

No. 778,027.

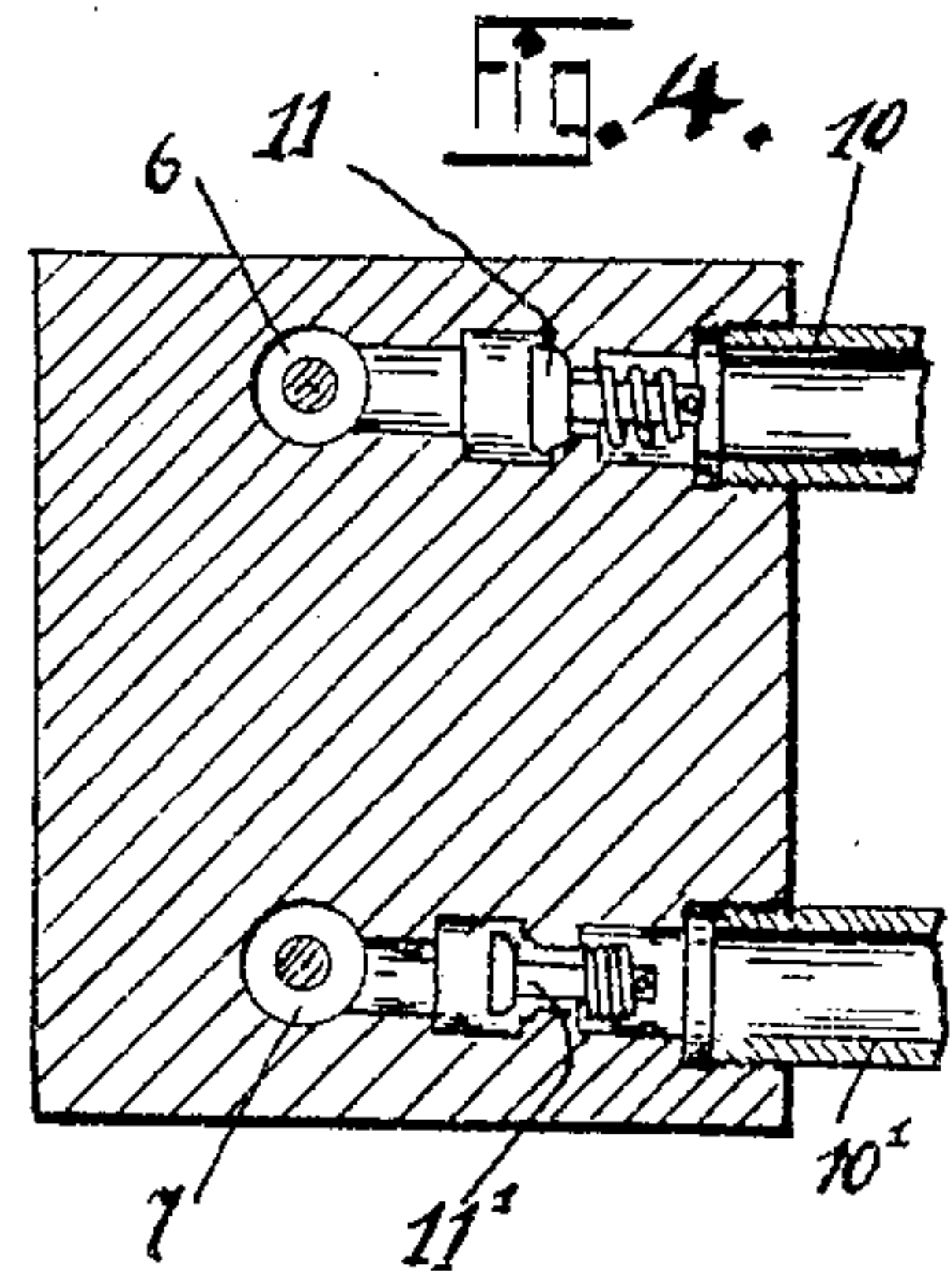
