J. R. FRENCH.

PISTON RING.

APPLICATION FILED NOV. 5, 1921.

1,435,223.

Patented Nov. 14, 1922.

Fig. 1.

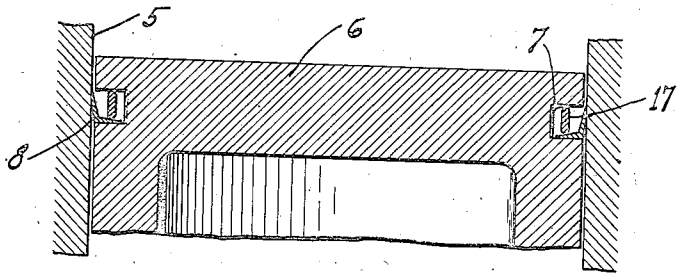


Fig. 2.

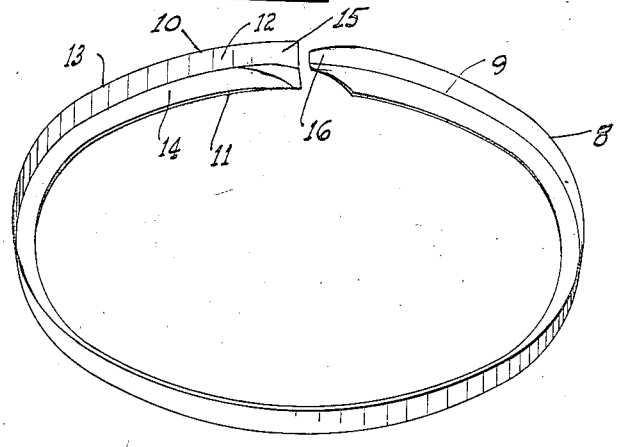
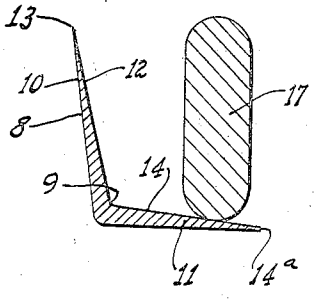
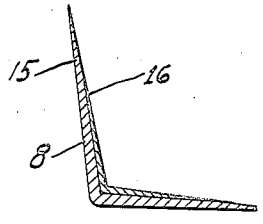


Fig. 3.

Fig. 4.





Inventor

James R. French

By Watson E. Coleman Attorney

Patented Nov. 14, 1922. 1,435,223

UNITED STATES PATENT OFFICE.

JAMES R. FRENCH, OF LOUISVILLE, KENTUCKY, ASSIGNOR OF ONE-FOURTH TO JOSEPH P. GANNON, OF LOUISVILLE, KENTUCKY.

PISTON RING.

Application filed November 5, 1921. Serial No. 513,055.

To all whom it may concern:

Be it known that I, JAMES R. FRENCH, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Piston Rings, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to piston rings and has for its object to provide a device of this character so arranged that it positively prevents leakage and at the same time does not interfere with the movement of the piston on which it is used in a cylinder.

It is another object of the invention to provide a ring of this character including a strip of flexible or ductile metal which is bent at its intermediate portion lengthwise of the strip to produce a channeled ring, the inner face of the ring inclining outwardly, said channeled ring being urged outwardly by means of an expansible ring disposed within the channel.

It is still a further object of the invention to provide a ring of this character which is substantially L-shaped in cross section, both inner faces of the ring being beveled substantially in convergent relation, the lower beveled face being adapted to receive an expansible ring, the upper portion of said ring being adapted to extend above the upper edge of the remaining wall of the first mentioned ring.

With these and other objects in view, the invention consists in the improved construction and arrangement of parts to be hereinafter more particularly described, fully claimed and illustrated in the accompanying drawings, in which:—

Figure 1 is a fragmentary sectional view of a cylinder and piston, showing the invention applied;

Figure 2 is a perspective view of the main ring of the device;

Figure 3 is a sectional view of the engaged ends of the main ring; and

Figure 4 is an enlarged sectional view of the main and expansible rings.

Referring to the drawings, 5 designates a cylinder of conventional form in which a piston 6 is mounted, the piston having the usual ring groove 7.

In order to properly position a ring within the groove 7, and at the same time supply a ring which prevents leakage without interfering with the movement of the piston in the cylinder, there is provided a novel ring consisting of a length of flexible or ductile material 8 which is bent or extended at its intermediate portion longitudinally of the length as at 9 to provide a side wall 10 and a base 11. The side wall corresponds in heighth to the width of the base portion 11. The wall 10 inclines upwardly with respect to the base 11, the inner face 12 of the wall 10 being beveled or canted from the junction of the wall 10 with the base 11 to the edge 13 of the wall 10, the edge 13 being adapted to engage the cylinder wall. In view of the inclination of the wall 10, the portion of said wall below the edge 13 is slightly spaced from the wall of the cylinder so that friction to a large extent is overcome and the ring permitted to operate efficiently.

