March 18, 1930. F. W. MOYER ET AL 1,751,350

PUMP PLUNGER

Filed June 25, 1927 3 Sheets-Sheet 1

Fig. 1.

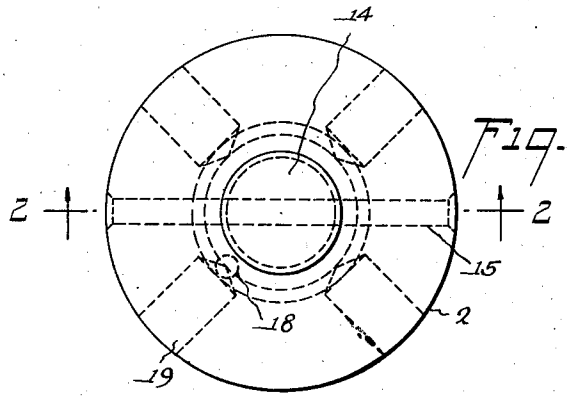


Fig. 2.

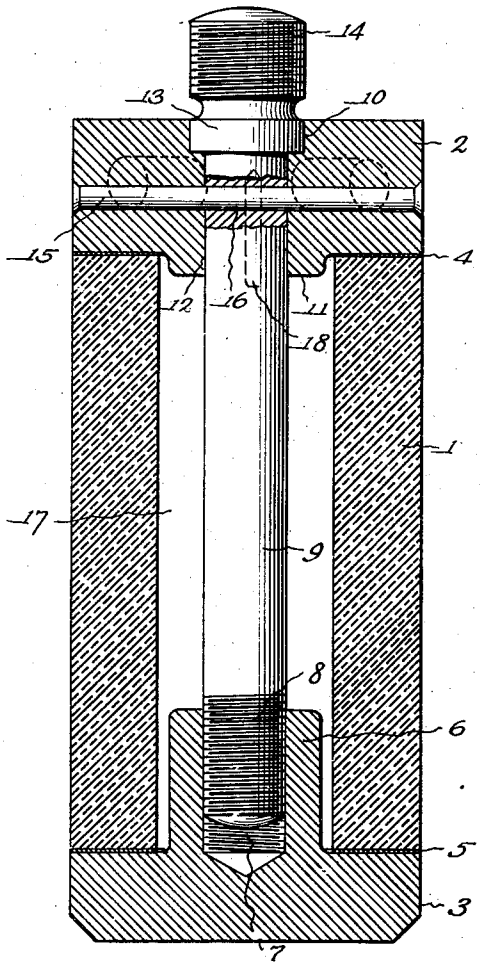
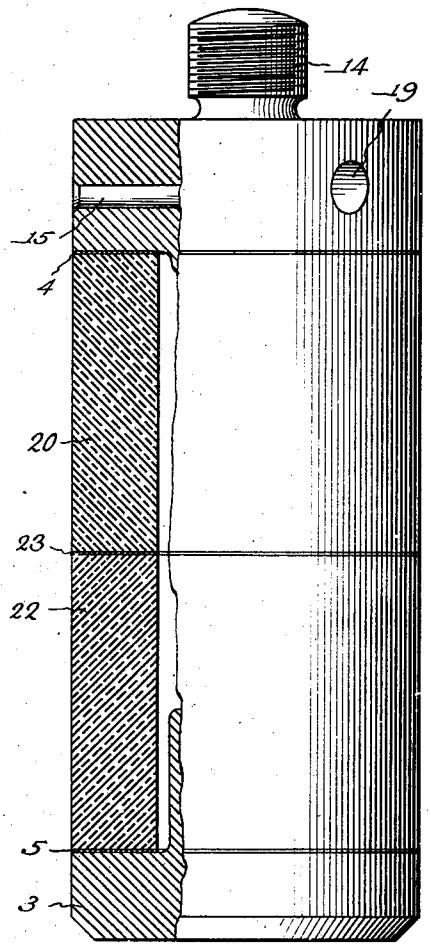


Fig. 3.



INVENTOR
FRED W. MOYER
FRANK J. RENINGER
BY
Munn & Co.
ATTORNEY

March 18, 1930. F. W. MOYER ET AL 1,751,350

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Filed June 25, 1927 3 Sheets-Sheet 2

Fig. 4.

