June 24, 1930. A. GUERRIERO 1,765,722

PISTON PACKING RING

Filed July 2, 1929

Fig. 1

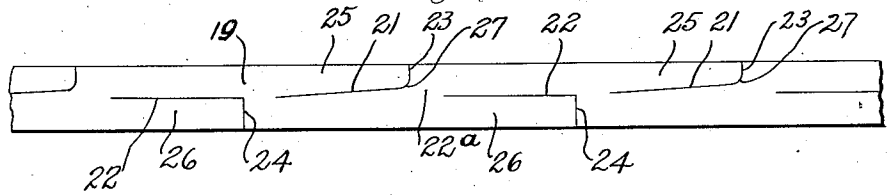


Fig. 2

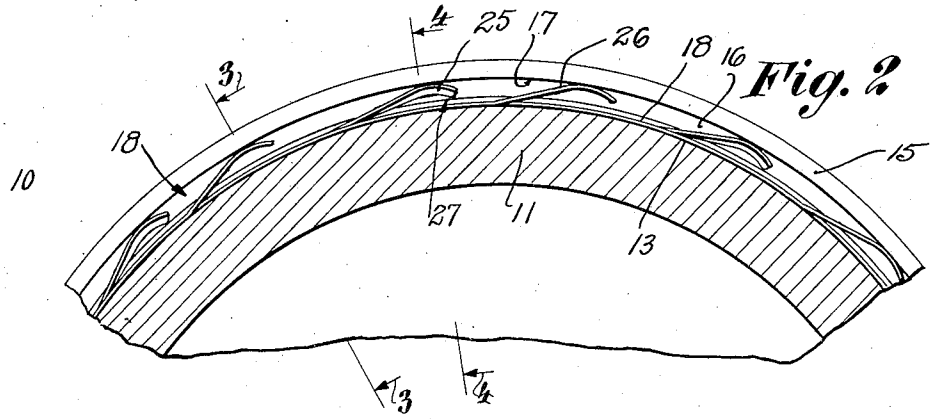


Fig. 3

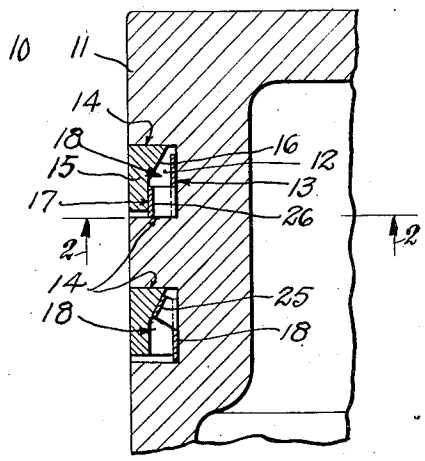
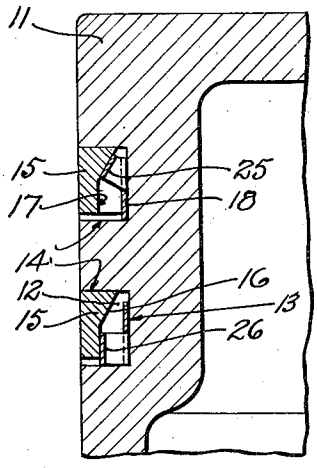


Fig. 4



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UNITED STATES PATENT OFFICE

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PISTON PACKING RING

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This invention relates to piston rings, and has among its objects the provision of an improved construction including a piston ring and a coacting spring so that the feed of oil through the groove receiving the ring, with consequent fouling of the spark plug is avoided.

Another object of the invention is to construct an improved device of the nature set forth in which the tension of the spring on the piston ring is rendered more uniform to the end that excessive or incorrect wear of the ring on the cylinder wall may be avoided.

A further object of the invention is to provide a device of the nature set forth which shall be simple in construction, inexpensive to manufacture, and reliable and efficient in use to a high degree.

Other objects and advantages of the invention will become apparent as the specification proceeds.

With the aforesaid objects in view, the invention consists in the novel combinations and arrangements of parts hereinafter described in their preferred embodiments, pointed out in the subjoined claims, and illustrated on the annexed drawing, wherein like parts are designated by the same reference characters throughout the several views.

