June 18, 1929. C. H. WILLS 1,717,750

PISTON FOR INTERNAL COMBUSTION ENGINES

Filed Oct. 13, 1924

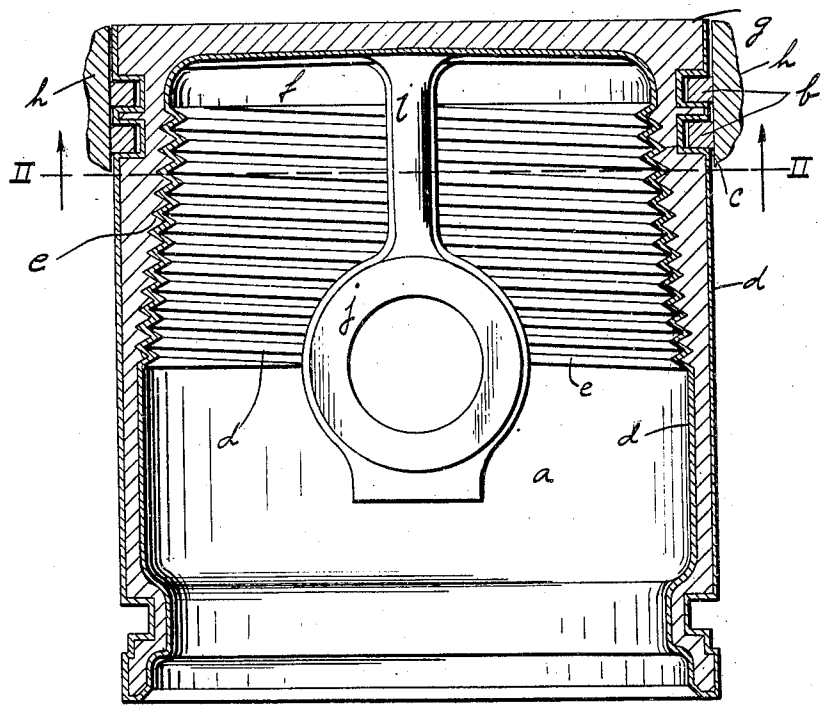


FIG. 1.

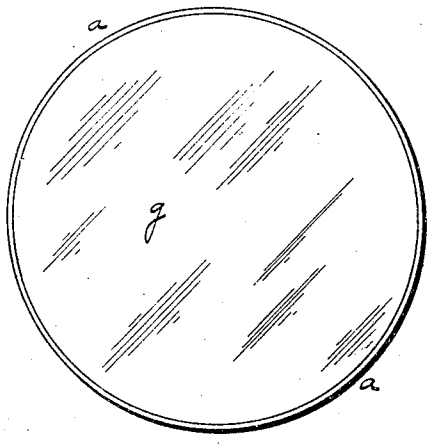


FIG. 3.

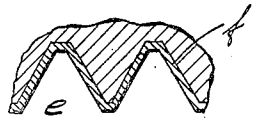


FIG. 4.

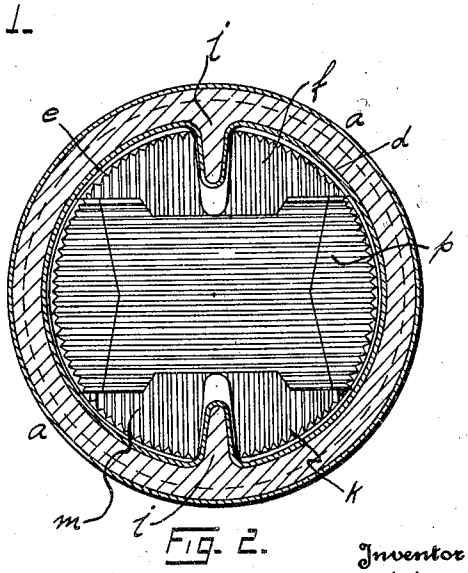


FIG. 2.

