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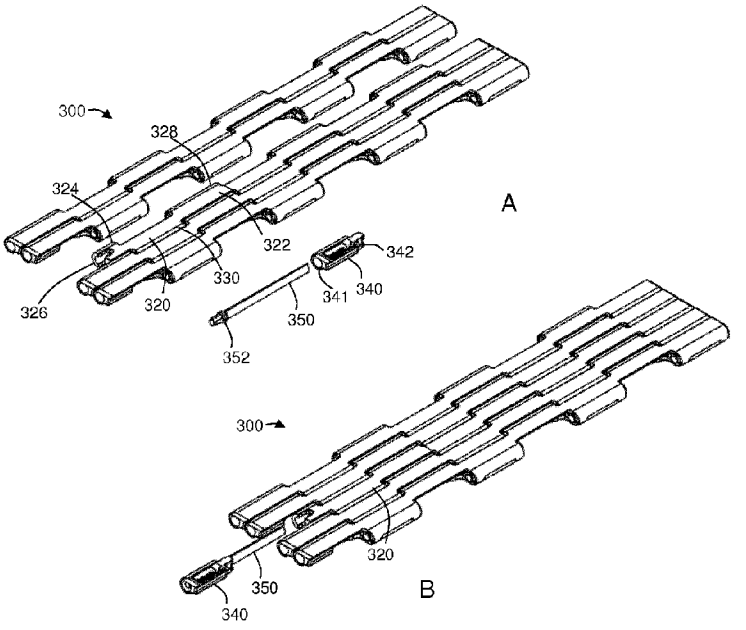

(57) Abrégé/Abstract:
A modular belt (300) comprises a belt module (320), a pivot rod (350) and a link cap (340). The belt module (320) comprises an intermediate section (322), an outer link end (324) extending from the intermediate section (322) in a first direction parallel to a direction of belt travel and an opposing link end (330) extending from the intermediate section (322) in a second direction opposite the first direction. The opposing link end (330) is configured to interdigitate with link ends of an adjacent module and has a transverse opening defined therein. The outer link end (324) has a transverse opening defined therein and a mating connector (326). The pivot rod (350) is disposed through the transverse opening of the outer link end (324). The link cap (340) is for retaining the pivot rod (350) and has a corresponding connector (342) configured to mate with the mating connector (326) of the outer link end (324).

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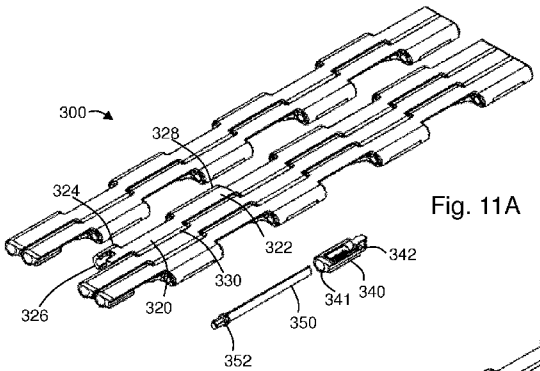

Fig. 11A

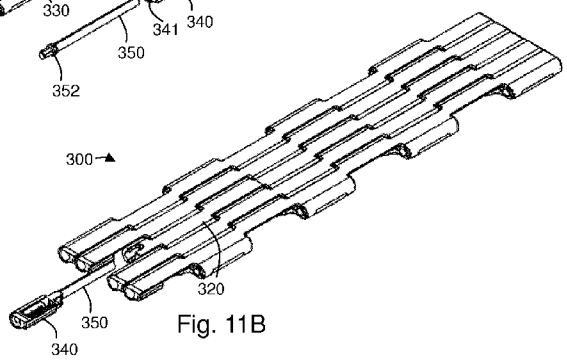

Fig. 11B

(57) **Abstract**: A modular belt (300) comprises a belt module (320), a pivot rod (350) and a link cap (340). The belt module (320) comprises an intermediate section (322), an outer link end (324) extending from the intermediate section (322) in a first direction parallel to a direction of belt travel and an opposing link end (330) extending from the intermediate section (322) in a second direction opposite the first direction. The opposing link end (330) is configured to interdigitate with link ends of an adjacent module and has a transverse opening defined therein. The outer link end (324) has a transverse opening defined therein and a mating connector (326). The pivot rod (350) is disposed through the transverse opening of the outer link end (324). The link cap (340) is for retaining the pivot rod (350) and has a corresponding connector (342) configured to mate with the mating connector (326) of the outer link end (324).

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ROD RETENTION SYSTEM AND METHOD

Field of the Invention

[0001] The present invention relates to modular belts, including chained and brick-laid modular conveyor belts.

Background of the Invention

[0002] Modular plastic belts are designed as chains (one belt module in each row of the belt) or brick-laid belts (having more than one belt module in one or more rows). The belt modules have intercalated link ends with bores for pivot rods which hingedly join the module(s) to those of the adjacent rows. Pivot rod retaining provisions are necessary to avoid the rods from escaping of the belt.

[0003] Many modern modular conveyor belts have a small belt pitch, often 0.5 inch (approximately 1.27 cm) or smaller. Due to this small belt pitch there is very little space available for rod retaining systems such as clips or locks. Possible solutions are known in the art such as those disclosed in U.S. patents US 5 645 160 A and US 7 108 127 B2. In these cases the rod ends are furnished with retaining rings, which engage in the outermost links by a press fit or abutment of a ring against the link face. Although these solutions solve the problem of retaining the rod, in small pitch belts, extraction of the rod for disassembly remains difficult. This is particularly important for cleaning, maintenance, or repair of the belt. Therefore, there is a need for a rod retaining system, which is well retaining the rod but also allows easier extraction.

Brief Summary of the Invention

[0004] According to an embodiment, there is provided a modular belt, comprising: a belt module comprising: an intermediate section; an outer link end extending from the intermediate section in a first direction parallel to a direction of belt travel, the outer link end having a transverse opening defined therein and a mating connector; and an opposing link end

extending from the intermediate section in a second direction opposite the first direction, the opposing link end configured to interdigitate with link ends of an adjacent module, the opposing link end having a transverse opening defined therein; a pivot rod disposed through the transverse opening of the outer link; and a link cap for retaining the pivot rod, the link cap having a corresponding connector configured to mate with the mating connector of the outer link end.

[0004a] According to another embodiment, there is provided a belt module system, comprising: an end module comprising: an intermediate section; an outer link end extending from the intermediate section in a first direction parallel to a direction of belt travel, the outer link end having a transverse opening defined therein and a mating connector; and an opposing link end extending from the intermediate section in a second direction opposite the first direction, the opposing link end configured to interdigitate with link ends of an adjacent module, the opposing link end having a transverse opening defined therein; and a link cap for preventing migration of a pivot rod when a pivot rod is installed, the link cap having a corresponding connector configured to mate with the mating connector of the outer link end; wherein the link cap further comprises an integrated rodlet configured to be disposed through the transverse opening of the outer link end when the link cap is attached to the outer link end.

[0004b] According to another embodiment, there is provided a method of assembling a modular belt, comprising the steps of: inserting a pivot rod into a link cap to form a link cap assembly; lacing the pivot rod of the link cap assembly through transverse openings of interdigitated link ends of two adjacent belt modules; and attaching the link cap assembly to the end module of the module row.

[0005] The present disclosure provides belts (chains or brick-laid) using rod retaining systems similar to those disclosed in US 5 645 160 A, but including a special end module for easier disassembly. The outer link end of the end module is altered to be narrower and furnished

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with a connecting structure. A separate cap piece is produced, providing a corresponding connecting structure suitable to connect to the outer link end of the end module such that the width of the outer combined pieces is substantially the same as the other link ends of the belt. The link cap is furnished with an opening allowing for assembly with a pivot rod, and in some embodiments, the link cap provides the previously known rod retaining structures.

[0006] The present disclosure also provides a method for assembling a modular belt, wherein the pivot rod is inserted into the link cap before the assembly is attached to the end module. The link cap provides for easier grip and more convenient removal of the pivot rod for disassembly of the module.

[0007] In another embodiment, the link cap includes an integrated rodlet, for more convenient assembly.

[0008] The disclosed belt module system may be used in a single row to assemble a belt. In other embodiments, the belt module system may be installed on every row of a belt, or any number of rows of the belt. Additionally, the belt module system may be installed on one or both side of a module row.

Description of the Drawings

[0009] For a fuller understanding of the nature and objects of the invention, reference should be made to the following detailed description taken in conjunction with the accompanying drawings, in which:

Figure 1A is a top view of a belt module system according to an embodiment of the present invention;

Figure 1B is an orthogonal view of the belt module system of figure 1A;

Figure 1C is an orthogonal view of the belt module system of figures 1A and 1B, wherein the link cap is not attached to the end module;

Figure 2 is an orthogonal view of a belt portion having the belt module system of figures 1A-1C installed;

Figure 3A is a top view of a belt module system according to another embodiment of the present invention;

Figure 3B is a top view of the belt module system of figure 3A with the link cap attached to the end module;

Figure 3C is an orthogonal view of the belt module of figure 3B;

Figure 3D is an orthogonal view of the belt module of figure 3A;

Figure 3E is another orthogonal view of the belt module of figures 3B and 3C;

Figure 3F is another orthogonal view of the belt module of figure 3A and 3D;

Figure 4A is a top view of a pivot rod and link cap according to another embodiment of the present invention;

Figure 4B is a top view of the assembled pivot rod and link cap of figure 4A and a belt module;

Figure 5A is an orthogonal view of the pivot rod and link cap of figure 4A;

Figure 5B is an orthogonal view of the assembled pivot rod and link cap and the belt module of figure 4B;

Figure 6A is a top view of a pivot rod and link cap according to another embodiment of the present invention, wherein the link cap has a bayonet-type connector;

Figure 6B is a top view of an end module and the assembled pivot rod and link cap of figure 6A;

Figure 7A is an orthogonal view of the pivot rod and link cap of figure 6A;

Figure 7B is an orthogonal view of the end module and the assembled pivot rod and link cap of figure 6B;

Figure 7C is an orthogonal view of an assembled pivot rod and link cap and an assembly of belt modules, wherein the link cap has a bayonet connector;

Figure 8A is an end view of a link cap having an integrated rodlet according to another embodiment of the present invention;

Figure 8B is an alternate end view of the link cap of figure 8A;

Figure 8C is an orthogonal view of the link cap of figures 8A and 8B;

Figure 9 is a partial orthogonal detail of two rows of assembled modules showing the interface of a rodlet and a floating rod;

Figure 10A is an end view of the link cap of figure 1A;

Figure 10B is an end view of the end module of figure 1A;

Figure 10C is an end view of the link cap and end module of figures 10A and 10B;

Figure 11A is an orthogonal view of a portion of a belt according to an embodiment of the present disclosure before assembly;

Figure 11B is an orthogonal view of the belt portion of figure 11A during assembly;

Figure 12A is a top view of the belt portion of figure 11A;

Figure 12B is a top view of the belt portion of figure 11B;

Figure 13A is a bottom view of the belt portion of figures 11A and 12A;

Figure 13B is a bottom view of the belt portion of figures 11B and 12B;

Figure 14 is a top view of the assembled belt portion of figures 11A-13B;

Figure 15 is an orthogonal view of a portion of a belt according to another embodiment of the present invention;

Figure 16 is a top view of a portion of a belt according to another embodiment of the present invention;

Figure 17 is a top view of a portion of a belt according to another embodiment of the present invention; and

Figure 18 is a flowchart depicting a method according to another embodiment of the present disclosure.