In the drawing:

Figure 1 is a fragmentary view of a spring blank made according to my invention.

Fig. 2 is a fragmentary bottom sectional view taken on line 2—2 of Fig. 3.

Figs. 3 and 4 are views in vertical section taken on line 3—3 and 4—4 of Fig. 2.

The advantages of the invention as here outlined are best realized when all of its features and instrumentalities are combined in one and the same structure, but, useful devices may be produced embodying less than the whole.

It will be obvious to those skilled in the art to which this invention appertains, that the same may be incorporated in several different constructions. The accompanying drawing, therefore, is submitted merely as showing the preferred exemplification of the invention.

Generally described, the invention provides a piston ring construction, whereby a ring is received in a groove in the piston, and a spring is placed between the ring and the bottom of the groove. It is desired to press the ring substantially uniformly against the cylinder wall to prevent the same from being cut by the ring, or from being unduly worn down thereby, and yet function with the reliability desired in devices of this nature. To prevent oil from working through the groove and fouling the spark plug, it is desirable to cause the ring to hug a side wall of the groove. Both of these objects are attained by an improved coaction between the ring and the spring. To illustrate one possible embodiment of the invention, in which I have endeavored to emphasize simplicity, the ring has inner cylindrical and conical surfaces, one above the other. A spring made of any suitable material, preferably spring sheet metal, rests against the base of the groove and has pressed portions or tongues extending therefrom to bear flat against the ring surfaces mentioned. These portions or tongues permit the exertion of a moderate degree of tension on the ring, through the resilience of the spring or of the tongues. Since the tongues comprise two series, being cut at opposite edges of the spring, one series acts against the conical and the other against the cylindrical surface. The tongues acting against the conical surface are bent to lie flat thereagainst. They may be tapered toward their ends to afford uniform tension, and formed or curved to avoid cutting into the rings. The tongues bearing on the conical surface move the ring into position to close the groove to prevent any flow of oil therethrough while the other tongues actuate the ring into contact with the cylinder wall. The total force so exerted includes the component of the force on the conical surface and is consequently the greater force. Requisite clearances are afforded for both the ring and the spring, and it will be understood that the construction herein shown is intended to be merely illustrative, and can be embodied in many different arrangements within the scope of the claims.

Referring in detail to the drawing, 10 denotes a device embodying the invention. The

same includes a piston 11, having one or more grooves 12. The grooves may be of any desired form, but as shown, each includes a base wall 13 and side walls 14.

Disposed in each groove is a suitable split ring 15, which may be of any conventional construction except that it has an inner conical or inclined annular surface 16. If desired, an inner cylindrical surface 17 may also be provided, the surfaces referred to being one above the other. It may be stated generally, that the inner conformation of the ring will depend largely upon the specific spring that may, within the scope of the invention, be employed.

Positioned within the groove 12 and resting against the base 13 thereof is a resilient member 18. This member is made of a strip of spring metal 19. The width of this spring is of any suitable dimension, and it may be somewhat less than the width of the groove 12, to provide the required clearances. The ring, on the other hand, may be equal in width to the groove, although, as a result of wear, its width may slightly decrease and afford a clearance.

The opposite edges of the strip 19 may be of any desirable shape, consistent with the objects to be attained. A plurality of slits 21, 22 are made therein in proximity to the center line of the strip, these slits being longitudinally spaced to provide intermediate portions 22^a of any required size, depending on the strength of the spring, the strains to which it is to be subjected, and other factors. The slits extend into the opposite edges at 23, 24, forming spaced tongues 25, 26 extending along opposite edges of the strip. The length of these tongues may be varied as required, as will be readily appreciated. Each tongue is thus offset or staggered with respect to an adjacent tongue at the opposite edge of the strip. The tongues 25 may be narrowed toward their free ends according to the theory of a beam of uniform strength, and the end portions particularly of the tongues 25 may be concaved or curved as shown at 27 for a purpose hereinafter described.

The tongues or spring portions 26 are bent outward from the spring 18 to lie flat against the cylindrical surface 17 of the ring. The tongues 25 are also bent outward and on the same side of the spring 18, but they are also shaped at an angle with the spring to lie flat against the conical surface 16.

