Nov. 15, 1955 L. E. RUSSELL 2,723,794

PUMP

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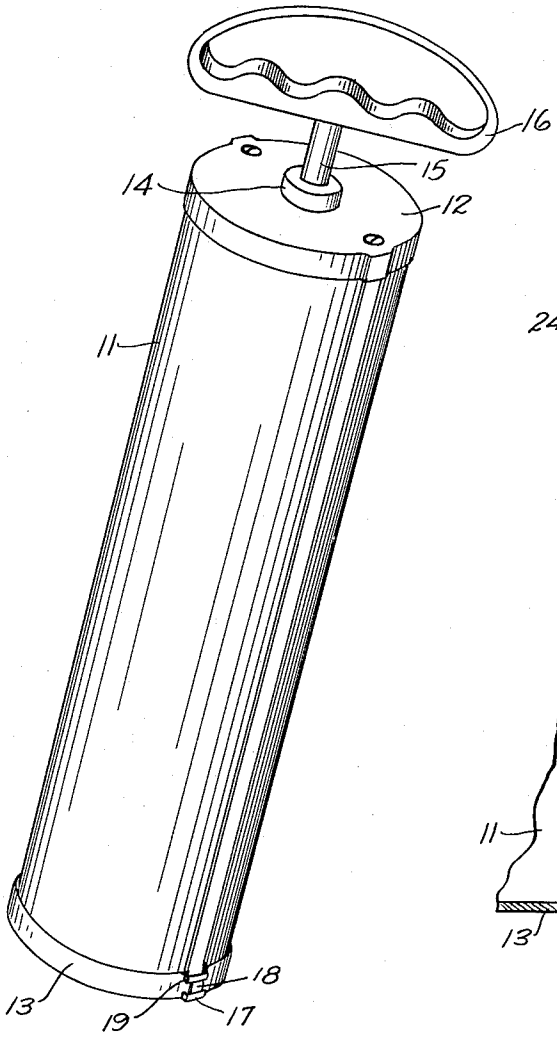


Fig.-1

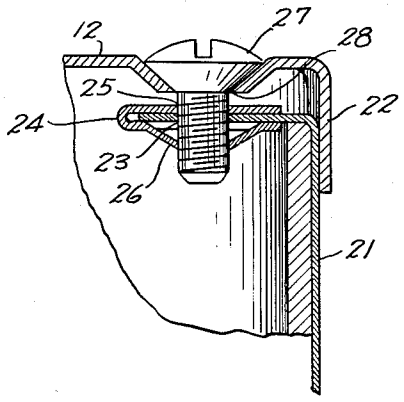


Fig.-2

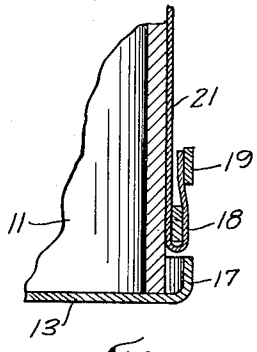


Fig.-3

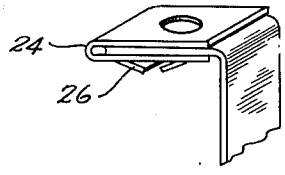


Fig.-4

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6 Claims. (Cl. 229—5.7)

This invention relates to hand operated air pumps, and more particularly to the cylinder construction and assembly used therein.

Pumps of the instant type are used in many and sundry different applications. In all such applications there is one common prerequisite, namely, economy and durability. To meet and satisfy the demand it is necessary that the pumps be of such design that they may be economically manufactured, yet be durable and of long life.

Thus the object of the invention is to improve the construction as well as the means and mode of assembly of hand pumps, whereby they may not only be economically and easily manufactured, but will be more efficient and satisfactory in use, adaptable to a wide variety of applications having relatively few parts and be unlikely to get out of repair.

It is a further object of the invention to produce a durable and inexpensive cylinder construction in pumps of the class described, using only fiberboard and stamped metal parts.

Another object of the invention is to reduce materially the number of parts used in the cylinder assembly as well as the need for machining such parts.

A further object of the invention is to utilize a principle of flexible metallic straps for seating end closures on the cylinder element and to provide a single simple adjustment means for drawing up such straps to thereby firmly seat the end elements on the cylinder.

A further object of the invention is to provide a pump structure possessing the advantageous structural features, the inherent meritorious characteristics and the mode of assembly herein mentioned.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention intended to be protected by Letters Patent consists of the features of construction, the parts and combinations thereof, and the mode of operation, as hereinafter described or illustrated in the accompanying drawings, or their equivalents.

Referring to the accompanying drawing, wherein is found the preferred but obviously not necessarily the only form of embodiment of the invention,

Fig. 1 is a perspective view of a hand pump in accordance with an illustrative embodiment of the invention;

Fig. 2 is a fragmentary view in longitudinal section showing the manner of attachment of the upper end of the tie strap;

Fig. 3 is a view similar to Fig. 2, showing the manner of attachment of the lower end of the tie strap; and

Fig. 4 is a detail view in perspective of the upper end of the tie strap, and speed nut mounted thereon.

Like parts are indicated by similar characters of reference throughout the several views.

