

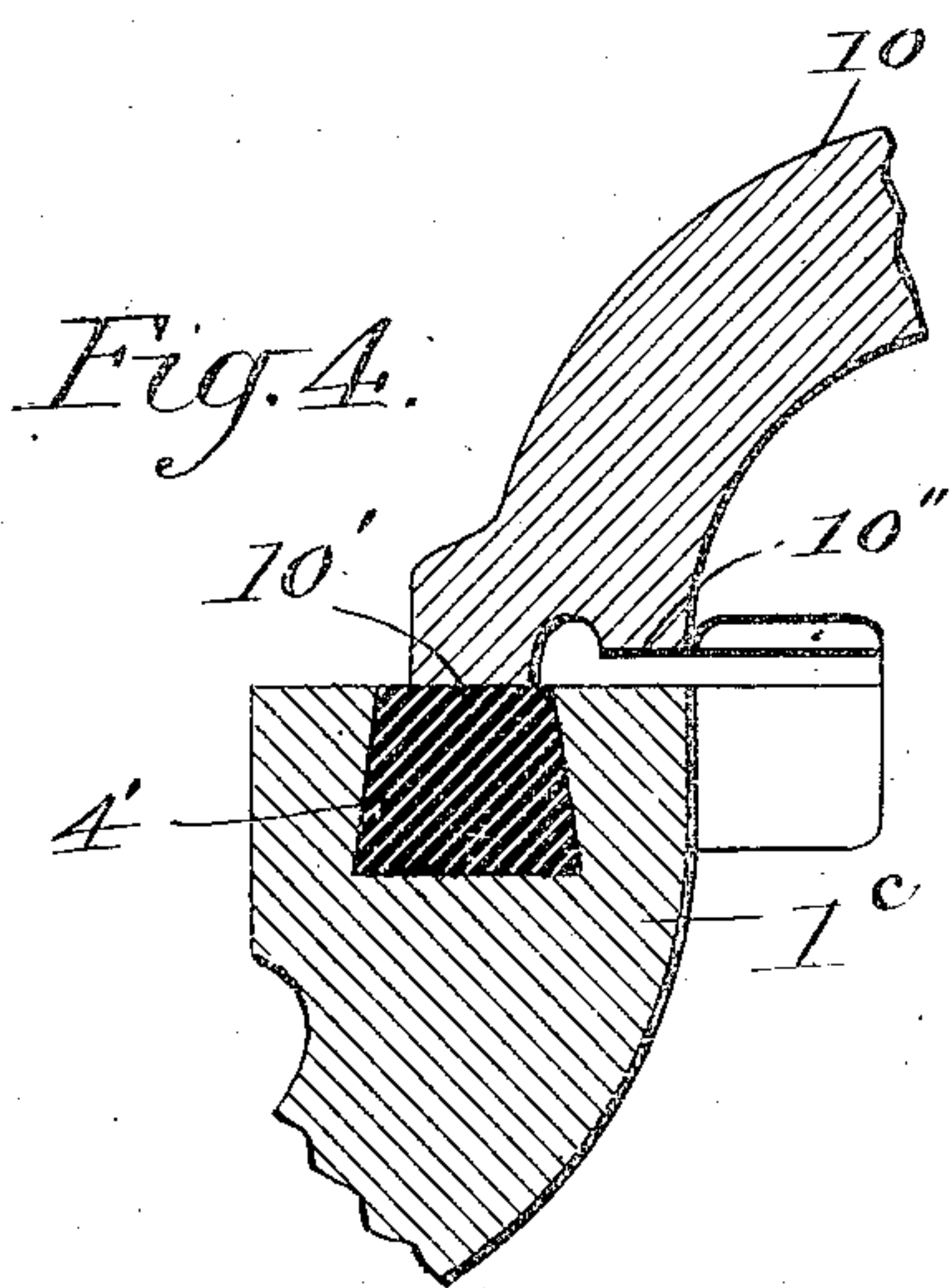