The tongues 25 assure that a sufficient force will be exerted on the ring to move the same into contact with one of the sides 14 of the groove. Thus oil is prevented from passing through the groove to foul the spark plug. Part of the tension of the tongues 25 is outward on the ring, that is, at right angles to the axis of the piston, depending on the angle of the said conical surface. Since all the tension of the tongues 26 acts in a similar direction, the bearing pressure on the ring moving the same against the cylinder wall is greater than that moving the same to close the groove, and yet the latter motion is caused in a reliable manner.

The forces exerted by the tongues 25, 26 are sufficient to cause the ring to bear evenly on the cylinder wall, and yet not so hard as to cause cutting or undue wear of the same.

The tension on the tongues can be readily adjusted by merely bending the tongues slightly to suit the desired conditions. The length and consequently the number of tongues can be made to suit, and by decreasing the length of the tongues and increasing their number, the tension on the ring can be made as great as desired. But the tongues 25, 26 may have any desired relation with respect to each other in length.

It will thus be seen that I have provided a device which fulfills the several objects of the invention and is well adapted to meet the conditions of practical use.

I claim:

1. The combination with a piston having a groove, of a ring in the groove, said ring having on its inner side a substantially vertical surface, and a conical surface, and a single resilient member in the groove having spaced portions bearing against both surfaces of the ring, the portions bearing against the conical surface being tapered.

2. The combination with a piston having a groove, of a ring in the groove, said ring having an inner inclined surface, and a single resilient member in the groove having separate portions some of which bear against the ring solely at right angles to the piston axis and others bear against the inclined surface.

3. The combination with a piston having a groove, of a ring in the groove, and a spring of flat sheet metal interposed between the ring and the base of the groove, said ring having an inner cylindrical surface and an inner conical surface, said spring lying against the base of the groove, said spring having a plurality of tongues cut at the opposite edges thereof and extending toward the ring, the tongues at one edge of the spring bearing against the cylindrical surface, and those at the upper edge bearing against the conical surface.

4. The combination with a piston having a groove, of a ring in the groove, and a spring of flat sheet metal interposed between the ring and the base of the groove, said ring having an inner cylindrical surface and an inner conical surface, said spring lying against the base of the groove, said spring having a plurality of tongues cut at the opposite edges thereof and extending toward the ring, the tongues at one edge of the spring bearing against the cylindrical surface, and those at the upper edge bearing against the

conical surface, the latter tongues being formed to lie flat against the conical surface.

5. A piston ring having a single inner surface at an angle to the piston axis, and a spring of sheet metal having tongues struck therein and bent at an angle to the piston axis to bear flat against the said surface.

6. In combination, a piston having a groove, a ring therein, a sheet metal spring for the ring, the ring having a conical inner surface, the spring lying flat against the base of the groove and having tongues extending from the spring and bent at an angle to the piston axis bearing against the conical surface.

7. The combination with a piston having a groove, of a ring and a sheet metal spring in the groove, said ring having a plurality of surfaces, said spring having tongues cut therein, said tongues bearing against the ring, said tongues including a plurality of series thereof which series are spaced with respect to each other in the axial direction of the piston, the tongues of one of the series being tapered and twisted at less than a right angle to the piston axis to act on a corresponding surface of the ring.

8. The combination with a piston having a groove, of a ring in the groove, and a resilient means in the groove bearing on the inner side of the ring, the ring having an inner surface at less than a right angle to the piston axis, the resilient means including peripherally spaced twisted portions bearing flatly on the said surface, the resilient means including other means in a plane spaced from that of the said portions to resiliently bear against the ring at right angles to the piston axis.

9. The combination with a piston having a groove, of a ring in the groove, and a resilient means in the groove bearing on the inner side of the ring, the ring having an inner surface at an angle to the piston axis, the resilient means including peripherally spaced portions acting on the said surface, the resilient means including other means in a plane spaced from that of the said portions to resiliently bear against the ring at right angles to the piston axis, the peripherally spaced portions constituting tongues bent on an angle to the piston axis to bear flat on the said inner surface.

In testimony whereof I affix my signature.

ANTHONY GUERRIERO.