

May 5, 1925.

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G. C. DEAKINS ET AL

EXPANSIBLE PISTON PACKING

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Fig. 1.

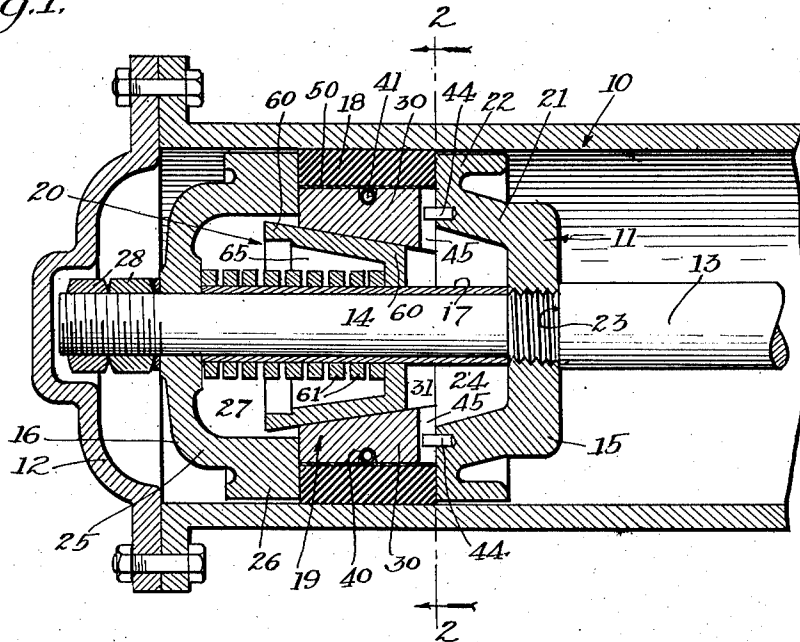
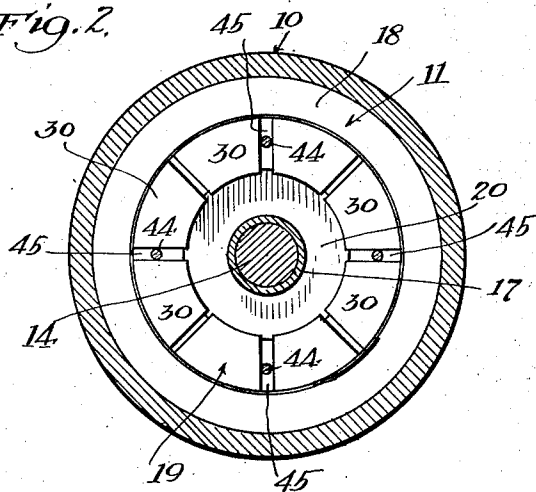


Fig. 2.



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UNITED STATES PATENT OFFICE.

GROVER C. DEAKINS, OF ANAHEIM, AND LELAND S. HAMER, OF FULLERTON, CALIFORNIA, ASSIGNORS OF ONE-THIRD TO ELIHU C. WILSON, OF LOS ANGELES, CALIFORNIA.

EXPANSIBLE PISTON PACKING.

Application filed October 19, 1922. Serial No. 595,694.

To all whom it may concern:

Be it known that we, GROVER C. DEAKINS and LELAND S. HAMER, citizens of the United States, and residents of Anaheim and Fullerton, respectively, both in the county of Orange, State of California, have invented new and useful Improvements in Expansible Piston Packing, of which the following is a detailed specification.

This invention has to do with packing means for pistons of the general character used in pumps, compressors, and similar machines, and it is an object of this invention to provide a simple, effective, improved means of this character.

An object of the present invention is to provide an arrangement and proportioning of the parts of a simple, effective, automatic piston packing means, which permits of quick and convenient assembling.

Another object of this invention is to provide a compact automatic piston packing means with a wide range of operation or adjustment.

The various objects and features of our invention will be best and more fully understood by reference to the following detailed description when taken in connection with the accompanying drawings of one specific embodiment of the invention, while the scope of our invention will be more particularly pointed out in the appended claims.

