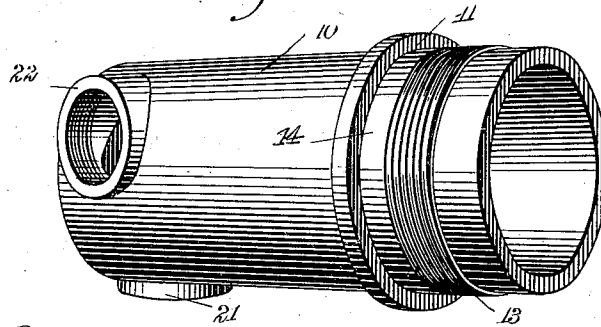


I. CRABB.  
CYLINDER AND WATER JACKET FOR INTERNAL COMBUSTION ENGINES.  
APPLICATION FILED MAR. 16, 1911.

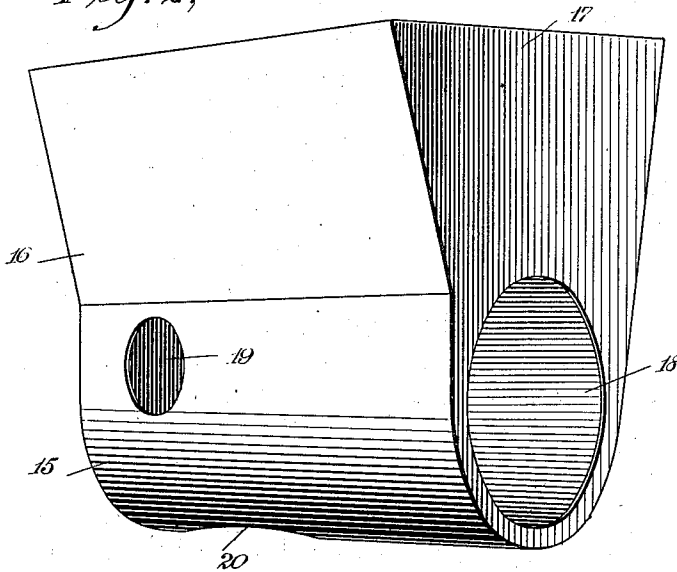
1,008,789.

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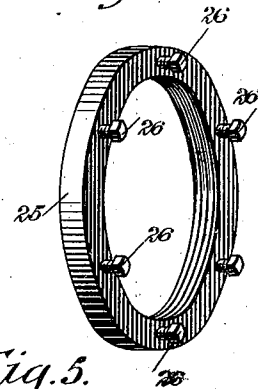
*Fig. 1,*



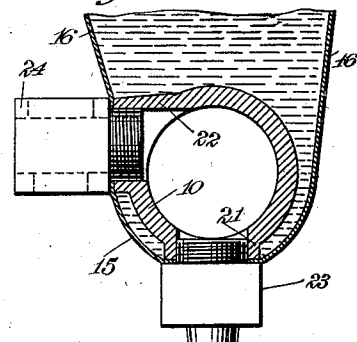
*Fig. 2,*



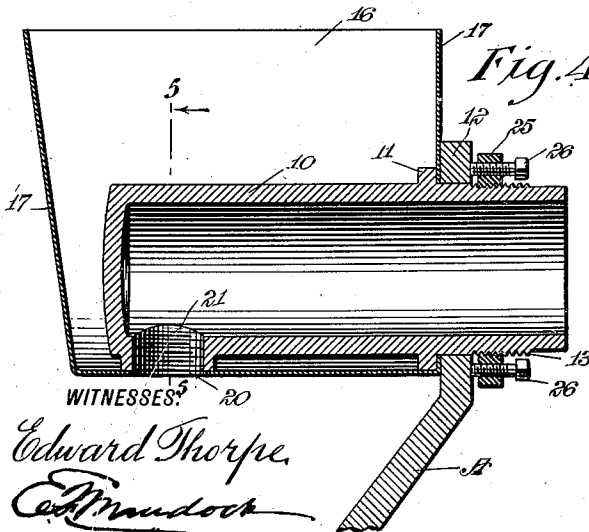
*Fig. 3,*



*Fig. 5.*



*Fig. 4,*



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# UNITED STATES PATENT OFFICE.

ISAIAH CRABB, OF WEST UNION, IOWA.

CYLINDER AND WATER-JACKET FOR INTERNAL-COMBUSTION ENGINES.

1,008,789.

Specification of Letters Patent.

Patented Nov. 14, 1911.

Application filed March 16, 1911. Serial No. 614,799.

*To all whom it may concern:*

Be it known that I, ISAIAH CRABB, a citizen of the United States, and a resident of West Union, in the county of Fayette and State of Iowa, have invented a new and Improved Cylinder and Water-Jacket for Internal-Combustion Engines, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to provide a cylinder and water jacket therefor constructed and arranged in such manner as to avoid breakage or other damage usually sustained by closed and rigid water jacket constructions caused by the expansion of the water contained therein when formed into ice; and to provide a construction of cylinder and water jacket therefor to permit the rapid and easy separation of the same for repair or renewal.

One embodiment of the present invention is disclosed in the structure illustrated in the accompanying drawings, in which like characters of reference denote corresponding parts in all the views, and in which—

Figure 1 is a perspective view of a cylinder for internal combustion engines constructed in accordance with the present invention;

Fig. 2 is a perspective view of a water jacket for the said cylinder constructed in accordance with the present invention; Fig. 3 is a perspective view of a clamping collar for holding and forcing the cylinder into water-tight connection with the water jacket; Fig. 4 is a longitudinal section of a cylinder and water jacket therefor constructed and arranged in accordance with the present invention; and Fig. 5 is a detail view, on an enlarged scale, in vertical section taken on the line 5—5 in Fig. 4.

