



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
13.04.2022 Bulletin 2022/15

(51) International Patent Classification (IPC):
F04D 13/08 ^(2006.01) **F04D 29/70** ^(2006.01)

(21) Application number: **20200468.5**

(52) Cooperative Patent Classification (CPC):
F04D 29/708; F04D 13/08; F04D 13/086;
F04D 29/4273; F05D 2230/644; F05D 2260/30

(22) Date of filing: **07.10.2020**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

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(54) **MECHANISM FOR PUMP**

(57) A mechanism (150) for a pump (100) which includes a pump body (120) having protrusions (122). The mechanism (150) includes a movable basket (130) movable between a first position and a second position. The one or more protrusions (122) bias the movable basket (130) in one of the first position and the second position. The mechanism (150) includes a switch bar (140) which allows selective locking of the protrusions (122). The switch bar (140) moves between a locking position (P1)

and an unlocking position (P2). The mechanism (150) is characterized in that the actuation of a trigger (160) moves the switch bar (140) between the locking position (P1) and the unlocking position (P2). And, in the unlocking position (P2) of the switch bar (140), the protrusions (122) is unloaded such that the movable basket (130) is movable between the first position and the second position.

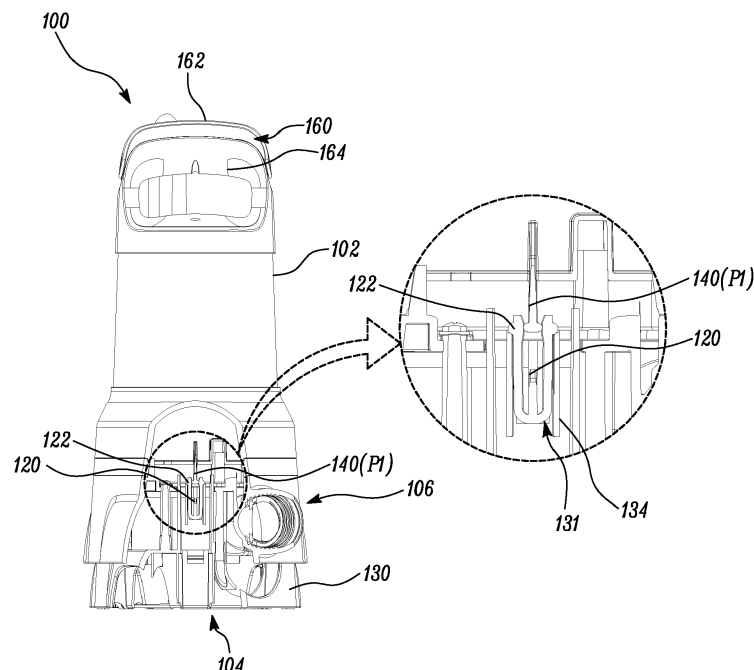


FIG. 4A

Description

TECHNICAL FIELD

[0001] The present disclosure relates to pumps. More specifically, the present disclosure relates to a submersible pump which allows vertical level adjustment of the pump.

BACKGROUND

[0002] A pump such as a submersible pump (or sub pump, or electric submersible pump (ESP)) is a device which is submerged in a fluid to be pumped. Typically, submersible pumps are generally used in different applications such as clear and dirty water operations. These applications may involve change in adjustment of size of a suction inlet of the submersible pump to cater to different applications. The change in adjustment of the size of the suction inlet may involve level adjustment of the submersible pump.

[0003] However, there may be instances where the level adjustment of the submersible pump may be typical and a high skill-oriented job. Moreover, conventional submersible pump finds it challenging to provide a user-friendly and efficient arrangement for the level adjustment of the submersible pump.

[0004] Thus, there is a need for an improved submersible pump which allows desired level adjustment of the submersible pump. Further, the submersible pump shall provide a user-friendly and convenient action to perform the level adjustment.

SUMMARY

[0005] In view of the above, it is an objective of the present invention to solve or at least reduce the drawbacks discussed above. The objective is at least partially achieved by a mechanism for a pump. The mechanism includes a pump body having one or more protrusions. The mechanism includes a movable basket which moves between a first position and a second position. The one or more protrusions bias the movable basket in one of the first position and the second position. The mechanism includes a switch bar which allows selective locking of the one or more protrusions. The switch bar moves between a locking position and an unlocking position to load and unload the one or more protrusions, respectively. Further, the mechanism includes a trigger to actuate the switch bar. The mechanism is characterized in that the actuation of the trigger moves the switch bar between the locking position and the unlocking position. In the unlocking position of the switch bar, the one or more protrusions is unloaded such that the movable basket is movable between the first position and the second position. Thus, the present disclosure provides a simple, efficient, and user-friendly mechanism which actuates by a user action on the trigger to adjust the level (between the first

position and the second position) of the movable basket of the pump.

[0006] According to an embodiment of the present invention, the first position and the second position of the movable basket are an extended position and a retracted position, respectively. This allows to setup the pump for different application by size adjustment of a suction inlet of the pump, based on switching of the movable basket between the first position and the second position.

[0007] According to an embodiment of the present invention, the extended position and the retracted position of the movable basket correspond to a dirty water mode and a clean water mode, respectively. The extended position and the retracted position adjust the suction inlet of the pump to setup for the dirty water and clean water mode.

[0008] According to an embodiment of the present invention, the protrusions include one or more angled surfaces which engage with linear elements of the movable basket. The protrusions having the angled surfaces bias the movable basket in one of the first position and the second position.

[0009] According to an embodiment of the present invention, the one or more angled surfaces keep the movable basket in the first position or the second position, when the protrusions are loaded by a hammer of the switch bar. The switch bar loads the protrusions so as to keep the movable basket locked in the first position or the second position.

[0010] According to an embodiment of the present invention, the trigger is provided with a handle of the pump. This allows actuation of the switch bar of the mechanism by a simple user action with the handle of the pump.

[0011] According to an embodiment of the present invention, for the movable basket in the extended position with the switch bar in the locking position, an external force moves the movable basket from the extended position to the retracted position. Further, the external force is a force acting on the movable basket due to free fall of the pump. This may protect the movable basket and the pump from any damage such as during inadvertent fall of the pump.

[0012] According to an embodiment of the present invention, the pump is a submersible pump. The submersible pump finds applications in the clean water and dirty water modes, although the pump may be any pump as used or known in the art.

