United States Patent [19]

Hoffmann

[11] **3,738,335**

[45] **June 12, 1973**

[54] **PISTON FOR INTERNAL COMBUSTION ENGINES**

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[22] Filed: **Nov. 26, 1971**

[21] Appl. No.: **202,530**

[30] **Foreign Application Priority Data**

Nov. 27, 1970 Germany ..... P 20 58 410.5

[52] **U.S. Cl.** **123/41.35,** 92/186

[51] **Int. Cl.** **F01p 3/10**

[58] **Field of Search** ..... 123/41.35, 41.16, 123/193 P, 32 A, 32 B, 32 C; 29/156.5 A; 92/176, 186

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[57] **ABSTRACT**

A piston for an internal combustion engine with a ring-shaped cooling space arranged in the piston top which is connected with a feed bore and with a discharge bore for the cooling medium; in particular, the piston has an eccentrically arranged combustion space recess about which the cooling space is laid as an open-ring whose ends are connected with the feed bore and the discharge bore, respectively.

2 Claims, 2 Drawing Figures

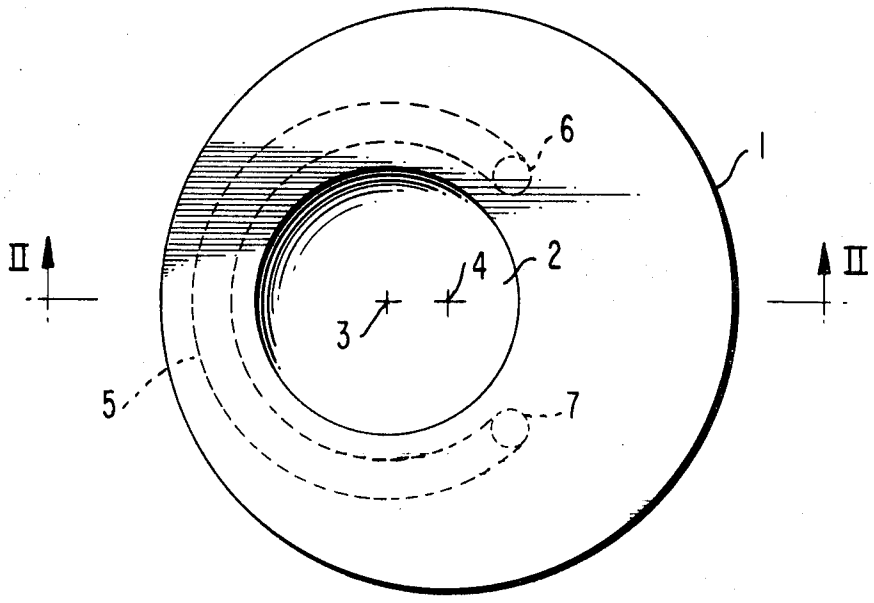
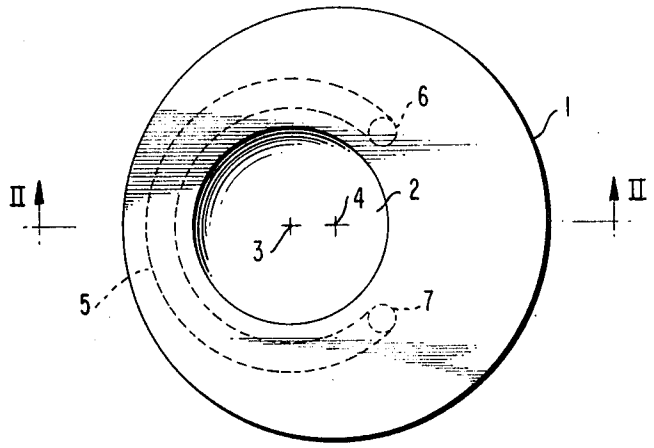


FIG. 1



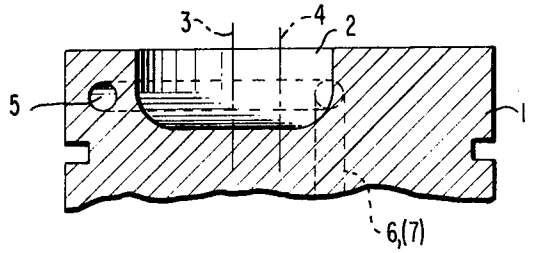


FIG. 2

PISTON FOR INTERNAL COMBUSTION ENGINES

The present invention relates to a piston for internal combustion engines with a ring-shaped cooling space arranged in the piston top, which is connected with a feed bore and with a discharge bore for the cooling medium, and more particularly the present invention relates to a piston with an eccentrically arranged piston combustion space recess about which the cooling space is placed.

In pistons of this type the cooling spaces are normally constructed as closed rings, in which the connections for the cooling medium supply and the cooling medium discharge are located mutually opposite along a diameter through the ring. If such an annularly shaped cooling space is arranged about a piston combustion space recess, generally a uniform heat removal in relation to the circumference of the combustion space recess takes place by the cooling medium. For centrally or coaxially arranged combustion space recesses a circumferentially uniform heat removal by the cooling medium is therefore quite desired, however, this is not the case for combustion space recesses which are arranged eccentrically to the center longitudinal axis through the pistons because in that case a cooling takes place also in those areas where it is not necessary as such. Those are the areas of the piston in which the combustion space recess is located further away from the piston circumference than in other areas.

