(No Model.)

2 Sheets—Sheet 1.

R. L. TEED.

HYDRAULIC VALVE.

No. 379,617. Patented Mar. 20, 1888.

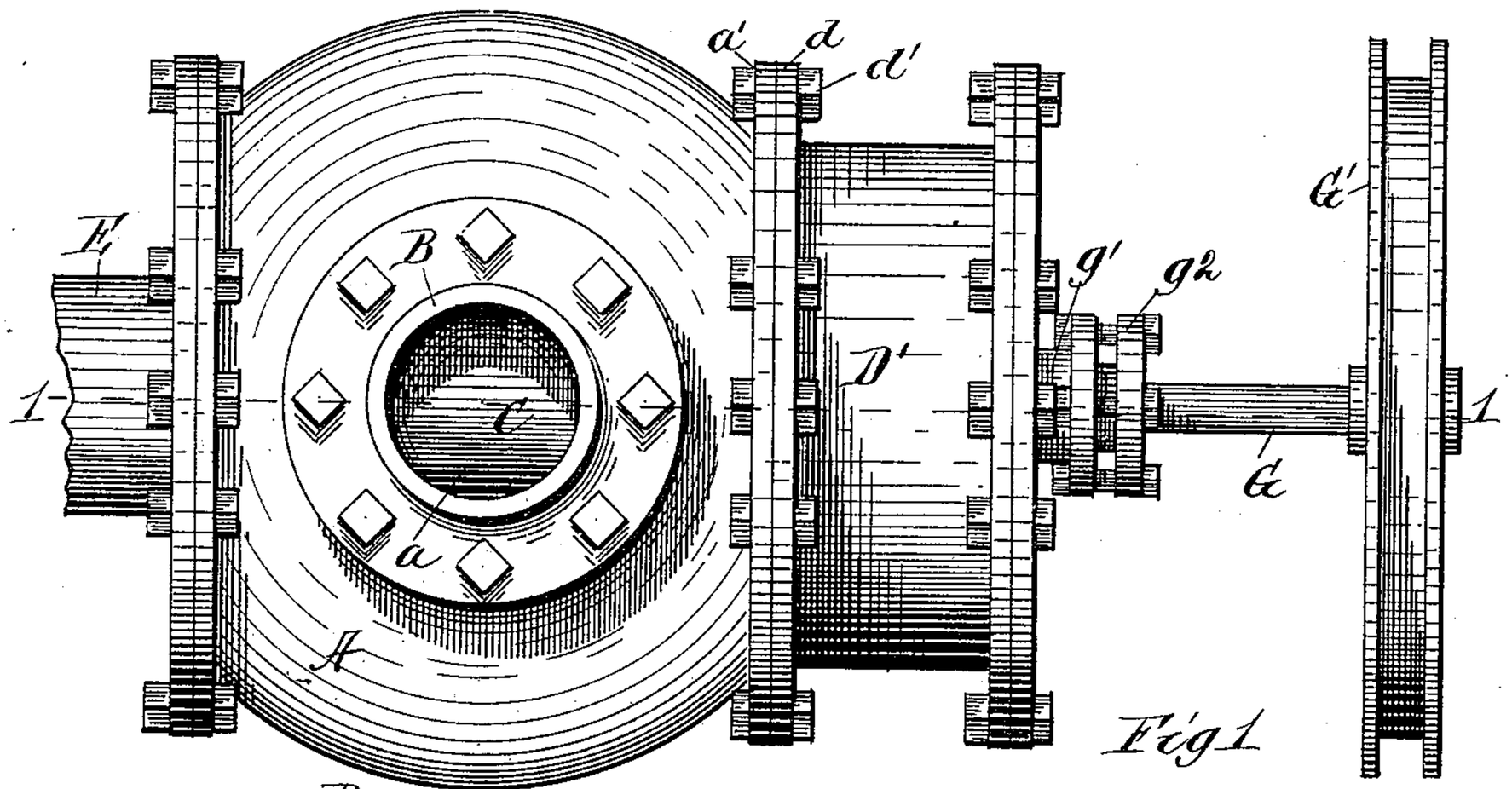

Fig 1

