Sept. 23, 1924. 1,509,117

W. H. THOMSON

PISTON FOR COMBUSTION ENGINES

Filed Oct. 3, 1921

FIG. 1.

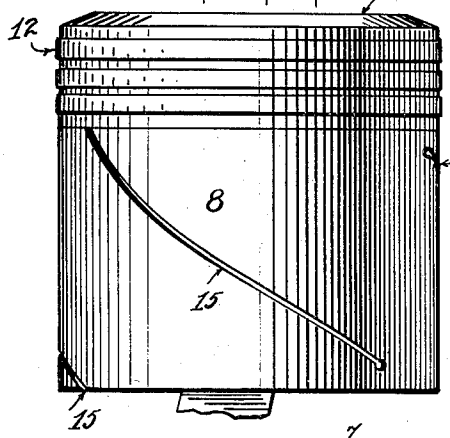


FIG. 2.

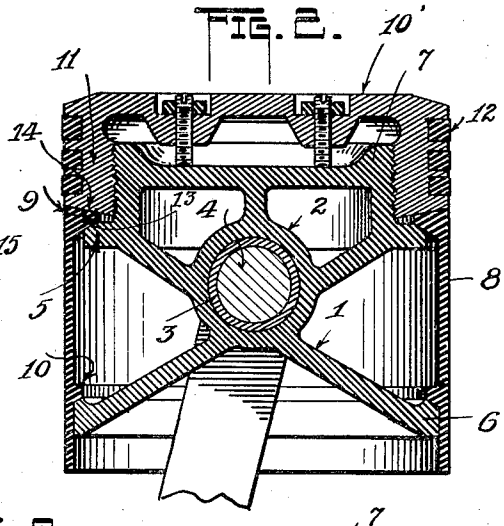


FIG. 3.

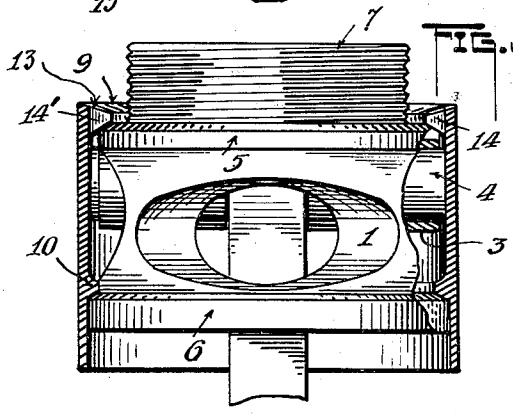


FIG. 4.

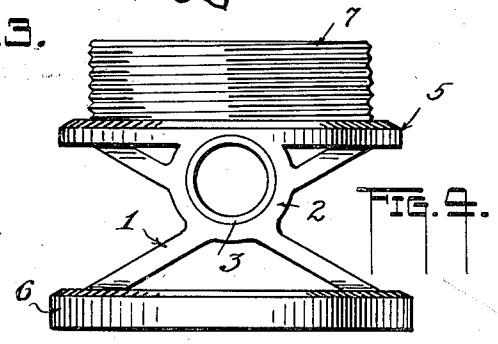


FIG. 5

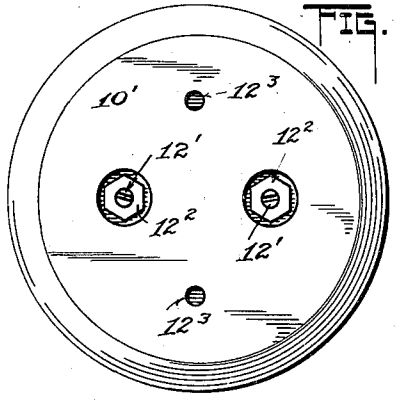
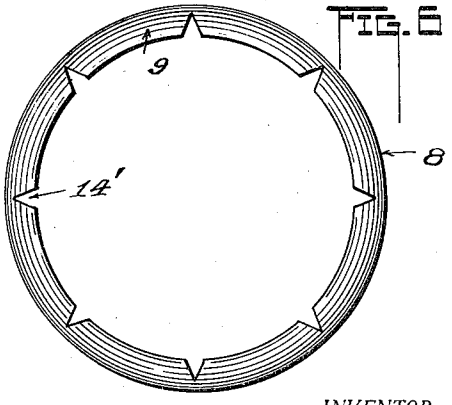


FIG. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM H. THOMSON, OF PEORIA, ILLINOIS.

