

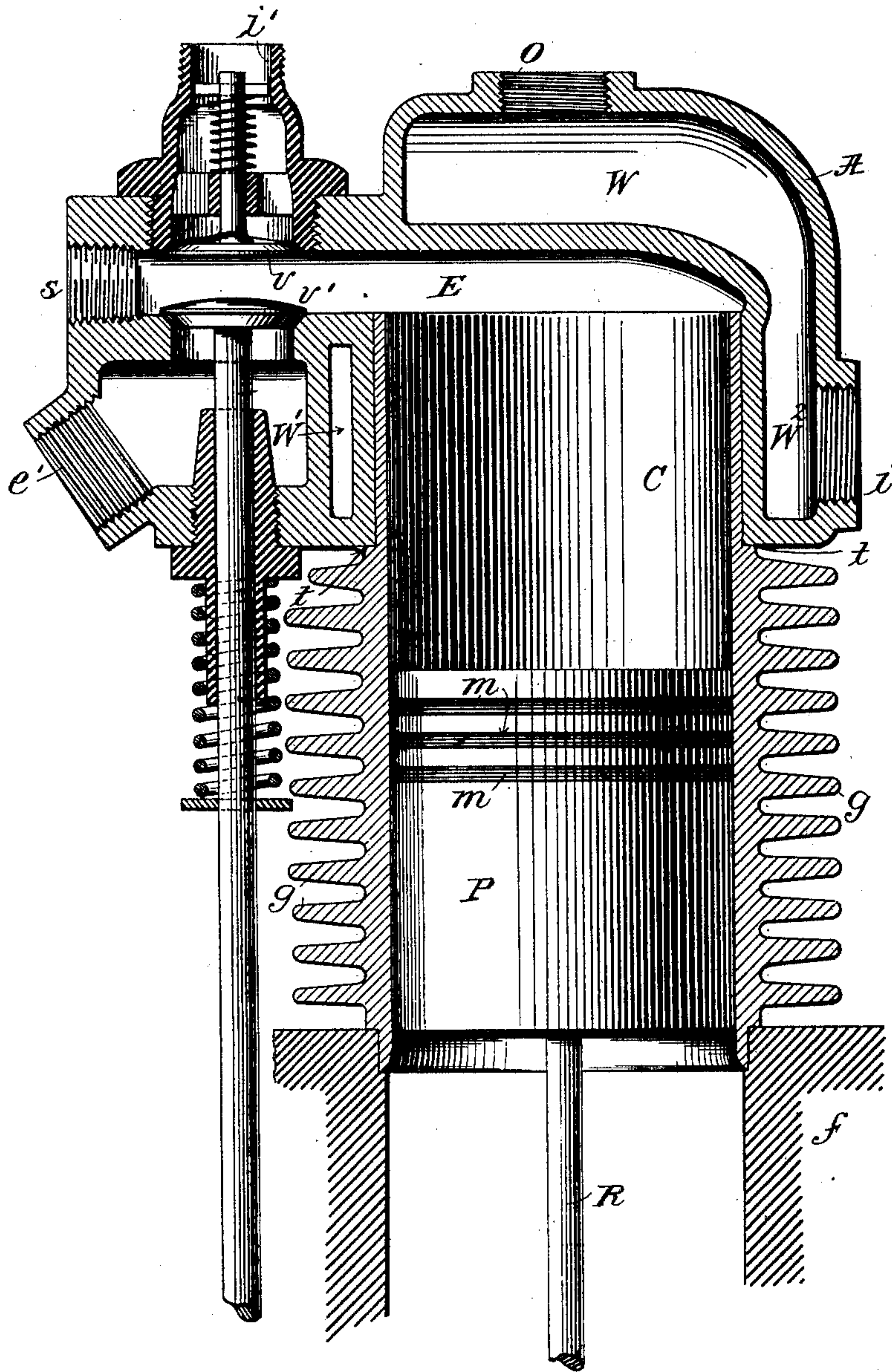
No. 679,410.

Patented July 30, 1901.

E. T. BIRDSALL.
EXPLOSIVE ENGINE.

(Application filed Aug. 3, 1900.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

EDWARD T. BIRDSALL, OF NEW ROCHELLE, NEW YORK, ASSIGNOR TO
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EXPLOSIVE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 679,410, dated July 30, 1901.

Application filed August 3, 1900. Serial No. 25,782. (No model.)

To all whom it may concern:

Be it known that I, EDWARD T. BIRDSALL, a citizen of the United States, residing at New Rochelle, in the county of Westchester and State of New York, have made a new and useful Invention in Explosive-Engines, of which the following is a specification.

