May 8, 1928. 1,668,672

C. W. DARRAH

PISTON

Filed April 1, 1927

Fig. 4.

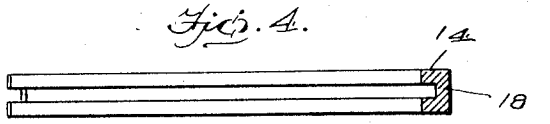


Fig. 1.

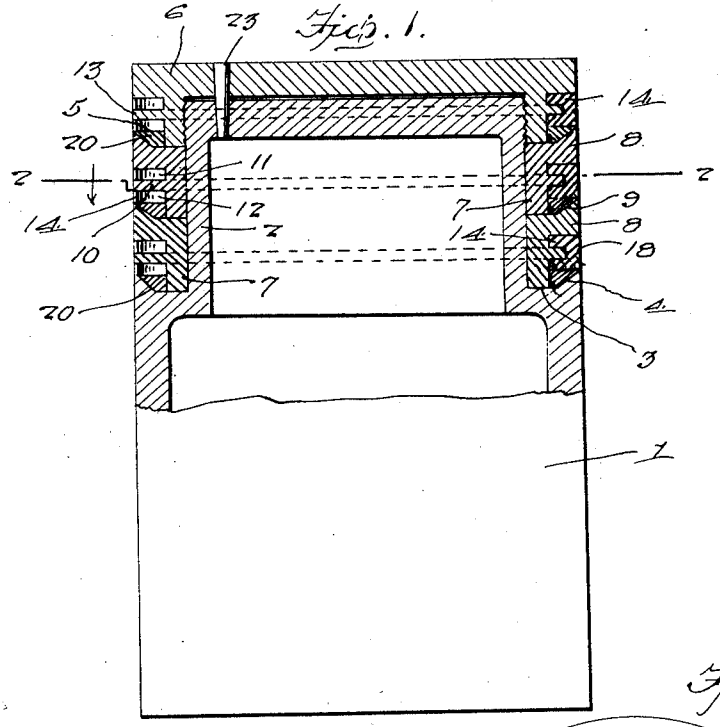


Fig. 3.

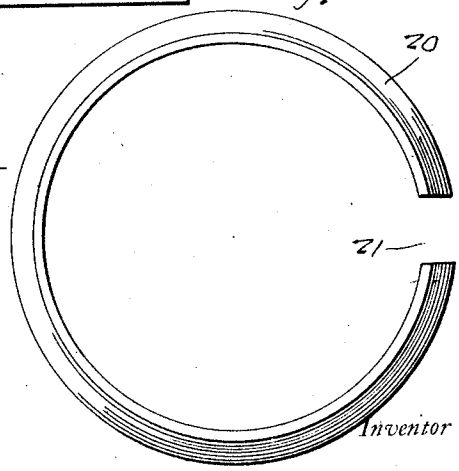
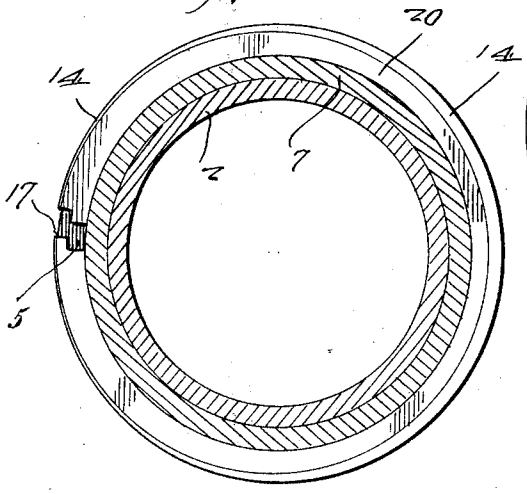


Fig. 2.



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UNITED STATES PATENT OFFICE.

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PISTON.

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The present invention relates to improvements in piston constructions and has for its principal object to provide a means whereby the efficiency of the internal combustion engine may be increased, and at the same time permitting the pumping of oil and the accumulation of carbon, as well as eliminating piston slaps.

One of the important objects of the present invention is to provide a piston, wherein leakage of oil around the piston will be prevented, the piston being further of such construction, as to prevent any possibility of compression escaping around the piston, the piston being further adapted to take up any wear which may occur on the piston rings.

A further object is to provide a piston of the above mentioned character which is simple in construction, strong and durable, and otherwise well adapted for the purpose for which it is designed.