[0013] Other features and aspects of this invention will be apparent from the following description and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The invention will be described in more detail with reference to the enclosed drawings, wherein:

FIG. 1 shows perspective views of a submersible pump having a movable basket in an extended po-

sition, respectively, in accordance with an aspect of the present disclosure;

FIG. 2 shows perspective views of a submersible pump having a movable basket in a retracted position, respectively, in accordance with an aspect of the present disclosure;

FIGS. 3A, 3B show perspective views of a mechanism for a submersible pump, in accordance with an aspect of the present disclosure;

FIGS. 4A, 4B show perspective views of a mechanism for a submersible pump for switching of a movable basket, in accordance with an aspect of the present disclosure; and

FIGS. 5A, 5B show perspective views of a mechanism for a submersible pump for switching of a movable basket, in accordance with an aspect of the present disclosure.

DESCRIPTION OF EMBODIMENTS

[0015] The present invention will be described more fully hereinafter with reference to the accompanying drawings, in which example embodiments of the invention incorporating one or more aspects of the present invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. For example, one or more aspects of the present invention may be utilized in other embodiments and even other types of structures and/or methods. In the drawings, like numbers refer to like elements.

[0016] Certain terminology is used herein for convenience only and is not to be taken as a limitation on the invention. For example, "upper", "lower", "front", "rear", "side", "longitudinal", "lateral", "transverse", "upwards", "downwards", "forward", "backward", "sideward", "left", "right", "horizontal", "vertical", "upward", "inner", "outer", "inward", "outward", "top", "bottom", "higher", "above", "below", "central", "middle", "intermediate", "between", "end", "adjacent", "proximate", "near", "distal", "remote", "radial", "circumferential", or the like, merely describe the configuration shown in the Figures. Indeed, the components may be oriented in any direction and the terminology, therefore, should be understood as encompassing such variations unless specified otherwise.

[0017] FIGS. 1, 2 illustrate different views of a pump 100. The present disclosure illustrates and refers to the pump 100 as a submersible pump 100, however the present disclosure may be readily implemented with any pump as used or known in the art. The submersible pump 100 includes a pump housing 102. The pump housing

102 has an inlet 104 and an outlet 106 for a liquid. The liquid is pumped up from the inlet 104 and pumped out from the outlet 106. The outlet 106 is connected with a hose connector 108 which may allow connection of a hose (not shown) for pumping of the liquid. FIG. 1 illustrates a movable basket 130 in an extended position (alternatively, a first position hereinafter). The extended position of the movable basket 130 allows to increase overall height of the submersible pump 100. This increase in the overall height may allow level adjustment between the inlet 104 and the ground (not shown) on which the submersible pump 100 is placed.

[0018] The extended position of the movable basket 130 allows exposure of one or more inlet openings 132 provided on the movable basket 130. The present disclosure illustrates inverted "U" shaped inlet openings 132, however the inlet openings may be provided with any shape, size, number, dimensions, and the like, without any limitations. During working of the submersible pump 100 with the movable basket 130 in the extended position, the inlet openings 132 allow ease of operation with dirty water such as water having different and significant size of particles.

[0019] Referring to FIG. 2, the movable basket 130 is illustrated in a retracted position (alternatively, a second position hereinafter). In the retracted position, the movable basket 130 moves substantially within the pump housing 102. The retracted position of the movable basket 130 allows to decrease overall height of the submersible pump 100. This decrease in the overall height may allow level adjustment between the inlet 104 and the ground (not shown). Moreover, in the retracted position of the movable basket 130, the inlet openings 132 (shown in FIG. 1) towards side of the movable basket 130 are covered by the pump housing 102. In this arrangement, clean water may enter the submersible pump 100 from around the inlet 104 which may have few, and significantly smaller sized inlet opening (not shown) which may restrict any large sided particles (i.e. for dirty water). So, this allows applicability of the submersible pump 100 in the retracted position of the submersible basket 130 for clean water operations.

[0020] In some embodiments, the first position and the second position of the movable basket 130 are the extended position and the retracted position, respectively. This allows to setup the pump 100 for different application by size adjustment of the suction inlet 104 of the pump 100, based on switching of the movable basket 130 between the first position/extended position and the second position/retracted position. Further, the extended position, and the retracted position of the movable basket 130 correspond to a dirty water mode and a clean water mode, respectively. As the dirty water mode requires larger inlet area of the suction inlet 104 to ensure efficient functioning of the pump 100, compared to the clean water mode, the pump 100, the extended position and the retracted position accordingly provide the necessary change in the inlet area of the suction inlet 104.

[0021] The extended position and the retracted position adjust the suction inlet **104** of the pump **100** to setup for the dirty water and clean water mode. The present disclosure illustrates two positions i.e. the first position and the second position however actual implementation of the present disclosure may have multiple (generally more) number of positions of the movable basket **130** of the pump **100**. Moreover, the multiple positions may then allow multiple modes apparatus from and additional to the dirty water and clean water mode of the pump **100**.

[0022] Referring to FIGS. 1, 2, the submersible pump **100** includes a handle **160**, which for the present disclosure is referred to as a trigger **160**. The handle **160** works as a "trigger" to allow to change the position of the movable basket **130**. As used herein, the "trigger" by the handle **160** of the submersible pump **100** may activate based on a user action (such as touch, push, push and hold, among others) with the handle **160**. When a user presses the trigger **160**, the trigger **160** allows to change the position of the movable basket **130**, by working of a mechanism **150** illustrated in FIG. 3.

[0023] The handle **160** of the submersible pump **100** include an upper part **162** and a lower part **164**. The upper part **162** is movable relative to the lower part **164**. The lower part **164** may be fixedly attached with the pump housing **102**. Movement of the upper part **162** (as best illustrated in FIGS. 4A, 4B, 5A, and 5B) relative to the lower part **164** allows actuation of the trigger **160**, such as based on user action on the upper part **162** of the handle **160**.

[0024] In some embodiments, the trigger **160** may be provided with the handle **160** of the pump **100**. However, the trigger **160** may be provided with any other part or component of the pump **100**, and the present disclosure is not to be limited by the trigger **160**. This allows actuation of the switch bar **140** of the mechanism **150** by the user action with the handle **160** of the pump **100**.

