March 28, 1944. H. C. KEITH 2,345,482

PISTON FOR STEAM DRIVEN PUMPS

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Fig. 1.

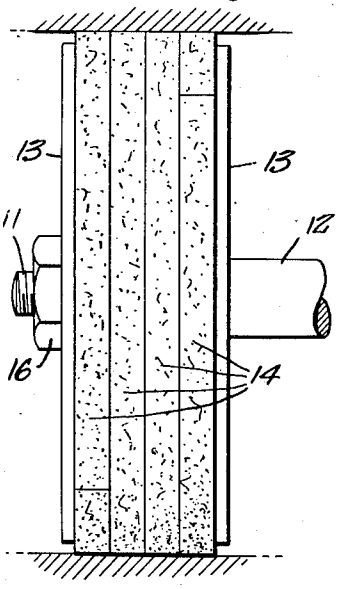


Fig. 2.

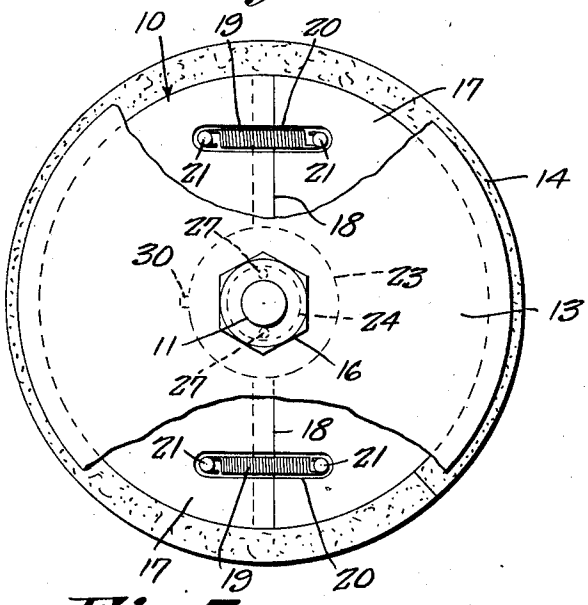


Fig. 7.

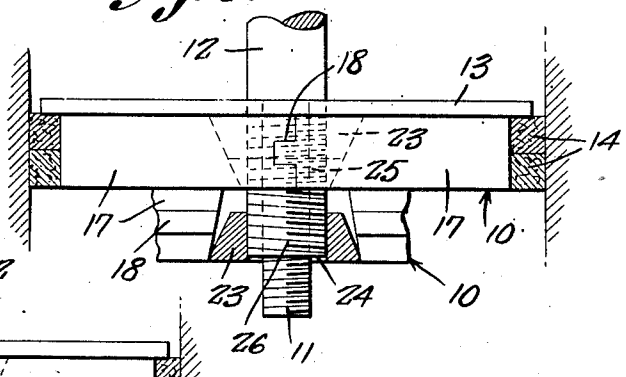
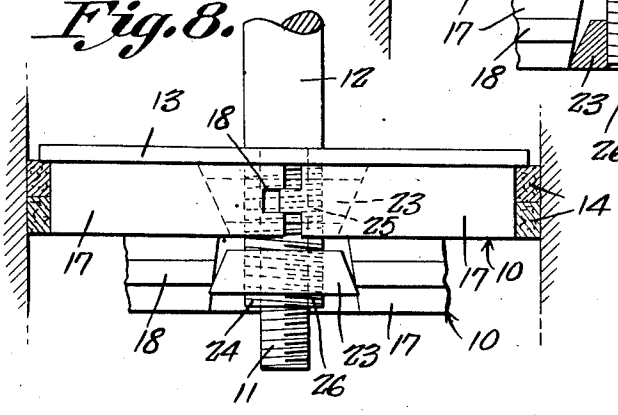


Fig. 8.



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Fig. 3.

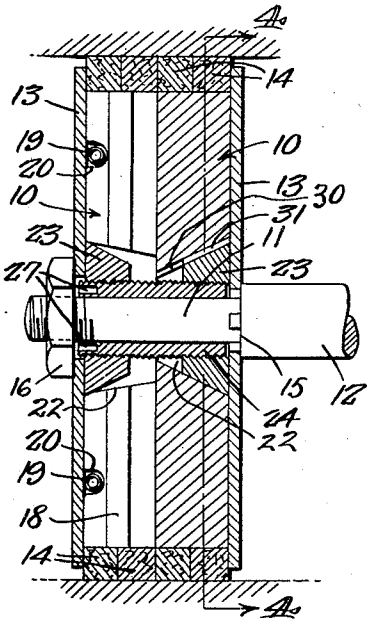


Fig. 4.

