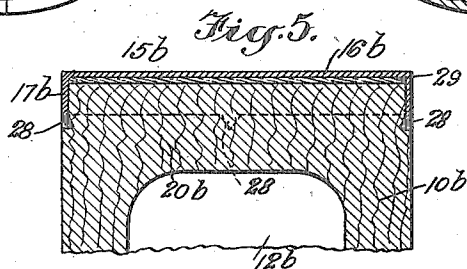
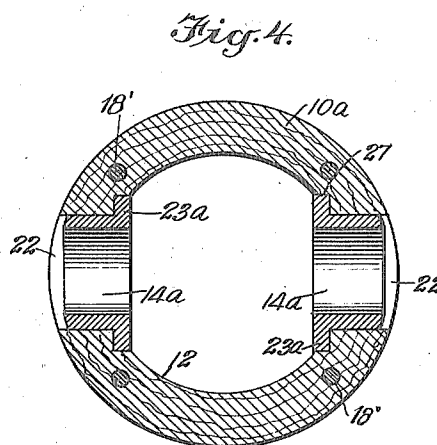
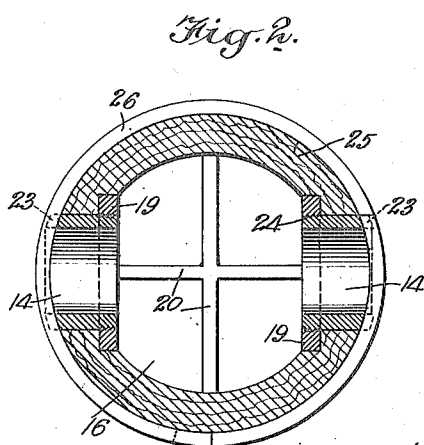
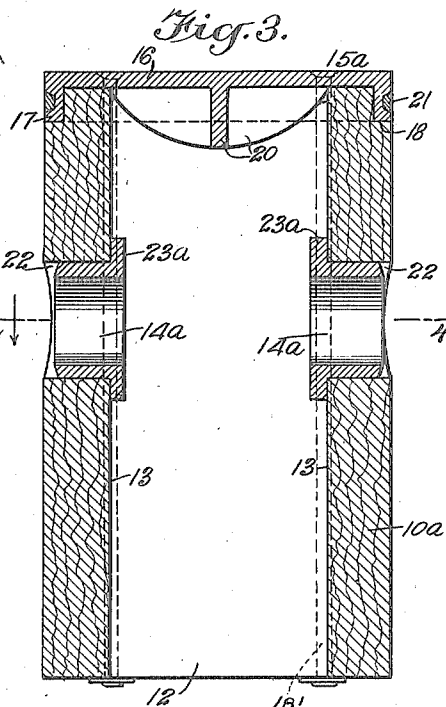
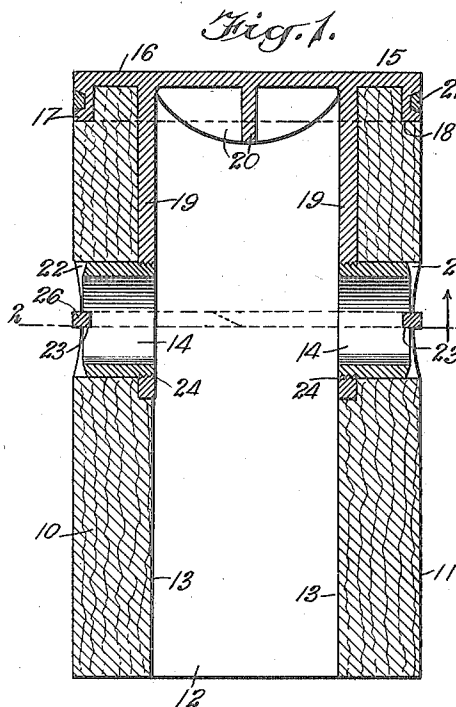


G. B. SCHOU.
NON-METALLIC ENGINE PISTON.
APPLICATION FILED MAY 31, 1918.

1,294,956.

Patented Feb. 18, 1919.



WITNESSES

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GUSTAV B. SCHOU, OF NEW YORK, N. Y.

NON-METALLIC ENGINE-PISTON.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GUSTAV B. SCHOU, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, and county and State of New York, have invented a new and Improved Non-Metallic Engine-Piston, of which the following is a full, clear, and exact description.

This invention relates to prime movers, and has particular reference to reciprocating engines especially of the internal combustion type.