Referring to the drawings, a pump comprising a cylinder assembly in accordance with the instant invention may comprise an open ended cylinder **11**, the opposite ends of which are closed by respective closure caps **12** and **13**. The upper cap **12** has an axial opening mounting a bushing **14** in which a rod **15** has a sliding fit. One end of the rod **15** is within the cylinder **11** and is connected to a piston therein (not shown). The other end of the rod **15** is outside and above the cylinder **11** and has a handle **16** secured thereto. It will of course be understood that the assembly comprising the rod **15**, handle **16** and piston (not shown) are reciprocated in the operation of the pump to draw air into the cylinder and to expel it therefrom under pressure, the air leaving the cylinder by way of an opening (not shown) in the lower closure cap **13**.

Referring to the cylinder assembly in greater detail the cylinder **11** is in the illustrated instance made of a relatively stiff but non-metallic material, for example fiberboard. The closure caps **12** and **13** are stamped metal pieces, recessed to receive the respective ends of the cylinder **11** with a close fit. On the upstanding side wall of closure cap **13** is a pair of diametrically opposed protruding portions **17**, cut away and formed to present vertically offset ribs **18** and **19**. Each portion **17** receives one end of a thin relatively flexible and deformable metal strap **21**, such end of the strap being folded about the rib **18** and substantially back upon itself with the extremity thereof being inserted between the cylinder wall and the rib **19**. The straps **21** are accordingly anchored to the closure cap **13** against all ordinary thrusts and stresses.

The straps **21** extend upwardly along the outside of cylinder **11** in close parallel relation thereto. The upper ends thereof are received in protruding portions **22** in the side wall of the closure cap **12**, and, inside the cap, are turned over into abutting relation with the top of the cylinder **11** in a plane substantially normal to the axis of the cylinder and parallel to the base wall of cap **12**. The inturned ends of the straps **21** project beyond the wall of cylinder **11** and are formed with respective openings **23**.

Installed on the inturned end of each strap **21** is a speed nut **24**. According to the known construction of devices of this kind, the nut **24** has an opening **25** in overlying registering relation with the opening **23** and outstruck resilient fingers **26** in underlying spaced relation to the opening **23**. Extending through the registering openings **23** and **25** into threaded engagement with the fingers **26** is the shank of a screw **27** passed through the cap **12** and the head of which is seated in a countersunk opening **28** in the cap. By turning the screw **27** downward through the speed nut **24**, the closure cap **12** is drawn firmly to a seat on cylinder **11**, the reactant force of such action being applied in a direction to urge the strap **21** upward. The straps **21** thereby are tightened and the lower cap **13** is drawn to a firm seat on the bottom of cylinder **11**.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise but one of several modes of putting the invention into effect.

Having thus described my invention, I claim:

1. A cylinder for a pump or the like, including a cylindrical member open at both ends, cap members receiving and enclosing the opposite ends of said cylindrical member, straps anchored at their one ends to the cap member at one end of said cylindrical member and extending in parallel relation to said cylindrical member toward the other end thereof, the others ends of said straps being

received in and enclosed by the cap member at the said other end of said cylindrical member, said other end of said straps further being turned over upon the said other end of said cylindrical member, and detachable connections between the said cap member at said other end of the cylindrical member and said other ends of said straps.

2. A cylinder for use in a pump or the like, including an open ended cylindrical member, closure caps receiving and enclosing opposite ends of said cylinder, deformable tie members extending in parallel relation to said cylindrical member, means providing an anchor for one end of said tie members on one of said closure caps, the opposite ends of said tie members being received in and closed by the other one of said closure caps and further being turned over upon the opposite end of said cylindrical member and presenting respective screw openings, and screw connectors passed through the said other of said closure caps and through the screw openings in said tie members.

3. A cylinder according to claim 2, characterized by a nut installed on the turned over end of each of said tie members cooperable with a respective screw connector to tighten and hold said closure caps upon said cylindrical member.

4. A cylinder for use in a pump or the like, including an open ended cylindrical member, closure caps for the ends of said member, said caps being recessed to receive said cylinder with a relatively close fit, a plurality of relatively thin and deformable straps extending in parallel relation to said cylindrical member outside thereof, a rib formation on one of said closure caps to which the adjacent ends of said straps are detachably anchored, the opposite ends of said straps being received within the other one of said closure caps and turned over the adjacent end of said cylindrical member to lie substantially normal to the axis of said member, and adjustable connections between said other closure cap and the turned over ends of said straps for tightening said straps to seat said closure caps firmly on the ends of said cylindrical member.

5. A cylinder for a pump or the like, including a cylindrical member made of relatively stiff and inflexible fiberboard material and open at its opposite ends, stamped metal closure caps having flanges respectively receiving and enclosing the opposite ends of said cylindrical member and flexible deformable straps on the outer side of said cylindrical member engaged with and interconnecting said closure caps, said straps at their one end being positioned between the end of the wall of the cylindrical member and the overlying flange of said metal closure cap, the end of said strap being connected to the under side of said closure cap.

6. A cylinder according to claim 5, characterized in that said straps are detachably connected to said closure caps, the other of said caps presenting extruded rib portions over which ends of respective straps are folded back upon themselves.

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