Detailed Description of the Invention

[0010] With reference to figures 1A-1C, the present invention may be embodied as a belt module system **10** for use with a modular belt, such as a conveyor belt. The system **10** comprises an end module **20** having an intermediate section **22**. An outer link end **24** extends from the intermediate section **22** in a first direction, the first direction being parallel to the direction of belt travel (longitudinal direction). The outer link end **24** has a mating connector **26**, further described below. The outer link end **24** has a transverse opening **25** (see figure 10B) through its width, the transverse opening **25** being suitable for a pivot rod for lacing modules together so as to form a belt.

[0011] In some embodiments, for example, the embodiment depicted in figures 3A-3F, the end module **70** may comprise an inner link end **78** extending from the intermediate section **72** in the same direction as the outer link end **74** - the first direction. The inner link end **78** having a transverse opening **79** through its width, the transverse opening **79** of the inner link end **78** being coaxially aligned with the transverse opening **75** of the outer link end **74**.

[0012] The end module **70** has an opposing link end **80** extending from the intermediate section **72** in a second direction. The second direction is parallel to the direction of belt travel but opposite to the first direction. The opposing link end **80** is configured to interdigitate (intercalate) with link ends of an adjacent module. For example, the end module **70** may be installed in a belt so that the opposing link end **80** is interdigitated between the outer link end and the inner link

end of an adjacent end module. In other belts, the end module **70** may be installed in a belt such that the opposing module is interdigitated between link ends of another type of module.

[0013] The opposing link end **80** has a transverse opening **82** extending through its width. The transverse opening **82** is configured to be coaxially aligned with the transverse openings of any interdigitated link ends. It should be noted that coaxially aligned should not be viewed to limit the transverse openings to be circular in shape, but broadly interpreted to describe that a pivot rod may be installed through the openings of interdigitated link ends. In this way, modules may be interconnected to form a belt.

[0014] The belt module system **60** further comprises a link cap **90** configured to be attached to the outer link end **74** of the end module **70**. The link cap **90** is used to retain a pivot rod when such a rod is installed through the transverse openings **75**, **79** of the outer and inner link ends **74**, **78**. The link cap **90** has a corresponding connector **92** configured to mate with the mating connector **76** of the outer link end **74**. In some embodiments, the mating connector **76** is a "female"-type connector and the corresponding connector **92** of the link cap **90** is a "male"-type connector. The connectors **76**, **92** may engage with a press fit (sometimes referred to as a snap on), such as that depicted in figures 1A-1C. In another embodiment, depicted in figures 6A, 6B, 7A-7C, the connectors **126**, **142** engage with a bayonet connection, wherein the link cap **140** and its corresponding connector **142** must be rotated relative to the end module **120** for full engagement of the connectors **126**, **142**.

[0015] The belt module system **60** may further comprise a pivot rod **100** (figures 4A, 4B, 5A, and 5B) configured to be disposed through the transverse openings of the outer and inner link ends **74**, **78** of the end module **70**. The link cap **90** is configured to retain the pivot rod **100**. In some embodiments, the pivot rod **100** has a retaining ring **102** having a diameter D_{ring} which is larger than a diameter D_{rod} of the pivot rod **100** and the link cap **90** is configured to cooperate with the retaining ring **102** to prevent migration of the pivot rod **100** from its position when installed, as is known in the art (for example, with a ring slot of the link cap **90** wherein the retaining ring **102** will be captured until urged by a removal force). In such embodiments, the link cap **90** is configured to have a transverse opening **91** which is coaxial with the transverse openings **75**, **79** of the outer and inner link ends **74**, **78**. The transverse opening **91** of the link cap **90** may have a diameter which provides a tight fit (*i.e.*, an interference fit) with the retaining

ring of the pivot rod **100** such that the when the retaining ring **102** engages with the link cap **90**, the pivot rod **100** must be urged into an installed position with a force.

[0016] In other embodiments, the link cap **90** may simply block movement of the pivot rod **100** from its position in the direction of the link cap **90**. For example, in some embodiments, the link cap **90** may not have a transverse opening **91** such that the link cap **90** serves as an abutment for the pivot rod **100**. The link cap **90** may have another type of abutment to prevent the pivot rod **100** from migrating out of the belt past the link cap **90**. In another embodiment, the link cap **90** has a transverse opening that does not span the entire width of the link cap **90**, but instead only part-way through the link cap **90**, thereby creating a pocket in which the pivot rod **100** can reside. In such embodiments, when installed in a belt, it may be advantageous to provide link caps **90** on each side of the belt in order to prevent movement of the pivot rod **100** in either of the axial directions.

[0017] In other embodiments, such as the embodiment depicted in figures 8A-8C, the link cap **240** comprises an integrated rodlet **250**. For example, the link cap **240** may be molded so as to include a rodlet **250**. The rodlet **250** may be of any suitable length, including as long as the transverse width of a finished belt or longer (such that the rodlet may be trimmed to length once installed). In some embodiments, the rodlet **250** is less than the entire width of a particular belt. In such embodiments, the rodlet **250** serves to retain a floating rod **255** ("floater") in the proper position within a belt. Figure 9 depicts a single module row of a belt where the rodlet **250** can be seen interfacing with a floater **255** at a point **261** within the inner link end **228** of an end module **220**. The rodlet **250** may be sized to have a length such that the interface with the floater **255** occurs at any desirable position across the width of a belt.

[0018] It should be noted that the end module **70** is named as such because it is thought to be advantageous (though not required) to position the end module **70** at a transverse side (edge) of a belt. In such configurations, the "outer" link end **74** is positioned to be nearest the edge of the belt. It will be recognized that the belt module system **60** may further comprise a center module **260** having an intermediate section, and a plurality of first link ends extending from the intermediate section in the first direction. The center module **260** also includes a plurality of second link ends extending in the second direction and configured to interdigitate with the plurality of first link ends. Transverse openings are located in the link ends such that a

pivot rod **255** may interlock the interdigitated link ends. More than one center module **260** may be used, and a wide belt may comprise many brick-laid modules.

[0019] In other embodiments, the end module **620** may comprise more than one inner link end and more than one opposing link end (see figure 17). In this way, a belt may be constructed by interdigitating the end modules **620** without the need for center modules for a brick-laid configuration. This configuration is often referred to as a chain.

[0020] The link cap **40** may have a cross sectional shape (when viewed along a longitudinal axis of the link cap - *i.e.*, across the width of the belt) which is substantially the same as the cross-sectional shape of the outer link end **24**. It should be noted that this may also be considered a combined cross-sectional shape of the outer link end **24** and the intermediate section **22**, but solely for convenience and without limitation, reference is made in this disclosure to the outer link end **24**. For example, in figure 10A, it can be seen that the cross-section of the link cap **40** has a shape (around the circumference) that is substantially the same as the cross-sectional shape of the outer link end **24** of the belt module **20** (see figure 10B). In this context, substantially should be interpreted broadly as being only limited by function. For example, in the exemplary embodiments described herein and depicted in, for example, figures 10A-10C, link cap **40** includes a raised logo on its top surface which is not matched by the top surface of the outer link end **24**. Depending on the application for which a particular belt is designed, this should be considered within the scope of substantially the same cross-sectional shape.

[0021] The link cap **90** may further comprise an indicator **93** for distinguishing a belt module having a link cap **90** from traditional belt modules. In this way, personnel needing to operate on the belt can more readily identify the link cap(s) used to disassemble the belt. The indicator **93** may be noticeable based on, for example, visual appearance, texture, etc. The indicator **93** may be an embossed surface, a raised surface, a painted surface (*e.g.*, silk-screened, printed, etc.), a differently colored portion, an overmolded portion, an insert, or any other type of indication, including combinations of different indication. For example, in the embodiments depicted in the figures, the indicator **93** comprises a raised logo of the belt manufacturer, which may be molded with the link cap **90**.

[0022] In some embodiments, such as the embodiment depicted in figure 1A, the outer link end **24** has a transverse width W_{OLE} that is less than the transverse width W_{Opp} of the opposing link end **30**. The link cap **40** may be designed to have a width W_{LC} such that when the

link cap **40** is attached to the outer link end **24**, the combined width $W_{Combined}$ is substantially the same as W_{Opp}. $W_{Combined}$ may be selected to be any suitable width.

[0023] The present disclosure may be embodied as a modular belt **300** having a belt module system as described above (figures 11A-17, or belt **310** of figure 2). In this way, the modular belt **300** comprises a belt module **320** having an intermediate section **322**. An outer link end **324** extends from the intermediate section **322** in a first direction, the first direction being parallel to the direction of belt **300** travel (longitudinal direction). The outer link end **324** has a mating connector **326**. In some embodiments, an inner link end **328** may extend from the intermediate section **322** in the same direction as the outer link end **324** - the first direction. The outer link end **324** and the inner link end **328** each include a transverse opening through the width of the link end **324**, **328** for a pivot rod. As such, the transverse openings are coaxially aligned with one another.

[0024] The belt module **320** has an opposing link end **330** extending from the intermediate section **322** in a second direction. The second direction is parallel to the direction of belt **300** travel but opposite to the first direction. The opposing link end **330** is configured to interdigitate (intercalate) with link ends of an adjacent module. For example, figure 17 depicts an exemplary embodiment of a belt **600** wherein the belt module **620** may be installed in the belt **600** such that the opposing link end **630** is interdigitated between the outer link end **624** and the inner link end **628** of an adjacent belt module **620**. In other belts, the end module may be installed in a belt such that the opposing module is interdigitated between link ends of another type of module (see, for example, figures 15 and 16).

[0025] The opposing link end **330** has a transverse opening extending through its width. The transverse opening is configured to be coaxially aligned with the transverse openings of any interdigitated link ends. It should be noted that coaxially aligned should not be viewed to limit the transverse openings to be circular in shape, but broadly interpreted to describe that a pivot rod may be installed through the openings of interdigitated link ends.

[0026] The belt **300** further comprises a pivot rod **350** configured to be disposed through the transverse openings of the outer and inner link ends **324**, **328** of the belt module **320**. The belt **300** further comprises a link cap **340** configured to be attached to the outer link end **324** of the belt module **320**. The link cap **340** is used to retain the rod **350** in position through the transverse openings of the outer and inner link ends **324**, **328**. The link cap **340** has a

corresponding connector **342** configured to mate with the mating connector **326** of the outer link end **324**. In some embodiments, the mating connector **326** is a "female"-type connector and the corresponding connector **342** of the link cap **340** is a "male"-type connector. The connectors **326**, **342** may engage with a press fit (sometimes referred to as a snap on), such as that depicted in figures 16-17. In other embodiments, such as the belt **400** depicted in figure 15, the connectors engage with a bayonet connection (such as the connectors depicted in figures 6A, 6B, and 7A-7C), wherein the link cap and its corresponding connector must be rotated relative to the end module for full engagement of the connectors.