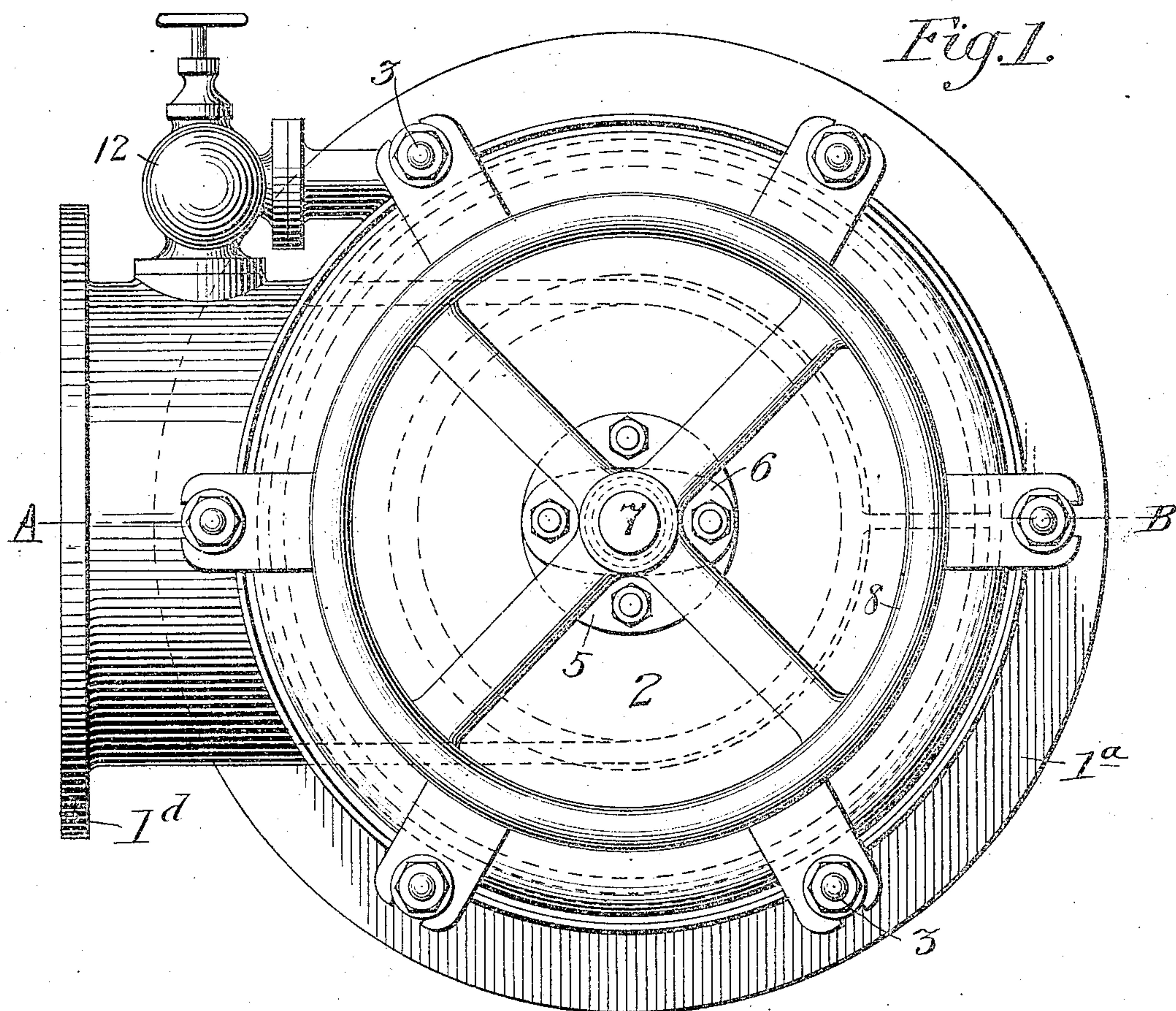
No. 845,244

