

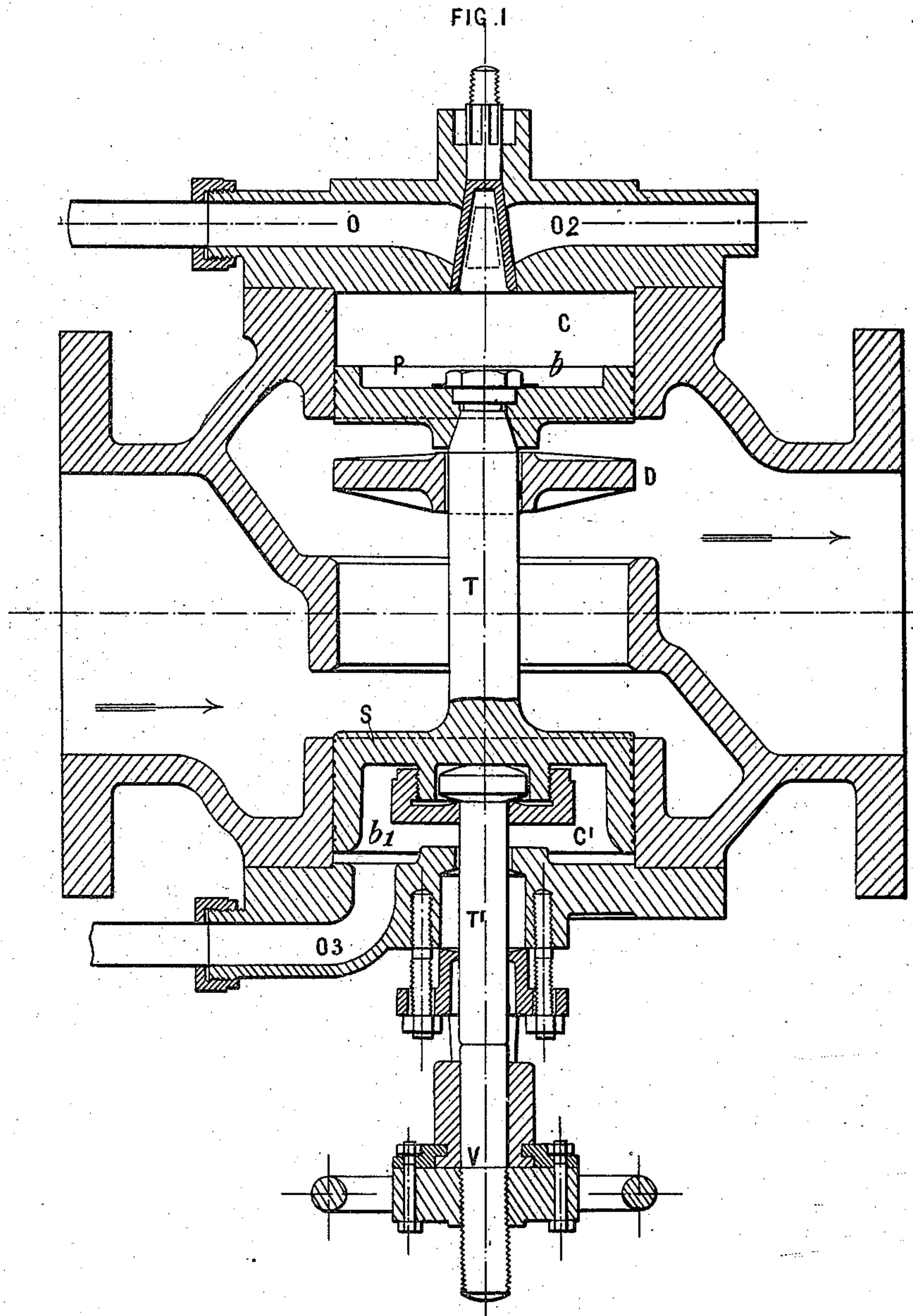
(No Model.)

3 Sheets—Sheet 1.

A. BOUCHER.
STEAM VALVE.

No. 544,950.

Patented Aug. 20, 1895.



Witnesses.

Dennis Sumbly,
Robert Everett.

