

(No Model.)

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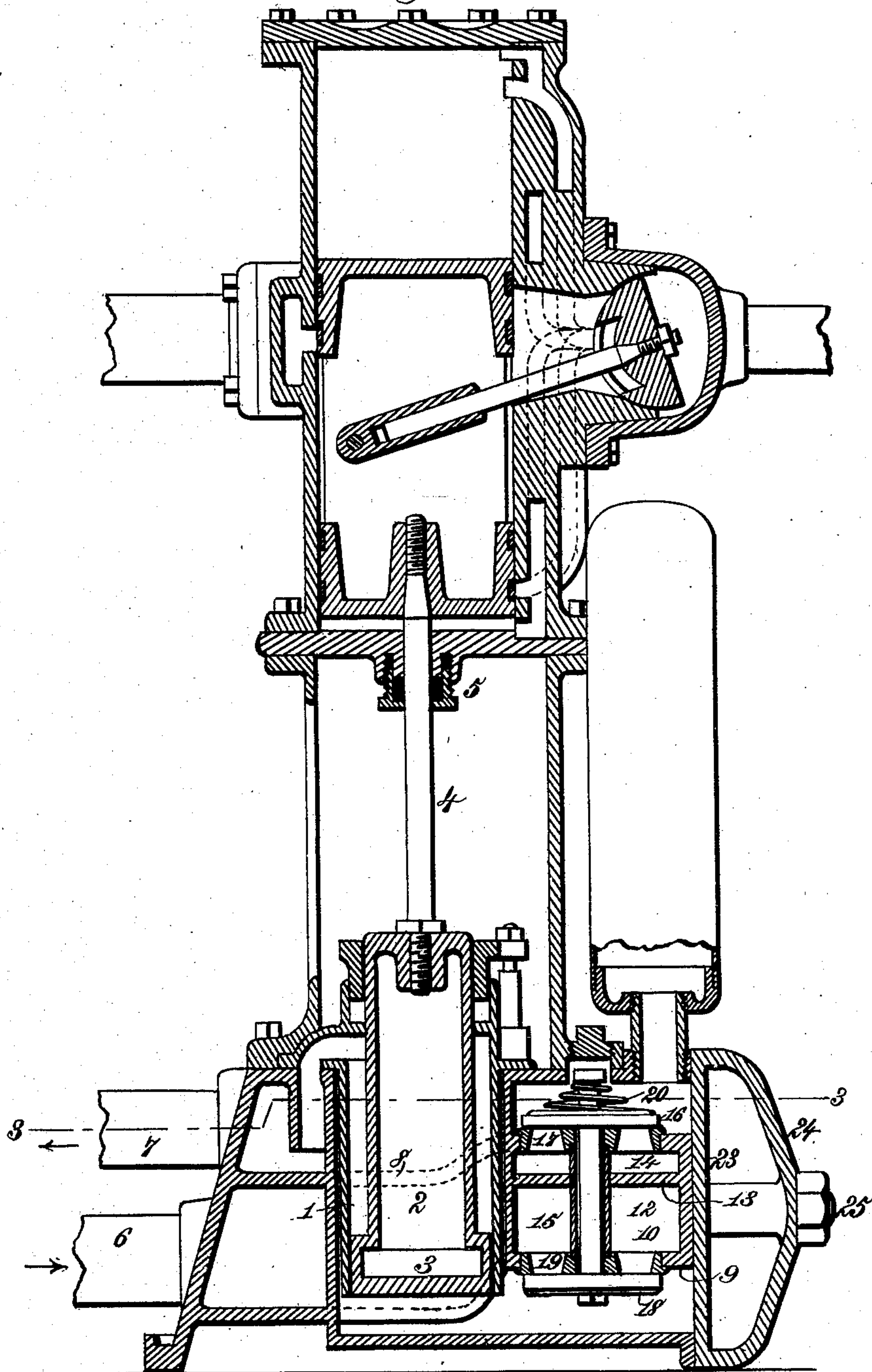
E. G. SHORTT.

DUPLEX PUMPING ENGINE.

No. 389,770.

Patented Sept. 18, 1888.

Fig. 1.



Witnesses.
Robert G. Smith
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Inventor.
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(No Model.)