[0025] FIGS. 3A, 3B illustrate the mechanism **150** for the pump **100**, with the switch bar **140** in a locking position "P1" and an unlocking position "P2".

[0026] The mechanism **150** includes the pump body **120** exhibiting an element **131** having one or more protrusions **122**. The protrusions **122** may be snap-fit like arrangements which allow biasing or loading, such as of one or more linear elements **134** of the movable basket **130**. The present disclosure illustrates two protrusions **122**, however actual implementation of the mechanism **150** may have any number of protrusions **122**. The mechanism **150** includes the linear elements **134** of the movable basket **130**. The linear elements **134** engage with the protrusions **122** when the movable basket **130** moves between the first position and the second position, as illustrated best in FIGS. 1, 2. The one or more protrusions **122** bias the linear elements **134** such that the movable basket **130** remains in one of the first position and the second position. In some embodiments, the protrusions **122** include one or more angled surfaces **124** which engage with the linear elements **134** of the movable basket

130. The angled surfaces **124** load or unload the movable basket **130**, based on the switch bar **140** being in the locking position "P1" (shown in FIG. 3A) and the unlocking position "P2" (shown in FIG. 3B).

[0027] The mechanism **150** includes the switch bar **140** which allows selective locking of the protrusions **122**, and thereby the angled surfaces **124**. The switch bar **140** includes a hammer **142** around a lower end of the switch bar **140**. The hammer **142** of the switch bar **140** moves between the locking position "P1" and the unlocking position "P2" to load and unload the protrusions **122**, respectively. Further, the mechanism **150** includes the trigger **160** (shown in FIGS. 1, 2) to actuate the switch bar **140**. The present disclosure provides the trigger **160** with the handle **160** (shown in FIGS. 1, 2). The mechanism **150** is such that the actuation of the trigger **160** moves the switch bar **140** (i.e. the hammer **142**) between the locking position "P1" and the unlocking position "P2". And in the unlocking position "P2" of the switch bar **140**, as shown in FIG. 3B, the one or more protrusions **122** is unloaded such that the movable basket **130** is movable between the first position and the second position. Thus, the present disclosure provides a simple, efficient, and user-friendly mechanism **150** which actuates by the user action on the trigger **160** such as to adjust level of the movable basket **130** of the pump **100**.

[0028] Referring to FIGS. 4A, 4B, the pump **100** is illustrated with the movable basket **130** in the extended position. FIG. 4A illustrates the trigger **160** in an "inactive state", and the switch bar **140** which engages and loads the protrusions **122** with the movable basket **130**. This inactive state of the trigger **160** keeps the switch bar **140** in the locking position "P1", to bias the protrusions **122**. The protrusions **122**, in turn, load or bias the movable basket **130** in the extended position.

[0029] FIG. 4B illustrates the trigger **160** in an "active state", due to the user action. The user action may be a single press, long press, press and hold, and the like of the trigger **160**. The present disclosure is not limited by choice of user action to activate the trigger **160**. This active state of the trigger **160** moves the switch bar **140** from the locking position "P1" to the unlocking position "P2". This movement of the switch bar **140** to the unlocking position "P2", unbiases the protrusions **122**. Then, the movable basket **130** is free to move from the extended position to the retracted position, as illustrated in FIG. 5A. In some embodiments, the user may provide a push with the handle **160** to move the movable basket **130** (when unloaded from the protrusions **122**) from the extended position to the retracted position. Alternatively, the movable basket **130** (when unloaded from the protrusions **122**) may move from the extended position to the retracted position under its own weight (under the action of gravity of the pump **100**).

[0030] FIG. 5A illustrates the movable basket **130** in the retracted position. Here, the movable basket **130** has moved to the retracted position. As illustrated, the switch bar **140** allows movement of the linear elements **134** of

the movable basket **130** above the protrusions **122**. In this arrangement, the trigger **160** is still in the "active state" and thereby the switch bar **140** is still at the unlocking position "**P2**". **FIG. 5B** illustrates locking of the movable basket **130** in the retracted position. Here, with the movable basket **130** in the retracted position, the user action is removed as indicated by the "inactive state" of the trigger **160**. This allows the switch bar **140** to move back to the locking position "**P1**". In the locking position "**P1**", the switch bar **140** loads the protrusions **122**. The protrusions **122** then bias (or load) the linear element **134** of the movable basket **130** in the retracted position.

[0031] In some embodiments, the protrusions **122** having the angled surfaces **124** bias the movable basket **130** in one of the first position (shown in **FIGS. 4A, 4B**) and the second position (shown in **FIGS. 5A, 5B**). Further, the one or more angled surfaces **124** keep the movable basket **130** in the first position or the second position, when the protrusions **122** are loaded by the hammer **142** of the switch bar **140**, as illustrated in **FIGS. 4A, 5B**, respectively. When the pump **100** is setup for working, the switch bar **140** loads the protrusions **122** so as to keep the movable basket **130** locked in the first position or the second position.

[0032] In some embodiments, the movable basket **130** may be spring-loaded to keep the movable basket **130** in the extended position, in absence of any external load or action. During implementation, the movable basket **130** may move from the retracted position to the extended position being spring loaded, provided the switch bar **140** is in the unlocking position "**P2**". The movable basket **130** may be spring-loaded such that it take care of any gravity action acting on the movable basket **130**, such during movement from the retracted position to the extended position.

[0033] In some embodiments, the switch bar **140** is spring-biased to generally remain in the locking position "**P1**". In the active state of the trigger **160**, the switch bar **140** moves from the unlocking position "**P2**" to the locking position "**P1**", as shown in **FIGS. 4B, 5A**. Then, the switch bar **140** moves under spring-action back to the locking position "**P1**" when the trigger **160** is the "inactive state", as illustrated in **FIGS. 4A, 5B**. The inactive state of the trigger **160** allows the switch bar **140** to lock the movable basket **130** in the extended state and the retracted state as illustrated in **FIGS. 4A, 5B**, respectively.