PATENTED FEB. 26, 1907.

M. LORENZ.
VALVE.

APPLICATION FILED AUG. 2, 1906.

3 SHEETS—SHEET 1.



Witnesses:
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G. J. Neill

Inventor:
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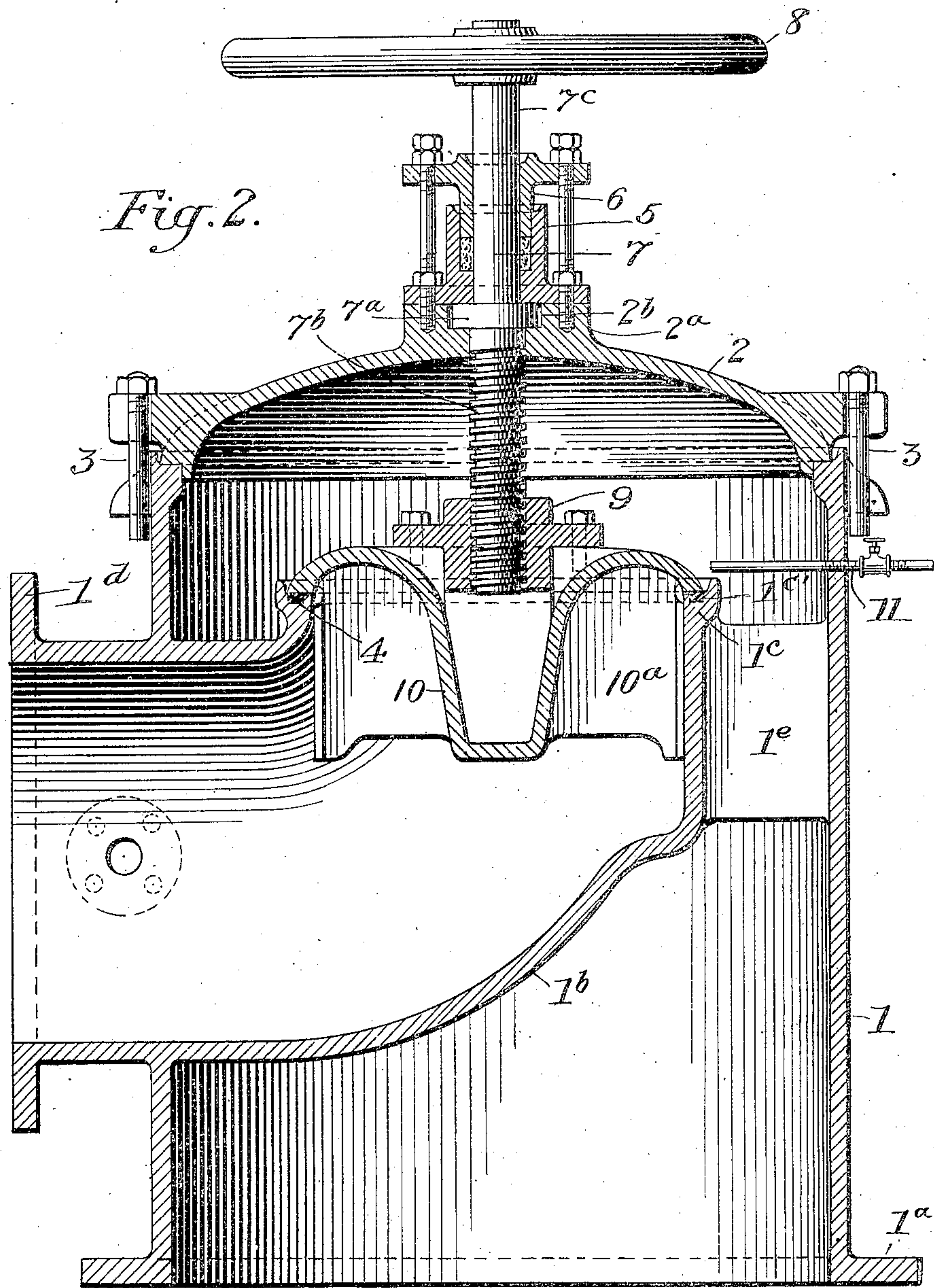
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3 SHEETS—SHEET 2.



