To all whom it may concern:

Be it known that I, ERWIN E. MILLER, a citizen of the United States, residing at Fullerton, in the county of Orange and State of California, have invented new and useful Improvements in Expandible Packings for Plungers, of which the following is a specification.

This invention relates to improvements in plungers for pumps and the like.

An important object of the invention is to provide a plunger having an expandible packing, and to provide a spacing or centering part which will keep the packing in concentric relation about the plunger rod.

Other objects of the invention are to provide a plunger in which the leakage between the heads is effectively prevented and in which fluid pressure which expands the packing is applied beneath the end portions of the packing so that the end portions of the packing will be properly expanded to take up wear at the portions of the packing, where wear is the greatest.

A further object of the invention is to provide an improved plunger head which is used in the embodiment of the improved construction.

With the foregoing and other objects in view which will be made manifest in the following detailed description and specifically 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 barrel or cylinder and through the improved form of plunger disposed therein, Fig. 2 is a side elevation of the plunger, Fig. 3 is an end elevation of the plunger, Fig. 4 is a vertical section taken on the line 4—4 of Fig. 2, Fig. 5 is a vertical section through the pump barrel and plunger showing a modified construction, Fig. 6 is a similar view to Fig. 5, showing a still further modified form of construction, Fig. 7 is a vertical section through Fig. 5 taken upon the line 7—7, and Fig. 8 is a vertical section taken on the line 8—8 of Fig. 6.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, the plunger rod is indicated at 10 and is shown as provided with a tapered portion 11 and a cylindrical threaded portion 12. On the plunger rod there are mounted two heads 13 and 14, which are maintained on the rod as by a nut 15 and a lock nut 16. The heads 13 and 14 have projecting hubs 17 and 18, which abut each other. On the opposed faces of the heads 13 and 14 there are formed annular shoulders 19 and 20 respectively, and grooves 21 and 22 are formed in the faces of the heads about the hubs 17 and 18 within the annular shoulders 19 and 20. Ports 23 are formed longitudinally through the heads 13 and 14 and terminate upon the shoulders 19 and 20.

An expandible packing 24 has end portions 25 which are engageable upon the annular shoulders 19 and 20. This packing is preferably formed of soft, flexible rubber or equivalent material and has inwardly extending flanges 26 which are arranged inwardly of the end surfaces of the packing and bear upon the opposed faces of the heads 13 and 14. About the abutting hubs 17 and 18 there is disposed a sealing ring 27 which has outwardly extending flanges 28 which are disposed within the grooves 21 and 22. As clearly shown in Fig. 1, the inwardly extending flanges 26 on the expandible packing 24 overlap the outwardly extending flanges 28 on the sealing ring 27. As both the sealing ring 27 and the packing 24 are formed of soft, flexible material, this overlap forms a tight seal against leakage from the chamber 29 between the abutting hubs 17 and 18. As the piston reciprocates, fluid pressure enters the apertures 23 and escapes into the chamber 29 past the flanges 26, thus expanding the packing 24. When the chamber 29 is substantially filled with fluid, the fluid pressure within the apertures 23 is applied beneath the end portions 25 of the expandible packing 24, and as these end portions have their outer edges worn considerably, the pressure so applied keeps the end portions expanded to take up wear.

The pumps for which the improved plungers are primarily designed usually have their barrels or cylinders arranged in horizontal position, so that the plunger reciprocates horizontally. Because of the weight on the packing 24, it tends to bear against the bottom surface of the cylinder and the packing will consequently wear the most on its lower surface.

In the modification shown in Fig. 5, means is provided for maintaining the pack-
ing 24 concentrically about the plunger rod 10 so that wear will be equally distributed over the peripheral surface of the packing.

This means consists of a spacing or centering part 30 formed integral with the sealing ring 27. It is in the form of a projecting central flange which is engageable upon the interior surface of the expansible packing 24 at approximately its center.

This flange divides the chamber 29 into two compartments 29a and 29b and is provided with notches or recesses 31 upon its peripheral surface, permitting flow or establishing communication between the compartments 29a and 29b, so that fluid can readily flow from one compartment to another. The flange 30 maintains the expansible packing 24 in concentric relation about the plunger rod and cooperates with the shoulders 19 and 20 in keeping it in such position.

In Fig. 6 a further modified form of plunger is provided, in which the centering part is indicated at 33 which is formed integral with the packing 24, constituting an inwardly extending central flange which is disposed centrally between the flanges 26 on the packing 24. This central flange has its interior surface engageable upon the center of the sealing ring 27, and has notches 33 formed on its inner surface, which permits the fluid to readily pass from one compartment to the other defined in the chamber 29 by the flange.

From the above it will be appreciated that an improved form of plunger is provided in which the expansible packing is maintained in concentric relation about the plunger rod, and the packing has flange portions engaging and overlapping flange portions on the sealing ring to effectively prevent any leakage between the heads.

