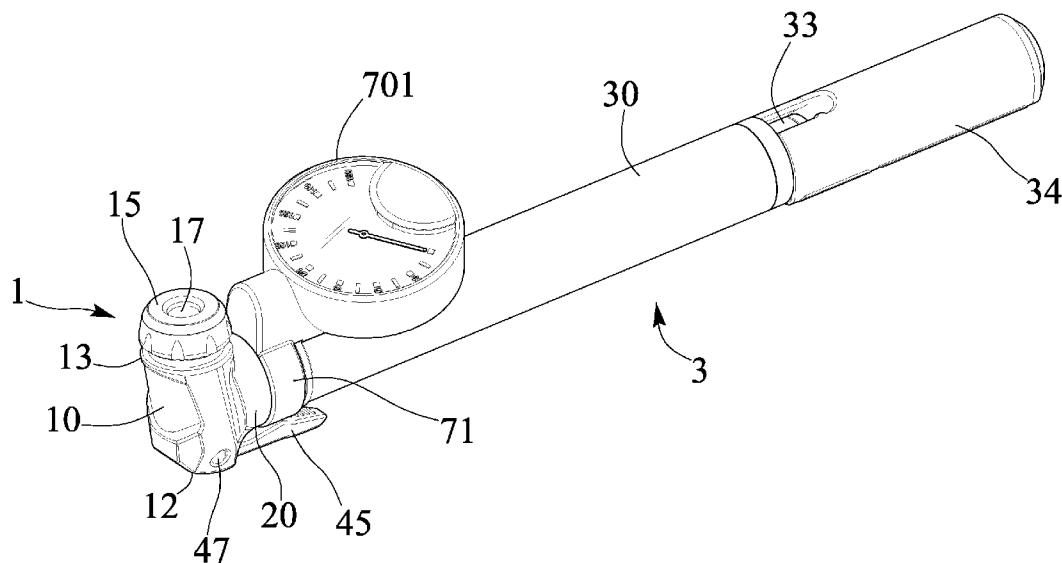




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WANG(10) **Pub. No.: US 2015/0167656 A1**(43) **Pub. Date: Jun. 18, 2015**(54) **AIR PUMP HAVING PIVOTAL PRESSURE
GAUGE**(52) **U.S. Cl.**
CPC **F04B 33/005** (2013.01); **F04B 51/00**
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Ltd., Taichung (TW)**(21) Appl. No.: **14/108,466**(22) Filed: **Dec. 17, 2013****Publication Classification**(51) **Int. Cl.**
F04B 33/00 (2006.01)
F04B 51/00 (2006.01)(57) **ABSTRACT**

An air pump device includes a housing having a barrel, a gasket engaged in the housing and having a cavity for engaging with an inflation valve, a pumping mechanism coupled to the barrel for generating and supplying a pressurized air to the barrel and the housing, the barrel includes an outer peripheral recess communicating with the chamber of the barrel for receiving the pressurized air from the barrel, and a pressure gauge includes a ring member engaged onto the barrel and includes an inlet formed in the pressure gauge and communicating with the outer peripheral recess of the barrel for receiving the pressurized air from the barrel and for indicating a pressure in the chamber of the barrel.