[0034] In some embodiments, the mechanism **150** allows to protect the movable basket **130** of the pump **100** during external force events such as accidental free fall and the like. During implementation, for the movable basket **130** in the extended position with the switch bar **140** in the locking position "**P1**", an external force may move the movable basket **130** from the extended position to the retracted position. Referring to **FIGS. 3A, 4A**, the hammer **142** of the switch bar **140** biases the protrusions **122** to keep the linear elements **134** and the movable basket **130** in the extended position. Now, in case the movable basket **130** experiences the external force (say

due to falling of the pump **100** on the ground), the linear elements **134** may move around the protrusions **122**, even when the hammer **142** is in the locking position "**P1**". It is worth noting that the hammer **142** is positioned below the angled surfaces **124** of the protrusions **122**. This position of the hammer **142** may allow slight bending and room for desired movement of the protrusions **122** such the linear elements **134** move above the protrusion **122**. This movement of the protrusion **122** may allow movement of the movable basket **130** from the extended position to the retracted position, as illustrated with reference to **FIGS. 4A, 5B**. Further, this bending of the protrusion **122** (or the angled surfaces **124**) may be due to shape, size, material, type, position of the protrusions **122**, and the angled surfaces **124**. Further, the external force may be a force acting on the movable basket **130** due to free fall, or any other external contact, of the pump **100**. This may protect the movable basket **130** and the pump **100** from any damage during such external force events on the pump **100**.

[0035] The present disclosure provides the mechanism **150** for the pump **100**, which is preferably a submersible pump. The mechanism **150** allows switching of the movable basket **130** of the pump **100** between the extended position and the retracted position. This allows benefits related to level adjustment of the pump **100**. Further, the mechanism **150** with the level adjustment allows the submersible pump **100** to find different applications, such as in the clean water and dirty water modes.

[0036] In the drawings and specification, there have been disclosed preferred embodiments and examples of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for the purpose of limitation of the scope of the invention being set forth in the following claims.

LIST OF ELEMENTS

[0037]

100	Pump/Submersible Pump
102	Pump Housing
104	Inlet/Suction Inlet
106	Outlet
108	Hose Connector
120	Pump Body
122	Protrusion
124	Angled Surface
130	Movable Basket
131	Element
132	Inlet Opening
134	Linear Elements
140	Switch Bar
142	Hammer
150	Mechanism
160	Handle/Trigger
162	Upper Part
164	Lower Part

P1 Locking Position
P2 Unlocking Position

(160) is configured with a handle (160) of the pump (100).

Claims

1. A mechanism (150) for a pump (100), the mechanism (150) comprising:

a pump body (120) having one or more protrusions (122);
 a movable basket (130) adapted to move between a first position and a second position, wherein the one or more protrusions (122) is adapted to bias the movable basket (130) in one of the first position and the second position;
 a switch bar (140) adapted to allow selective locking of the one or more protrusions (122), wherein the switch bar (140) moves between a locking position (P1) and an unlocking position (P2) to load and unload the one or more protrusions (122) respectively; and
 a trigger (160) configured to actuate the switch bar (140),

characterized in that:

the actuation of the trigger (160) moves the switch bar (140) between the locking position (P1) and the unlocking position (P2);
 and
 in the unlocking position (P2) of the switch bar (140), the one or more protrusions (122) is unloaded such that the movable basket (130) is movable between the first position and the second position.

2. The mechanism (150) of claim 1, wherein the first position and the second position of the movable basket (130) are an extended position and a retracted position, respectively.
3. The mechanism (150) of claim 2, wherein the extended position and the retracted position of the movable basket (130) correspond to a dirty water mode and a clean water mode, respectively.
4. The mechanism (150) of claim 1, wherein the protrusions (122) include one or more angled surfaces (124) adapted to engage with linear elements (134) of the movable basket (130).
5. The mechanism (150) of claim 4, wherein the one or more angled surfaces (124) are adapted to keep the movable basket (130) in the first position or the second position, when the protrusions (122) are loaded by a hammer (142) of the switch bar (140).
6. The mechanism (150) of claim 1, wherein the trigger

7. The mechanism (150) of claim 2, wherein for the movable basket (130) in the extended position with the switch bar (140) in the locking position (P1), an external force moves the movable basket (130) from the extended position to the retracted position.
8. The mechanism (150) of claim 7, wherein the external force is a force acting on the movable basket (130) due to free fall of the pump (100).
9. The mechanism (150) of claim 1, wherein the pump (100) is a submersible pump (100).

