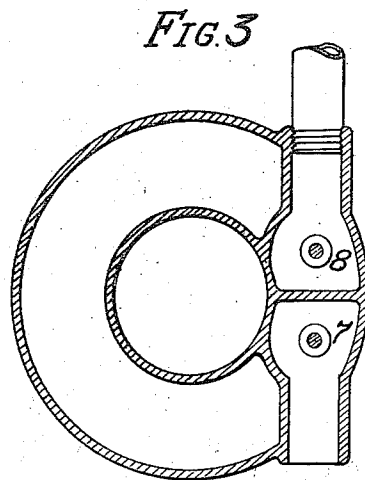
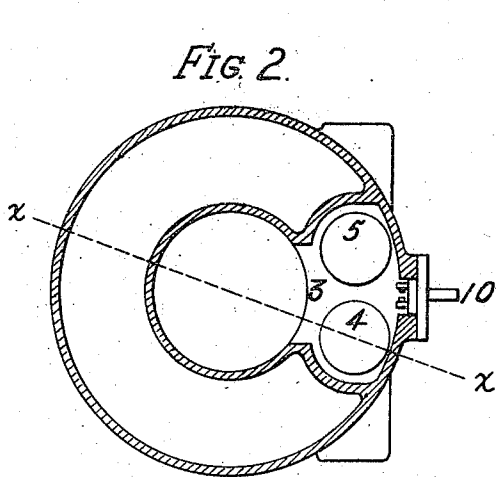
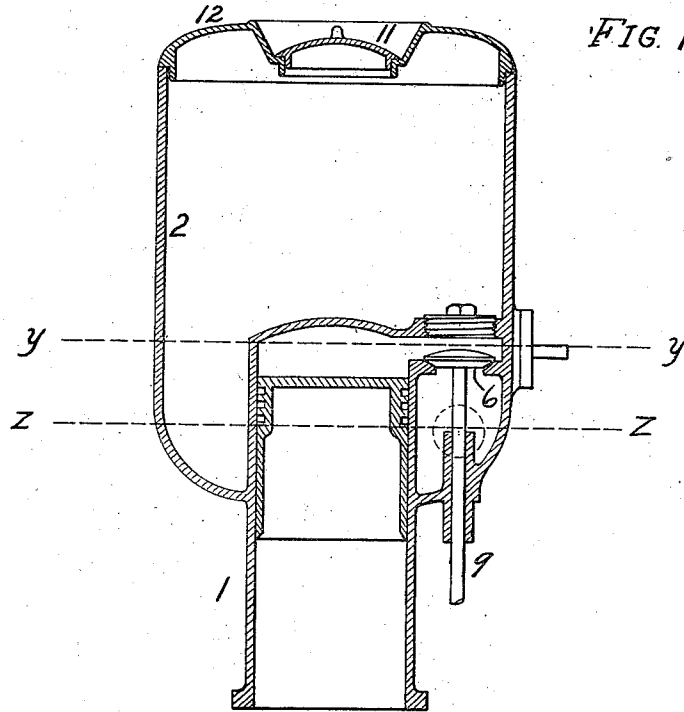


H. G. HOLMES.
EXPLOSIVE ENGINE.
APPLICATION FILED JUNE 15, 1907.

948,925.

Patented Feb. 8, 1910.



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EXPLOSIVE-ENGINE.

948,925.

Specification of Letters Patent.

Patented Feb. 8, 1910.

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To all whom it may concern:

Be it known that I, HERBERT GLENN HOLMES, a citizen of the United States, residing at Lansing, in the county of Ingham and State of Michigan, have invented a new and useful Improvement in Explosive-Engines, of which the following is a specification.

My invention relates to gasoline engines and its object is to produce an engine in which not only the cylinder, but the valve chambers shall be effectually cooled and at the same time the difficulty of cleaning the water jacket shall be avoided, the danger of injury by freezing reduced to a minimum, the quantity of water necessary for effective cooling largely decreased, the necessity of a separate water tank avoided, and the engine itself be cheap in construction and effective in operation. I attain these purposes by the mechanism set forth in the accompanying drawings in which—

Figure 1 is a vertical section of my engine cylinder and water tank along the line $x-x$ of Fig. 2. Fig. 2 is a horizontal section along the line $y-y$ of Fig. 1 and Fig. 3 a horizontal section along the line $z-z$ of Fig. 1.

In the drawings, 1 is the engine cylinder which is of the usual construction. A water jacket surrounds the upper end of the cylinder extending downwardly to substantially the lowest point reached by the piston in its travel and has an enlarged tank extending upwardly therefrom and connecting directly therewith to constitute a combined condensing and cooling chamber 2. The water jacket and cooling tank are integral one with the other and with the engine cylinder. An inlet and exhaust passage 3 opens from the upper part of the engine cylinder as shown in Fig. 2. In this passage are mounted the inlet port 4 and the exhaust port 5 which are of the usual construction. These ports are separated from one another by a vertical partition and closed by valves 6 of the usual construction as shown in Fig. 1. The ports 4 and 5 open respectively into chambers 7 and 8 as shown in Fig. 3. The valve stems 9 pass down through guides in these chambers and the valves are operated in any preferred manner. It is evident that by this construction the entire upper part of the cylinder and the valve chambers 7 and 8 are continually kept

cool by contact with the water in the tank. It is also evident that the large size of the chamber surrounding the upper end of the cylinder makes cleaning very easy and avoids all difficulties arising from deposits of lime and other material from the evaporation of the water in the tank.

The curved form of the base of the tank makes injury from freezing extremely unlikely to occur as the water is thus free to expand in an upward direction and the cylinder, tank and valve chambers can all be cast integrally as one piece and require only a minimum of machine work and labor thus making the device very cheap in construction. At the same time, the closely fitting cover of the tank and the highly efficient radiating qualities of the material of which it is composed, combined with the closeness of contact of the water with the cylinder and the perfection of circulation make the cooling extremely efficient and at the same time employ only a very small quantity of water which is easily and conveniently replaced. The tank itself being formed of cast iron instead of the usual thin metal and integral with the engine cylinder, is absolutely free from any liability of derangement or injury and is as durable as the engine itself. The spark plug 10, as shown in Fig. 2, opens into the chamber 3 between the ports 4 and 5 and is thus in the freshest of the admitted charge and in the most favorable position for prompt and certain ignition. A lid 11 is provided to close the tank. It also operates in connection with the main covering of the tank to condense a large part of the steam formed by the evaporation of the water.

I claim as my invention,

1. In an explosive engine, the combination of a cylinder and a transversely extending inlet and exhaust passage adjacent one end thereof, oppositely disposed inlet and exhaust ports connecting with said passage and extending longitudinally of the cylinder, valves for the ports, a spark plug arranged at a point between said ports, and a cooling tank having a portion embracing the cylinder end and ports, whereby the upper surface of the same are subjected to the direct contacting action of the cooling medium in the tank, and means for affording access to said ports through said tank

whereby the valves may be removed without disturbing any other part of the engine.

2. In an explosion engine, the combination of a cylinder, a cooling tank cast integral therewith and embracing the upper portion thereof and extending above the top thereof thereby forming a space between the cylinder and the said tank and above the cylinder adapted to be filled with cooling fluid, inlet and exhaust valve chambers, a vertical partition separating the same, said valve chambers communicating at their upper part

with a port leading to the cylinder, said valve chambers being cast integral with the tank casing and cylinder and located within the tank in a manner such that the cooling fluid contacts with the top and sides thereof.

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

HERBERT GLENN HOLMES.

Witnesses:

MARY SQUIRE COBB,
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