Other objects and advantages of the invention will become apparent during the course of the following detailed description.

In the accompanying drawing, forming a part of this application, and in which like reference characters designate like parts throughout the several views:

Figure 1 is a view partly in elevation and partly in section of my improved piston construction, showing the manner in which the several parts are held in assembled relation.

Figure 2 is a sectional view, taken approximately on the line 2—2 of Figure 1, showing the piston ring in top plan.

Figure 3 is a bottom plan view of the bevelled locking ring, and

Figure 4 is a cross sectional view through one of the packing rings.

In the drawing, wherein for the purpose of illustration is shown the preferred embodiment of my invention, 1 designates the body portion of the piston, the upper portion thereof being reduced as illustrated at 2. The shoulder 3 formed at the juncture of the body with the reduced portion is formed at its outer edge with the bevelled portion 4, the purpose of which will be hereinafter more fully described.

The upper end of the reduced portion 2 is externally threaded and cooperating therewith is the internally threaded flange or sleeve portion 5, formed on the bottom of the head 6. In this manner, the head may be readily attached or detached from the upper end of the reduced portion 2 and the diameter of this head is substantially the same as the outer diameter of the body 1.

The purpose of mounting the detachable head 6 in the particular manner as shown will be hereinafter more fully described.

Adapted to encircle the reduced portion 2 of the body 1 are the superposed sleeves or bands 7. In the present instance, two of such elements are shown, although it is to be understood that I do not wish to limit myself to the particular number of bands or sleeves which may be employed. The lower edge of the lowermost band or sleeve 7 rests on the shoulder 3, while the lower edge of the upper sleeve or band engages the upper edge of the lowermost sleeve. The outer edge of the annular flange or sleeve 5 formed on the bottom of the head 6, will engage the upper edge of the uppermost sleeve, in the manner as clearly illustrated in Figure 1. These sleeves or bands 7 are adapted to slide freely over the reduced portion 2 of the body 1, when the head 6 is detached from the upper end of the reduced portion.

An annular flange 8 is formed on the upper edge portion of each of the sleeves or bands 7 and these flanges extend laterally from the respective sleeves or bands so that the outer diameter of the flange will be substantially the same as the outer diameter of the body 1. A bevelled ledge 9 is formed on the upper face of each flange 8, adjacent its outer peripheral edge, as clearly illustrated in Figure 1, and the purpose thereof will be presently apparent.

An eccentric rib 10 is formed on the intermediate portion of the outer peripheral face of each band or sleeve 7 and as is clearly shown in Figure 1, the widest portion of each eccentric rib has its peripheral edge disposed flush with the outer peripheral face of the body 1 and the flanges 8 formed on the sleeves 7. The ribs 10 will form upper and lower packing ring receiving channels 11 and 12 respectively, in each of the sleeves. A similar eccentric rib 13 is formed on the outer peripheral face of the depending flange or sleeve 5 formed on the bottom of the head 6, and this last mentioned rib also provides a pair of opposed packing ring receiving channels similar to the channels 11 and 12.

A channel shaped piston packing ring 14 has its inwardly directed sides arranged in the channels 11 and 12 respectively pro-

vided therefor in each of the sleeves or bands 7, as well as the depending flange or sleeve 5 formed on the bottom of the detachable head 6. Each packing ring is also of eccentric formation, and is split, as illustrated at 17, with reference more particularly to Figure 2. The wider portion of each piston packing ring 14 is disposed on opposite sides of the eccentric rib 10, so that the wider portion of the packing ring will be disposed against the respective sides of the narrowest portion of the rib, and this is clearly shown in Figure 1. The base portion 18 of each packing ring encircles the respective rib 10 in the manner as clearly shown in Fig. 1.

The channeled packing ring 14 has its upper face disposed against the bottom face of the flange 8, and for the purpose of retaining the packing rings 14 in engagement with the respective ribs, I provide the bevelled locking rings 20. The bevelled faces of these rings co-act with the bevelled ledges 9 of the flanges 8 and the lowermost locking bevelled ring co-operates with the bevelled portion 4 formed on the shoulder 3. In this manner, the packing rings will be properly positioned in the channels formed by the several ribs on the sleeves or bands 7 and the depending flange or sleeve 5 on the bottom of the head 6. The bottom face of the lowermost packing ring will engage the upper flat face of the respective bevelled locking ring 20, as clearly illustrated in Figure 1.

