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E. DAIBER

PISTON FOR INTERNAL COMBUSTION ENGINES

Filed Nov. 9, 1921

Fig. 1.

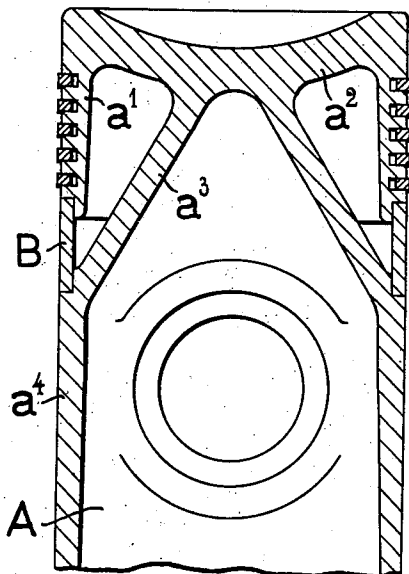


Fig. 2.

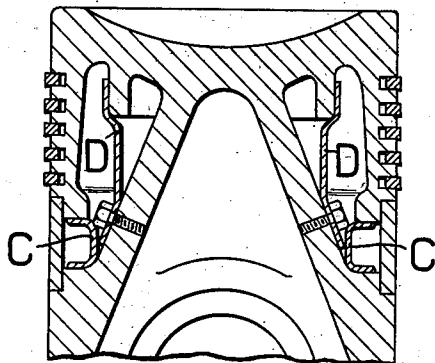


Fig. 4.

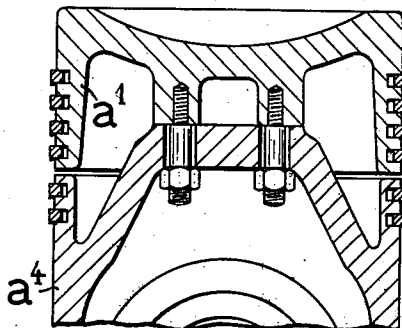


Fig. 5.

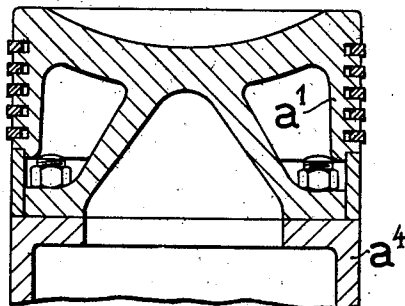
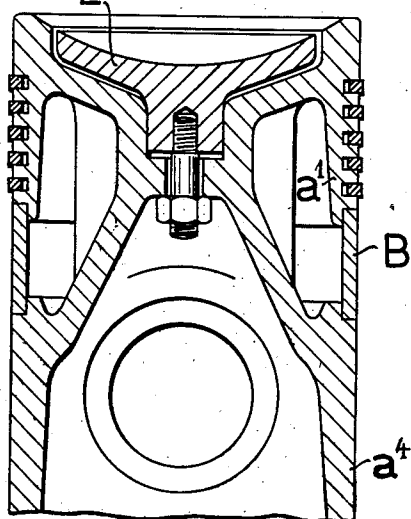


Fig. 3.



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UNITED STATES PATENT OFFICE.

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PISTON FOR INTERNAL-COMBUSTION ENGINES.

Application filed November 9, 1921, Serial No. 514,058.

To all whom it may concern:

Be it known that I, ERNST DAIBER, residing at Kiel, 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.

This invention relates to air-cooled pistons for internal combustion engines and has for its object to take away in a particularly effective manner, the heat accumulated in the front wall of the piston and in the upper portion of the piston body.

This object is chiefly attained by that the piston body is divided up, perpendicularly to its longitudinal axis, in two portions, and that the front wall of the piston and the upper portion of the piston body connected to said front wall, are supported by an inner piston body. This inner body which is preferably of conical shape and the lower wall portion of which terminates in the lower portion of the piston body, serves to transmit the working pressure exerted by the piston.

Several embodiments of the invention are illustrated in the drawings showing the respective pistons in longitudinal section.

