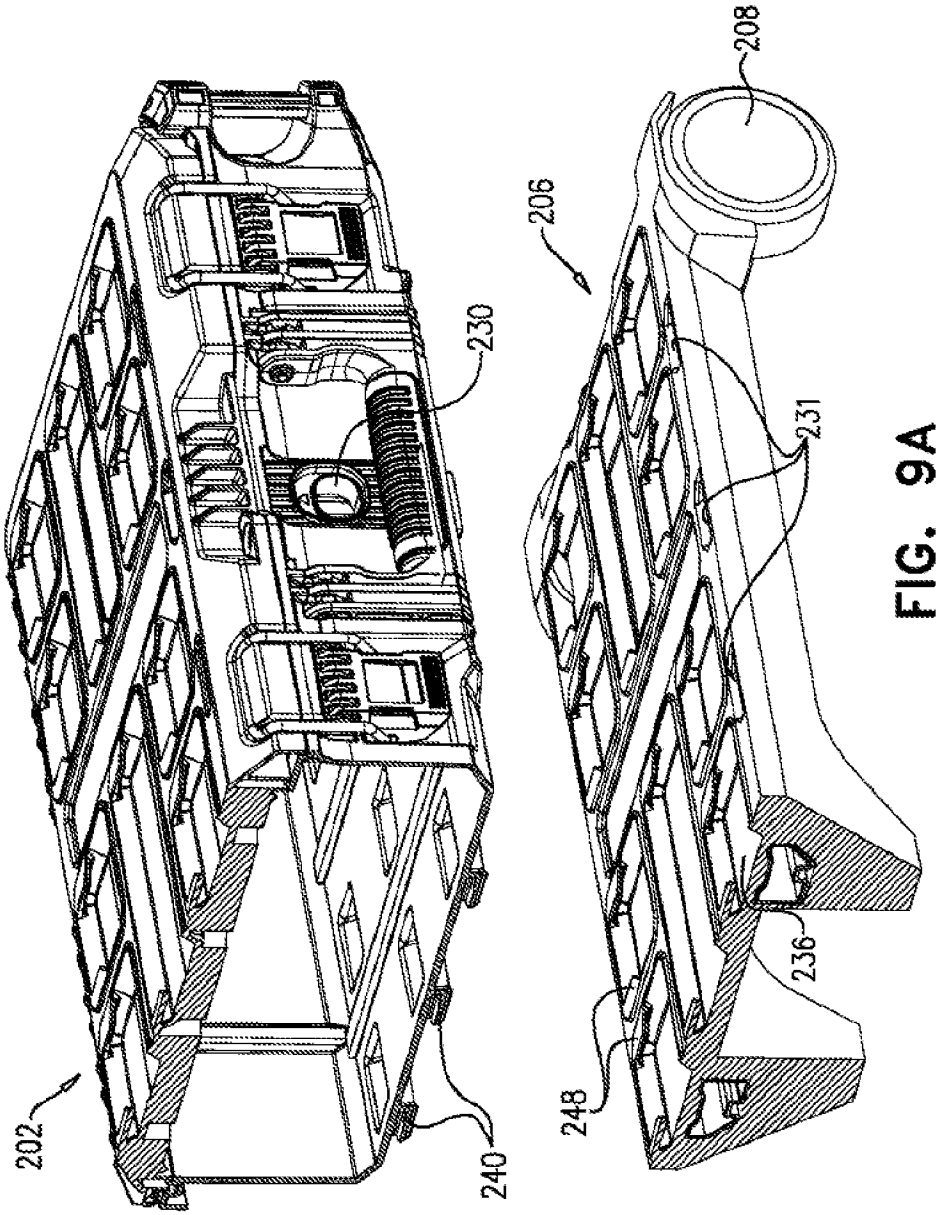


FIG. 9A

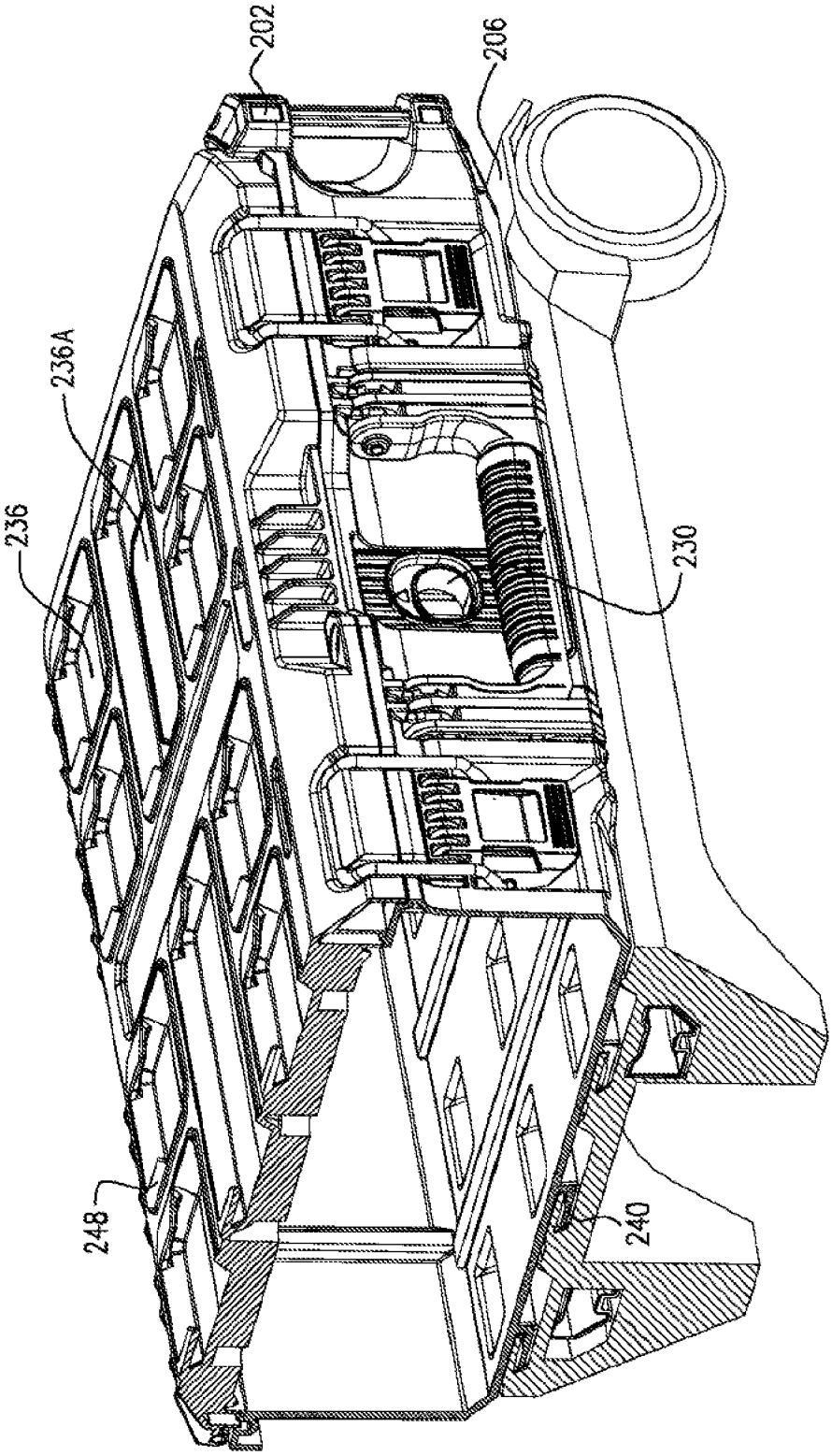


FIG. 9B

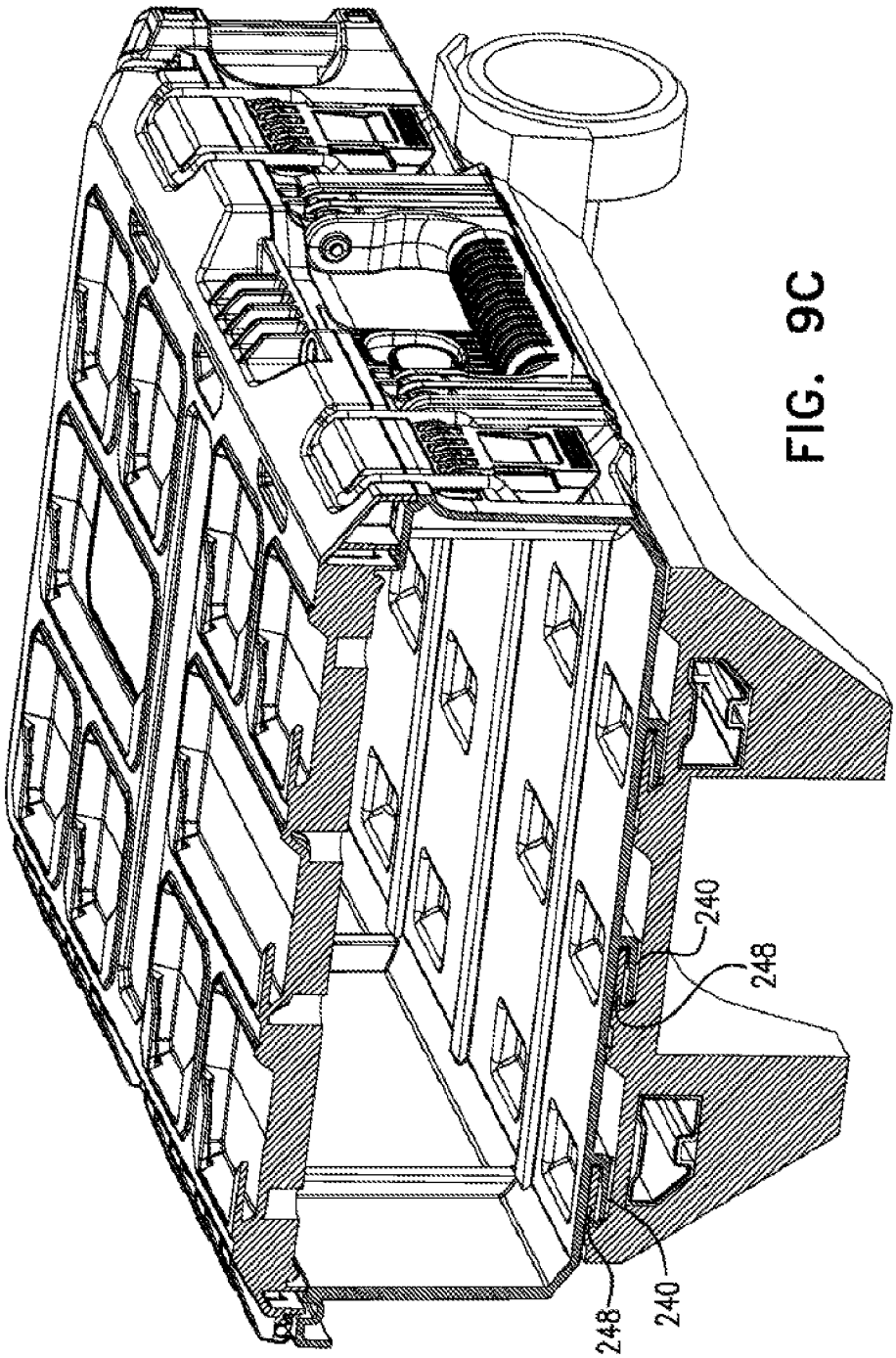


FIG. 9C

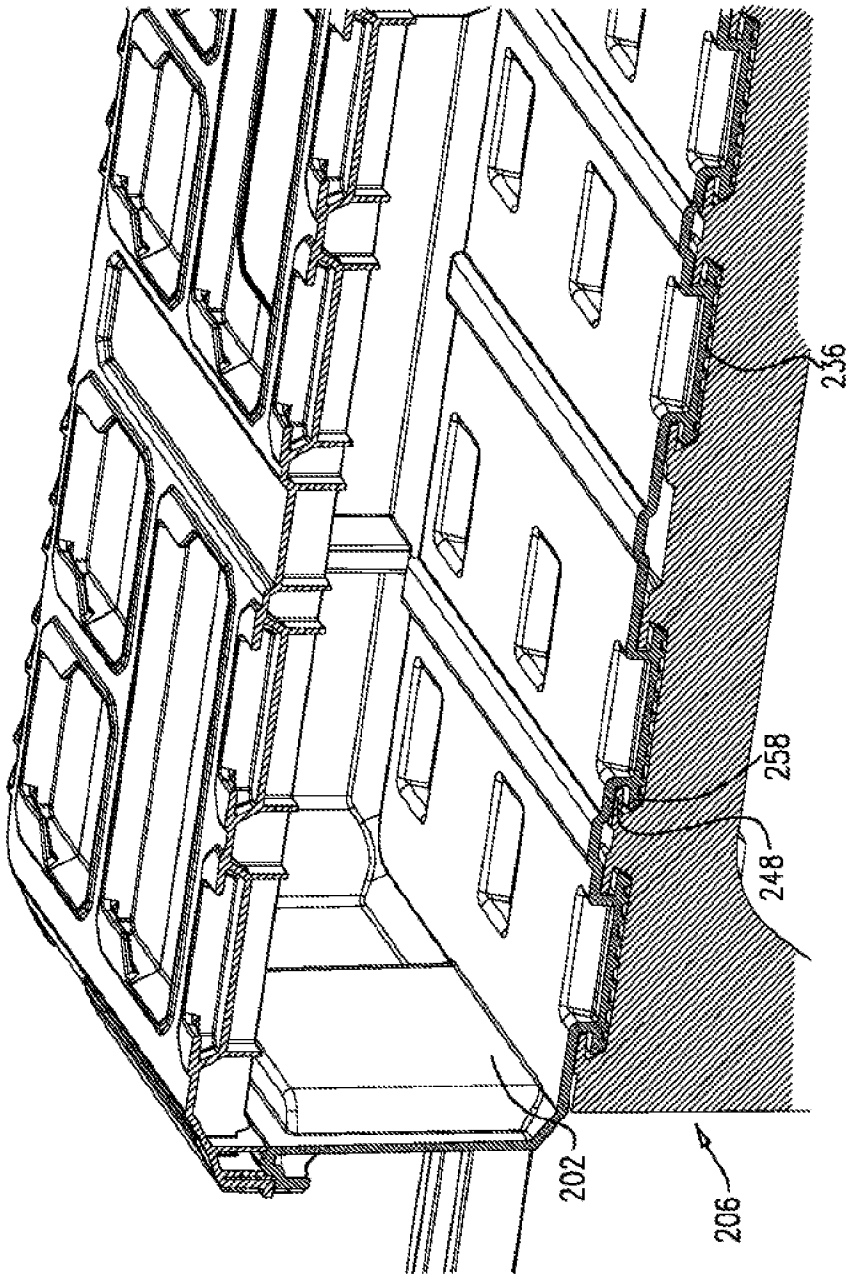


FIG. 9D

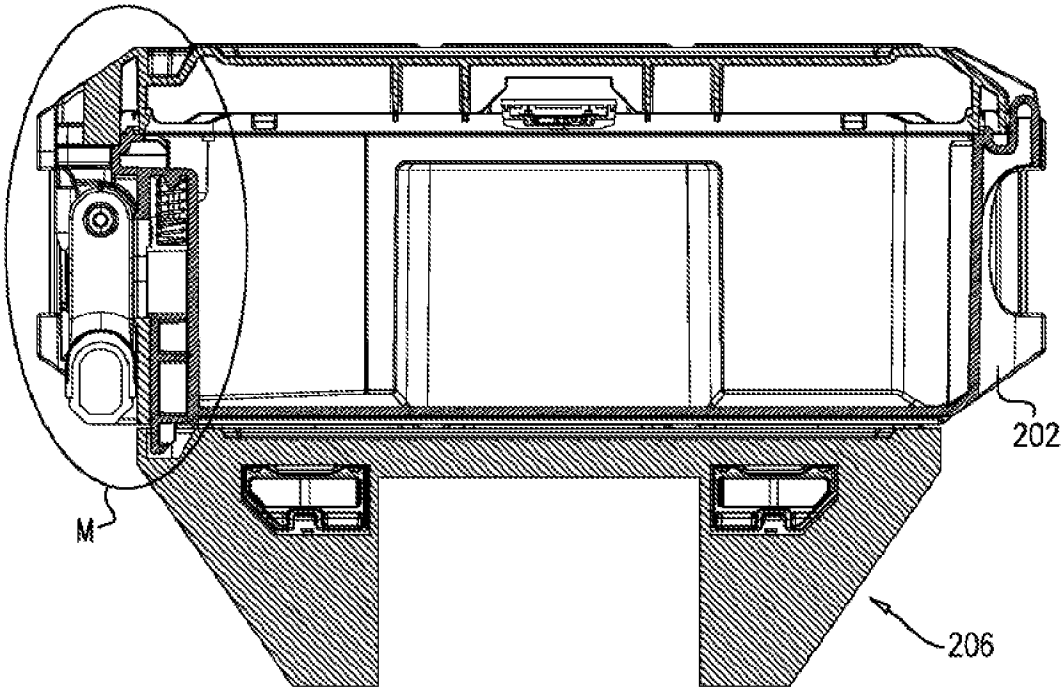


FIG. 10A

