Jan. 31, 1928.

1,657,478

W. G. KRAUS

PLUNGER

Filed March 4, 1926

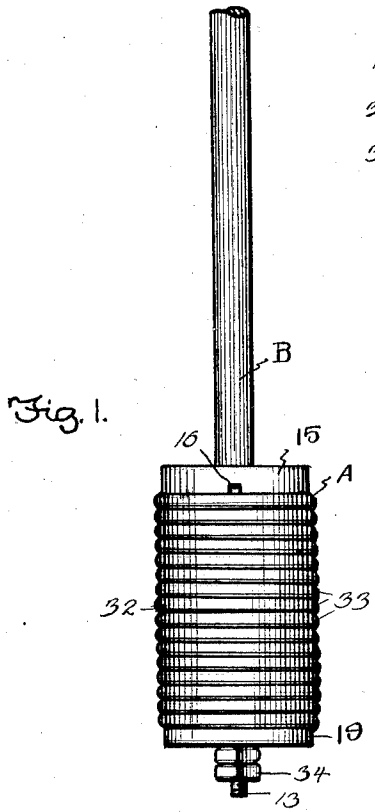


Fig. 1.

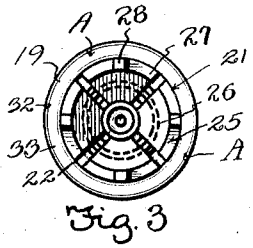


Fig. 3

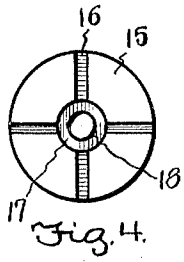


Fig. 4.

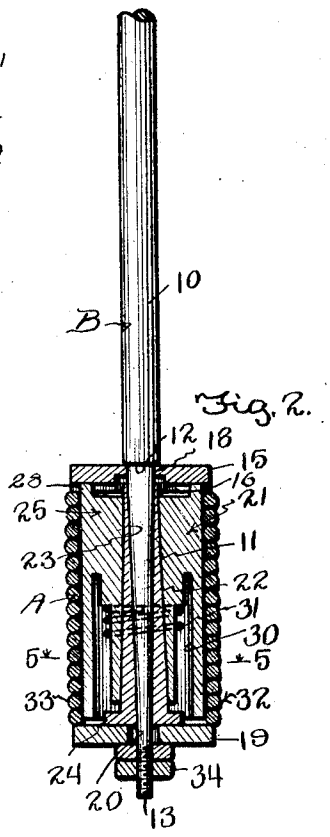


Fig. 2.

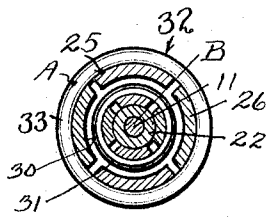


Fig. 5.

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UNITED STATES PATENT OFFICE.

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PLUNGER.

Application filed March 4, 1926. Serial No. 92,318.

This invention appertains to plungers or pistons susceptible for use for a number of different purposes, such as pumps, engines and the like.

The primary object of the present invention is to provide an improved expansible plunger to effectively take care of wear, as the same occurs on the plunger packing and cylinder wall, so as to insure a proper fit at all times.

A further object of the invention is the provision of a novel packing for the plunger and novel means for compressing and holding the packing in place about the plunger body.

A still further object of the invention is to provide an improved plunger or piston of the above character, which will be durable and efficient in use, one that will be simple and easy to manufacture and one which can be placed upon the market at a small cost.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts, as will be hereinafter more specifically described, claimed, and illustrated in the accompanying drawings, in which drawings:

Figure 1 is a side elevation of the improved plunger,

Figure 2 is a longitudinal section through the same,

Figure 3 is an end view of the plunger body removed from the rod with the packing and one end disk removed from the body,

Figure 4 is an elevation of one of the end disks of the plunger, and

Figure 5 is a section taken on the line 5—5 of Figure 2 through the plunger and rod.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter A generally indicates the improved plunger or piston and B the plunger rod.

The plunger rod includes the usual body portion 10 having one end thereof 11 reduced in diameter to provide an annular stop shoulder 12. If preferred the reduced portion 11 of the rod can be gradually tapered toward its free end, and such end is provided with external threads 13 for a purpose, which will be hereinafter more fully described.

