Feb. 27, 1940. T. R. RYMAL 2,191,861

PUMP

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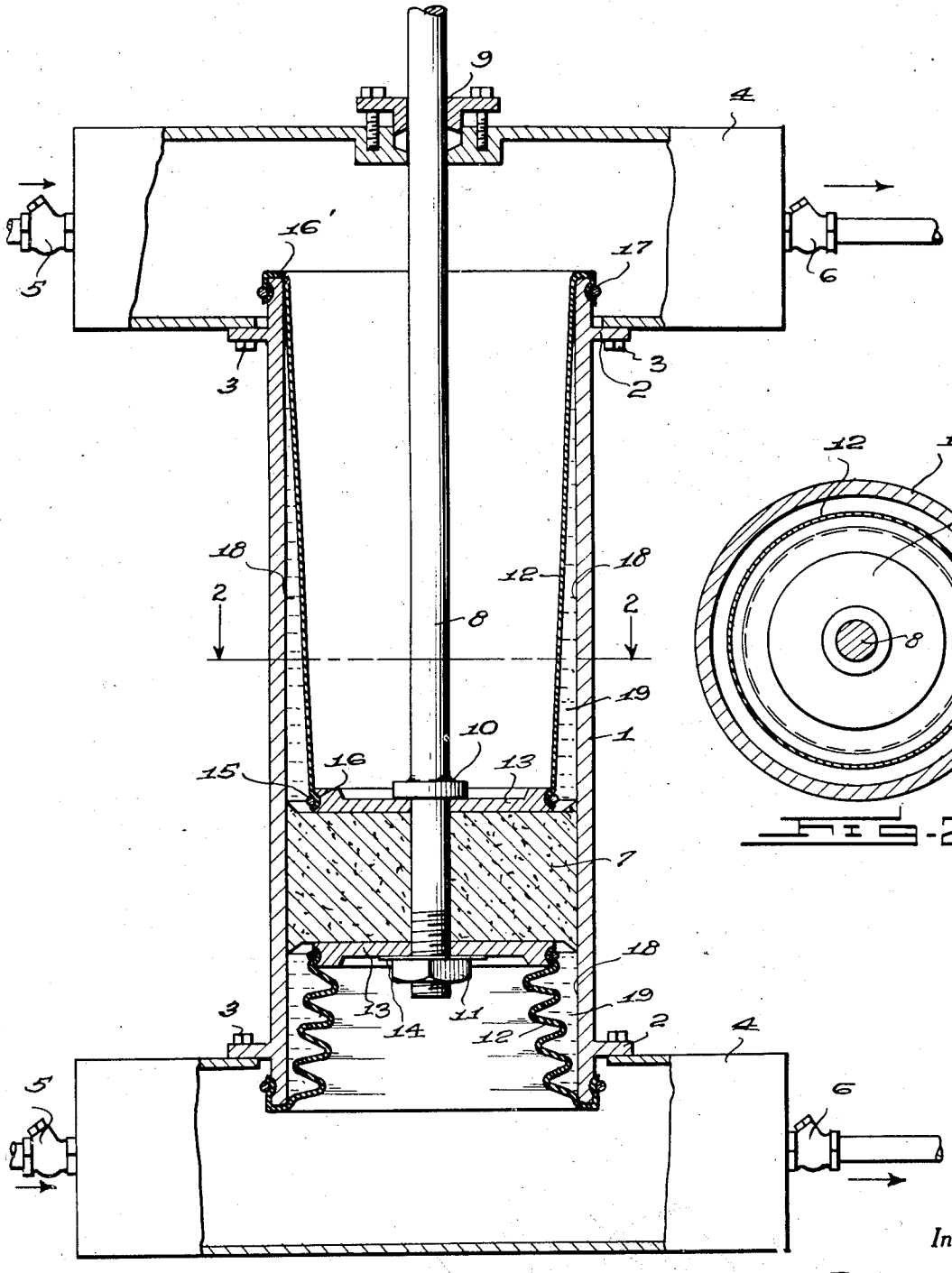


FIG-1-

FIG-2-

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4 Claims. (Cl. 103—148)

My invention relates to improvements in pumps of the double acting type such as are used in pumping abrasive, or acid containing, matter or fluid, and more particularly to liners for the cylinders of such pumps.

The principal object of the invention is to equip such pumps with inexpensive, efficient, and durable means for preventing such substances from coming into contact with the wall of the pump cylinder and the periphery of the pump piston, thereby obviating scoring and other injury such as usually occurs in the cylinder in the pumping of such material.

To the accomplishment of the above, and subordinate objects presently appearing, a preferred embodiment of my invention has been illustrated in the accompanying drawing, set forth in detail in the succeeding description, and defined in the claims appended hereto.

In said drawing:

Figure 1 is a view in longitudinal section of a pump embodying my improvement,

Figure 2 is a view in transverse section taken on the line 2—2 looking in the direction indicated by the arrow.