The lower face of the base 11 is flat and adapted to engage the bottom of the groove 7. The upper face 14 of the base 11 is beveled or canted from the junction of the wall 10 with the base 11 to the inner edge 14^a of said base. By this means, the inner faces 12 and 14 of the ring are disposed substantially in converging relation, the purpose of which will be hereinafter described. After the formation of the wall 10 and base 11 and the beveled faces 12 and 14, the length 8 is then formed into a ring. The end portion 15 of the ring, or one end portion of the wall 10 and base 11, is beveled toward the extremity of said end and adapted to receive the opposite end portion 16 of the length which is tapered and partially reduced so as to permit a perfect union when the tapered portion 16 is disposed in engagement with the end portion 15, and at the same time to prevent the tapered portion from interfering with the expansion and retraction of the ring.

In connection with the ring 8 there is provided an expansible ring 17, said ring being substantially rectangular in cross section with the exception that its longitudinal edges are rounded, the width of the ring 8 corresponding to the height of the wall 10, while the thickness of the ring is only half the width of the base 11. The ring 17 is sprung upwardly so that when contracted it will serve to urge the ring 8 outwardly, it being of course obvious that the ring 17 is of the separable type. The ring 17 is

adapted to be disposed within the channel formed by the wall 10 and base 11 of the ring 8, one of the rounded edges of the ring 17 being engaged with the beveled face 14 of the base 11.

An important feature of this device is that the beveled face 14 of the base 11 substantially serves as a wedge, and as the ring 17 is disposed upon said face 14, contact of the upper edge of the ring with the upper wall of the groove 7, together with the expansible force of the ring 17 will cause the ring 8 to be moved upwardly by the riding of the lower rounded edge of the ring 17 upon said beveled face. A side or radial thrust is thereby produced which constantly urges the ring 8 outwardly of the groove 7. In view of this novel arrangement, it is not necessary for the ring 17 to engage the inner face of the wall 10. In this way an oil pocket is formed through the cooperation of the wall 10 and the ring 17 so that any oil or matter removed from the cylinder by the edge 13 of the wall 10 will be directed into the pocket between the ring 17 and inner face of the wall 10 and directed downwardly by the beveled face 12 of the wall 10. Furthermore, as the expansible ring is disposed upon the beveled face 14, it prevents the edge 13 of the ring 8 from coming in contact with the edge of the upper wall of the groove 7 so that danger of said edge obstructing the passage of the oil into the oil pocket is prevented. At the same time, the edge 13 does not interfere with the expansion of the ring.

From the foregoing it will be readily seen that this invention provides a novel form of piston ring which positively prevents leakage, and wherein the expansible means for the main ring is not resisted in its expansion, but assisted through the reduction of friction and the direction of the expansible force to the proper portion of the main ring. All of these features are possessed by a ring arrangement which is simple in construction and which does not require a special make of piston or groove for its use.

What is claimed is:—

1. A piston ring of the character described comprising a ring including a side and a base portion, said side portion tapering upwardly and extending outwardly with respect to the base portion, said base portion having its upper surface beveled outwardly with respect to said side portion, and an expansible ring normally disposed centrally of the beveled base portion in spaced relation to the junction of the side portion with the base portion, said side wall being urged outwardly into engagement with a cylinder upon expansion of the ring on said beveled base portion.

2. A piston ring of the character described comprising a ring including a side and a base portion, the inner faces of the side and base portions being canted outwardly from the junction of said side and base portions to the edges thereof, an expansible ring, said ring being substantially rectangular in cross section and having its longitudinal edges rounded, one of said edges being adapted to engage the inclined or canted face of the base portion, whereby expansion of the expansible ring will cause a radial thrust upon the base portion and through the medium of the beveled face of the base portion to urge the first mentioned ring outwardly.

3. A piston ring of the character described comprising a ring including a side and a base portion, the inner faces of the side and base portions being canted outwardly from the junction of said side and base portions to the edges thereof, an expansible ring, said ring being substantially rectangular in cross section and having its longitudinal edges rounded, one of said edges being adapted to engage the inclined or canted face of the base portion, whereby expansion of the expansible ring will cause a radial thrust upon the base portion and through the medium of the beveled face of the base portion to urge the first mentioned ring outwardly, said expansible ring being disposed in spaced relation to the canted face of the side portion of the first mentioned ring and cooperating with said side portion to form a pocket for the reception of foreign matter.

In testimony whereof I hereunto affix my signature.

JAMES R. FRENCH.