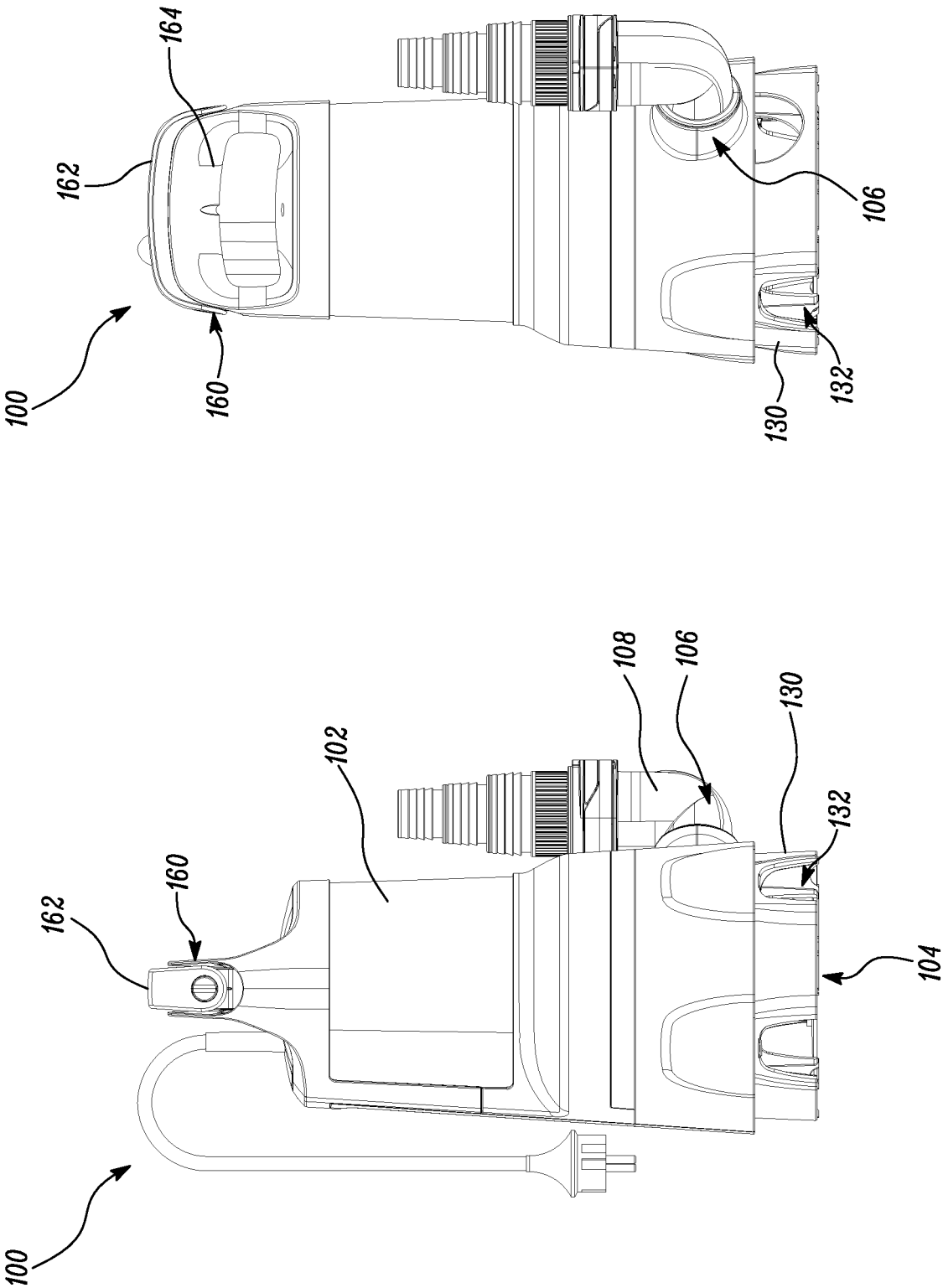


FIG. 1

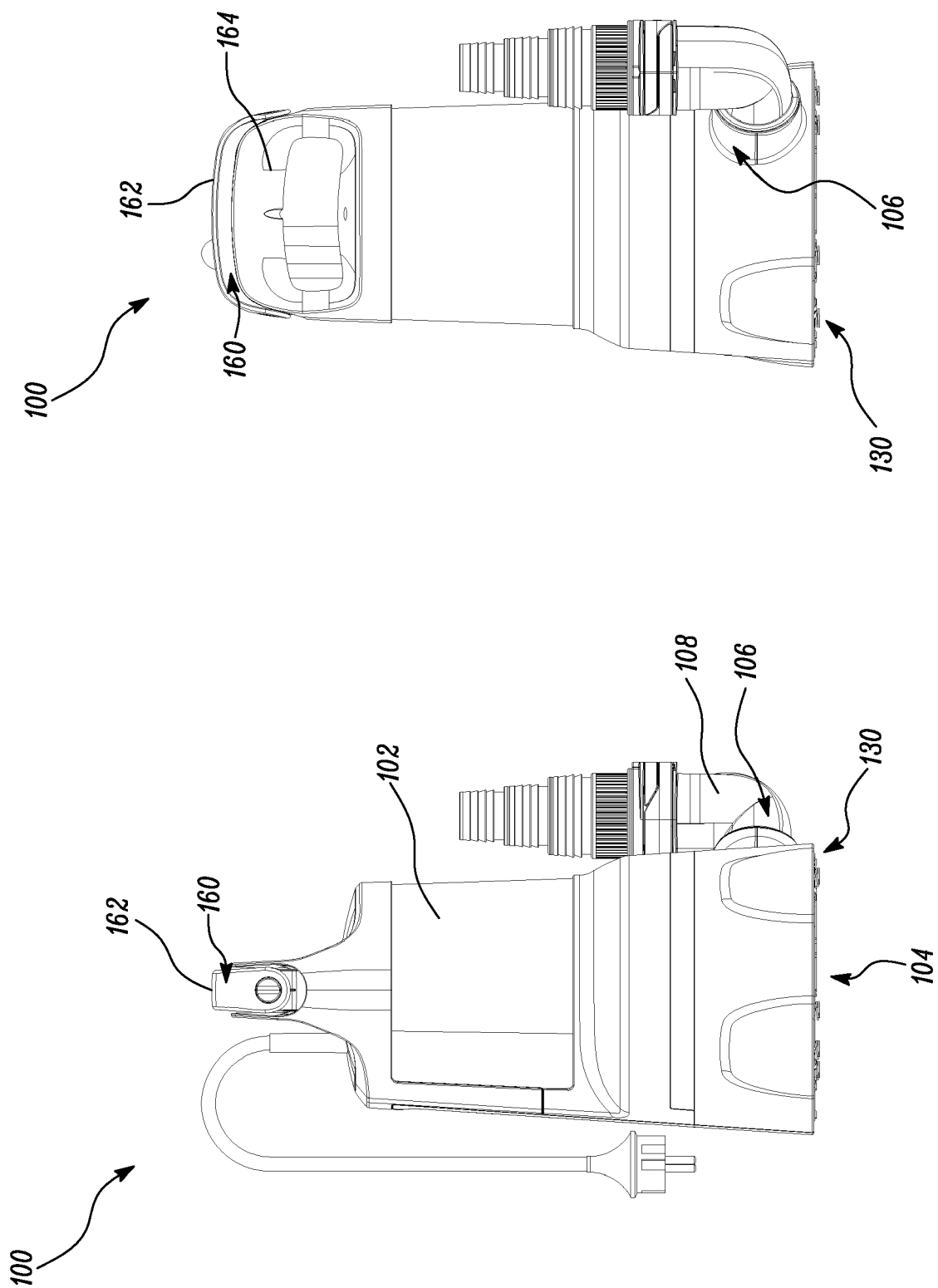


FIG. 2

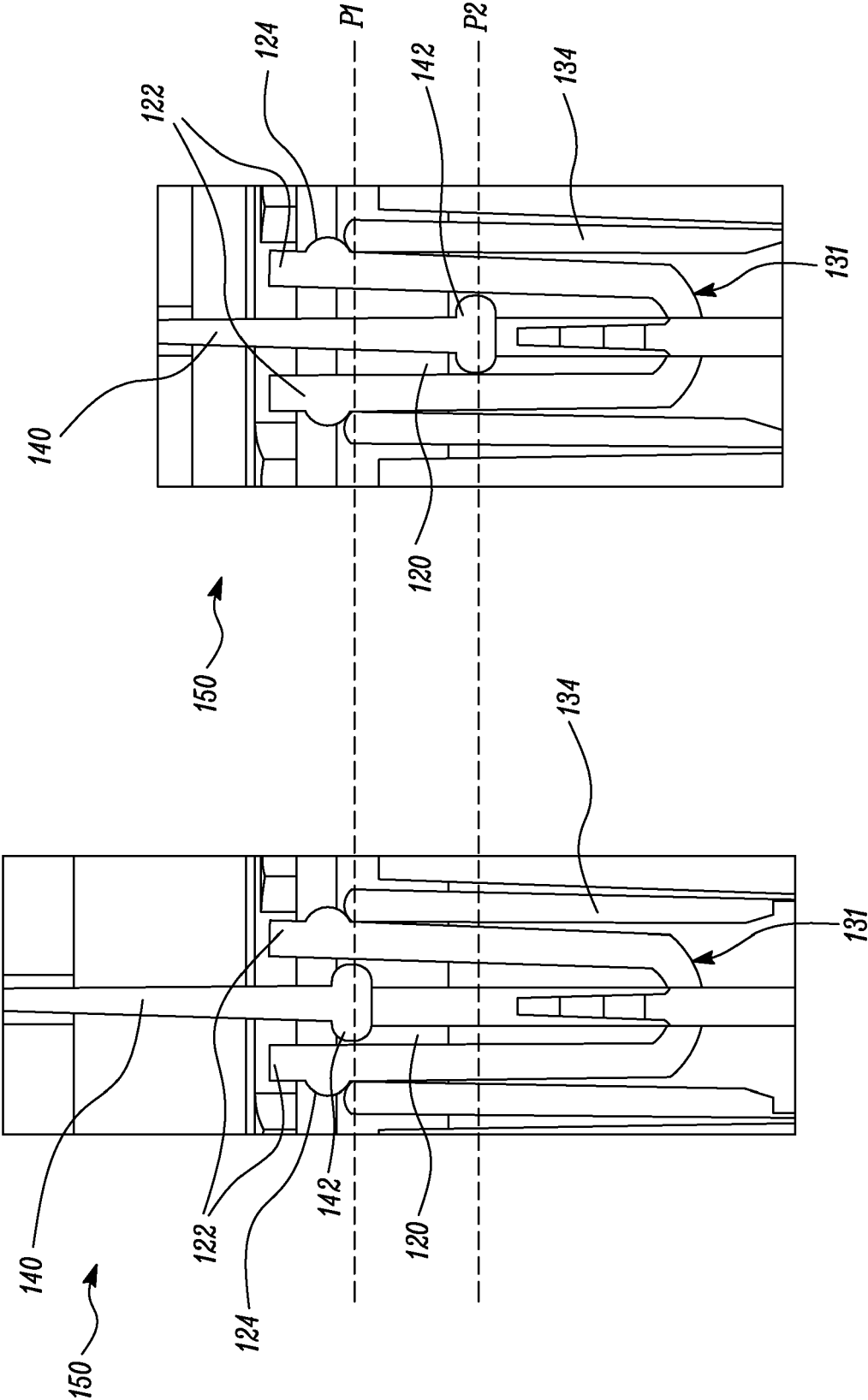


FIG. 3B

