E. DAIBER & P. A. RITTER.

COOLING DEVICE FOR INTERNAL COMBUSTION ENGINES.

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Fig. 1.

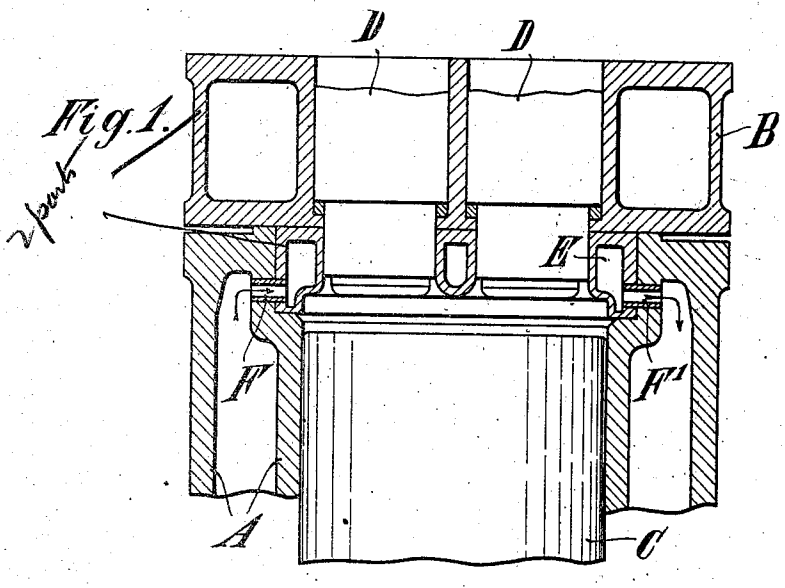
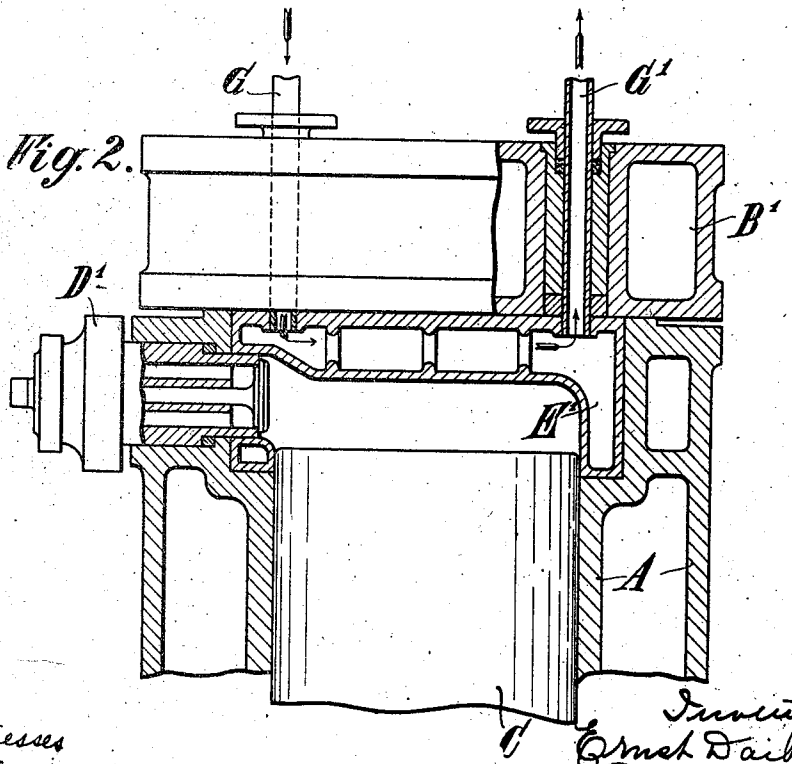


Fig. 2.



Witnesses
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UNITED STATES PATENT OFFICE.

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COOLING DEVICE FOR INTERNAL-COMBUSTION ENGINES.

1,180,983. Specification of Letters Patent. Patented Apr. 25, 1916.

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To all whom it may concern:

Be it known that we, ERNST DAIBER and PAUL A. RITTER, citizens of the German Empire, residing at Kiel, Germany, have invented certain new and useful Improvements in Cooling Devices for Internal-Combustion Engines, of which the following is a specification.

