

No. 619,594.

Patented Feb. 14, 1899.

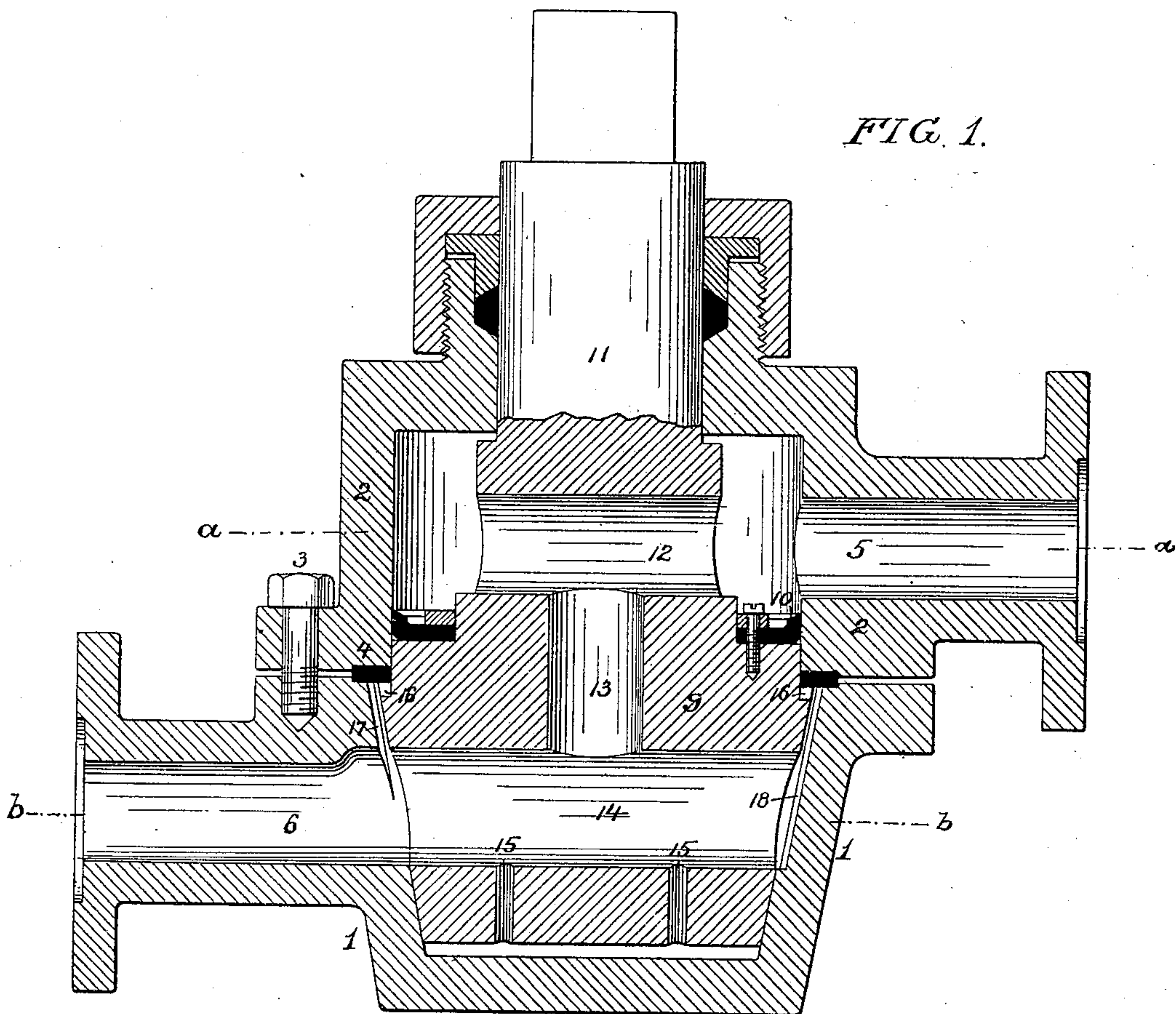
F. J. MARTIN.