Referring to the drawing by numerals, the pump to which my invention has been shown as applied comprises a pump cylinder 1 having a pair of external flanges 2 adjacent opposite ends thereof by means of which and bolts 3 said ends of the cylinder 1 are secured to a pair of displacement chambers 4 to open into said chambers. Each chamber 4 is provided on one side thereof with a suitable inlet valve 5 and on the opposite side thereof with an outlet valve 6.

The cylinder 1 contains the usual pump piston 7 adapted for reciprocation therein by means of the piston rod 8 extending through one chamber 4 and out of the same by way of a stuffing box 9, said piston being secured on said rod between a collar 10 on the latter and the usual nut 11 threaded onto the same.

As will be understood, in this type of pump, under each stroke of the piston 7 the material being pumped is drawn into one displacement chamber 4 by way of the inlet valve 5 thereof and forced out of the other chamber 4 by way of the related outlet valve 6 and such material is free to enter opposite ends of the cylinder 1.

According to my invention, the inner wall of the cylinder 1 and the periphery of the piston 7, are isolated from the material, or vice versa, by the following means.

A pair of bellows-like, cylindrical liners, of rubber or other suitable material, are provided in the cylinder 1 upon opposite sides of the piston 7, respectively, the inner end of each liner being connected to one face of the piston 7 and its outer end to the corresponding end of said cylinder. The liners 12 preferably taper toward their inner ends. The connection of the inner end of each liner 12 to the face of the piston 7 preferably comprises a peripherally grooved disc 13 of smaller diameter than the internal diameter of the cylinder 1, one of said discs being clamped to the related face of the piston by the before-mentioned collar 10 and the other disc being similarly secured to the related face of said piston by the before-mentioned nut 11 and a washer 14, said discs 13 being concentric to the piston 7 as will be understood. A clamping ring 15 secures the inner end of the liner 12 in the groove 16 of its disc 13. The outer end of each sleeve is stretched over the end of the cylinder 1 and secured in a groove 16' in the outer wall of the cylinder 1 by means of a clamping ring 17. It is, of course, obvious that the sleeves 12 may be secured to the piston and to the cylinders in any preferred manner. By virtue of the described tapered form of the liners 12, said liners form together with the inner wall of the cylinder 1 sealed chambers 18 for containing lubricating oil or other suitable lubricant represented at 19 in which the piston 7 works.

The operation of my invention will be readily understood. Suffice it to explain, that under reciprocation of the piston 7, the liners 12 stretch, or fold, as the case may be and completely seal the inner wall of the cylinder 1 and the periphery of the piston 7 so that the material being pumped cannot contact these parts and act as an abrasive against the same. Thus the life of the pump, as regards these parts, is materially prolonged. The lubricant 19 sealed in the chambers 18 further contributes to long life of the pump.

The foregoing will, it is believed, suffice to impart a clear understanding of my invention without further explanation.

Manifestly the invention, as described, is susceptible of modification without departing from the inventive concept and right is herein reserved to such modifications as fall within the scope of the subjoined claims.

What I claim is:

1. In a pump of the class described, a pump cylinder open at both ends, a piston reciprocating in said cylinder, and a pair of bellows-like cylindrical liners of rubber in said cylinder upon

opposite sides of said piston, respectively, each liner having an inner end connected to one face of the piston and an outer end connected to one end of the cylinder, said liners forming together with the inner wall of the cylinder chambers around the latter upon opposite sides of the piston in which said pistons operate and for containing oil, said liners being lengthwise extensible under movement of said piston in opposite directions, respectively, whereby the length of said chambers is varied in accordance with the stroke of said piston in opposite directions.

2. In a pump of the class described, a pump cylinder open at both ends, a piston reciprocating in said cylinder, and a pair of bellows-like cylindrical liners of rubber in said cylinder upon opposite sides of said piston, respectively, each liner having an inner end connected to one face of the piston and an outer end connected to one end of the cylinder, said liners tapering inwardly to space the same from the inner wall of the cylinder, whereby said liners together with the inner wall of the cylinder form chambers upon opposite sides of the piston in which said piston works and for containing oil, said liners being lengthwise extensible under movement of the piston in opposite directions, respectively, whereby the length of said chambers is varied in accordance with the stroke of said piston in opposite directions.

3. In a pump, a pump cylinder open at both ends, a piston reciprocable in the cylinder, a pair of approximately cylindrical liners formed of flexible material in said cylinder upon opposite sides of the piston, respectively, each liner having an inner end connected to the piston and an outer end connected to the cylinder.

4. In a pump, a cylinder open at both ends, a piston reciprocable in the cylinder, a pair of cylindrical liners formed of flexible material in the cylinder upon opposite sides of the piston, respectively, each liner having an inner end connected to the piston and an outer end connected to the cylinder, said liners forming together with the inner wall of the cylinder, chambers around the liners upon opposite sides of the piston for containing a lubricant.

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