

(No Model.)

2 Sheets—Sheet 1.

G. ANDERSON.
VALVE.

No. 477,398.

Patented June 21, 1892.

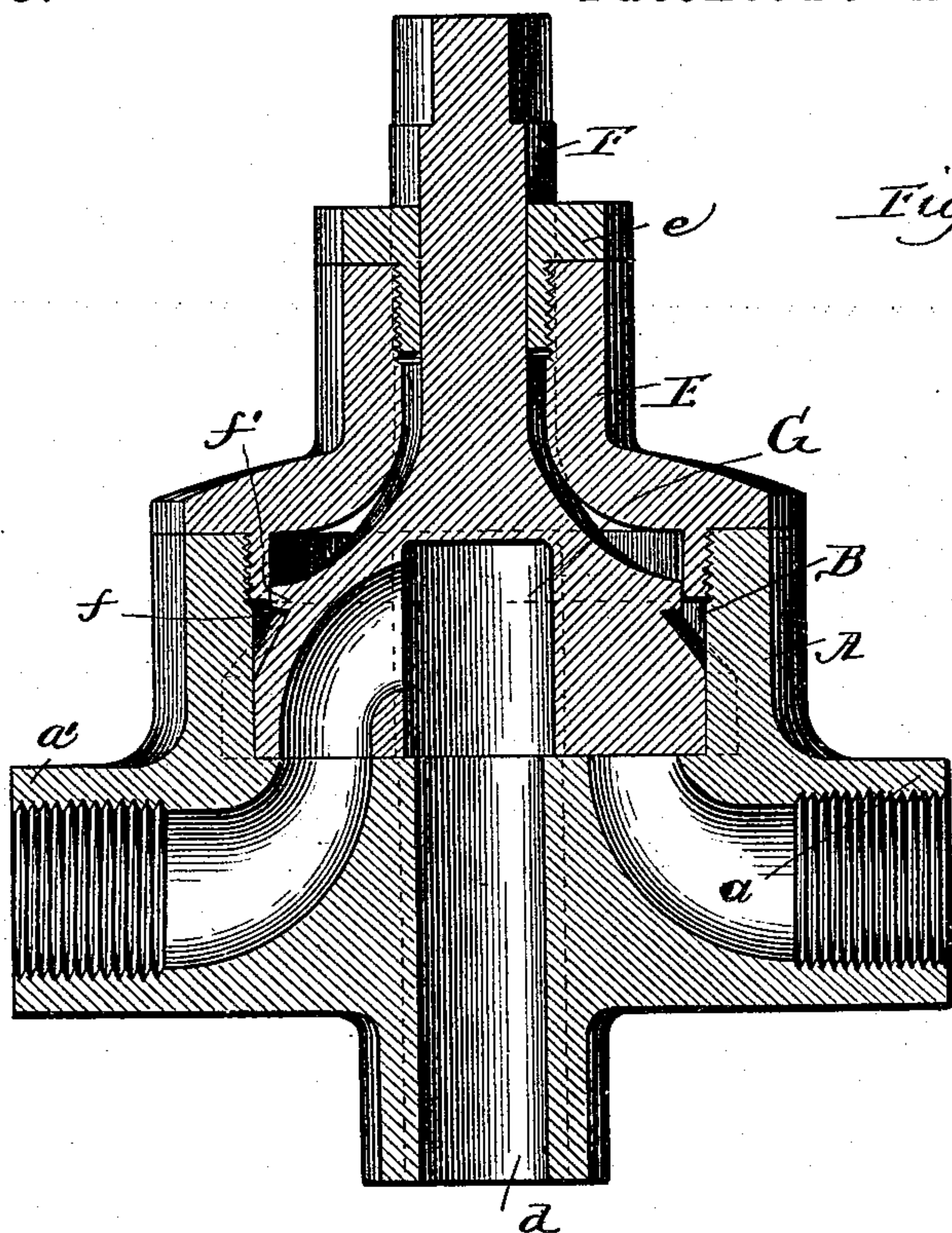


Fig. 1.