VALVE.

(Application filed Feb. 9, 1898.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses:

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FIG. 2.

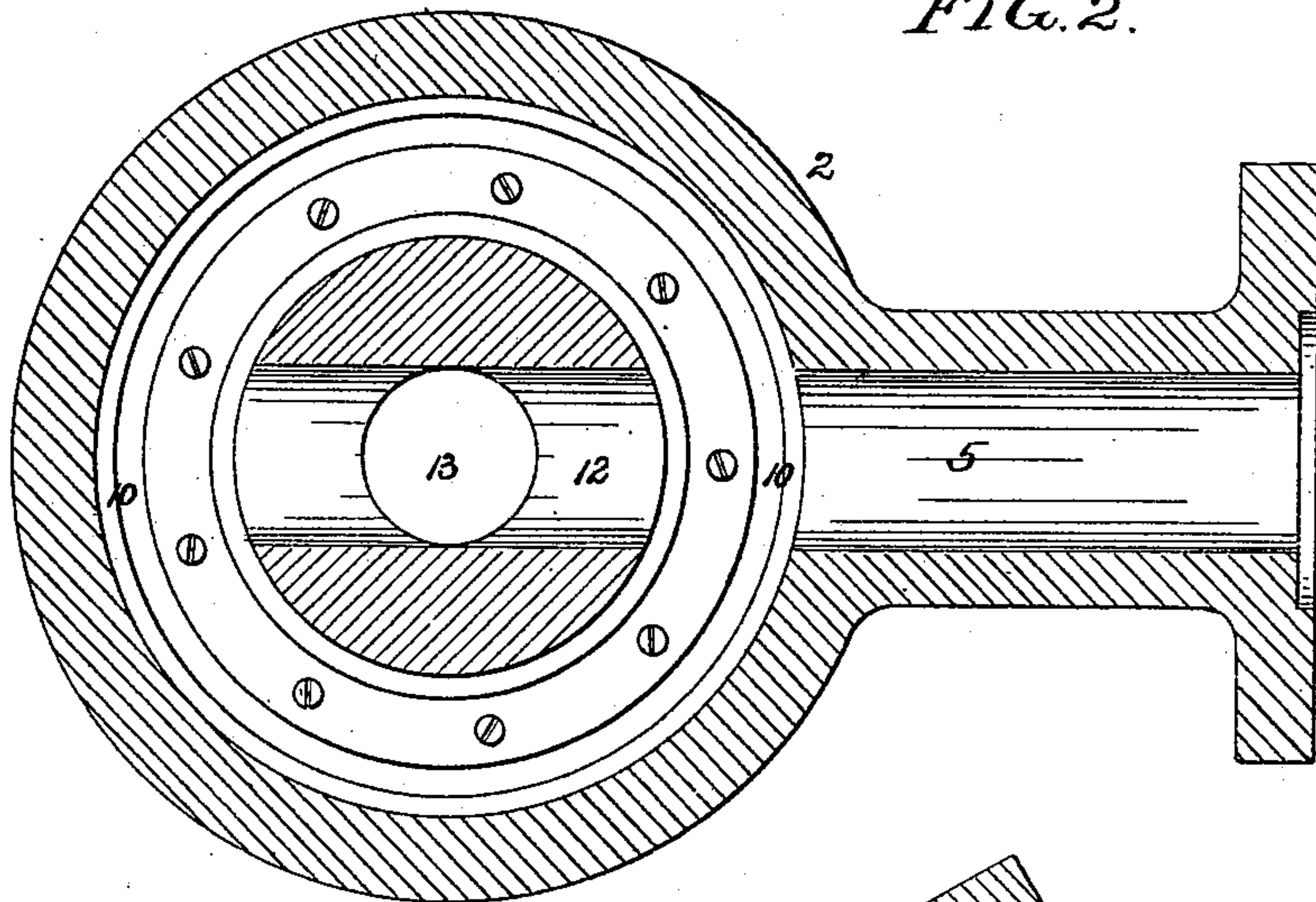
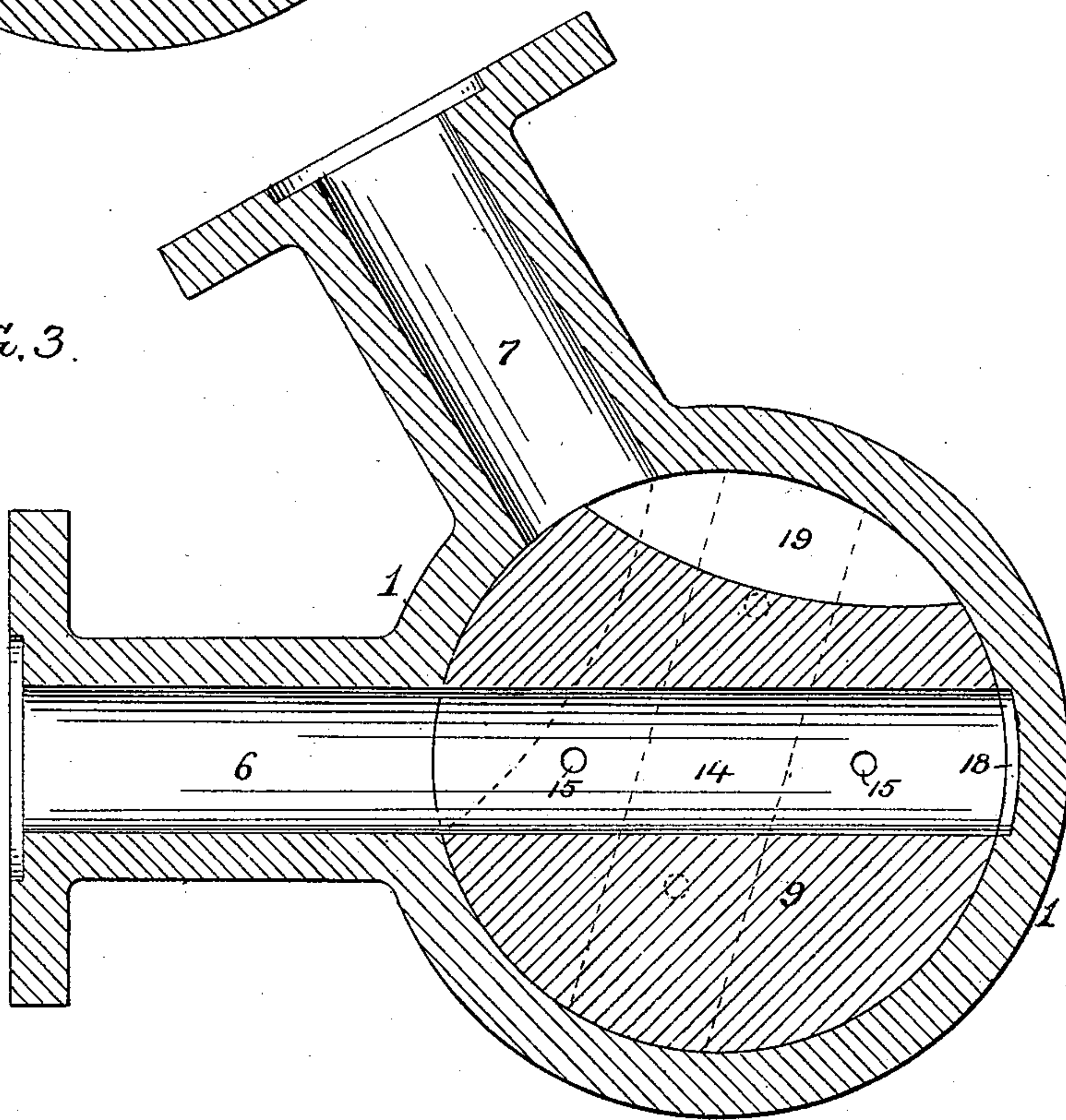


FIG. 3.



