PATENT SPECIFICATION

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309,587

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Complete Accepted: May 29, 1930.

COMPLETE SPECIFICATION.

Improvements relating to the Cylinder Blocks of Radial Cylinder Internal Combustion Engines.

We, CENTRA HANDELS-UND INDUSTRIE A.-G., a Swiss Company, of Quaderstrasse, Chur, Switzerland, Assignees of PAUL SCHMALJOHANN, a German national, of 135, Harmstrasse, Kiel, Germany, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

Internal combustion engines, in which a plurality of cylinders are radially disposed with the pistons working in a common explosion chamber, have several advantages. It is, however, generally very difficult to cast the cylinder block of such an engine so as to include in one piece the water jackets for cooling, and, in the case of two-stroke engines, the air inlet and exhaust conduits.

According to the invention the manufacture of the engine is facilitated by providing for each cylinder of the "star" a separate water jacket, which is fitted over the cylinder and is provided with openings for the inlet of air and the outlet of exhaust gases, the cylinder block having a support for the jackets at the centre of the star. The connection of the water jackets to this support may, for example, be effected by bolts. The support for the jackets may be integral with the cylinder block or may be made separately, in which case it is made in two or more parts fitted to the block and fixed to each other, as by means of bolts. Between the support and the block there are sufficiently large and accessible spaces for forming water cooling chambers.

In order that the velocity of the water flowing in these large spaces shall not be unduly reduced, with consequent reduction of the rate of cooling, projections are provided in the water jacket to reduce the cross-section of the water passages, so that the velocity is high enough to ensure effective cooling of the engine.

A further improvement, which is more particularly applicable to engines completely enclosed in a casing, consists in surrounding the cylinder block and the attached water jackets with a casing in which any water due to leakage may collect, and from which the water may be drained through a discharge pipe. Where this casing is closed to the exterior, it is preferable to use it also for the supply of air for scavenging and for combustion.

The accompanying drawings illustrate an example of an internal combustion engine according to the invention.

Fig. 1 shows a vertical section through the engine.

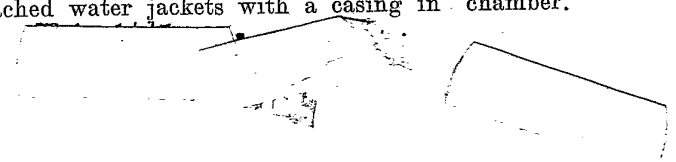
Fig. 2 shows the cylinder casting thereof to an enlarged scale, and

Fig. 3 is a cross section taken on the line A—B of Fig. 2.

The engine illustrated is of the two-stroke type, and has three radially disposed stationary cylinders a^1, a^2 and a^3 cast in one piece, within which work pistons e. The pistons work in a common explosion chamber p, and are provided with gudgeons f carrying rollers which run in rotatable cam tracks h. These cam tracks are fixed to a rotatable drum i.

The cylinder casting a^1, a^2, a^3 has in the vicinity of the combustion chamber p a supporting part b, which may be integral with it or may consist of two separately cast parts, bolted to each other. Water jackets c^1, c^2 and c^3 are pushed over the cylinders and fixed to the supporting part b, so as to form cooling chambers u and v.

The cylinder block a^1, a^2, a^3 and b is supported by a fixed casing k closed to the exterior, and the water jackets lie within this casing. The jackets c^1, c^2 about the cylinders a^1, a^2 are provided with openings m, which are in line with air inlet ports s in the cylinders, and open into the interior r of the casing k. The water jacket c^3 of the cylinder a^3 has an exhaust conduit n, into which open the exhaust ports t. In communication with the conduit n there is an exhaust pipe o which passes through the casing k with a tight joint. Air for scavenging and for combustion is introduced into the casing k through a conduit (not shown) so that the member supporting the cylinder block is also used as an air supply chamber.



The manufacture of the casting comprising the cylinders and the supporting part b is comparatively simple, as the cooling chambers u, v, are formed by mounting the water jackets and securing them to the supporting part b.

The water jackets are also provided with projections d^1, d^2 and d^3, which so constrict the spaces between the cylinder block and the part b that the cross-section of the water passages at this part are relatively small, and the velocity of the water is high enough to ensure proper cooling.