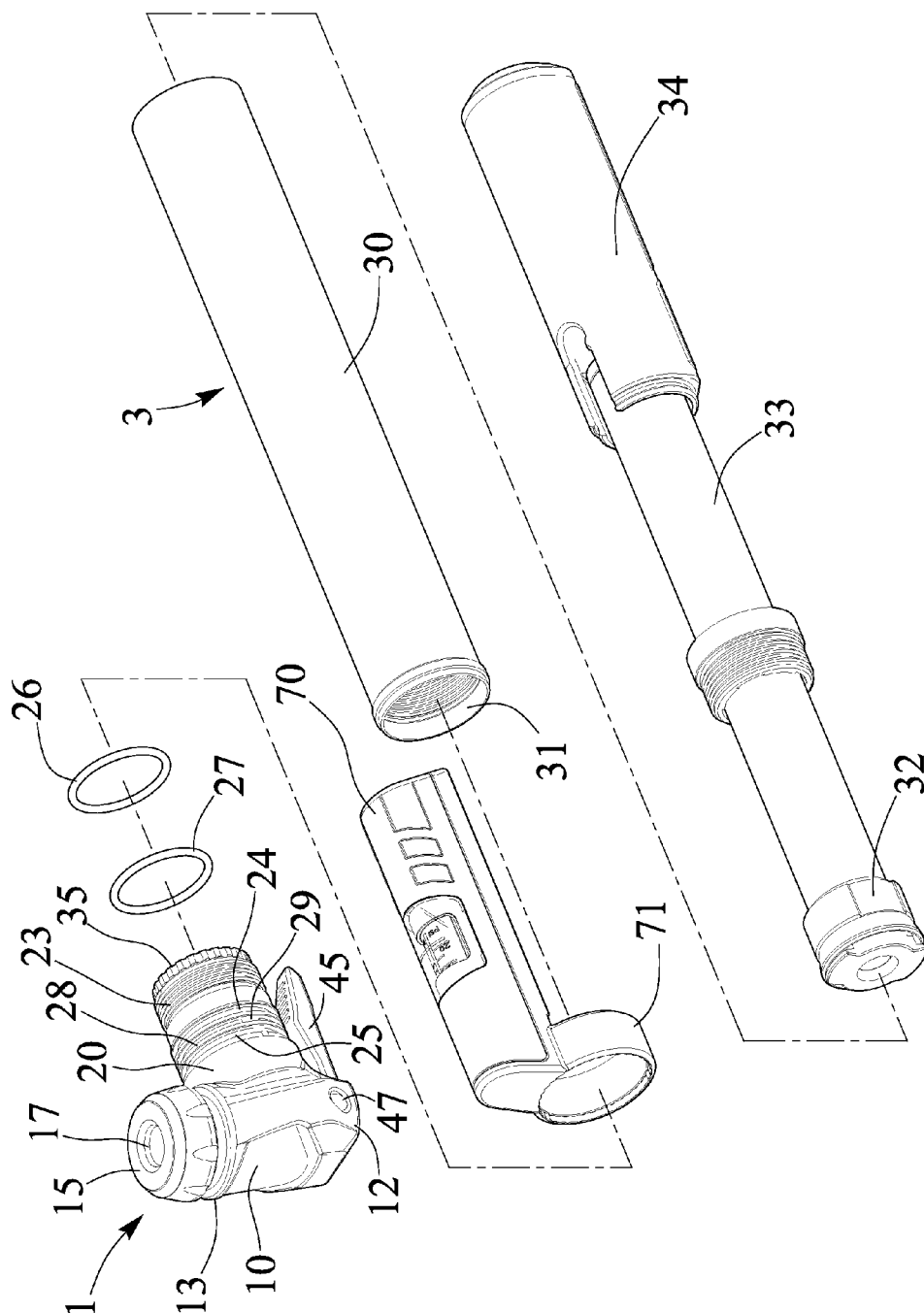


FIG. 1

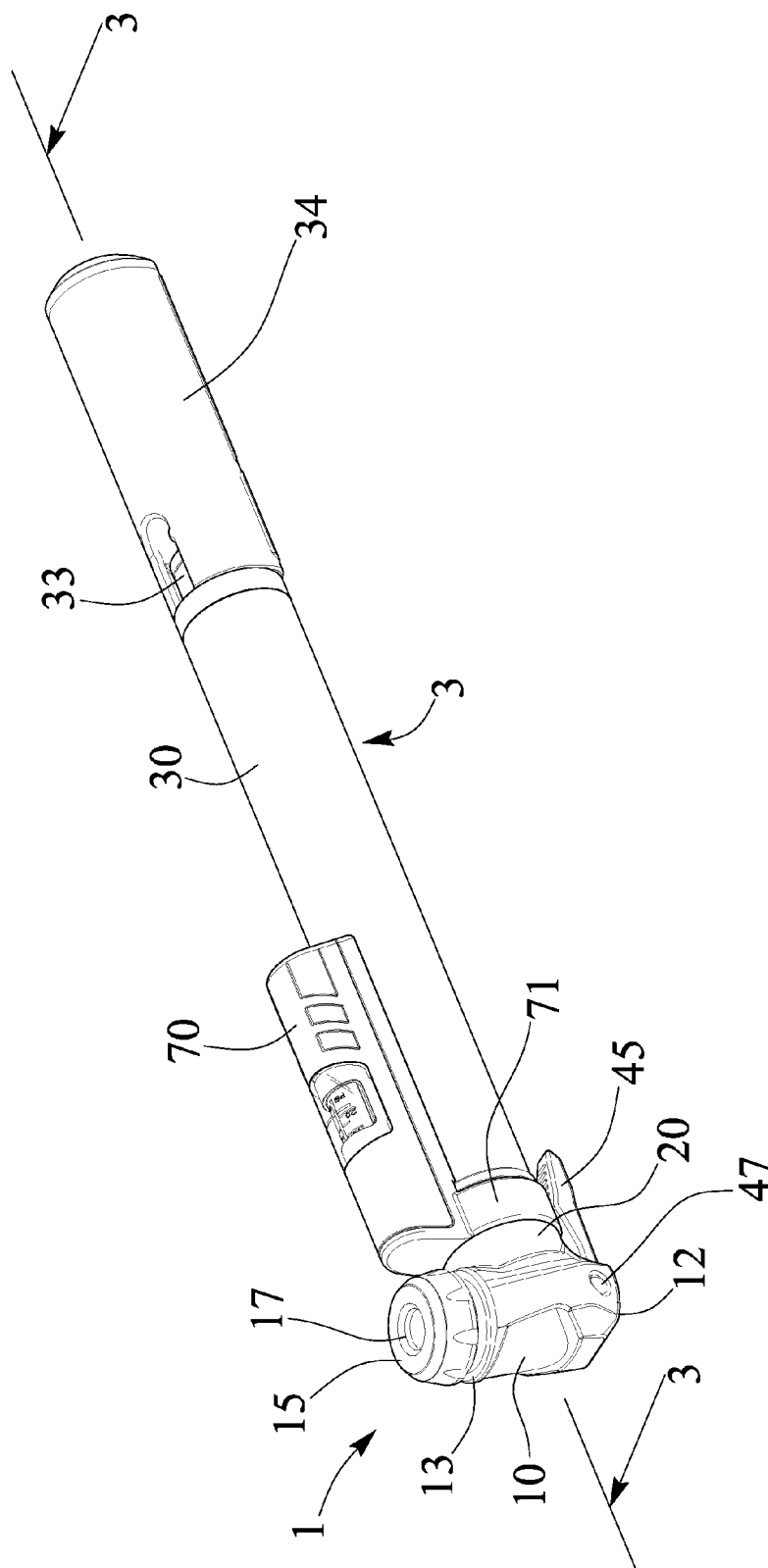


FIG. 2

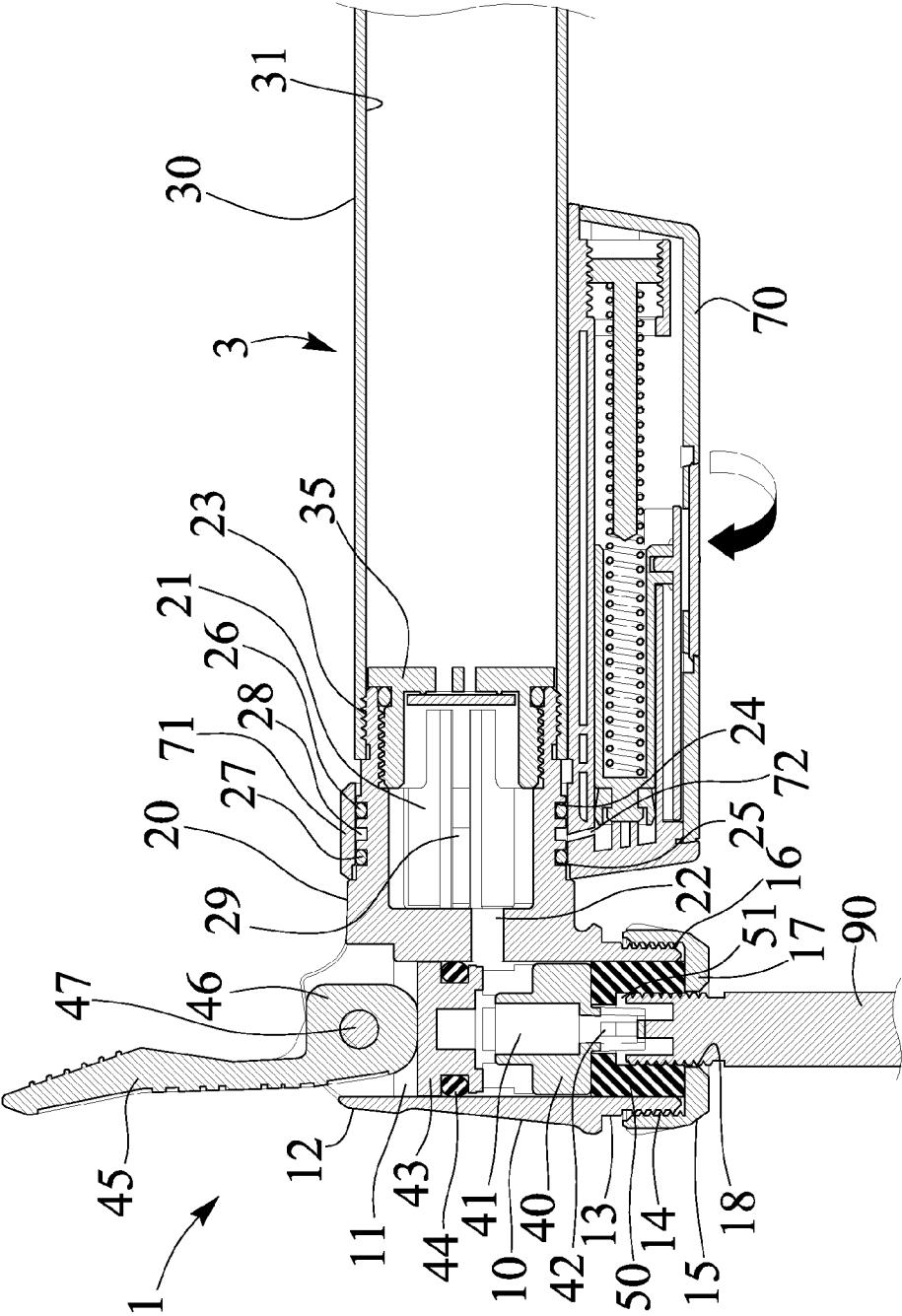


FIG. 3

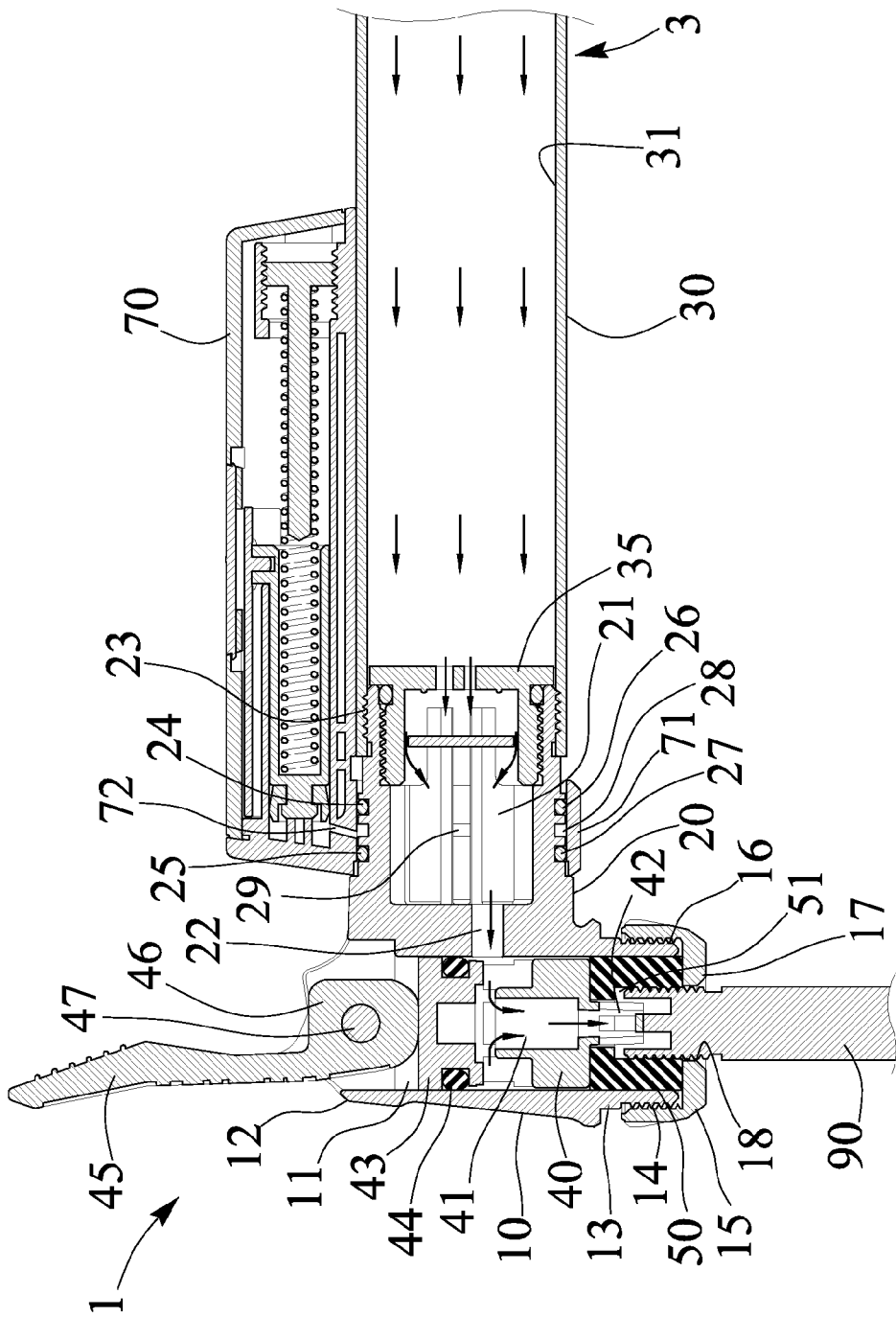


FIG. 4

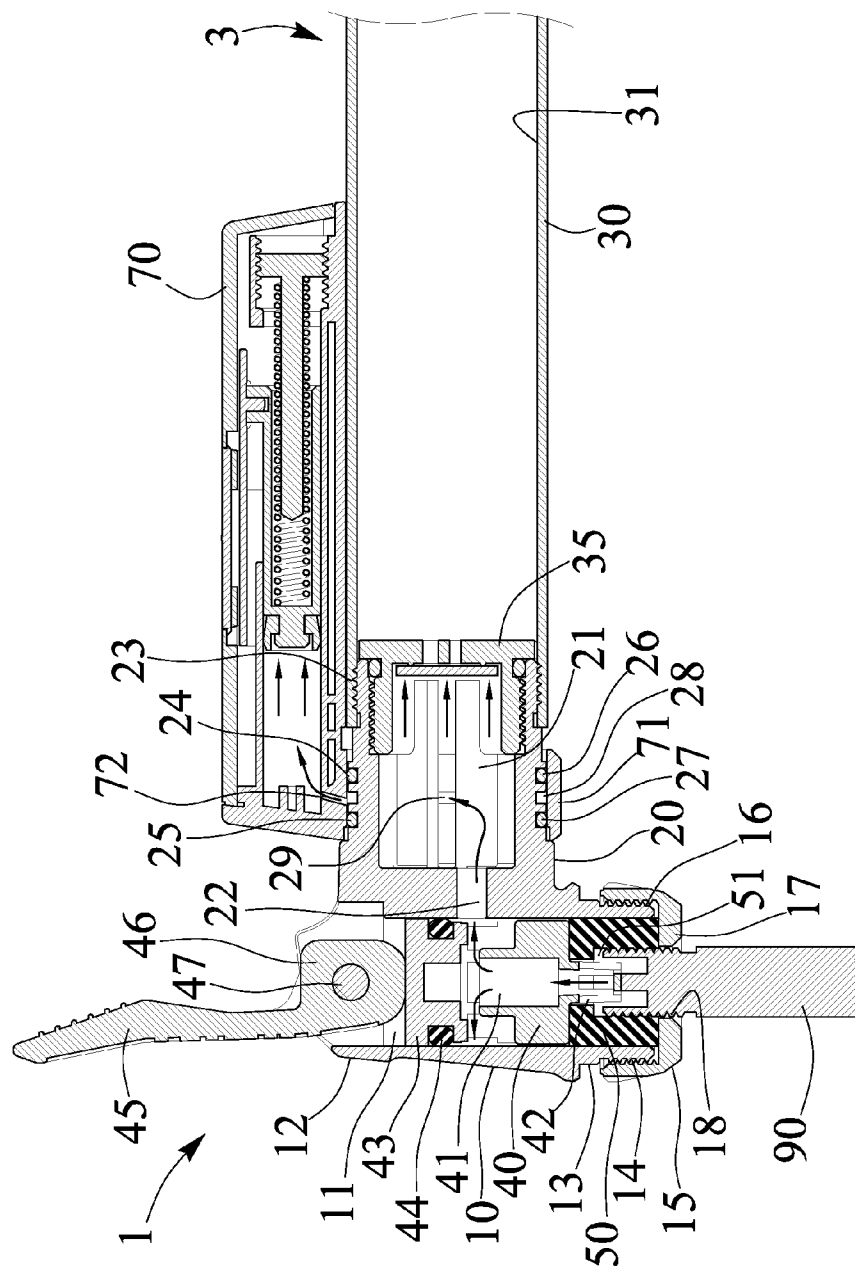


FIG. 5

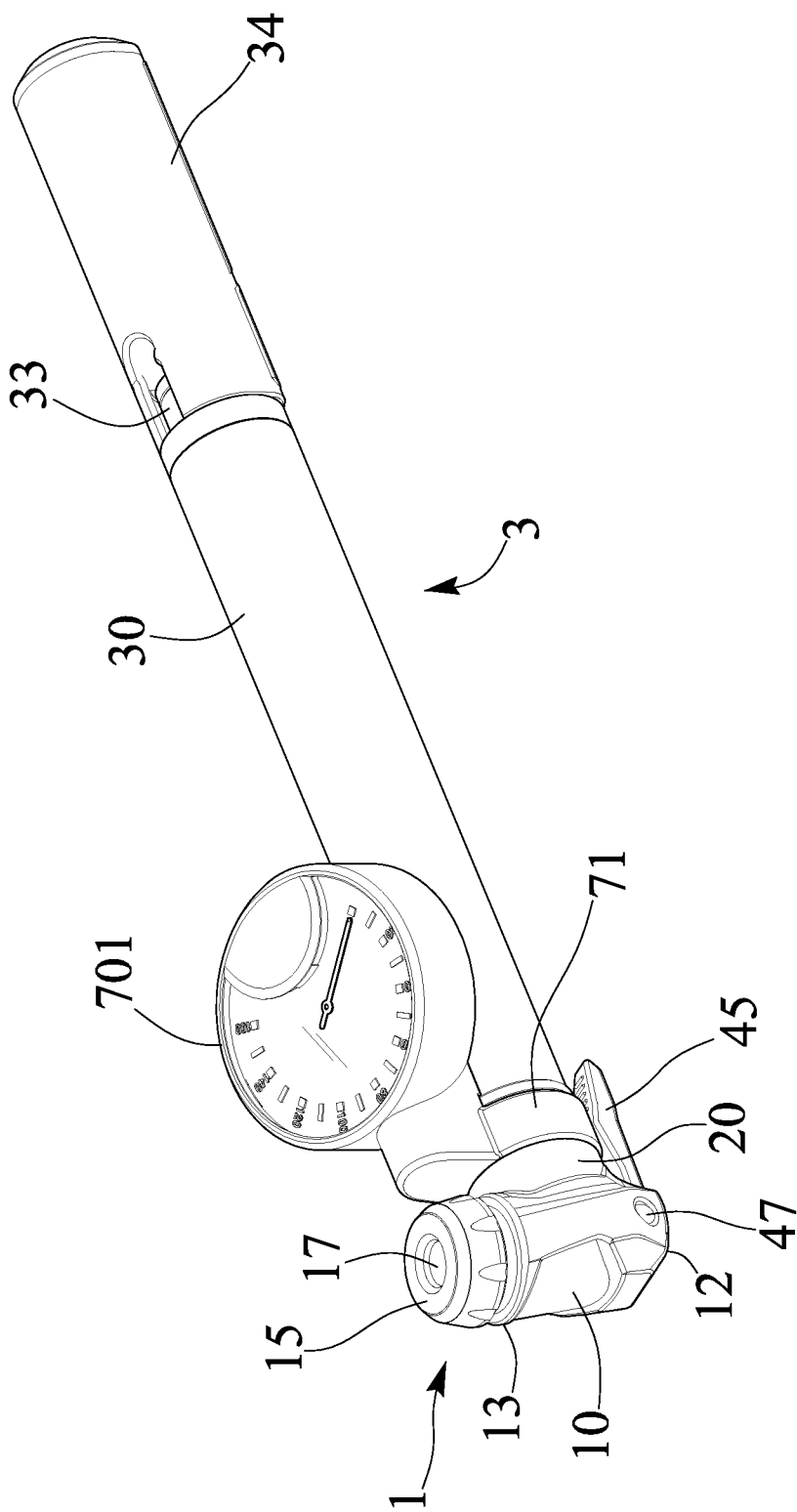


FIG. 6

AIR PUMP HAVING PIVOTAL PRESSURE GAUGE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to an air pump or hand pump device or apparatus, and more particularly to an air pump or hand pump device or apparatus including an improved pressure gauge pivotally or rotatably