

C. R. GREEN.
PISTON.
APPLICATION FILED MAY 4, 1916.

1,228,909.

Patented June 5, 1917.

Fig. 1.

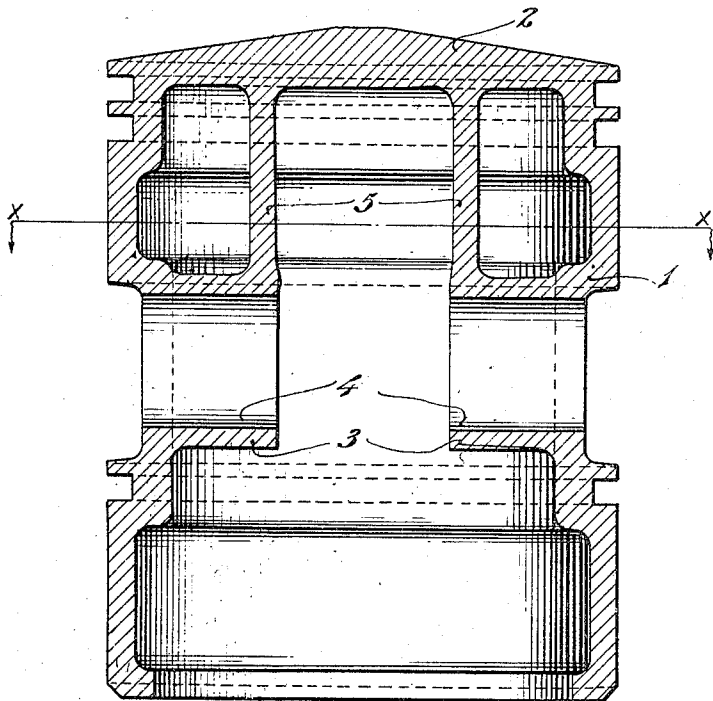


Fig. 2.

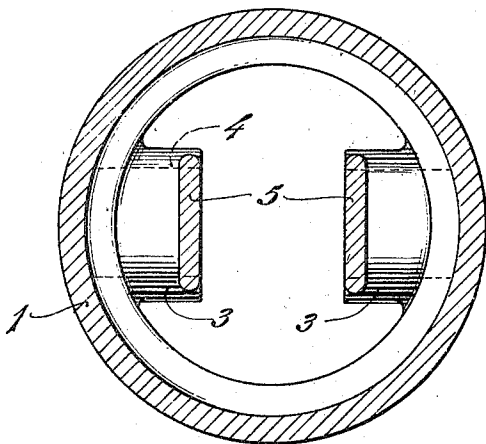
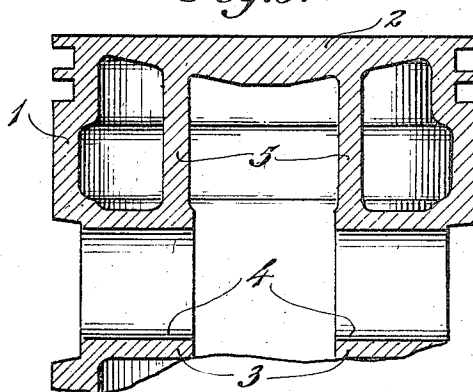


Fig. 3.



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PISTON.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CARL R. GREEN, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Pistons, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to pistons and more particularly to a piston for use with an internal combustion engine. As is well known, the head of the piston in an internal combustion engine is subjected to an
15 intense heat. This heat causes an expansion of the piston, making it necessary to provide a large clearance between the piston and the cylinder to take care of this expansion. This excessive clearance produces
20 undesirable results, such as noise and leakage of gas while the engine is warming up. Further, the intense heat tends to weaken the metal and make it more liable to injury and distortion under the strain to which it
25 is exposed. These effects of the heat are present in all pistons, but are especially noticeable in pistons constructed of aluminum compositions and of similar metals.

30 The object of the present invention is to provide a piston so constructed that the heat will be distributed and dissipated in such a manner as to minimize its effects upon the piston; and in which the piston will be reinforced at the point of greatest
35 strain; and, further, to provide such a piston which will be very light in weight.

In the accompanying drawings Figure 1 is a longitudinal sectional view taken through a piston embodying my invention;
40 Fig. 2 is a horizontal section taken on the line $x-x$, looking in the direction of the arrows; Fig. 3 is a sectional view showing a slightly modified form of the piston.