[0027] In some embodiments, the pivot rod **350** has a retaining ring **352** having a diameter D_{ring} which is larger than a diameter D_{rod} of the pivot rod **350**, and the link cap **340** is configured to cooperate with the retaining ring **352** to prevent migration of the pivot rod **350** from its position when installed, as is known in the art (for example, with a ring slot **344** of the link cap **340** wherein the retaining ring **352** will be captured until urged by a removal force, see figure 13A). In such embodiments, the link cap **340** is configured to have a transverse opening **341** (see figure 11A) which is coaxial with the transverse openings of the outer and inner link ends **324**, **328**. In other embodiments, the link cap **340** may simply block movement of the pivot rod **350**, from its position, in the direction of the link cap **340**. In such embodiments of belts **500**, it may be advantageous to provide link caps **540** on each side of the belt **500** in order to prevent movement of the pivot rod in either of the axial directions (see figure 16).

[0028] The belt module **620** may have more than one inner link end **628** and more than one opposing link end **630** such that a belt **600** may be built up by chaining belt modules **620**, rather than bricklaying modules (see figure 17).

[0029] The present invention may be embodied as a method **900** for assembling a modular conveyor belt comprising the step of inserting **903** a pivot rod into a link cap (see figure 18). The method **900** further comprises the step of lacing **906** the pivot rod through transverse openings of interdigitated link ends of two adjacent belt modules. The link cap and pivot rod are then secured **909** to the end module of the module row. It should be noted that the order of steps in the method **900** is not fixed. For example, the modular conveyor belt may also be assembled by attaching **909** the link cap to the end module of a module row, and then lacing **906** a pivot rod through the transverse openings of interdigitated link ends, and then securing **903** the pivot rod into the link cap.

[0030] Although the present invention has been described with respect to one or more particular embodiments, it will be understood that other embodiments of the present invention may be made without departing from the spirit and scope of the present invention. Hence, the present invention is deemed limited only by the appended claims and the reasonable interpretation thereof.

CLAIMS:

1. Modular belt, comprising:

a belt module comprising:

an intermediate section;

an outer link end extending from the intermediate section in a first direction parallel to a direction of belt travel, the outer link end having a transverse opening defined therein and a mating connector; and

an opposing link end extending from the intermediate section in a second direction opposite the first direction, the opposing link end configured to interdigitate with link ends of an adjacent module, the opposing link end having a transverse opening defined therein;

a pivot rod disposed through the transverse opening of the outer link; and

a link cap for retaining the pivot rod, the link cap having a corresponding connector configured to mate with the mating connector of the outer link end.

2. Modular belt according to claim 1, wherein the belt module further comprises one or more inner link ends extending from the intermediate section in the first direction, the one or more inner link ends having a transverse opening coaxial with the transverse opening of the outer link end.

3. Modular belt according to claim 1 or 2, wherein the link cap further comprises an integrated rodlet configured to be coaxial with the pivot rod.

4. Modular belt according to any one of claims 1 to 3, wherein the corresponding connector of the link cap is a plug connector.

5. Modular belt according to any one of claims 1 to 3, wherein the corresponding connector of the link cap is a bayonet connector.

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6. Modular belt according to any one of claims 1 to 5, wherein the pivot rod has a rod diameter and the pivot rod further comprises a retaining ring having a ring diameter greater than the rod diameter.

7. Modular belt according to any one of claims 1 to 6, wherein the link cap has a transverse opening coaxial with the transverse opening of the outer link end and the transverse opening of the link cap has a diameter which is less than the ring diameter of the pivot rod.

8. Modular belt according to any one of claims 1 to 7, wherein in the link cap is configured to abut the pivot rod.

9. Modular belt according to any one of claims 1 to 8, wherein the link cap further comprises an indicator for distinguishing the link cap from other belt components.

10. Modular belt according to claim 9, wherein the indicator is a raised surface design.

11. Modular belt according to claim 9, wherein, the indicator is a painted design.

12. Modular belt according to any one of claims 1 to 11, wherein the link cap is of a different color than the color of other belt components.

13. Modular belt according to any one of claims 1 to 12, wherein the link cap has a cross-sectional shape which is substantially the same as the cross-sectional shape of the outer link end.

14. Modular belt according to any one of claims 1 to 13, wherein the outer link end has a transverse width that is less than a transverse width of the opposing link end.

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15. Modular belt according to any one of claims 1 to 14, wherein when the link cap is attached to the outer link end, a total transverse width of the link cap and outer link end is substantially the same as the transverse width of the opposing link end.

16. Modular belt according to any one of claims 2 to 15, wherein the belt module comprises more than one inner link end and more than one opposing link end.

17. Belt module system, comprising:

an end module comprising:

an intermediate section;

an outer link end extending from the intermediate section in a first direction parallel to a direction of belt travel, the outer link end having a transverse opening defined therein and a mating connector; and

an opposing link end extending from the intermediate section in a second direction opposite the first direction, the opposing link end configured to interdigitate with link ends of an adjacent module, the opposing link end having a transverse opening defined therein; and

a link cap for preventing migration of a pivot rod when a pivot rod is installed, the link cap having a corresponding connector configured to mate with the mating connector of the outer link end;

wherein the link cap further comprises an integrated rodlet configured to be disposed through the transverse opening of the outer link end when the link cap is attached to the outer link end.

18. Belt module system according to claim 17, wherein the end module further comprises one or more inner link ends extending from the intermediate section in the first direction, the one or more inner link ends having a transverse opening coaxial with the transverse opening of the outer link end.

19. Belt module system according to claim 17 or 18, wherein the corresponding connector of the link cap is a bayonet connector.

20. Belt module system according to claim 17 or 18, wherein the corresponding connector of the link cap is a push connector.

21. Belt module system according to any one of claims 17 to 20, wherein the link cap is configured to abut a pivot rod when installed.

22. Belt module system according to any one of claims 17 to 21, wherein the link cap further comprises an indicator for distinguishing the link cap from other belt components.

23. Belt module system according to claim 22, wherein the indicator is a raised surface design.

24. Belt module system according to claim 22, wherein the indicator is a painted design.

25. Belt module system according to any one of claims 17 to 24, wherein the link cap is of a different color than the color of the end module.

26. Belt module system according to any one of claims 17 to 25, wherein the link cap has a cross-sectional shape which is substantially the same as the cross sectional shape of the outer link end.

27. Belt module system according to any one of claims 17 to 26, wherein the outer link end has a transverse width that is less than a transverse width of the opposing link end.

28. Belt module system according to claim 27, wherein when the link cap is attached to the outer link end, a total transverse width of the link cap and outer link end is substantially the same as the transverse width of the opposing link end.

29. Belt module system according to any one of claims 17 to 28, further comprising:

a center module comprising:

an intermediate section;

a plurality of first link ends extending from the intermediate section in the first direction, and each first link end having a transverse opening configured to align with the transverse opening of the outer link end when the center module abuts the end module; and

a plurality of second link ends extending from the intermediate section in the second direction, the plurality of second link ends configured to interdigitate with the plurality of first link ends of an adjacent module, each second link end having a transverse opening and configured to align with the transverse opening of the opposing link end when the center module abuts the end module.

30. Belt module system according to any one of claims 18 to 29, wherein the end module comprises more than one inner link end and more than one opposing link end.

31. Method of assembling a modular belt, comprising the steps of:

inserting a pivot rod into a link cap to form a link cap assembly;

lacing the pivot rod of the link cap assembly through transverse openings of interdigitated link ends of two adjacent belt modules; and

attaching the link cap assembly to the end module of the module row.

