May 6, 1930. F. H. ROBERTS 1,757,877

PISTON RING

Filed Oct. 1, 1928

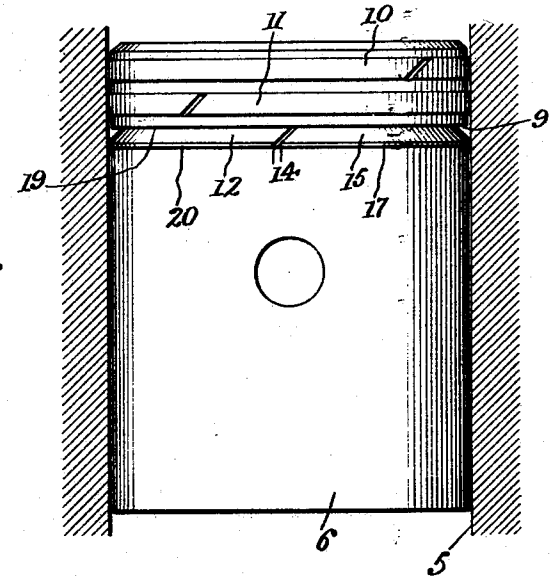


Fig. 1.

Fig. 3.

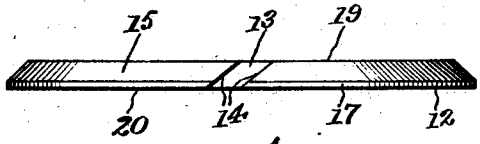


Fig. 4.

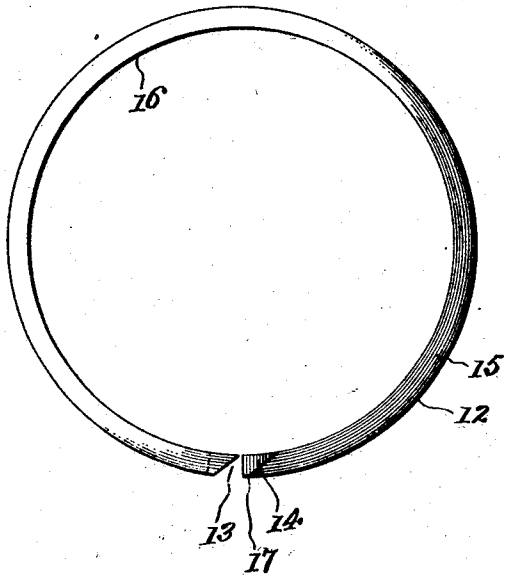
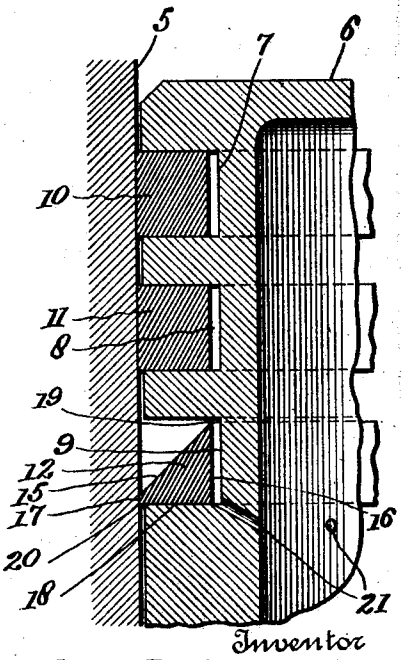


Fig. 2.



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UNITED STATES PATENT OFFICE

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PISTON RING

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The present invention relates to improvements in piston rings, and has for an object to provide an improved packing ring for the pistons of internal combustion or other engines, which will efficiently hold compression and oil, while permitting of an adequate lubrication of the cylinder walls.

Another object of the invention is to provide an improved ring which will avoid oil pumping, carbon deposits and fouled spark plugs, while improving combustion, reducing oil consumption, securing greater gasoline mileage, power and compression, reducing crank case dilution, avoiding the sticking of valves and resulting in improved lubrication for the piston pin, bushing, cylinder wall, piston and piston ring.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claim appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views,

Figure 1 is a fragmentary section taken through a cylinder showing a piston in side elevation equipped with the improved piston ring.

