April 12, 1932. E. G. BUCHMANN 1,853,200

PISTON RING

Filed April 12, 1930

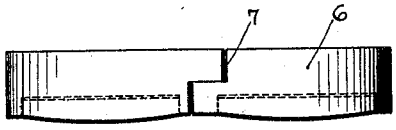


Fig. 1.

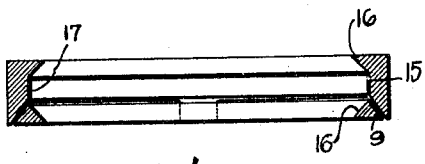


Fig. 4.

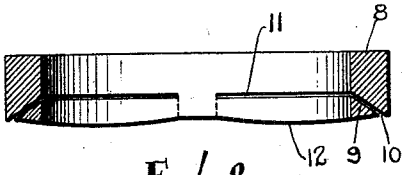


Fig. 2.

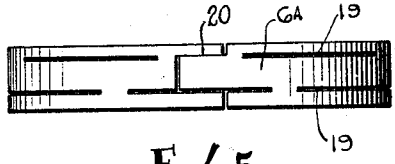


Fig. 5.

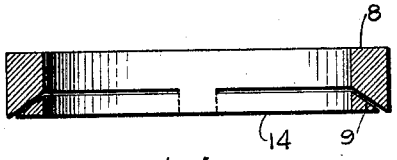


Fig. 3.

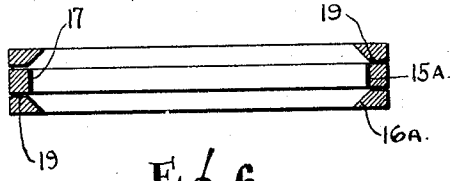


Fig. 6

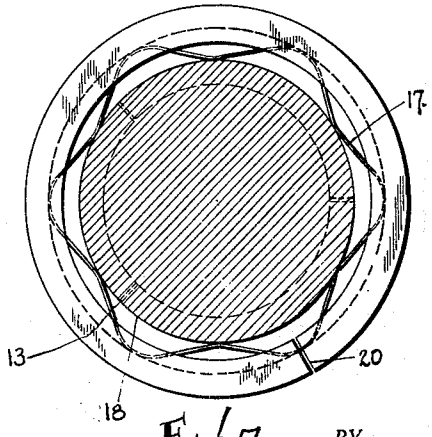


Fig. 7.

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UNITED STATES PATENT OFFICE

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PISTON RING

Application filed April 12, 1930. Serial No. 443,688.

This invention relates to piston rings, and is especially adapted and intended to be used on the pistons of internal combustion engines.

The object of the invention is to provide a ring having improved means for collecting oil from the cylinder wall and returning the same to the crank case.

Another object of the invention is to provide improved means for seating the edges of the ring against the side walls of the groove. By side walls of the groove is meant the top and bottom walls when the piston is in vertical position.

A further object of the invention is to provide improved means for expanding a split ring against the cylinder wall.

A further object of the invention is to provide a ring having a greater wall thickness than has heretofore been provided in rings of this general type. This greater thickness provides a relatively wide seating or contact surface against the side walls of the groove, and the greater the contact surface the more effective is the seal between the ring and the side walls of the groove, and consequently the better it can hold compression and oil from passing behind and around the ring.

With these and other objects in view several forms of the invention are hereinafter described and are illustrated in the accompanying drawings in which Fig. 1 is a side elevation of one form of the ring. Fig. 2 is a section thereof. Fig. 3 is a section of the modified form. Fig. 4 is a section of a further modification. Fig. 5 is a side elevation of another form. Fig. 6 is a detail in section of Fig. 5. Fig. 7 is a plan view of a form shown in Fig. 5.

Referring to the forms shown in Figs. 1 and 2, the ring 6 is a transplit ring with a stepped joint at 7 permitting expansion and contraction. One edge 8 is flat, to seat against the corresponding side wall of a groove in the piston. This will ordinarily be the top wall of the groove, in a vertical engine, or the groove nearest the cylinder head. At its opposite edge the ring is provided with a series of channels or slots 9 cut therein, and these channels extend at an inclination inwardly from just inside the corner of the ring as indicated at 10, which will be termed the inlet end of the channels, to the inside of the ring through which the channels open at the outlet end 11 into the ring groove.