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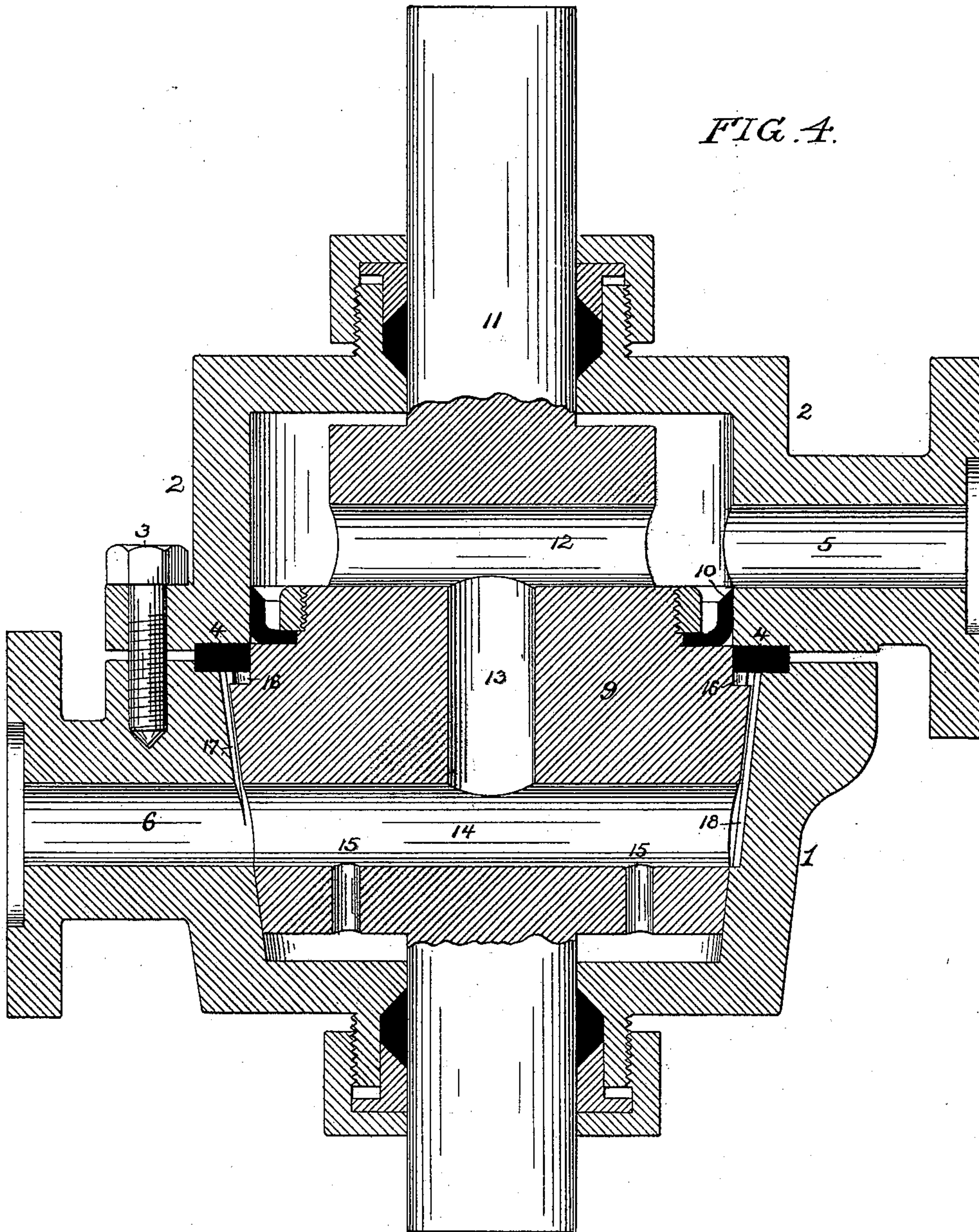
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