E. W. CLARK.

ARTICLE OF MANUFACTURE.

APPLICATION FILED AUG. 5, 1919.

1,358,364. **Patented Nov. 9, 1920.**

Fig. 2

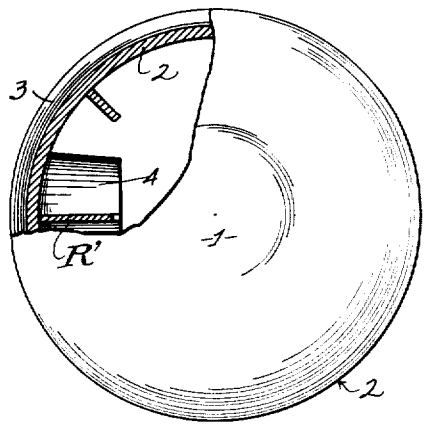


Fig. 1

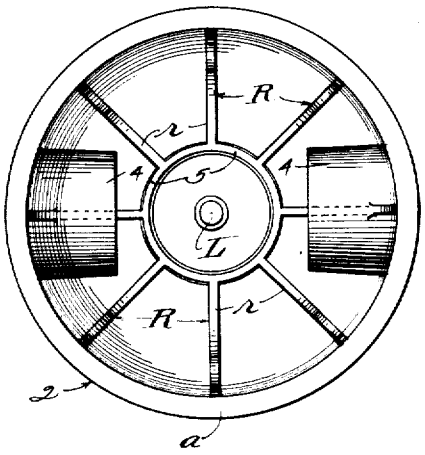


Fig. 3

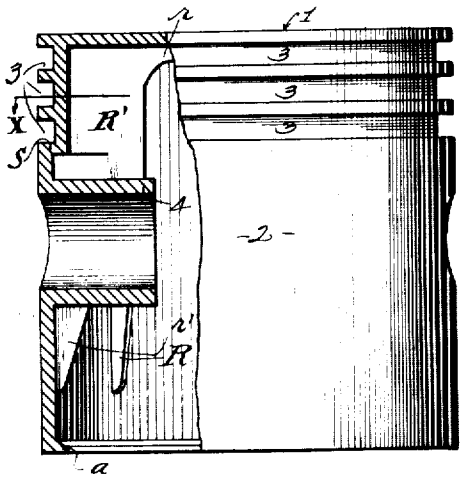
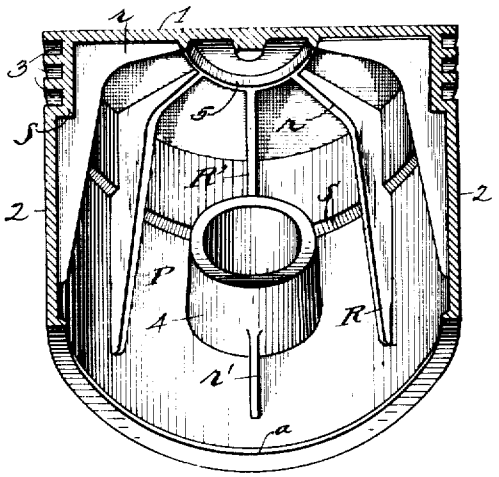


Fig. 1



Inventor:
Edward W. Clark,
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UNITED STATES PATENT OFFICE.

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ARTICLE OF MANUFACTURE.

1,358,364. Specification of Letters Patent. Patented Nov. 9, 1920.

Application filed August 5, 1919. Serial No. 316,262.

To all whom it may concern:

Be it known that I, EDWARD W. CLARK, a citizen of the United States, and a resident of Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Articles of Manufacture, of which the following is a specification.

My invention relates to an article of manufacture generally and particularly to a piston for internal combustion engines as an article of manufacture and methods for manufacturing the same, and the main object of this invention is to provide a piston of minimum weight and maximum efficiency, formed as an integral structure of cast metal, preferably of cast iron and internally reinforced so as to render the head incapable of breakage in ordinary usage due to the shock of the gas explosions in the cylinder.