The lower edge or surface of the ring, where it seats against the opposite side wall of the groove in the piston, is provided with a series of curved or projecting surfaces 12, which correspond in number and position to the channels 9, and form spring members permitting axial compression of the ring. That is to say, when the ring is inserted in the groove it is compressed axially and slipped or forced into the groove with the result that the bowed or projecting portions 12 exert a spring pressure against one side of the groove and force the surface 8 into close and sealing contact with the upper or opposite wall of the groove, thereby making a very effective seal to prevent leakage or loss of compression around behind the ring.

The oil collecting function of such a ring is this: The inlet 10 to the passages 9 will ordinarily be adjacent, or possibly slightly uncovered at, the surface of the piston, and on the out stroke of the piston the oil adhering to the surface of the cylinder will be scraped therefrom by the edge of the ring and will flow inwardly through the passages 9 into the ring groove, from which it may be drained back into the crank case by any suitable means, such for example as holes 13 (Fig. 7) extending through the piston wall from the bottom of the ring groove.

It will be noted that the ring provides a wide bearing or seal between the surface 8 and the side wall of the groove, and also provides means for permitting axial compression of the ring and for collecting oil from the cylinder wall.

The form shown in Fig. 3 is the same as that shown in Fig. 2, with respect to the passages 9, but instead of having a bowed or projecting surface 12, the corresponding surface or edge 14 is made straight, or parallel to the surface 8. This form has the same functions with respect to the wide bearing and the oil collecting feature as that

above described, and also provides a wide bearing at both edges 8 and 14.

In the form shown in Fig. 4 the same oil collecting passages 9 are provided, extending through the ring from one edge or side wall thereof, at an inclination, to the inside of the ring, but in this form the inside surface of the ring is channeled or cut away to produce a channel extending completely around the ring, the bottom of the channel being indicated at 15, and beveled at its edges as indicated at 16, to the opposite surfaces or edges of the body of the ring. And in this form is provided means to expand the ring, consisting of a corrugated spring 17 (shown also in Fig. 7) which is inserted in the channel and bears against the bottom 18 of the groove in the piston. This spring tends to expand the ring after it is inserted in the groove and hold its other wall in close contact with the cylinder wall, the ring being transplit, as indicated above, to permit expansion or compression. This form retains the wide bearing and oil collecting features above described.

In the modified form shown in Figs. 5 and 6 the ring 6*a*, instead of having the inclined grooves 9, has a series of staggered grooves 19, shown arranged in two lines, these grooves extending through the ring from the outer to the inner surfaces and communicating at their inner ends with the channel on the inside of the ring the bottom of which is indicated at 15*a* and the beveled edges of which are indicated at 16*a*. And this form is provided with a corrugated expanding spring 17 as above described. Also, this form may have a tongue joint, where it is transplit, as indicated at 20, instead of the stepped joint 7. This form, it will be noted, has a wide bearing at top and bottom, and the slots 19 serve to permit the flow of oil inwardly through the ring to the bottom of the groove from which it can return to the crank case through the holes 13.

The invention may be embodied in various other forms within the scope thereof, and no limitation in this respect is implied.

I claim:

1. A transplit piston ring having a series of slots, extending their whole length from the inner surface of the ring through the edge of said ring and nearly the whole circumference of the ring.

2. A piston ring as set forth in claim 1, the opening of the slots through the edge of the ring being close to the outer periphery of the ring so as to collect oil from nearly the whole circumference of a cylinder wall.

3. A transplit piston ring having a series of slots extending from the inner surface of the ring to and through one edge of the ring the opening through said edge being wholly inside of the peripheral surface of the ring.

4. A transplit piston ring as in claim 3, and one edge of the ring having a series of projections to produce axial expansion of the ring.

5. A transplit ring as in claim 3, in combination with a spring within the ring to expand the same and hold said peripheral surface in contact with a cylinder wall.

6. A transplit ring having a series of slots extending from the inner surface of the ring through to and connecting with a groove at one edge of the ring, said groove being wholly inside of the periphery of the ring, one edge of said ring having a series of projections to produce axial expansion of said ring.

7. The combination stated in claim 6, the inner side of the ring being channeled, and an expansion spring in contact with the bottom of said channel.

8. The combination as stated in claim 6 and an expansion spring having contact with the ring and the bottom of the ring groove.

In testimony whereof, I do affix my signature.

EDWARD G. BUCHMANN.