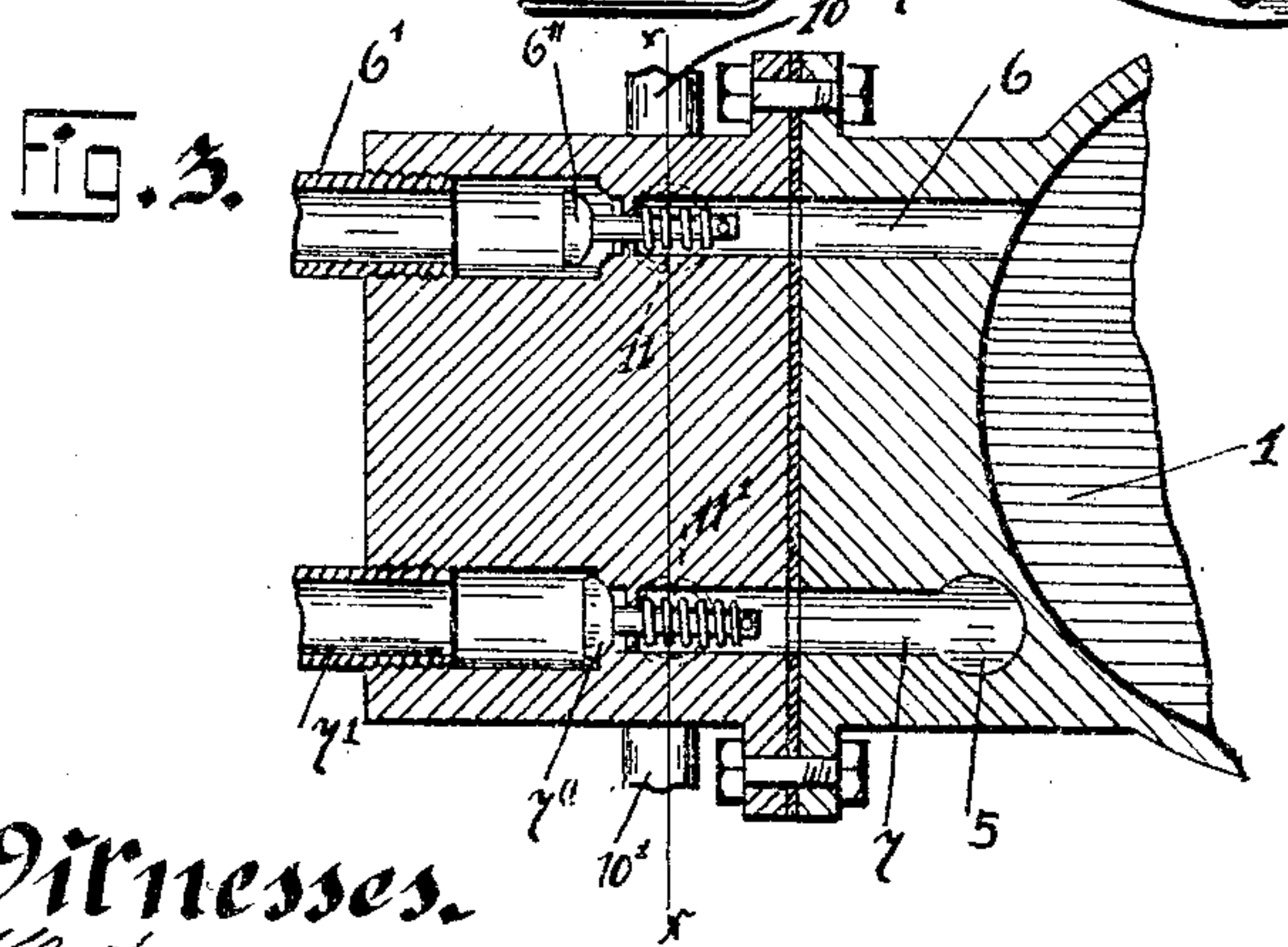