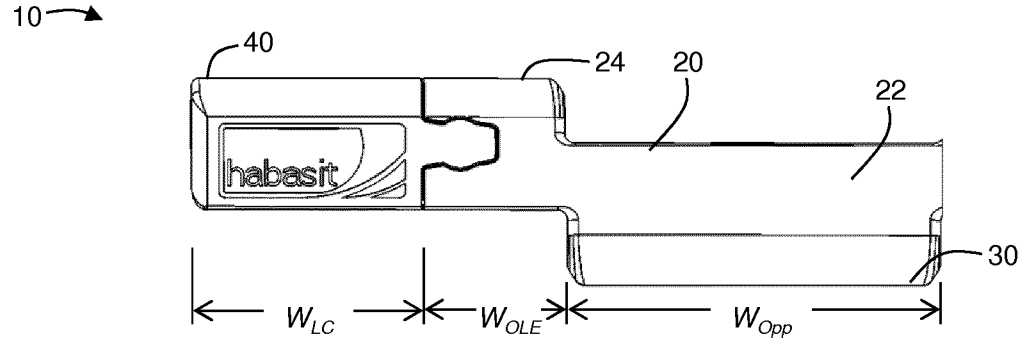


Fig. 1A

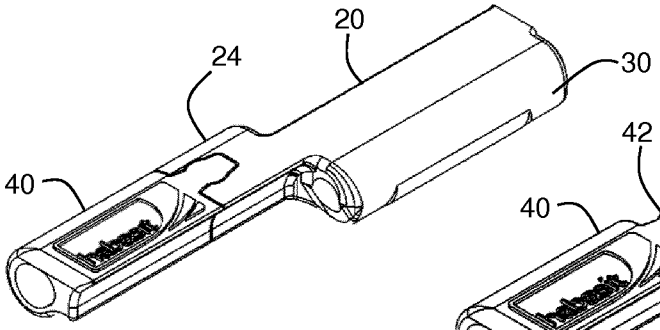


Fig. 1B

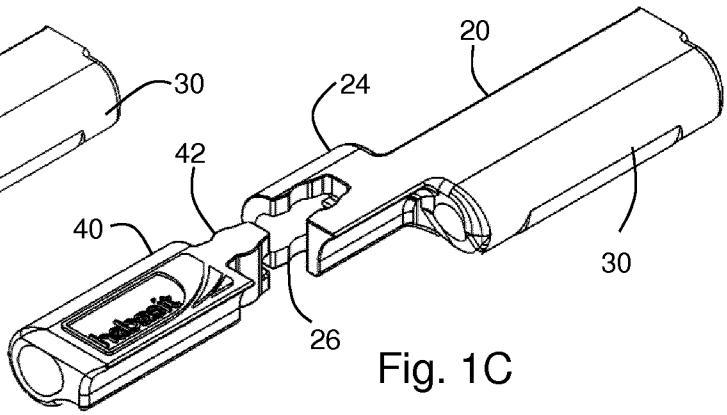


Fig. 1C

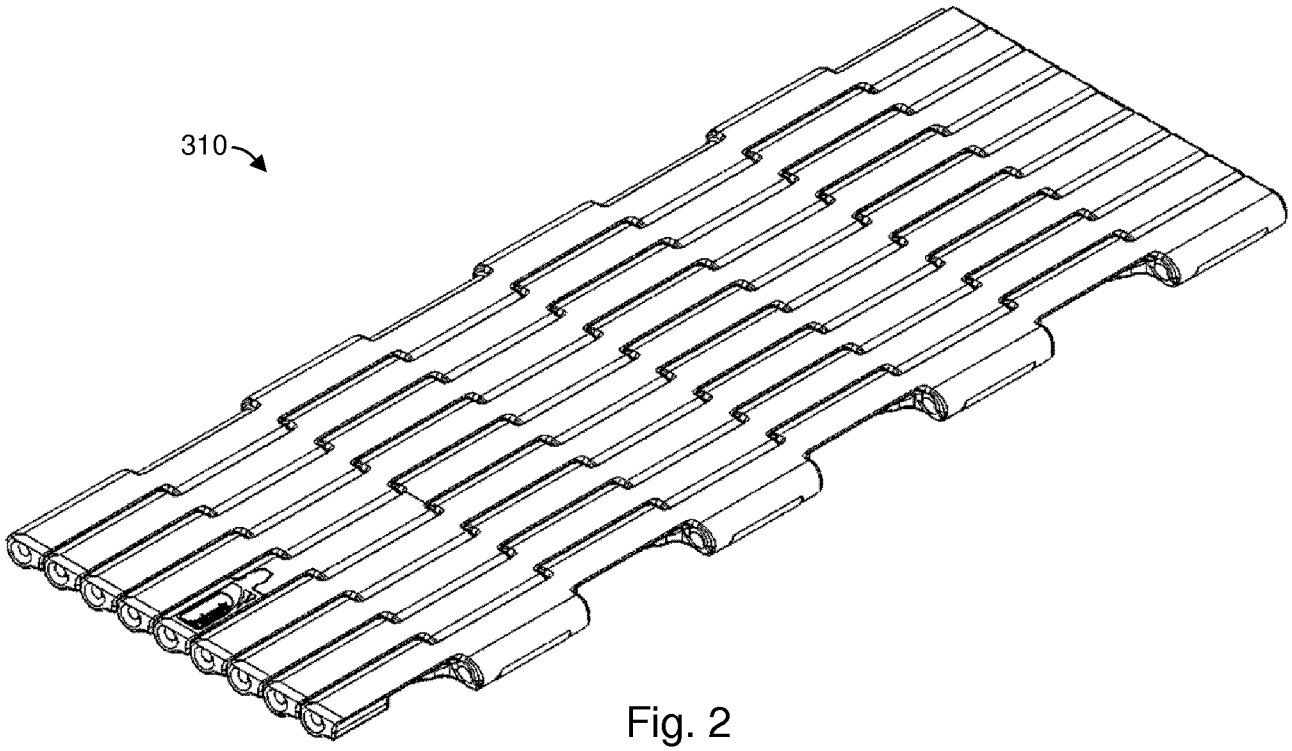


Fig. 2

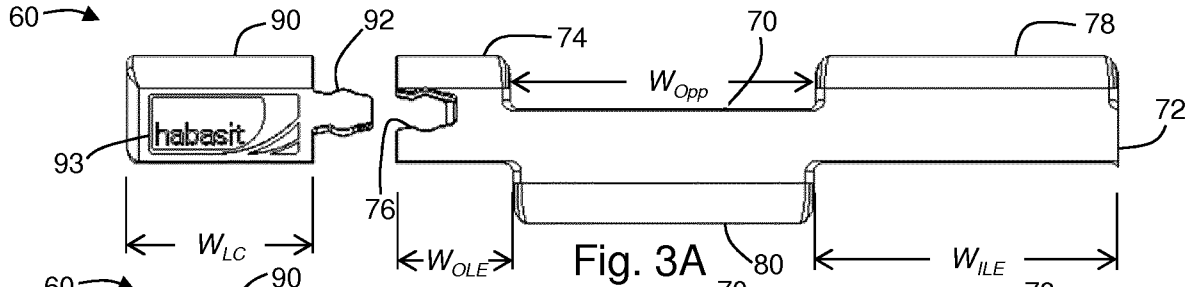


Fig. 3A

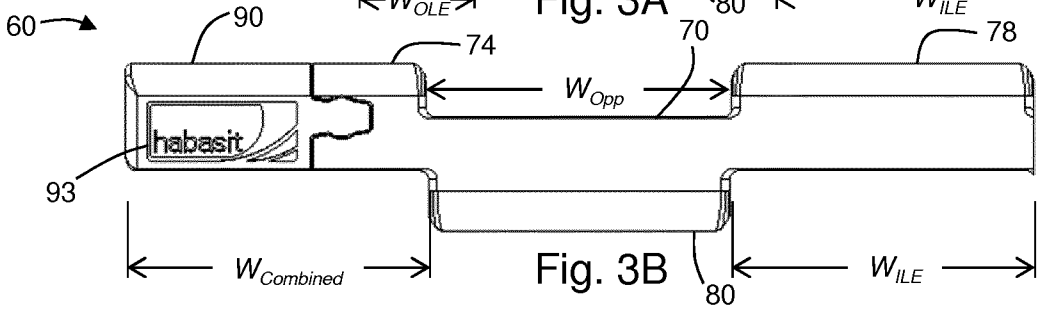


Fig. 3B

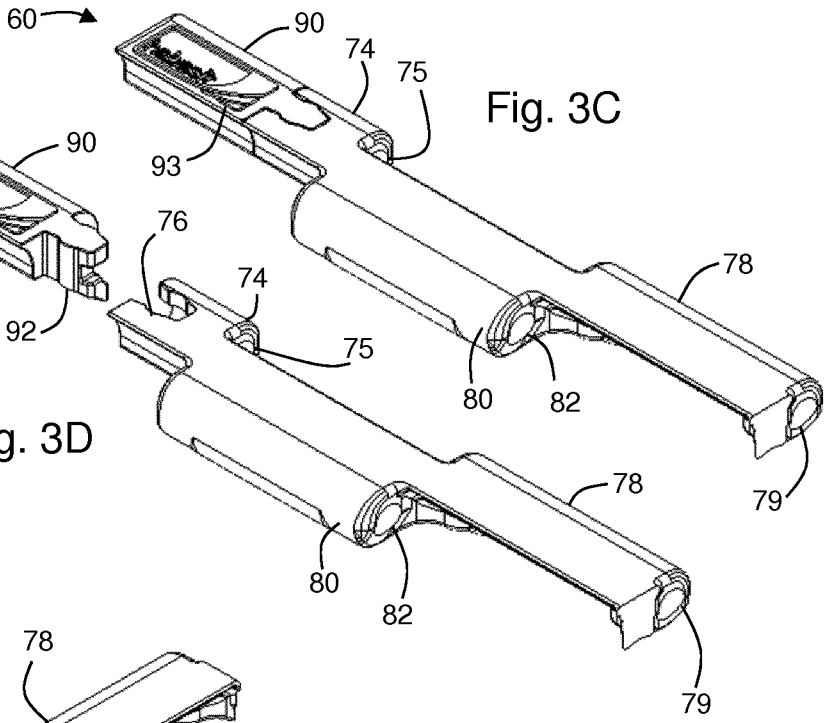


Fig. 3C

Fig. 3D

Fig. 3E

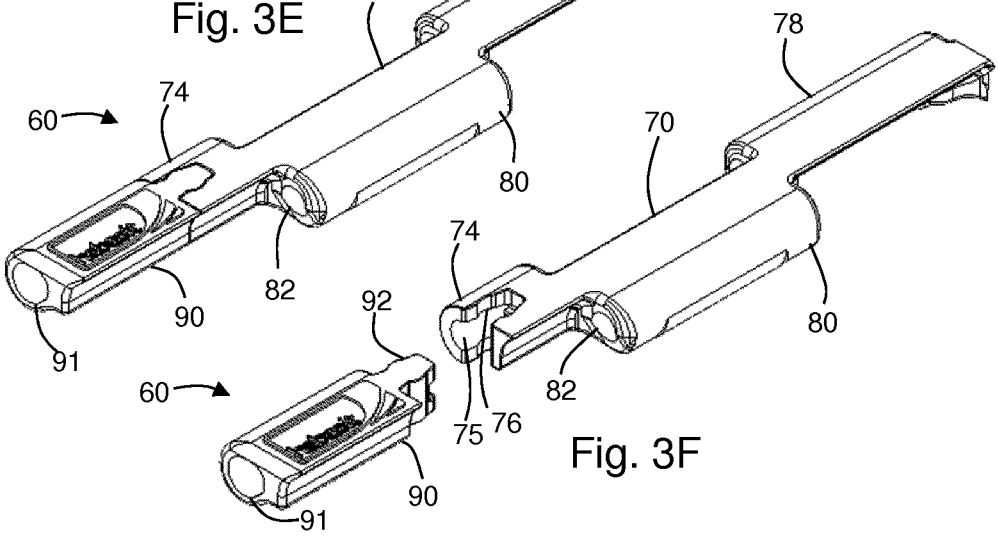


Fig. 3F

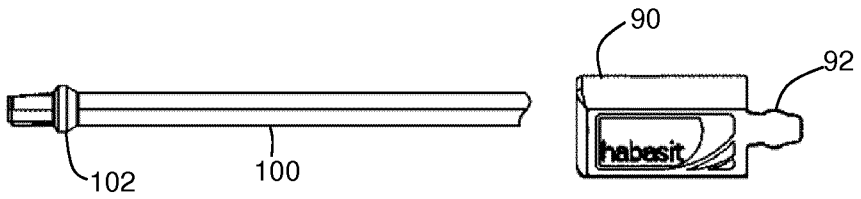


Fig. 4A

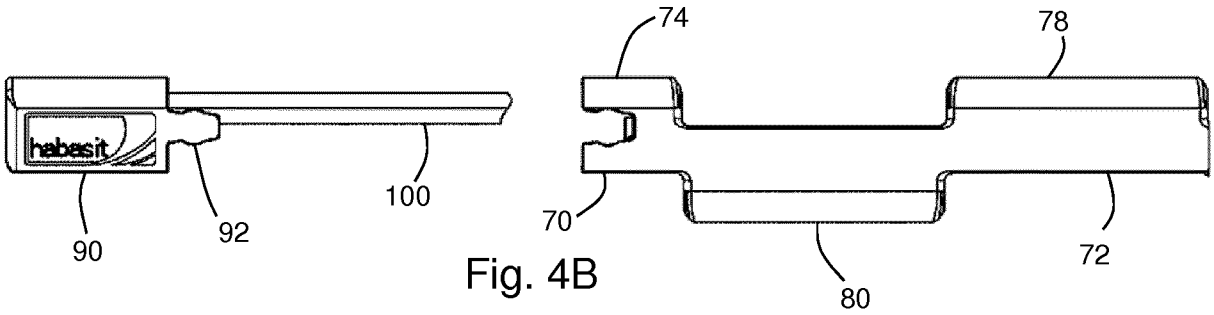
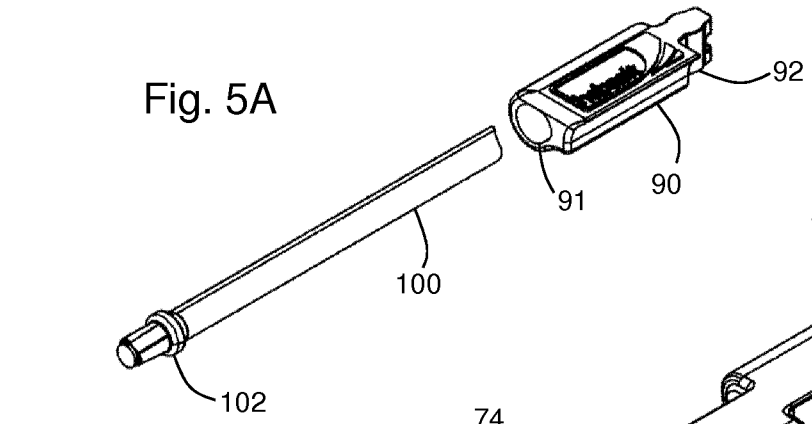