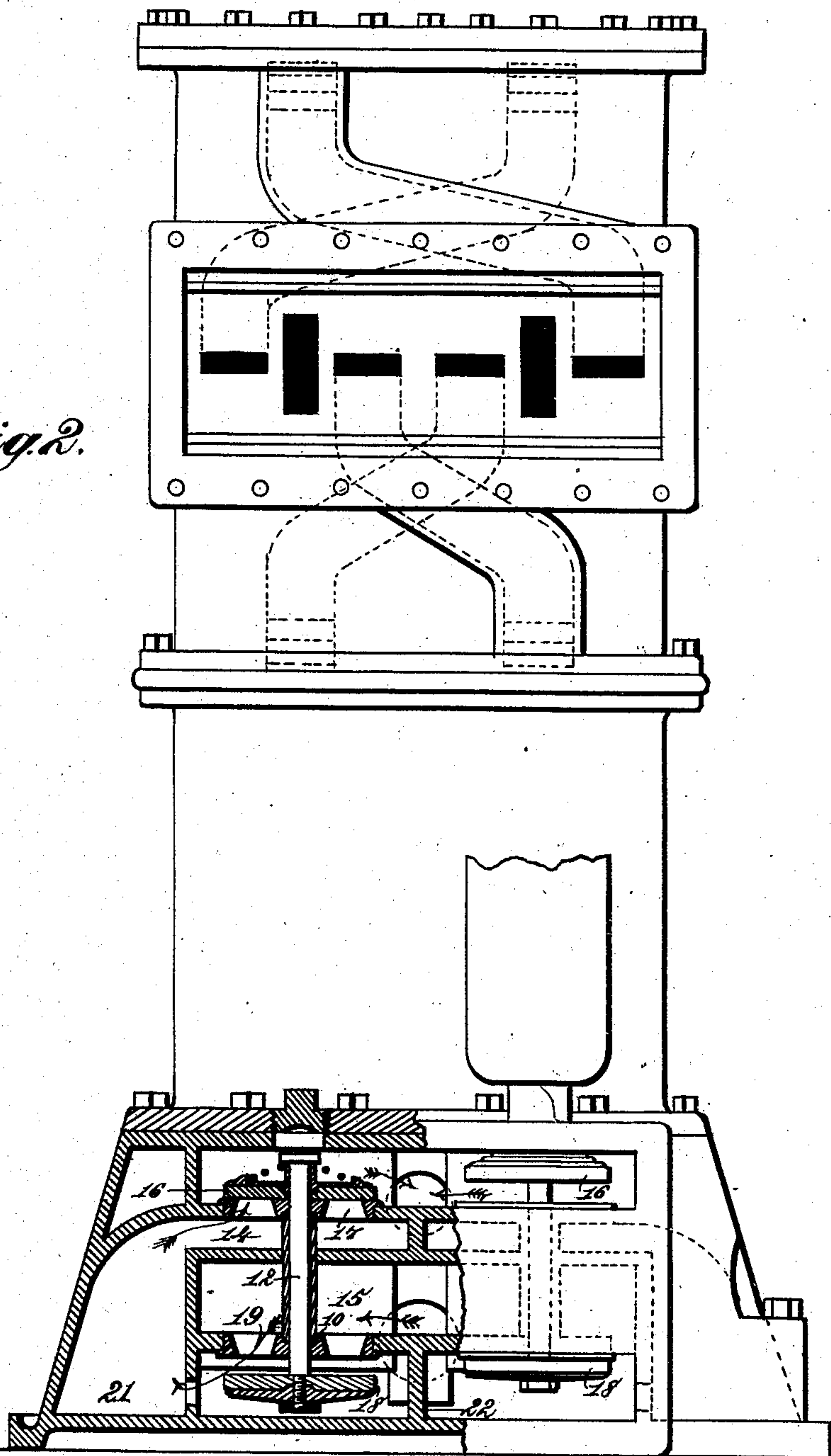
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Fig. 2.



Witnesses.
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(No Model.)