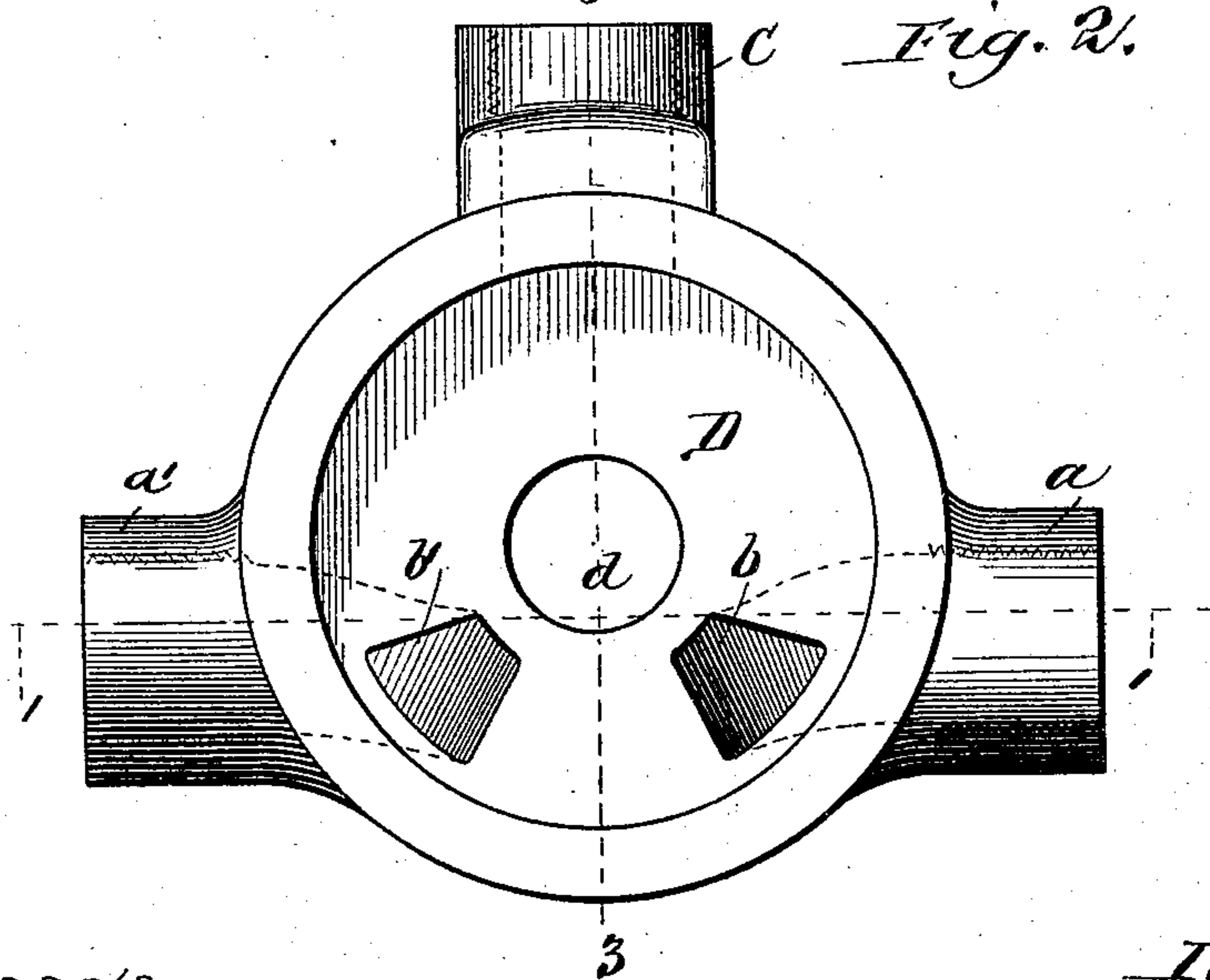


Fig. 2.