Fig. 4B

Fig. 5A



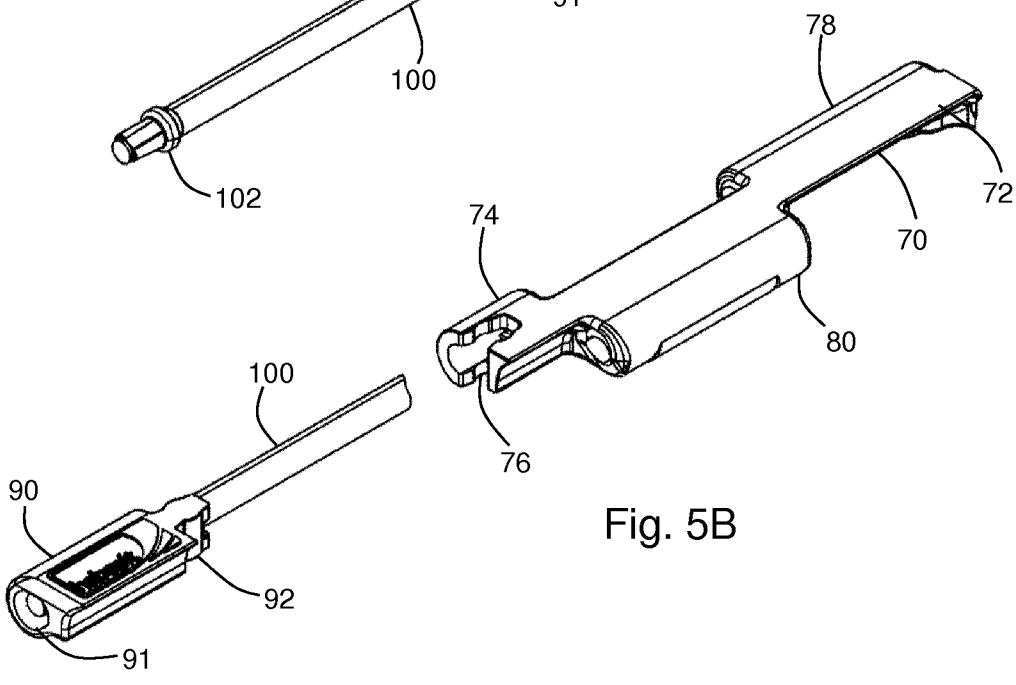


Fig. 5B

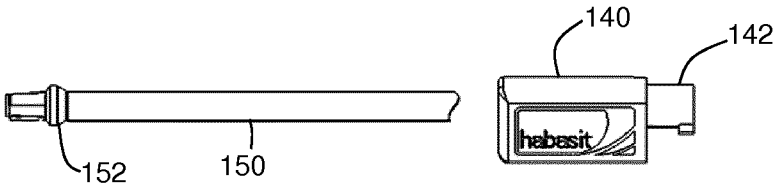


Fig. 6A

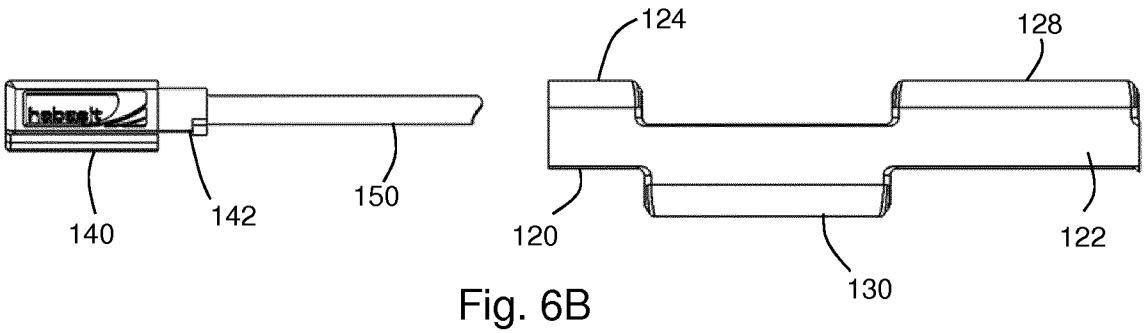
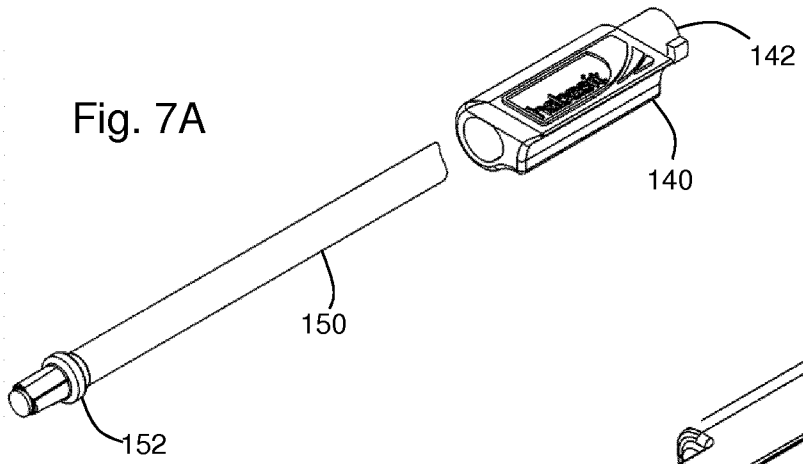


