Oct. 28, 1930. F. L. MINNICK 1,779,555

PISTON

Filed April 17, 1929

Fig. 1.

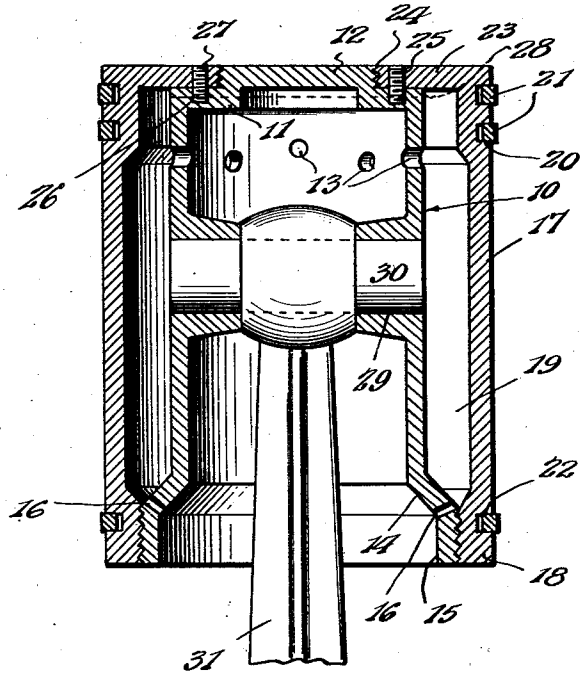



Fig. 2.

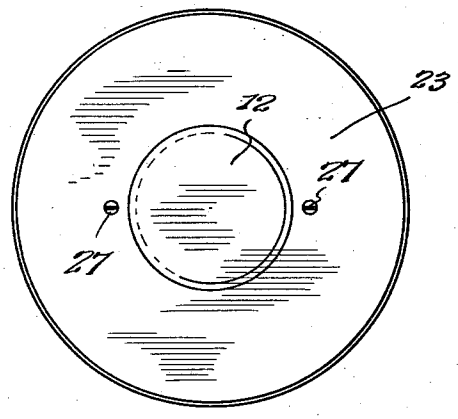
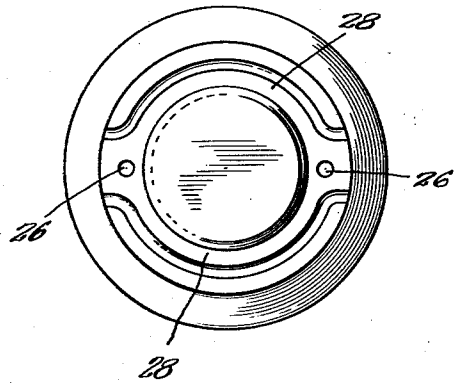



Fig. 3.




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# UNITED STATES PATENT OFFICE

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## PISTON

Application filed April 17, 1929. Serial No. 355,901.

The present invention is directed to improvements in pistons more particularly designed for use in connection with internal combustion engines.

The primary object of the invention is to provide a piston employing a removable shell which can be conveniently detached from the piston upon removing the cylinder head of the engine, whereby the shell can be withdrawn so that piston rings may thus be renewed without the necessity of removing the oil pan from the engine crank case or detaching the connecting rods of the pistons from the engine shaft.

Another object of the invention is to provide a piston wherein the shell as well as the piston core will be oil cooled, means being employed whereby circulation of oil will be had between the shell and core.

Another object of the invention is to provide a piston wherein means will be employed for accommodating expansion of the metal.

A further object of the invention is to provide a piston adapted for use in connection with internal combustion engines of conventional form.

With these and other objects in view, this invention resides in the novel features of construction, formation, combination and arrangement of parts to be hereinafter more fully described, claimed and illustrated in the accompanying drawings, in which:

Figure 1 is a vertical sectional view through the piston.

Figure 2 is a top plan view of the same.

Figure 3 is a top plan view of the core.

Referring to the drawings, 10 designates a cylindrical piston core which is preferably formed from aluminum or other light metal. This core is open at its lower end while the upper end thereof is closed by a top wall 11 from which rises an axially disposed dome 12. Formed through the side wall of the core near its upper end is a circumferentially spaced series of staggered oil passages 13 while at the lower end portion the core is provided with an inclined wall 14 which terminates in an exteriorly threaded skirt 15. Oil passages 16 are formed in the lower end of the wall 14, the purpose of which will appear later.

Removably fitting over the core 10 is a shell 17, said shell having a thickened lower portion 18 which is adapted to thread upon the skirt 15, and owing to the presence of the wall 14 the shell will be annularly spaced from the core to provide an oil reservoir 19. The shell is provided near its upper end with grooves 20 in which piston rings 21 are mounted and near its lower end with a similar groove for receiving the piston ring 22.

The top wall 23 of the shell is provided with a centrally disposed threaded opening 24 and in which the dome 12 is threaded when the shell and core are in assembled relationship. The top wall 23 is provided with threaded openings 25 which are adapted to coincide with threaded sockets 26 formed in the wall 11 of the shell in order that set screws 27 may be used for interlocking the shell and core against relative movement when in their assembled position.

The wall 11 of the shell is provided with grooves 28 which extend from one side of the chamber 19 to the other so that oil may freely pass above the wall 11 to maintain the same cool.

The piston core 10 is provided with the wrist pin bearings 29 for receiving the wrist pin 30 to which the connecting rod 31 is connected, as customary.

It will be observed that upon removing the set screws 27, a spanner wrench can be engaged in the openings 25 in order that the shell can be rotated to release the same from the dome 12 and skirt 15, and owing to the threaded connection of the dome with the wall 23 and the skirt with the thickened portion 18 the piston will, when assembled, be extremely rugged.

It will be obvious that when the piston is moving downwardly, oil will be splashed upwardly within the core and thus forced into the chamber 19 through the passages 13. Upon entering this chamber or reservoir, the oil will then, incident to the travel of the piston, be caused to circulate through the grooves 28 for cooling the head of the core as well as the head of the shell, constituted

by the walls 11 and 23. When the piston is moving upwardly, oil will be expelled from the chamber 19 through the passages 16. Thus the oil will be caused to circulate within the chamber 19 for cooling the side wall of the core as well as the side wall of the shell. Consequently, the entire wall surface of the shell as well as the major portion of the wall surface of the core will be subjected to the cooling action of the circulating oil so that overheating of the piston will be prevented.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in size, shape, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

What is claimed is:

1. A piston including a core, a removable shell carried by the core and defining an annular chamber, the top walls of the shell and core having intimate engagement, and means whereby a cooling fluid may circulate within the chamber and between said top walls.

2. A piston including a core formed at its lower end with a threaded skirt, the top wall of said core having a threaded opening formed therein, a removable shell surrounding the core to define a fluid chamber between the shell and core, said shell having threaded engagement at its lower end with the skirt, and a dome carried by the top wall of the core for threaded engagement in the opening of the top wall of the shell.

3. A piston comprising a core having a dome carried by its top wall, the lower end of the core having an inclined wall and a terminal exteriorly threaded skirt, a shell removably engaged with the core and annularly spaced therefrom to provide an oil chamber, said shell having its lower end threaded upon the skirt, the top wall of said shell having an opening formed therein for receiving the dome, set screws carried by the top wall of the shell and engaged in the top wall of the core to interlock the core and shell against relative rotation, and means for conducting oil from the core into the chamber and discharging it therefrom.

In testimony whereof I affix my signature.

FREDERICK L. MINNICK. [L. S.]