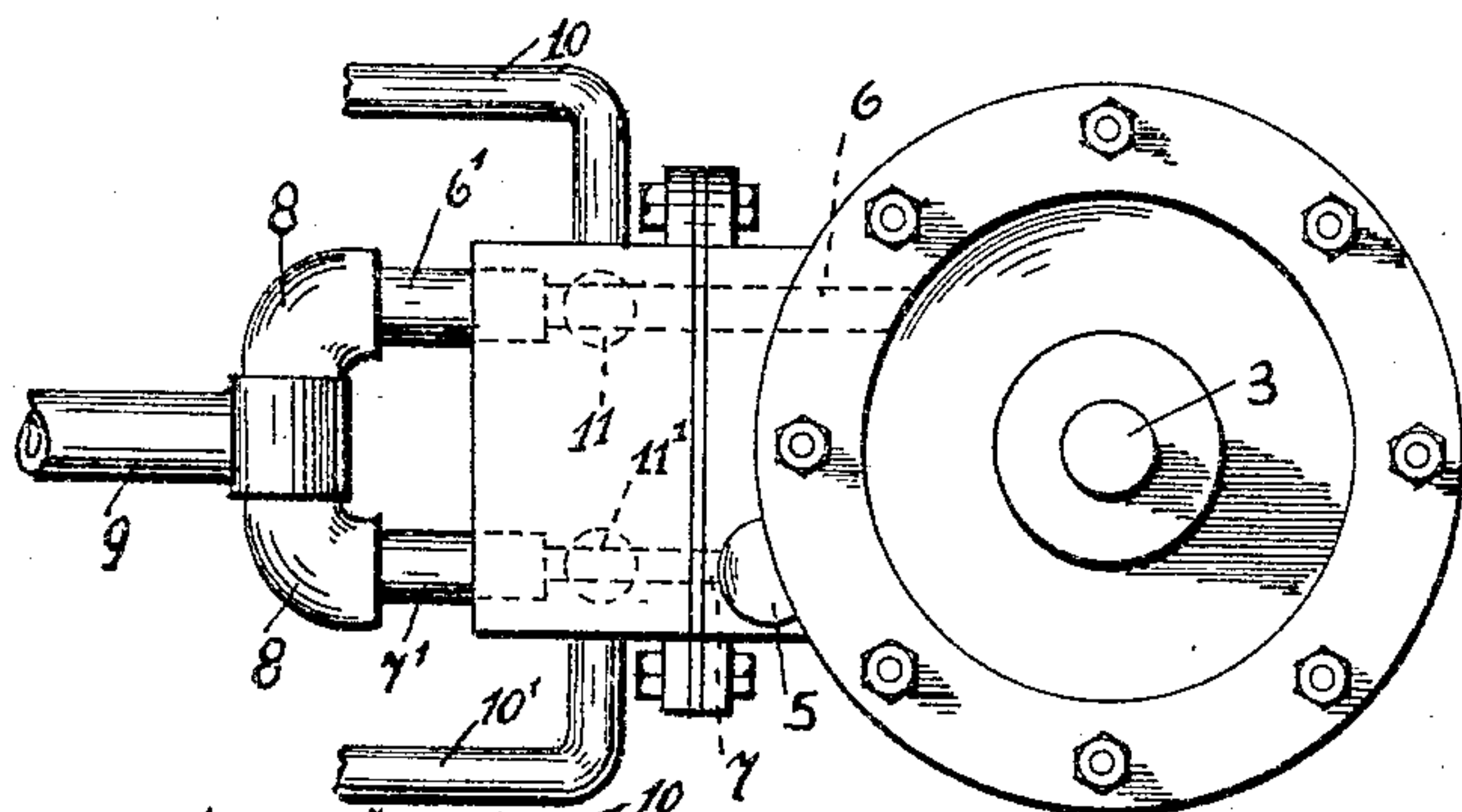