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

I claim:

1. A plunger for pumps and the like comprising a plunger rod, means providing heads upon the plunger rod having shoulders formed on their opposed faces, a sealing ring having outwardly extending flanges disposed between the heads, an expansible packing having end portions engageable upon the shoulders and inwardly extending flanges overlapping the flanges on the sealing ring, and means for admitting fluid pressure to the space between the packing and the sealing ring to expand the packing.

2. A plunger for pumps and the like comprising a plunger rod, means providing heads upon the plunger rod having shoulders formed on their opposed faces, a sealing ring having outwardly extending flanges disposed between the heads, an expansible packing having end portions engageable upon the shoulders and inwardly extending flanges overlapping the flanges on the sealing ring, and means for admitting fluid pressure to the space between the packing and the sealing ring to expand the packing.

3. A plunger for pumps and the like comprising a plunger rod, means providing heads upon the plunger rod having shoulders formed on their opposed faces, a sealing ring having outwardly extending flanges disposed between the heads, an expansible packing having end portions engageable upon the shoulders and inwardly extending flanges overlapping the flanges on the sealing ring, and means for admitting fluid pressure to the space between the packing and the sealing ring to expand the packing.

4. A plunger for pumps and the like comprising a plunger rod, means providing heads upon the plunger rod having shoulders formed on their opposed faces, a sealing ring having outwardly extending flanges disposed between the heads, an expansible packing having end portions engageable upon the shoulders and inwardly extending flanges overlapping the flanges on the sealing ring, and means for admitting fluid pressure to the space between the packing and the sealing ring to expand the packing.

5. A plunger for pumps and the like comprising a plunger rod, means providing heads upon the plunger rod, an expansible packing disposed between the heads, a spacing or centering part arranged upon the inside of the packing for maintaining the packing in concentric relation to the plunger rod, and means for admitting fluid pressure to the space between the packing and the sealing ring to expand the packing.

6. A plunger for pumps and the like comprising a plunger rod, means providing heads upon the plunger rod, an expansible packing disposed between the heads, a spacing or centering part for maintaining the packing in concentric relation to the plunger rod, said spacing or centering part being arranged centrally of the packing upon the inside thereof, and means for admitting fluid pressure to the space between the heads to expand the packing.

7. A plunger for pumps and the like comprising a plunger rod, means providing heads upon the plunger rod, an expansible packing disposed between the heads, a spacing or centering part for maintaining the packing in concentric relation to the plunger rod, said spacing or centering part being arranged centrally of the packing and having passages therethrough for admitting fluid pressure between the heads upon either side of the centering part.

8. A plunger for pumps and the like comprising a plunger rod, means providing heads upon the plunger rod, an expansible packing disposed between the heads having
inwardly extending flanges, means for admitting fluid pressure to the space between the heads and packing to expand the packing, and a spacing or centering part for maintaining the packing in concentric relation about the plunger rod, said spacing or centering part being spaced from said flanges.

9. A plunger for pumps and the like comprising a plunger rod, means providing heads upon the plunger rod, an expansible packing disposed between the heads having inwardly extending flanges, means for admitting fluid pressure to the space between the heads and packing to expand the packing, and a spacing or centering part for maintaining the packing in concentric relation about the plunger rod, said spacing or centering part having passages therethrough and being arranged centrally of the packing.

10. A pump plunger comprising a plunger rod, means providing a pair of heads upon the plunger rod having annular grooves upon their opposed faces, an expansible packing disposed between the heads having inwardly extending flanges, a sealing ring disposed between the heads having outwardly extending flanges disposed within said grooves and being overlapped by the flanges on the sealing ring, and means for admitting fluid pressure to the space between the heads to the space on both sides of the centering part to expand the packing.

11. A pump plunger comprising a plunger rod, means providing a pair of heads upon the plunger rod having annular grooves upon their opposed faces, an expansible packing disposed between the heads having inwardly extending flanges, a sealing ring disposed between the heads having outwardly extending flanges disposed within said grooves and being overlapped by the flanges on the sealing ring, and means for admitting fluid pressure to the space between the packing and sealing ring.

12. A head for plungers and the like comprising a head having a hub projecting from one face thereof, a groove formed in the face about the hub, an annular shoulder formed on the face about the groove, and passages formed in the head terminating in grooves upon the shoulder.

13. A plunger for pumps and the like comprising a plunger rod, means providing two heads upon the plunger rod, an expansible packing arranged between the heads, a sealing ring disposed between the heads, a spacing or centering part disposed between the sealing ring and the packing for keeping the packing in concentric relation about the plunger rod, and means for admitting fluid pressure between the packing and sealing ring.

14. A plunger for pumps and the like comprising a plunger rod, two heads mounted upon the plunger rod, means for keeping the heads properly spaced thereon, an expansible packing ring fitting between the heads, a spacing or centering part arranged between the ring and said means for keeping the packing ring in concentric relation about the plunger rod, and means for admitting fluid pressure between the heads to the space on both sides of the centering part to expand the packing ring.

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

ERWIN E. MILLER.