Among the objects of the invention is to provide a novel construction of reciprocating piston for an internal combustion, steam, or other type of engine, whereby the piston itself will perform all necessary functions demanded thereof, yet will be cheaper, quicker to make, and more reliable in action, especially in high altitudes or cold climates than the ordinary metal piston.

More specifically stated I construct a piston of a practical and durable nature, the body of which is chiefly of wood or other analogous non-metallic structure, the same, however, being reinforced at those parts or points most subjected to heat or wear in order to make it reliable and efficient, the main surface contact between the piston and the cylinder (not shown) being wood or other non-metal.

With the foregoing and other objects in view the invention consists in the arrangement and combination of parts hereinafter described and claimed, and while the invention is not restricted to the exact details of construction disclosed or suggested herein, still for the purpose of illustrating a practical embodiment thereof reference is had to the accompanying drawings, in which like reference characters designate the same parts in the several views, and in which—

Figure 1 is a vertical central sectional view of one form of my improved piston.

Fig. 2 is a horizontal sectional view of the same on the line 2—2 looking upward.

Fig. 3 is a vertical section of a modified form of the invention.

Fig. 4 is a horizontal section of the same on the line 4—4; and

Fig. 5 is a fragmentary detail sectional view of a further modification.

Referring now more specifically to the drawings, I show a piston body 10 of which for the purpose of this description may be understood to be of wood, turned, bored, or

otherwise formed of one or more cooperating blocks of wood or the like. In my practice I have found that this body may be formed readily, conveniently and reliably for all practical uses from a single block, the same having a cylindrical outer surface 11 and a longitudinal central cavity 12. The cavity 12 may be cylindrical or any other appropriate form in cross section, preferably, however, with a pair of oppositely arranged parallel flat faces 13, the portions of the body adjacent to such faces being consequently somewhat heavier than the remaining portions of the body wall in vertical alinement with the piston rod bearing thimbles or bushings 14 which are fitted in said reinforced wall portions in horizontal alinement with each other in any suitable manner. The bushings 14 are made of bronze, brass, or other suitable wear resisting metal or alloy.

In Figs. 1 and 2 I show a piston having a metal cap 15 comprising the following features: A disk 16 the upper or outer surface of which receives the direct impact of the motive means, a downwardly projecting flange 17 rabbeted at 18 into the upper end of the body 10, a pair of diametrically oppositely arranged parallel plates or aprons 19 countersunk into the opposed parallel walls of the reinforced portions above described of the body, and a suitable reinforcement truss structure 20. These four parts of the cap 15 are preferably made as an integral structure either as a drop forging, casting, or otherwise fabricated so as to be applied easily and directly to the head end of the piston body. The flanged periphery of the disk 16 is preferably of the same diameter as the cylindrical surface 11 and may, if desired, be provided with a split packing ring 21 of any suitable or conventional structure for its usual purpose, but which is preferably outwardly flared. In this form of the invention the connecting rod pin bushings 14 are of hollow cylindrical form and fitted into oppositely arranged coaxial holes 22 formed in the reinforced wall portions of the body. The outer end of each bushing is provided with a pair of notches or recesses 23, while the inner end of each bushing is externally threaded at 24 whereby the same is screwed firmly into a correspondingly threaded hole in the lower end portion of the adjacent apron 19. The notches 23 of both of the bushings in the connected position all lie in

the same plane as the annular groove 25 which constitutes a seat for a split ring 26 which has the dual function of constituting a packing ring and a locking key, preventing the vibration from loosening the bushings from the aprons.

The construction of the cap 15 as above set forth gives ample protection to the upper end of the body 10 as well as ample strength for the piston rod connections through the aprons 19. The truss structure 20 is designed for maximum strength in proportion to the weight of the material whereby even though the disk 16 may be relatively thin the truss structure will prevent any danger of inward crushing thereof. At the same time the truss 20 comprises a plurality of downwardly projecting fins affording rapid radiation of heat into and through the interior cavity 12 of the body with the result that excessive heating of the piston of an internal combustion engine is prevented.

