No. 627,304. Patented June 20, 1899.

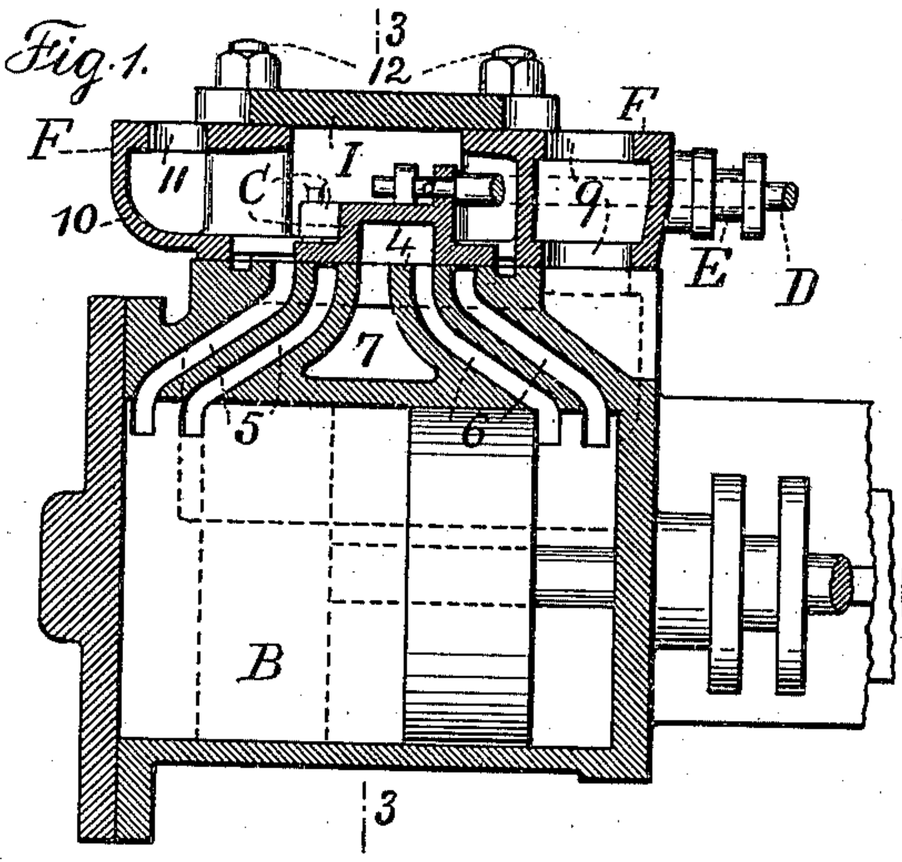
G. DE LAVAL.

STEAM ENGINE FOR DIRECT ACTING PUMPS.

(Application filed Aug. 9, 1898.)

(No Model.)

Fig. 1.



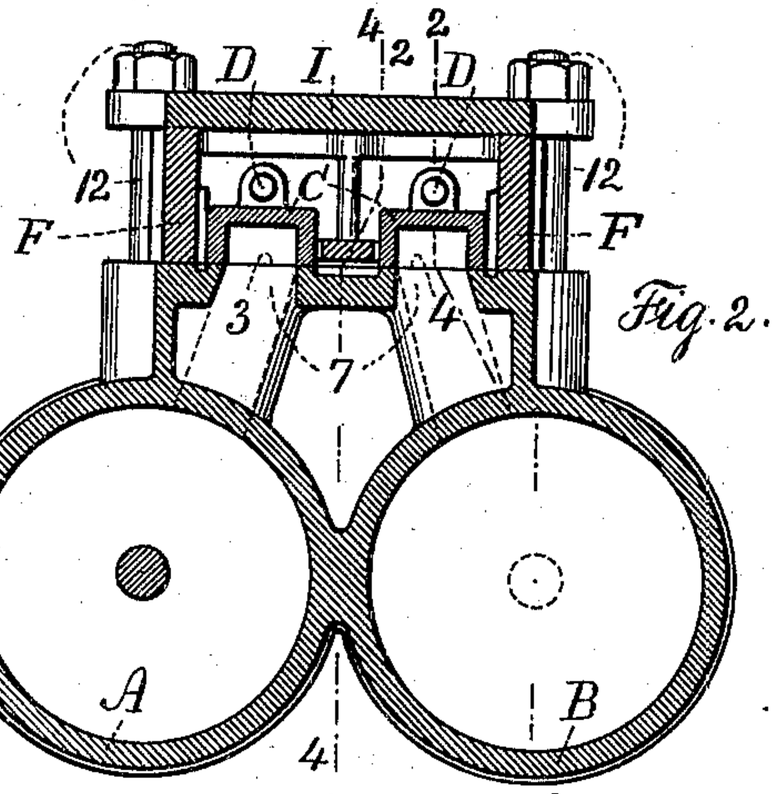


Fig. 2.