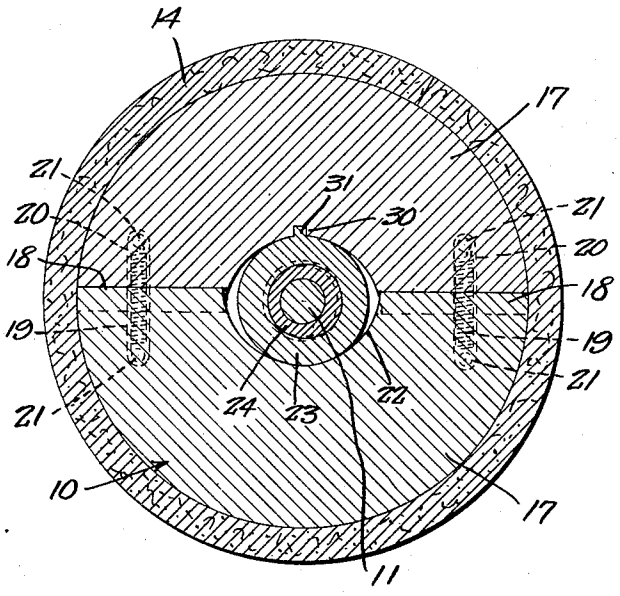


Fig. 5.

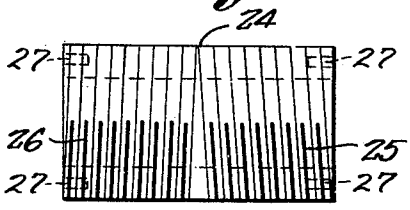


Fig. 6.

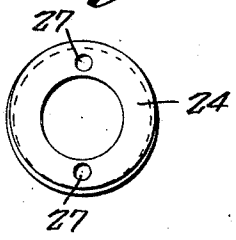
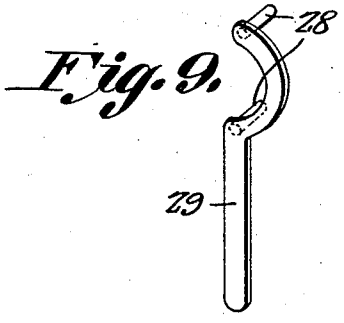


Fig. 9.



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PISTON FOR STEAM DRIVEN PUMPS

Homer C. Keith, El Reno, Okla.

Application June 26, 1942, Serial No. 448,661

4 Claims. (Cl. 309—4)

This invention relates to pistons for steam driven pumps and has for an object to provide a device for expanding worn packing as it is needed until it is worn down to the minimum, thus saving expense and delay in repacking.

A further object is to provide apparatus of this character which will be formed of a few strong, simple and durable parts, which will be inexpensive to manufacture, and which will not easily get out of order.

With the above and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings forming a part of this specification:

Figure 1 is a side elevation of a piston constructed in accordance with the invention.

Figure 2 is an end elevation of the piston shown in Figure 1 with portions cut away.

Figure 3 is a longitudinal sectional view of the piston shown in Figure 1.

Figure 4 is a cross sectional view taken on the line 4—4 of Figure 3.

Figure 5 is a side elevation of the packing expander sleeve.

Figure 6 is an end elevation of the sleeve showing the wrench openings.

Figure 7 is a cross sectional view of the piston with one of the disks shown in edge elevation and with one half section of the companion disk removed and the other half section of the companion disk broken away to show the position of one of the expanders.

Figure 8 is a view similar to Figure 7 but showing the expander in adjusted position.

Figure 9 is a detail perspective view of the wrench for rotating the expander sleeve.

Referring now to the drawings in which like characters of reference designate similar parts in the various views, the piston comprises a plurality of disks 10, in the present embodiment of the invention two in number, mounted upon a reduced portion 11 of a piston rod 12, between metal plates 13. Fiber packing rings 14 are mounted upon the disks, preferably a pair of the packing rings being mounted upon each disk. The plates 13 are slightly greater in diameter than the disks 10, and slightly smaller in diameter than the packing rings 14. The rear plate contacts with a shoulder 15 on the piston rod and a nut 16 is threadedly engaged on the reduced portion 11 of the piston rod and contacts with the front plate, to hold the several parts of the piston in assembled relation.

