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(54) **SPRAYER**

(57) A sprayer (100) includes a handle (116) and a valve (106) for switching a flow of the water from an outlet (104). The sprayer (100) includes an inlet (102) for receiving water. The sprayer (100) includes a trigger (110) configured to actuate the valve (106). The trigger (110) moves between a locked position and an unlocked position. The trigger (110) allows the flow of the water in the locked position and stops the flow of the water in the unlocked position. The sprayer (100) further includes a

locking mechanism (114) which is activated by the trigger (110). The locking mechanism (114) includes a contour (108). The locking mechanism (114) includes a locking element (112) which moves between a first state and a second state with the contour (108). In the second state the locking element (112) engages with the contour (108) in the locked position. The sprayer (100) is characterized in that the locking element (112) is a linear spring.

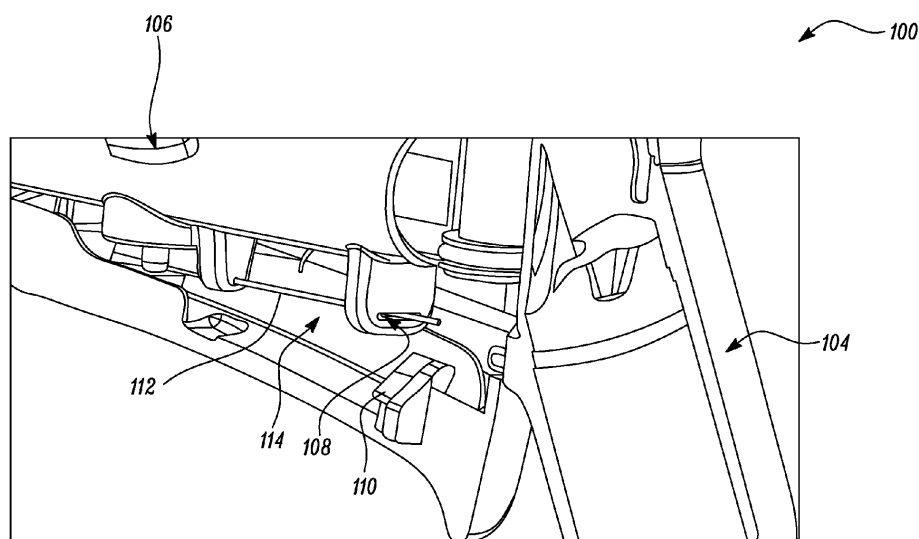


FIG. 2

Description

TECHNICAL FIELD

[0001] The present disclosure relates to a sprayer. More specifically, the present disclosure relates to the sprayer having a locking mechanism.

BACKGROUND

[0002] A sprayer is a device used to spray a liquid, where sprayers find common applications for projection of water, weed killers, crop performance materials, pest maintenance chemicals, as well as for manufacturing and production of line ingredients. In agriculture, the sprayer is a piece of equipment that is used to apply herbicides, pesticides, and fertilizers on agricultural crops.

[0003] However, there may be instances where applicators such as the sprayer or any other system including a stream, a jet, a sprinkle, and the like may require two hands for operation (i.e., one for holding a body of the sprayer, and the other to adjust an applicator head). This makes operation of the device (i.e. the sprayer) more cumbersome and less appealing for a common user (say a gardener).

[0004] An example of a sprayer is provided in US patent application US 2014 0 3 67 496 A1 (hereinafter referred to as '496 reference). The '496 reference provides a sprinkler. The sprinkler includes a handle. Further, the sprinkler includes a nozzle and a lever. The lever is connected to the handle and is pivotable between an idle position and an active position. The sprinkler further includes a lever-locking apparatus for locking the lever in the active position. The lever-locking apparatus includes an anchor on the handle, a stop formed on the handle, and a catch attached to the lever. The catch is moved on the anchor and stopped by the stop trapped on the anchor as the lever is pivoted towards the handle and released. The catch is released from the anchor as the lever is again pivoted towards the handle and released. However, the locking mechanism of '496 reference is complex in the manufacturing process.

[0005] Thus, there is a need for an improved sprinkler which is easier to manufacture and less in costs.

