

April 13, 1926.

1,580,131

P. GHIARDI

PUMP

Filed Oct. 27, 1925

2 Sheets-Sheet 1

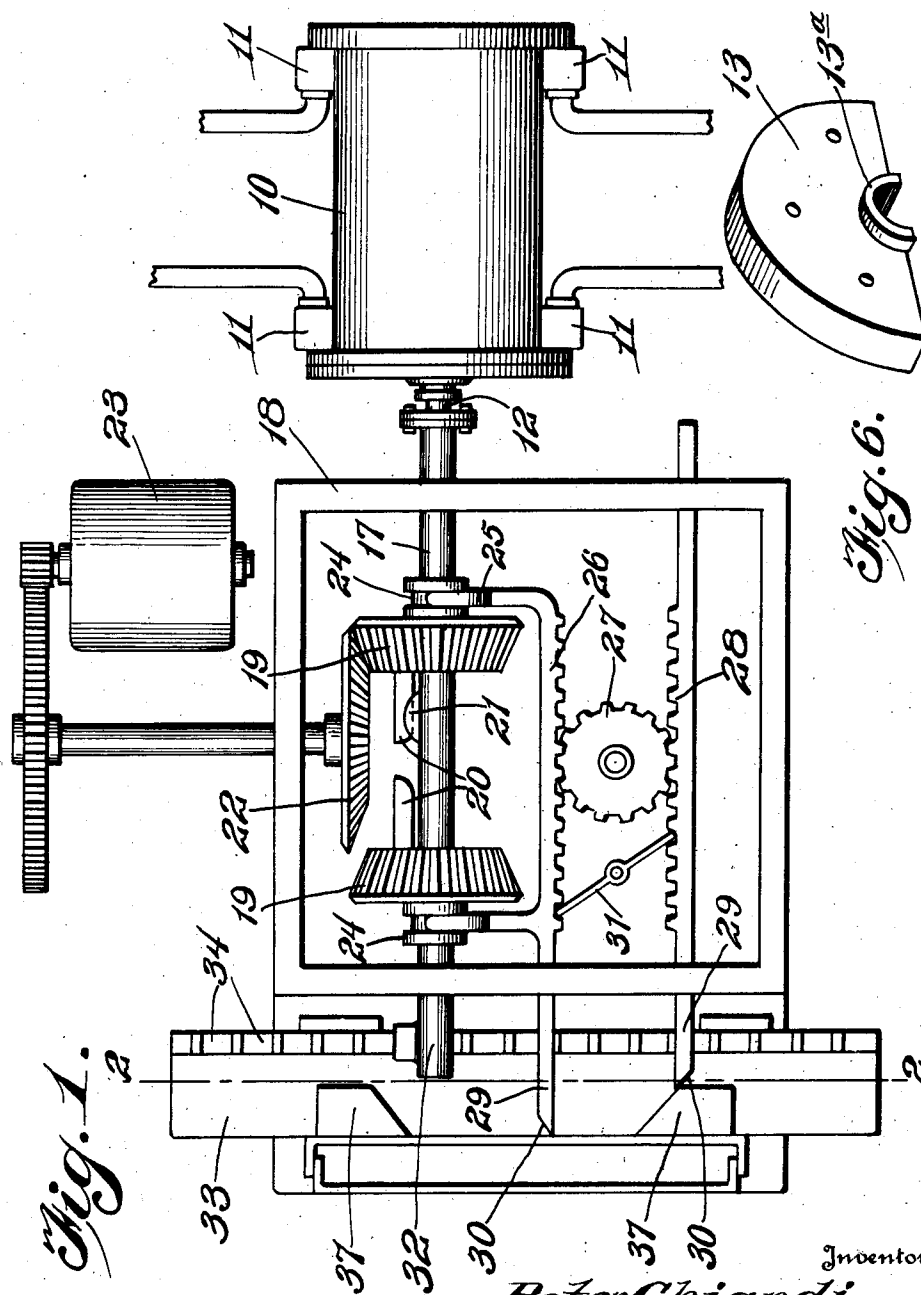


Fig. 1.

Fig. 6.

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Fig. 2.

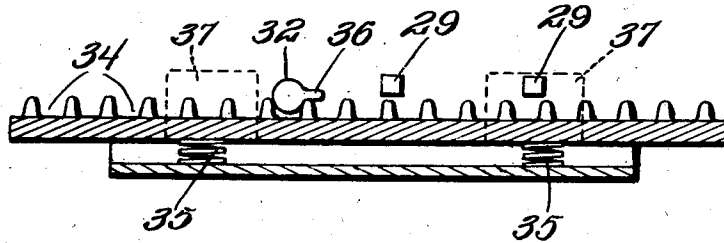


Fig. 3.