Witnesses

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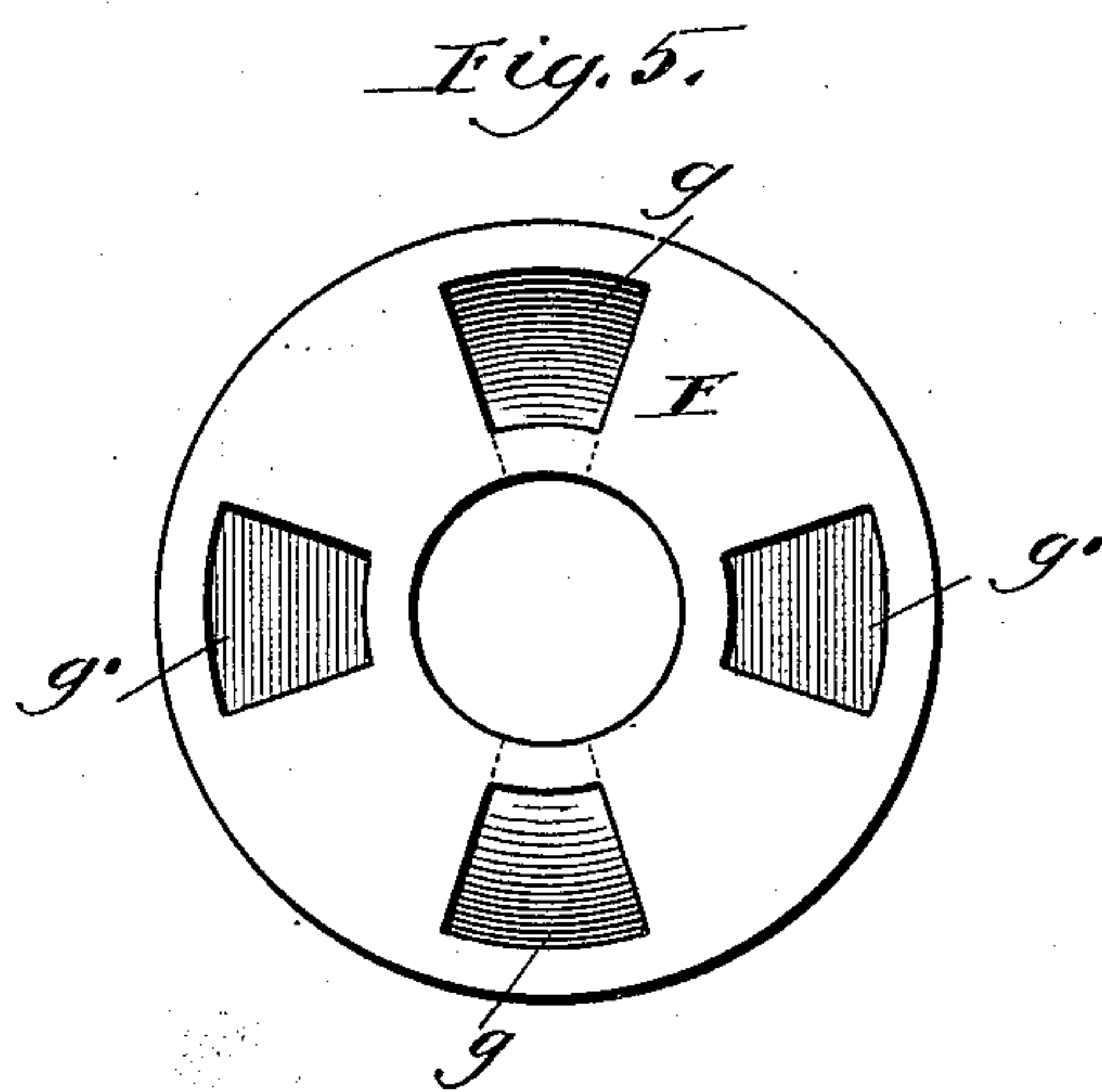