Fig. 6B

Fig. 7A



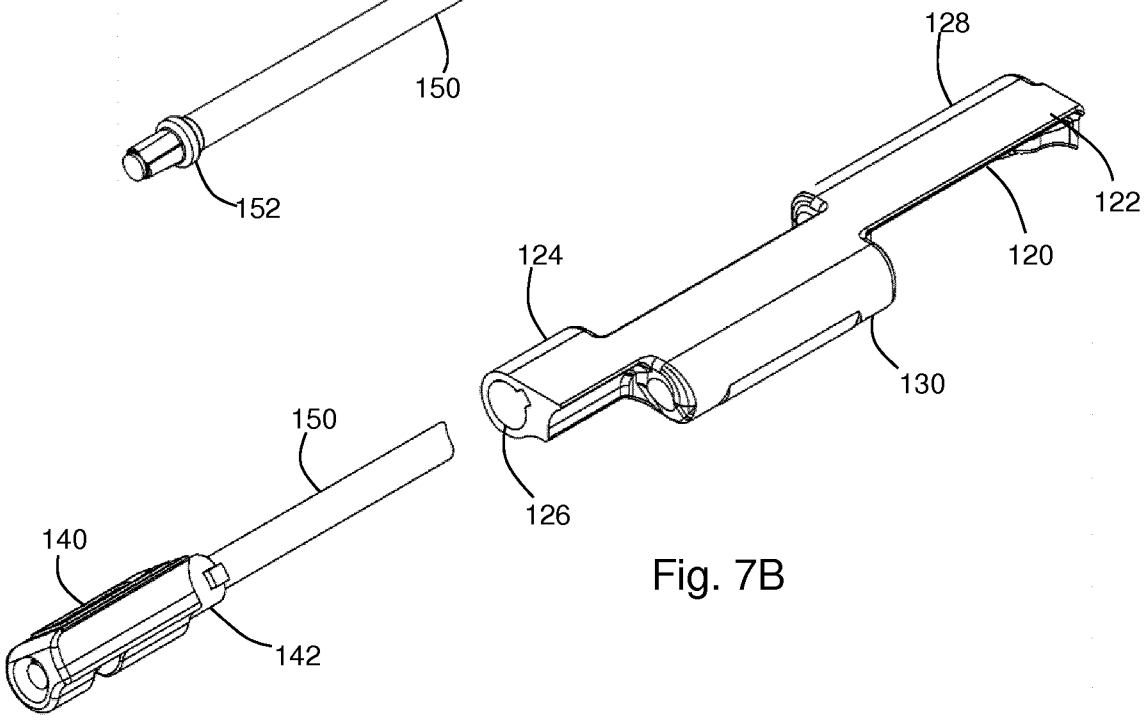


Fig. 7B

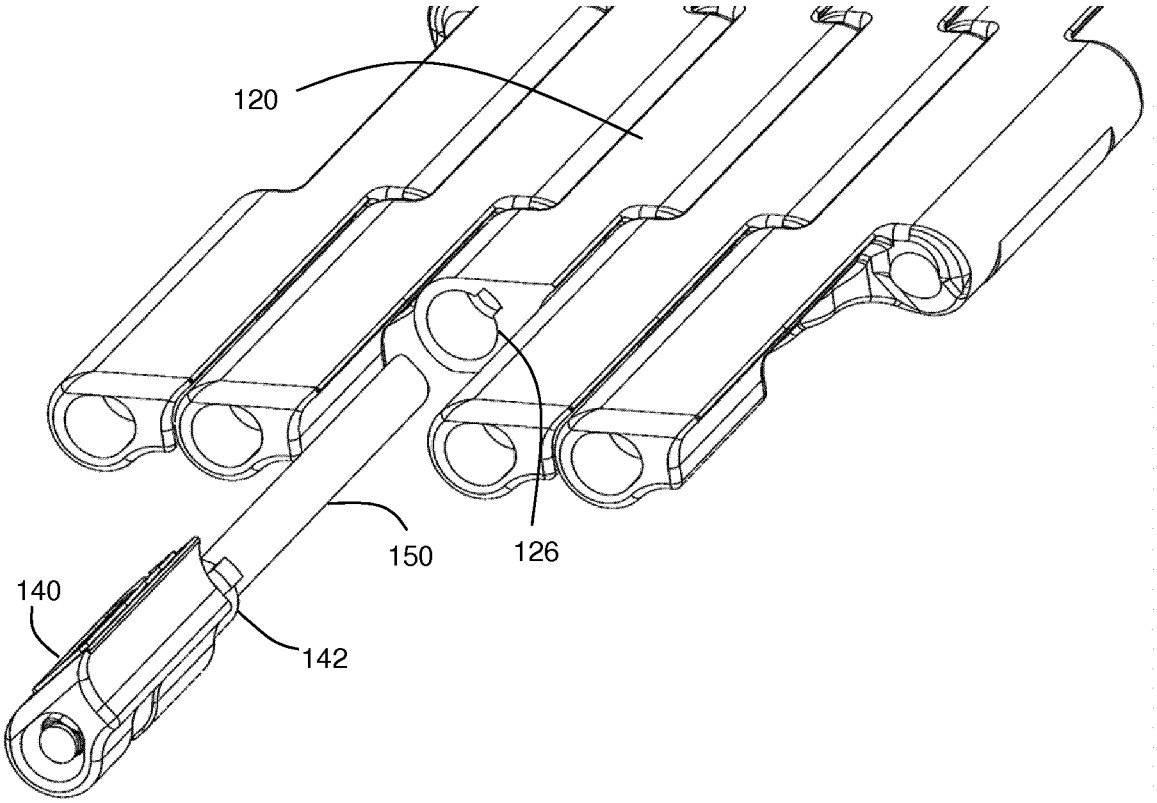


Fig. 7C

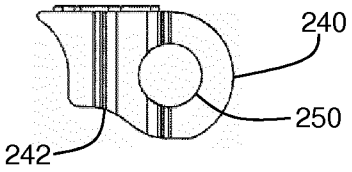


Fig. 8A

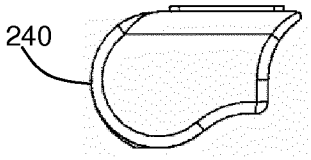


Fig. 8B

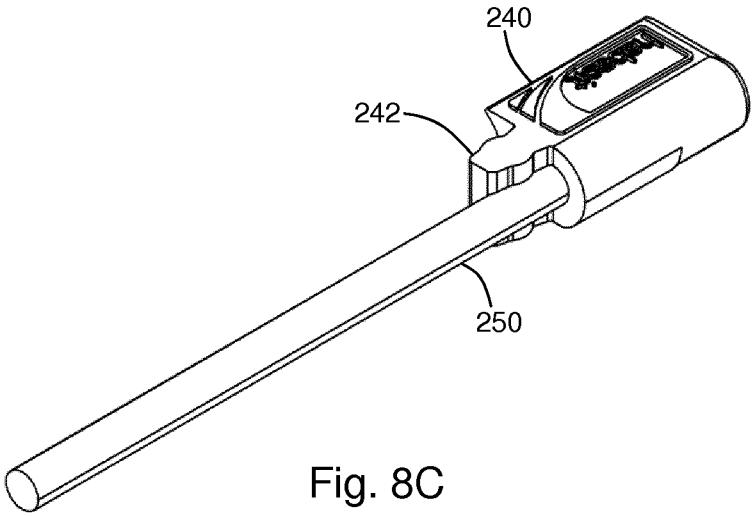


Fig. 8C

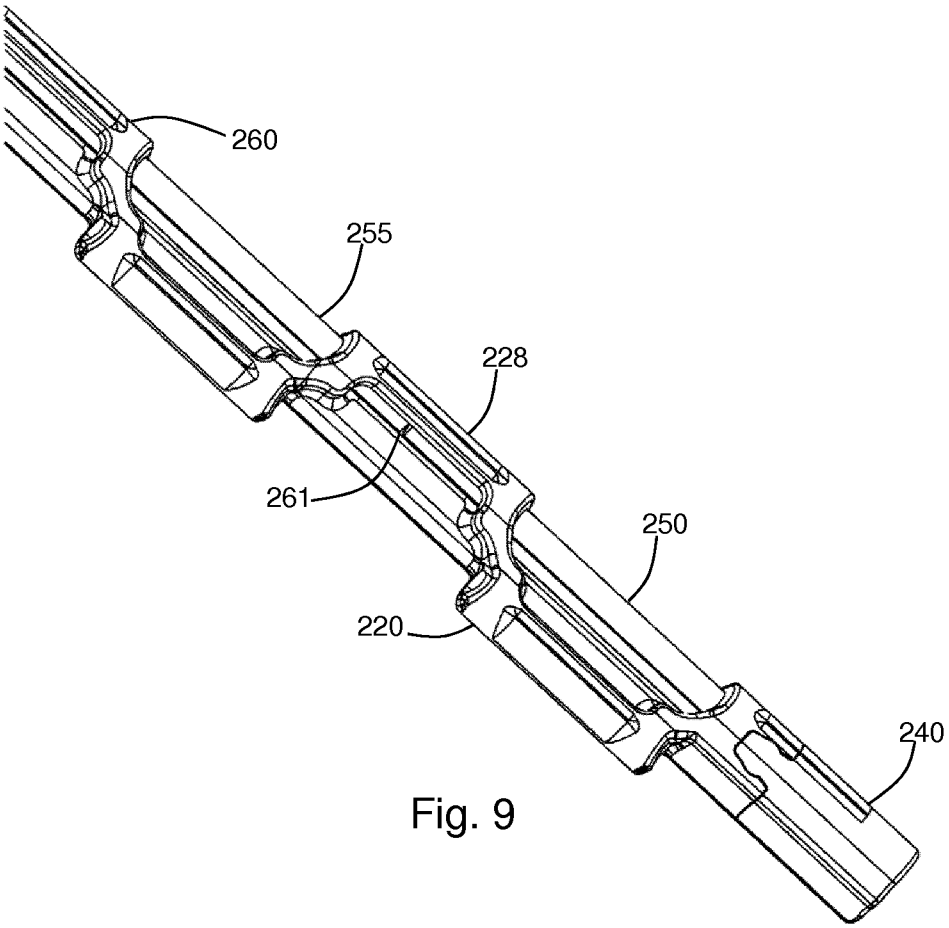


Fig. 9

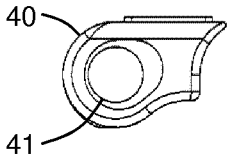


Fig. 10A

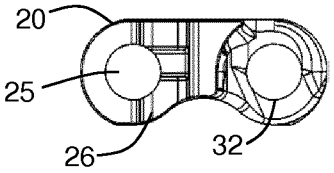


Fig. 10B