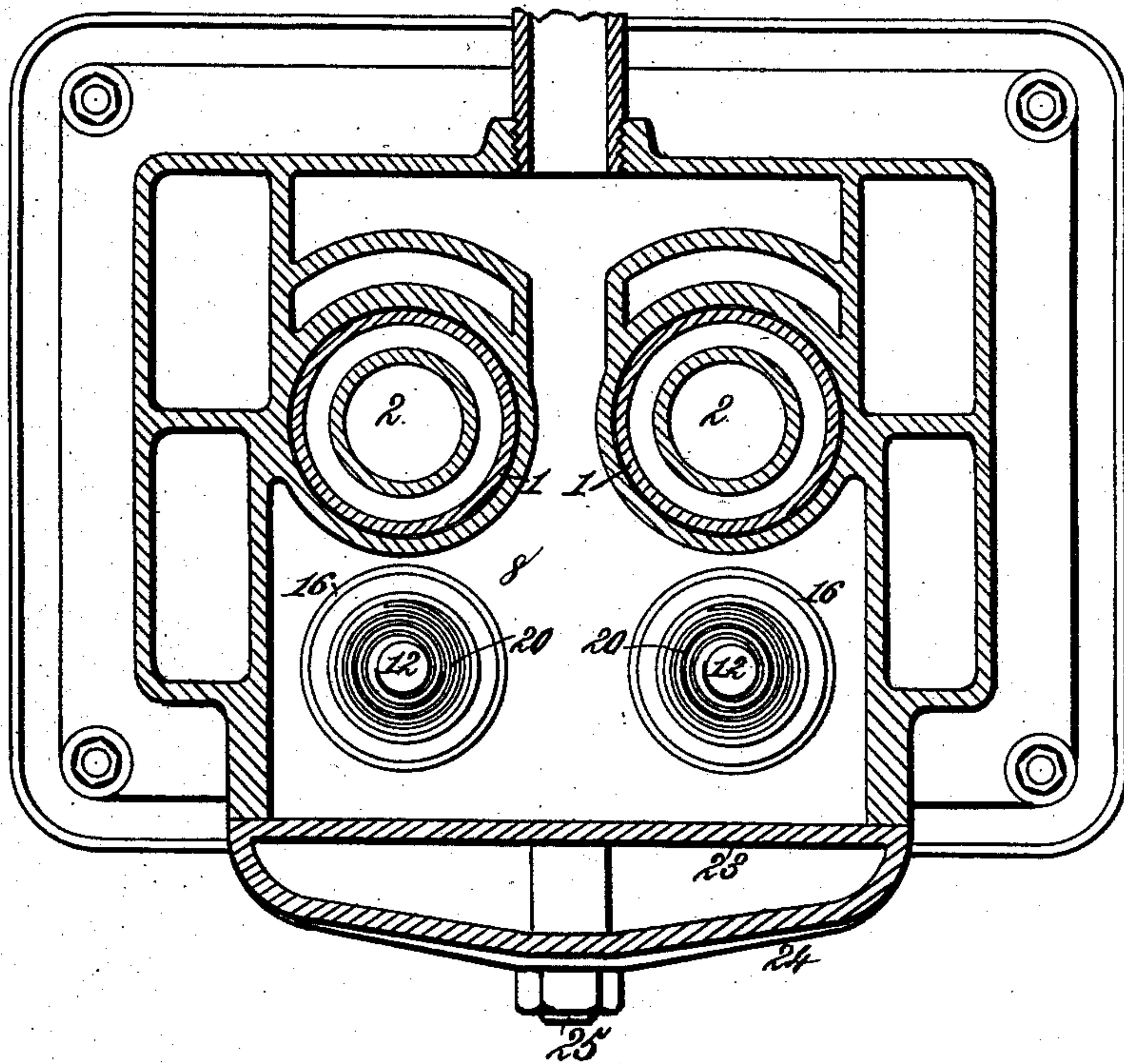
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Fig. 3.



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UNITED STATES PATENT OFFICE.

EDWARD G. SHORTT, OF CARTHAGE, NEW YORK.

DUPLEX PUMPING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 389,770, dated September 18, 1888.

Application filed April 7, 1888. Serial No. 269,942. (No model.)

To all whom it may concern:

Be it known that I, EDWARD G. SHORTT, a citizen of the United States, residing at Carthage, in the county of Jefferson and State of New York, have invented new and useful Improvements in Duplex Pumping-Engines, of which the following is a specification.

My present invention relates to duplex pumping-engines, and the purpose thereof is to provide an improved construction and arrangement of the parts constituting the pumping mechanism, whereby the actuating mechanism shall be rendered effective at the initial stroke, and whereby, also, the pump shall be operative at all times, whether the pump-casing be filled or empty.