Fig. 3.

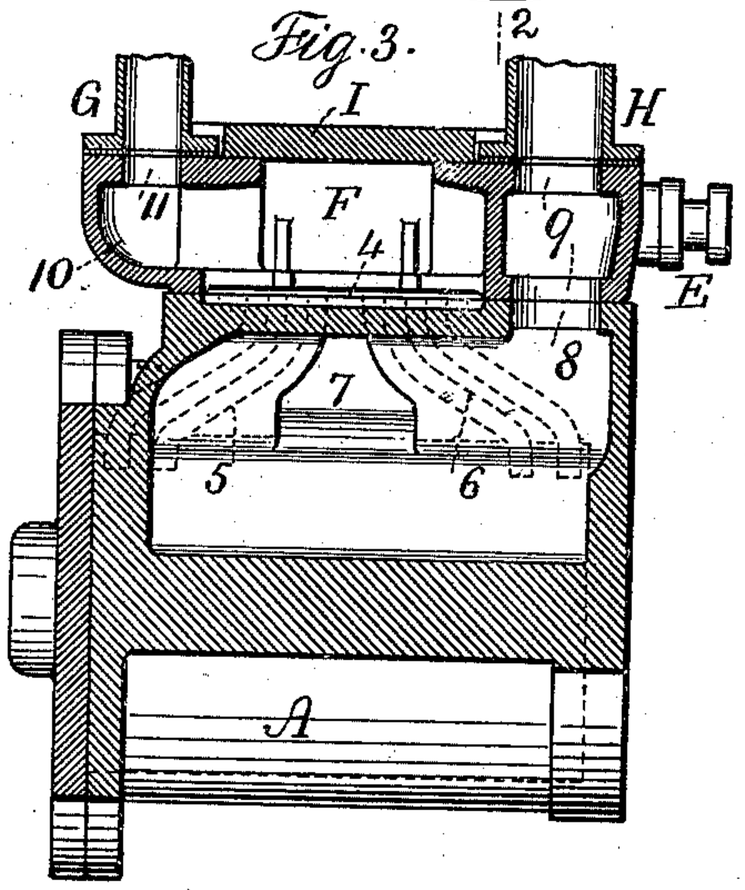


Fig. 4.