As the casing k surrounds the cylinder block and water jackets, any water which leaks through the joints between the cylinder block a^1, a^2, a^3 or the member b and the water jackets c^1, c^2, c^3 is collected in the casing and is drained off through the outlet l at the bottom.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. An internal combustion engine having radially disposed cylinders and a common explosion chamber for all the pistons, characterized in that on each cylinder (a^1, a^2, a^3) there is placed a separate water jacket (c^1, c^2, c^3) connected to a supporting part or member (b) at the central portion of the cylinder block.

2. An engine according to claim 1, characterized in that the water jackets (c^1, c^2, c^3) are provided with projections (d^1, d^2, d^3) for reducing the cross section of the water passages (v) between the cylinder block (a^1, a^2, a^3) and the supporting part or member (b).

3. An engine according to claims 1 and 2, characterized in that the cylinder block (a^1, a^2, a^3) and the water jackets (c^1 c^2, c^3) are surrounded by a casing (k) having at the bottom an outlet (l) for the discharge of water leaking out of the water passages.

4. A two-stroke cycle internal combustion engine according to claims 1 to 3, characterized in that the casing (k) is closed to the exterior and provides a chamber (r) for the supply of air for scavenging and for combustion, the air inlet ports of the cylinders (a^1, a^2) opening into the said chamber.

Dated this 28th day of March, 1929.

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Fig. 1.

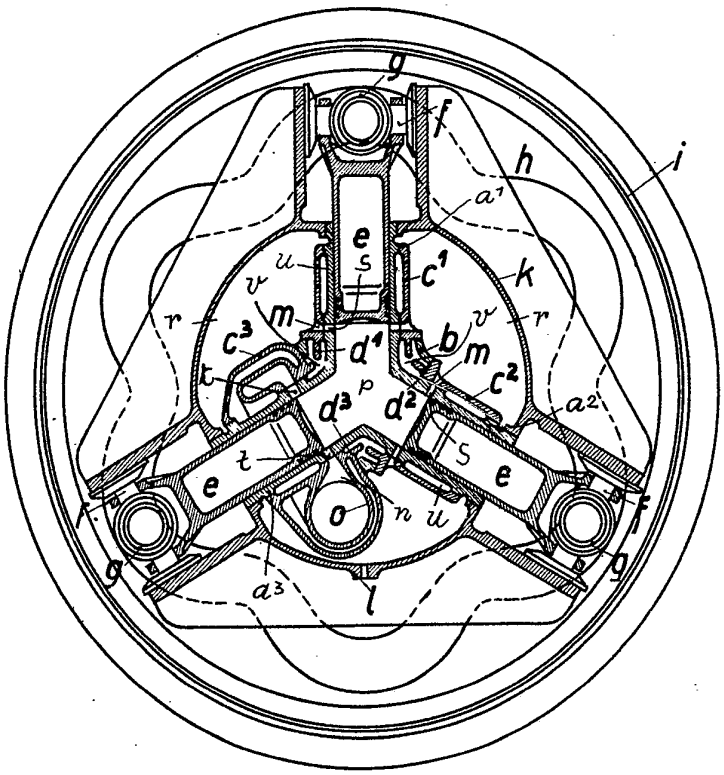


Fig. 3.

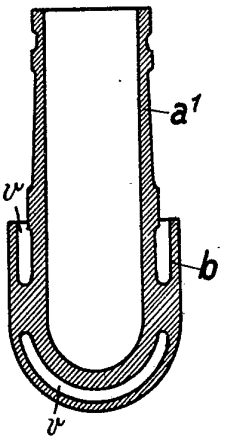
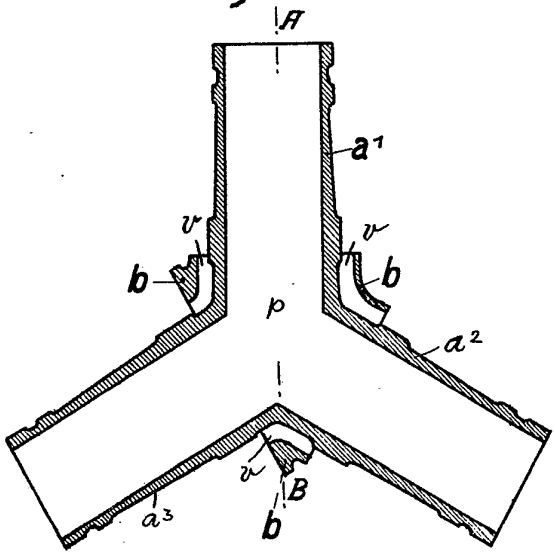


Fig. 2.



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