Inventor

Alexandre Boucher.
By James L. Norris.
Atty

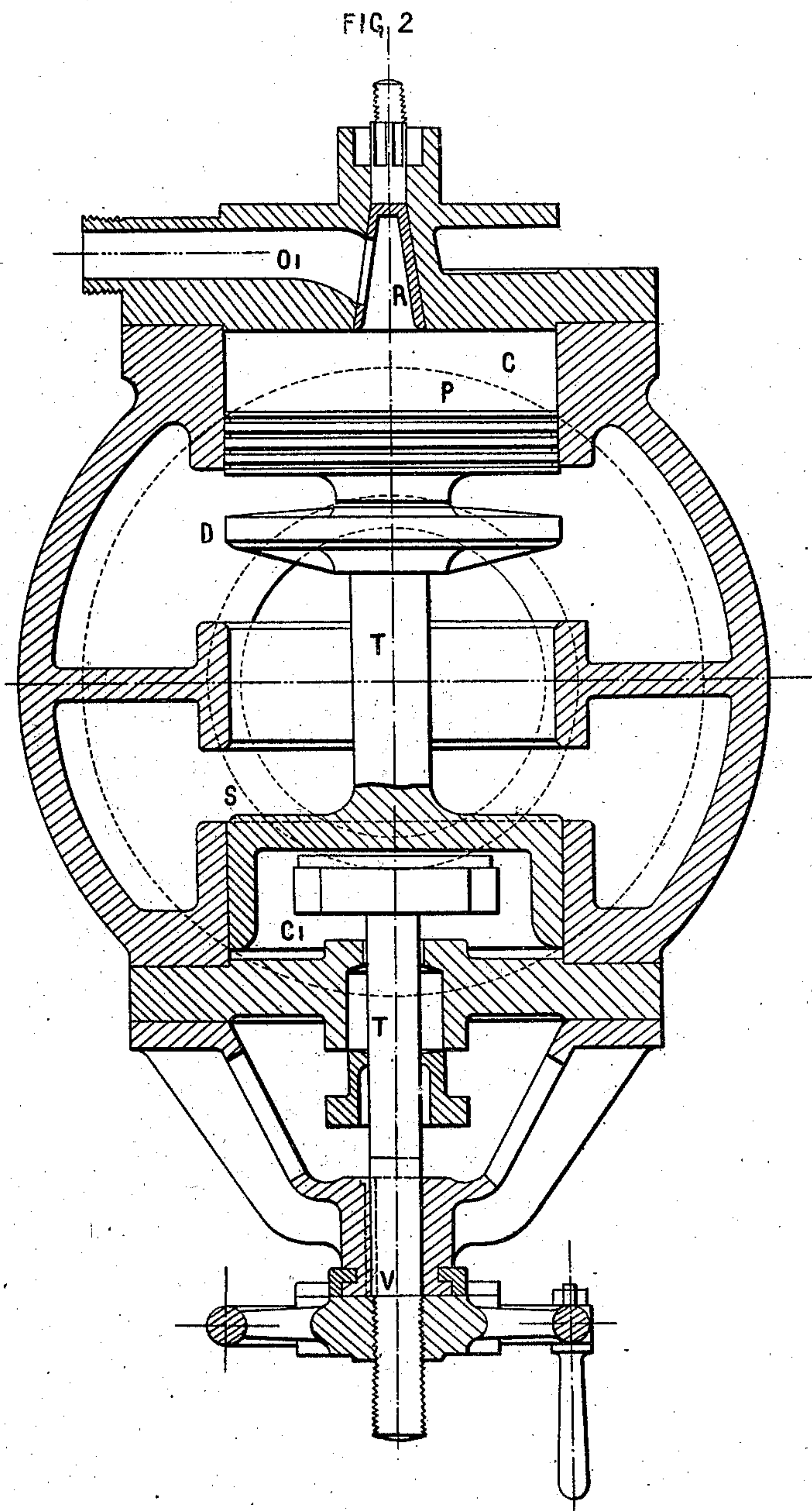
(No Model.)

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A. BOUCHER.
STEAM VALVE.

No. 544,950.

Patented Aug. 20, 1895.



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(No Model.)

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A. BOUCHER.
STEAM VALVE.

No. 544,950.