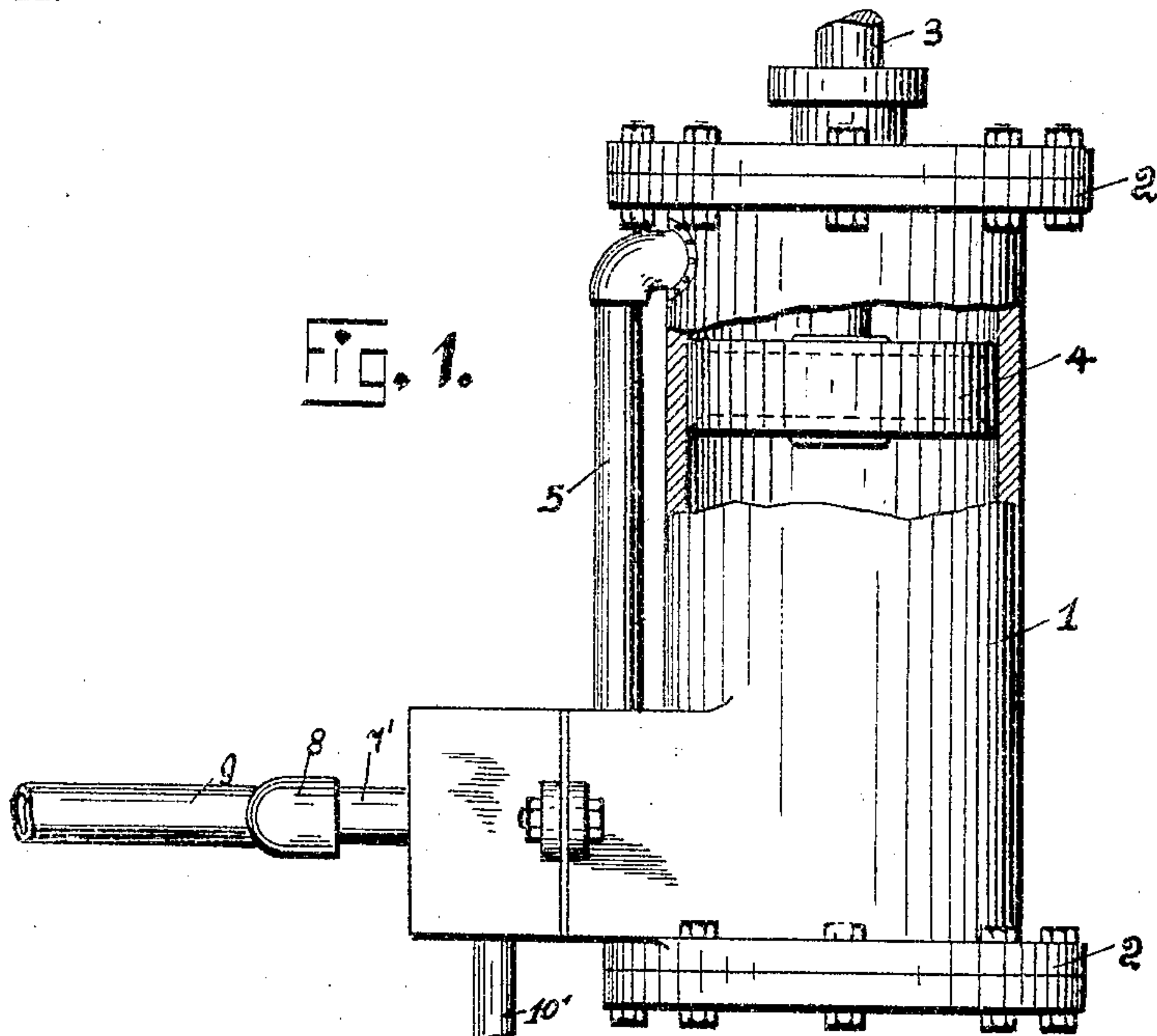
PATENTED DEC. 20, 1904.