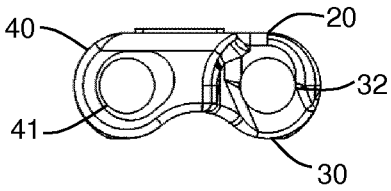


Fig. 10C

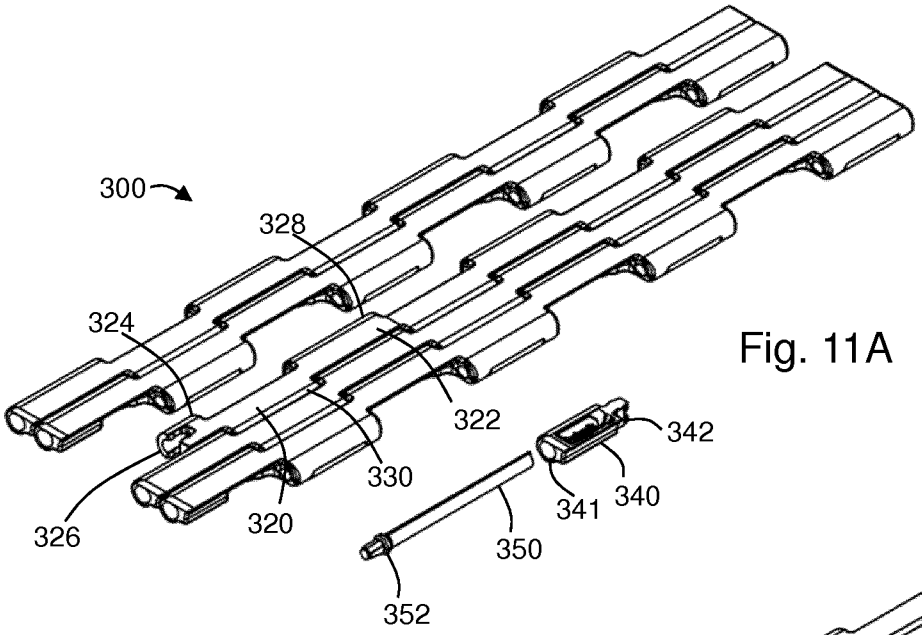


Fig. 11A

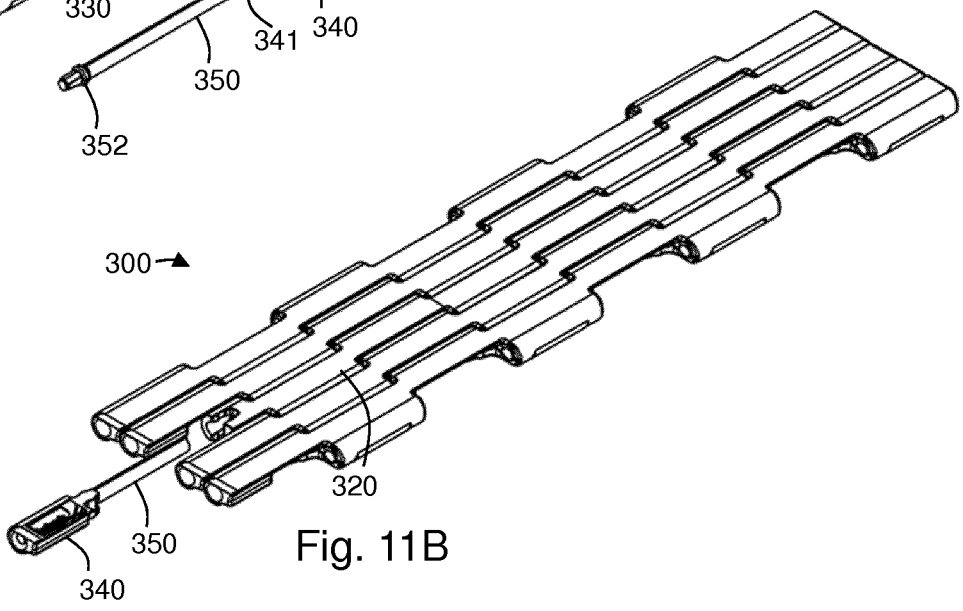


Fig. 11B

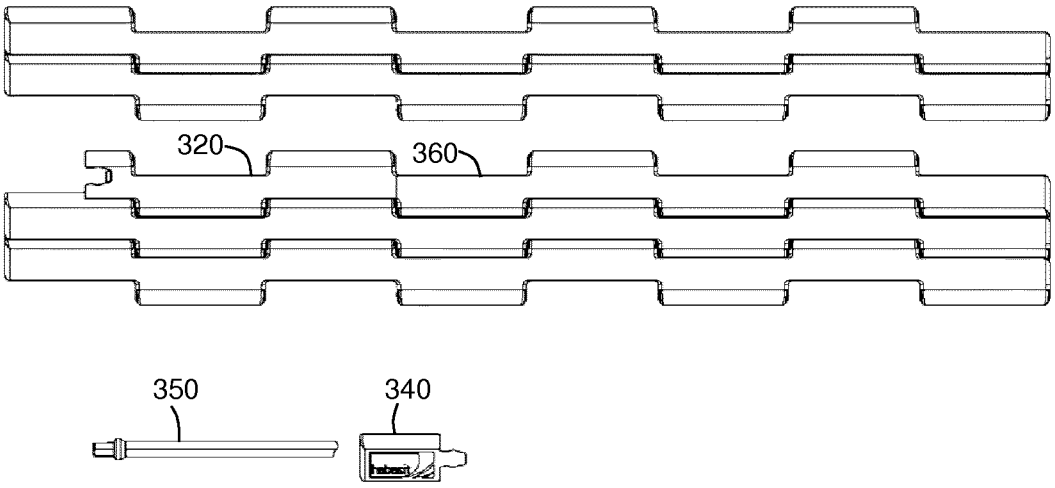


Fig. 12A

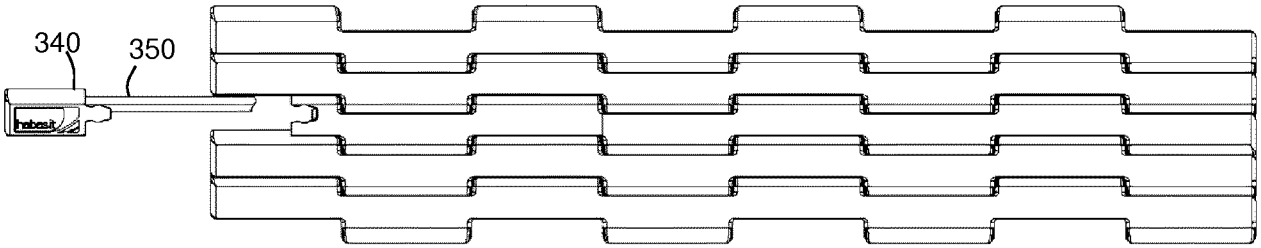


Fig. 12B

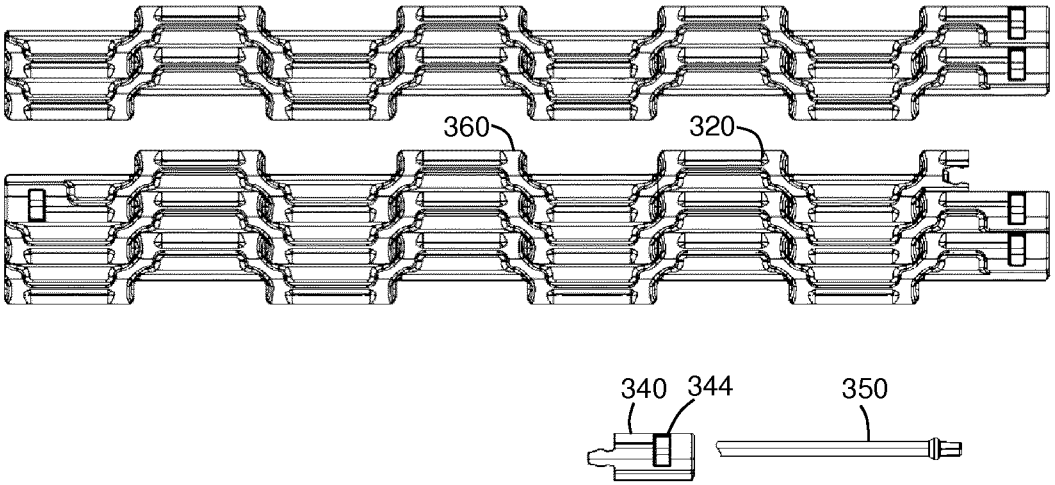


Fig. 13A

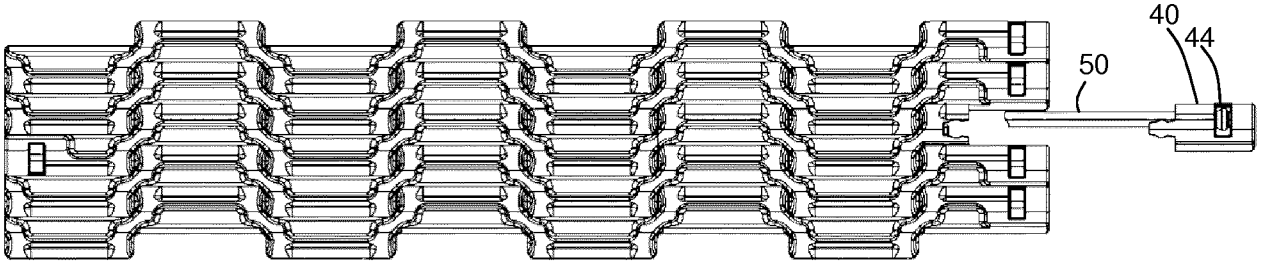


Fig. 13B

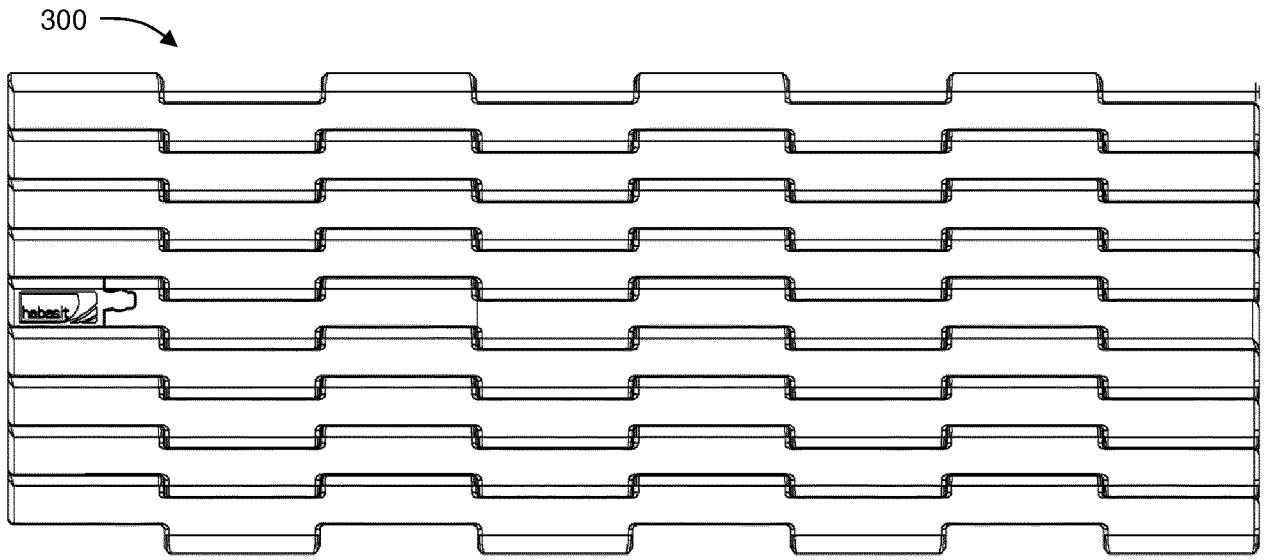


Fig. 14

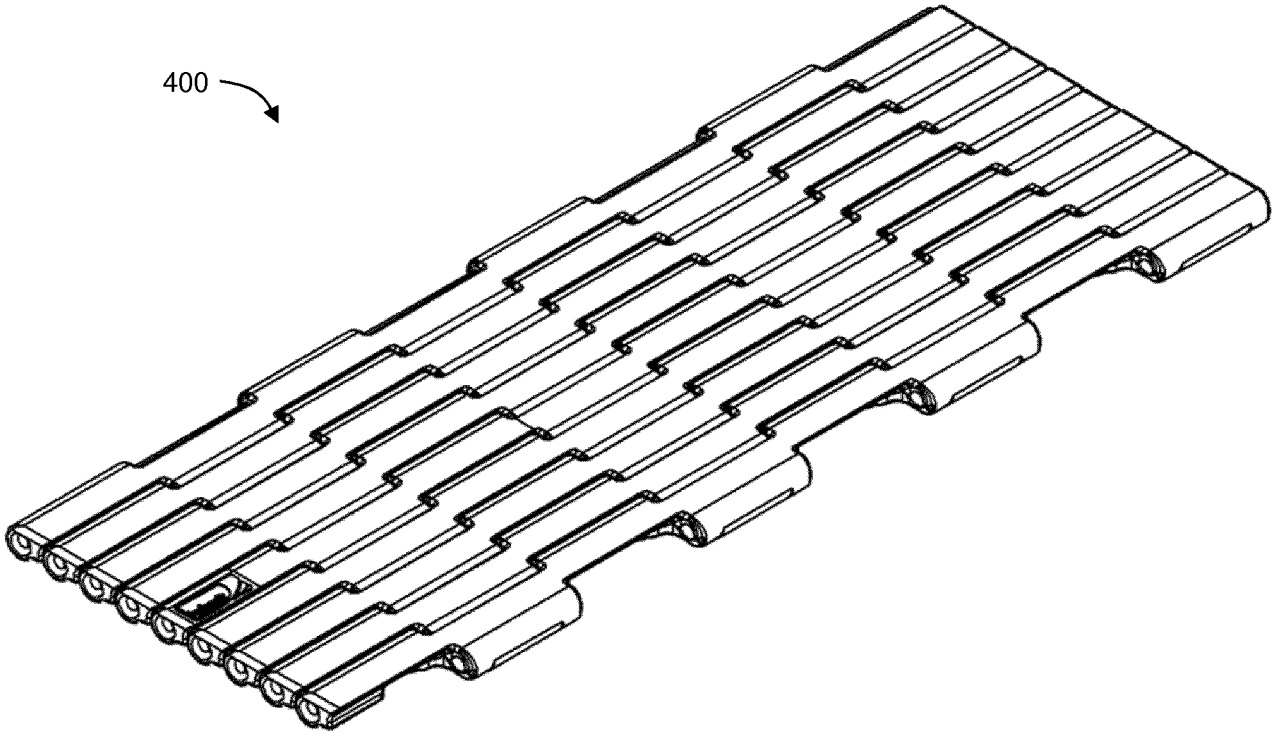