My invention has for its object to provide means for more effectually cooling the parts of explosive-engines which usually become heated from the effect of the explosion of the gases therein and will be understood by referring to the accompanying drawing, which is a vertical sectional view of an explosive-engine embodying my improvement, the piston, piston-rod, and valves and their supporting valve-rods being shown in elevational view.

Prior to my invention it has been the custom to provide explosive-engines with radially-disposed gills around the body of the cylinder and the explosion-chamber, thus giving to them a relatively large heat-radiating capacity. It is found, however, by experience that even with the best disposition or arrangement of such heat-radiating gills it is not possible to keep the cylinder and the explosion-chamber sufficiently cool to effectually operate the engine, it being often necessary, as I have ascertained in connection with automobile-engines, to stop the engine for a sufficient time to allow it to cool. It is also old to cool explosive-engines through the combined effect of heat-radiating gills about the cylinder and a circulating water-jacket around the explosion-chamber.

My improvement consists in so combining these features that the circulating water in the water-jacket not only cools the explosion-chamber, but also the valves, valve-seats, and a large portion of the cylinder immediately adjacent to said chamber.

Referring now to the drawing in detail for a full and clear understanding of the invention, such as will enable others skilled in the art to construct and use the same, C represents the cylinder of an explosive-engine, having cast integral with the greater portion of the outer surface thereof heat-radiating gills *g g*, said cylinder being secured in the usual manner to a standard or base *f*. The upper portion of this cylinder is turned down in a

lathe with extreme accuracy to a point above the upper gill *g*, so as leave a shoulder *t*.

R is the piston-rod, P the piston, and *m m* the usual form of packing-rings therefor.

E is the explosion-chamber, and A the water-jacket therefor, said water-jacket and explosion-chamber being cast in one integral piece and in such manner that there is afforded a compound water-chamber *W W' W²*, extending around the explosion-chamber closely adjacent to the valves and also entirely around the upper portion of the cylinder C when in position resting upon the shoulder *t*.

i is the inlet, and *o* the outlet, of the water-jacket, and *i'* is the inlet, and *e'* the exhaust, for the gas or explosive agent, *s* being an inlet for the sparking plug or igniting device, all of said inlets being screw-threaded, as shown, for receiving the usual attachments and in the usual manner.

v v' are the usual spring-seated inlet and exhaust valves, the former secured in a detachable seat and both provided with the usual valve-rods and springs, as shown.

By providing the compound water-chamber *W W' W²*, which serves the function of cooling the explosion-chamber, the valves, valve-seats, and that end of the cylinder C adjacent thereto, I am enabled to operate successfully an explosive-engine under all conditions of usage, and particularly in connection with automobiles or motor-cars, where it is especially desirable that the engine should be kept at the lowest possible temperature.

I do not limit my improvement to the special details of arrangement herein shown. I believe it is broadly new with me to provide an explosive-engine with a water-jacket having a compound water-chamber which serves the multiple function of cooling the valves, the explosion-chamber, and that portion of the cylinder adjacent thereto, and my claims are generic as to this feature.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. An explosive-engine having a cylinder provided with heat-radiating gills; in combination with an explosion-chamber provided with a compound water-chamber surrounding the explosion-chamber and one end only of

the cylinder, the junction between said compound water-chamber and cylinder being effected by slipping the former over the latter in substantially the manner shown.

5 2. An explosive-engine having a cylinder provided with heat-radiating gills over a portion of its length; in combination with an explosion-chamber adapted to fit snugly over the remaining portion thereof and provided
10 with a compound water-chamber which surrounds the explosion-chamber and one end only of the cylinder, the lower end of said compound water-chamber resting against a shoulder on the outside of the cylinder and
15 adjacent to one of the heat-radiating gills, the arrangement being such that an absolutely-tight joint is effected between the two under all conditions of usage, substantially as shown and described.

20 3. An explosive-engine having a cylinder; in combination with an explosion-chamber provided with a compound water-chamber which fits snugly around one end of the cylinder so as to form an absolutely-tight joint
25 between the two, one branch W' of the com-

pound water-chamber being located between the valves and the cylinder, substantially as shown and described.

4. An explosive-engine provided with an explosion-chamber cast integral with a com- 30 pound water-chamber and adapted to fit snugly over one end of the cylinder of the engine in such manner that the circulating water cools both the cylinder and the explosion-chamber, one branch of the compound 35 water-chamber being located between the cylinder and the valves of the engine; said compound water-chamber and explosion-chamber being cast integral and located, when in position, with its lower end against a ledge or 40 shoulder on the outside of the cylinder, substantially as shown and described.

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

EDWARD T. BIRDSALL.

Witnesses:

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M. F. KEATING.