SUMMARY

[0006] 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 sprayer. The sprayer includes an inlet for receiving water. The sprayer further includes an outlet for discharging water from the sprayer. The sprayer includes a handle. The sprayer includes a valve for switching a flow of the water from inlet to the outlet. Further, the sprayer includes a trigger configured to actuate the valve. The trigger moves between a locked position and an unlocked position. The trigger allows the flow of the

water in the locked position and stops the flow of the water in the unlocked position. The sprayer further includes a locking mechanism configured to be activated by the trigger. The locking mechanism includes a contour. The locking mechanism includes a locking element which moves between a second state and a first state within the contour. In the second state, the locking element engages with the trigger in the locked position. The sprayer is characterized in that the locking element is a linear spring. Thus, the present disclosure provides a simple, efficient, and user-friendly locking mechanism for the sprayer.

[0007] According to an embodiment of the present invention, in the first state the locking element is disengaged from the trigger. This stops the flow of the water as the valve remains closed in the unlocked position of the trigger.

[0008] According to an embodiment of the present invention, the locking element is a wire. The locking element gets locked in the contour which further checks the flow of water by directly or indirectly controlling the valve.

[0009] According to an embodiment of the present invention, the contour is a space or a slot where the locking element moves in. This allows desired locking of the contour and the locking element.

[0010] According to an embodiment of the present invention, the contour is integrally provided on the body of the sprayer opposite its trigger. This will allow to make the sprayer more compact and light weight, while have other implementation benefits.

[0011] Other features and aspects of this invention will be apparent from the following description and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The invention will be described in more detail with reference to the enclosed drawings, wherein:

FIG. 1 shows a perspective view inside a sprayer, in accordance with an aspect of the present disclosure;

FIG. 2 shows a perspective view of the sprayer of **FIG. 1** around a locking mechanism, in accordance with an aspect of the present disclosure;

FIG. 3 shows a perspective view inside the sprayer having the locking mechanism, in accordance with an aspect of the present disclosure; and

FIG. 4 shows a perspective view of the sprayer of **FIG. 3** around the locking mechanism, in accordance with an aspect of the present disclosure.

DESCRIPTION OF EMBODIMENTS

[0013] 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.

[0014] 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.

[0015] FIG. 1 illustrates a sprayer 100. The sprayer 100 of the present disclosure may be any device which finds application in outdoor or garden installations to supply or spray water as per the requirement of the installations. The sprayer 100 has an inlet 102 which may be connected to a water source such as, but not limited to, a hose, a tap or any other water supply. The sprayer 100 further includes an outlet 104. The outlet 104 allows discharge of water from the sprayer 100. The sprayer 100 includes a handle 116 on its body which allows to hold the sprayer 100 during working of the sprayer 100.

[0016] The sprayer 100 further includes a valve 106. The valve 106 switches a flow of the water from the inlet 102 to the outlet 104 and thereby allows to control the quantity of the water coming out of the outlet 104 of the sprayer 100. Further, the sprayer 100 includes a trigger 110 which is configured to actuate the valve 106. Moreover, the sprayer 100 includes a locking mechanism 114. The locking mechanism 114 has a contour 108 and a locking element 112. In a preferred embodiment of the present disclosure, the locking element 112 is a linear spring, however different types of the locking element 112 have been contemplated and are well within the scope of the present disclosure.

[0017] In some embodiments, the locking element 112 may be one or more of a torsion spring, a constant force spring, a compression spring, an extension spring, a Belleville spring, a spring clip, a natural spring and the like.

[0018] In some embodiments, the locking element 112 is a wire. The locking element 112 may be one or more of an annular snap-fit, a cantilever snap-fit, a torsional snap-fit and the like. Further, there may be different types

of threaded locking methods for secure connections of the locking element 112 such as bolts and nuts, screws and tapped nuts, threaded components and the like.

[0019] FIG. 2 illustrates the sprayer 100 around the locking mechanism 114. The locking mechanism 114 is configured to be activated by the trigger 110, or by any other part or component of the sprayer 100. In particular the trigger 110 may embody a specific protrusion that is formed to engage and disengage with the locking mechanism 114, whereby the shape of this protrusion may be according to the protrusions generally known from the state of the art (for example with EP 2 368 640 B1), that allow for locking and unlocking of triggers. Further, the locking mechanism 114 includes the contour 108. The present figure illustrates the sprayer 100 in an unlocked position which can be appreciated by position of the trigger 110. Herein, the trigger 110 is in an unlocked position since the trigger 110 remains away from the locking mechanism 114. Further, during working of the sprayer 100, the trigger 110 may move between the unlocked position and the locked position (shown in FIGS. 3, 4) to suit the desired need of the flow of water. In some embodiments, the sprayer 100 may be used left-handed, or right-handed or in any other state.

