Sept. 30, 1924. 1,510,042

L. O. CLEWETT

PUMP LINER

Original Filed Nov. 4, 1922

Fig. 1.

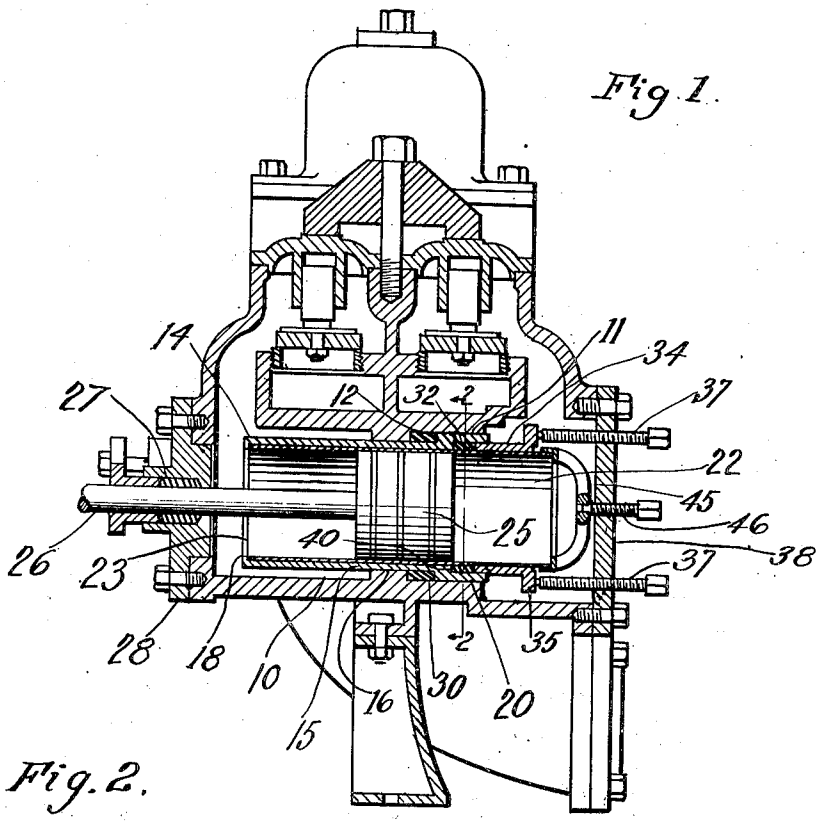


Fig. 2.

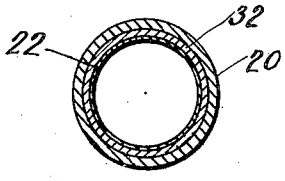
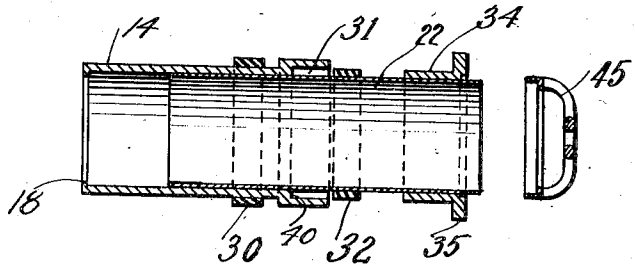


Fig. 3.



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UNITED STATES PATENT OFFICE.

LOUIS O. CLEWETT, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO LOS ANGELES PUMP & SUPPLY CO., A CORPORATION OF CALIFORNIA.

PUMP LINER.

Application filed November 4, 1922, Serial No. 599,124. Renewed April 2, 1924.

To all whom it may concern:

Be it known that I, LOUIS O. CLEWETT, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Pump Liner, of which the following is a specification.

This invention relates to reciprocating pumps, and relates particularly to the appliance of liners to pump cylinders for re-establishing the efficiency of the pump.