Each disk is of sectional formation, and the sections are of semicircular formation as shown at 17 in Figure 4. The two sections of each disk are connected by tongue and groove joints indicated at 18 in Figures 3, 4, 7 and 8, the joints being formed on the straight confronting edges of the sections. The two sections of each disk are yieldably spring pressed toward each other through the medium of a pair of helical springs 19 disposed in the face of respective grooves 20 in the section and terminally connected to dowels 21 disposed at the opposite ends of each recess, see Figure 2.

The piston rod receiving axial openings 22 of the disks 10 are tapered for the reception of conical expanders 23 which are threadedly engaged upon the ends of an expander sleeve 24, see Figure 5. The expander sleeve is provided at one end with a right-hand thread 25 and at the other end is provided with a left-hand thread 26 so that when the sleeve is rotated on the reduced portion 11 of the piston rod both expanders will be moved toward or away from each other according to the direction or rotation of the sleeve. The sleeve is provided in one end with spanner wrench receiving openings 27, see Figure 6, to receive the projections 28 of a spanner wrench 29, see Figure 9, for turning the sleeve on the reduced portion 11 of the piston rod as an axis. When the sleeve is rotated in one direction the expanders 23 will be moved toward each other and will spread apart the sections of the disks to increase the diameter of the disks and force the packing rings 14 radially outward to compensate for wear in the packing rings. The expanders are of frustrum shape.

To prevent the expanders from turning while being adjusted the expanders are equipped with respective splines 30 which fit in grooves 31 formed in the walls of the expander receiving openings 22 of the disks 10, see Figure 4. As also shown in this figure the expander receiving openings 22 are of oval contour, the long axis of one opening being disposed at a right angle to the long axis of the other opening in respective disks, see Figure 3. Consequently one expander will expand the sections of its respective disk in a direction at a right angle to the direction in which the other expander expands the sections of its respective disk.

To adjust the expanders the nut 16 may be

removed to expose the end of the sleeve 24 having the wrench openings 27 therein. The wrench may then be applied to rotate the sleeve and expand the sections of the disks to force the packing rings 14 radially outward. Then the nut 16 is replaced to hold the various parts of the piston in assembled adjusted position.

From the above description it is thought that the construction and operation of the invention will be fully understood without further explanation.

What is claimed is:

1. A piston comprising a piston rod having a shoulder and being of reduced uniform diameter beyond the shoulder, metal plates on the reduced portion of the piston rod, disks mounted upon the reduced portion of the piston rod between the plates, packing rings on the disks, the plates being slightly greater in diameter than the disks and slightly smaller in diameter than the packing rings, each packing ring being of sectional formation, means yieldably holding the sections of each packing ring urged toward each other, said sections of each disk having tapered openings receiving the reduced portion of the piston rod, a sleeve loose on the reduced portion of the piston rod having a right-hand thread at one end and a left-hand thread at the other end, expanders of frustrum shape threadedly engaged with the end portions of the sleeve adapted to be moved toward each other in said openings of the disk when the sleeve is turned axially and expand the sections of the respective disks radially outward to increase the diameter of the disks and compensate for wear on the packing rings, and a nut on the reduced portion of the piston rod engaging one of said plates, the other of said plates engaged in said shoulder, said nut holding the several parts of the piston in assembled relation.

2. The structure as of claim 1 and in which said openings for receiving the reduced portion of the piston rod are of oval contour, the long axis of one oval opening being disposed at a right angle to the long axis of the other opening to permit the sections of respective disks being expanded outwardly at right angles relatively to each other.

3. The structure as of claim 1 and in which said sleeve is provided in one end with wrench receiving means to permit rotation of the sleeve with resultant adjustment of the expanders longitudinally of the sleeve.

4. A piston, comprising a piston rod, metal plates on the piston rod, disks mounted upon the piston rod between the metal plates and of a slightly less diameter, packing rings on the disks and extending beyond the plates, means yieldably holding the section of each packing ring urged towards each other, each section of each disk having tapered openings receiving the piston rod, a sleeve loosely mounted on the piston rod within the tapering openings in the sections of the packing rings, expanders of frustrum shape threadedly engaged with the end portions of the sleeve adapted to move towards each other, and means for rotating said sleeve for moving the frustrum shaped expanders in opposite directions.

HOMER C. KEITH.