These bevelled locking rings are also freely slidable over the reduced end 2 of the body portion 1, and are split as indicated at 21 in Figure 3.

After the sleeves and locking rings as well as the packing rings have been properly positioned on the reduced portion 2 of the body 1 and the head 6 is tightened on the upper threaded end of the reduced portion 2, a locking wedge shaped pin 23 is driven through suitable registering openings provided therefor in the head 6 and the top of the reduced portion 2, and this is clearly illustrated at 23, in Figure 1. This locking means will prevent any possibility of the head 6 being disengaged or from rotating with respect to the reduced portion of the body 1.

The provision of a piston construction of the character above described will insure an efficient operation of the internal combustion engine with which the piston may be associated so that oil will be prevented from escaping past the piston rings as well as eliminating the collection of carbon and piston slaps. Furthermore, a piston constructed in accordance with the present invention will automatically take any wear which may occur by the packing rings coming in contact with the wall of the cylinder.

The simplicity with which the present piston is constructed, enables the several parts to be readily assembled or disassembled.

While I have shown the preferred embodiment of my invention, it is to be understood that various changes in the size, shape and arrangement of parts may be resorted to, without departing from the spirit of the invention or the scope of the appended claims.

What I claim is:

1. A piston comprising a body portion, the upper end thereof being reduced, a series of superposed bands encircling the reduced portion, a lateral flange on the upper edge portion of each band, an eccentric rib formed on the outer peripheral face of each band at the intermediate portion thereof, a split channeled eccentric packing ring encircling each band and its rib, the uppermost portion of each channeled packing ring engaging the bottom face of the flange formed on the band, means for maintaining the lowermost portion of the channeled ring against the bottom of the respective eccentric rib and a flanged head secured on the upper end of the reduced portion for locking the bands against vertical sliding movement.

2. A piston comprising a body, the upper portion thereof being reduced, a series of superposed bands encircling the reduced portion, a lateral flange on the upper edge portion of each band, an eccentric rib formed on the outer peripheral face of each band at the intermediate portion thereof, a split channeled eccentric packing ring encircling each of the aforementioned bands and its rib, the uppermost portion of each packing ring engaging the bottom face of the flange formed on the sleeve, a locking ring interposed between the bottom portion of each packing ring and the upper face of each flange formed on the sleeve for holding said packing ring in position on the respective rib, and a head detachably secured on the upper end of the reduced portion for locking the bands against sliding movement on the reduced portion of the body.

3. A piston comprising a body, the upper portion thereof being reduced, a shoulder formed at the juncture of the reduced portion with the body, the outer edge portion of said shoulder being bevelled, a plurality of superposed bands encircling the reduced portion, the lower edge of the lowermost band engaging said shoulder, a lateral flange formed on the upper portion of each band, a bevelled ledge formed on the upper face of each flange at the outer edge thereof, a head detachably secured on the upper end of the reduced portion, an eccentric rib formed on the outer peripheral face of each band at the intermediate portion thereof, a split channeled eccentric piston packing ring encircling each of said bands at its eccentric

rib, the uppermost face of the channeled packing ring being disposed against the bottom face of the lateral flange formed on each band, and bevelled locking rings encircling the lower portion of each band and cooperating with the aforementioned bevelled ledges for holding the bottom portion of the packing ring against the bottom face of the respective eccentric rib.

4. A piston comprising a body, the upper portion thereof being reduced, a shoulder formed at the juncture of the reduced portion with the body, the outer edge portion of said shoulder being bevelled, a plurality of superposed bands encircling the reduced portion, the lower edge of the lowermost band engaging said shoulder, a lateral flange formed on the upper portion of each band, a bevelled ledge formed on the upper face of each flange at the outer edge thereof, a head detachably secured on the upper end of the reduced portion, an eccentric rib formed on the outer peripheral face of each band at the intermediate portion thereof, a split channeled eccentric piston packing ring encircling each of said bands and its eccentric rib, the uppermost face of the channeled packing ring being disposed against the bottom face of the lateral flange formed on each band, split bevelled locking rings encircling the lower portion of each band and cooperating with the aforementioned bevelled ledges for holding packing rings in position around the respective eccentric ribs, said head adapted to secure the bands against sliding movement on the reduced portion, and means for locking the head against accidental movement on the reduced portion of the piston.

In testimony whereof I affix my signature.

CHARLES W. DARRAH.