[0020] In some embodiments, the locking mechanism 114 may be actuated by action of the trigger 110, or the handle 104 in some embodiments. On actuating the trigger 110 once, the locking element 112 may get locked with any or both of the trigger 110 and contour 108. And when actuating the trigger 110 in the locked state the locking element 112 may get unlocked from any or both of the trigger 110 and contour 108. Herein, the locking mechanism 114 may be configured such that the locking element 112 may move between a second state and a first state within the contour 108. In the second state of the locking element 112, the locking element 112 engages with the trigger 110 in the locked position, as illustrated in FIG. 4. In the first state of the locking element 112, the trigger 110 is disengaged from the locking element 112 as well as the contour 108, as illustrated in FIG. 2.

[0021] In some embodiments, the locking mechanism 114 may include a bayonet coupling, a fine thread screw coupling, a coarse thread screw coupling, a push-pull coupling, a breakaway coupling, a push and press to release coupling, a coupling locked by screw, a push-push locked coupling and the like.

[0022] Making reference to FIG. 2 again, the locking element 112 is in the unlocked position. Therefore, no discharge of water from the outlet 104 (shown in FIG. 1). This shows that the trigger 110 stops the flow of the water in the unlocked. It is understood that the valve 106 may be partially, or fully opened by the trigger 110 in some embodiments of the present disclosure.

[0023] In some embodiments, the valve 106 may be actuated manually, mechanically, electrically, hydraulically, pneumatically and the like. Moreover, there may be power operated actuators associated with the valve 106. The actuators may allow the valve 106 to open, or

close automatically, at the touch of a button and the like. The power actuators make the operation of the valve **106** to suit the requirement (say more or less frequent).

[0024] In some embodiments, the locking element **112** may be one or more of a copper wire, a stainless-steel wire, a high strength alloy wire, a copper covered steel wire, a bare copper wire, a tinned copper wire, a silver coated copper wire, a nickel coated copper wire, an aluminum wire and the like.

[0025] **FIG. 3** illustrates the sprayer **100** with the locking mechanism **114** in the locked position. On actuating the trigger **110**, the locking element **112** moves within the contour **108** from the first state to the second state. Further, the trigger **110** (in the locked position) gets locked with the locking element **112** (in the second state) to allow the flow of water. As will be evident, the valve **106** gets opened or unlocked to stop the flow of the water from the outlet **104** in this position of the trigger **110**, which is in the locked position.

[0026] In some embodiments, the sprayer **100** may be a boom sprayer, a boomless sprayer nozzle, a mist sprayer, a three-point hitch sprayer, a truck-bed sprayer, a towing, a hitch sprayer, a UTV sprayer, an ATV sprayer, a spot sprayer, or a backpack sprayer.

[0027] **FIG. 4** illustrates another view of the locking mechanism **114** in the locked position. As will be appreciated through this figure, the body of the sprayer and the contour **108** be integrally provided in some embodiments. More particularly, the contour **108** may be integrally provided on the body of the sprayer. Alternatively, the trigger **110** and the body of the sprayer may be different or independent from each other. Different variations of the trigger **110** and the contour **108** have been contemplated for the present disclosure and all such variations are well within the scope of the present disclosure. This will allow to make the sprayer **100** more compact and light weight, among other benefits.

[0028] 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

[0029]

100	Sprayer	
102	Inlet	50
104	Outlet	
106	Valve	
108	Contour	
110	Trigger	
112	Locking Element	55
114	Locking Mechanism	
116	Handle	

Claims

1. A sprayer (**100**) comprising:

an inlet (**102**) for receiving water;
 an outlet (**104**) for discharging water from the sprayer (**100**);
 a handle (**116**);
 a valve (**106**) for switching a flow of the water from the inlet (**102**) to the outlet (**104**);
 a trigger (**110**) configured to actuate the valve (**106**), wherein the trigger (**110**) moves between a locked position and an unlocked position, and wherein the trigger (**110**) allows the flow of the water in the locked position and stops the flow of the water in the unlocked position ;
 the sprayer (**100**) further includes a locking mechanism (**114**) configured to be activated by the trigger (**110**), the locking mechanism (**114**) comprising:

a contour (**108**) and
 a locking element (**112**) which moves between a first state and a second state within the contour (**108**),
 wherein in the second state the locking element (**112**) engages with the trigger (**110**) in the locked position;

characterized in that:

the locking element (**112**) is a linear spring.