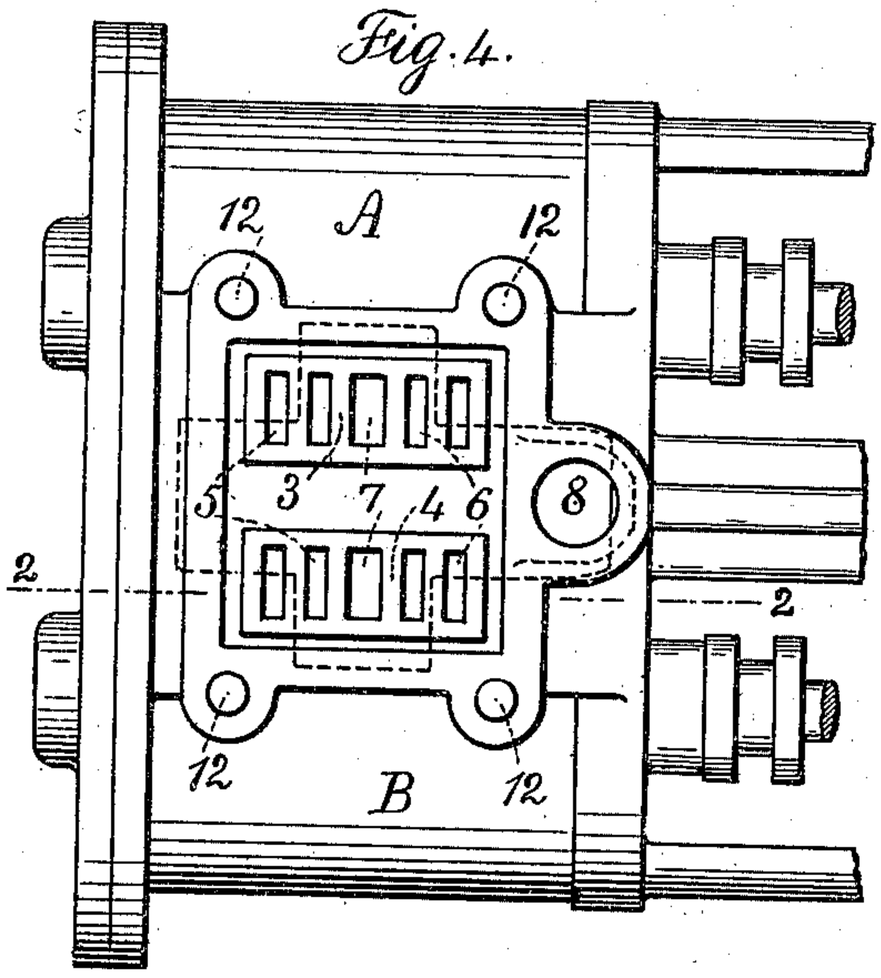


Fig. 5.

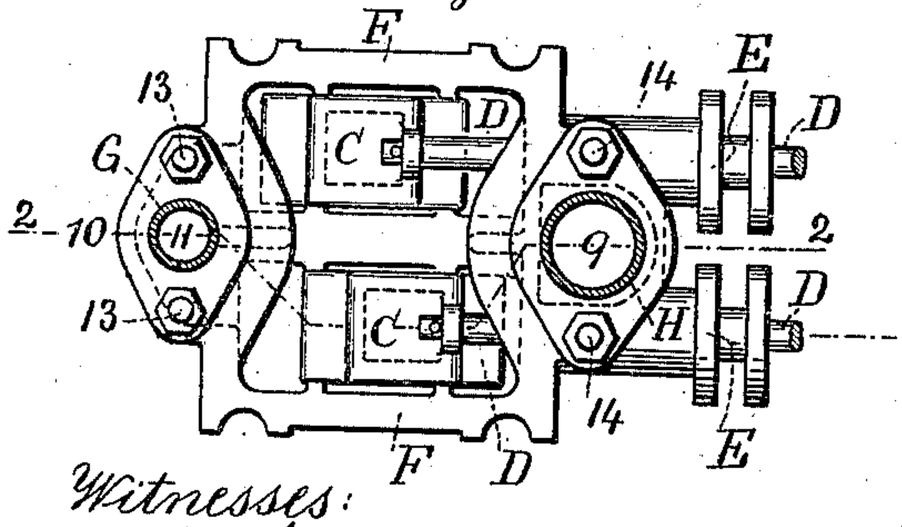
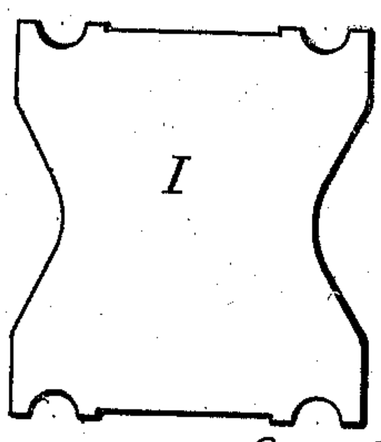


Fig. 6.



Witnesses:
J. Stair
Chas. A. Smith

Inventor:
George de Laval
by L. W. Serrell & Son
attys

UNITED STATES PATENT OFFICE.

GEORGE DE LAVAL, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR TO THE GEO. F. BLAKE MANUFACTURING COMPANY, OF NEW YORK, N. Y.

STEAM-ENGINE FOR DIRECT-ACTING PUMPS.

SPECIFICATION forming part of Letters Patent No. 627,304, dated June 20, 1899.

Application filed August 9, 1898. Serial No. 688,160. (No model.)

To all whom it may concern:

Be it known that I, GEORGE DE LAVAL, a citizen of the United States, residing at Cambridge, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Steam-Engines for Direct-Acting Pumps, of which the following is a specification.

In almost all instances the steam passing to the pumping-engine comes through a pipe leading down from above and the exhaust passes off through a pipe leading up from the engine. In engines for pumps that have heretofore been constructed it has been usual to connect the steam-supply pipe to the top of the valve-chest and to take off the exhaust at either one side or the other of the valve-chest or of the cylinder below the valve-chest. This has rendered it necessary to provide the exhaust-pipe with an elbow or bend and to make two openings, one at each side of the valve-chest or cylinder, so that one side or the other can be connected to the exhaust-pipe, according to which is most convenient in fitting up the engine.

The object of the present invention is to dispense with the lateral connections and elbows, especially for the exhaust-pipe, and to provide for taking off the exhaust from above the steam-chest, and the parts are arranged so as to use two adjacent steam-cylinders and one valve-chest for the two cylinders, and the present improvements are particularly available in cases where the valves are moved by a direct connection from the cross-head.