attached or mounted or secured or coupled to the air pump or hand pump and pivotal or movable relative to the air pump or hand pump to suitable selected position or location and for allowing the pressure gauge to be easily and quickly seen and read by the user.

[0003] 2. Description of the Prior Art

[0004] Typical air pump devices or apparatuses comprise a piston slidably or movably disposed or engaged in a cylinder housing and movable along or relative to the air pump device for generating a pressurized air and for filling or supplying the pressurized air to selectively inflate various kinds of balls, inner tires of the bicycles or the motorcycles or the vehicles, or other inflatable articles, and a pressure gauge attached or mounted or secured to the air pump device for showing or indicating the pressure within the air pump device.

[0005] For example, U.S. Pat. No. 5,964,577 to Chuang, U.S. Pat. No. 6,196,807 to Wu, U.S. Pat. No. 6,485,264 to Wu, U.S. Pat. No. 6,558,129 to Wang, U.S. Pat. No. 6,805,537 to Wu, and U.S. Pat. No. 8,336,386 to Wang disclose several of the typical hand operated air pumps each also comprising a cylinder housing including a chamber or compartment formed therein for slidably or movably receiving or engaging with a piston which is slidable and movable along or relative to the air pump device for generating a pressurized air and for filling or supplying the pressurized air to selectively inflate various kinds of balls, inner tires of the bicycles or the motorcycles or the vehicles, or other inflatable articles, and normally, a pressure gauge is further provided and attached or mounted or secured to the air pump device for showing or indicating the pressure within the air pump device.