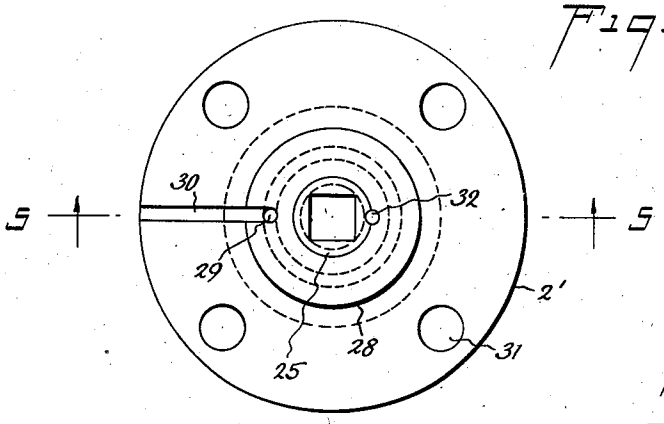


Fig. 6.

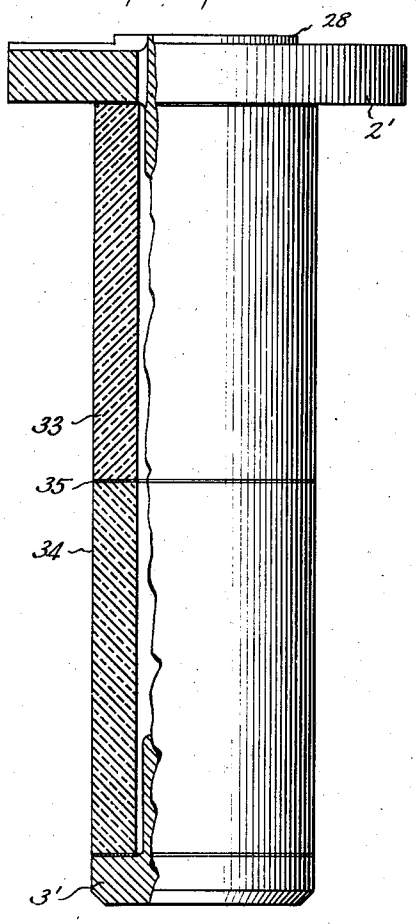
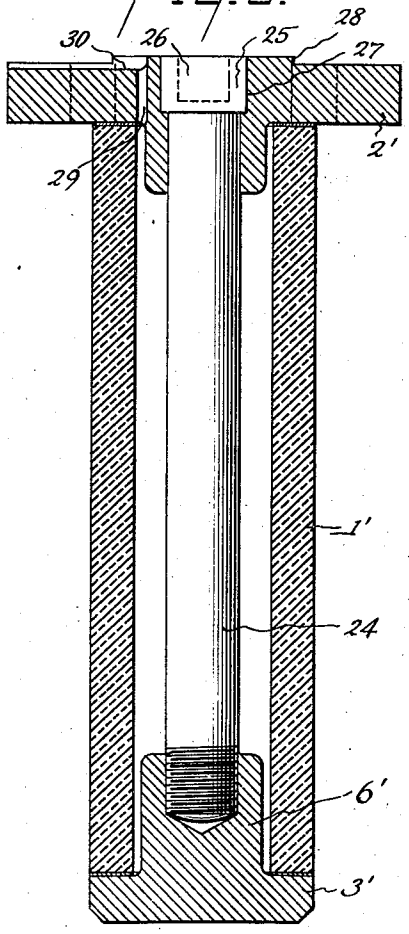


Fig. 5.



INVENTOR
FRED W. MOYER
FRANK J. REHINGER.
BY Munn & Co.
ATTORNEY

March 18, 1930. F. W. MOYER ET AL 1,751,350

PUMP PLUNGER

Filed June 25, 1927 3 Sheets-Sheet 3

Fig. 7.

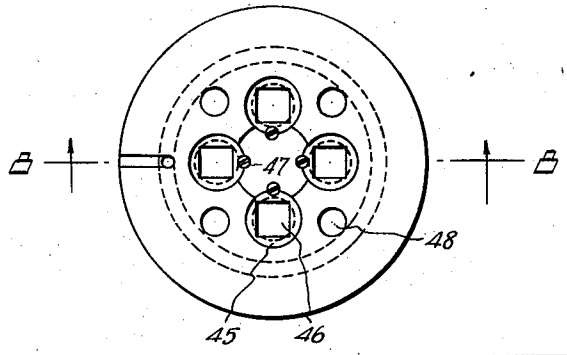


Fig. 8.