Figure 2 is an enlarged fragmentary sectional view, through a piston and cylinder showing the improved ring.

Figure 3 is an edge view of the improved ring, and

Figure 4 is a bottom view thereof.

Referring more particularly to the drawings 5 represents the usual cylinder wall of an internal combustion engine; and 6 represents a piston of conventional form fitted to reciprocate in the cylinder 5. The piston is fitted with packing rings following the customary practice and grooves 7, 8 and 9 are provided in the head of the piston 6 for the purpose of receiving such packing rings. Two rings of the ordinary construction are shown at 10 and 11, while the third ring conforms to the present invention.

This improved ring, shown more particularly in Figures 3 and 4 comprises a ring body 12 of appropriate spring material, shaped to substantially circular form to agree with the contour of the piston 6 and being split as indicated at 13 with overlapping beveled ends 14. The ring is preferably of a substantially triangular cross section, as shown in Figure 2. In this respect it differs widely from the customary rings 10 and 11 shown as of substantially rectangular cross section, and as engaging the cylinder wall throughout the entire areas of their outer faces and having upper and lower edges in scraping contact with the cylinder wall.

The triangular shape of the new ring is such that the diagonal or hypotenuse 15 extends from the upper edge of the inner wall 16 downwardly and outwardly toward the lower edge of the outer wall, which by this formation is almost wholly removed from and the new ring has a minimum of contact with the cylinder wall 5. It will be noted, however, particularly in connection with the enlarged Figure 2, that an outer wall portion 17 of short height is provided on the outer face of the new ring in engagement with the cylinder wall 5. The inner wall 16 and the bottom wall 18 are substantially untouched, so that the new ring has a wide bearing upon the lower wall of the ring groove 9. The upper portion of the inner wall 16 constitutes substantially an annular knife edge 19. The ring is also of preferably slightly smaller height than the height of the ring groove 9. The lower outer edge 20 of the new ring is sharpened to provide a knife edge for scraping the oil from the cylinder wall 5.

In the operation of the device, the new ring is carried up and down with the piston 6 as it is being reciprocated in the cylinder. On the up stroke of the piston, due to the angle on which the ring is machined, the oil is enabled to pass freely. However, on the downward stroke, the knife edge 20 scrapes down the cylinder wall 5 and removes surplus oil which is allowed to pass through the openings 21 into the interior of the piston and thence down into the crank case. On the down stroke of the piston, the new ring will float to the top of the ring groove leaving a space between the bottom wall 18 of the ring and the adjacent wall of the ring groove 9, so

that the scraped oil may find ready exit through the openings 21. This movement of the new ring to the top of the ring groove will bring the knife edge 19 against the upper wall of the ring groove 9 and the pressure of the ring through this knife edge upon the upper ring wall will tend to cant the ring presenting the knife edge 20 and the wall 17 at an angle to the cylinder wall for the purpose of better scraping the same. The ring is made from one piece angle cut compression ring material. The outer edge of the ring may be ground down or it may be formed initially of the triangular shape shown. The ring is a single ring of simple construction and the tooling process in making the ring is very simple and accurate and the ring is thus inexpensive and easy to manufacture.

It is noted that only a thin edge 17 of the ring touches the cylinder wall thus providing for the removal of excess oil, and by the angle on which the ring is cut, preferably 35 or 50 degrees, the tension is reduced enough to prevent entire drying of cylinder wall.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claim.

What is claimed is:—

In combination with a piston having a ring groove and perforations at the base of the ring groove communicating with the interior space of the piston, an improved piston ring of less height than the height of the ring groove in the piston floatingly mounted in said groove and being a split circle of resilient material cut diagonally and having right angular base and inner walls, the inner wall being joined by the diagonal wall at the upper inner edge of the ring, the lower edge of the diagonal wall terminating above the outer edge of the lower base wall, a narrow cylinder wall contacting surface between the diagonal wall and the base wall, the lower outer edge of said ring being sharpened.

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