[0006] However, the pressure gauge of the typical air pump device or apparatus is normally solidly and stably attached or mounted or secured to the air pump device at one side of the air pump device and partially blocked or shielded or covered by the air pump device, such that the pressure gauge of the typical air pump device or apparatus normally may not be easily and quickly seen and read by the user.

[0007] The present invention has arisen to mitigate and/or obviate the afore-described disadvantages of the conventional hand air pump devices.

SUMMARY OF THE INVENTION

[0008] The primary objective of the present invention is to provide an air pump device including improved pressure gauge pivotally or rotatably attached or mounted or secured or coupled to the air pump or hand pump and pivotal or movable relative to the air pump or hand pump to suitable selected position or location and for allowing the pressure gauge to be easily and quickly seen and read by the user.

[0009] In accordance with one aspect of the invention, there is provided an air pump device comprising a housing including a compartment formed therein, and including a barrel having a chamber formed in the barrel, and having an entrance formed in the barrel and communicating with the

compartment of the housing and communicating with the chamber of the barrel for guiding a pressurized air to flow from the chamber of the barrel into the compartment of the housing, a gasket engaged in the compartment of the housing, and the gasket including a cavity formed in the gasket for engaging with an inflation valve, a pumping mechanism coupled to the barrel of the housing for generating and supplying the pressurized air to the chamber of the barrel and the compartment of the housing, the barrel of the housing includes an outer peripheral recess formed in an outer peripheral portion of the barrel and communicating with the chamber of the barrel for receiving the pressurized air from the barrel, and a pressure gauge includes a ring member engaged onto the barrel and includes an inlet formed in the pressure gauge and communicating with the outer peripheral recess of the barrel for receiving the pressurized air from the barrel and for indicating a pressure in the chamber of the barrel, the ring member of the pressure gauge is rotatable relative to and around the barrel and the tubular member and the housing for 360 degrees for allowing the pressure gauge to be easily and quickly seen and read by the user when the air pump device is actuated or operated by the user.

[0010] The barrel of the housing includes at least one orifice formed in the barrel and communicating with the outer peripheral recess and the chamber of the barrel for allowing the pressurized air to flow from the chamber of the barrel and through the orifice and into the outer peripheral recess of the barrel.

[0011] The barrel of the housing includes two sealing rings engaged onto the barrel and engaged with the ring member of the pressure gauge for making an air tight seal between the ring member of the pressure gauge and the barrel and for preventing an air leaking problem from being occurred.

[0012] The barrel of the housing includes two outer peripheral depressions formed in the outer peripheral portion of the barrel for engaging with sealing rings respectively, and the outer peripheral recess of the barrel is located between the outer peripheral depressions of the barrel and the sealing rings for preventing an air leaking problem from being occurred.

[0013] The housing includes a sliding member slidably received and engaged in the compartment of the housing, the sliding member includes a bore formed therein and communicating with the entrance of the barrel for receiving the pressurized air from the barrel, the sliding member is engaged with the gasket for squeezing or actuating the gasket to engage with and to grasp or grip the inflation valve.

[0014] The housing includes a follower slidably engaged in the compartment of the housing and engaged with the sliding member for depressing or actuating or moving the sliding member to squeeze or actuate the gasket to grasp or grip the inflation valve. The housing includes a cover attached to the housing and engaged with the gasket.

[0015] The housing includes a hand grip having a cam member engaged in the compartment of the housing and pivotally secured to the housing with a pivot shaft, and the cam member is contacted or engaged with the follower for actuating or forcing the follower and the sliding member to engage with the gasket and to grasp or grip the inflation valve to the housing.

[0016] The pumping mechanism includes a tubular member coupled to the barrel of the housing, and having a space formed in the tubular member, a piston slidably engaged in the space of the tubular member and movable relative to the

tubular member for generating a pressurized air and for supplying the pressurized air to the chamber of the barrel and then to flow into the compartment of the housing.

[0017] The pumping mechanism includes a piston rod attached or mounted or secured to or extended from the piston, and a handle is attached or secured to the piston rod for moving the piston relative to the tubular member in order to generate the pressurized air.

[0018] Further objectives and advantages of the present invention will become apparent from a careful reading of the detailed description provided hereinbelow, with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] FIG. 1 is a partial exploded view of an air pump device in accordance with the present invention;

[0020] FIG. 2 is a perspective view of the air pump device;

[0021] FIG. 3 is a cross sectional view of the air pump device taken along lines 3-3 of FIG. 2;

[0022] FIGS. 4, 5 are cross sectional views similar to FIG. 3, illustrating the operation of the air pump device; and

[0023] FIG. 6 is another perspective view similar to FIG. 2, illustrating the other arrangement of the air pump device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0024] Referring to the drawings, and initially to FIGS. 1-3, an air pump device 1 in accordance with the present invention comprises a head body or housing 10 including a compartment 11 formed therein and opened upwardly through an upper portion or one end portion 12 of the housing 10 (FIGS. 3-5) and also opened downwardly through a lower or bottom portion or the other end portion 13 of the housing 10 (FIGS. 3-5), the housing 10 includes a positioning or retaining or anchoring portion or device or member 14, such as an outer thread 14 formed or provided on the outer peripheral portion of the lower or bottom portion or the other end portion 13 of the housing 10 for threading or engaging with a control ferrule or barrel or sleeve or cover 15 or the like.

