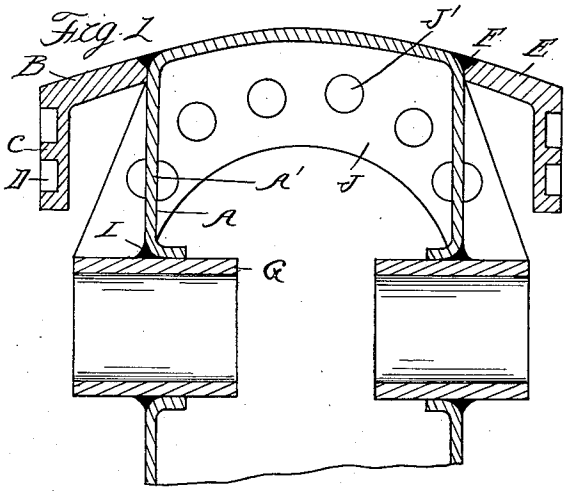
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Fig. 1



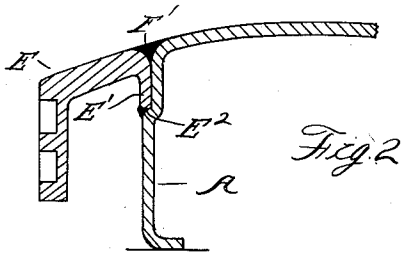




Fig. 2.

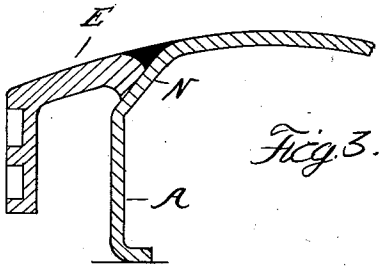



Fig. 3.

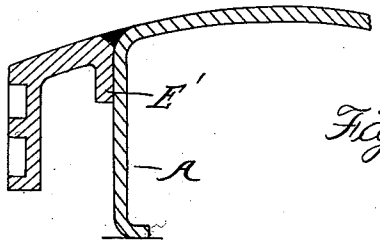



Fig. 4.

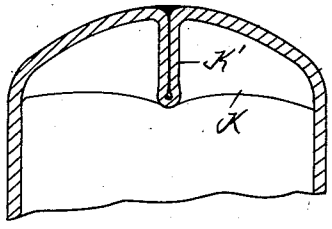
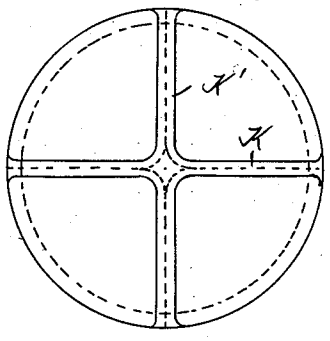



Fig. 5.

Fig. 6.




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Fig. 7.

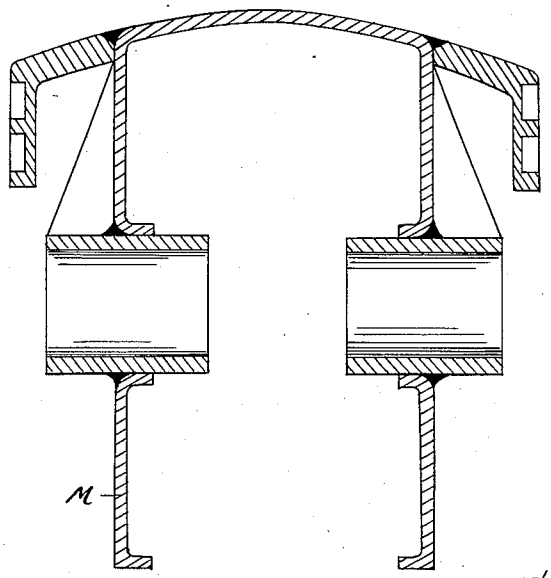



Fig. 9.

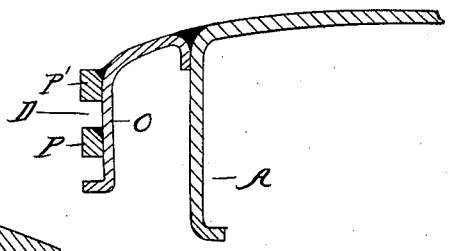
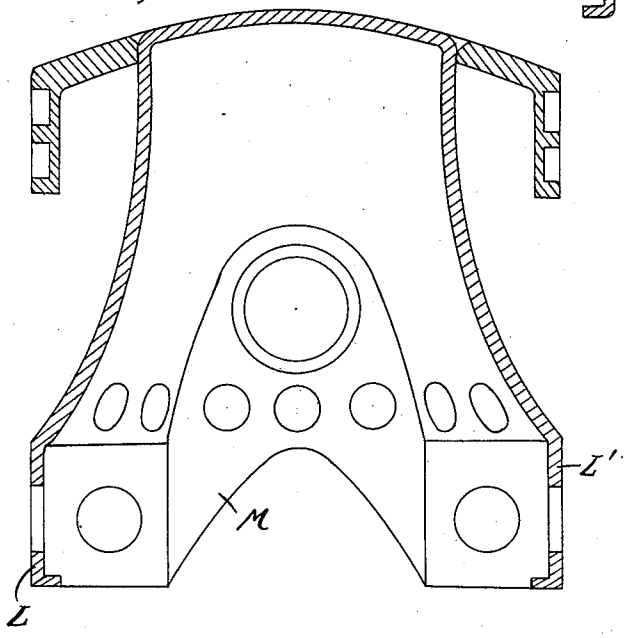



Fig. 8.