The improved plunger or piston A comprises an inner disk or plate 15, which is adapted to be slipped upon the reduced portion 11 of the rod B until the same rests against the shoulder 12. The inner face of the disk 15 is provided with radially extending grooves 16, which as shown, are disposed at quarters. These grooves 16 lead into an annular recess 17, which is formed in the axial center of the disk, about the opening 18 formed therein for receiving the plunger. An outer disk 19 is arranged also upon the reduced portion 11 of the plunger rod and is provided with a relatively large axial opening or bore 20 for receiving the said rod in order to permit the free sliding movement of the same on the rod and this disk is substantially of the same diameter as the disk 15. Arranged between the disks 15 and 19 is the plunger body 21 proper, which comprises an inner tapered expander element 22 having an axial bore 23 for the reception of the reduced portion of the rod and this bore can likewise be tapered to conform to the configuration of the said portion 11 of the rod. The other end of the expander 22 is provided with an annular flange 24 for resting against the disk 19. The outer expansible body 25 of the plunger is preferably constructed from a plurality of independent expansible sections 26, each of which form a sector of a circle and when the sections 26 are assembled, a substantially tapered bore 27 will be formed through the said expanding body. As shown, there are four of the sections 26, and at the inner end of the expanding body, each section is provided with a lug 28, which slidably fits in one of the ways or grooves 16 formed within the disk 15. As shown the outer end of the expansion body is provided with an inwardly directed relatively deep groove 30 and a contractile coil spring 31 is fitted within the groove about the sections for normally holding the sections together and against the expander or mandrel 22.

Arranged about the expanding body 25 between the disks 15 and 19 is the packing 32 which can consist of a plurality of rings 33. These rings can be constructed of asbestos suitably treated with graphite and

can be of an endless construction or a split construction. The disks 15 and 19 are of a greater diameter than the diameter of the expanding body 25 so as to effectively hold the packing 32 theretbeween.

In assembling the improved plunger, the disk 15 is first placed on the plunger rod adjacent the shoulder 12, after which the expander 22 is placed in the expanding body 25 and these pieces are then slipped into engagement with the disk with the lugs 28 in the groove 16 after which the packing 32 is placed in position. The disk 19 is then placed on the body in engagement with the outer end of the expander 22 and the outermost packing ring after which suitable nuts and jam nuts 34 are placed on the threaded end 13 of the plunger rod and threaded into tight contact with the disk 19 for forcing the expander into the expanding body 25. This will gradually force the sections 26 of the expanding body 25 outward until the packing is in the contact with the wall of the cylinder. As wear occurs, it is merely necessary to give nuts 34 a few turns, so as to force the packing into tighter contact with the cylinder.

From the foregoing description, it can be seen that I have provided a novel expanding plunger of exceptionally simple and durable character, which will effectively take care of wear and prevent injury to the wall of the cylinder.

Changes in details may be made without departing from the spirit or the scope of this invention, but:

What I claim as new is:

1. A plunger comprising a rod, including a reduced portion defining a stop shoulder, a plunger body fitted upon the reduced portion of the rod including an inner plate engaging the stop shoulder having its inner face provided with radially extending guide grooves, an expander mandrel slidably mounted upon the reduced portion of the rod, an expanding shell receiving the mandrel including a plurality of radial movable sections, each section having a guide lug formed on its inner end slidably mounted within one of the guide grooves of the disk, an outer disk engaging the expander mandrel, resilient means normally holding the sections of the expanding shell in engagement with the mandrel, an adjusting member threaded upon the rod for engaging the outer disk and for moving the disk and mandrel toward the opposite disk, and a plurality of packing rings disposed upon the shell intermediate said disks.

2. A plunger of the character described including a rod having one end reduced and setting up a stop shoulder, a disc body fitted about said reduced portion and bearing against said shoulder, an expander-mandrel mounted upon said reduced portion, an expanding shell receiving said mandrel, and including a plurality of radially movable sections bearing at their inner ends against the adjacent face of said disc, said expanding shell having a deep groove formed in the outer end thereof setting up a relatively thin portion overlying said mandrel, a resilient element surrounding said thin portion of the shell and normally contracting the sections thereof against the mandrel, a disc member upon the outer end of said reduced portion, means threaded upon the rod bearing against said outer disc for forcing said mandrel inwardly to expand the shell section, and a packing wrapped about said shell between said discs.

In testimony whereof I affix my signature.

WILLIAM G. KRAUS.