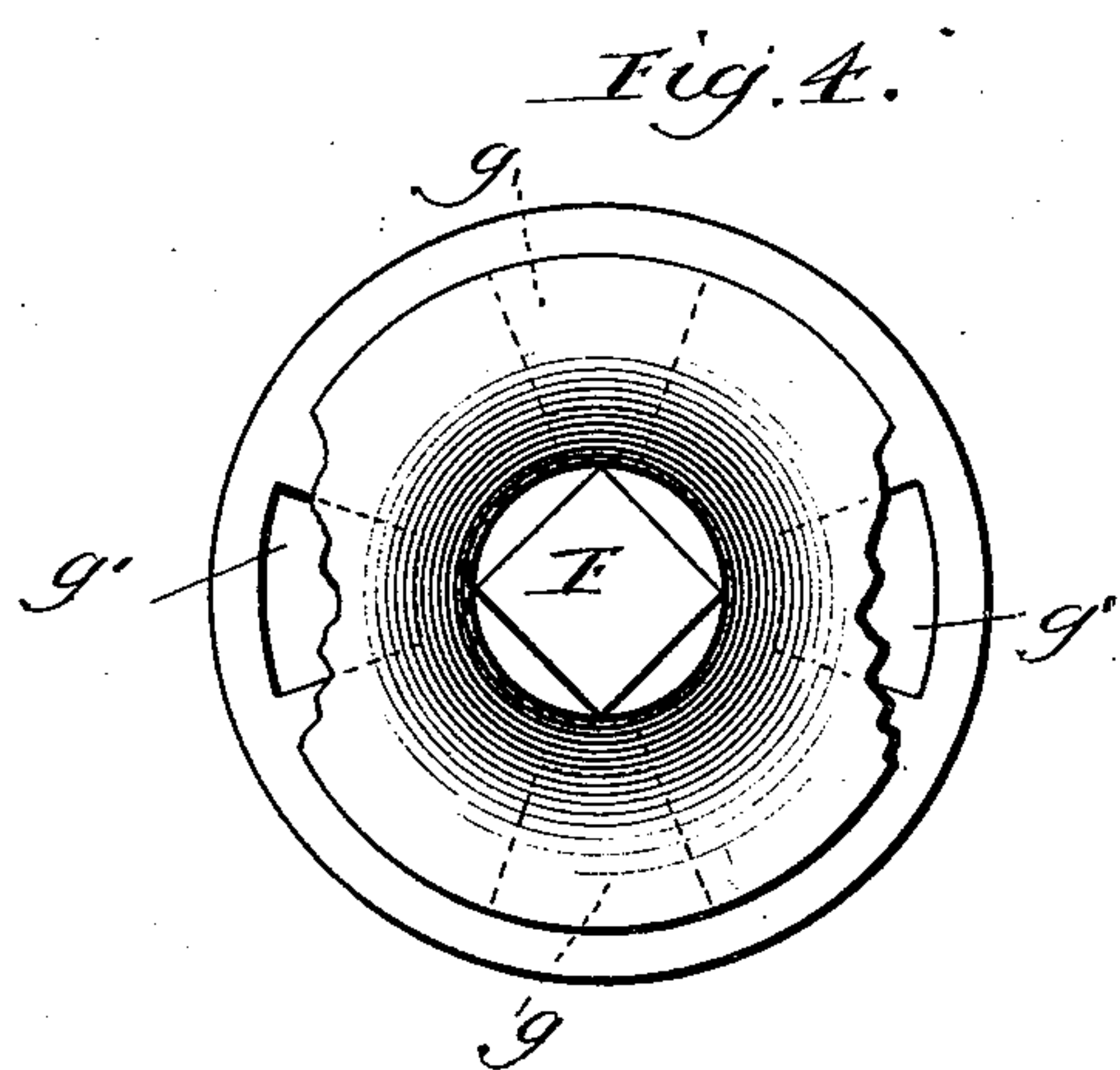
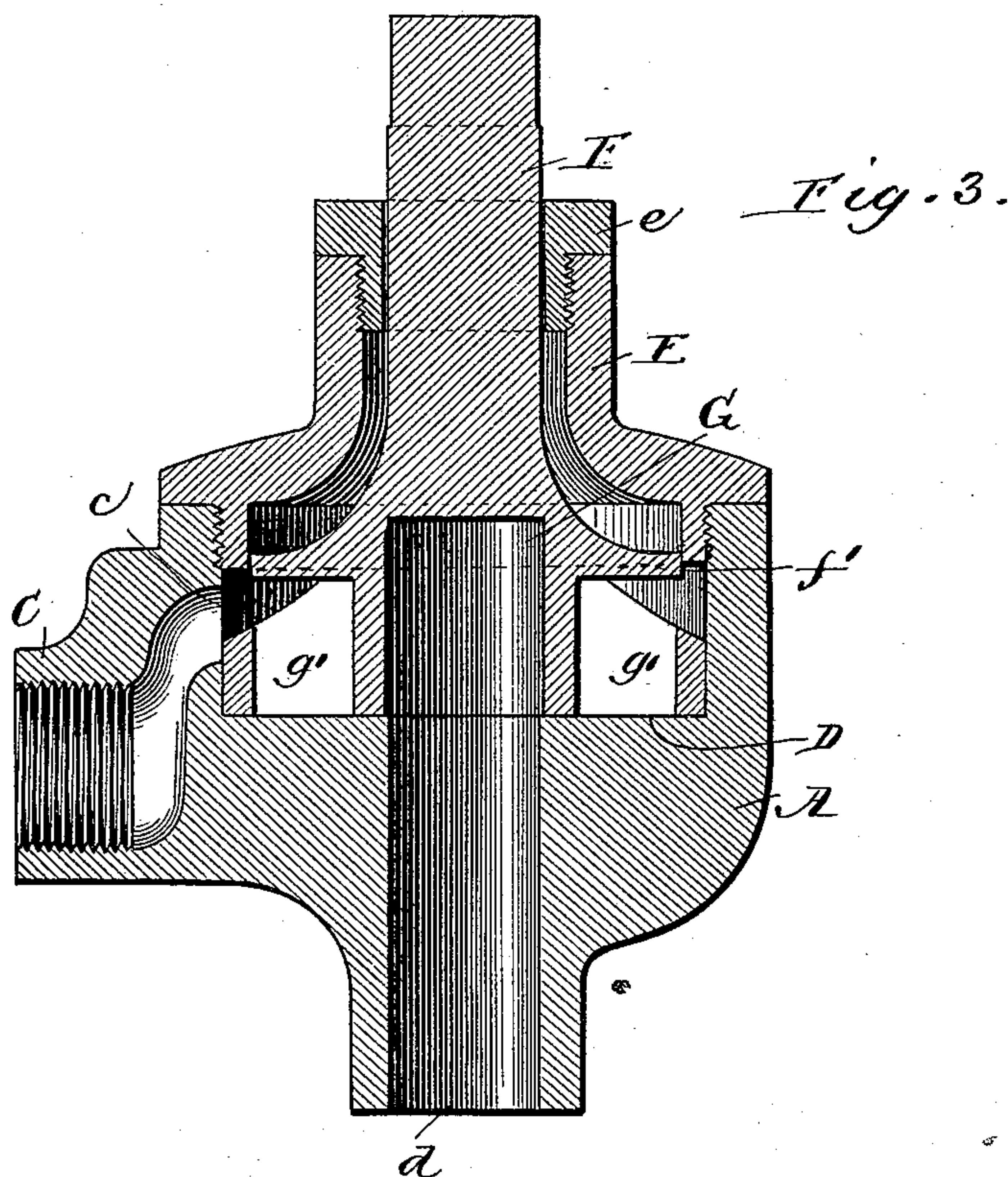
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Ralph Vandeghe