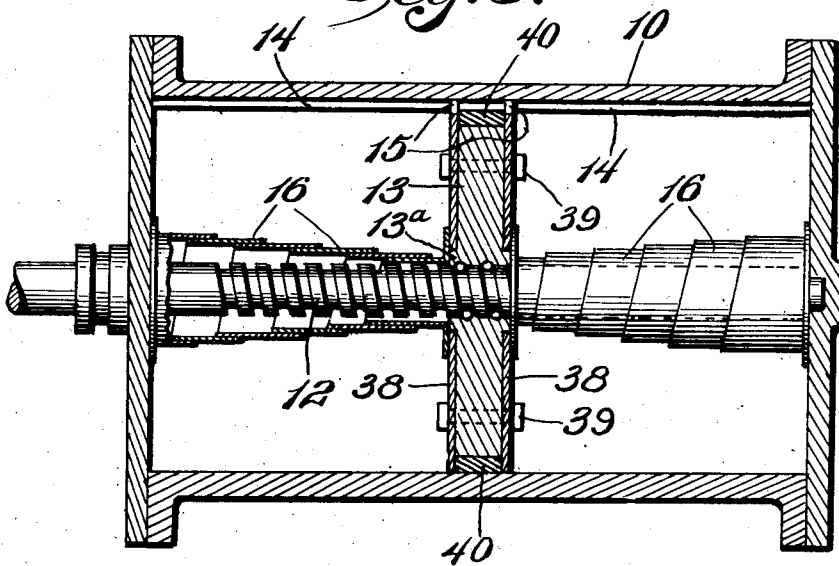


Fig. 4.

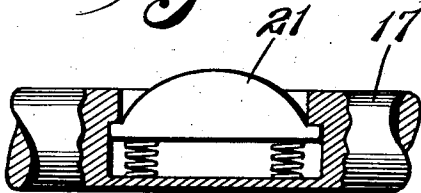
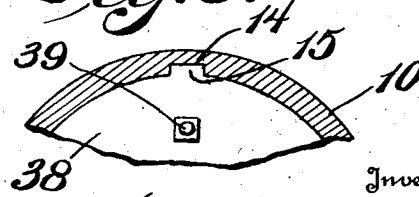


Fig. 5.



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Patented Apr. 13, 1926.

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UNITED STATES PATENT OFFICE.

PETER GHIARDI, OF KITTANNING, PENNSYLVANIA.

PUMP.

Application filed October 27, 1925. Serial No. 65,241.

To all whom it may concern:

Be it known that I, PETER GHIARDI, a citizen of Italy, residing at Kittanning, in the county of Armstrong and State of Pennsylvania, have invented certain new and useful Improvements in Pumps, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to pumps and more particularly to a high pressure pump and means for operating the same.

An important object of the invention is to provide a novel and readily producible structure in such operating mechanism whereby the piston of the pump may be caused to reciprocate.

A further and more specific object of the invention is to provide an operating mechanism for reciprocating the pistons of that type of pump wherein the piston is advanced longitudinally of the pump shaft by a worm formed upon the pump shaft, the piston being in the form of a nut.

These and other objects I attain by the construction shown in the accompanying drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention and wherein:—

Figure 1 is a plan view of a pump constructed in accordance with my invention; Figure 2 is a sectional view on the line 2—2 of Figure 1;

Figure 3 is a sectional view through the pump;

Figure 4 is an enlarged detail sectional view through the drive shaft;

Figure 5 is an enlarged detail sectional view showing the manner of preventing rotation of the piston of the pump.

Figure 6 is a perspective view of one of the piston sections.

Referring now more particularly to the drawings, the numeral 10 indicates a pump cylinder having the usual valves 11 controlling the intake and discharge therefrom. Rotatably mounted at the axis of the cylinder is a worm shaft 12 and mounted upon this shaft is a piston 13 formed as a nut and held against rotation with relation to the cylinder by means of a groove 14 formed in the cylinder wall and engaging with a lug 15 formed in the periphery of the piston. As a means for packing to prevent leakage about the worm shaft 12, I have shown a plurality of telescopically engaged sleeves 16 surrounding this shaft at each

side of the piston 13, one of these sleeves at each side of the piston being secured to the cylinder wall while another of the sleeves is shown as attached to the piston. The sleeves are so constructed that each sleeve interlocks with the next preceding sleeve and forms a tight joint therewith so that as the sleeves are extended, the shaft is covered by the extensible tube thus formed, which tube has its ends sealed to the piston and cylinder.