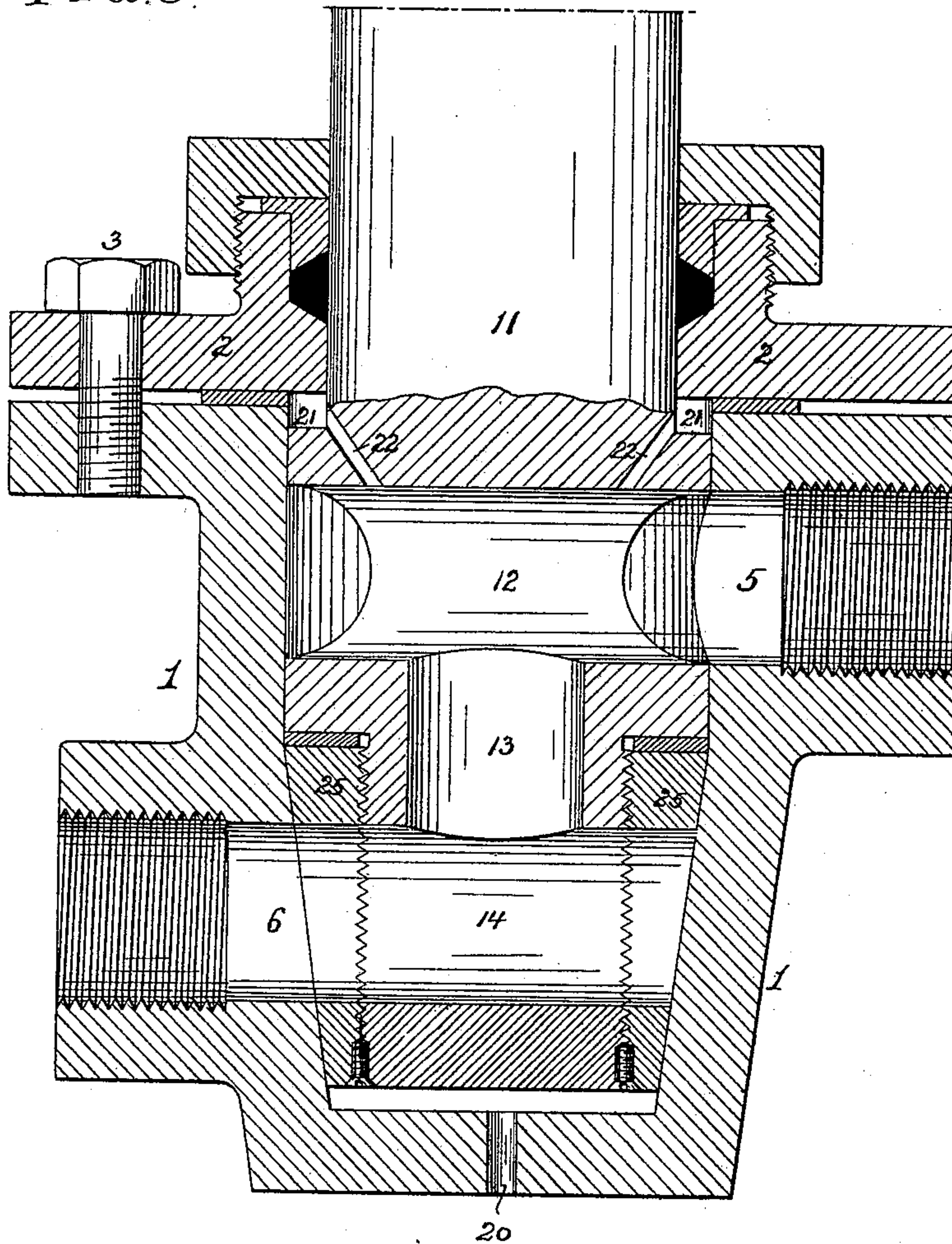
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(No Model.)