Pumps are now applied to a very great variety of uses and are employed for transferring substances of widely varied characteristics. Pumps employed in the transfer of solutions containing abrasive substances, such as lubricating mud employed in rotary well drilling, are subjected to very severe wear between the interior wall of the pump cylinder and the piston. This wear being very rapid, quickly destroys the efficiency of a pump devoted to such use. In order to facilitate the re-establishment of the efficiency of these pumps, the employment of steel liners, having various inside diameters so that they may be fitted to the piston, has been adopted. The degree of accuracy with which these liners must be made in order to properly fit into the pump cylinder and to form a working seal therein adds considerable to the expensiveness thereof and further causes a waste due to the number of sleeves it is necessary to discard owing to their not adhering closely to the prescribed limits.

It is an object of the invention to provide an improved form of adaptor by which a liner may be applied to a pump, this adaptor making it possible to employ liners of considerable variation.

It is a further object of the invention to provide with such an adaptor a means for providing a perfect liquid seal between the adaptor and the walls of the cylinder and also between the adaptor and the outer face of the liner.

It is a still further object of the invention to provide a simplified means for expanding the packing members which are employed to accomplish the above mentioned seal.

The specific advantages of my invention and further objects thereof will be made evident hereinafter.

Referring to the drawing which is for illustrative purposes only,

Fig. 1 is a vertical longitudinal section through a pump head equipped with an embodiment of my invention.

Fig. 2 is a section through the adaptor and liner I employ, taken upon a plane represented by the line 2—2 of Fig. 1.

Fig. 3 is an extended sectional view of the adaptor and liner and parts accessory to their employment in a pump cylinder.

The cylinder 10 of the pump shown in Fig. 1 has the bore thereof enlarged at its outer end as indicated at 11, which enlargement extends inwardly from the outer end of the cylinder to a shoulder 12. In the cylinder 10 is an adaptor 14 having the body 15 thereof of a diameter to pass through the constricted portion 16 of the cylinder 10. The forward end of the adaptor 14 is provided with an integral lip 18 having a function which will hereinafter become evident. The rearward end of the adaptor has a cylindrical enlargement 20 formed thereupon having an outside diameter substantially equal to the diameter of the bore enlargement 11, to enable the cylindrical enlargement to enter the bore enlargement 11 as shown in Fig. 1.

A renewal liner 22 is placed in the adaptor 14 through the rearward end thereof and is adapted to abut against the lip 18 as indicated at 23. The pump piston 25 works within the liner 22 and is reciprocated by means of a piston rod 26 which passes through a packing box 27 situated in the front head 28 of the cylinder 10.

Surrounding the body 15 of the adaptor 14 so as to be between the shoulder 12 and the cylindrical enlargement 20 of the adaptor 14, a packing ring 30 is placed. Within the annular recess 31 formed between the cylindrical enlargement 20 and the sleeve 22 a packing ring 32 is placed.

Over the rearward end of the sleeve 22 a follower 34 provided with a flange 35 is placed, this follower being adapted to extend within the recess 31 so as to axially compress the packing ring 32 and to cause its radial expansion between the liner 22 and the wall of the recess 31, when pressure is applied to the follower by screws 37 which are threaded through the rear head 38 of the cylinder and bear against the flange 35.

The axial pressure exerted by the follower 34 upon the packing ring 32 is received by the shoulder 40 constituting the bottom of the recess 31 and produces a forward movement of the adaptor 14 which causes the compression of the packing ring 30 between the shoulder 12 and the cylindrical enlargement 20.

In order to hold the liner 22 securely in position a spider 45 is placed over the rearward end thereof and a screw 46, which is also threaded through the head 38, is brought to bear upon the spider so as to force the liner 22 securely against the lip 18.

The features of my invention make it possible to employ an adaptor member which is not necessarily a perfectly machined fit with the cylinder 10, and further makes it possible to employ liner members which fit somewhat loosely within the adaptor, the seal between the front and rear chambers of the pump being established by the expansion of the packing members between the adaptor and the cylinder walls and between the adaptor and the liner.