FIG. 3A

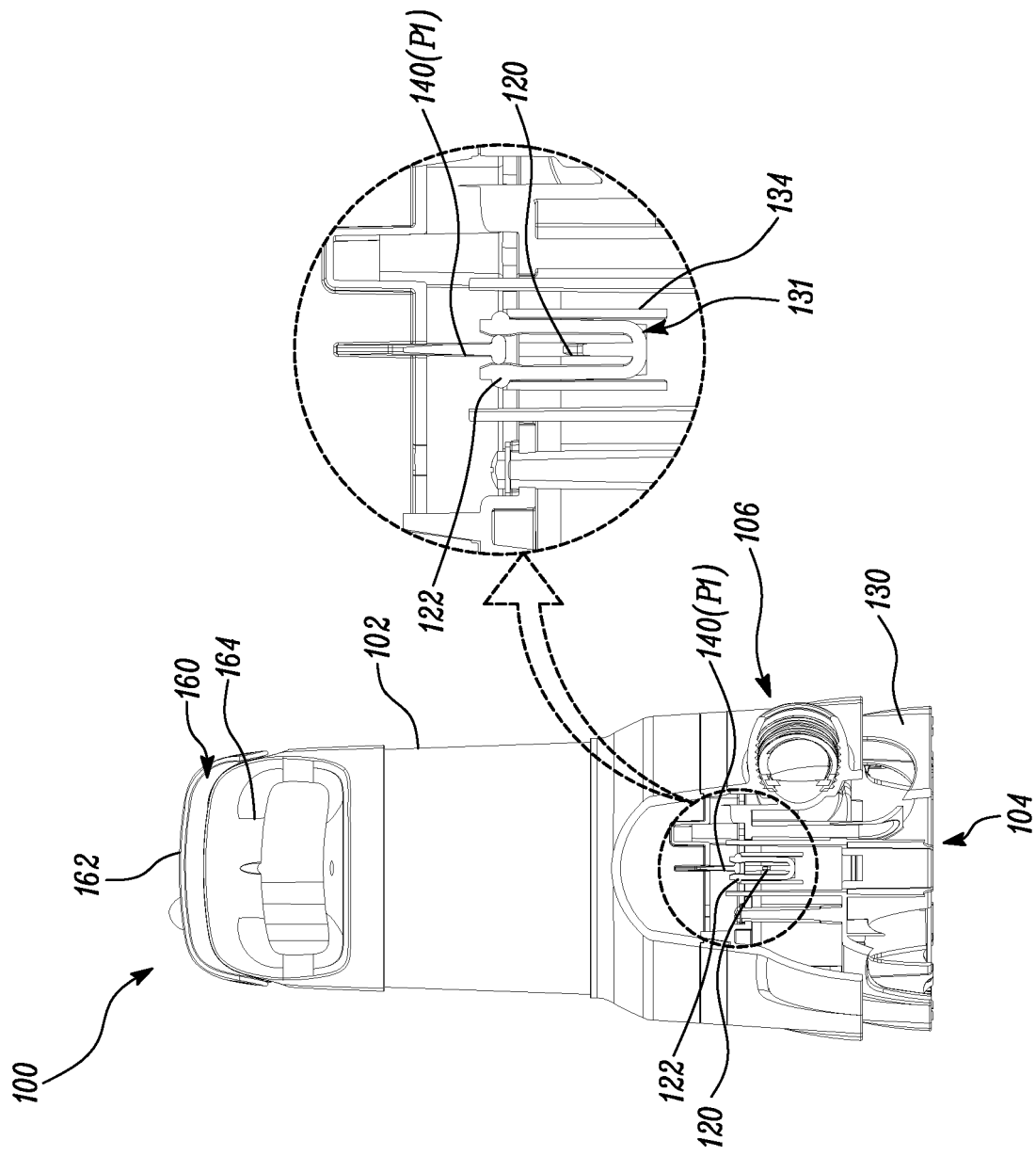


FIG. 4A

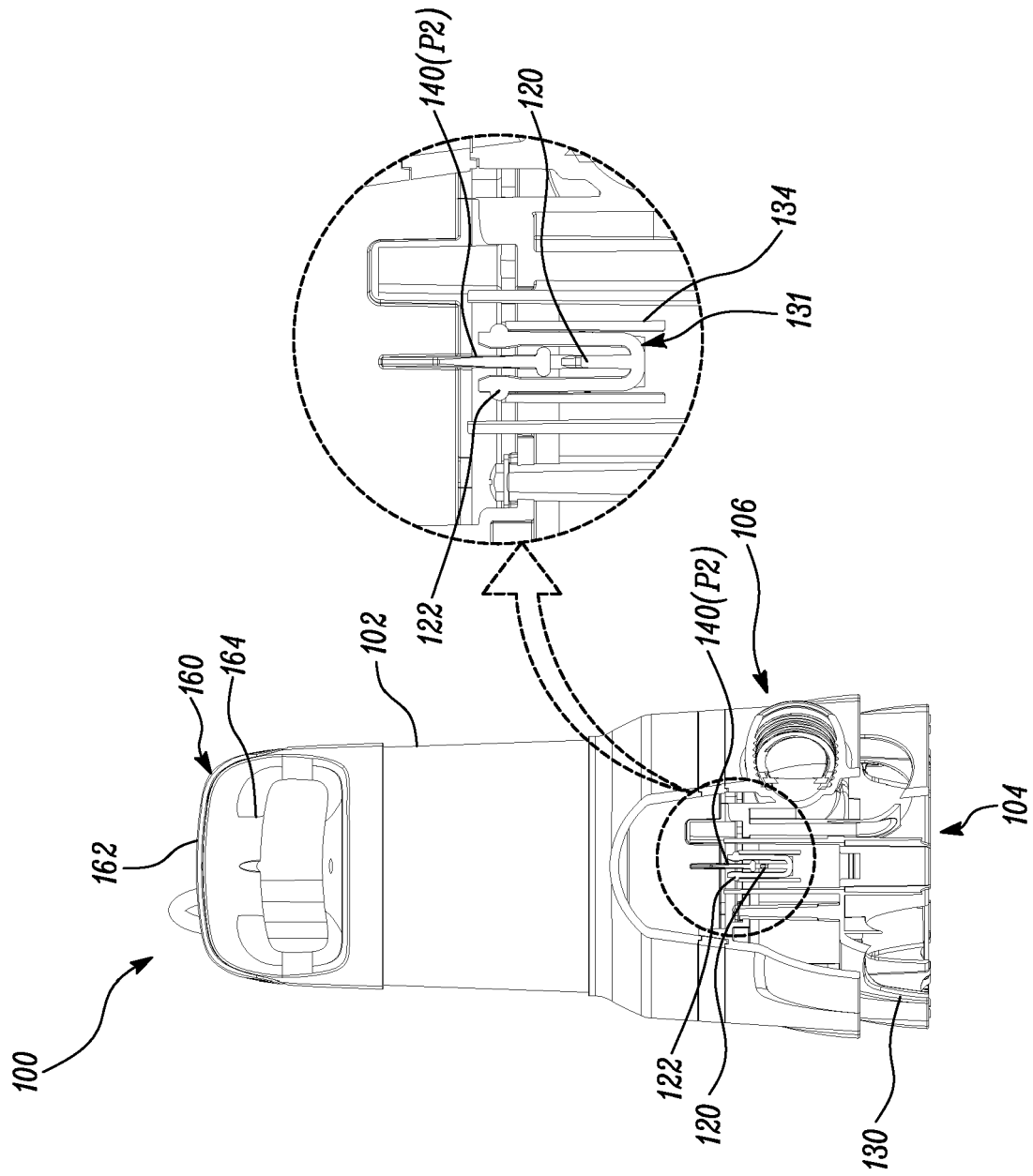


FIG. 4B

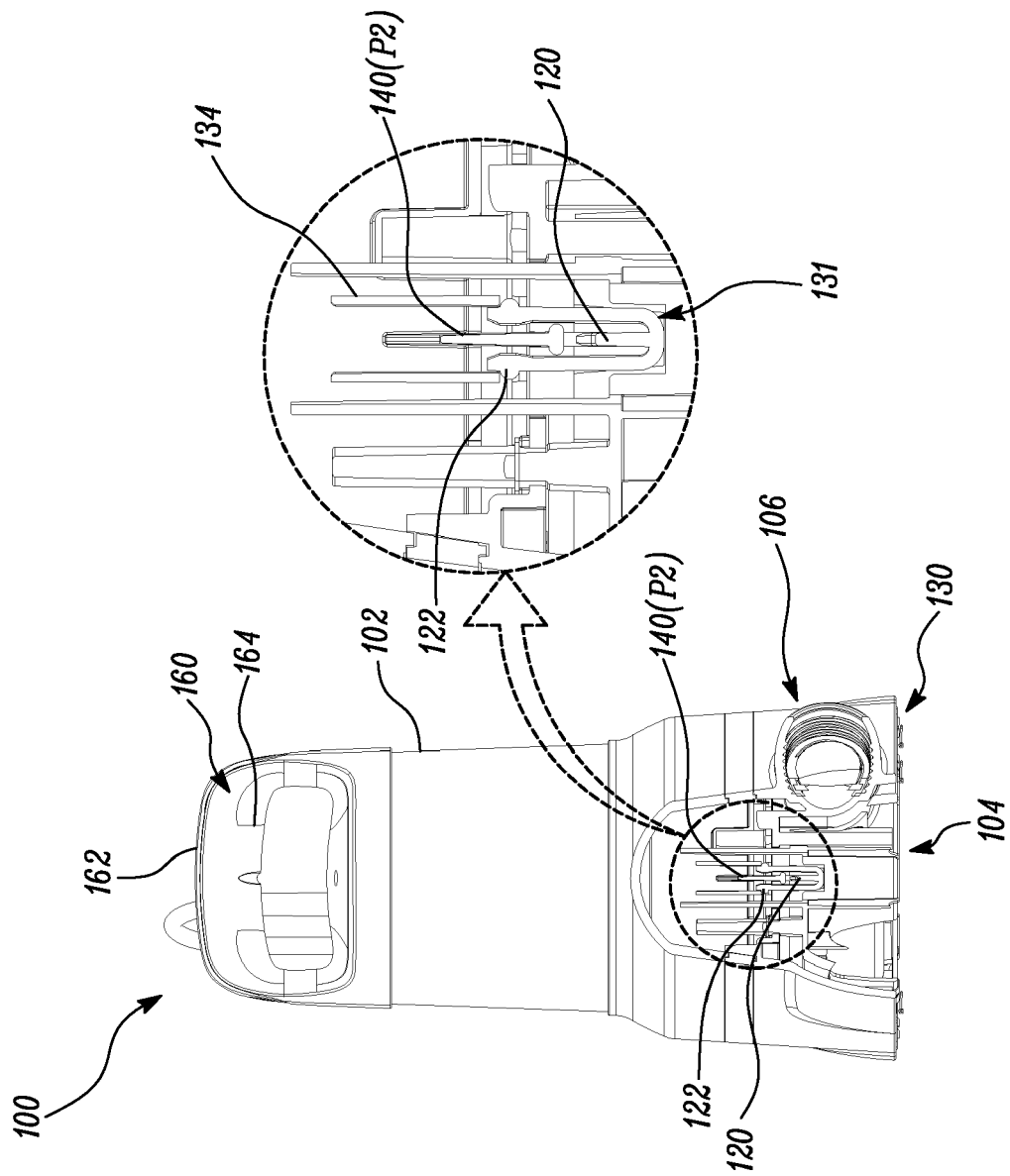