E. FREI.

PUMP.

APPLICATION FILED SEPT. 9, 1904.

NO MODEL.



Witnesses.
C. Klottermann,
E. E. Potter.

Inventor.
Emil Frei.
St. C. Ewert & Co.
Attorneys.

UNITED STATES PATENT OFFICE.

EMIL FREI, OF ALLEGHENY, PENNSYLVANIA.

PUMP.

SPECIFICATION forming part of Letters Patent No. 778,027, dated December 20, 1904.

Application filed September 9, 1904. Serial No. 223,818.

To all whom it may concern:

Be it known that I, EMIL FREI, a citizen of Switzerland, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Pumps, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in pumps, and has for its object the provision of novel means whereby a pump will discharge at both the upward and downward stroke of the piston and will also feed at the upward and downward stroke of the piston.

Another object of my invention is to provide a number of check-valves in the inlet and outlet ports that will alternately open and close at each stroke of the piston.

My invention further aims to provide a pump that will be extremely simple in construction, strong, durable, comparatively inexpensive to manufacture, and highly efficient in its operation.

With the above and other objects in view the invention consists in the novel construction, combination, and arrangement of parts to be hereinafter more fully described, and specifically pointed out in the claim.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this application, wherein like numerals of reference indicate like parts throughout the several views, in which—

Figure 1 is a front elevation of my improved pump, showing a portion of the cylinder in vertical section. Fig. 2 is a top plan view thereof. Fig. 3 is a fragmentary longitudinal sectional view. Fig. 4 is a transverse vertical sectional view taken on the line *xx* of Fig. 3.

In the drawings the cylinder 1 of the pump is of the ordinary construction and is provided with cylinder-heads 2 2 and the ordinary piston-rod 3, carrying the piston 4, operating in the cylinder 1. This cylinder 1 is formed with an abutment at one end and is provided with an inlet-pipe 5, which serves as an inlet-pipe when the piston 4 is operated downwardly and serves as an outlet-pipe when the piston

4 is making its upward stroke. An inlet and outlet port 6 communicates with the lower end of the cylinder. The said pipe 5 communicates with a port 7, which is formed in the aforesaid abutment and which extends at right angles to the pipe 5. These ports 6 and 7 communicate with discharge-pipes 6' and 7', which are connected to elbows 8 8 and lead into a discharge-pipe 9, which feeds the boiler. (Not shown in the drawings.) Check-valves 6'' and 7'' are interposed between the port 6 and discharge-pipe 6' and port 7 and discharge-pipe 7', respectively. Communicating with the ports 6 and 7 are feed-pipes 10 10', in which are also secured check-valves 11 and 11'.

The operation of my improved pump is as follows: We will assume that there is a water-pressure above and below the cylinder in the position as shown in Fig. 1 of the drawings and that the piston is traveling downwardly. The water will then be discharged through the port 6 at the bottom of the cylinder into the discharge-pipe 6', thereby opening the check-valve 6'' and simultaneously closing the check-valve 11 of the feed-pipe 10, thus permitting the water to be discharged through the elbow 8 in the discharge-pipe 9 and thence into the boiler. Simultaneously with the downward stroke of the piston the valve 11' of the feed-pipe 10' will be opened and will feed the water through the pipe 10', port 7, and pipe 5 into the upper portion of the cylinder and by this suction will simultaneously close the valve 7'' of the discharge-pipe 7'. We will now assume that the piston has completed its downward stroke, and upon its upward stroke the following operation takes place. The water will be discharged through pipe 5 from the upper portion of the cylinder into the port 7, opening the valve 7'', simultaneously closing the valve 11', and permitting the water to be discharged through pipe 7' into the discharge-pipe 9, leading to the boiler. Simultaneously with this operation the check-valve 6'' will be closed and the check-valve 11 will be opened, permitting the water to enter through pipe 10 and thence into the cylinder.

The many advantages obtained by the use

of my double-acting pump will be readily apparent from the foregoing description taken in connection with the accompanying drawings.

It will be noted that various forms of check-valves may be employed to accomplish the desired results, and I do not wish to limit myself to any particular form of check-valve, automatic or gravity valve, and it will further be noted that various slight changes may be made in the general construction and arrangement of the discharge and feed pipes without departing from the spirit of my invention.

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

In a pump the combination of a cylinder,

and piston, said cylinder having an abutment at one end formed with parallel ports, one of which leads into the cylinder, with check-valves disposed in each port, separate outlet-pipes communicating each with one of said ports, a pipe leading from one of said ports to the end of the cylinder opposite that into which the other of said ports leads, inlet-pipes leading to both said ports, check-valves arranged between said inlet-pipes and said ports.

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

EMIL FREI.

Witnesses:

E. E. POTTER,
H. C. EVERT.