In the form shown in Figs. 3 and 4 the body 10^a is or may be substantially the same as that of Fig. 1, it being provided with flat faces 13 on the opposite sides of the interior cavity 12 providing reinforced side portions bored at 22 for the connecting pin bushings 14^a. The faces 13 may be spaced somewhat more than the corresponding faces of the first structure so as to accommodate the flanges 23^a formed on the inner ends of the bushings which bearing against the faces 13 and countersunk into notches 27 serve to prevent outward movement or displacement of the bushings as well as providing ample bearing surfaces for the connecting rod (not shown). The space between the flanges 23^a of the opposed bushings is the same as that between the opposing surfaces of the aprons 19 in the construction of pistons for the same size or type of engine so as to accommodate naturally the same size of piston rod connections. The cap 15^a is similar to the cap 15 with respect to the disk 16, flange 17 and truss or radiator structure 20. Any suitable means may be provided to lock the cap 15^a upon the head or rabbeted end 18 of the body 10^a, such as a series of longitudinal bolts 18' having flat countersunk heads. Obviously the interlocking of the bushings 14 in the lower ends of the aprons 19 answers this purpose in Figs. 1 and 2.

The detail in Fig. 5 represents any suitable form of wooden body 10^b, the cavity 12^b of which may be shorter than the body, leaving a partially solid head 20^b just within the cap 15^b which for this reason may be somewhat lighter than shown in the other figures. This cap comprises a disk 16^b and a flange 17^b which may be stamped, turned, spun or otherwise formed from relatively thin metal, the free edge of the flange being

provided with prongs 28, or their equivalent, which when forced into the outer surface of the body 10^b serve to lock the cap in place. If desired a sheet of asbestos 29 or other non-conductor of heat may be interposed between the disk 16^b and the head 20^b to reduce any possibility of the body becoming charred under heat. It will be understood that this piston in Fig. 5 will be provided with similar or suitable piston rod connecting means. For practical purposes I have found that the piston body formed of wood is sufficiently strong and reliable for an internal combustion engine without other protection than herein indicated. However, in some instances it may be useful to impregnate the wooden body with a suitable refractory medium. It is to be noted furthermore that for aeroplane motors which are demanded to serve in extremely high and cold altitudes there is great danger and accompanying hazard from the freezing of the piston to the cylinder during idle periods of the engine. This danger is vastly greater with respect to metal-to-metal than in the use of my piston wherein nearly all of the surface contact is between the wood or its equivalent and metal.

I claim:

1. The herein described piston for reciprocating engines, the same comprising a hollow block of natural wood, means of a different material to protect the end of the block from fire, and wear resisting piston rod connections carried by the block remote from the protecting means.

2. The herein described light piston for reciprocating internal combustion engines, the same comprising a body made of a block of wood, piston rod connecting means fitted in opposite sides of the body, and a cap to protect the head end of the body from excessive heat.

3. The herein described light piston for reciprocating internal combustion engines, the same comprising a body mainly of wood, piston rod connecting bushings fitted in opposite sides of the body, and means to protect the head end of the body from excessive heat.

4. The herein described piston comprising a nonmetallic body having a hollow center and diametrically opposite transverse holes, a metallic cap on the head end of the body, said cap including a pair of parallel aprons extending downward within the cavity and having holes registering with the body holes aforesaid, and a pair of bearing bushings interlocking with said apron holes and fitted in said body holes whereby the cap is held from displacement from the body.

5. In an engine piston, the combination of a hollow non-metallic body having a pair of transversely arranged coaxial bearing holes, a metallic cap fitted upon and protecting the

head end of the body, said cap including means depending into the interior of the body across the axis of said holes, and a pair of bearing bushings fitted in said holes and interlocking with said cap depending means.

6. The herein described reciprocating engine piston comprising a hollow non-metallic body having oppositely arranged transverse holes, the portions of the body in which the holes are formed being thicker than the remaining portions, a pair of metallic bearing bushings fitted in said holes, and means to prevent longitudinal movement of the bushings along said holes.

7. The herein described piston for an internal combustion engine comprising a hollow non-metallic body having a pair of diametrically and transversely arranged coaxial holes, a pair of tubular bushings fitted in said holes and having threaded inner ends, a metallic cap protecting the head end of the body and having a pair of spaced aprons

depending therefrom across the inner ends of said holes, said aprons having threaded holes registering with the body holes into which the bushings are screwed, and means to prevent the loosening of the bushings from the aprons.

8. The herein described piston for an internal combustion engine comprising a hollow non-metallic body and a metallic protecting cap for the head end thereof, said cap comprising an impact receiving disk, and means adjacent to the disk to prevent excessive heating of the cap.

9. The herein described piston for reciprocating gas engines, the same comprising a hollow wooden body, a metal cap protecting the head end thereof, said cap comprising a peripheral flange embracing the head of the body and inwardly projecting radiator means to dissipate the heat of the cap, and means to lock the cap to the body.

GUSTAV B. SCHOU.