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UNITED STATES PATENT OFFICE.

GILBERT ANDERSON, OF CHICAGO, ILLINOIS.

VALVE.

SPECIFICATION forming part of Letters Patent No. 477,398, dated June 21, 1892.

Application filed June 23, 1891. Serial No. 397,257. (No model.)

To all whom it may concern:

Be it known that I, GILBERT ANDERSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Valves, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section on line 1 1 of Fig. 2. Fig. 2 is a top or plan view of the valve chamber and seat. Fig. 3 is a vertical section on line 3 3 of Fig. 2. Fig. 4 is a top or plan view of the valve-stem, and Fig. 5 is a bottom view of the valve-stem.

My invention relates to valves, and more particularly to that class called "balanced valves," which are adapted to be used in hydraulic machinery where the valves are subject to great pressure, such as in hydraulic cranes.

The object of my invention is to simplify and improve the construction of valves of this class, and I accomplish this object as hereinafter specified, and as illustrated in the drawings.

That which I regard as new will be pointed out in the claims.

In the drawings, A indicates the valve-casing, in which is a cylindrical valve-chamber B. *a a'* indicate pipes, which are preferably cast integral with the valve-casing, and which are adapted to conduct water into the valve-chamber B through ports *b b'*, which open into the valve-chamber through the bottom of said chamber. The pipes *a a'* are preferably screw-threaded, as best shown in Fig. 1, so that the proper connections may easily be made. As best shown in Fig. 2, the ports *b b'* are located about forty-five degrees from each other on the arc of a circle and are preferably shaped as shown in the drawings. The pipes *a a'*, which lead to the ports *b b'*, are preferably in the same straight line on opposite sides of the valve-casing; but they may be located at any other points, if desired.

C indicates a pipe, which is also preferably cast integral with the valve-casing, and which leads to a port *c*, which opens into the valve-chamber at a point a short distance above the bottom of said chamber, as best shown in Fig. 3. The port *c* may be located at any suitable point in the valve-chamber, but is

preferably at a point equidistant from the ports *b b'* and at the opposite side of the valve-chamber.

D indicates the valve-seat, which is flat and has a central opening or passage *d*, which leads to a waste-pipe. If desired, by making suitable connections with the passage *d* the water as it passes from the valve-chamber, as will be hereinafter described, may be conducted back to a reservoir and used over again.

E indicates a cap, which is adapted to be screwed upon the valve-casing to tightly seal the valve-chamber, the valve-chamber being internally screw-threaded at its upper portion to receive the threads of the cap, as best shown in Figs. 1 and 3.

The cap E is provided with a gland *e*, adapted to be screwed upon it at its upper end. The gland *e* is adapted to tightly fit the valve-stem F, the upper end of which passes upward through the cap E, as shown in the drawings. Any suitable packing may be used to prevent leakage through the cap E and gland *e*.

The valve-stem F is somewhat bell-shaped, its lower end being circular and adapted to fit tightly into the valve-chamber B, as best shown in Fig. 1, while its upper portion is elongated into a stem, which is adapted to pass through the cap, as hereinbefore described. Near the upper part of that portion of the valve-stem which fits into the chamber B is provided a peripheral groove *f*, which is shaped as shown in Fig. 1, being angular at the top and inclining gradually outward to the sides of the valve-chamber. By making the groove *f* in this manner a projecting lip *f'* is formed, as best shown in Figs. 1 and 3. The groove *f* is so located on the valve-stem that the lip *f'* will be upon a level with or slightly higher than the top of the port *c* when the valve-stem is resting upon the valve-seat, as best shown in Fig. 3. The groove *f* will then be opposite the port *c*.

G indicates a central chamber, which is formed in the lower part of the valve-stem, as best shown in Figs. 1 and 3, which chamber is adapted to be over the passage *d* when the stem is resting upon the valve-seat.

g indicates passages which are formed in the valve-stem on opposite sides and extend

from the chamber G to the bottom of the valve-stem, as best shown in Fig. 1, and are adapted to register with the ports $b b'$. The openings of the passages g are preferably shaped to correspond with the shape of the ports $b b'$.

g' indicate openings or passages which extend from opposite sides of the bottom of the valve-stem and open into the valve-chamber at the groove f , as best shown in Fig. 3. The openings of the passages g' at the bottom of the valve-stem are also preferably shaped to correspond with the shape of the ports $b b'$, with which they are adapted to register.