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FIG. 3

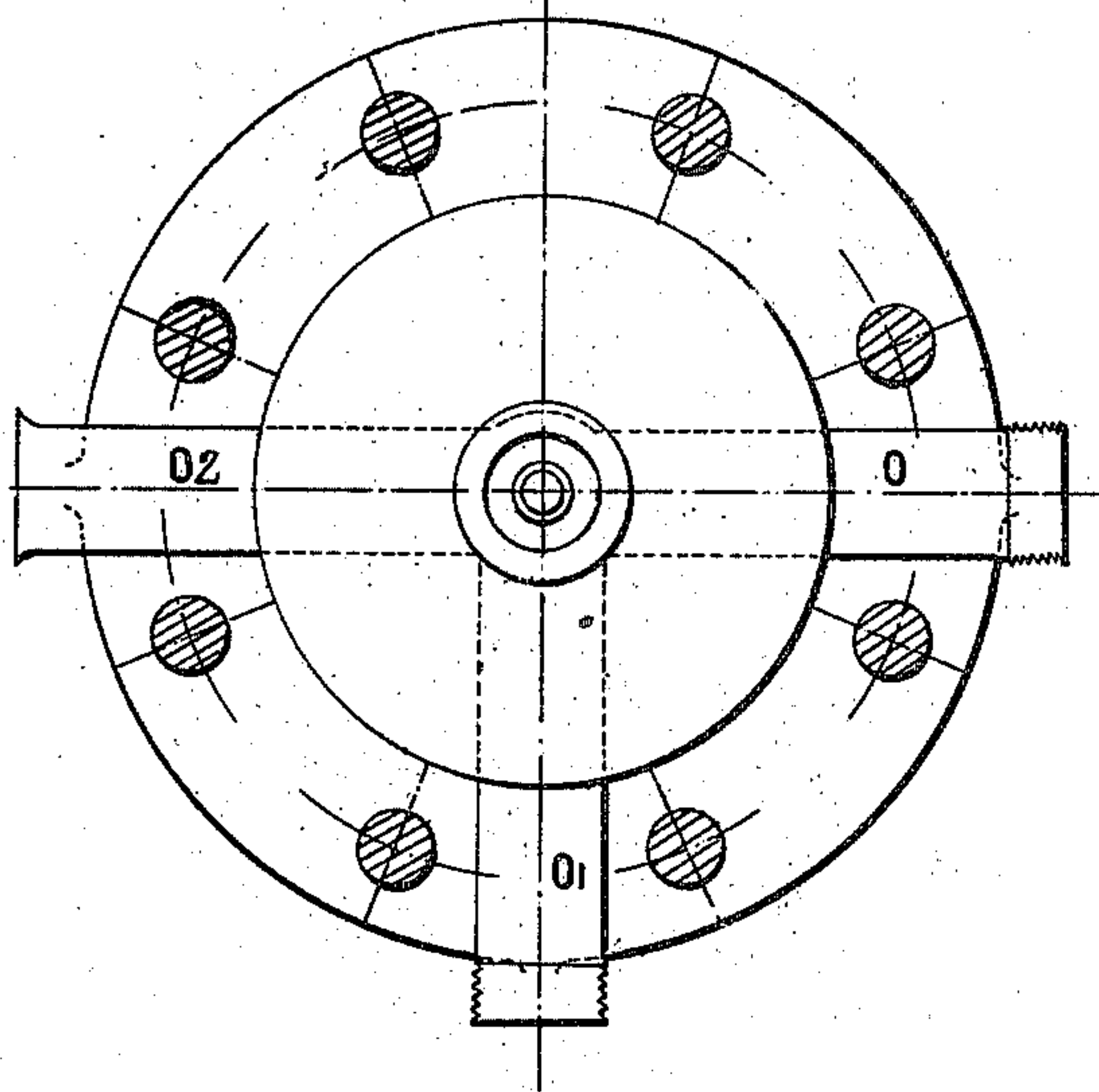
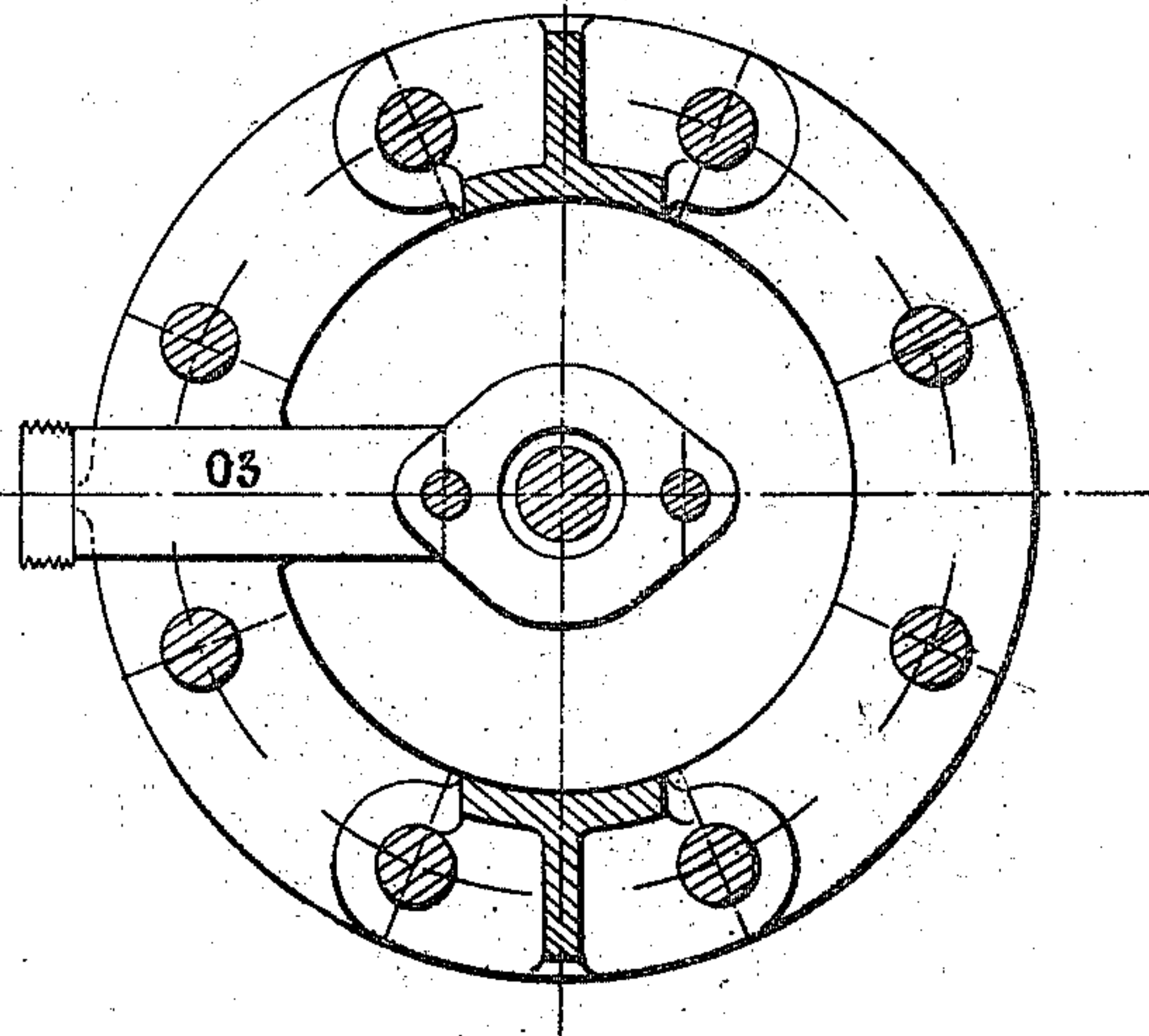