PISTON FOR COMBUSTION ENGINES.

Application filed October 3, 1921. Serial No. 504,949.

To all whom it may concern:

Be it known that I, WILLIAM H. THOMSON, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented new and useful Improvements in Pistons for Combustion Engines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention pertains to improvements in pistons particularly adapted for use in internal combustion engines.

The main object of my invention is the provision of a piston that may be expanded to fit the cylinder with which it is used to the end that piston slap may be eliminated.

Another object is that of providing a type of piston that can be expanded from time to time and thus take up any slight looseness whereby reboring of the cylinder and replacement of a piston will be unnecessary, and that the piston and cylinder, moreover, by taking up any looseness, will be kept in perfect form, i. e., will not get "out of round".

Another object of the invention is to provide a piston that includes an expansible sleeve and certain parts used in conjunction therewith adapted to expand said piston evenly throughout to any required or desired extent.

In the appended drawings, forming part of my application,

Figure 1 is an elevation of a piston constructed according to my invention.

Figure 2 is a sectional elevation of the same.

Figure 3 is an elevation of the piston showing a sleeve thereof in longitudinal section.

Figure 4 is an elevation of the body of the piston as viewed in Figure 2.

Figure 5 is a plan of the piston.

Figure 6 is a plan of a sleeve shown in the first three figures.

Before entering into the construction of my invention in detail the advantages to be derived may receive attention.

It is my design to provide a piston-skirt that may be expanded in order to take up the wear incident to long use to the end that piston slap may be eliminated as it begins to be apparent; that the cost of new pistons and reboring of the cylinders of an engine may be delayed as long as possible by thus being enabled to make the adjustment named; that the life of the engine may be prolonged; that adjustments may be made to suit the condition of any given cylinder; that oil may be more readily prevented entering the combustion chamber together with a possible saving of gas.

In addition, the body of the piston is made up of two separable parts which admits of one of the parts, or that carrying the usual piston rings, to be removed without taking down the motor so that new rings may be substituted for old ones when occasion demands.

Again, due to the construction employed the usual wrist-pin is housed at its ends so that it cannot at any time score the walls of the cylinder as often happens in the common type of piston.

What may be termed the "body" of the piston includes a skeleton portion 1 preferably of light metal alloy having a central housing 2 bored to receive a bushing 3 of a different type of metal, such as bronze, for example, for receiving the usual wrist-pin 4. The body further includes spaced ring portions 5 and 6 beveled downwardly and outwardly on corresponding surfaces, or what may be said to be their upper surfaces, besides which there is an exteriorly threaded portion 7 for a purpose to be made known.

The ring portion 5 is somewhat smaller in diameter than the portion 6 whereby a sleeve or skirt now to be described may be placed down over it to rest upon the two. Said skirt is indicated at 8 and is designed to slidably engage the cylinder walls. At one end it has an interior flange 9 and spaced therefrom is a second interior flange 10. These flanges are spaced from one another a distance substantially equal to the distance between the ring portions 5 and 6 of the body and it is to be noted that said flange 9 is adapted to lie upon the ring portion 5 and is beveled to correspond with the bevel of the latter.

It is also to be noted that the distance across the skirt within the flange 10 is slightly less than the diameter of the ring portion 5 so that the skirt can be let down thereover. The ring portion 6 is enough greater in diameter than the said portion 5, however, to form a seat for said flange 10 which is beveled to correspond therewith.

