March 22, 1927. 1,621,560

C. REGENBOGEN

COOLING ARRANGEMENT FOR INTERNAL COMBUSTION ENGINES

Filed March 17, 1922

Fig.1.

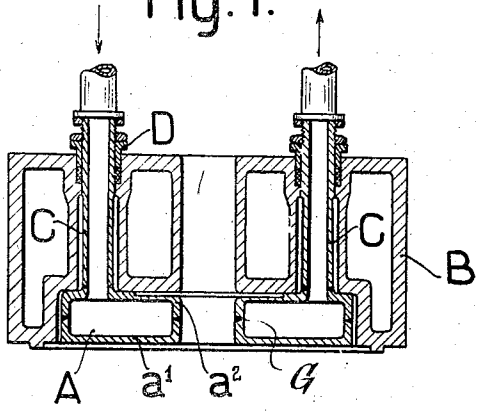


Fig.2.

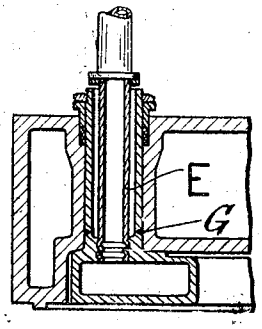


Fig.3.

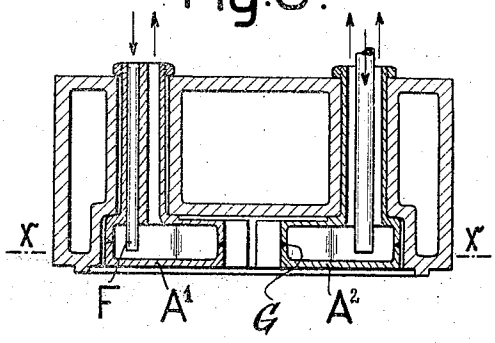


Fig.4.

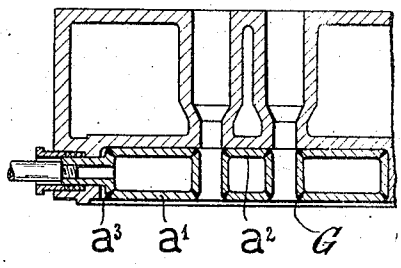
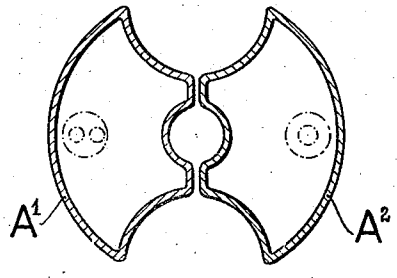


Fig.5.



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UNITED STATES PATENT OFFICE.

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COOLING ARRANGEMENT FOR INTERNAL-COMBUSTION ENGINES.

Application filed March 17, 1922, Serial No. 544,535, and in Germany March 17, 1921.

It is already well-known with internal combustion engines of large dimensions to arrange freely expansible water-cooled chambers on the side of the cylinder covers lying towards the combustion room. If these chambers should satisfactorily answer their purpose—viz, to lead off the heat at that place,—they have to be made very thin-walled which is very difficult to be carried out with cast chambers. It is further necessary that the walls of such chambers be of exactly the same thickness throughout, as otherwise the difference of material will cause heat-stresses in the walls which might produce cracks and easily endanger the entire plant.

The present invention has for its object to provide a water chamber construction by which the aforementioned drawbacks are obviated. This object is principally attained by composing the chambers of several parts of pressed ingot iron or of steel casting or the like, which are connected with each other by welding. This method makes it possible to produce a chamber which has an extraordinarily small and uniform wall-thickness answering all practical needs.

Another feature of the invention consists in that the means (anchors or the like) which serve to carry the chamber and which may be used at the same time for feeding and leading-off the cooling water, can eventually be directly welded to the chamber too so that packings between the chamber and cooling water conduits are dispensed with.

With these ends in view the invention consists in the arrangement, construction and combination of parts to be hereinafter described and particularly pointed out in the appended claim.

Some embodiments of the subject-matter of the invention are illustrated, by way of example, in the accompanying drawing in which:

Fig. 1 shows a vertical longitudinal section through a portion of the cylinder cover having a water chamber arranged on its inner side,

Fig. 2 shows a similar view of a modification,

Fig. 3 shows a similar view of another modification, and

Fig. 4 shows a similar view of a still further modification,

Fig. 5 is a section through the water chamber according to Fig. 3, on the line x—x of that figure.

The water chamber A according to Fig. 1 fits into a lower recess of the cylinder cover B and is divided on a horizontal middle-plane as is to be seen from said figure. The two simple dish-shaped portions a^1, a^2 are made of ingot iron by pressing and welded to each other at their opposing edges. The welding places G are markably indicated in the drawing. The upper portion of the water chamber is provided with openings for leading the cooling water in and out, said openings being provided with protruding edges with which the hollow anchors C are connected also by welding, the cooling medium passing through these anchors. The anchors C as well as the chamber A itself possess enough lateral play for enabling them to expand freely in all directions. The anchors are preferably disposed near the central portion of the chamber, since the expansion of the chamber itself is slightest at that point. If that cannot be done for one reason or the other, it will be advisable to increase the lateral play downwardly, as will be understood from Fig. 1. Stuffing boxes D mounted in the cover, form a tight joint between the anchors and the cover. The way taken by the cooling water in entering and leaving the water chamber is indicated by arrows.

The embodiment according to Fig. 2 of the drawings differentiates from that above described in that the anchor C which is welded to the chamber, is not directly constructed for the passage therethrough of the cooling water, a special cooling water pipe E being used for this purpose which pipe extends through the anchor and which is fastened to the bottom of the chamber, for instance by rolling it into the same. This arrangement possesses the advantage that, in case the water feeding pipe E gets leaky at its point of connection with the upper chamber wall, such leakage will become observable by an exit of water in upward direction.

The embodiment according to Fig. 3 shows a water chamber consisting of two portions A^1, A^2 independent from each other and having each its own water inlet and outlet. The necessary openings for the passage

of the water are disposed in an anchor each of which is mounted approximately in the middle of the chamber portion to be cooled.

In order to secure a proper distribution of the cooling water in the respective chamber portion, a pipe F is mounted in the water admission opening, said pipe extending nearly unto the bottom of the chamber, so that this chamber wall, which is most endangered, is directly washed with fresh water. Besides, baffle-walls may at will be provided in the interior of the chamber for ameliorating the guiding of the water. In the portion lying at the right of Fig. 3, the openings for leading the water in and out are shown as arranged concentrically with relation to each other.

Fig. 4 shows an embodiment of the water chamber in which the bottoms a^1, a^2 are almost completely smooth and welded to a special marginal portion a^3. The cooling water is led in and out from the side. If anchors for suspending the chamber are being used with this construction, same may be solid and likewise welded to the chamber.

It is remarked that it is well-known in internal combustion engines to arrange wrought iron protective plates in front of the cast iron cylinder cover towards the combustion room, these plates being united with the cover to an unseparable whole by welding, shrinking or the like.

Claim:

A water chamber of the character stated comprising several separately cooled portions which are each composed of a plurality of welded parts, said portions being independent from each other and adapted to expand freely with relation to each other and the parts surrounding them.

The foregoing specification signed at Hamburg, Germany, this 16th day of March, 1923.

CONRAD REGENBOGEN.