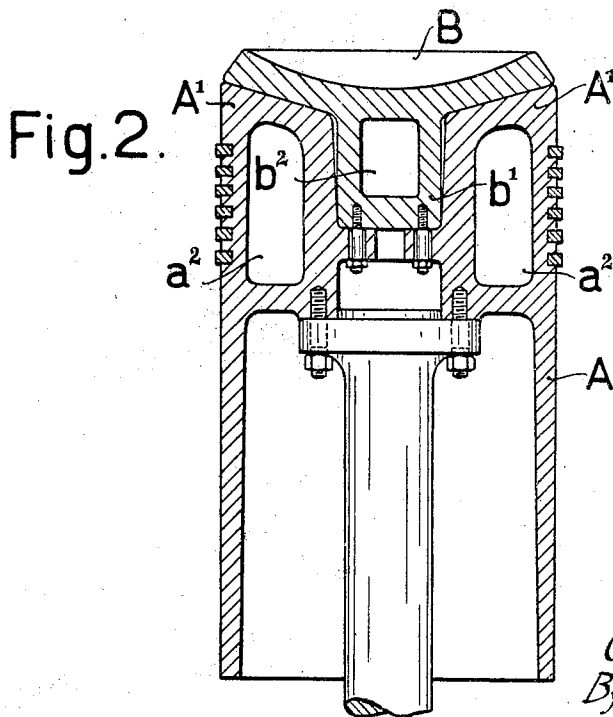
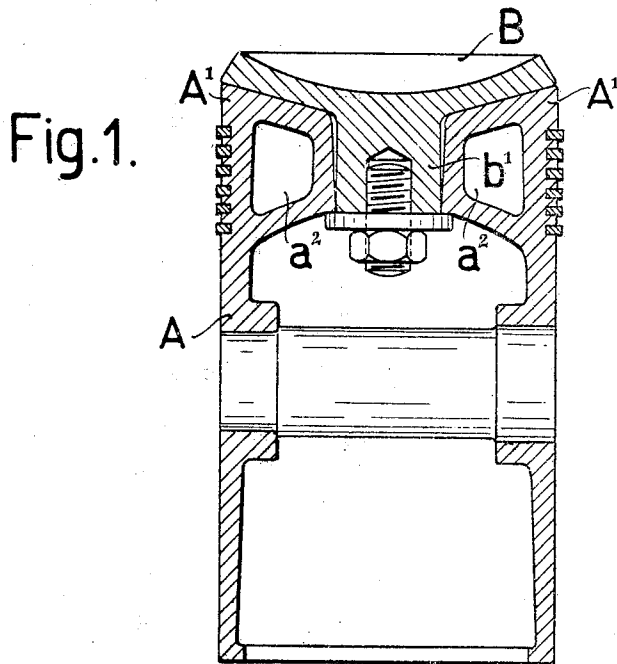


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 PISTON FOR INTERNAL COMBUSTION ENGINES.
 APPLICATION FILED NOV. 19, 1920.

1,373,263.

Patented Mar. 29, 1921.



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UNITED STATES PATENT OFFICE.

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PISTON FOR INTERNAL-COMBUSTION ENGINES.

1,373,263.

Specification of Letters Patent.

Patented Mar. 29, 1921.

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To all whom it may concern:

Be it known that I, CONRAD REGENBOGEN, residing at Kiel-Gaarden, Germany, a citizen of the German Republic, have invented a certain new and useful Improvement in Pistons for Internal-Combustion Engines, of which the following is a specification.

In large internal combustion engines, more particularly two-stroke cycle engines, running at high speed, the amount of heat transmitted from the combustion chamber to the piston is so great that natural air cooling is insufficient and fluid cooling has to be resorted to.

It is well known in the art to construct such pistons with a second transverse wall at the end of the piston nearest the combustion chamber, thus providing the piston with a hollow chamber, through which the cooling fluid is conducted, whereby the heat passing over to the fluid is carried away by the latter, thus cooling the piston and preventing the overheating thereof.

In internal combustion engines from which a very great amount of heat has to be taken off, that is to say, engines in which both speed and cylinder diameter are very great, it has been shown that breaking of pistons often occurs, even when fluid cooling is resorted to, the reason being that the piston wall nearest the combustion chamber, on account of its great diameter, is considerably more overheated than, for instance, the cylindrical sides of the piston.

On account of the said great differences in temperature, stresses will set up in large pistons, which will cause their breaking. This will occur the sooner, the faster the cooling of the piston takes place, and the greater the temperature taken up by the piston surface nearest the combustion chamber.

In order to overcome these disadvantages, that portion of the piston nearest the combustion chamber, forms, in accordance with the present invention, an annular hollow body adapted to receive cooling fluid. Further, a protecting cap, covering the front-face of the piston, is inserted in the latter with sufficient play, in such a manner that the cap may expand without straining the hollow annular body which partly surrounds it.

In the accompanying drawing two em-

bodiments of the present invention are illustrated, and

Figure 1 shows one construction of a piston for single-acting internal combustion engines, with oscillating piston-rod; and

Fig. 2 a second construction of a piston for a single-acting internal combustion engine with rigid piston-rod.

In both of the illustrated embodiments, the piston body A is constructed as a hollow annular body A' at its end nearest the combustion chamber, the hollow portion a^2 of which is arranged for fluid cooling. In the central hole of the hollow part A' is inserted a protecting cap B covering its front face, the shank b' of which is rigidly secured to the piston body, as clearly shown in the drawing. The protecting cap B is provided with enough play in the hollow part A', so that, even at very high temperatures, to which it alone is exposed, it may expand without straining the hollow part A'.

The high temperatures will, in this manner, not injure pistons up to a certain size, because, on the one hand, the protecting cap B may expand without hindrance, and, on the other hand, because the temperature, as a result of the direct cooling through the well-cooled hollow part A' of the piston, does not rise above the permissible amount.

It may, however, be necessary with pistons of very great diameter also to cool directly the shank b' of the protecting cap B, which extends rearward into the hollow part A' of the piston. For this purpose, the shank b' is provided with a chamber b^2 for receiving cooling fluid, as shown in Fig. 2. The cooling fluid is now made to pass first through the hollow portion a^2 of the piston, and thereupon through the chamber b^2 of the protecting cap B, whereby the part B of the piston, which is exposed to the higher temperature during operation, receives cooling fluid of higher temperature. By the described and illustrated arrangement, the advantage is attained, that each of the two piston parts show the smallest possible difference in temperature, and in this manner are amply protected against too high strains.

Claims.

1. A piston for internal combustion engines, comprising an annular hollow portion adapted to be cooled by a cooling fluid, and

a cap provided with an integral shank portion inserted in said annular portion and covering the front face thereof, the shank thereof providing means for attachment of
5 the cap to the annular hollow portion, the insertion being such that sufficient play is allowed between the two portions, whereby the cap portion may expand without straining the annular portion.

10 2. A piston for internal combustion engines, comprising an annular hollow portion adapted to be cooled by a cooling fluid, and a cap portion inserted in said annular por-

tion and covering the front face thereof, the insertion being such that sufficient play is 15 allowed between the two portions, whereby the cap portion may expand without straining the annular portion, said cap also being provided with a chamber for cooling fluid.

The foregoing specification signed at 20 Kiel, Germany, this 26th day of June, 1920.

CONRAD REGENBOGEN.

In presence of—

C. HELSIG,

Dr. Ing. HANS TÄHEL.