The subject matter of the present invention resides in a cooling device for internal combustion engines and its object is to protect endangered places in the compression chamber from the influence of too great fluctuations in temperature. These fluctuations in temperature cause non-permissibly high strains of the material with at times consequent appearance of cracks in the walls, particularly where the straight wall surfaces are interrupted, as for instance, at the edges of the valve openings. This is avoided in the present invention by providing thin-walled, water cooled chambers around the inlet openings of the valves situated in the walls of the compression chamber, and through which the valve cages are drawn.

Two embodiments of the present invention are illustrated in the accompanying drawing, and Figure 1 shows a vertical longitudinal section of the part in question of the working cylinder of an upright two-stroke-cycle internal combustion engine, the valves of which are situated in the cylinder cover, while Fig. 2 is a similar representation of the same kind of engine, in which the valves are arranged in the walls of the cylinder.

The embodiment illustrated in Fig. 1 will first be described. A is the double walled working cylinder, B the cylinder cover, and C the working piston. The necessary valves are situated in the cylinder cover, but only two scavenging valves are shown.

In accordance with the present invention, the inlet openings for the valves, provided in the compression chamber are inclosed by exchangeable cooling chambers, which impinge with their upper end faces against the cylinder cover B, and these individual valve inclosures are united into a single cooling chamber E for the sake of simplicity when the valves are situated close together. In order to facilitate the carrying off of the heat as far as possible, the walls of this cooling chamber, which are situated toward the combustion chamber, are made very thin. The valves D, leading through the cylinder cover and penetrating the cooling chamber E, are, however, not packed against the latter, but against the cylinder cover B, in order to avoid any straining of the cooling chamber. The admittance and removal of the cooling water to and from the cooling chamber E takes place through pipes F and F^1, which connect the cooling chamber with the cool water chamber of the cylinder. The cooling chamber E can be produced and finished cheaply, and may, when necessary, easily be replaced by others, kept in store.

The embodiment of the invention illustrated in Fig. 2 differs from the one shown in Fig. 1, principally thereby that the necessary valves are arranged in the cylinder walls, only one scavenging valve D^1, however, being shown in the drawing. The water cooled individual inclosing chambers, provided at the entering place of the valves, are also in this embodiment, for the sake of simplicity, united into a closed cooling ring E^1, which is provided with a hollow, water cooled bottom, reinforced by webs, for the simultaneous protection of the cylinder cover, which feature, however, does not constitute the main object of the invention. The admittance and removal of the water in the cooling chamber E^1 is accomplished by means of special pipes G, G^1, provided in the cover B^1.

We claim:—

1. A cooling device for internal combustion engines, having a cylinder cover over its combustion chamber, said device comprising a hollow member beneath said cover inserted at the combustion end of the cylinder, said member having apertures for receiving the valve cages and completely inclosed spaces for cooling fluid, surrounding said valve apertures.

2. A cooling device for internal combustion engines, having a cylinder cover over its combustion chamber, said device comprising a hollow member at the combustion end of the cylinder, said member having apertures for receiving the valve cages and completely inclosed spaces for cooling fluid, surrounding said valve apertures, the walls of said member facing the combustion chamber being very thin.

3. A cooling device for internal combustion engines, having a cylinder cover over its combustion chamber, said device comprising a hollow member at the combustion end of the cylinder, said member forming the combustion chamber and having apertures

for receiving the valve cages and completely inclosed space for cooling fluid, surrounding said valve apertures, said space having suitable connections to insure circulation of cooling fluid therethrough.

4. A cooling device for internal combustion engines, having a cylinder cover over its combustion chamber, said device comprising a hollow member at the combustion end of the cylinder, said member forming the combustion chamber and having apertures for receiving the valve cages and completely inclosed spaces for cooling fluid, surrounding said valve apertures, said spaces intercommunicating to form a continuous inclosed chamber and conduits connecting the inclosed chamber or chambers with a cooling fluid storage.

In testimony whereof the foregoing specification is signed.

ERNST DAIBER.
PAUL A. RITTER.