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# UNITED STATES PATENT OFFICE.

CECIL H. TAYLOR, OF DETROIT, MICHIGAN.

## ENGINE PISTON.

Application filed October 6, 1919. Serial No. 328,788.

*To all whom it may concern:*

Be it known that I, CECIL H. TAYLOR, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Engine Pistons, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to engine pistons of the type in which the body of the piston is formed of pressed sheet metal, and it is the object of the invention to obtain a structure having various advantages as hereinafter set forth.

In the drawings:

Figure 1 is a central longitudinal section through a piston embodying my invention;

Figures 2, 3 and 4 are similar views showing modified constructions;

Figures 5 and 6 are, respectively, central sections and plan view of a piston body blank showing the manner of reinforcing the same;

Figures 7 and 8 are central longitudinal sections in transverse planes showing still other modifications;

Figure 9 is a section similar to Figure 1 showing another modification.

In the design of engine pistons it is essential; first, to provide a cylindrical portion for fitting the walls of the engine cylinder and for carrying the sealing rings; second, a head which receives the direct pressure of the gases within the cylinder; and third, bearings for the wrist pin which couples with the pitman-rod extending to the crank. For forming the cylinder-engaging portion cast metal, and particularly cast iron, has been found to be well adapted. This material is not, however, as great in tensile strength as wrought metal and I, therefore, preferably form my improved piston of a composite structure in which a cast metal skirt is combined with a pressed metal body. It is, however, absolutely essential that these parts be strongly united to each other, so as to withstand not only the pressure of gases within the cylinder, but also inertia stresses which at high speed, are even greater, than the gaseous pressure. This I have accomplished by forming the skirt as an annulus of relatively small mass surrounding a cup-shaped pressed sheet metal structure forming the body of the piston, the two parts being intergraded, preferably by welding. The pressed sheet metal body has attached thereto the bearings for the wrist pin, preferably by welding, and suitable reinforcements are preferably provided for transmitting the stresses from the head to the bearings.

In detail and as shown in Figure 1, A is a pressed sheet metal cup-shaped body which is surrounded by the annulus B having a cylindrical skirt C with grooves D therein for receiving the piston rings. There is also provided an inwardly-extending flange E which fits against the pressed sheet metal body and is integrally united thereto by welding, as indicated at F whereby an unbroken smooth surface for the head of the piston is obtained. The body A is formed with side walls A′ thereof extending into contact with the wrist pin bearings G in a plane intermediate the ends of said bearings. Thimble flanges H may be pressed integral with the body to form a more extended contact for the bearing G and the parts may then be welded, as indicated at I. Where further reinforcement is required, a web J may be arranged in the central plane of the body and the bearings G and secured by welding. This web is preferably cut away at J′ to lighten the same.

In the construction shown in Figures 5 and 6, a reinforcing web is formed integral with the pressed sheet metal body by so drawing said body as to form the transversely folded portions K and K′. With the construction as shown in Figures 7 and 8 the pressed sheet metal body is flared downward to form segmental bearings L and L′ on opposite sides of the cylinder in the plane of movement of the pitman-rod. Between these segments the body is flattened, as indicated at M, so as to leave a space between the walls and the cylinder and also to bring the plane of connection with the wrist pin bearings intermediate the ends thereof. The advantage of this construction is that the bearings are kept cool by contact with the air on all sides thereof, and reduction in unloaded friction surface.

The annulus B may be united with the pressed sheet metal body in various ways. Thus, as shown in Figure 1, the flange E merely abuts against the cup-shaped body and is secured by welded metal filling the V-shaped groove. In Figure 2 the flange E is provided with a down-turned portion E′ abutting against a shoulder $E^2$ on the body

and the welded metal is filled into a V-shaped groove F'. In Figure 3 the flange E engages a beveled portion N of the sheet metal body and is similarly welded. In Figure 4 a flange E is used without the abutment $E^2$.

While it is desirable to form the annulus B of cast metal, it may be partly formed of pressed metal, as in the modified construction shown in Figure 9. With this structure, O is a pressed sheet metal skirt which is welded to the pressed cup-shaped sheet metal body, and P, P' are cast metal rings welded thereto to form intermediate the same the grooves D for the piston rings. The rings P, P' may be successively positioned on the member O and welded thereto, in that way avoiding interference with each other during the welding.

What I claim as my invention is:

1. A piston comprising a pressed sheet metal body having an integral head of smaller diameter than the cylinder, and a skirt of different metal for fitting the cylinder having an inwardly-extending flange the inner peripheral face of which is welded to said body.

2. A piston comprising a pressed sheet metal body cupped to form an integral head of smaller diameter than the cylinder, a skirt of different metal for fitting the cylinder surrounding said body and having an inwardly-extending flange integrally united around the inner peripheral face thereof to the wall of said cupped head.

3. A piston comprising a pressed sheet metal body cupped to form an integral head of smaller diameter than the cylinder, an annular skirt of different metal for fitting the cylinder integrally united around the inner periphery thereof to said body, and wrist pin bearings intersecting said body intermediate their ends and rigidly attached thereto.

4. A piston comprising a pressed sheet metal body having a cupped end portion of smaller diameter than the cylinder with a flaring lower end forming diametrically opposite segments for fitting the cylinder with flattened side walls connecting said segments, an annular skirt integrally united around the inner periphery thereof to the cupped end portion of said body, and wrist pin bearings secured to said flattened side walls.

5. A piston comprising a body having a reduced head, a skirt surrounding said head and having a flange secured to said head, said skirt being spaced from said head a distance corresponding to the width of said flange.

In testimony whereof I affix my signature.

CECIL H. TAYLOR.