To these ends my invention consists in the several novel features of construction and new combinations of parts hereinafter fully described, and then definitely pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical section showing part of the duplex pumping mechanism in connection with the steaming mechanism. Fig. 2 is a front elevation, partly in section, showing the same parts. Fig. 3 is a horizontal section on the line 3 3, Fig. 1.

In the said drawings, the reference numeral 1 denotes the duplex pumping-cylinders, in each of which moves a piston, 2, the latter consisting of a cylindrical body projecting above the mouth of the cylinder and having a head, 3, suitably packed therein. Each piston is connected directly to the steam-piston above it by a piston-rod, 4, and is guided by the packing-box 5, in which its cylindrical body moves. The inlet and outlet to the pump are preferably located at the rear of the casing, and consist of two pipes, 6 and 7, opening one above the other into the pumping-chamber. The inlet-passage within the latter is separated from the outlet by a diaphragm, 8, whereby the two currents are prevented from mingling.

Directly in front of each pump-cylinder 1 is arranged a valve-casing, 9, having a central opening, 10, to receive the valve-stem 12. The valve-chamber is divided by a diaphragm, 13, into a forcing-compartment, 14, and a suction-compartment, 15, below, the latter being of

the greater dimensions. Upon the valve-stem 12 is mounted rigidly a valve, 16, closing the inlet-port 17, and upon the opposite end of said valve-stem is mounted a valve, 18, closing the ports 19, which permit the outgoing current. The construction of the valve and valve-stem is such that the former shall have a limited movement upon the latter, and, for purposes to be explained hereinafter, a spring, 20, of any suitable character, is interposed between the top of the valve 18 and the end of the valve-stem 12, said spring having sufficient power to raise the stem and the valve 16, and thereby close both the inlet and the outlet ports.

When either pump-cylinder rises—as, for example, that shown in Fig. 1—the valve 18 opens and permits the water to flow from the inlet chamber or passage into the pump-cylinder behind the piston. As the latter descends, the valve 18 closes, the water passes from the pump-cylinder under said valve, through the opening 21 in the wall, thence up into the outlet-chamber, and, raising the valve 16, it passes to the pipe 7. A diaphragm, 22, separates the inlet-passages beneath the valve-casings, to prevent the pump-piston from disturbing the inlet-valve in the adjacent casing, which must act alternately therewith.

The spring 20 is practically useful only when the engine is started without water enough in the pump-casing to govern the action of the valve. In such case it would be necessary either to fill or partly fill the pump, or to run the engine rapidly enough to create a sufficient current of air to lift the valve 18 and its stem. By employing the spring 20 for this purpose the pump is always ready to work at the first stroke.

The front of the inlet and outlet chambers is closed by a bonnet consisting of a flat plate, 23, and a common shell, 24, formed thereon. A single central bolt, 25, passing through the latter, through the plate 23, and into the casing, serves to secure the closing-plate firmly, and avoids the necessity of bolting at numerous points on its edge.

I have shown the pumping mechanism as connected with and operated by the duplex steaming mechanism which constitutes the subject-matter of my application filed December 15, 1887, Serial No. 258,013, and I there-

fore make no claim in this case to such steaming mechanism.

What I claim is—

1. In a pumping-engine, the combination, 5 with a duplex pumping mechanism, of duplex valve-casings having separate inflow and outflow chambers, valve-stems arranged vertically and passing through both, a valve rigidly mounted on the lower end of said stem 10 and opening to permit inflow, and a valve loosely mounted on the upper end of said stem and opening to permit outflow, substantially as described.

2. The combination, with duplex valve casings and with an inflow-chamber and outflow-chamber separated by a diaphragm, 8, and having communication with said valve-casings, of the vertical valve-stems 12, the valves 16, rigidly mounted on the lower ends of the same, 20 the valves 17, loosely mounted on the upper ends of said valve stems, the springs 20, interposed between said valves 17 and the ends of

the valve-stems, the cylinders 1, the pistons 2, and actuating mechanism giving alternate action to said pistons, substantially as described. 25

3. The combination, with a valve-casing having a diaphragm separating the same into an inflow and outflow chamber, of a central valve-stem arranged within said casing, and a 30 valve opening to the suction of the pump-cylinder and closed by the force of the outgoing current on the same stem above the forcing-chamber and closing to the inflow and opening to the outgoing current, both valves being normally closed by a spring acting upon 35 the adjustable valve and on the valve-stem, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD G. SHORTT.

Witnesses:

C. OBERLY,

A. A. COLLINS.