45 In these drawings I have illustrated one embodiment of my invention and have shown the same as comprising a hollow cylindrical body portion 1 closed at one end by a head 2 and provided on opposite sides with inwardly extending bosses 3, in which are
50 formed supports or bearings 4 for the shaft or pin by means of which the piston rod is connected with the piston. The central portion of the piston head is heated to a greater temperature than the circumferential portions thereof, this being due to the
55 proximity of the circumferential portions

to the water jacketed cylinder; and the central portion of the piston head is also subjected to the greatest strain. To properly take care of the excessive heat at the center of the head and to provide the necessary strength, without adding unnecessary weight to the piston, I have made the central portion of the piston head thicker than the circumferential portions. The piston
60 head is preferably in the form of a solid cone having a flat base which forms the inner face of the piston head, the apex of the cone being directed toward the explosion chamber. It will be obvious, however, that
65 substantially the same result could be had by inverting the conical cylinder head and turning the flat face outward, as shown in Fig. 3. The heat will be conducted away from the relatively thin circumferential portions of the piston head through the cylindrical body portion and thence to the water
70 jacketed walls of the cylinder. To conduct the heat away from the thicker central portion of the piston head, I have provided a plurality of heat conducting members or
75 struts 5, which are interposed between the inner face of the piston, at points remote from the circumference thereof, and the body portion of the piston, and serve not
80 only to conduct away the heat but to reinforce the central portion of the piston head. Preferably these members or struts extend between the inner face of the piston head and the inner portions of the bosses 3 and
85 are thus placed at the points where they will best resist the strains to which the piston is subjected. Preferably the body of the piston head and struts are cast integral as this provides a very rigid construction
90 and can be very cheaply manufactured.

By providing the piston with the conical head and the reinforcing and heat conducting members, I am enabled to so dissipate the heat of the head as to prevent the same
100 from being heated to an excessive degree and am enabled to reduce the thickness of the circumferential portions of the piston head. This results in a piston having a relatively small amount of expansion and contraction thus requiring a correspondingly
105 small amount of clearance; a piston of light weight; and a piston of relatively great strength.

I wish it to be understood that I do not
110 desire to be limited to the details of construction shown and described for obvious

modifications will occur to a person skilled in the art.

Having now fully described my invention, what I claim as new, and wish to secure by Letters Patent, is:—

1. A hollow piston comprising a body, a head having a thickened central portion, and heat conveying and reinforcing members connected with said head at points spaced from the edges thereof and with said body at points remote from said head.

2. A hollow piston comprising a body, a head having a thickened central portion, bosses rigidly secured to and extending inwardly from said body, and struts connected at their ends with said head at points spaced from the circumference thereof and with the inner portions of the respective bosses.

3. A hollow piston comprising a body, a head, bosses rigidly secured to and extending inwardly from said body, and struts connected at their respective ends with said piston head at points spaced from the circumference thereof and with the inner portions of the respective bosses.

4. A hollow piston having a cylindrical body, a head having a thickened central portion, said body having integral bosses extending inwardly therefrom to form bearings, and members formed integral with said piston and connected at their ends with said head at points spaced from the circumference thereof and with the inner portions of the respective bosses.

5. A hollow piston having a cylindrical body, a head having a thickened central portion, said body having integral bosses extending inwardly therefrom to form bearings, and struts formed integral with said piston, each of said struts being connected at one end with said head at a point spaced from the circumference thereof, and at its other end with said body at a point remote from said head, and being spaced away from said body.

6. A hollow piston comprising a cylindrical body, a head formed integral with said body at one end thereof, said head increasing gradually in thickness from its circumference toward its center, and a reinforcing device interposed between the central portion of said head and a part of said body remote from said head.

7. A hollow piston comprising a body, a

head at one end of said body, and reinforcing members connected with the inner face of said head at points spaced from its edge and with said body at points remote from said head.

8. A hollow piston comprising a body, a head at one end of said body, said head having one face substantially flat, and increasing gradually in thickness from its circumference toward its center, a plurality of members each connected at one end with said head at a point remote from its circumference and connected at its other end with said body at a point remote from said head, said members serving both as heat conducting members and as reinforcing members.

9. A hollow piston comprising a body, a head at one end of said body, said head having one face substantially flat, and increasing gradually in thickness from its circumference toward its center, and a plurality of members each connected at one end with said head at a point remote from its circumference and connected at its other end with said body at a point remote from said head, said members serving both as heat conducting members and as reinforcing members, the several parts of said piston being cast in one piece.

10. A hollow piston comprising a body, a head at one end of said body having a thickened central portion, bosses extending inwardly from said body and a plurality of members, each connected at one end with said head at a point spaced from the circumference thereof and connected at its other end with one of said bosses, said members serving both as heat conducting members and reinforcing members, and the several parts of said piston being cast in one piece.

11. A hollow piston comprising a body, a head at one end of said body, bosses extending inwardly from said body and forming bearings, and a plurality of members each connected at one end with said head at a point spaced from the circumference thereof and connected at its other end with one of said bosses, said members serving both as heat conducting members and reinforcing members, and the several parts of said piston being cast in one piece.

In testimony whereof, I affix my signature hereto.

CARL R. GREEN.