This invention is an improvement over the expansible packing disclosed in my co-pending application, Serial No. 718,798, filed June 9, 1924.

I have found that the expansible packing as disclosed in my prior application tends to creep between the heads and the cylinder, so that after considerable use the edges of the expansible packing become chewed and otherwise chipped off and destroyed.

It is therefore one object of this invention to provide means for overcoming this disadvantageous feature.

I have also found that fluid entering in the recess formed in the expansible packing tends to pass between the heads of the plunger and to creep down around the plunger rod and pass outwardly between one head and the nut upon the plunger rod which engages that head. If the fluid carries any amount of sand, this flow of fluid causes the part to become worn, and therefore it is another object of this invention to provide means for overcoming this difficulty.

With the foregoing and other objects in view which will be made manifest in the following detailed description and pointed out in the appended claims, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein:

Figure 1 is a vertical section through a pump cylinder showing the pump plunger with the improved self-expanding packing.

Fig. 2 is a section taken substantially on the line 2—2 of Fig. 1.

Fig. 3 is a section taken on the line 3—3 of Fig. 1.

Fig. 4 is a view taken in the direction of the arrow 4 in Fig. 1.

Fig. 5 is a front elevation of the improved expansible packing, and

Fig. 6 is a section taken substantially on the line 6—6 of Fig. 5.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, the plunger upon which my improvements have been shown consists of a plunger rod 10 having a tapered portion 11 terminating in a threaded end as at 12. A head 13 has its hub portion 14 so formed as to snugly fit upon the tapered portion 11 of the plunger rod 10. The head is provided with a plurality of apertures 15 for a purpose hereinafter to be described.

A second head 16 fits upon the portion 12 and has its hub portion 17 adapted to abut the hub portion 14 of the head 13. This head is provided with apertures 18. Suitable grooves 19’ are formed in the hub portions 14 and 17 of the heads 13 and 16 respectively.

An expansible packing 19 is disposed between the heads 13 and 16 and is in the form of a ring of soft flexible material, preferably of soft rubber, and has an interior annular recess 20 formed therein. A nut 21 is threaded on to the threaded portion 12 of the plunger rod 10 and urges the head 16 into engagement with the head 13. A lock nut 22 may be employed to prevent loosening of the nut 21.

It has been my experience that the expansible packing disclosed in my co-pending application will have its outer edges tend to creep between the heads 13 and 16 and the pump cylinder C, as the plunger is being reciprocated. This causes the outer edges of the ring 19 to become chewed up. In the present invention I provide rings 23 which are formed of relatively hard rubber, and these rings are inset into the outer edges of the ring 19, as indicated upon the drawing. The rings 23 being of relatively hard rubber will not creep between the heads 13 and 16 and permit the expansible packing to become chipped off, but these rings preferably have sufficient elasticity to permit the slight expansion of the expansible packing as the packing becomes worn.

The operation of the plunger with its expansible packing is as follows: As the plunger reciprocates within the cylinder C, the fluid under pressure upon either side of the plunger may enter through the apertures 18 depending upon the direction in which the plunger is being moved. Because of the flexibility of the flange portions 19’ formed by the annular recess 20 in the ring 19, these flange portions are slightly lifted, permitting the fluid to pass from the apertures 18 or 19’, as the case may be, through the recesses or grooves 19’, and to enter the annular recess 20, thereby causing the expansion of the packing. When the pressure of the fluid within the recess 20 is of any considerable magnitude, the fluid is caused to enter between the abutting faces of the hub portions 14 and 17 and to creep downwardly about the threaded portion 12 of the plunger rod 10 and to escape between the nut 21 and the head 16.

As previously stated, if the fluid carries...
any sand, there becomes a quick or rapid wear upon these parts. To prevent such movement of fluid, an annular groove 24 is formed in the face of the hub portion 14 which is engaged by the hub portion 17, and packing 25 which may be of flexible rubber 26 compressed therein by tightening the head 16 against the head 13 by means of the nut 21. A similar groove 26 is formed in the face of the head 16 which is engaged by the nut 21, and similar packing 27 may be compressed therein. The packings 25 and 27 prevent the movement of fluid between the heads and downwardly about the threaded portion 12.

This improved construction of the packing and the plunger provides a much longer life for the plunger than in the device disclosed in my prior application.

It will be understood that various changes in the detail of construction may be made without departing from the spirit or scope of the invention as defined by the appended claims.

1. An expansible packing for hydraulic plungers comprising a ring of flexible material having an interior annular recess formed therein, the outer edges of said ring being formed of relatively hard material.

2. An expansible packing for hydraulic plungers comprising a ring of flexible soft rubber having an interior annular recess formed therein, and rings of relatively hard rubber set into the outer edges of said ring.

3. A pump plunger comprising a plunger rod, a head secured upon said plunger rod having apertures therethrough, a second head having apertures therethrough secured upon said plunger rod, and an expansible packing disposed between said heads, said packing comprising a ring of relatively soft flexible material having an interior annular recess formed therein, and relatively hard material set into the outer edges of said ring.

4. A pump plunger comprising a plunger rod, a head secured upon said plunger rod, a second head secured in abutting relation to the first mentioned head upon said plunger rod, an expansible packing disposed between said heads, an annular groove formed in one of the abutting surfaces of said heads, and packing compressed in said groove.

5. A pump plunger comprising a plunger rod, a head secured upon said plunger rod, a second head secured upon said plunger rod, an expansible packing disposed between said heads, a nut threaded upon said plunger rod engaging said second head, an annular groove formed in the surface of the said second head which is engaged by said nut, and packing compressed in said groove.

6. A pump plunger comprising a plunger rod, a head secured upon said plunger rod, a second head upon said plunger rod, a nut threaded on to said plunger rod urging said second head into abutting relation with the first head, packing compressed between the abutting surfaces of said heads, packing compressed between said nut and said second head, expansible packing disposed between said heads, said expansible packing being in the form of a ring of relatively flexible material having an interior annular recess formed therein, the outer edges of said ring being formed of relatively hard material, and apertures formed in said heads as and for the purposes described.

7. An expansible packing for plungers comprising a ring formed of soft, flexible rubber, and rings of relatively hard rubber set into said ring and forming the outer edges thereof.

8. An expansible packer for plungers comprising a ring of relatively soft material, the outer edges of the ring being formed to provide recesses, and a relatively hard material disposed within said recesses.

9. An expansible packer for plungers comprising a ring of relatively soft material, the outer edges of the ring being formed to provide recesses, and a relatively hard material disposed within said recesses, said hard material having its exterior surfaces approximately flush with the exterior surfaces of the ring.

In testimony whereof I have signed my name to this specification.

ERWIN E. MILLER.