The present invention is concerned with the task to so construct a cooling space in the piston that a cooling is effected deliberately only where a cooling is absolutely necessary, and more particularly with a cooling medium that is still as cold as possible.

The underlying problems are solved according to the present invention in that the cooling space is constructed as open ring, to one end of which is connected the supply bore and to the other end of which is connected the discharge bore.

An aimed-at, desired cooling of these piston areas which necessitate an additional cooling is realized in a simple manner by the present invention. Piston areas from which heat is given off to the cylinder, without having to utilize additional means, remain outside the effective area of the cooling medium. As a result thereof the additional piston areas to be cooled can be supplied with a relatively cold cooling medium. An additional advantage results with the cooling of pistons in internal combustion engines with cylinder rows of V-shape where in one cylinder row endangered piston areas and in the other cylinder row non-endangered piston areas are disposed at the pressure side of the piston, i.e., with identical pistons the cooling requirements in both cylinder rows are different in that simply the function of the feed and discharge bores for the cooling medium are interchanged from cylinder row to cylinder row. Furthermore, it is achieved by the present invention that the cooling medium flows faster on the inside of the cooling space according to the present invention than when a splitting up of the cooling medium stream takes plase as occurs in a closed ring.

Accordingly, it is an object of the present invention to provide a piston for internal combustion engines which avoids by simple means the aforementioned shortcomings and drawbacks encountered in the prior art.

Another object of the present invention resides in a piston for internal combustion engines with a cooling means arranged therein that assures cooling only within those piston areas actually requiring such additional cooling.

A further object of the present invention resides in a piston for internal combustion engines with an eccentrically arranged combustion space recess which is provided with a cooling means effectively cooling only those areas of the piston top which are endangered by the eccentric location of the combustion space recess.

A still further object of the present invention resides in a piston for internal combustion engines which assures a more rapid flow of the cooling medium and therewith a more intense cooling due to the lower temperature of the cooling medium.

There and further objects, features and advantages of the present invention will become more apparent from the following description when taken in connection with the accompanying drawing which shows, for purposes of illustration only, one embodiment in accordance with the present invention, and wherein

FIG. 1 is a plan view of a piston in accordance with the present invention, and

FIG. 2 is a cross sectional view through the piston taken along line II—II of FIG. 1.

Referring now to the drawing wherein like reference numerals are used throughout the two views to designate like parts, a combustion space recess 2 is arranged in a piston 1. This combustion space recess 2 is constructed axially symmetrically. Its center longitudinal axis 3 is located eccentrically to the center longitudinal axis 4 through the piston 1. For purposes of cooling preferred piston areas about the combustion space recess 2 a ring-shaped cooling space 5 is provided in the piston top which is constructed as open ring. A feed bore 6 is connected to one end of the open ring forming the cooling space 5 and a discharge bore 7 is connected to the other end thereof. The function of these two bores 6 and 7 can be interchanged if so desired or required. As can be seen from FIG. 1, the cooling space 5 is disposed about the axially symmetrically constructed combustion space recess 2 but does not extend over 360° of the circumference thereof but instead terminates within that area of the piston top which does not require any additional cooling due to the presence of a larger amount of heat-conducting material effecting removal of heat in the direction toward the cylinder walls.

While I have shown and described only one embodiment in accordance with the present invention, it is understood that the same is not limited thereto but is susceptible of numerous changes and modifications as known to those skilled in the art and I therefore do not wish to be limited to the details shown and described herein but intend to cover all such changes and modifications as are encompassed by the scope of the appended claims.

What I claim is:

1. A piston for internal combustion engines with cooling space means arranged in the piston head and connected to a supply bore and to a discharge bore for the cooling medium, characterized in that the cooling space means is constructed as open-ring, to one end of which is connected the supply bore and to the other end of which is connected the discharge bore, said piston being provided with a combustion space recess ar-

ranged in the top thereof, the cooling space means being arranged about only a portion of the combustion space recess corresponding to those areas of the piston top endangered by heat, the combustion space recess being arranged eccentrically with respect to the piston axis and the cooling space means being arranged about the combustion space recess at least within those areas thereof spaced closer to the circumference of the piston, the piston combustion space recess being axially symmetrical and the cooling space means extending about the circumference thereof to an extent greater than 180° but less than 360° of the circumference of the recess, the open-ring coolant space means being disposed between the side walls of the combustion space recess and the side walls of the piston, and the opening in the open-ring coolant space means being located on that side of the combustion space recess which is more remote from the side walls of the piston.

2. A piston for internal combustion engines with

cooling space means arranged in the piston head and connected to a supply bore and to a discharge bore for the cooling medium, characterized in that the cooling space means is constructed as open-ring, to one end of which is connected the supply bore and to the other end of which is connected the discharge bore, the piston being provided with a combustion space means arranged eccentrically with respect to the piston axis and the cooling space means being arranged about only a portion of the combustion space recess corresponding to those areas of the piston top endangered by the heat, said areas being spaced closer to the circumference of the piston, the open-ring coolant space means being disposed between the side walls of the combustion space recess and the side walls of the piston, and the opening in the open-ring coolant space means being located on that side of the combustion space recess which is more remote from the side walls of the piston.

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