[0025] For example, as shown in FIGS. 3-5, the cover 15 includes an inner thread 16 formed or provided therein for threading or engaging with the outer thread 14 that is formed in the other end portion 13 of the housing 10 and for detachably or changeably or selectively attaching or mounting or securing or coupling the cover 15 to the other end portion 13 of the housing 10, and includes a peripheral flange or projection or bulge or swelling or protrusion 17 extended radially and inwardly therefrom for forming or defining a relatively decreased or reduced entrance or orifice or passage or aperture 18 in the cover 15. The housing 10 further includes a stud or extension or inlet barrel 20 extended laterally and outwardly therefrom for connecting or coupling to a pressurized air reservoir or hand-held air pump which will be described in further details hereinafter.

[0026] For example, the barrel 20 includes a chamber 21 formed therein, and includes a lateral orifice or entrance 22 formed therein, such as formed in or through the barrel 20 of the housing 10 and communicating with the compartment 11 of the housing 10 for guiding the pressurized air to flow from the chamber 21 of the barrel 20 into the compartment 11 of the housing 10. The housing 10 further includes an outer thread 23 formed or provided on the outer peripheral portion of the barrel 20 for threading or engaging with an air pump or

pumping mechanism 3 and for detachably or changeably or selectively attaching or mounting or securing or coupling the pumping mechanism 3 to the barrel 20 of the housing 10. The pumping mechanism 3 includes a cylinder housing or tubular member 30 detachably coupled to the barrel 20 of the housing 10, and having a chamber or compartment or space 31 formed therein.

[0027] The pumping mechanism 3 further includes a piston 32 (FIG. 1) slidably or movably received or engaged in the space 31 of the tubular member 30 and slidable and movable along or relative to the tubular member 30 for generating a pressurized air and for filling or supplying the pressurized air to the chamber 21 of the barrel 20 (FIGS. 3-5) and then into the compartment 11 of the housing 10 and provided for selectively inflating various kinds of balls, inner tires of the bicycles or the motorcycles or the vehicles, or other inflatable article, and a piston rod 33 (FIGS. 3-5) is extended from the piston 32, and a handle 34 is attached or mounted or secured to the piston rod 33 for moving the piston 32 along or relative to the tubular member 30 in order to generate the pressurized air and to supply the pressurized air to the chamber 21 of the barrel 20 and then to the compartment 11 of the housing 10.

[0028] A control ferrule or barrel or lock sleeve or lock nut 35 may further be provided and threaded or engaged with the barrel 20 (FIGS. 3-5) for solidly and stably anchoring or securing or retaining or positioning or locking the tubular member 30 to the barrel 20 of the housing 10, and thus for allowing the pumping mechanism 3 to be used for suitably generating the pressurized air and for suitably supplying the pressurized air to the chamber 21 of the barrel 20 and the compartment 11 of the housing 10. The above-described structure or configuration for the connection mechanism or status between the barrel 20 and the tubular member 30 is typical and is not related to the present invention and will not be described in further details.

[0029] The air pump device 1 further includes a valve piece or shank or sliding member 40, as shown in FIGS. 3-5, slidably or movably disposed or engaged into the compartment 11 of the housing 10, and the sliding member 40 includes a chamber or compartment or space or bore 41 formed therein and communicating with the compartment 11 of the housing 10 and the entrance 22 of the barrel 20 or of the housing 10 for selectively receiving the pressurized air from the space 31 of the tubular member 30, and includes an opening or mouth 42 formed therein and communicating with the bore 41 of the sliding member 40 for allowing the pressurized air to selectively flow out through the bore 41 of the sliding member 40 and to an inflation valve 90 (FIGS. 3-5), such as a French type valve or a U.S. type or the like.

[0030] As also shown in FIGS. 3-5, an elastic grasping member or mouth or gasket 50 is attached or mounted or secured or received or contained or engaged in the compartment 11 of the housing 10, and anchored or retained or positioned between the protrusion 17 of the cover 15 and the sliding member 40, and includes a cavity 51 formed therein and having a predetermined size or dimension or standard for receiving or engaging with the inflation valve 90, and the gasket 50 is made of soft or elastic materials, such as rubber, plastic or other synthetic materials having a suitable or predetermined softness or resilience for being selectively depressed or compressed or squeezed or deformed to grip or grasp or hold or retain the inflation valve 90 to the sliding member 40 and the housing 10 and the cover 15.

[0031] As also shown in FIGS. 3-5, another sliding member or follower 43 is also slidably or movably disposed or engaged into the compartment 11 of the housing 10, and a sealing ring 44 is attached or mounted or secured or engaged onto the follower 43, and contacted or engaged between the follower 43 and the housing 10 for selectively making a water or air tight seal between the follower 43 and the housing 10, and an actuating handle or knob or hand grip 45 includes a cam member 46 disposed or received or engaged in the compartment 11 of the housing 10 and pivotally or rotatably attached or mounted or secured to the housing 10 with a pivot shaft 47, and the cam member 46 is contacted or engaged with the follower 43 for selectively forcing the follower 43 and the sliding member 40 to squeeze the gasket 50 and to grasp the inflation valve 90 to the sliding member 40.