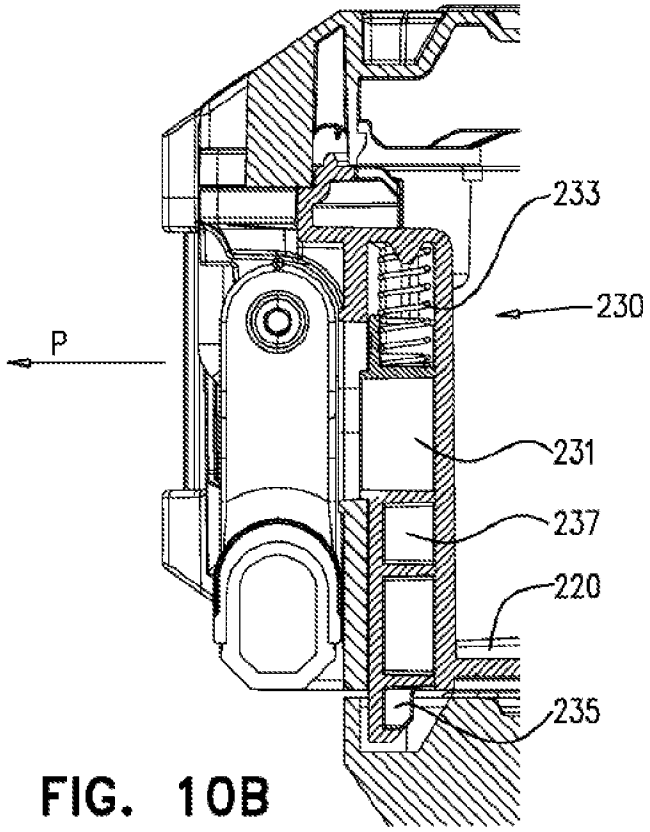


FIG. 10B

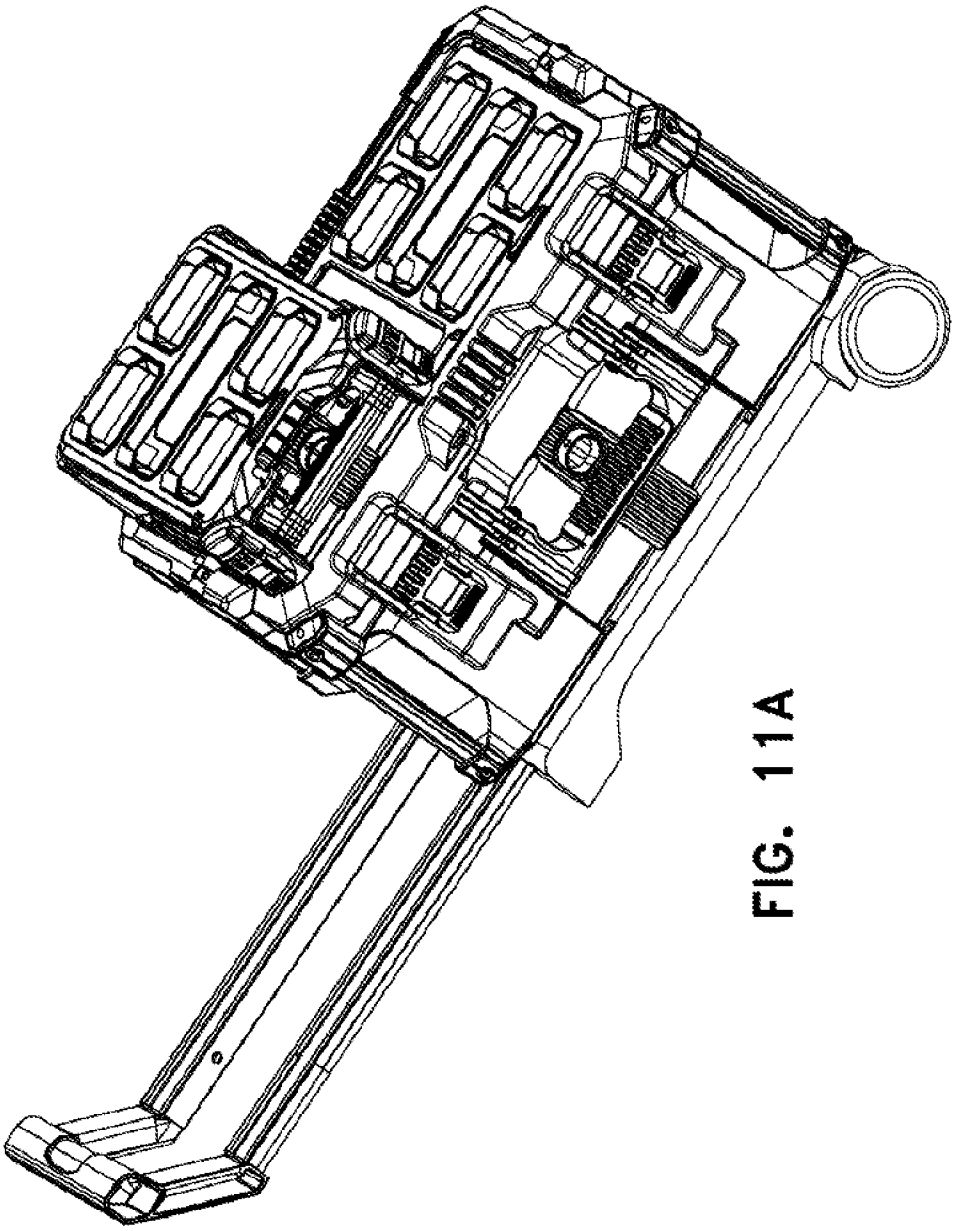


FIG. 11A

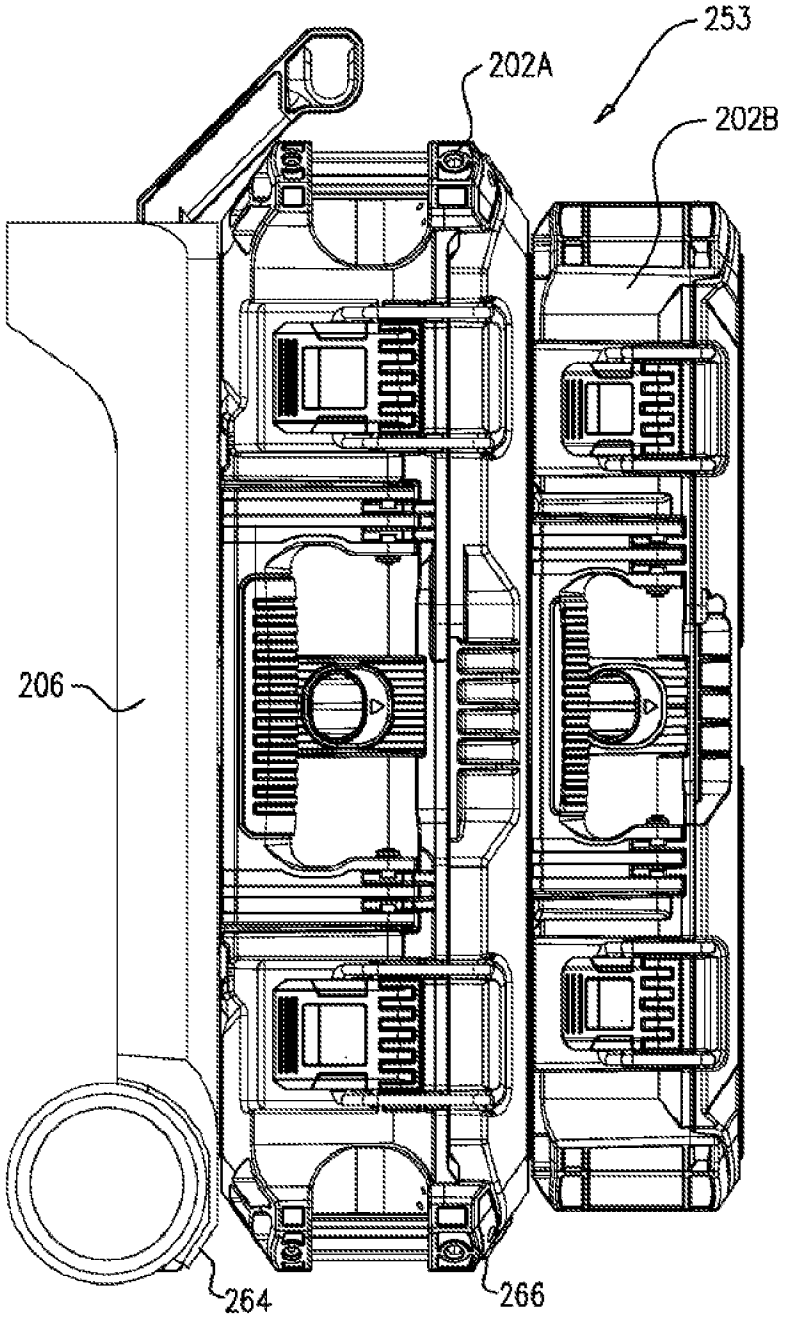


FIG. 11B

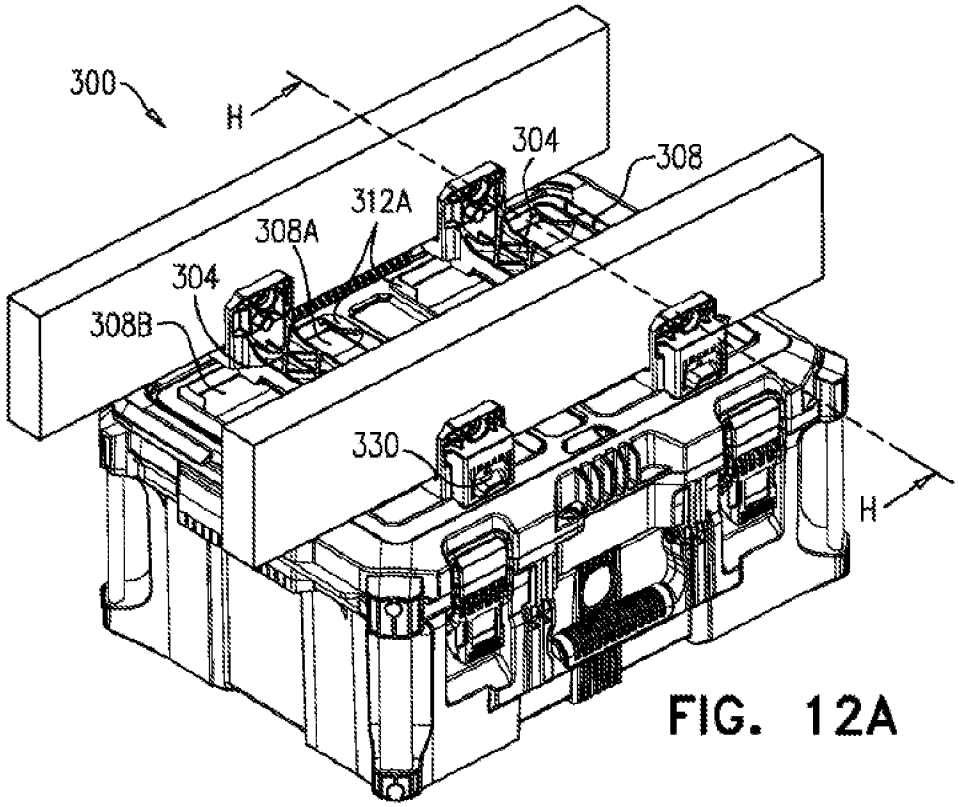


FIG. 12A

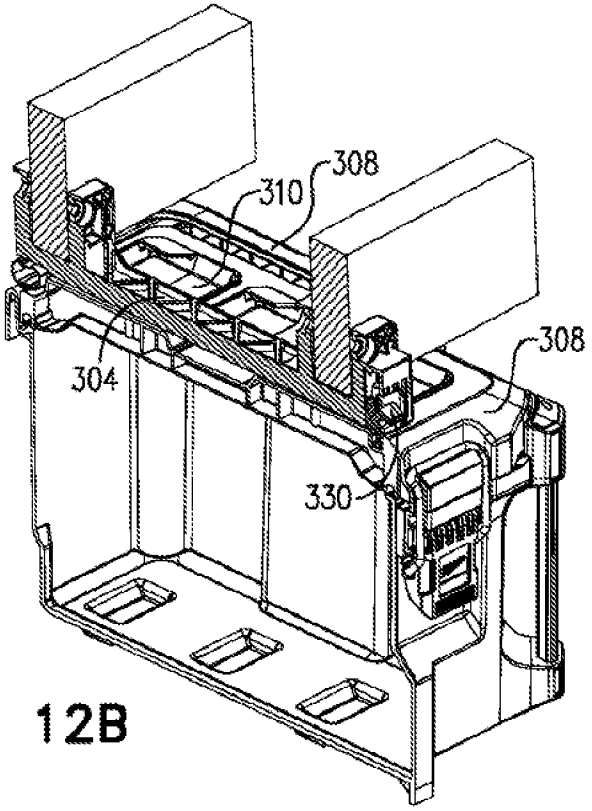
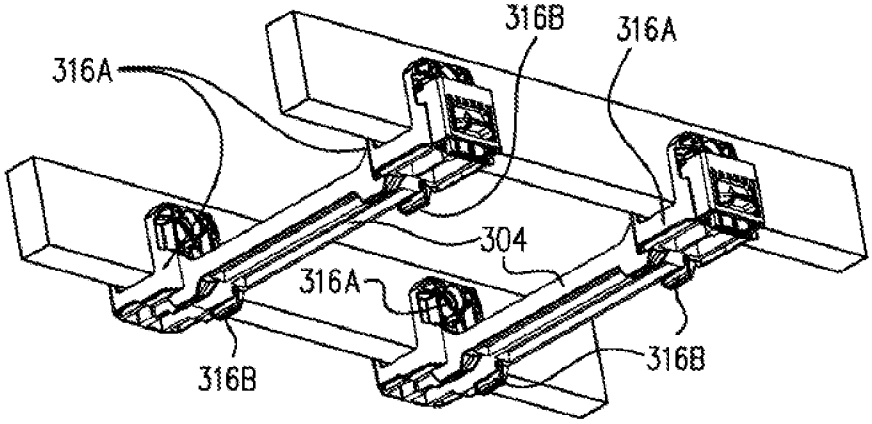