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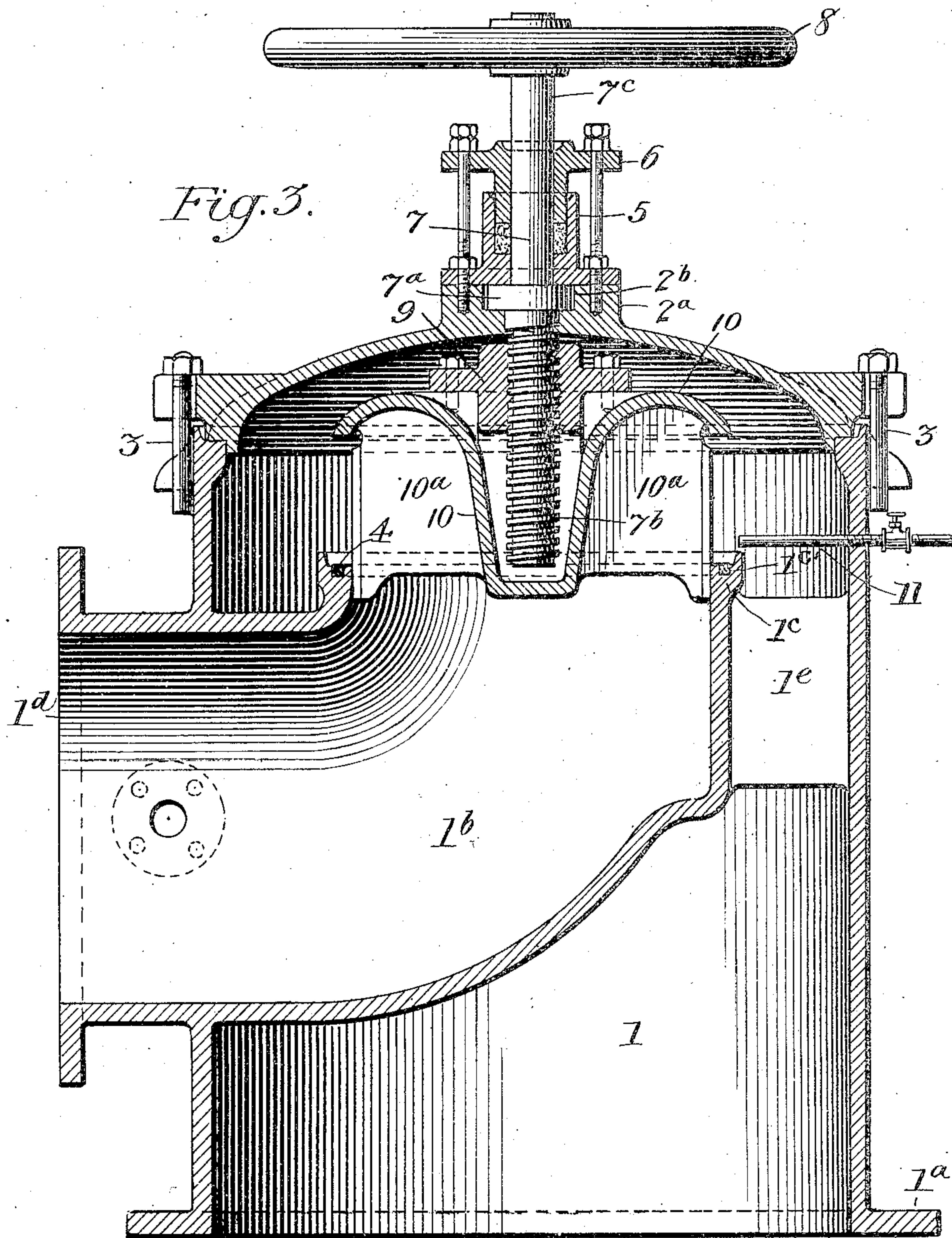
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

MAX LORENZ, OF HONOLULU, TERRITORY OF HAWAII.

VALVE.

No. 845,244.

Specification of Letters Patent.

Patented Feb. 26, 1907.

Application filed August 2, 1905. Serial No. 272,378.

To all whom it may concern:

Be it known that I, MAX LORENZ, a subject of the German Emperor, residing at Honolulu, county of Oahu, Territory of Hawaii, have invented certain new and useful Improvements in Valves, of which the following is a specification.

This invention relates to valves, particularly to valves for a vacuum, such as are employed in connection with evaporating and condensing apparatus.

The object of the invention is to produce a valve of this character which when closed shall be tight under any vacuum which may be used and at the same time be compact, easily operated, and cheaply made.

It has heretofore been difficult to make a tight joint in a valve closed under the pressure of a high vacuum, particularly in a large and cheaply-constructed valve such as is needed in connection with evaporating apparatus. Metallic joints are not tight, owing to unequal expansion of the valve and seat. Soft-rubber seats do not last under these conditions. A tight joint is cheaply obtained, however, by the construction hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a top plan view of a valve embodying my improvements. Fig. 2 is a sectional elevation of the same on the line A B of Fig. 1, showing the valve closed. Fig. 3 is a similar view showing the valve opened, and Fig. 4 is a fragmentary cross-section showing a modification of the valve and its seat.

The main body-casting 1 is provided at its lower end with a flange 1^a to bolt to a vapor-pipe from the top of an evaporator, for example. The cover 2 is secured to the upper end of the body 1 by the T-headed bolts 3. Cast in the body 1 is the elbow 1^b, turned upward and provided with the valve-seat 1^c at its upper end. The other end of the elbow 1^b projects through the side of the body 1 and is provided with a flange 1^d to bolt to the suction-pipe of a vacuum-pump. A groove 1^e is turned in the valve-seat 1^c, in which a soft-rubber ring 4 is forced, its top projecting only slightly above the level of the valve-seat 1^c, which is flat and normal to the direction of the movement of the valve. A rib 1^e connects the elbow 1^b with the wall of the body 1 on the side opposite to the outlet of said elbow and aids in supporting the valve-seat 1^c. Above the center of the cover 2 is the boss 2^a,

provided with a recess 2^b. To the boss 2^a is bolted the stuffing-box 5, provided with the gland 6. A stem 7 is provided with a collar 7^a, adapted to turn in the recess 2^b below the stuffing-box 5. The threaded portion 7^b of the stem 7 projects into the body 1 through the cover 2. The stem 7 passes through the stuffing-box 5 and gland 6, respectively, and an operating-wheel 8 is attached to its upper end 7^c.