It has been demonstrated in practice that in internal combustion engines principally, the stroke being comparatively short, a considerable amount of vibration is set up by the operations of the pistons, and it is an object of this invention to eliminate as much as possible of such vibration by providing a light weight piston of the character mentioned, thus considerably lessening the energy expended by the engine at each revolution of the crank shaft by decreasing the weight of the pistons which are lifted thereby. This advantage is more apparent in four cylinder engines than in six cylinder engines, as in the latter the stroke is longer and the vibration is normally less.

Heretofore in pistons of ordinary types a plentiful supply of metal has been usually provided at the head and in the walls at points where the greatest strain is had and the benefits of light weight have been sacrificed for long life and strength. I have discovered by experiment and practice that an integral piston may be provided having a minimum weight and yet with a substantial reduction in the thickness of the metal around the skirt and in the head by the provision of scientifically arranged and proportioned reinforcing ribs on the inner side of the head and skirt and serving to connect these portions in such a manner that the successive impacts from the gas explosions will be resisted effectively by the head and the strain distributed, so that the life of the piston will not ordinarily be affected. It is such an object I seek to accomplish by means of the structure hereinafter disclosed.

Referring to the drawings in which I have shown one practical embodiment of my invention:

Figure 1 is a bottom plan of my improved piston;

Fig. 2 is a top plan of the same, partly in section;

Fig. 3 is a side elevation of the same, partly in section;

Fig. 4 is a transverse sectional view, in perspective, of the interior of the piston.

Similar characters of reference are employed in the several views of the drawing and in the specification for indicating the same and like parts.

Referring now, more in detail to the drawing, my improved piston will be seen to embody the usual form of commercial piston, with the head portion 1, the wall 2, having ring grooves 3, 3, therein and wrist pin bosses 4, 4, being formed integral therewith, as usual. The casting is so formed that the thickness of the said head and wall may be as little as possible and yet be rigid enough for use, a plurality of ribs R, R, etc., being formed at regular intervals around the interior of the piston which radiate from the center and are tapered from their upper portions to their lower extremities.

A central depending lug L is formed on the inner side of the head 1, by means of which the piston may be centered in a lathe or other finishing machine, and an annular rib 5, is formed concentrically around said lug for affording rigidity to the head. The portions r, r, etc., of the ribs R, R, etc., connect with the concentric rib 5, and taper radially therefrom so as to afford additional rigidity to the head. Other ribs R′, and R′ are provided above the pin bosses 4, 4, and said ribs are substantially wider than the ribs R, R, etc., the outer edges thereof being substantially flush with the ends of the bosses, so that sufficient bracing may be provided at these points. Below the bosses 4, 4, smaller ribs r', r', are provided, as shown for obvious purposes. At the lower end of the skirt, I provide an annular rib a, which serves to reinforce the bottom of the skirt.

It will be obvious that the system of ribs shown and described will distribute the strain equally over the piston skirt and head, and that the weakest point, *i. e.* in the

center of the head, is braced by tapered ribs to the wall of the piston, thus obviating any breakage at this point due to the explosions in the cylinder. For this reason the thickness of metal at the head may be minimized, and likewise, the thickness of metal around the skirt may be substantially decreased from the ordinary pistons without decreasing the efficiency or at any point weakening the piston structure vitally. At the bottom of the lowest of the ring grooves 3, a shoulder *s* is provided which forms an annular rib for reinforcing the wall of the piston.

What I claim is:

As an article of manufacture, an integral structure comprising a circular head member, an annular wall member and oppositely disposed bosses extending inwardly from said wall member, an annular rib being provided on the inner side of said head member, and a plurality of radially formed ribs connecting said annular rib and said wall member and extended substantially downwardly on the interior of said wall member.

Signed at Los Angeles, Los Angeles county, California, this 30th day of July, 1919.

EDWARD W. CLARK.

In peresence of—
STANLEY S. TURNER,
H. M. BRUNDAGE.