FIG. 12B


316B
316A
316A
304
316A
316B
316B

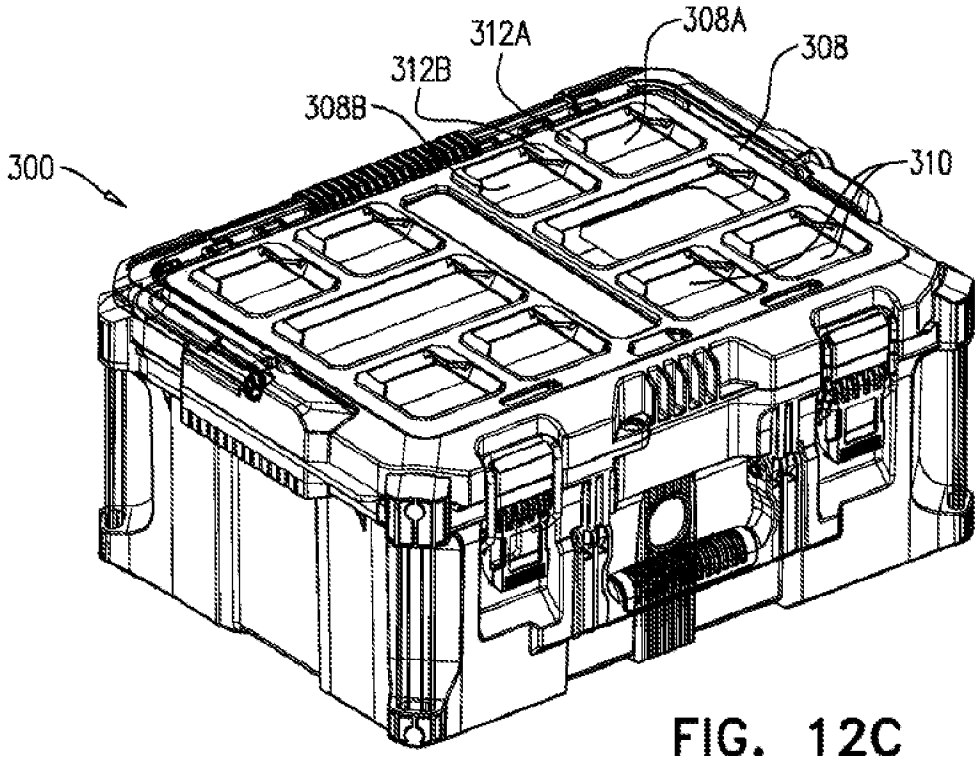

312A
308A
308
312B
308B
300
310

FIG. 12C

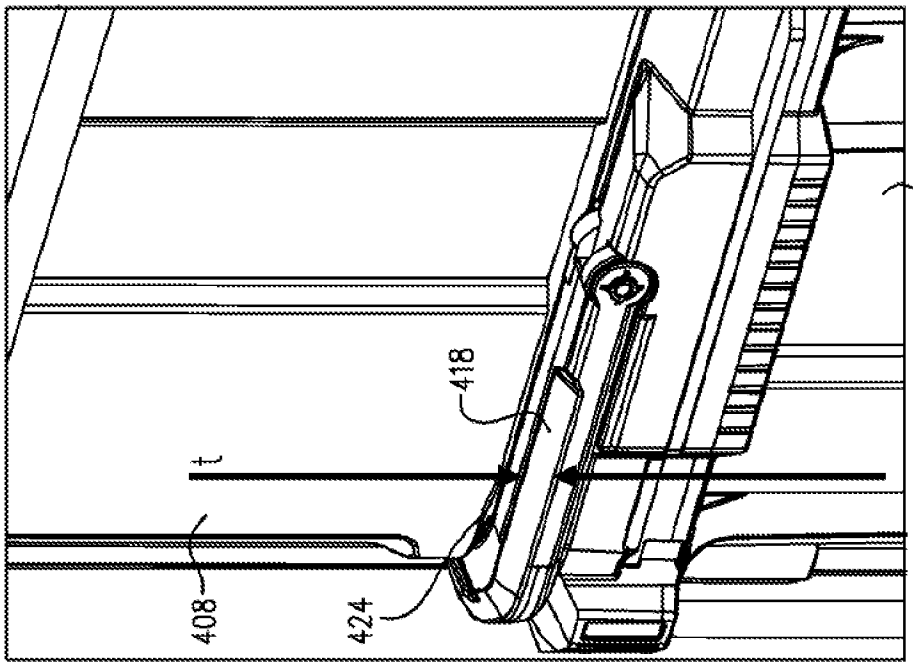


FIG. 13B

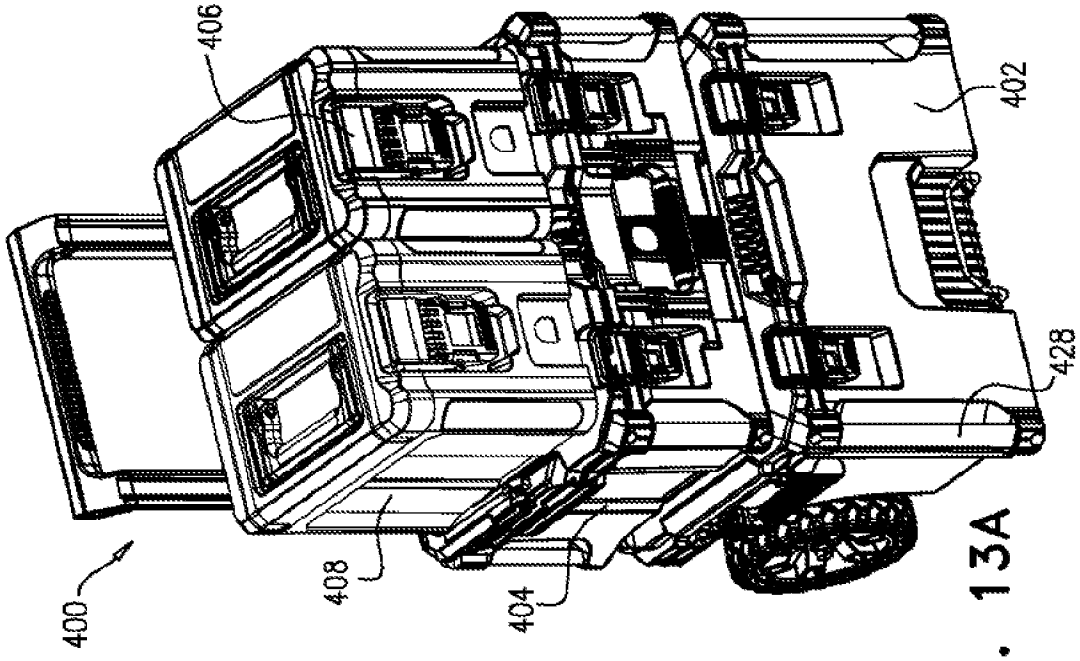


FIG. 13A