4 Sheets—Sheet 4.

FIG. 5.



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UNITED STATES PATENT OFFICE.

FRANCIS J. MARTIN, OF PHILADELPHIA, PENNSYLVANIA.

VALVE.

SPECIFICATION forming part of Letters Patent No. 619,594, dated February 14, 1899.

Application filed February 9, 1898. Serial No. 669,692. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS J. MARTIN, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Valves, of which the following is a specification.

My invention relates to that class of valves which are used for governing or directing the flow of fluids under high pressure, the object of my invention being to so construct such a valve that while it will always be subjected to sufficient pressure to keep it properly seated the pressure will not be so great as to prevent the easy turning of the valve in its casing. This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of a valve constructed in accordance with my invention. Fig. 2 is a sectional plan view of the same on the line *a a*, Fig. 1. Fig. 3 is a sectional plan view on the line *b b*, Fig. 1. Fig. 4 is a view illustrating the application of my invention to a valve having a plug with two stems, and Fig. 5 is a vertical sectional view of another form of valve embodying my invention.

Referring first to Figs. 1, 2, and 3, 1 represents the lower portion or body of the valve-casing, and 2 the upper portion or bonnet of the same, these two parts being securely confined together by means of bolts or screws 3, and suitable packing 4 being interposed between the two parts, so as to insure a fluid-tight joint between them. In the upper portion or bonnet 2 of the valve-casing is formed the inlet-passage 5 for the fluid under pressure, and in the lower or body portion 1 of the valve-casing is formed the outlet-passage 6, which communicates with a pipe leading to the mechanism to be operated, and in the construction of valve shown in Figs. 1, 2, and 3 the body 1 of the casing also has an exhaust branch 7, as shown in Fig. 3.

The interior of the body 1 of the valve-casing is tapered, being of greater diameter at the top than at the bottom, and to this portion of the valve-casing is adapted the correspondingly-tapered lower portion of the valve-plug 9, which has a cylindrical upper portion fitting in the lower portion of the bonnet 2

and having a packing-ring 10 for preventing leakage of fluid downward around the plug.

Above the packed portion of the plug 9 is a stem 11, which passes through a suitable stuffing-box on the bonnet 2 and which has in that portion which is contained within the bonnet a transverse passage 12, which communicates through a vertical passage 13 with a transverse passage 14 in the tapered lower portion of the plug, this latter passage also communicating through openings 15 with the space between the bottom of the valve-plug and the closed bottom of the valve-casing 1.

Between the tapered portion of the valve-plug 9 and the cylindrical portion of the same is a contracted annular shoulder 16, and the annular chamber formed in the valve-casing above this shoulder communicates with narrow passages or channels 17 and 18, formed in the interior of said valve-casing, the passage 17 communicating with the discharge branch 6 and the passage 18 communicating with the transverse passage 14 of the valve-plug when the latter is turned so as to communicate with the discharge branch 6. The valve-plug 9 also has a segmental chamber 19, which may be caused to open communication between the passages 6 and 7 of the valve-casing when the valve-plug is turned to the position shown by dotted lines in Fig. 3.

When the valve is in use, constant pressure is maintained in the chamber surrounding the stem of the valve-plug and also in the passages 12, 13, 14, and 15 and in the chamber between the bottom of the valve-plug and the bottom of the valve-casing, the parts being so proportioned that the area subjected to downward pressure is slightly in excess of that subjected to upward pressure, so that the valve-plug will be held to its seat with sufficient firmness to secure a tight joint, but yet not with such pressure as to interfere with the free turning of the same through the medium of its projecting stem.