Adapted to bear upon the top of the skirt

is a piston-head 10′ which includes an internally threaded flange 11 to engage the threaded portion 7 of the body. The exterior surface of the flange is grooved after the manner of pistons of internal combustion engines to receive packing rings 12. Extending through what may be termed the top of the piston-head is one or more set-screws 12′ that may be locked by nuts 12^2, said screws adapted to bear upon the top of the body, and 12^3 are sockets in the piston-head for receiving a spanner wrench for adjusting purposes. The outer or top surface of the flange 9 is beveled downwardly and inwardly at 13 and the extremity of the flange 11 is beveled at 14 to correspond with it.

The skirt is constructed in such a way that it may be expanded, I having shown several examples of methods of slitting it with the above end in view, though other ways of slitting it may be adopted; though whatever its form the flange 9 is preferably notched at its inner edge at intervals as 14′, Figure 6.

The skirt is furnished with a series of three slits 15 each of which extends spirally part way around the same, but partially severing the metal. That is to say, each of said slits at one end is cut through the edge of the metal while the other ends terminate slightly distant from the other edge. In this way a series of spiral shaped zones is created which permit the skirt to be spread or expanded slightly.

It is to be understood that I may employ other forms of skirt that will also admit of expansion.

Now, since the beveled flanges 9 and 10 of the skirt bear directly upon the similarly beveled ring portions 5 and 6 of the body, pressure upon said skirt to force the flanges 9 and 10 against the said portions 5 and 6 must evidently result in an even spreading of the skirt when the latter is provided with the slits described. The cap or head described serves in the capacity of a pressure device in that by having threaded engagement with the body the lower edge of its flange will engage the skirt and force it downwardly to obtain the spread thereof, the inwardly and downwardly bevel of the skirt and flange, if used, assisting in the ultimate result.

After having adjusted the skirt to have a snug sliding fit in the cylinder the set screws may be set up in firm contact with the body thus creating friction between the threads of the latter and the cap, preventing movement of the two members relatively, the nuts 12^2 being tightened to fix the screws in position.

It is only necessary to merely remove the usual engine head (not shown) in order to make the desired or required adjustments; a most simple operation throughout, and, of course, at no time is there more than a very slight adjustment required.

It is observed that since the skirt 8 encloses the piston body and the pin 4, the latter cannot reach and score the cylinder walls.

Changes obvious to the skilled person may be made in my device the structure shown being but one of the forms that provides for realizing the desired objects.

I claim:

1. In a piston, a body-portion having two annular beveled faces spaced from one another longitudinally thereof, an expansible skirt portion having interior faces adapted to engage the beveled faces, and a portion adapted to engage the skirt the same being adjustable relative to said skirt and the body, adapted to force the skirt upon the beveled faces of the body for expanding said skirt.

2. In a piston, a body-portion having faces spaced from one another longitudinally of the same, an expansible skirt portion enveloping the body also having spaced faces corresponding in position to those of the body, and a portion adapted to move the skirt with respect to the body in the direction of the described faces thereof, the faces of one of the two first described elements being beveled whereby the skirt portion will be expanded during its movement in one direction.

3. In a piston, a body-portion having annular beveled faces spaced from one another, an expansible skirt portion enveloping the body having corresponding beveled faces to engage said annular faces, and a portion adjustable with respect to the body adapted by pressure thereof upon the skirt to expand the latter due to said beveled faces.

4. In a piston, a body-portion including a pair of annular flanges both beveled on the same side and spaced from one another longitudinally of said body portion, an expansible skirt enveloping the body and having flanges therein having faces beveled to substantially correspond with the faces of the body-flanges, and a portion threaded upon the body adapted by adjustment upon its threads to engage the said skirt for moving the flanges thereof against those of the body for expanding said skirt.

5. A piston including a body having a threaded part and also having extensions on its outer surface beveled outwardly and downwardly, an expansible skirt portion likewise having extensions beveled to correspond therewith, and a member threaded to engage the threads of said body adapted to engage and move the skirt relatively to the body in a direction to cause the skirt to be expanded.