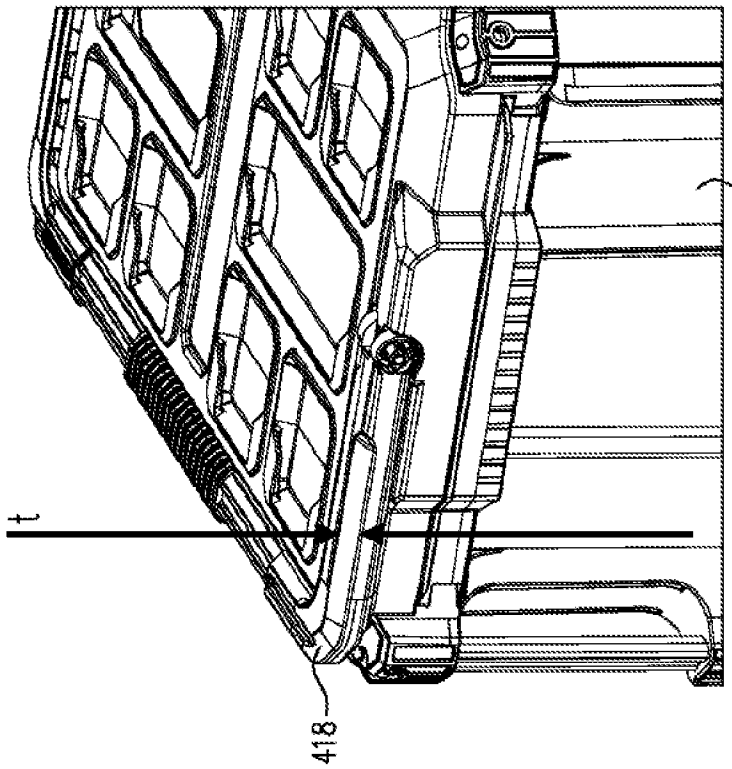


FIG. 13D

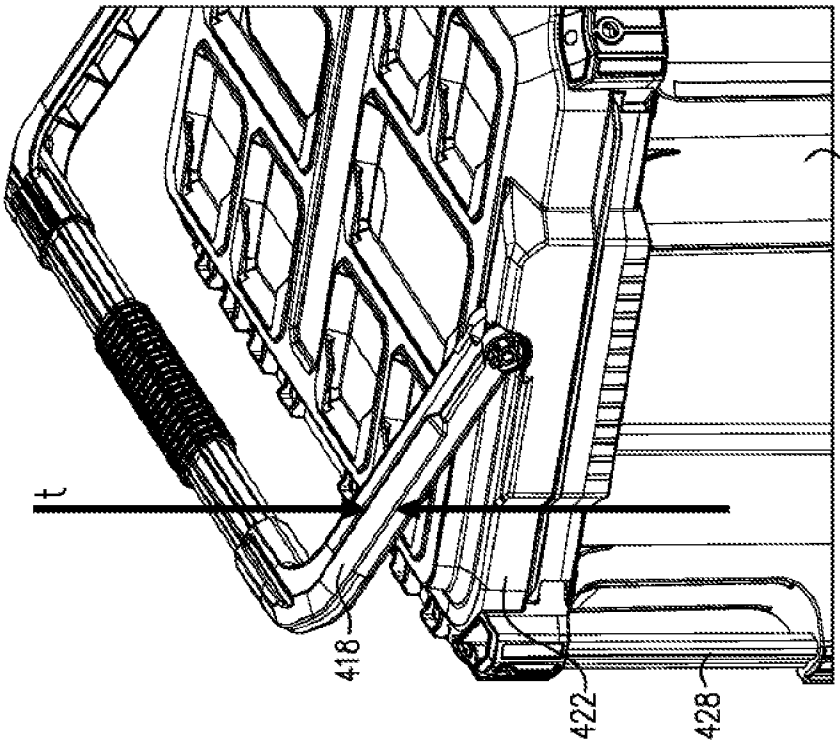


FIG. 13C

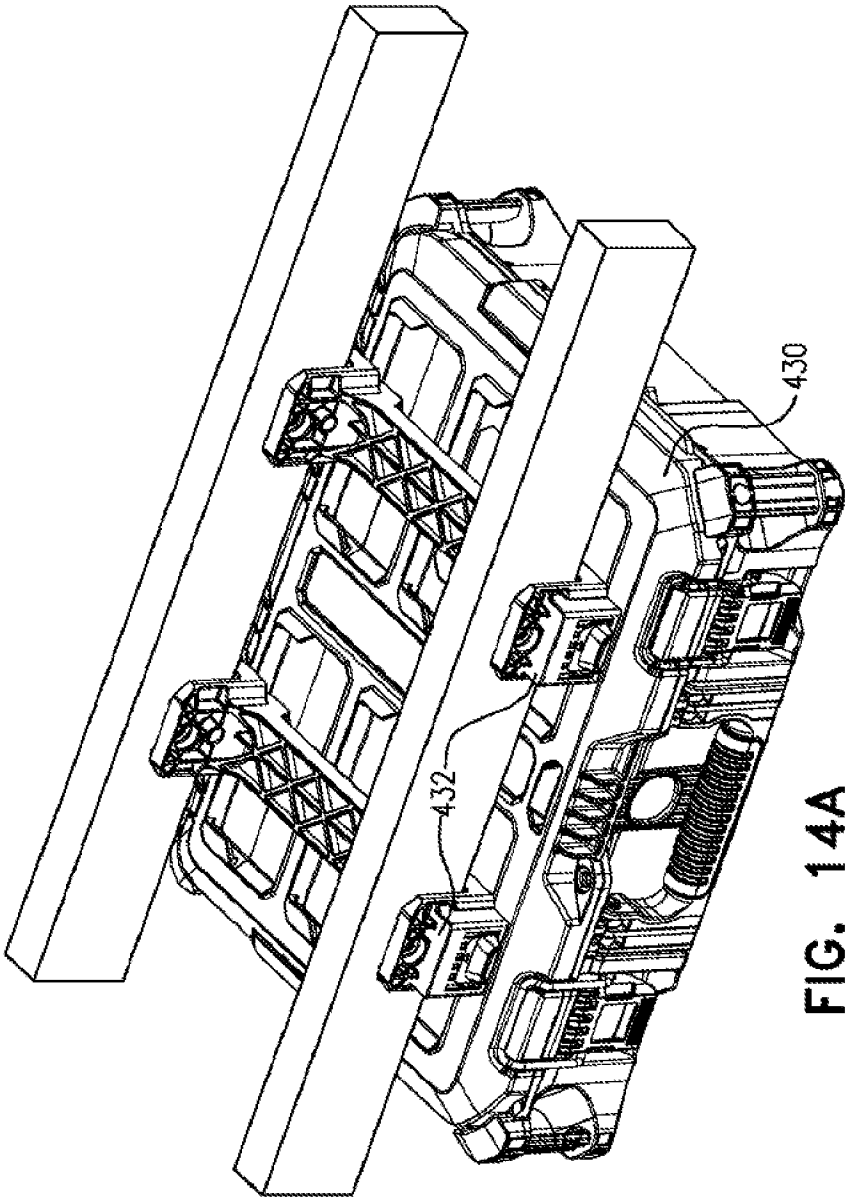


FIG. 14A

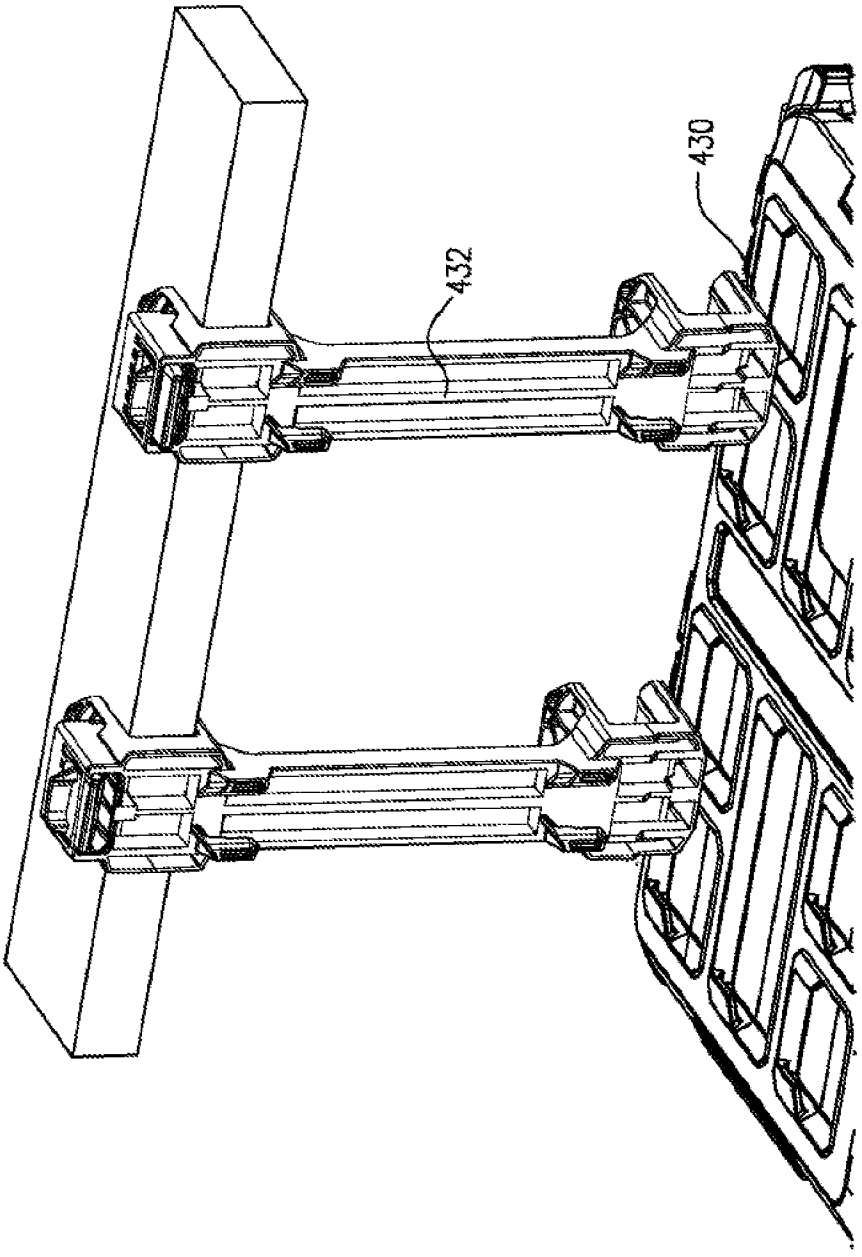


FIG. 14B

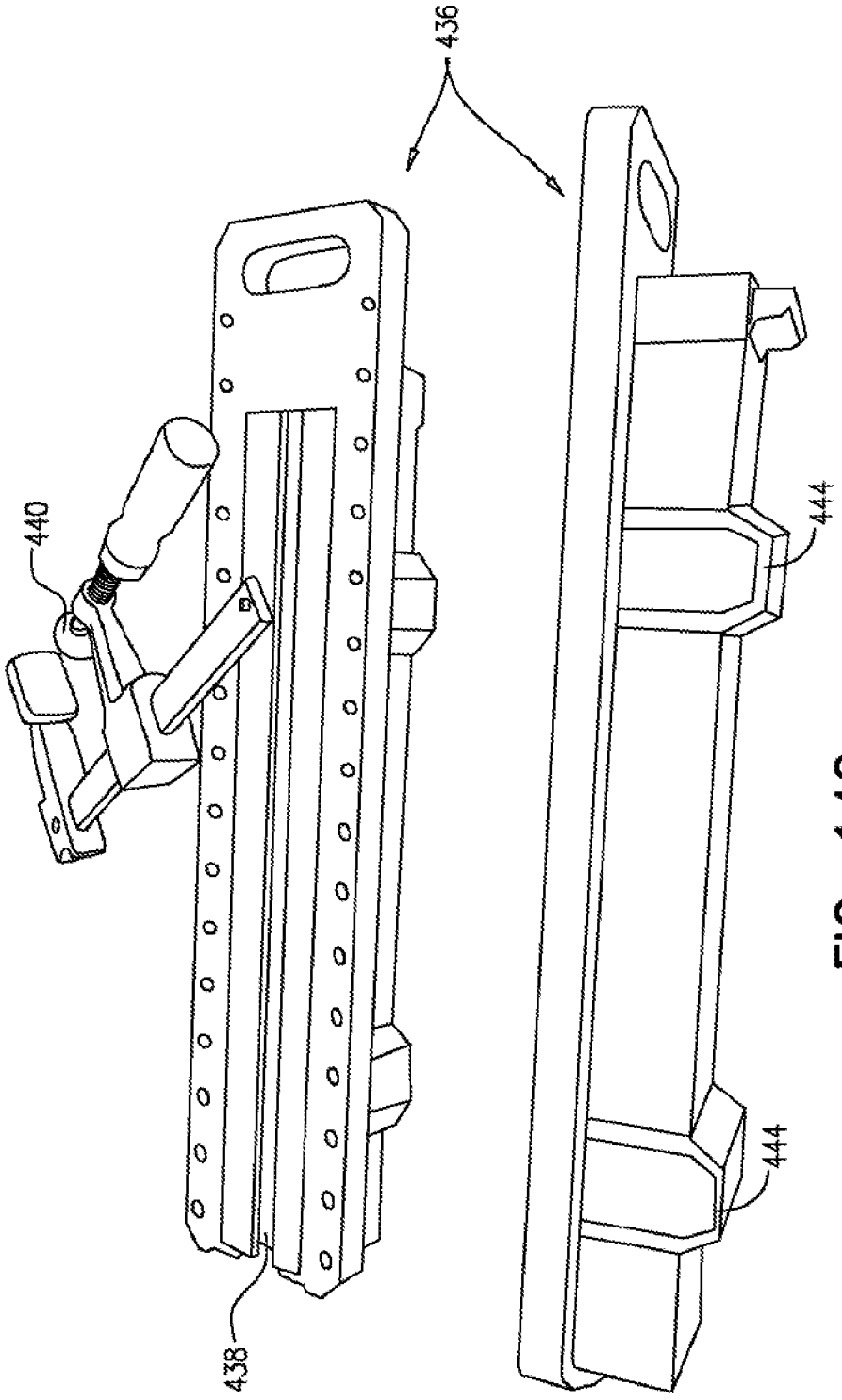


FIG. 14C