Fig. 15

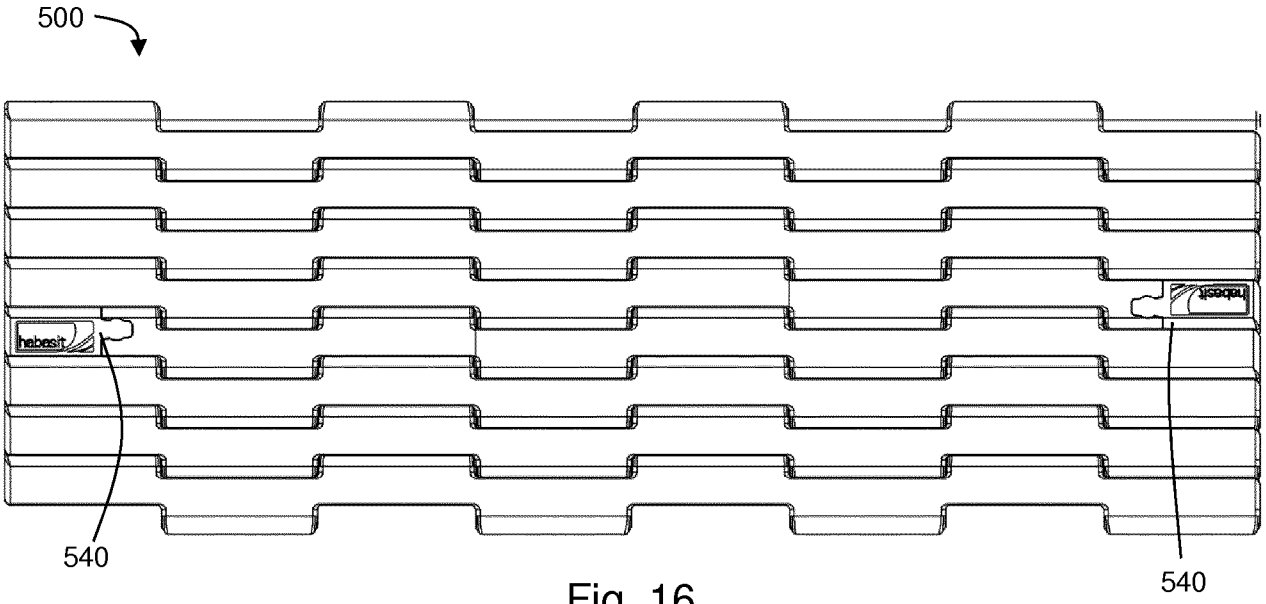


Fig. 16

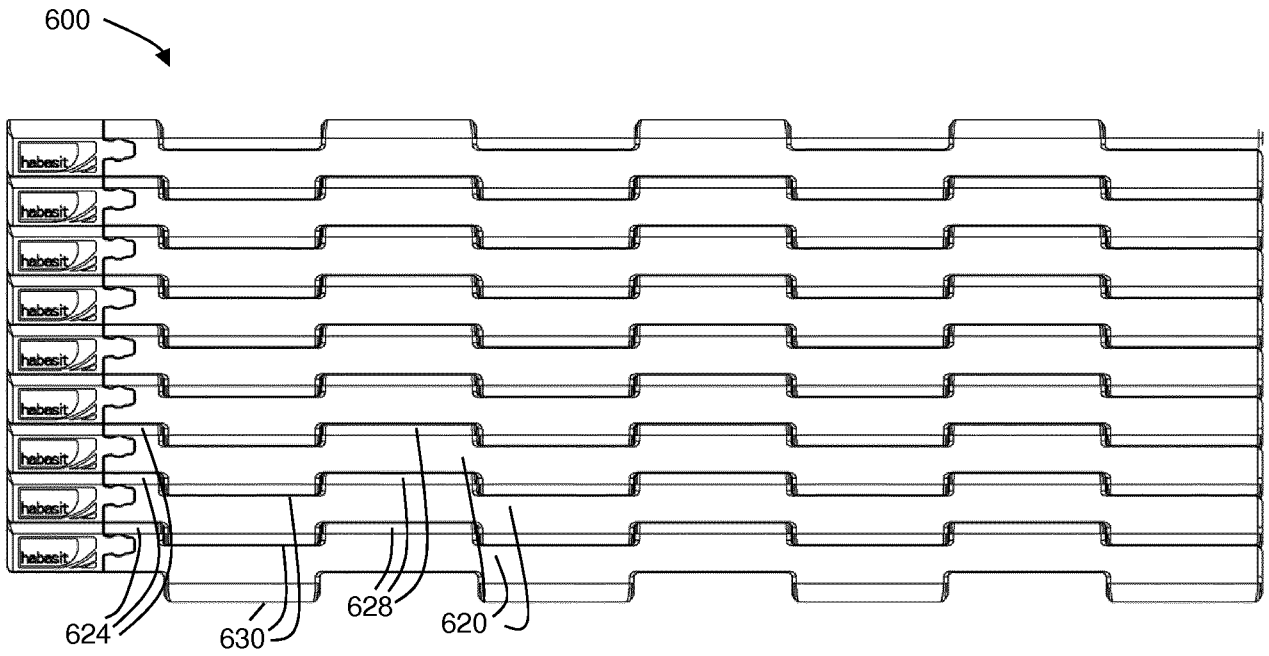


Fig. 17

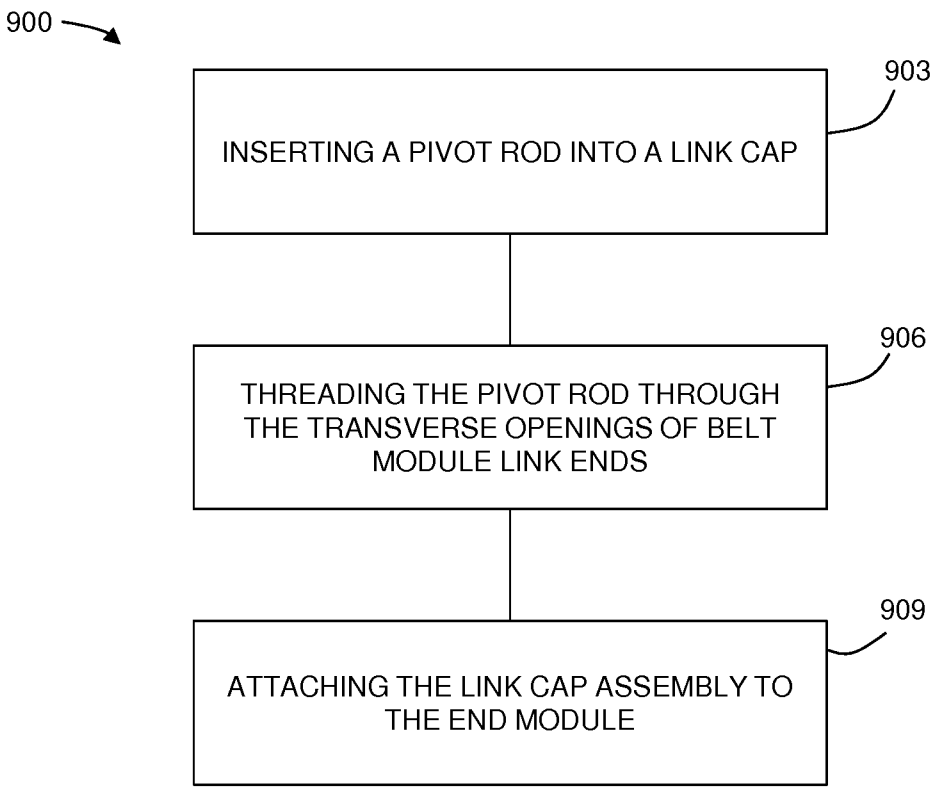
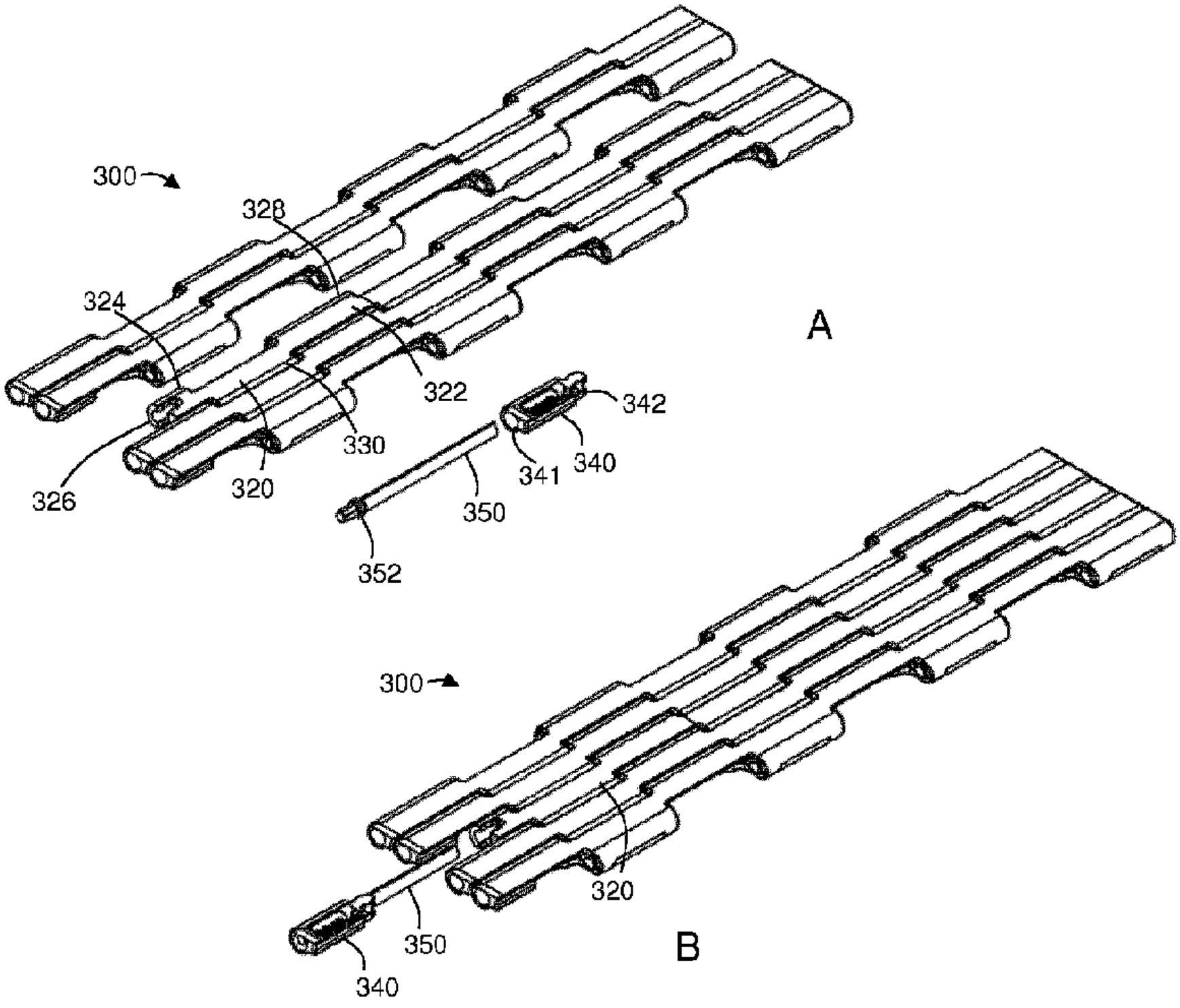

900
903
INSERTING A PIVOT ROD INTO A LINK CAP
906
THREADING THE PIVOT ROD THROUGH THE TRANSVERSE OPENINGS OF BELT MODULE LINK ENDS
909
ATTACHING THE LINK CAP ASSEMBLY TO THE END MODULE

Fig. 18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