[0032] As shown in FIGS. 1 and 3-5, the housing 10 includes one or more (such as two) outer peripheral depressions 24, 25 formed or provided in the outer peripheral portion of the barrel 20 for receiving or engaging with sealing rings 26, 27 respectively, and further includes an outer peripheral recess 28 also formed or provided in the outer peripheral portion of the barrel 20 and located between the outer peripheral depressions 24, 25 of the barrel 20, and further includes one or more cavities or apertures or orifices 29 formed therein and communicating with the outer peripheral recess 28 and the chamber 21 of the barrel 20 for allowing the pressurized air to selectively flow from the chamber 21 of the barrel 20 and to flow out through the orifices 29 and into the outer peripheral recess 28 of the barrel 20.

[0033] The air pump device 1 further includes a pressure gauge 70, such as an electrical type pressure gauge 70 having a barrel or sleeve or tubular member or ring member 71 attached or mounted or secured or engaged onto the barrel 20 and contacted or engaged with the sealing rings 26, 27 for selectively making a water or air tight seal between the ring member 71 of the pressure gauge 70 and the barrel 20, and the pressure gauge 70 includes an entrance or orifice or passage or aperture or inlet 72 formed therein and communicating with the outer peripheral recess 28 of the barrel 20 for selectively receiving the pressurized air from the barrel 20 and for indicating or showing the pressure in the chamber 21 of the barrel 20 and the space 31 of the tubular member 30.

[0034] In operation, as shown in FIGS. 3-5, the ring member 71 of the pressure gauge 70 is rotatable relative to the barrel 20 and the tubular member 30 and the housing 10 to the upper portion of the barrel 20 (FIGS. 4-5), or to the lower or bottom portion of the barrel 20 (FIGS. 2-3), or to the other portions of the barrel 20, for allowing the pressure gauge 70 to be pivoted or rotated relative to and around the barrel 20 and the tubular member 30 and the housing 10 for 360 degrees, and to be easily and quickly seen and read by the user when the air pump device 1 is actuated or operated by the user. Alternatively, as shown in FIG. 6, the pressure gauge 701 may be selected from the other type of the pressure gauge 701 for showing or indicating the pressure within the chamber 21 of the barrel 20 and the space 31 of the tubular member 30.

[0035] Accordingly, the air pump device or hand pump in accordance with the invention includes an improved pressure gauge pivotally or rotatably attached or mounted or secured or coupled to the air pump or hand pump and pivotal or movable relative to the air pump or hand pump to suitable selected position or location and for allowing the pressure gauge to be easily and quickly seen and read by the user.

[0036] Although this invention has been described with a certain degree of particularity, it is to be understood that the present disclosure has been made by way of example only and that numerous changes in the detailed construction and the combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as hereinafter claimed.

I claim:

1. An air pump device comprising:

- a housing including a compartment formed therein, and including a barrel having a chamber formed in said barrel, and having an entrance formed in said barrel and communicating with said compartment of said housing and communicating with said chamber of said barrel for guiding a pressurized air to flow from said chamber of said barrel into said compartment of said housing,
- a gasket engaged in said compartment of said housing, and said gasket including a cavity formed in said gasket for engaging with an inflation valve,
- a pumping mechanism coupled to said barrel of said housing for generating and supplying the pressurized air to said chamber of said barrel and said compartment of said housing, wherein:

said barrel of said housing includes an outer peripheral recess formed in an outer peripheral portion of said barrel and communicating with said chamber of said barrel for receiving the pressurized air from said barrel, and a pressure gauge includes a ring member engaged onto said barrel and includes an inlet formed in said pressure gauge and communicating with said outer peripheral recess of said barrel for receiving the pressurized air from said barrel and for indicating a pressure in said chamber of said barrel.

2. The air pump device as claimed in claim 1, wherein said barrel of said housing includes at least one orifice formed in said barrel and communicating with said outer peripheral recess and said chamber of said barrel for allowing the pressurized air to flow from said chamber of said barrel and through said at least one orifice and into said outer peripheral recess of said barrel.

3. The air pump device as claimed in claim 1, wherein said barrel of said housing includes two sealing rings engaged onto said barrel and engaged with said ring member of said pressure gauge for making an air tight seal between said ring member of said pressure gauge and said barrel.

4. The air pump device as claimed in claim 3, wherein said barrel of said housing includes two outer peripheral depressions formed in said barrel for engaging with sealing rings respectively, and said outer peripheral recess is located between said outer peripheral depressions of said barrel and said sealing rings.

5. The air pump device as claimed in claim 1, wherein said housing includes a sliding member slidably received and engaged in said compartment of said housing, said sliding member includes a bore formed therein and communicating with said entrance of said barrel for receiving the pressurized air from said barrel, said sliding member is engaged with said gasket.

6. The air pump device as claimed in claim 5, wherein said housing includes a follower slidably engaged in said compartment of said housing and engaged with said sliding member.

7. The air pump device as claimed in claim 6, wherein said housing includes a hand grip having a cam member engaged

in said compartment of said housing and pivotally secured to said housing with a pivot shaft, and said cam member is engaged with said follower for forcing said follower and said sliding member to engage with said gasket.

8. The air pump device as claimed in claim 1, wherein said housing includes a cover attached to said housing and engaged with said gasket.

9. The air pump device as claimed in claim 1, wherein said pumping mechanism includes a tubular member coupled to said barrel of said housing, and having a space formed in said tubular member, a piston slidably engaged in said space of said tubular member and movable relative to said tubular member for generating a pressurized air.

10. The air pump device as claimed in claim 9, wherein said pumping mechanism includes a piston rod extended from said piston, and a handle attached to said piston rod for moving said piston relative to said tubular member in order to generate the pressurized air.

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