

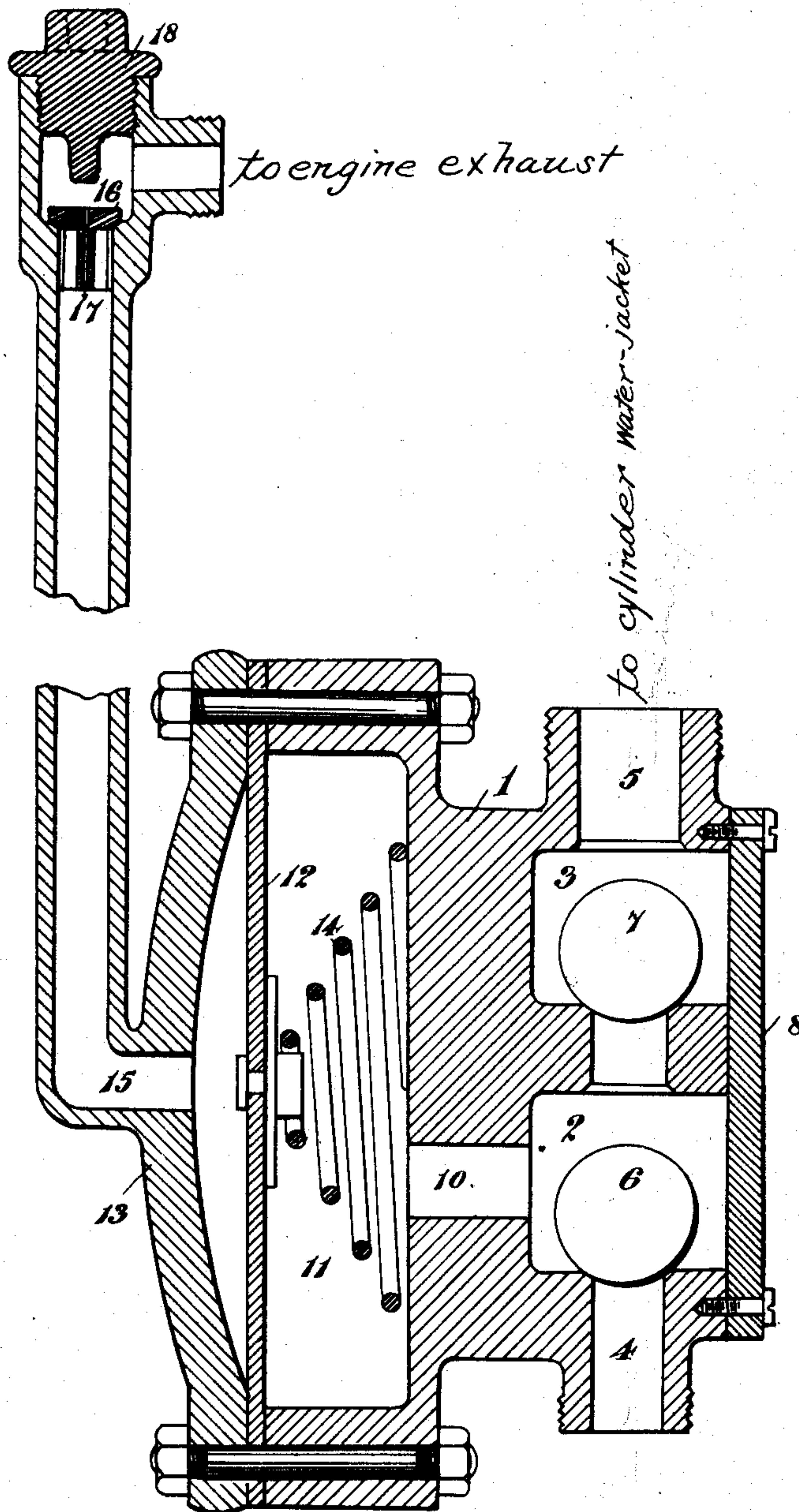
No. 668,954.

Patented Feb. 26, 1901.

C. E. DAWSON.
EXPLOSION ENGINE.

(Application filed Sept. 21, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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EXPLOSION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 668,954, dated February 26, 1901.

Application filed September 21, 1900. Serial No. 30,692. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ERNEST DAWSON, a subject of the Queen of Great Britain and Ireland, and a resident of Hogarth Works, Chiswick, in the county of Middlesex, England, have invented certain new and useful Improvements in Explosion-Engines, (for which I have made application for Letters Patent in Great Britain, No. 22,636, dated November 13, 1899,) of which the following is a specification.