In the drawings Fig. 1 is a detail sectional view of a pump cylinder and piston, the piston being constructed in accordance with the present invention; and, Fig. 2 is a transverse sectional view of the parts shown in Fig. 1, being a view taken as indicated by line 2-2 of Fig. 1.

In the drawings numeral 10 designates, generally, a typical pump cylinder and numeral 11 designates, generally, a piston adapted to operate in the cylinder 10. The cylinder 10 is of ordinary construction and is provided at its outer end with a removable cylinder head 12. The piston 11 is shown arranged in the cylinder and mounted on the outer end of the usual piston rod 13.

In accordance with the present invention the piston 11 is carried on the reduced outer end portion 14 of the piston rod 13 and comprises, generally, an inner end plate 15, an outer end plate 16, a spacer sleeve 17 carried on the reduced part 14 between the plates 15 and 16, a body of expansible pack-

ing 18 carried between the periphery portions of the plates 15 and 16 so that it contacts with the wall of the cylinder 10, an expansible carrier 19 for the body of packing 18 and an operating mechanism 20 adapted to automatically expand the carrier 19 to keep the packing 18 expanded into proper engagement with the wall of the cylinder 10.

The inner end plate 15 is provided with an inwardly extending hub part 21 and a periphery part 22, which fits the cylinder 10 with clearance. The hub 21 of the plate 15 is screw-threaded onto the inner end portion of the reduced portion 14 until it bears against the shoulder 23 formed on the piston rod between the main portion thereof and the reduced portion 14. A central recess 24 is provided in the inner face of the plate 15 and extends into the hub portion 21. The recess 24 is adapted to receive a part of the operating mechanism as will be hereinafter more fully described.

The outer end plate 16 is provided with an outwardly extending hub part 25 which is slidably carried on the outer end part of the reduced portion 14 and a periphery part 26 which fits the cylinder 10 with clearance. A central recess 27 is provided in the inner face of the plate 16 and extends into the hub 25. The recess is adapted to carry a portion of the operating mechanism 20, as will be hereinafter described. The outer plate 15 is retained on the reduced portion 14 of the piston rod by means of suitable nuts 28 screwthreaded onto the outer end of the reduced portion 21, as clearly illustrated in Fig. 1 of the drawings.

The spacer sleeve 17 is slidably carried on the reduced portion 14 of the piston rod between the plates 15 and 16 and serves to definitely space the plates. In practice the nuts 28 are tightened against the plate 16 so that the spacer sleeve 17 is clamped tightly between the plates 15 and 16.

The body 18 of packing material is confined between the periphery portions of the plates 15 and 16 and is expansible or capable of being expanded or forced outwardly to compensate for wear which takes place between it and the wall of the cylinder 10. The exact construction of the body of packing 18 and the exact material out of which the body of packing is formed, will, of course, depend upon the conditions under

which the pump is to operate and may in each instance be such as to best suit the existing conditions.

The expansible carrier 19 which I have illustrated in the drawings comprises a plurality of separate segments 30 which fit together to form an annular expansible body having a central tapered opening 31 through it. The several segments 30 are preferably of equal size and of the same shape so that they form an annular body which can be expanded uniformly in all directions.

The outer surfaces of the segments 30 are provided with registering circumferential grooves 40 which carry a looped spring 41. The spring 41, which is preferably a looped helical spring, serves to yieldingly hold the segments 30 together so that they form an annular body and so that they can be conveniently handled when the piston is being assembled. In accordance with the preferred form of the invention lugs 44 extend from the inner face of the plate 15 into radial grooves 45 formed in the ends of the segments 30. The lugs 44 cooperate with the grooves 45 to prevent circumferential movement of the segments but to allow them to be freely movable radially. In practice it is desirable to arrange an ended sheet metal ring 50 between the segments 30 and the packing 18, as we have clearly illustrated in the drawing. In practice we prefer to form the ring 50 of sheet metal and to overlap its ends as we have illustrated in Fig. 2.