6. A piston including a body-portion having a threaded part and an expansible skirt portion enclosing the body portion, the said portions being arranged whereby lon-

gitudinal movement of one with respect to the other in one direction will expand the skirt portion, and a piston-head including piston-rings adapted to engage the threaded part of said body portion and bear upon said skirt portion.

7. A piston including a body-portion, a skirt portion consisting of a single part partially severed at intervals throughout its circumference whereby it may be expanded, the said portion constructed whereby longitudinal movement of one with respect to the other in one direction will cause the skirt portion to be expanded, and a part having threaded engagement with the body portion adapted to move the said skirt portion with respect to said body portion.

8. A piston for an internal combustion engine including in its construction a body-portion having a threaded upper portion and a pair of spaced annular flanges below the same, said flanges being downwardly and outwardly beveled, an expansible skirt having spaced interior flanges corresponding in position to the first named flanges and adapted to rest thereon, and a piston-head including a flange interiorly threaded, the same adapted to engage the threads of the body-portion, said flange adapted to engage upon the skirt for forcing the same against the flanges of said body-portion.

9. A piston for an internal combustion engine including in its construction a body-portion having a threaded upper portion and a pair of spaced annular flanges below the same, said flanges being downwardly and outwardly beveled, an expansible skirt having spaced interior flanges corresponding in position to the first named flanges and adapted to rest thereon, a piston-head including a flange interiorly threaded, the same adapted to engage the threads of the body-portion, said flange adapted to engage upon the skirt for forcing the same against the flanges of said body-portion, and means to secure the head relatively to the said body-portion.

10. A piston for an internal combustion engine including in its construction a body-portion having a threaded upper portion and a pair of spaced annular flanges below the same, said flanges being downwardly and outwardly beveled, an expansible skirt having spaced interior flanges corresponding in position to the first named flanges and adapted to rest thereon, a piston-head including a flange interiorly threaded adapted to engage the threads of the body-portion, said flange having an inwardly and downwardly beveled lower surface adapted to engage upon the skirt for forcing the latter against the flanges of said body-portion.

11. A piston for an internal combustion engine including in its construction a body-portion haping a threaded upper portion and a pair of spaced annular flanges below the same, said flanges being downwardly and outwardly beveled, an expansible skirt having an inwardly and downwardly extending bevel at its top surface and having spaced interior flanges corresponding in position to the first named flanges and adapted to rest thereon, a piston-head interiorly threaded adapted to engage the threads of the body-portion, and adapted to bear upon the bevel of the top surface of the said skirt, and means to secure the head relatively to the said body-portion.

12. A piston for internal combustion engines including in its construction a body-portion having a pair of spaced outwardly and downwardly extending annular flanges. an expansible skirt portion having a pair of interior flanges adapted to engage upon said flanges of the body, and a piston head mounted for adjustment upon the body whereby to engage and force the skirt portion upon the first named pair of flanges.

13. A piston for internal combustion engines including in its construction, a body-portion having a pair of spaced outwardly and downwardly extending annular flanges, an expansible skirt portion having a pair of interior flanges adapted to engage upon said flanges of the body, a piston head mounted for adjustment upon the body whereby to engage and force the skirt portion upon the first named pair of flanges, and means to secure the head and body relatively.

14. An engine-piston including in its construction a body-portion at one of its extremities and also having an annular flange extending beyond the threaded periphery of said body-portion, an expansible skirt enveloping the flange and having an internal flange to rest upon the latter, the flanges being beveled whereby pressure upon the skirt will cause the latter to expand, an internally threaded piston-head engaging upon the said threaded portion of the said body-portion adapted when turned to move the skirt relatively to and longitudinally of the said body-portion, and means to secure the head in fixed relation to the latter.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. THOMSON.

Witnesses:

J. H. KINGSBURY,

L. M. THURLOW.