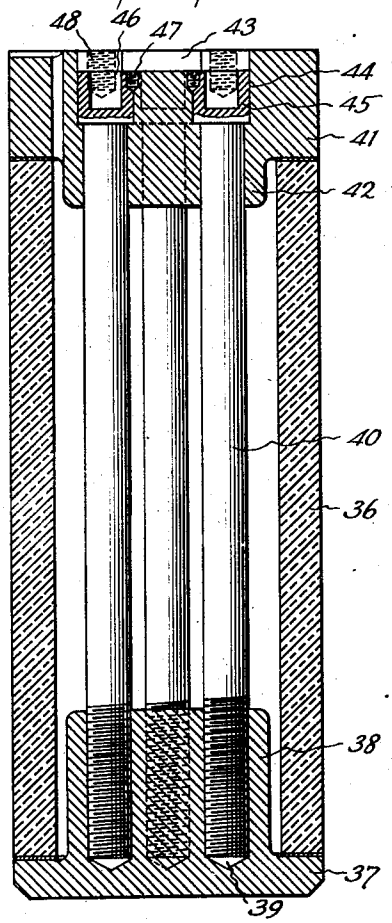
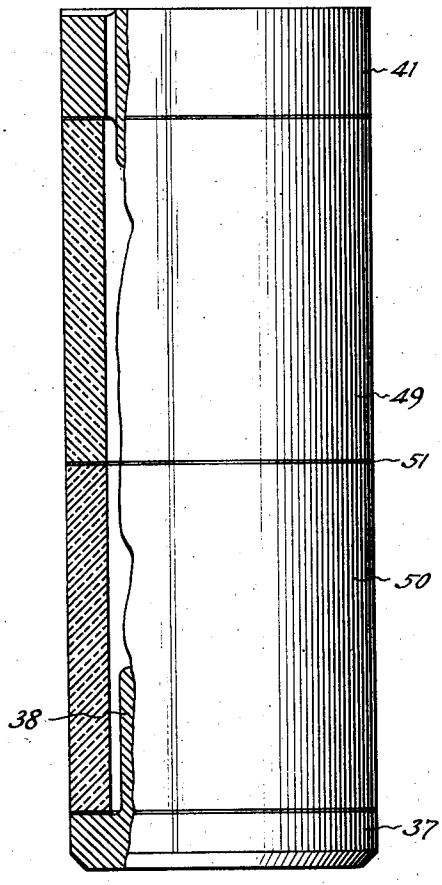


Fig. 9.



INVENTOR
FRED W. MOYER
FRANK J. RENINGER
BY Munn & Co.
ATTORNEY

Patented Mar. 18, 1930 1,751,350

UNITED STATES PATENT OFFICE

FRED W. MOYER AND FRANK J. RENINGER, OF ALLENTOWN, PENNSYLVANIA, ASSIGNORS TO THE ALDRICH PUMP COMPANY, OF ALLENTOWN, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

PUMP PLUNGER

Application filed June 25, 1927. Serial No. 201,372.

This invention relates to plungers for pumps capable of resisting the action of acids or other chemicals in water to be pumped from mines or elsewhere.

The object of the invention is to provide an improved simplified plunger which may be readily manufactured and when in use, will function efficiently.

Another object of the invention is to provide a built-up pump plunger wherein most of the plunger is made from vitreous or other acid resisting material.

A further object of the invention is to provide a pump plunger made of one or more cylindrical members with clamping heads of metal formed with means whereby one of the heads may be connected to the pump mechanism without endangering the main body of the pump.

In the accompanying drawings—

Figure 1 is a top plan view of a cylinder disclosing an embodiment of the invention.

Figure 2 is a sectional view through Figure 1, approximately on line 2—2.

Figure 3 is a side view of a slightly modified form of the invention to that shown in Figures 1 and 2, certain parts being broken away for illustrating the interior construction.

Figure 4 is a top plan view of another modified form of the invention.

Figure 5 is a sectional view through Figure 4, approximately on line 5—5.

Figure 6 is a side view with certain parts broken away disclosing a slightly modified form to that shown in Figure 5.

Figure 7 is a top plan view of an additional modified form of the invention.

Figure 8 is a sectional view through Figure 7, approximately on line 8—8.

Figure 9 is a side view with certain parts broken away, of a slightly modified form of the invention to that shown in Figure 8.