FIG. 4



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UNITED STATES PATENT OFFICE.

ALEXANDRE BOUCHER, OF ST. PETERSBURG, RUSSIA.

STEAM-VALVE.

SPECIFICATION forming part of Letters Patent No. 544,950, dated August 20, 1895.

Application filed June 6, 1895. Serial No. 551,880. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDRE BOUCHER, a citizen of France, and a resident of St. Petersburg, Russia, have invented a new and useful Improvement in Steam-Valves, of which the following is a specification.

This invention relates to steam stop-valves, and has for its object to provide a steam-actuated valve of novel and improved construction for automatically controlling the supply of steam from a boiler or battery of boilers to an engine; and to this end it consists in the novel construction and the combination and arrangement of parts hereinafter described and pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figures 1 and 2 show the apparatus in longitudinal sections at right angles to each other. Figs. 3 and 4 show in plan a top view and under side view of the said apparatus.

The valve proper S carries on its rod T a piston P of equal diameter to the said valve and moving in a cylinder C and communicating by a cock R with passages O, O', and O², leading, respectively, to the boiler, the conduit or steam-pipe, (of the engine,) or the atmosphere. The valve itself forms a second piston, moving in the cylinder C' and in constant communication with the boiler by means of the passage O³. The rod T' forms an extension of the rod T and passes through a stuffing-box and out of the valve-chest, its outer end bearing against a screw V, which is used for adjusting the valve on its seat and keeping it there in position.