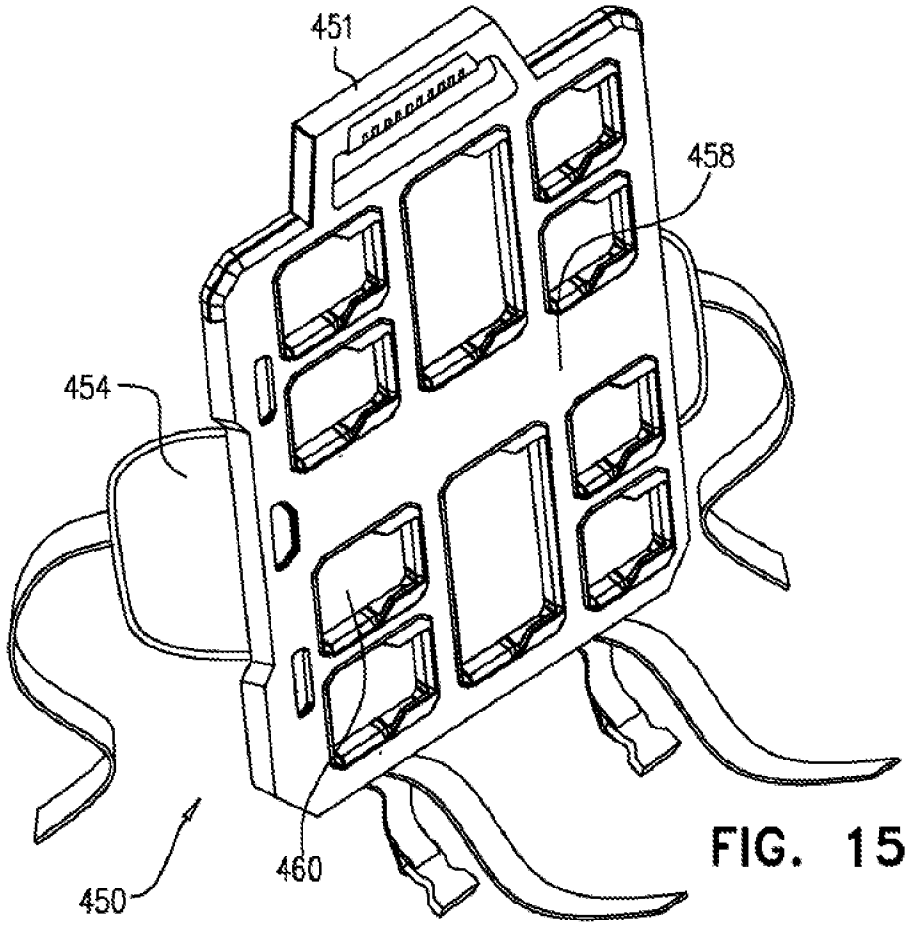


FIG. 15A

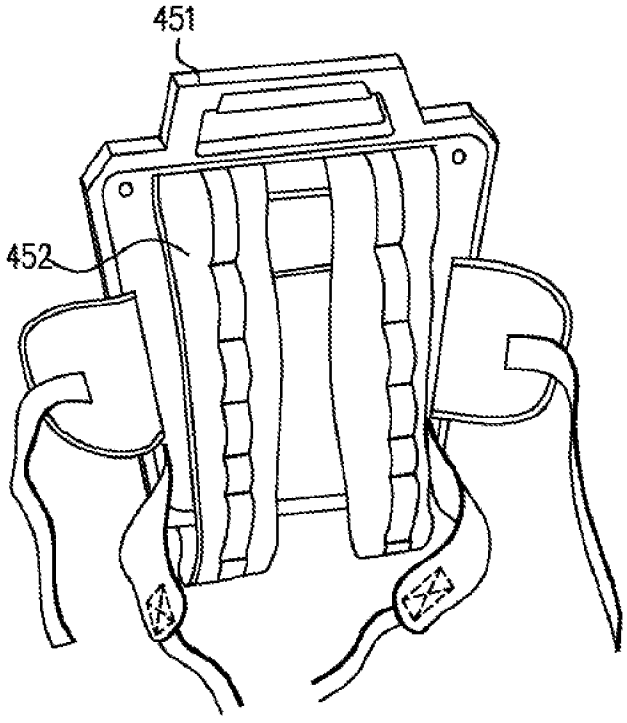


FIG. 15B

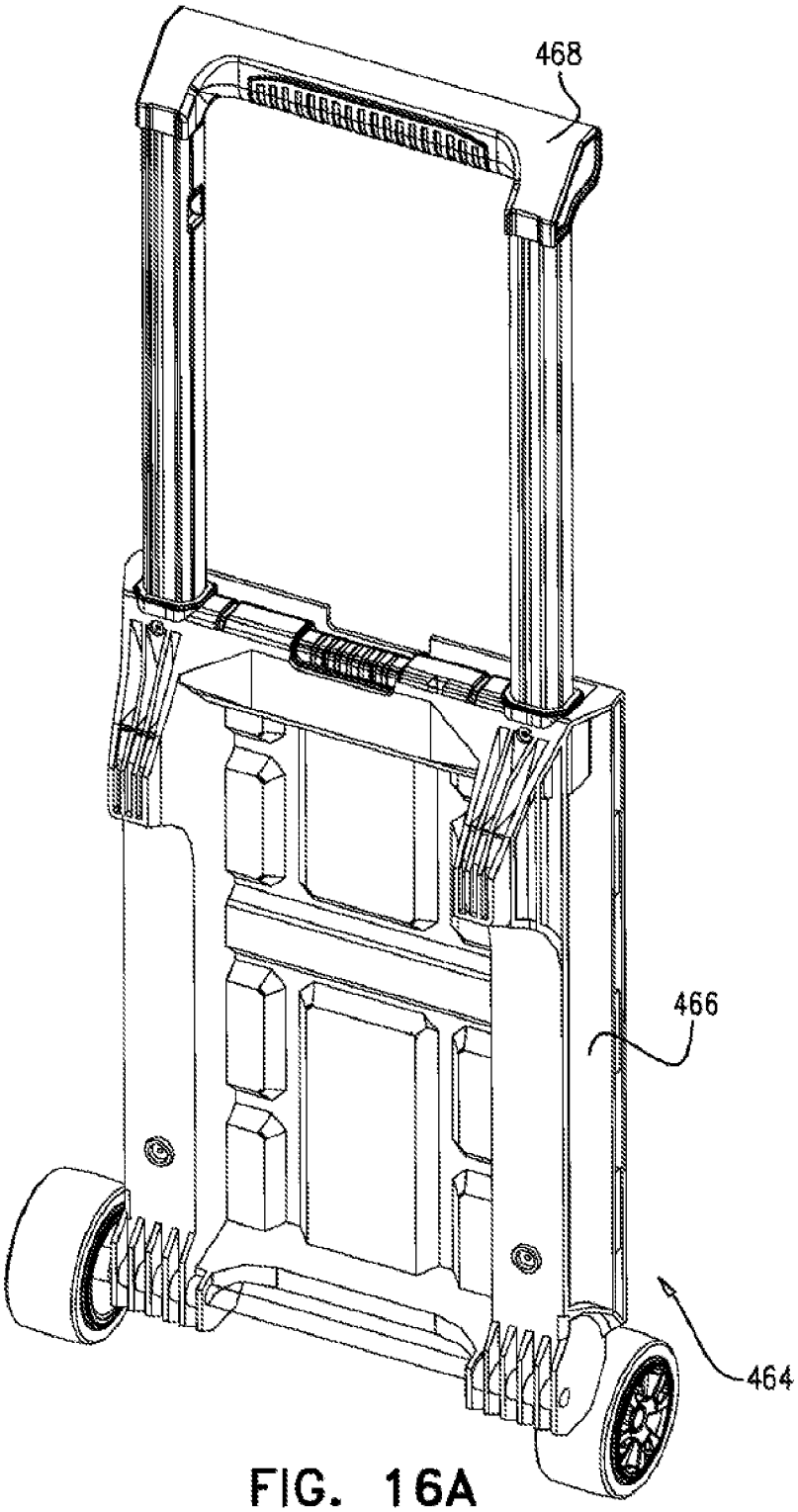


FIG. 16A

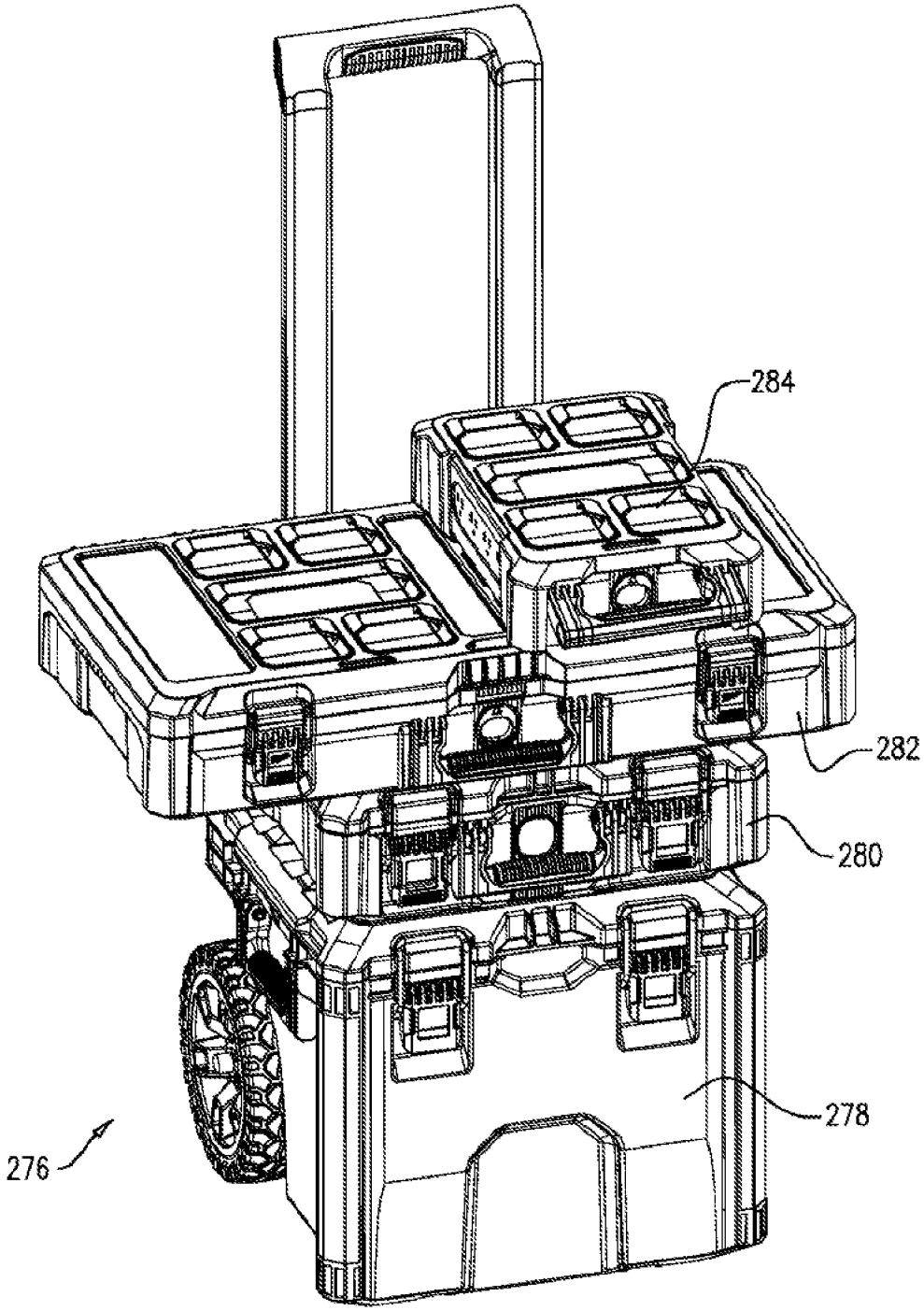


FIG. 16B

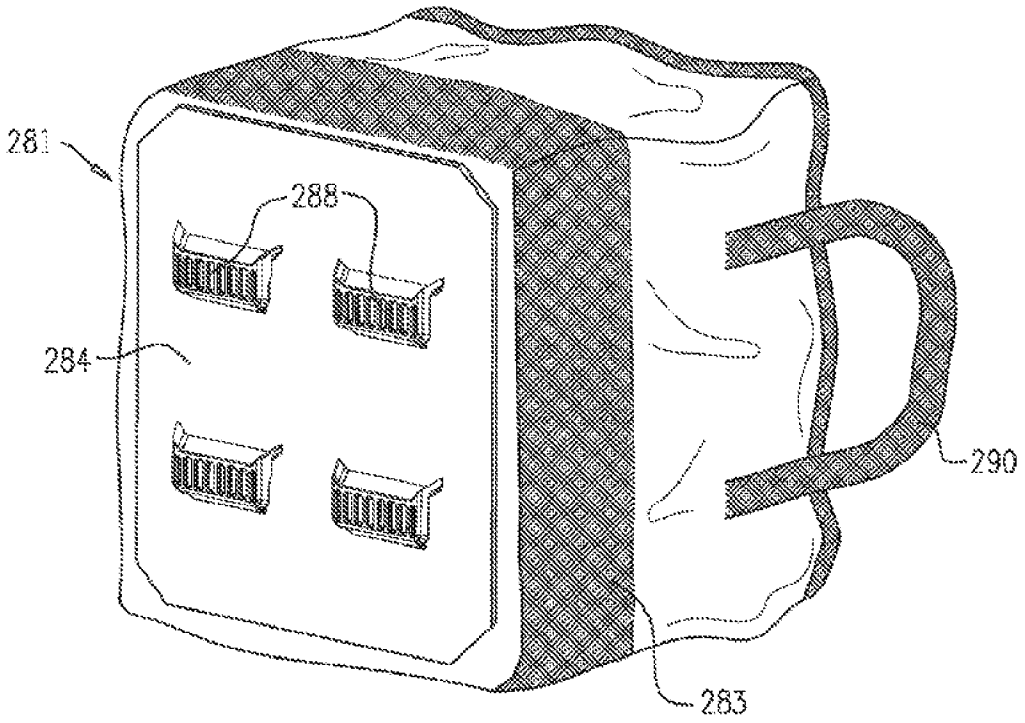