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UNITED STATES PATENT OFFICE.

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PISTON FOR INTERNAL-COMBUSTION ENGINES.

Application filed October 13, 1924. Serial No. 743,254.

My invention relates to pistons for internal combustion engines and an object of my improvements is to lessen their range of variation of temperature in use.

I secure this object among others in the device illustrated in the accompanying drawing in which:—

Figure 1, is a vertical central section of a piston embodying my invention.

Fig. 2, is a section on the line 2, 2, Fig. 1, to a reduced scale, looking in the direction of the arrows.

Fig. 3, is a top view indicating its polished surface.

Fig. 4, is a detail sectional view, to an enlarged scale, of the cooling threads on the interior of the piston.

a, indicates the piston as a whole. *c*, *c*, are the grooves for the packing rings and *b*, *b*, are the rings in the grooves *c*, *c*.

The piston is made of non-ferrous metal such as aluminum alloy, or magnesium alloy, and is of the usual hollow construction open at its lower end toward the crank case. The upper part of the interior wall is provided with ridges *e*, which in this instance have the shape of coarse screw threads, and the end wall is provided with ridges of a similar shape in cross section extending across said wall. These ridges are formed by providing a sectional core divided into parts as indicated by the lines *k* and *m*, Fig. 2, forming a coarse screw thread on its cylindrical surface and transverse ridges on its end. After the piston has been cast the central piece of the core is removed directly, after which the other parts of the core may be severally moved inward to disengage them from the casting and then removed directly from the mold.

d, is a shell of iron placed upon the outer cylindrical surface of the piston by electrodeposition and over the interior wall surface. The iron shell extends over the walls of the ring grooves and over the surfaces of the ridges *e* and *f*. The thickness of the shell is much exaggerated in the drawing.

The upper end of the piston is a nonabsorbent of radiant heat. It may be of the same material as the body of the cylinder and polished and bright to reflect the radiant heat.

The iron shell is adapted to radiate heat readily, and also to form a durable wearing surface at the portion that comes in contact with the wall of the cylinder.

The rings, *b*, *b*, are of iron and receive heat by contact with the walls of their grooves and they also absorb heat radiated from said walls and impart the heat thus received to the cylinder walls *h* and lubricating oil by contact and radiation.

The iron forming the inner surface of the piston radiates heat readily, which radiated heat is absorbed by the small particles of lubricating oil floating as a mist in the interior of the piston.

The ridges *e* and *f* present a large cooling surface which is washed by the material dashed into the piston by the rotation of the cranks.

With the above described construction the range of temperature variation is so small that the piston expands with the iron cylinder and the clearance may be small.

While I have described a particular construction for increasing the area of cooling surface, as ridges *e* and *f*, clearly other forms extending over a considerable portion of the interior of the piston may be substituted therefor.

Nonabsorbent is of course a relative term as referring to the action of a substance, or surface, exposed to heat.

While for distinctness I have defined my invention in the claims as consisting of a piston of nonferrous material with iron deposited thereon by electrodeposition I claim a range of equivalents for the metal of the piston all metals that are nonabsorbent of radiant heat, and for the covering metal all metals that are good radiators of heat when they are intimately united with the metal of the piston, so as to obviate any heat obstructing joint.

What I claim is:—

1. A hollow piston having an uncovered cylindrical inner surface and a cooling ridge for dissipating the heat therefrom, said ridge being shaped in a spiral form whereby

the said ridge may be cast with the piston and the pattern be removed by turning.

2. A piston for an internal combustion engine of nonferrous metal, such as aluminum or magnesium, having its outer cylindrical surface covered with iron by electrodeposition thereon.

3. A hollow piston for an internal combustion engine of nonferrous metal, such as aluminum or magnesium, having the walls of its hollow portion covered with iron by electrodeposition.

In testimony whereof, I sign this specification.

C. HAROLD WILLS.