The surface b' of the valve S has an area smaller than that of the surface b of the piston P, the difference between the respective areas being equal to the sectional area of the valve-rod T', and therefore if both these surfaces have the same pressure of steam exerted on them there will be a greater pressure on the surface b than on the surface b'. A small discharge-cock is placed at the bottom of the cylinder C. When the valve S is held against its seat by the screw V, if the latter be loosened and the cylinder C at the same time be placed in communication with the boiler the valve S will open by reason of the steam, which works at the same pressure (that of

the steam in the boiler) on the surfaces b b', exerting a greater force on the surface b of the piston in the direction of opening it than on the surface b' of the valve in the direction of closing it. If, on the other hand, when the valve is opened the cylinder C be placed in communication with the atmosphere, so as to allow the steam to escape, whose pressure on the surface b of the piston P kept the valve open, the latter is closed by the pressure of the steam, which alone continues to act on the surface b' of the valve S. Since the opening and closing of the valve S depends on the difference of pressures exerted by the steam on the surfaces b and b', the rod T may be equally well placed either horizontally or vertically; but at the same time when the rod of the valve is situated vertically, the valve being beneath the piston, it will be seen that the weight of the said valve, together with its piston, tends to open it.

When the valve S is open, the cylinder C should be placed in communication with the steam-conduit leading to the engine, so that the valve may close automatically in case of rupture of the said conduit. In this case the high velocity which the steam acquires in the conduit, owing to its escape into the atmosphere, diminishes the pressure in the said conduit and the cylinder C before a like diminution of pressure can take place in the boiler and the cylinder C'. Consequently the pressure on the surface b of the piston immediately becomes less than the pressure on the surface b' of the valve, so that the latter is closed.

The section of the rod T', which has only to resist a strain proportional to its section and to the pressure of the steam, may be very small, and consequently has but small influence on the speed of closing the valve in case of rupture of the conduit. The section, however, should be of sufficient size to prevent the small difference of pressure which normally exists between the pressure in the boiler and the pressure in the conduit causing the said valve to be closed at a wrong time; but a very small section of the rod suffices to prevent this.

The section of the passages O' and O² should be sufficiently small to prevent the steam in its escape from the cylinder C, for the prompt closing of the valve S, causing the said valve

to be driven with a dangerous shock against its seat.

The additional sliding valve D is only necessary when the valve proper is placed on a boiler forming part of a group of several boilers, so as to cause the automatic closing of the valve of a boiler which has been damaged and so to prevent the other boilers of the same group emptying by this damaged part. This sliding valve D works freely on the rod T and is kept on its seat by the steam when the latter attempts to pass back again through the inner orifice of the valve reversing its current, which in the normal direction opens the said valve D.

For operating the screw V and the cock R keys formed by small grooved wheels may be employed, into which can take transmission chains, so that these parts may be operated equally well from a distance as near at hand.

As it is important that the cylinder C be placed in communication with the steam-conduit as soon as the said cylinder ceases to be in communication with the boiler or with the atmosphere, which is effected by operating the cock R, it is preferred to employ for operating the said cock in place of an ordinary key, which may be made use of in emergencies, a key worked by springs or counterweights, which automatically secures the desired movement.

What I claim is—

1. The combination with a valve casing having a steam inlet and outlet and an intermediate valve seat, of a valve adapted to close against said seat and fitted in a cylinder in constant communication with the boiler, a piston fitted in a cylinder and rigidly connected with said valve, passages connecting said cylinder with the boiler, the steam pipe of the engine and the atmosphere respectively, and a valve for controlling said passages, substantially as described.

2. The combination with a valve casing having a steam inlet and outlet and an intermediate valve seat, of a valve adapted to close against said seat and fitted in a cylinder in constant communication with the boiler, a piston fitted in a cylinder and rigidly connected with said valve, passages connecting said cylinder with the boiler, the steam pipe of the engine and the atmosphere respectively, a valve for controlling said passages, and an auxiliary valve loosely arranged on the stem connecting the said valve and cylinder, and operating to seat upon the valve seat by back pressure, substantially as described.

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

ALEXANDRE BOUCHER.

Witnesses:

ALEXANDRE TARRING,
M. DIXON.