Referring to the accompanying drawings by numerals, 1 indicates a cylinder and 2 and 3 heads operatively associated with cylinder 1. The cylinder or block 1 is made preferably of vitreous material, as for instance, porcelain, glass, china or other suitable material which will resist acid. As shown in Figure 2, the cylinder 1 is made of one piece throughout and has clamped thereto the heads 2 and 3. Very thin washers 4 and 5 of fiber or other material, are arranged between the cylinder 1 and the respective heads 2 and 3. The head 3 is provided with an inwardly extending portion 6 extending into the bore of the cylinder 1 but spaced therefrom. The section 6 is provided with a threaded bore 7 for receiving the threaded section 8 of the shaft 9. The head 2 is provided with a recess 10 and an inwardly extending projection 11 substantially the same depth as the recess 10, whereby substantially the same amount of material is provided at the inner face of the head 2 to that removed and forming recess 10. Recess 10 merges into a bore 12 through which shaft 9 extends, said shaft snugly contacting with the walls of bore 12. When the section 8 is screwed into socket 7, shaft 9 preferably has an enlargement 13 formed integral therewith, said enlargement fitting into the socket or recess 10 and snugly fitting the same. Enlargement 13 merges into a threaded section 14 whereby the plunger may be secured to suitable pump mechanism. In order to prevent any accidental unscrewing of the threaded section 8, a pin 15 extends through head 2 and also through shaft 9 as shown in Figure 2. This pin is upset or riveted at the ends after it is placed in position, whereby the rod or shaft 9 is firmly locked in the desired position.

When assembling the parts of the plunger, the heads, washers and cylinder 1, are assembled without the rod 9 or pin 15. After the parts have been assembled, the same are placed in some form of clamp or press so that the heads are pressed towards each other and consequently, tightly clamp the cylinder 1 in place. While in this pressed condition, rod 9 is screwed into place and is screwed down as tightly as the parts will permit with safety. If desired, the aperture 16 through which pin 15 extends, may be drilled after the rod 9 is in place. After the rod 9 has been thus screwed into place, pin 15 is inserted and the ends upset, after which the clamping means are removed. As members 6 and 9 are of metal, the threads connecting these members

are somewhat resilient and as member 9 has been screwed in under some considerable tension, there is continually a clamping action which clamps the heads continually firmly against the ends of the cylinder 1.

From Figure 2 it will be noted that the cylinder 1 does not contact with any of the parts except the heads, or rather washers 4 and 5. In order to take care of any possible pressure in the chamber or space 17, a vent hole 18 is drilled in the head 2, said hole 18 merging into one of the apertures or bores 19. The apertures or bores 19 are provided so that a tool may be used in screwing the section 14 onto the pump mechanism.

In Figure 3, a modified form of the invention is shown to that illustrated in Figure 2, the modification consisting only in the fact that the cylinder is made from sections 20 and 22 with a suitable washer 23 arranged therebetween. Two sections have been shown though a greater number might be used if desired. Aside from this difference, the construction is identical to that shown in Figure 2.

In Figures 4 and 5, another form of the invention is shown, wherein the cylinder 1′ is of less diameter than the head 2′. The head 3′ is the same diameter as the cylinder 1′. The extension 6′ is provided with a threaded bore for receiving the threaded end of rod or shaft 24. This rod or shaft is provided with an integral enlargement 25 having a polygonal-shaped socket 26 whereby a wrench may be inserted for screwing the rod or shaft 24 in place. The enlargement 25 fits into a socket 27 in the head 2′ so that the outer surface of the enlargement 25 is flush with the raised portion 28 of head 2′. A vent opening 29 is provided, which registers with the groove 30. A plurality of apertures 31 are provided in the outer part of head 2′ whereby the head 2′ may be bolted or otherwise secured to the operating mechanism of the pump. The raised portion 28 is turned to fit a recess in a suitable pump mechanism and serves also to align both plunger and pump mechanism. The flat surface on head 2 is machined to fit against the pump mechanism. As indicated particularly in Figure 4, a small pin 32 acts as a lock for preventing a reverse rotation of shaft 24.

In Figure 6, a modified form is shown to that illustrated in Figure 5, said modification consisting in forming the cylinder into sections 33 and 34 with a suitable washer 35 arranged therebetween. If desired, a greater number of sections could be provided without departing from the spirit of the invention. The heads 2′ and 3′ in this form of the invention, similar to the heads and other parts in the preferred form, may be made of any desired metal, as for instance, bronze or some other acid resisting material.

Referring to Figures 7, 8 and 9, a further form of the invention is disclosed, wherein the cylinder 36 is the same as cylinders 1 and 1′ and may be made of any desired thickness or other dimension. In this form of the invention, the head 37 is the same as the head 2 of the preferred form, except the projection 38 is formed with four threaded bores 39 for receiving the threaded ends of the four rods or shafts 40. Four rods or shafts are shown and other parts made to correspond, though it is evident that a less number or a greater number might be provided. The idea of providing these numerous rods is to distribute the strain more evenly and is particularly desirable in large plungers. The head 41 is provided with a comparatively small extension 42 which strengthens the head 41, while recess 43 is formed to properly fit a raised surface on pump connecting mechanism, and acts to align the plungers with the pump connecting mechanism. Each enlargement 45 is provided with a polygonal-shaped socket 46 for receiving the wrench whereby the rods or shafts may be screwed tightly in place. Suitable pins or screws 47 act as locking means for preventing rotation of the rods 40 after the same have once been placed in position. These members are mounted while the parts are under compression as described in regard to the preferred form of the invention. It will be noted that the head 41 is comparatively thick, thereby presenting sufficient metal to provide threaded bores 48 which receive screws associated with any suitable pump mechanism, whereby the head 41 may be rigidly clamped to the pump so as to function properly.

