July 21, 1936. E. M. TUCKER 2,048,416

PISTON AND RING CONSTRUCTION

Filed June 24, 1935

Fig. 1

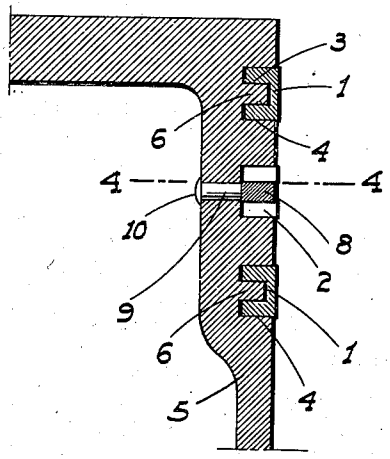


Fig. 2

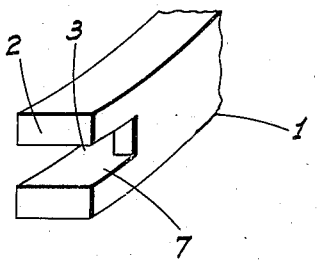


Fig. 3

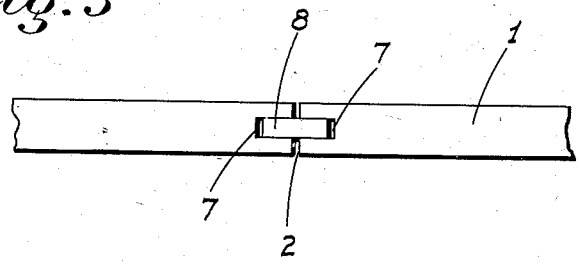
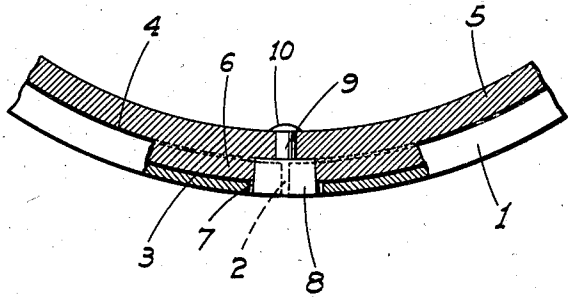


Fig. 4



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PISTON AND RING CONSTRUCTION

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Application June 24, 1935, Serial No. 28,081

1 Claim. (Cl. 309—47)

This invention relates to internal combustion engines and particularly to compression and oil sealing rings for the pistons of the engine. The principal object of my invention is to provide a ring for this purpose which while weighing considerably less than the conventional type ring, will have much greater area of wearing and contacting surface with the piston, so that while the reciprocating moment of the ring is reduced and the possibility or severity of piston slap is lessened, the ring has better compression retaining and oil sealing properties. At the same time the width and depth of the ring and its cooperating piston groove are not increased over what is now considered standard practice and yet the ring is of very sturdy construction capable of long use without breaking or wearing out.

As an additional object of my invention I have provided an improved ring locating and end sealing dowel unit, which more positively prevents leakage of compression and oil past the split ends of the ring than is obtainable with the present ring construction.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claim.

In the drawing similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a fragmentary sectional elevational of a gas engine piston showing my improved ring and groove arrangement.

Figure 2 is a fragmentary perspective view of the ring at one end of the same.

Figure 3 is a fragmentary side view of the ring showing the sealing and locking unit between the split ends of the ring.

Figure 4 is a fragmentary sectional plan view of the piston and ring taken on the line 4—4 of Figure 1.

Referring now more particularly to the characters of reference on the drawing, my improved ring 1 is of the one-piece split type, having its top and bottom walls parallel to each other and at right angles to the outer cylinder engaging face thereof; the split 2 of the ring extending radially thereof and parallel to its axis.

Cut in the back or inner face of the ring in symmetrical relation to the top and bottom faces is a rectangular groove 3 whose depth is substantially equal to one-half the thickness of the ring, and whose height is substantially equal to one-third that of the ring. This ring is adapted to fit in a groove 4 of corresponding shape cut in the piston 5, said groove having a ridge or tongue 6 projecting outwardly from the bottom of the groove to closely fit the groove 3 of the ring.

By reason of this construction it will be seen that the weight of the ring is considerably less than that of the ordinary ring due to the elimination of metal from the groove 3, so that reciprocating moment and ring slap is reduced. The ridge or tongue 6 of the piston, engaging the top and bottom walls of the groove 3 provide contacting surfaces in addition to the top and bottom walls of the ring and piston groove, between which oil must travel to pass behind the ring from top to bottom. The possibility of oil leaking is thus greatly reduced and also by reason of this arrangement and due to the fact that oil will be retained behind the ring, compression is greatly improved. This makes the use of the ring especially advantageous where high compression is essential as in Diesel engines. Also the wearing surface of the ring in contact with cooperating wearing surfaces in the piston are considerably increased over what is the case with the ordinary ring, thus insuring a long period of service for the ring without the possibility of looseness and piston slap developing. At the same time an unbroken area of contact of the ring for its full height with the cylinder wall is retained.

In order to prevent rotation of the ring in the piston groove and to seal the split end of the ring against leakage of oil therepast, the ring on both sides of the split is cut through from its outer face to the groove 3 to form a slot 7 extending parallel to the top and bottom of the ring, the height of the slot being the same as that of said groove.

Projecting across the split into the corresponding portions of the slot is a segmental tongue 8, having a running fit with the top and bottom walls of the slot but clearing the same somewhat at its ends, as shown, in order to allow of the necessary contraction of the ring when being inserted into the cylinder. A portion of ridge 6 is cut away to receive the portion of the tongue 8 inwardly of the slot 7, as shown in Figure 3, so that said tongue is held against movement about the piston. The tongue may be additionally secured in place by a pin 9 preferably formed integral with the tongue 8 centrally of its length and projecting radially of the piston through the same to its inner face, where said pin is headed over as at 10.

This tongue and slot construction provides a sealing arrangement similar in its action to that provided by the groove 3 and the tongue or ridge 6. Oil or compression to leak past the split end of the ring must pass about the upper and lower faces of the tongue on one side or the other on the split end of the ring in order to get below the ring from above the same and vice versa. Since said faces of the tongue and slot in contact with each other are relatively long, a very efficient sealing against such passage of oil or compression is provided.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claim.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

In a piston, a ring groove provided with a continuous ridge projecting outwardly from the bottom of the groove intermediate the side faces thereof, the outer face of said ridge lying inwardly of the outer wall of the piston; a ring fitting said groove and comprising a one-piece split member, the inner face of which is formed with a continuous circumferential groove to receive the ridge, said ring on both sides of the split being formed with a slot extending to the outer face thereof from the opposed faces of the groove in the ring and a tongue secured in the piston and extending into the slot, the adjacent portion of the ridge being cut away to the bottom of the ring groove and the tongue filling said cut away portion.

EMMITT M. TUCKER.