In the drawings, Figure 1 is a longitudinal section of the engine-cylinder and valve-chest near the line 2 2, Figs. 2, 4, and 5. Fig. 2 is a cross-section at the line 3 3, Fig. 1. Fig. 3 is a longitudinal section between the engine-cylinder and through the valve-chest at the line 4 4, Fig. 2. Fig. 4 is a plan view of the engine-cylinders and valve-seats. Fig. 5 is a separate plan view of the valve-chest and valves, and Fig. 6 is a plan view of the cover for the valve-chest.

The cylinders A and B are cast together, and they are provided with the valve-seats 3 4 and with steam and exhaust ports in the valve-seats, as usual. I have, however, represented two sets of ports 5 5 and 6 6 as passing to the respective ends of the cylinders and with the exhaust-port 7 in the middle. The valves C are to be of any desired character. Usually they are D slide-valves with valve-rods D passing out through the glands or stuffing-boxes E at the end of the valve-chest F. The special feature of my invention applies to this valve-chest F and to the exhaust-port that is cast with the cylinder and connects with the exhaust through the valve-chest.

It will be apparent that the cylinders form the bottom, and the valve-seat substantially the top, of an exhaust-chamber into which the ports 7 open, and the steam-ports 5 and 6 are passage-ways with separating-partitions cast between the valve-seats and the ends of the cylinder.

Instead of the exhaust-pipe passing off at either one side or the other of this exhaust-chamber I provide an opening at 8 up through the top of the chamber and below and between the stuffing-boxes E of the valve-chest, and I also make through the valve-chest an opening at 9, which is a continuation upward of the opening 8, and the valve-chest F has a hollow projection 10 at the rear, with an opening 11 through the top of the projection. Hence the steam-pipe G is connected at the opening 11 and the exhaust-pipe H is connected at the opening 9, both of them being at the top of the steam-chest F, and there is a cover I to the steam-chest, and the bolts 12 pass through the cover and into the plate containing the ports and forming the valve-seats.

It will now be apparent that the surface of the valve-seats and the surrounding surface upon which the lower edge of the steam-chest rests can all be in one plane, and hence the surfaces can be dressed or finished off smoothly with facility, and the lower edge of the valve-chest can also be finished off in one plane and the top surface of the valve-chest can be finished off in another and parallel plane, so as to receive the cover I and the pipes G and H, which may either be screwed into the openings or connected by flanges and bolts 13 14, and when the cover of the steam-chest is removed the steam-chest itself may be loosened from the cylinder and valve-seats, so as to be removed to give access to the valves, either within the valve-chest or as they may set upon

the valve-seats, the chest being removed. By this construction the parts are reliably connected with very little labor, or they can be disconnected and access obtained easily to the valves, and the exhaust-pipe and the steam-pipe are both connected to the steam-chest, and bends and lateral connections to the exhaust-pipe are avoided and the expense of construction materially lessened, because the exhaust is brought vertically and directly through the steam-chest at the opening 9, thereby enabling both the exhaust and the steam-pipes to be connected directly to the valve-chest instead of to the engine-cylinders.

I claim as my invention—

1. The combination with the engine-cylinder and the flat valve-seat upon the same having an exhaust-port opening downwardly through the seat into the chamber below, of a separate valve-chest resting at its lower edge upon the surface in the same plane as the valve-seat, the valve-chest having a vertical opening into it at one end for the steam, and a flat surface on the top for the connection of the steam-pipe and a vertical opening through the other end of the steam-chest corresponding to a vertical opening into the exhaust-chamber above the cylinder, the top of the valve-chest at the exhaust-opening being adapted to receive the exhaust-pipe and a cover over the valve-chest and bolts for securing the same and the valve-chest to the engine-cylinder, substantially as set forth.

2. Two engine-cylinders, flat valve-seats, ports connecting to the ends of the cylinders and ports opening down into the exhaust-chamber, the parts being cast together and the top surface dressed off in a plane to form the valve-seats and to receive the steam-chest, in combination with the valves and a steam-chest with the upper and lower edges of the chest dressed off in parallel planes, the steam-chest having at the top and at one end an opening for receiving the vertical steam-pipe and an opening through the other end for the exhaust, the exhaust-pipe being connected to the top of the chest and a separate removable cover to the valve-chest and bolts for securing the same and the valve-chest to the casting containing the engine-cylinders and the valve-seats, substantially as set forth.

Signed by me this 4th day of August, 1898.

GEORGE DE LAVAL.

Witnesses:

ALVAH F. DOLE,

JOHN J. FINLEY.