In Figure 9, a modified structure to that shown in Figure 8 is seen, said modification consisting in forming the cylinder in sections 49 and 50 with a suitable washer 51 arranged therebetween.

What we claim is:

1. A pump plunger or piston, comprising a cylinder of vitreous material, a head at one end having a threaded socket, a head at the opposite end having a passage-way therethrough formed with an offset, said heads fitting respectively over the entire surface of the respective ends of said cylinder and a rod independent of said heads but acting thereon extending through said bore, said rod having an enlargement fitting into said offset, and a threaded portion screwed into said threaded socket.

2. A pump plunger or piston, comprising a cylinder, a head at one end having a projection extending into the cylinder, said head engaging the entire surface of one end of said cylinder, said projection being formed with a threaded bore, a head fitting over the entire surface of the end of the cylinder at the opposite end, formed with a passageway extending therethrough, a rod extending through said passageway having an enlargement fit-

ting against said second mentioned head, and a threaded portion fitting into said threaded bore whereby said heads are clamped firmly against said cylinder, and means for locking said rod against accidental independent rotation.

3. A pump plunger, comprising a tube or cylinder of vitreous material, a head fitting against and covering one end of said cylinder, said head being formed with a projection extending into the cylinder, said projection having a threaded bore, a second head fitting against and covering the opposite end of the cylinder but projecting an appreciable distance therefrom, a clamping bolt independent of said heads but acting thereon, said bolt having a head countersunk in the second mentioned head and formed with a threaded end fitting into said threaded bore, said second mentioned head having apertures for receiving clamping bolts.

4. In a pump plunger, a cylinder, a head arranged on one end of said cylinder, said head being formed as a disk and projecting beyond the cylinder, said head having a series of openings for receiving clamping members, a vent for venting said cylinder, and a socket for receiving the head of a clamping bolt for clamping the head to the cylinder.

5. A pump plunger comprising a cylinder of vitreous material, a pair of heads formed of acid resisting metals, said heads being substantially of the same diameter as said cylinder and one of said heads having a portion loosely extending into said cylinder, and a radiating flange, said flange being formed with bolt-receiving openings spaced from the ends of said bolts, whereby said bolts will act to clamp said heads to the cylinder and said openings will act as sockets for receiving means for mounting the cylinder on an object and a plurality of bolts extending entirely through said cylinder for clamping said heads in position, said bolts being positioned so that the respective ends will be spaced inwardly from the outer faces of said heads.

6. A pump plunger or piston, comprising a cylinder of acid-proof material, a head of acid resisting metal, said head being provided with an inwardly extending projection formed with a plurality of threaded bores, a second head fitted on the opposite end of said cylinder, said second head having a recess in its outer part, and an inwardly extending projection on the inner part, said last mentioned head having a number of passage-ways extending therethrough of the same size and positioned in the same relative manner as said bores, each of said passage-ways having an enlarged portion whereby shoulders are presented, a screw member mounted in each of said passage-ways, the respective screw members having threaded portions fitting into the respective threaded bores, and enlarged heads fitting against said shoulders whereby upon the tightening of said screw members the heads at the respective ends of the cylinder will be pressed tightly against the cylinder.

7. A pump plunger or piston, comprising a cylinder of vitreous material, a head of different material mounted at each end of said cylinder, each of said heads being formed with a flange fitting respectively over the entire surface of the respective ends of said cylinder, each head having a depending portion extending into the cylinder to provide anchorage for a tie structure, and a tie structure independent of said heads but acting thereon, said tie structure extending through one of said heads and into the opposite head.

8. In a pump plunger, a cylinder, a head arranged on one end of said cylinder, said head being formed as a disk having a cylindrical portion projecting into the cylinder, said cylinder portion having a series of openings for receiving clamping bolts, and a socket for each opening for receiving the heads of clamping bolts for clamping the heads to the cylinder, a second head for said cylinder formed with a disk fitting against one end of the cylinder and a cylindrical projection extending into said cylinder, said projection having threaded sockets positioned in alignment with said openings, and bolts extending through said openings and into said threaded sockets, said bolts having their heads fitting into the first-mentioned sockets.

FRED W. MOYER.
FRANK J. RENINGER.