2. The sprayer (**100**) of claim 1, wherein in the first state the locking element (**112**) is disengaged from the trigger (**110**).

3. The sprayer (**100**) of claim 1, wherein the locking element (**112**) is a wire.

4. The sprayer (**100**) of claim 1, wherein the contour (**108**) is a space or a slot where the locking element (**112**) moves in.

5. The sprayer (**100**) of any of claims 1 to 4, wherein the contour (**108**) is integrally provided on the trigger (**110**).

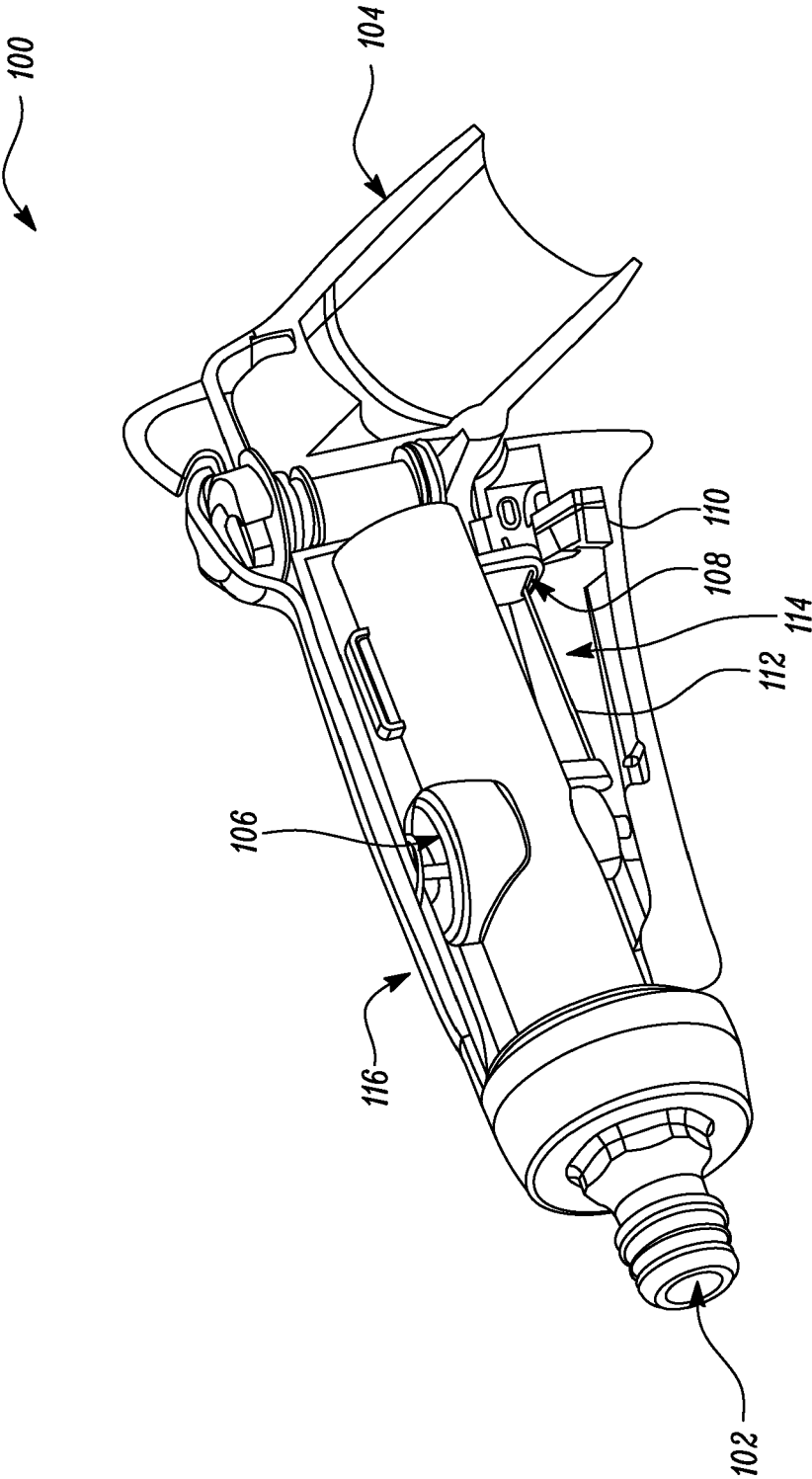


FIG. 1

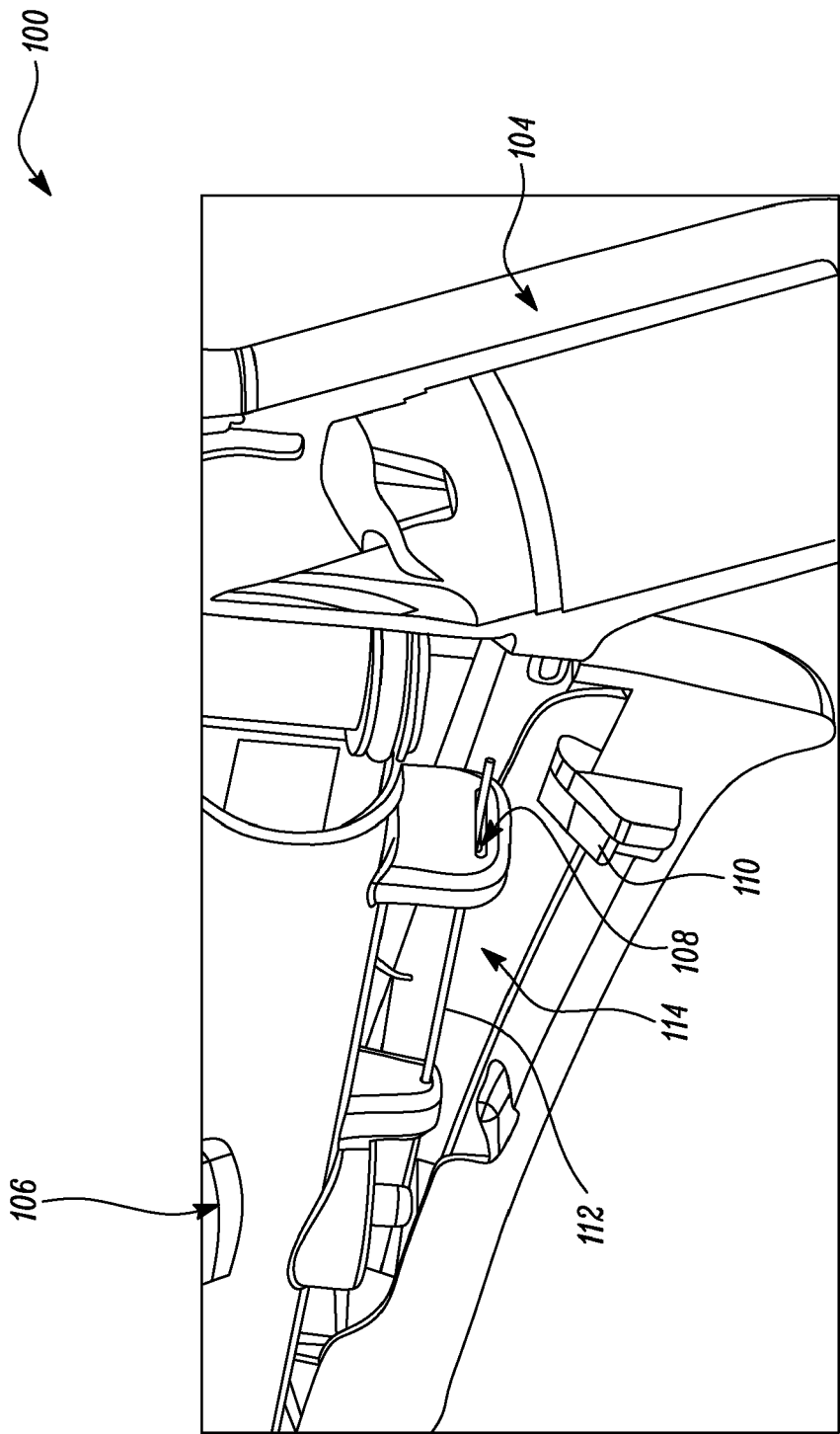


FIG. 2

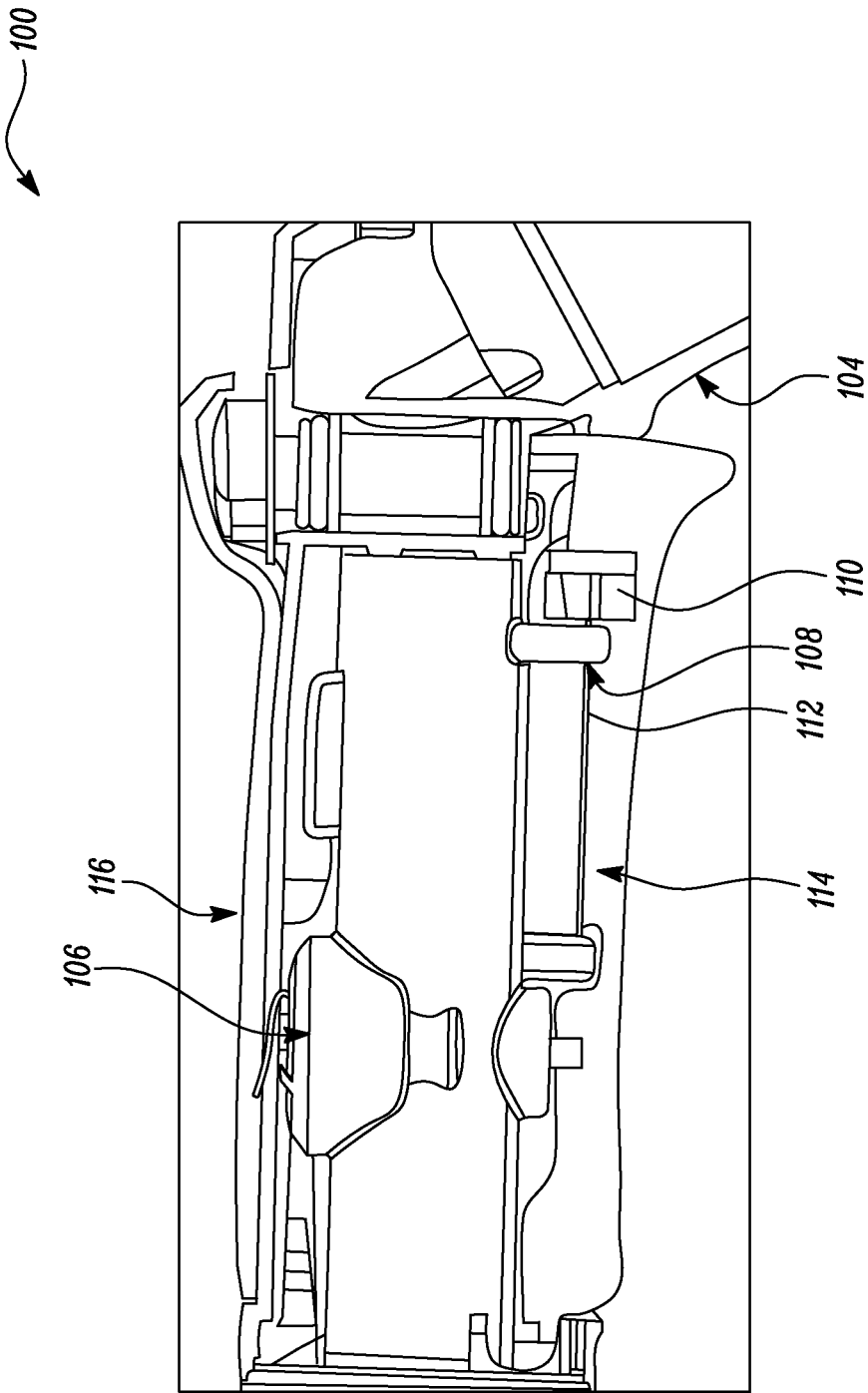


FIG. 3

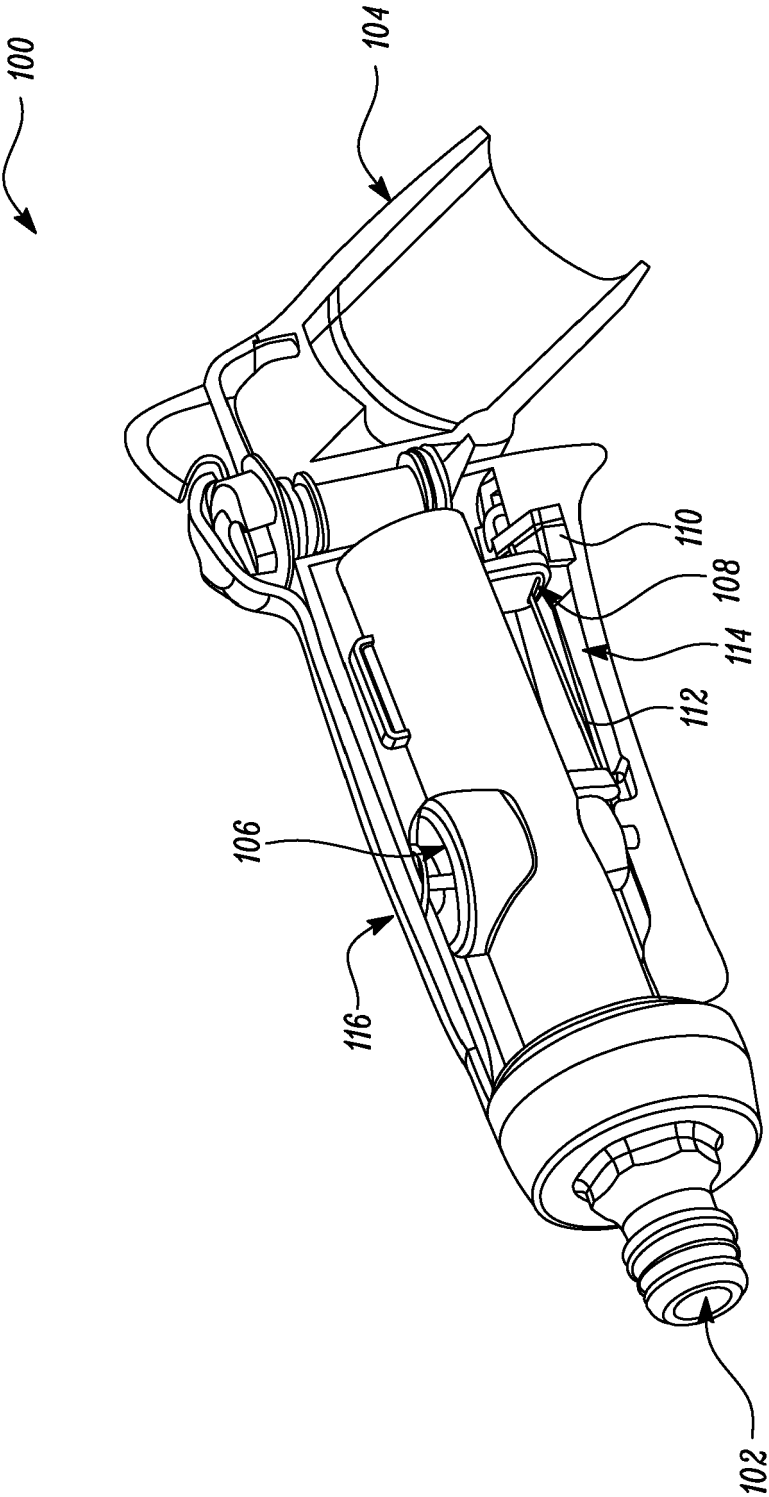


FIG. 4



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 20 0344

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2016/375453 A1 (TULLNEY HEIKO [DE] ET AL) 29 December 2016 (2016-12-29) * figures 1a, 1b *	1, 3, 4	INV. B05B12/00 B05B9/01
A	DE 23 18 313 A1 (WOMA MAASBERG CO GMBH W) 24 October 1974 (1974-10-24) * figure 2 *	1-5	
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A	JP 2005 138056 A (KOTOBUKI TSUSHO KK) 2 June 2005 (2005-06-02) * figures 26, 27 *	1-5	
			TECHNICAL FIELDS SEARCHED (IPC)
			B05B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 26 March 2021	Examiner Rente, Tanja
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 EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 20 20 0344

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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26-03-2021

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REFERENCES CITED IN THE DESCRIPTION

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- EP 2368640 B1 [0019]