FIG. 5A

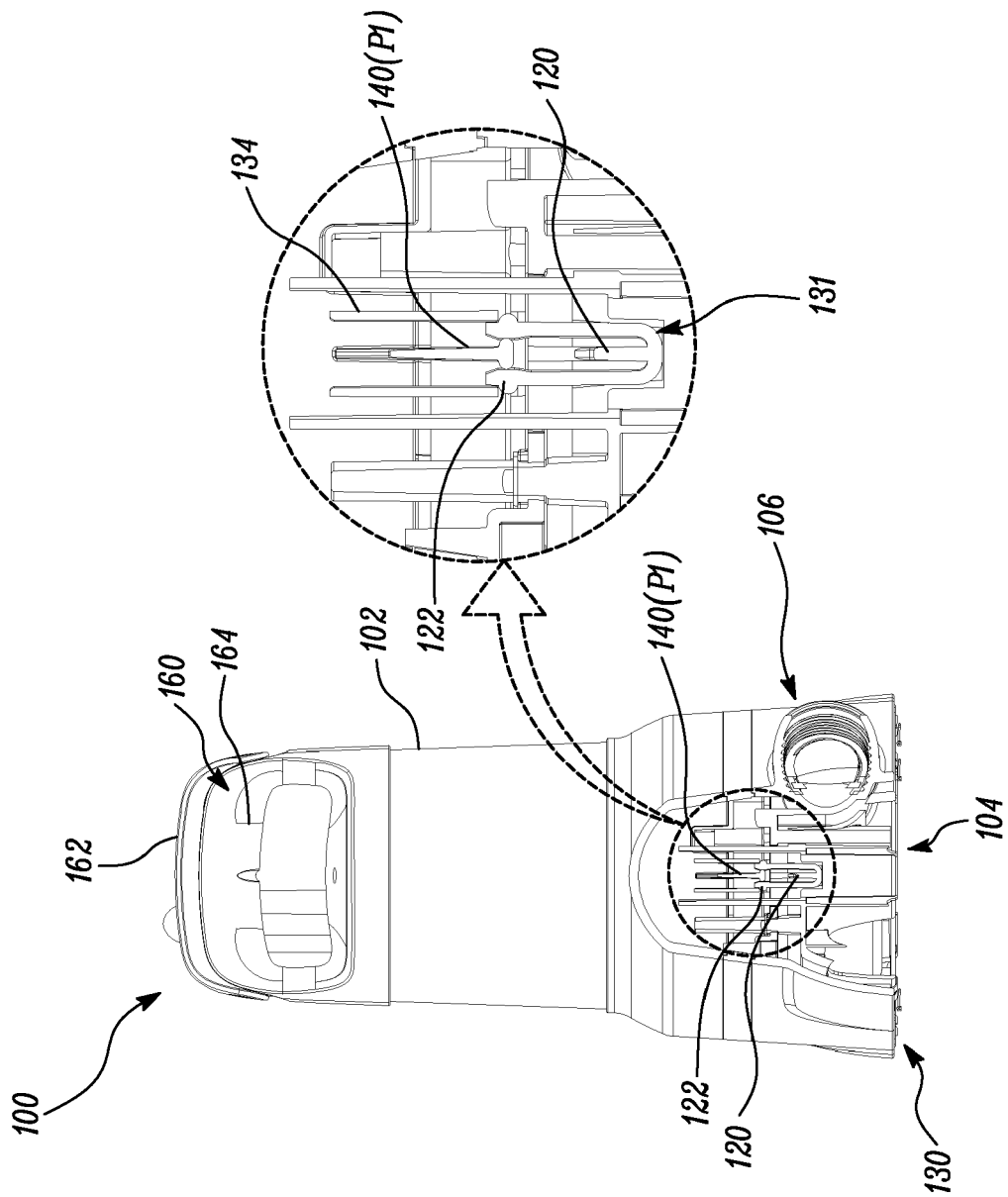


FIG. 5B



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 20 0468

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 20 20 0468

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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