The top of the valve-stem is preferably squared, so that the stem can be more easily turned; but any suitable device may be provided for operating it. The bottom of the valve-stem is flat, so as to be adapted to rest steadily upon the valve-seat.

The operation of my improved valve is as follows: The valve is connected at the pipe C to a pump or other source of water-supply, and the pipes $a a'$ are connected with the opposite ends of a cylinder, in which is a piston. Water under high pressure is then forced through the pipe C into the valve-chamber B on a level with the groove f , as best shown in Fig. 3. The presence of the lip f' will cause the water to bear upwardly upon the valve-stem and so equalize the pressure within the valve that the valve-stem is approximately balanced and may be easily operated. When the valve-stem is in the position shown in Fig. 1, the water after entering the chamber through the port c will pass around the valve-stem through one of the passages g' and out through the port b and passage a , since when the valve-stem is in the position indicated one of said passages g' will register with the port b . The water will be prevented from flowing through the other passage g' because of the fact that said passage will be over the solid portion of the valve-seat. After passing through the passage a the water will pass to the cylinder above referred to, where its pressure may be utilized to drive the piston in the usual manner. In order to return the piston to the opposite end of the cylinder, the valve is turned so that the pressure will be transferred to the other end of the cylinder to force the piston back. In using my improved valve when the pressure of the water is through the pipe a to the cylinder and the pipe a' is connected with the opposite end of the same cylinder as the water from the pipe a forces the piston to the opposite end of the cylinder what may be called the "spent water" will be forced from the cylinder through the pipe a' and passage g into the central chamber d in the valve-stem, whence it may flow back to the reservoir to be pumped through the valve again, as hereinbefore suggested. To reverse the valve in order to throw the water into the other end of the cylinder to which the valve is

attached, the valve-stem is so turned that one of the passages g' will be over or register with the port b' . The pressure of the water will then be through the pipe a' to the cylinder, and the return flow of the water will be through the pipe a .

I have described one way in which my improved valve may be used; but I do not wish to limit myself to the use described, as it may be used with various kinds of machinery.

In the drawings I have shown two passages g and two passages g' ; but, if desired, the valve-stem may be provided with two passages g and one g' or with two passages g' and one g . Either of the above forms may be used with a cylinder in which the pressure of the water is transferred to opposite ends of the cylinder to drive a piston, as hereinbefore described.

By making the bottom of the valve-stem flat and resting it upon a flat valve-seat wear is in a great measure compensated for, and the valve will therefore last much longer than valves heretofore used for a similar class of work. The connections are also rendered much tighter, so that leakage is avoided.

That which I regard as new, and desire to secure by Letters Patent, is—

1. The valve-casing A, having the cylindrical valve-chamber B, the flat valve-face D, the central outlet-passage d , the lateral port c , opening into the valve-chamber above the flat valve-face thereof, and the pair of inlet and outlet ports $b b'$, both opening upwardly at different points through the flat valve-face which constitutes the bottom wall of the cylindrical valve-chamber, in combination with the valve-stem F, provided with the vertical central chamber G, the vertical passages $g g'$, arranged round the latter, separated from each other, and closed at their lower ends by the flat valve-face at the bottom of the valve-chamber, and the peripheral groove f , opening at opposite sides of the valve-stem into the passages g' , substantially as described.

2. The valve-casing A, having the cylindrical valve-chamber B, the flat valve-face D, the central outlet-passage d , the port c , opening into the valve-chamber above the flat valve-face thereof, and the inlet and outlet ports $b b'$, both opening upwardly at different points through the flat valve-face of the valve-chamber, in combination with the bell-shaped valve-stem F, having a flat lower end and provided with a central chamber G, the passages $g g'$, arranged round the latter and closed by the flat valve-face of the valve-chamber, the peripheral groove f , opening at opposite sides into the passages g' , and the lip f' , located above the peripheral groove for equalizing the pressure and balancing the valve-stem, substantially as described.

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Witnesses.

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