FIG. 17

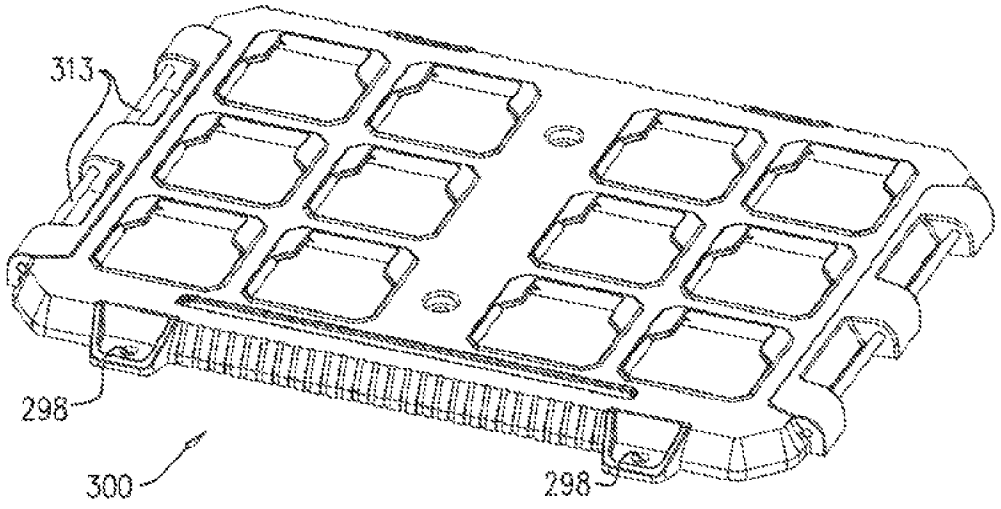


FIG. 18A

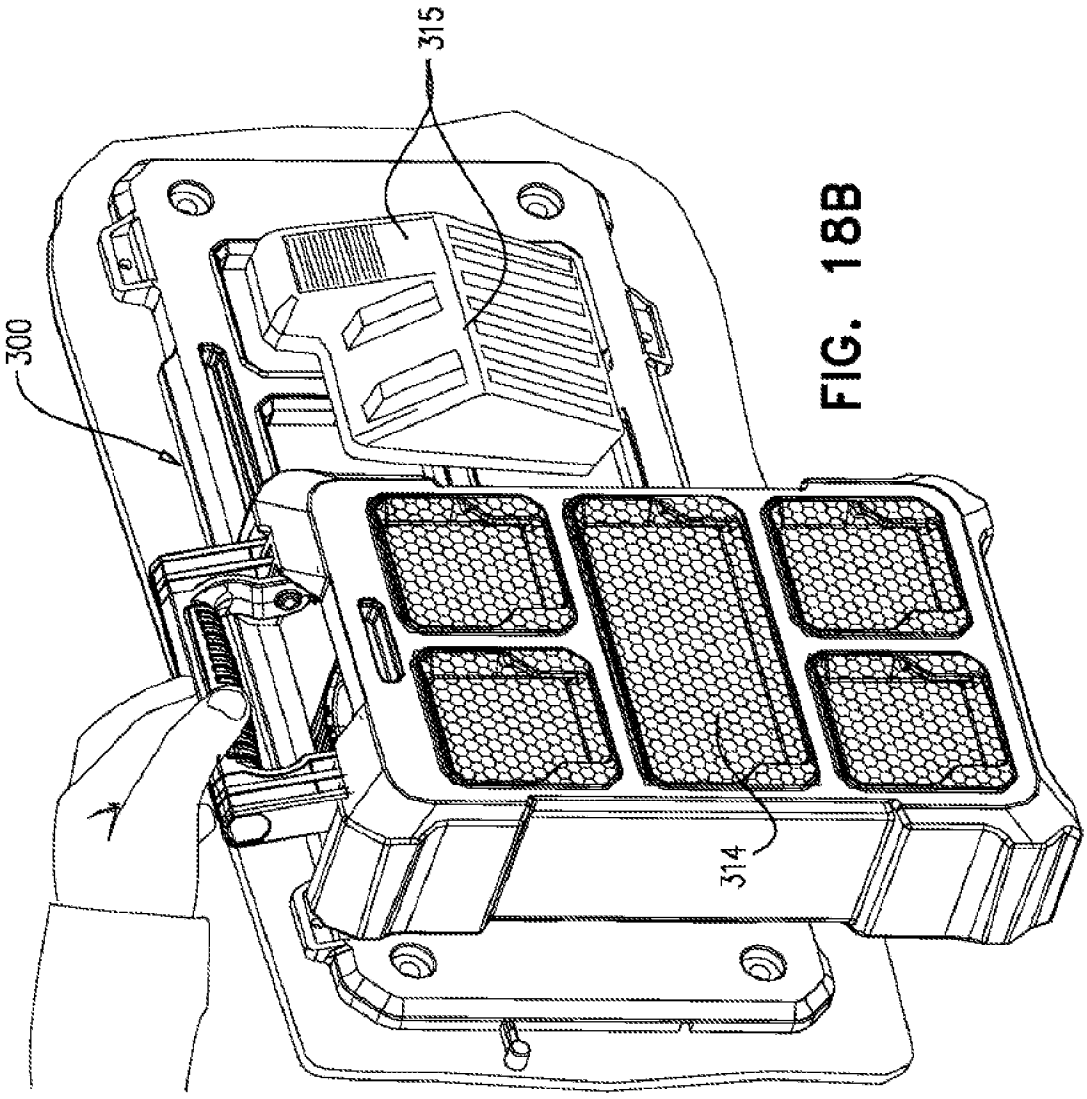


FIG. 18B

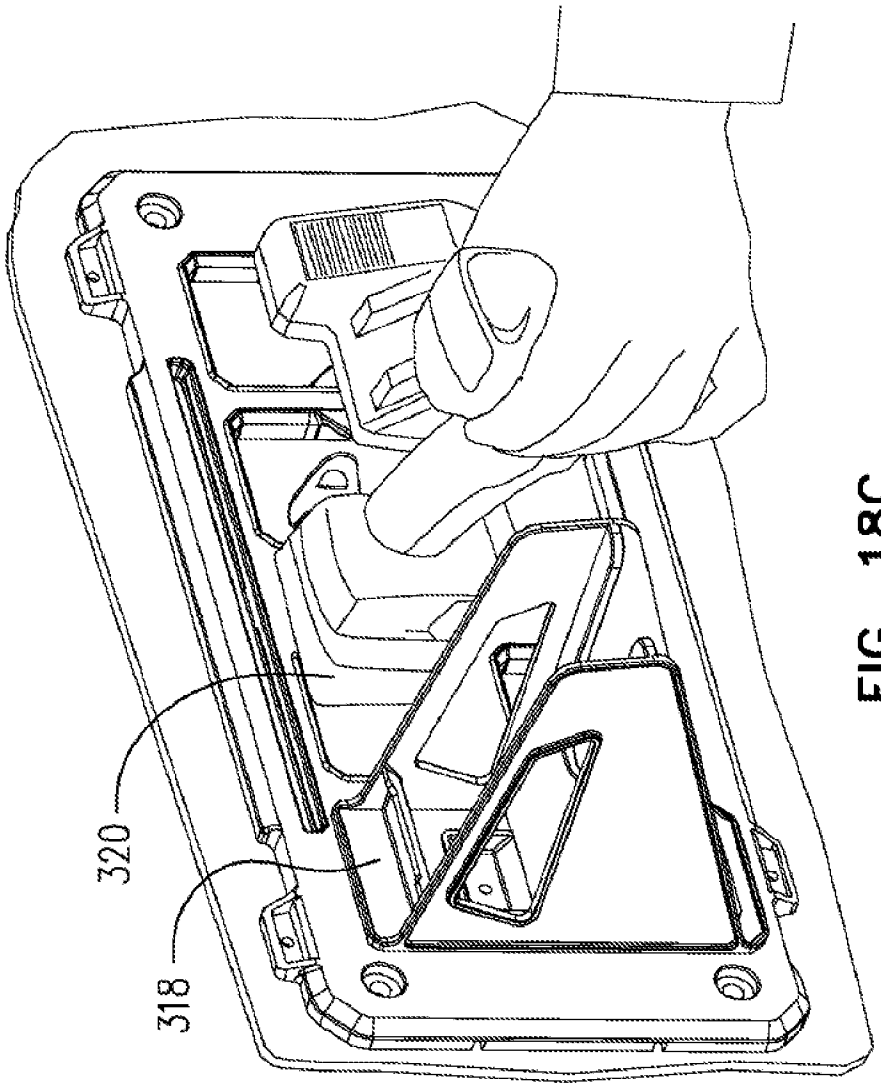


FIG. 18C

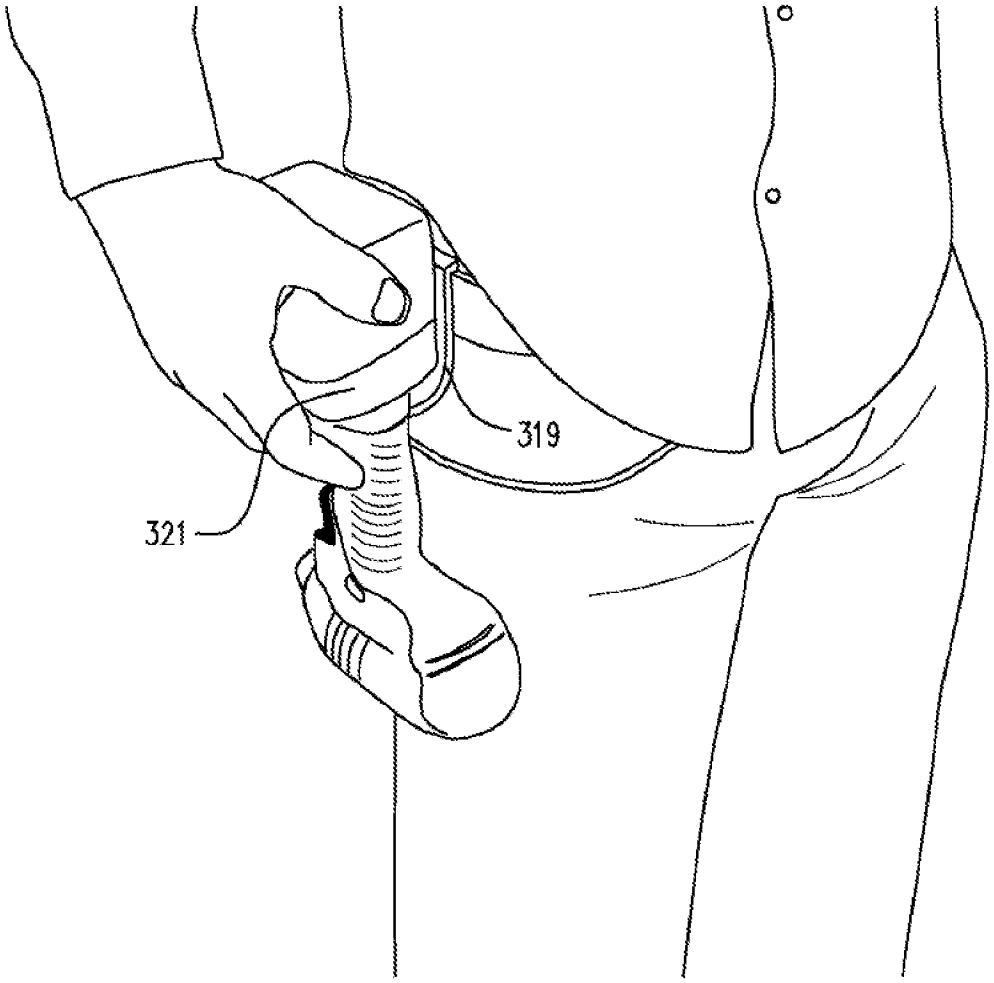
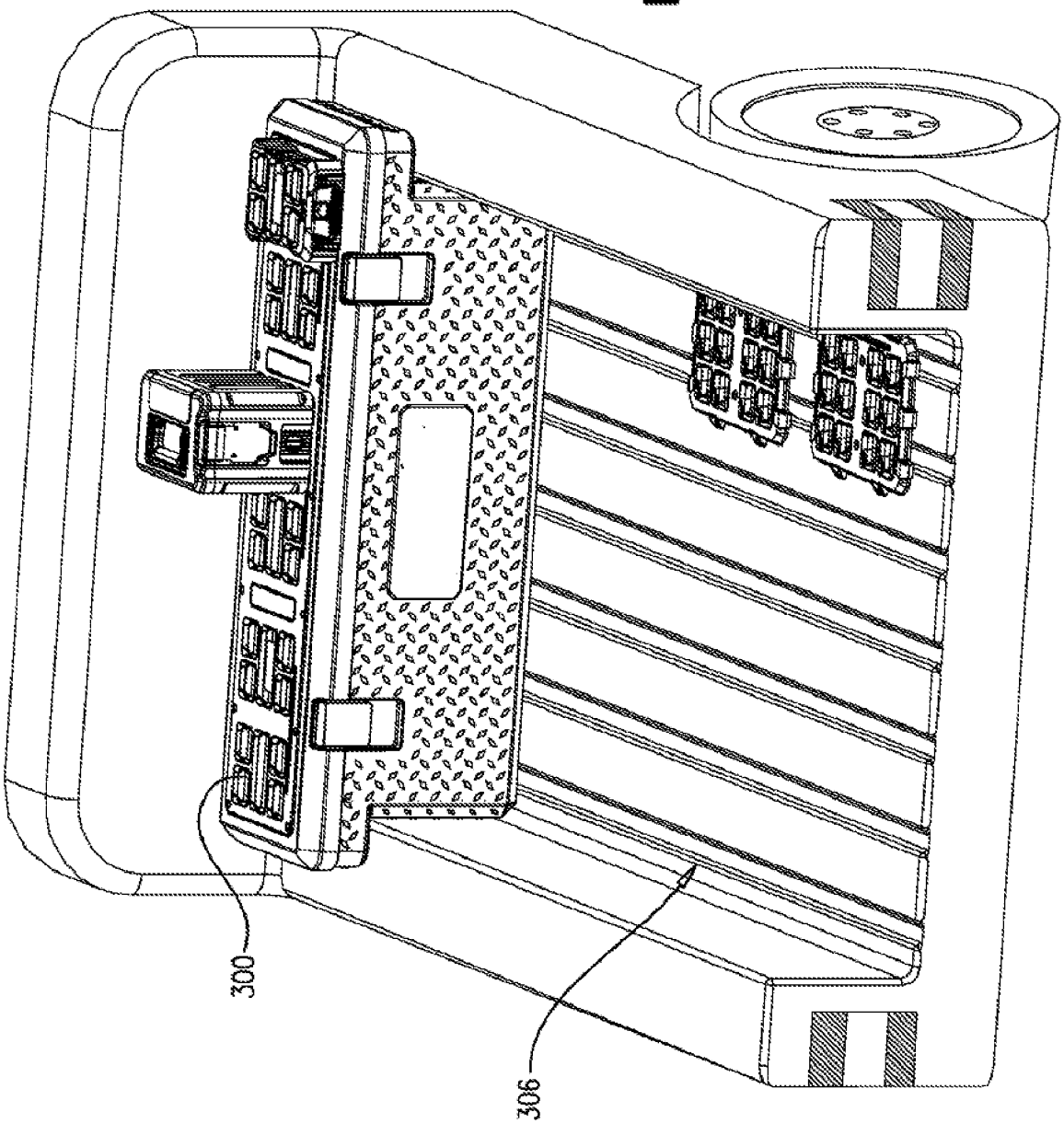