The operating mechanism for the pump includes a shaft 17 secured to the worm shaft 12 and axially aligning therewith, the shaft being journaled in a casing 18 and having rotatably mounted thereon within the casing a pair of pinions 19. Each pinion 19 has projecting from the face thereof next adjacent the other pinion a lug 20 adapted for coaction with a key 21 carried by and depressible with relation to the shaft 17 so that it may yield in event the lug 20 of the gear being engaged therewith does not happen to properly align when the gear is moved into its engaging position. The gears 19 are continually in mesh with teeth at opposite sides of a crown gear 22, which crown gear may be rotated in any suitable manner as, for example, from a motor 23.

The gears 19 are each formed at their outer ends with a shifting collar 24, these collars being engaged by forks 25 secured to a rack bar 26, the teeth of which mesh with a pinion 27. At its opposite side, the pinion 27 meshes with a second rack bar 28. Each rack bar 26 and 28 has an extension 29 provided with a beveled end 30, the purpose of which will presently appear. A spring 31 is provided for maintaining the rack bars against accidental movement and for maintaining them in their adjusted positions.

The shaft 17 is likewise provided with an extension, indicated at 32, extending over a bar 33 having in its upper surface a series of notches 34 adapted to selectively receive the shaft. This bar is kept in engagement with the shaft by means of springs 35. In alignment with the notches of the bar, the shaft's extensions 32 is formed with a lug 36 which, at each engagement thereof with the bar, advances the bar one notch in one direction or the other for a purpose presently to appear. Upon this bar 33 are formed a pair of spaced cam blocks 37 for coaction with the beveled ends 30 of the extensions 29 of the rack bars 26 and 28.

It will be seen that if one of the pinions 19 is held against rotation with relation to the shaft, the shaft will be rotated in one direction and during this rotation in this direction will cause the bar 33 to move longitudinally in one direction. When a gear 19 is in engaged position, one of the extensions 29 of the rack bars projects into the path of the cams 36. When the bar is shifted a predetermined distance and the piston 13 is completely straddled toward one end of the cylinder, this projecting extension is engaged by the cam and the rack bar moved longitudinally, shifting the gears, causing the other gear 19 to come in locking engagement with the key and the other of the extensions 29 to extend into the path of the cam. This causes a reversal of the direction of rotation of the shaft 17 and accordingly a reversal of the direction of operation of the bar 33 so that the second cam surface is brought into engagement with the newly projected extension 29.

While I do not wish to be limited to any particular form of piston 13, I preferably make the body of the piston of less diameter than the interior of the cylinder 10 and dispose on each side of the body of the piston the plates 38, these plates being circular in form and having the outstanding lug 15 which engages in the groove 14 formed in the barrel or cylinder 10. These plates 38 are held against opposite faces of the body of the piston by means of headed screws 39 or like means. Disposed between the perimeter of the body of the piston and the cylinder is a packing ring 40, this packing ring being held in place on each side by the annular plates 38. Preferably the body 13 of the piston is formed in two halves and the annular plates 38 act as rings holding these two halves together and holding the packing in place and holding the innermost of the telescopically engaged sleeves 16 in position and fast to the annular plate 38. This construction permits the ready assembly of the two sections of the piston and the holding

of these two sections in place by the plates 38 which embrace the flanges 13^a formed on the inner ends of the two sections of the piston.

It will be obvious that the construction hereinbefore set forth is obviously capable of a certain range of change and modification without materially departing from the spirit of the invention and I accordingly do not limit myself to such specific structure except as hereinafter claimed.

I claim:—

1. In a mechanism of the character described, a pump cylinder, a piston reciprocable therein, a shaft extending longitudinally of the piston and exteriorly screw-threaded, the piston being formed in two half sections having a circular passageway having interior screw-threads operatively engaging with the screw-threads of the shaft, the body of the piston being of less diameter than the interior diameter of the cylinder, annular plates disposed on each side of the body of the piston, the two sections of the piston having laterally projecting flanges with which said annular plates engage to hold the end sections in position, a packing ring extending around the perimeter of the piston and bearing against the cylinder wall, means holding the plates to the body of the piston, and coacting means formed upon the plates and the cylinder to prevent rotation of the piston.

2. In a mechanism of the character described, a pump cylinder, a piston reciprocable therein, a shaft extending longitudinally of the cylinder and exteriorly screw-threaded, the piston being formed in two half sections adapted to be assembled about the rod and providing an opening having screw-threads for coaction with the screw-threads of the rod and coacting means carried by the piston and the wall of the cylinder for preventing rotation of the piston.

In testimony whereof I hereunto affix my signature.

PETER GHIARDI.