Fig. 1 is a longitudinal sectional view of one embodiment of the invention, and Figs. 2, 3, 4 and 5 are fragmentary, longitudinal sectional views, respectively, of modified forms of the invention.

Referring first to Fig. 1, the body A of the piston is divided up, perpendicularly to its longitudinal axis, so as to form an upper and a lower portion. The upper portion a^1 is directly annexed to the front wall a^2 of the piston and is supported, together with said front wall, by a cone-shaped inner body a^3 whose wall terminates at its lower edge in the wall of the lower portion a^4 of the piston body. The circular gap existing between the portions a^1 and a^4 of the piston body is closed by a ring B which may serve, if desired also for lodging piston rings.

The inner piston body a^3 serves to transmit the working pressure exerted by the piston, but its chief destination is to lead away the heat accumulated in the front wall a^2 to cooler portions of the piston and to the air, thus producing a cooling effect. The heat passes from the front wall a^2 to

the inner body a^3 and from the latter, it easily flows away in a downward direction, since the inner body is enlarged downwardly, thus offering to the heat to be led away a more and more increasing area, and since the lower edge of the inner body goes over into the lower portion a^4 of the piston body, this portion being relatively cool.

Further, the inner body a^3 has a cooling action upon the front wall a^2 by that it takes up the heat radiating from the latter and transmits it onto the cooler lower portion of the piston.

The described method of dividing up the piston body enables the front wall and the adjoining upper portion of the piston to expand as freely as possible when heated.

Another portion of the heat accumulated in the front wall a^2 is transmitted to the upper portion a^1 of the piston body and passes at the gap existing between the portions a^1 and a^4 , through the ring B tightly filling this gap, to the portion a^4 . In order to increase the transmission of the heat at the gap, if desired special yielding connecting members C of any well heat-conducting material, may be provided, as illustrated in Fig. 2.

As further shown in this figure, connecting members D of the described nature may likewise be provided between the front wall and cooler portions of the piston.

Fig. 3 shows a piston of essentially similar construction but having a mushroom-shaped fitting member E adapted to protect the front wall of the piston and known per se.

The modifications illustrated in Figs. 4 and 5 differ from those described in the foregoing lines merely in that the front wall and the upper portion of the piston body connected thereto, are not cast in one piece with the lower piston portion, but are detachably connected thereto. This construction enables to easily replace the front wall portion of the piston when damaged. A mushroom-shaped protecting member may, of course, also be applied to these modified pistons.

The essential feature of the invention consists in, that the central portion of the front wall of the piston is connected to cooler portions of the latter, and that the front wall is able to expand as unhindered as possible

owing to its being separated from the piston body. By means of these two features, the front wall is not only cooled in a very effective manner but also the stresses occurring in the front wall due to differences in temperature, are diminished in the highest possible degree.

Claims:

1. A piston for internal combustion engines comprising a top wall and side walls, said side walls being divided by a circumferential gap forming upper and lower side walls, imperforate supporting walls for the top wall extending convergently upward from said lower side walls and meeting said top wall at its center and additional heat conducting means associated with said piston for conducting the heat from said top wall.

2. A piston for internal combustion engines comprising a piston body and a front wall, said body being divided up, perpendicularly to its longitudinal axis, in two portions so as to form a gap between them, said front wall being connected to the adjacent portion of said body, a heat-transmitting ring fitted in said gap, and a cone-

shaped inner body connecting said front wall to the other portion of said body.

3. A piston for internal combustion engines comprising a top wall and side walls, said side walls being divided by a circumferential gap forming upper and lower side walls, imperforate supporting walls for the top wall extending convergently upward from said side walls and meeting said top wall at its center, and disengageable connecting means between said top wall and said side walls.

4. A piston for internal combustion engines comprising a piston body and a front wall, said body being divided up, perpendicularly to its longitudinal axis, in two portions so as to form a gap between them, said front wall being connected to the adjacent portion of said body, a heat-transmitting ring fitted in said gap, and a cone-shaped inner body detachably connecting said front wall to the other portion of said body.

The foregoing specification signed at Kiel, Germany, this 11th day of October, 1921.

ERNST DAIBER.