FIG. 19

FIG. 20



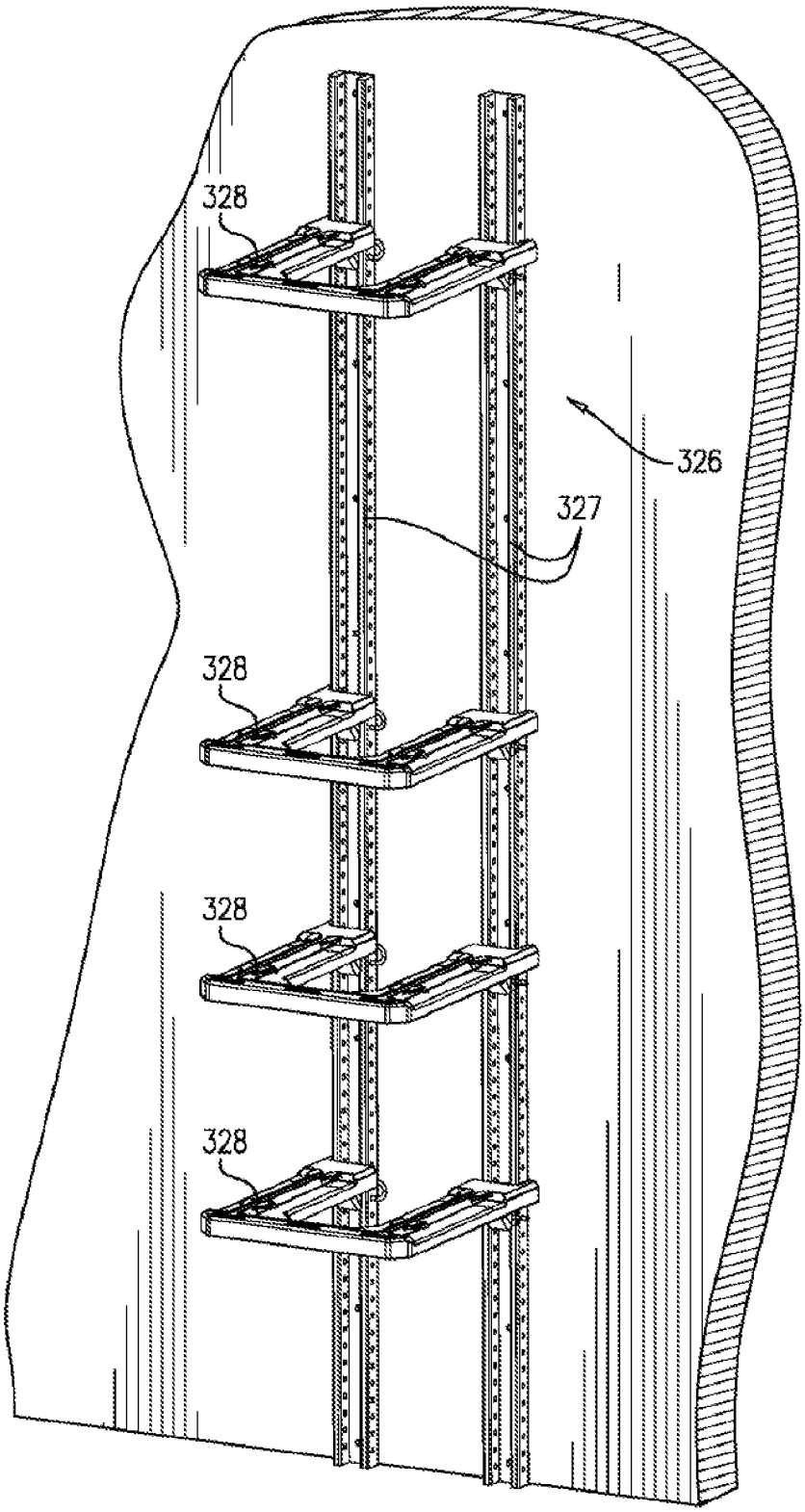


FIG. 21

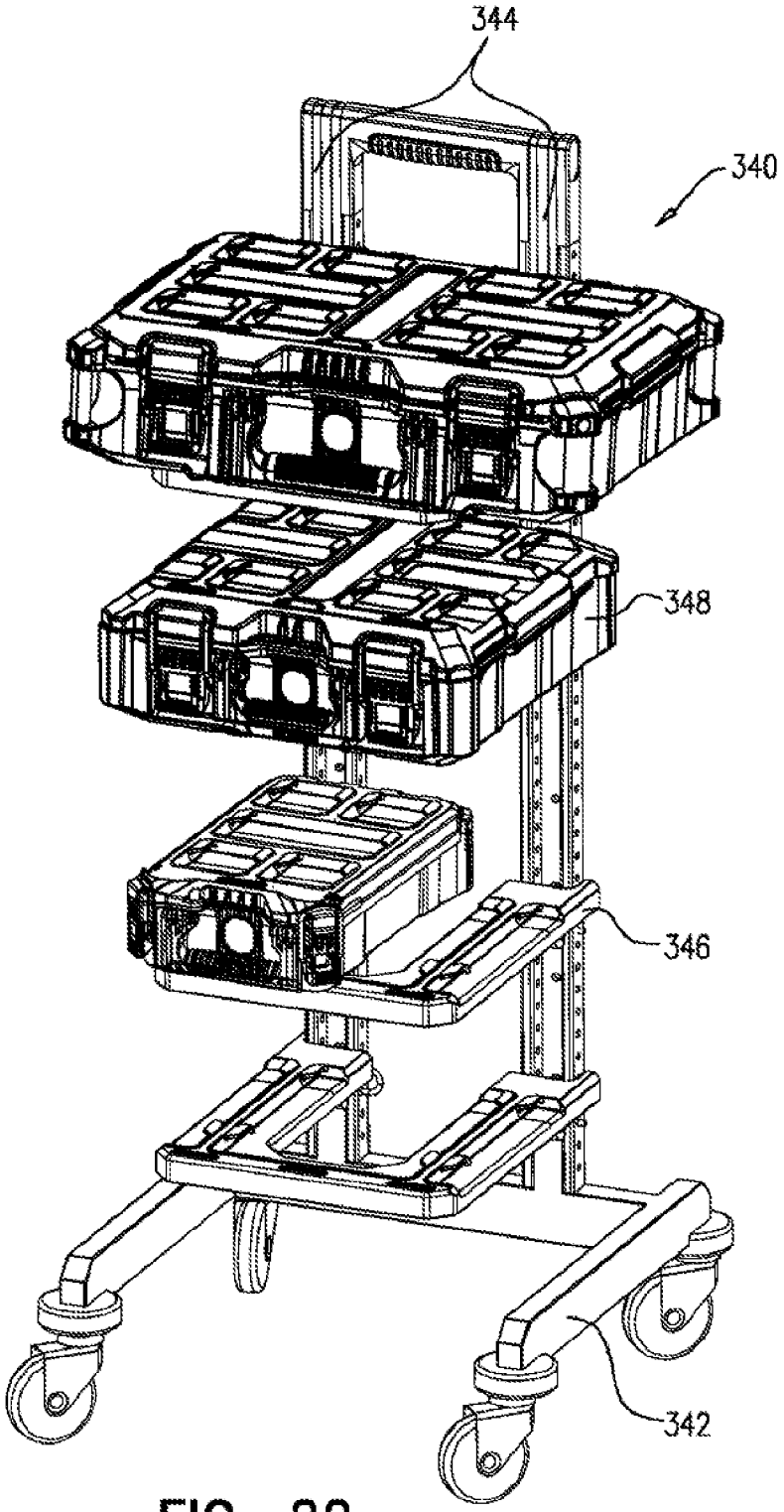


FIG. 22

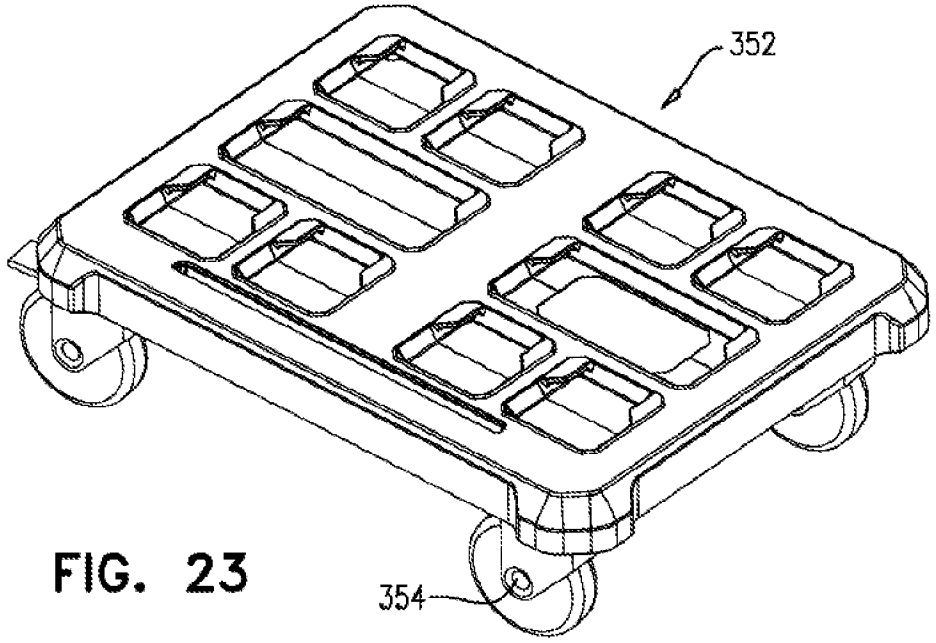


FIG. 23

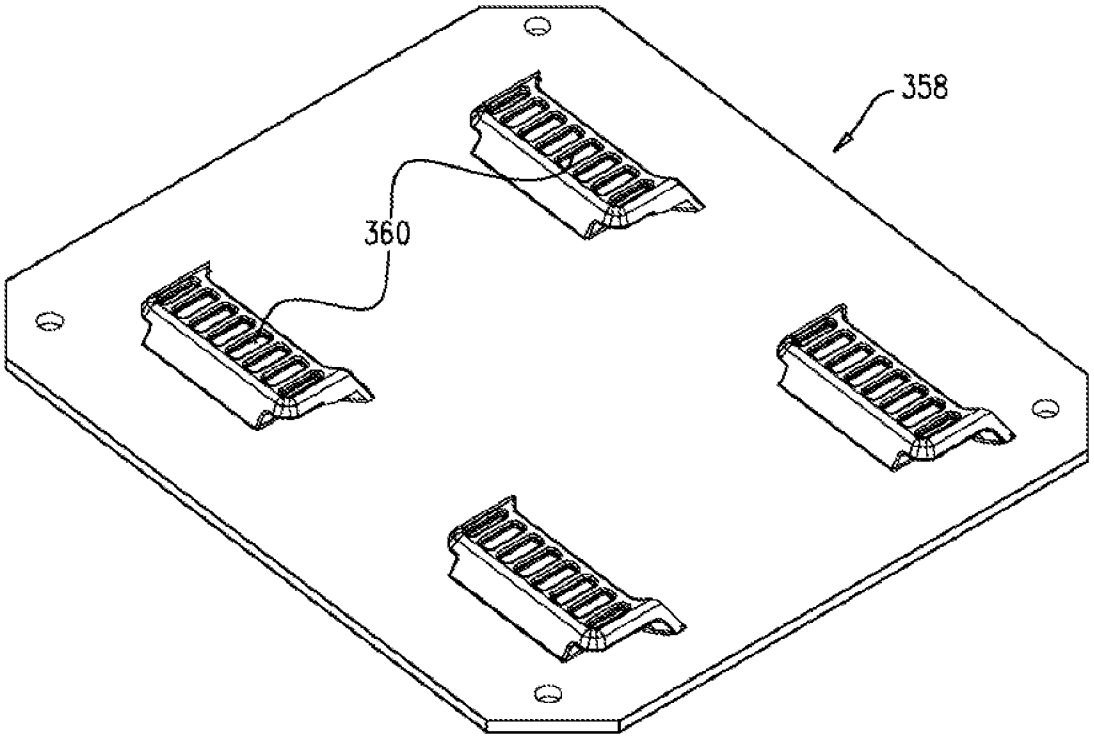


FIG. 24

COMBINED DECLARATION AND ASSIGNMENT

Title of Invention: UTILITY ASSEMBLY AND COUPLING MECHANISM

This declaration and assignment is directed to:

☐ The attached or filed herewith application of (list of named inventors)_____,

or

☒ The United States application or PCT international application Number 15/826,232 filed on November 29, 2017.

Declaration

As the below named inventor, I hereby declare that:

The above-identified application ("Application") was made or authorized by me.

I believe that I am the original inventor or an original inventor of a claimed invention or discovery in the Application.

I have reviewed and understood the contents of the Application, including the claims, and I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, the United States Code of Federal Regulations, §1.56 for filings of this Application in the United States of America.

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 for filings of this Application in the United States of America.

Assignment

MILWAUKEE ELECTRIC TOOL CORPORATION
13135 West Lisbon Road
Brookfield, WI 53005

a Delaware Corporation

(hereinafter designated as the "Assignee"),

☐ I hereby acknowledge that I have assigned the above-identified invention by previous assignment (attached hereto) to Assignee which is hereby conformed for recordation in the US Patent Office and I confirm I have and do assign and transfer:

or

☒ For good and valuable consideration, the sufficiency of which is acknowledged, I hereby assign and transfer and/or have assigned and transferred to Assignee:

my entire right, title, and interest in, to, and under the Application, including all priority rights for other countries arising therefrom and the right to claim priority to the Application, all inventions or discoveries therein disclosed, and any and all Letters Patent of the United States, European Patent Office and of all other countries, which may be granted for such inventions or discoveries, or any of them, all such inventions or discoveries and all rights in such Application including any and all provisionals, substitutions, divisions, and continuations thereof, and to all Letters Patent that may be granted for said inventions and discoveries, and in and to all extensions, supplementary protection certificates, reexaminations, renewals, and reissues thereof, to be held and enjoyed by Assignee for its own use and enjoyment to the full end of the term or terms for which such Letters Patent may be granted, as fully and entirely as the same would

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have been held and enjoyed by me had this assignment and sale not been made.

I shall execute all papers necessary in connection with the Application in the United States Patent and Trademark Office, European Patent Office, any other patent offices, and under the Patent Cooperation Treaty, and any continuing, divisional, or reissue applications thereof, any reexamination of any of such applications, and any patent term extensions or supplementary protection certificates of any such applications and also to execute separate assignments in connection with such applications as the Assignee may deem necessary or expedient.

I shall execute all papers necessary in connection with any litigation or any other judicial proceeding in the United States or other country, or any administrative proceeding in the United States Patent and Trademark Office, European Patent Office, any other patent office, or under the Patent Cooperation Treaty concerning the Application(s) or any continuation, divisional, or reissue applications thereof, or any reexamination of any such applications, or any Letters Patent issued therefrom or any patent term extensions or supplementary protection certificates of any such applications and to cooperate with the Assignee in every way possible in obtaining evidence and going forward with such litigation or proceeding.

I shall execute all papers and documents and perform any act which may be necessary in connection with claims or provisions of the International Convention for Protection of Industrial Property or similar agreements.

I shall do all other acts which, in the opinion of Assignee, may be necessary or desirable to secure the grant of Letters Patent to Assignee or its nominees, in the United States, by the European Patent Office and in all other countries where Assignee may desire to have such inventions or discoveries, or any of them, patented, with specifications and claims in such form as shall be approved by Assignee and to vest and confirm in Assignee or its nominees the full and complete legal and equitable title to all such Letters Patent.

I hereby (i) authorize and request the Commissioner of Patents to issue any and all Letters Patent of the United States resulting from the Application or any divisional, continuation, or reissue applications thereof, and any reexamination of any of such applications, to Assignee, and (ii) covenant that I have full right to convey the interest herein assigned, and that I have not executed, and will not execute, any agreement in conflict herewith.

I hereby grant the attorney of record the power to insert on this assignment any further identification which may be necessary or desirable in order to obtain legal recordation of this document.

LEGAL NAME OF INVENTOR

Grant T. Squiers

Signature

9.5.18

Date

COMBINED DECLARATION AND ASSIGNMENT

Title of Invention: UTILITY ASSEMBLY AND COUPLING MECHANISM

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MILWAUKEE ELECTRIC TOOL CORPORATION
13135 West Lisbon Road
Brookfield, WI 53005

a Delaware Corporation

(hereinafter designated as the "Assignee"),

☐ I hereby acknowledge that I have assigned the above-identified invention by previous assignment (attached hereto) to Assignee which is hereby conformed for recordation in the US Patent Office and I confirm I have and do assign and transfer:

or

☒ For good and valuable consideration, the sufficiency of which is acknowledged, I hereby assign and transfer and/or have assigned and transferred to Assignee:

my entire right, title, and interest in, to, and under the Application, including all priority rights for other countries arising therefrom and the right to claim priority to the Application, all inventions or discoveries therein disclosed, and any and all Letters Patent of the United States, European Patent Office and of all other countries, which may be granted for such inventions or discoveries, or any of them, all such inventions or discoveries and all rights in such Application including any and all provisionals, substitutions, divisions, and continuations thereof, and to all Letters Patent that may be granted for said inventions and discoveries, and in and to all extensions, supplementary protection certificates, reexaminations, renewals, and reissues thereof, to be held and enjoyed by Assignee for its own use and enjoyment to the full end of the term or terms for which such Letters Patent may be granted, as fully and entirely as the same would

have been held and enjoyed by me had this assignment and sale not been made.

I shall execute all papers necessary in connection with the Application in the United States Patent and Trademark Office, European Patent Office, any other patent offices, and under the Patent Cooperation Treaty, and any continuing, divisional, or reissue applications thereof, any reexamination of any of such applications, and any patent term extensions or supplementary protection certificates of any such applications and also to execute separate assignments in connection with such applications as the Assignee may deem necessary or expedient.