As shown in the accompanying drawings, the cylinder 10 is preferably cast in a single piece. It is provided with a packing flange 11 suitably arranged to bear upon a holding flange 12 of the frame A of the engine, and as is usual in cylinders provided for internal combustion engines, the one end is open to form a piston race for the engine piston. In the present instance, between the said open end and the flange 11 above described, there is provided a screw threaded section 13. It is between the section 13 and the flange 11 that the cylindrical seating surface 14 is formed, which seating surface fits the opening in the flange 12.

The form of engine for which the present construction is best adapted is that wherein the cylinder is disposed in horizontal position. The water jacket used in connection with these cylinders is preferably provided with a cylindrical lower portion 15, the curvature of the underside whereof is concentric with the wall of the cylinder 10. Above the median line of the cylinder, the said lower portion is preferably shaped to form a vertical wall above the upper edge whereof the sides of the structure forming the jacket are shaped to form the straight outwardly flared sides 16. The sides 16, together with the ends 17, form a hopper wherein the water is poured or otherwise delivered. By reason of the flared construction of the sides 16, the area of the upper surface of the water is augmented to form an increased radiating surface.

It is from a single piece of sheet metal that the sides 16 and ends 17, and the portion 15, are constructed. In practice, I prefer to use a suitable thin copper. The material from which the hopper and water jacket are constructed being thin and ductile, avoids cracking and breakage due to the expansion at the freezing moment of water.

It is to afford ease and rapidity of assembly that I have provided the lower portion with the end opening 18 and the lateral openings 19 and 20. The opening 18 is provided to receive the end of the cylinder 10 on which is formed the screw threaded section 13 and the seating surface 14.

When installing a cylinder 10 in the water jacket thus constructed, the cylinder is introduced through the hopper formed by the sides 16, and canted to extend the end of the cylinder through the opening 18. The longitudinal length of the sides 16 permits this action. The end of the cylinder is extended outward from the opening 18 until the flange 11 strikes against and is raised by the ends 17 of the water jacket. The cylinder is turned within the lower portion 15 until the opening in the boss 21 aligns with the openings 20, and the opening in the boss 22 aligns with the openings 19. The edges of the bosses are ground to conform in curvature to the walls of the portion 15 against which the said bosses rest. The interior of the bosses 21 and 22 are each provided with screw threads to receive the chambered plugs 23 and 24 respectively. The chambered plug

23 is directly connected with the exhaust pipe and has suitably mounted therein an exhaust valve. The chamber plug 24 is suitably connected with the fuel supply pipe and is provided to form a seat for a suitable inlet valve, an ignition plug if the engine be operated by an electric spark, or other suitable ignition device such as the ordinary fire pot. The cylinder being thus firmly mounted in the lower portion 15, the end of the said cylinder, protruding from the jacket and hopper, is extended through the opening provided in the flange 12 of the frame A. A collar 25 is now screwed upon the threaded section 13 until the said collar is forced hard against the side of the flange 12 opposite that on which rests the end 17 of the hopper. Any suitable device may be provided for tightening up the collar 25 against the flange 12 to draw the flange 11 into contact with the end 17, and the end 17 against the flange 12, to form a water-tight joint between the flange 11 and end 17, to prevent the escapement of water from the lower portion 15 and hopper connected therewith. A simple and preferred method of tightening the flange 11 upon the end 17 as employed by me is to provide the collar 25 with a series of perforations tapped to receive the bolts 26, 26 when manipulated to force through the collar 25 to bear on the outer side of the flange 12. By upsetting the bolts 26, 26, the flange 11 may be drawn tightly against the end 17 and flange 12. By means of this construction, a further advantage is gained in that any inaccuracy of the bearing between the flanges 11 and 12 may be corrected.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A cylinder and water jacket for internal combustion engines comprising a rigid metal cylinder having formed thereon intermediate the ends thereof an annular flange; an open top water jacket infolding said cylinder having an opening in the side thereof

to pass the said cylinder and to rest against said annular flange; a supporting frame for said cylinder having a perforated flange adapted to receive the said end of said cylinder; a clamping collar holdingly engaging said cylinder and the projected end thereof, said collar being provided with a series of screw threaded perforations; and a plurality of threaded bolts to register with the threads of said perforations adapted to be manipulated to force against said supporting flange to pull the said annular flange of said cylinder upon the interposed side of said jacket.

2. In an internal combustion engine, the combination with a cylinder having a plurality of tubular, internally-threaded extensions, adjacent the inner end of said cylinder, and a screw-threaded section adjacent the opposite end of said cylinder, an annular flange formed on said cylinder adjacent said screw-threaded section, a water-jacket having an open top extended above said cylinder, the walls of said jacket being provided with a plurality of openings to register with said extensions and said flange, the walls of said jacket adjacent said openings being adapted to rest upon the edge of said extensions and said flange, a plurality of screw-threaded clamping members, the threads whereof register with the threads in said extensions, said members being adapted to clamp the wall of said water-jacket upon said extensions, and an internally screw-threaded collar to engage the threads on said cylinder, and means mounted in said collar, to draw the said flange against the wall of said jacket, to form a water-tight joint therewith.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ISAIAH CRABB.

Witnesses:

J. W. BOPP,  
J. A. HOYER.