Loosely engaging the threaded end 7^b of the stem 7 is the nut 9, attached to the valve 10, which has a flat seat-engaging surface that is normal to the movement of the valve and is adapted to fit over the seat 1^c and the rubber ring 4. The valve 10 is preferably made of the shape as shown in order that the vapor may meet with as little resistance as possible and be deflected into the elbow 1^b when the valve is open and at the same time that the end 7^b of the stem 7 may clear the valve 10. The wings 10^a below the valve 10, preferably four in number, fit loosely the inside of the upper end of elbow 1^b and guide the valve in closing. A pipe 11 is introduced through the side of the body 1, its inner end clearing the valve 10, through which pipe oil, molasses, or other liquid is admitted to seal the valve when closed. A by-pass valve 12 is provided to connect the interior of the elbow 1^b with the interior of the body 1, as shown in Fig. 1.

It will be noted that by turning the wheel 8, and thereby the stem 7, the nut 9, together with the valve 10, is raised or lowered, the wings 10^a sliding inside of the end of the elbow 1^b and the seat 1^c. In lowering the valve 10 first engages the rubber 4, whereupon the pressure on the top of the valve compresses the rubber in the groove 1^e, and the valve closes metal to metal, as shown in Fig. 2. As previously stated, the rubber 4 projects but slightly above the seat 1^c in order that the valve 10 may close metal to metal by compressing the rubber 4 in the groove 1^e. It will be noted that the pressure due to the vacuum finally closes the valve. Liquid may be introduced through the pipe 11 to seal. By this construction a tight joint is cheaply and effectively obtained, as the pressure of the rubber 4 against the valve 10 compensates for any unequal expansion which warps the valve 10 or the seat 1^c and which otherwise would cause the valve to leak. The thread in the nut 9 and on the end 7^b of the stem 7 is a loose fit to allow both

for contraction and expansion and to permit the valve 10 to become seated by compressing the rubber 4. To open the valve, the by-pass valve 12 is first opened, thereby equalizing the pressures in the elbow 1^b and the body 1. The valve 10 may then be raised by turning the wheel 8.

In Fig. 4 there is illustrated a modified form of the invention in which the top of the valve-seat 1^c is flat throughout and the rubber packing 4' is seated in a groove in said flat seat, with its upper face flush with said seat, and is adapted to be engaged by the extended annular flange 10' of the valve prior to the final seating of the valve when the flat surface 10'' on the latter engages the corresponding surface of the seat 1^c.

It is obvious that, if desired, the valve as a whole can be used in other positions than the one described—as, for example, in an inverted position from that shown and described, in which case the pipe 11 is omitted.

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

1. In a valve of the kind described, a body provided with an elbow cast in its side, a flat valve-seat at the end of the elbow within the body and normal to the direction of movement of the valve, a groove in said seat, resilient packing in said groove, and a valve inside said body having a seat-engaging surface normal to the direction of the movement of the valve and broad enough to cover

the metal valve-seat and the resilient packing and adapted to compress said rubber and close metal to metal.

2. A valve of the kind described, comprising a body 1, a removable cover 2, an elbow 1^b, a flat metal valve-seat 1^c at one end of said elbow and normal to the direction of movement of the valve, a resilient packing in a groove 1^{c'} in said seat, a by-pass valve 12, and a valve 10, having a flat integral seat-engaging surface normal to its movement, said valve being operated by a stem 7 through the cover 2, so that when closed it first compresses the rubber 4 in the groove 1^{c'} and finally rests upon the seat 1'', substantially as described.

3. In a valve of the kind described, a casing, an integral valve-seat having a flat surface normal to the direction of movement of the valve, a resilient packing in a groove outside of said seat, an upwardly-extending rim outside of said groove, means for introducing a sealing liquid inside said rim, and a valve having a flat seat-engaging surface normal to the movement of the valve and adapted to first engage and compress the resilient packing and subsequently to engage the valve-seat.

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

MAX LORENZ.

Witnesses:

ROBT. J. PRATT,
WADE WARREN THAYER.