The operating mechanism 20 includes a conical wedge member 60 slidably carried on the sleeve 17 so that it fits the tapered opening 31 in the body formed by the segments 30 and a spring 51 carried on the sleeve 17 between the conical wedge member 50 and the outer end plate 15. The conical wedge member 15 is shaped or tapered so that its outer surface corresponds to and accurately fits the inner surfaces of the segments 30 as we have clearly illustrated in the drawings. The spring 51, which is a helical compression spring, extends into the recess 27 in the hub 25 of the plate 16 and into a recess 65 which extends deeply into the conical wedge member from its large end. By recessing the plate 16 and also the conical wedge member as we have illustrated in the drawings a neat compact construction is obtained and the spring 51 may be comparatively long. The parts are arranged and proportioned so that the large end of the conical wedge member 50 extends somewhat into the recess 27 in plate 16 during the first part of the operation of the wedge member, or when the body of packing 18 is comparatively thick, as we have illustrated in Fig. 1 of the drawings, while its small end extends into the recess in the plate 15 during the last part of the operation of the wedge member, or when the body of packing has

worn thin. The spring 61 is designed and proportioned so that it is compressed when in place as illustrated in Fig. 1 and so that it tends to move the conical wedge member 50 through the opening 31 and thereby expand the carrier 19 and force the packing into engagement with the wall of the cylinder with substantially uniform pressure during the wearing away of the packing.

From the foregoing description it will be obvious how the piston provided by the invention can be easily and quickly assembled or taken apart when the cylinder head 12 is removed and how the operating means 20 will operate to automatically feed the packing 18 to compensate for the wear which takes place between the cylinder wall and the packing. To assemble the piston the inner end plate is first screw threaded on the reduced portion of the piston rod until it bears against the shoulder on the rod. The body of packing and the packing carrier are then arranged in place with relation to the inner end plate so that the lugs 44 extend into the radial grooves 45. The wedge member and spring are then arranged on the sleeve 17 and the outer end plate and the nuts 28 are arranged on the end of the reduced portion of the rod. As the nuts are tightened on the end of the reduced portion the spring is compressed and the outer end plate is moved inwardly until it engages the spacer sleeve. When the piston is being taken apart the spring moves the outer end plate outwardly but the other parts remain in place until moved by the operator. From inspection of the drawings and from the foregoing description it will be seen that the arrangement and design of the parts provided by the present invention is simple and compact at the same time giving a very wide range of operation to the operating means 30 so that it will effectively feed a very thick body of packing.

Having described only a typical preferred form of our invention we do not wish to limit ourselves to the particular details hereinabove set forth but wish to reserve to ourselves any changes or variations that may appear to those skilled in the art or fall within the scope of the following claims.

Having described a preferred form of my invention, I claim:

1. In combination, a piston rod, two plates on the piston rod, means spacing the plates apart, each plate having a recess in its inner face, packing carried between the peripheral portions of the plates, and means for automatically expanding the packing including, a conical wedge member with a recess in its large end, the wedge member being slidable longitudinally on the rod and adapted during the first part of its operation to have one end extend into the recess in one of the plates and during the last

part of its operation to have its other end extend into the recess in the other plate, and a compression spring for moving the wedge member longitudinally, the spring having one end extending into the recess in the wedge member and having its other end extending into the recess in the plate adjacent the large end of the wedge member.

2. In combination, a piston rod, two plates on the end portion of the rod, the innermost plate being screw threaded on the rod, the outermost plate being slidable on the rod, a sleeve on the rod to space the plates apart, a nut screw threaded on the end of the rod to clamp the outermost plate against the sleeve, each plate having a hub extending from its outer face and having a recess in its inner face extending into the hub, packing carried between the peripheral portions of the plates, an expansible annular body inside of the packing, the body including a plurality of separate segments each having a radial groove in one end, a plurality of

lugs extending from the inner face of one of the plates into the grooves, a conical wedge member slidably carried on the sleeve and adapted to expand said body to feed the packing outwardly, the wedge member having one end extending into the recess in one of the plates when at one end of its movement and having its other end extending into the recess in the other plate when at the other end of its movement, the wedge member having a recess in its large end, and a compression spring for operating the wedge member, the spring having one end extending into the recess in the wedge member and having its other end extending into the recess in the plate adjacent the large end of the wedge member.

In witness that we claim the foregoing we have hereunto subscribed our names this 11th day of October, 1922.

GROVER C. DEAKINS.
LELAND S. HAMER.