My invention relates to improvements in connection with explosion or internal-combustion engines, and is more particularly applicable to such engines as are employed for tractive or propulsive purposes—for example, upon motor-cars or in launches.

The object of my invention is to economize the amount of water which it is necessary to carry with such engines for the purpose of cooling the motor-cylinder and also to dispense with the mechanically-operated pump and its attachments usually employed for circulating the cooling-water.

My invention consists in the particular construction and arrangement of parts hereinafter described, and particularly set forth in the claims.

In the accompanying drawing the figure is a sectional elevation of my improved automatic diaphragm-pump.

Referring to the drawing, I construct the water-jacket pump of a casting 1, which is provided with two valve-chambers 2 and 3, communicating at 4 and 5 with the inlet and outlet, respectively, of the supply of water to the engine-cylinder jacket. The valve-chambers are fitted with ball-valves 6 and 7, preferably constructed of rubber, and a cover-plate 8 is provided to enable the valves to be inserted or withdrawn when necessary.

The chamber 2 communicates by a passage 10 with a cylindrical vessel 11, formed upon the casting, within which vessel is stretched a flexible diaphragm 12, of leather or other suitable material, held circumferentially between a bolted cover 13 and the body of the casting. On the side of the diaphragm adjacent to the valve-chambers I provide a spring 14, which assists to return the diaphragm when it has been deflected from its unstrained position. To the space between the dia-

phragm and the cover I connect a vertical pipe 15, which communicates with the combustion-space or with the exhaust-pipe of the engine, according to the method of control which is adopted, through a differential check-valve 16. This valve is of the ordinary lift type and is provided with a small hole 17 through it, which permits some of the combustion products to pass through at each explosion into the space communicating with the cover side of the flexible diaphragm 12. A removable plug 18 is fitted to the check-valve chamber, which enables the valve to be withdrawn or replaced and also serves as a stop to limit its travel upward. The pipe 15 may, if desired, be filled with liquid, in which case the level should be some distance from the bottom of the valve in order to prevent the passing of the liquid into the cylinder on the charging stroke of the engine.

When an explosion takes place within the engine-cylinder, the pressure is transmitted through the small hole 17 in the check-valve to the diaphragm 12, the contracted opening preventing any danger of rupturing the diaphragm by the force of the explosion, and upon the exhaust-stroke the large opening caused by the rise of the lift-valve provides a large opening for the exit of the gases, which allows the spring 14 to return the diaphragm immediately to its place. A pulsating action is thus set up which pumps water through the cylinder-jacket, the passage of the water being controlled by the valves 6 and 7. The flow of water is thus regulated in proportion to the pressure attained by the explosions within the cylinder of and to the load upon the engine, and the cylinder is therefore maintained at a uniform temperature.

By this device positive circulation of the water through the water-jacket of an internal-combustion engine may be effected without the necessity of employing a mechanically-operated pump, and the amount of cooling-water required is reduced to a minimum.

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

1. In internal-combustion engines an automatically-acting water-jacket supplying and regulating pump, comprising a flexible spring-controlled diaphragm subject to the pressure

of the explosive charge or to the exhaust-gases on one side and on its other side acting upon the cooling-water of the cylinder-jacket, in combination with a differential check-valve
5 between the engine-cylinder and the flexible diaphragm and automatic non-return water-controlling valves, substantially as described.

2. In internal-combustion engines, an automatically-acting water-jacket supplying and
10 regulating pump comprising a casting having two valve-chambers fitted with non-return valves a diaphragm-chamber in communication with said valve-chambers, a flexible diaphragm partitioning said chamber, a diaphragm-controlling spring, a removable cover
15 for said chamber, a pipe for connection to the engine-cylinder, and a differential check-valve, substantially as described.

3. In internal-combustion engines, an automatically-acting water-jacket supplying and
20 regulating pump comprising a casting having two valve-chambers fitted with non-return valves, a diaphragm-chamber in communication with said valve-chambers, a movable spring-pressed diaphragm or partition in said
25 chamber, a pipe for connection to the engine-cylinder, and a check-valve therein having a contracted open passage through the same, substantially as described.

In witness whereof I have hereunto set my
30 hand in presence of two witnesses.

CHARLES ERNEST DAWSON.

Witnesses:

MATTHEW A. ADAMS,
ALBERT E. PARKER.