I shall execute all papers necessary in connection with any litigation or any other judicial proceeding in the United States or other country, or any administrative proceeding in the United States Patent and Trademark Office, European Patent Office, any other patent office, or under the Patent Cooperation Treaty concerning the Application(s) or any continuation, divisional, or reissue applications thereof, or any reexamination of any such applications, or any Letters Patent issued therefrom or any patent term extensions or supplementary protection certificates of any such applications and to cooperate with the Assignee in every way possible in obtaining evidence and going forward with such litigation or proceeding.

I shall execute all papers and documents and perform any act which may be necessary in connection with claims or provisions of the International Convention for Protection of Industrial Property or similar agreements.

I shall do all other acts which, in the opinion of Assignee, may be necessary or desirable to secure the grant of Letters Patent to Assignee or its nominees, in the United States, by the European Patent Office and in all other countries where Assignee may desire to have such inventions or discoveries, or any of them, patented, with specifications and claims in such form as shall be approved by Assignee and to vest and confirm in Assignee or its nominees the full and complete legal and equitable title to all such Letters Patent.

I hereby (i) authorize and request the Commissioner of Patents to issue any and all Letters Patent of the United States resulting from the Application or any divisional, continuation, or reissue applications thereof, and any reexamination of any of such applications, to Assignee, and (ii) covenant that I have full right to convey the interest herein assigned, and that I have not executed, and will not execute, any agreement in conflict herewith.

I hereby grant the attorney of record the power to insert on this assignment any further identification which may be necessary or desirable in order to obtain legal recordation of this document.

LEGAL NAME OF INVENTOR

Christopher S. Hoppe

Signature _____ Date _____

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COMBINED DECLARATION AND ASSIGNMENT

Title of Invention: UTILITY ASSEMBLY AND COUPLING MECHANISM

This declaration and assignment is directed to:

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or

☒ The United States application or PCT international application Number 15/826,232 filed on November 29, 2017.

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Assignment

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Brookfield, WI 53005

a Delaware Corporation

(hereinafter designated as the "Assignee"),

☐ I hereby acknowledge that I have assigned the above-identified invention by previous assignment (attached hereto) to Assignee which is hereby conformed for recordation in the US Patent Office and I confirm I have and do assign and transfer:

or

☒ For good and valuable consideration, the sufficiency of which is acknowledged, I hereby assign and transfer and/or have assigned and transferred to Assignee:

my entire right, title, and interest in, to, and under the Application, including all priority rights for other countries arising therefrom and the right to claim priority to the Application, all inventions or discoveries therein disclosed, and any and all Letters Patent of the United States, European Patent Office and of all other countries, which may be granted for such inventions or discoveries, or any of them, all such inventions or discoveries and all rights in such Application including any and all provisionals, substitutions, divisions, and continuations thereof, and to all Letters Patent that may be granted for said inventions and discoveries, and in and to all extensions, supplementary protection certificates, reexaminations, renewals, and reissues thereof, to be held and enjoyed by Assignee for its own use and enjoyment to the full end of the term or terms for which such Letters Patent may be granted, as fully and entirely as the same would

Klein Tools Ex. 1021, Page 311 of 313

have been held and enjoyed by me had this assignment and sale not been made.

I shall execute all papers necessary in connection with the Application in the United States Patent and Trademark Office, European Patent Office, any other patent offices, and under the Patent Cooperation Treaty, and any continuing, divisional, or reissue applications thereof, any reexamination of any of such applications, and any patent term extensions or supplementary protection certificates of any such applications and also to execute separate assignments in connection with such applications as the Assignee may deem necessary or expedient.

I shall execute all papers necessary in connection with any litigation or any other judicial proceeding in the United States or other country, or any administrative proceeding in the United States Patent and Trademark Office, European Patent Office, any other patent office, or under the Patent Cooperation Treaty concerning the Application(s) or any continuation, divisional, or reissue applications thereof, or any reexamination of any such applications, or any Letters Patent issued therefrom or any patent term extensions or supplementary protection certificates of any such applications and to cooperate with the Assignee in every way possible in obtaining evidence and going forward with such litigation or proceeding.

I shall execute all papers and documents and perform any act which may be necessary in connection with claims or provisions of the International Convention for Protection of Industrial Property or similar agreements.

I shall do all other acts which, in the opinion of Assignee, may be necessary or desirable to secure the grant of Letters Patent to Assignee or its nominees, in the United States, by the European Patent Office and in all other countries where Assignee may desire to have such inventions or discoveries, or any of them, patented, with specifications and claims in such form as shall be approved by Assignee and to vest and confirm in Assignee or its nominees the full and complete legal and equitable title to all such Letters Patent.

I hereby (i) authorize and request the Commissioner of Patents to issue any and all Letters Patent of the United States resulting from the Application or any divisional, continuation, or reissue applications thereof, and any reexamination of any of such applications, to Assignee, and (ii) covenant that I have full right to convey the interest herein assigned, and that I have not executed, and will not execute, any agreement in conflict herewith.

I hereby grant the attorney of record the power to insert on this assignment any further identification which may be necessary or desirable in order to obtain legal recordation of this document.

LEGAL NAME OF INVENTOR

Steven W. Hyma

Signature

9/5/18

Date

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

Title of Invention: UTILITY ASSEMBLY AND COUPLING MECHANISM

As a below named inventor, I hereby declare that:

This declaration is directed to the application

☐ attached hereto, or

☒ United States application or PCT International Application No. 15/826,232 filed on November 29, 2017

The above-identified application was made by me 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 have reviewed and understand the contents of the above-identified application, including the claims.

I acknowledge the duty to disclose information which is material to the patentability of this application as defined in 37 CFR § 1.56.

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.

Legal Name of Inventor

Inventor: **Yaron BRUNNER** Date: 4/01/18

Signature: _____