My invention further provides a simplified means for expanding the packing members and maintaining the liner in working position.

I claim as my invention:

1. In a pump, the combination of: a cylinder; an adapter within said cylinder; a liner held in said adapter; a packing ring between said liner and said adapter; a packing ring between said adapter and said cylinder; and means for longitudinally compressing said packing rings so as to form a seal between said members.

2. In a pump, the combination of: a cylinder; an adapter within said cylinder; a liner held in said adapter; a packing ring between said liner and said adapter; a packing ring between said adapter and said cylinder; and means for simultaneously longitudinally compressing said packing rings so as to form a seal between said members.

3. In a pump, the combination of: a cylinder; an adapter within said cylinder; a liner held in said adapter; a packing ring between said liner and said adapter; a packing ring between said adapter and said cylinder, said adapter being so formed that pressure exerted upon one of said packing rings is transferred thereby to the other of said rings; and means for longitudinally compressing said packing rings so as to form a seal between said members.

4. In a pump, the combination of: a cylinder; an adapter within said cylinder; a liner held in said adapter; a packing ring between said liner and said adapter; a packing ring between said adapter and said cylinder, said adapter being so formed that pressure exerted upon one of said packing rings is transferred thereby to the other of said rings; a follower for compressing one of said packing rings; and means for forcing said follower against said packing ring.

5. In a pump, the combination of: a cylinder; an adapter within said cylinder; a liner held in said adapter; a packing ring between said liner and said adapter; a packing ring between said adapter and said cylinder, said adapter being so formed that pressure exerted upon one of said packing rings is transferred thereby to the other of said rings; a follower for compressing one of said packing rings; and screws threaded through a head of said cylinder for forcing said follower against said packing ring.

6. In a pump, the combination of: a cylinder; an adapter within said cylinder; a liner held in said adapter; a packing ring between said liner and said adapter; a packing ring between said adapter and said cylinder; means for longitudinally compressing said packing rings so as to form a seal between said members; and means for holding said liner in said adapter.

7. In a pump, the combination of: a cylinder; an adapter within said cylinder; a liner held in said adapter; a packing ring between said liner and said adapter; a packing ring between said adapter and said cylinder, said adapter being so formed that pressure exerted upon one of said packing rings is transferred thereby to the other of said rings; a follower for compressing one of said packing rings; screws threaded through a head of said cylinder for forcing said follower against said packing ring; and means for holding said liner in said adapter.

8. In a pump, the combination of: a cylinder having a bore enlargement at one end thereof; an adapter member having the body thereof of a size to pass through the bore of said cylinder, and a cylindrical enlargement at one end thereof adapted to enter said bore enlargement; a liner within said adapter, there being around said liner an annular recess provided by said cylindrical enlargement of said adapter; a packing member in said annular recess; a packing member between the body of said adapter and said bore enlargement; a follower for compressing said packing members; screws threaded through one head of said cylinder for forcing said follower against said packing member in said annular recess, the pressure thereof being transferred to said other packing member through the axial movement of said adapter in a direction to force said cylindrical enlargement against said other packing member; and means for holding said liner in said adapter.

9. In a pump, the combination of: a cylinder having a bore enlargement at one end thereof; an adapter member having the body thereof of a size to pass through the

bore of said cylinder, a cylindrical enlargement at one end thereof adapted to enter said bore enlargement; a liner within said adapter, there being around said liner an annular recess provided by said cylindrical enlargement of said adapter; a packing member in said annular recess; a packing member between the body of said adapter and said bore enlargement; a follower for compressing said packing members; screws threaded through one head of said cylinder for forcing said follower against said packing member in said annular recess, the pressure thereof being transferred to said other packing member through the axial movement of said adapter in a direction to force said cylindrical enlargement against said other packing member, and an internal lip at the other end thereof; a spider; and a screw threaded through said head for applying pressure through said spider to hold said sleeve against said internal lip.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 28th day of October, 1922.

LOUIS O. CLEWETT.