The provision of the annular shoulder 16 and of the pressure-chamber above the same is intended to prevent the lift of the valve from its seat when the plug is turned so as to cut off the flow to the branch 6. Under these circumstances there is in said branch a pressure equivalent to the load, and in the

event of any reduction of pressure in the inlet-chamber of the valve the higher pressure in the discharge branch, acting upon the inclined face of the valve, might tend to lift the same from its seat; but this tendency is counteracted by the downward pressure exerted upon the area of the annular shoulder 16.

In the valve shown in Fig. 4 the valve-plug has a stem at each end, so that it may be operated either from above or below, the valve in other respects, however, being substantially similar to that shown in Fig. 1; but in Fig. 5 I have shown a valve in which the bottom of the casing has a vent-opening 20, so that no upward pressure is exerted against the under side of the valve-plug, the stem 11 of the valve in this case being of such diameter that only an annular shoulder 21 of limited area intervenes between the same and the cylindrical upper portion of the valve-plug, the chamber above this shoulder communicating with the transverse passage 12 of the valve through passages 22. The tapered portion of the plug of this valve has an external sleeve 25 screwed upon it to provide a proper bearing-face which can be renewed when worn without replacing the entire valve-plug. The area of the shoulder 21 is such that the downward pressure upon the same is sufficient to overcome the lifting action upon the valve due to the fact that the upper portion of the transverse passage 14 of the valve-plug presents a somewhat greater area than the lower portion of said passage because of the tapered form of the valve-plug, the pressure upon the shoulder 21 being sufficient to overcome this upward pressure and to keep the valve-plug in its seat with sufficient firmness to prevent leakage.

In the valve shown in Fig. 5 I have dispensed with the packing-ring 10, and said ring may also be dispensed with, if desired, in valves of the character shown in Figs. 1 and 4, its use being simply precautionary.

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

1. A valve in which are combined a valve-plug having a tapering portion and having upper and lower transverse passages communicating with each other, a valve-casing in which said tapered valve-plug is seated, said casing having an inlet communicating with a chamber surrounding the upper portion of the valve-plug and an outlet communicating with the passage in the lower portion of said plug,

said valve-plug also having a projecting stem and an upper face surrounding said stem and slightly exceeding in area the face or faces of the valve against which pressure is exerted to lift said valve from its seat in the casing, substantially as specified.

2. A valve in which are combined a valve-plug having a tapering portion and transverse passages communicating with each other and with a chamber below the valve, a valve-casing closed at the bottom and providing a seat for said tapered valve-plug, an inlet-passage communicating with a chamber surrounding the upper portion of the valve-plug, and an outlet-passage communicating with the passage in the lower portion of the valve-plug, said valve-plug having a projecting stem and having around said stem an upper face of an area slightly in excess of the area subjected to upward pressure tending to lift the valve from its seat in the casing, substantially as specified.

3. A valve in which are combined a valve-plug having a tapering portion, projecting stems at both ends, and transverse passages communicating with each other and with the chambers surrounding the stems of the valve, with a valve-casing providing a seat for said tapered valve-plug, and having an inlet-passage communicating with the chamber around the upper portion of the valve, and an outlet-passage communicating with the lower transverse passage of the valve-plug, the upper surface of the valve presenting an area slightly in excess of that subjected to upward pressure tending to lift the valve, substantially as specified.

4. A valve in which are combined a valve-plug having a tapering portion and communicating passages, one communicating with the inlet branch and the other with the outlet branch of the valve-chest, said valve-plug presenting an upper face against which the pressure is exerted to hold the valve-plug to its seat when the valve is open, and also having a face forming the lower boundary of a pressure-chamber which is in communication with the outlet branch of the valve-chest, substantially as specified.

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

FRANCIS J. MARTIN.

Witnesses:

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