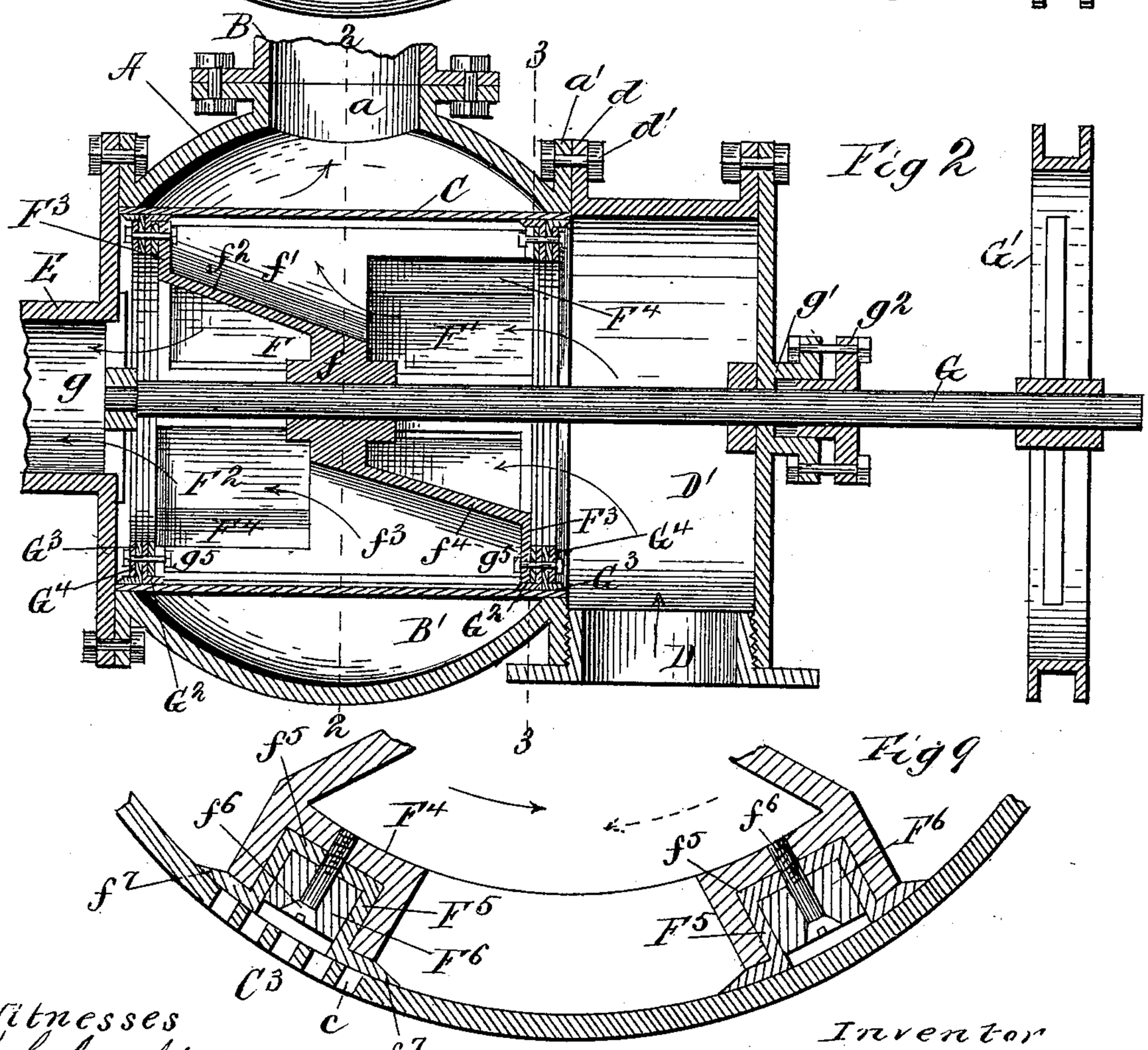

Fig 2

Fig 9

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Attorneys

(No Model.) 2 Sheets—Sheet 2.

R. L. TEED.

HYDRAULIC VALVE.

No. 379,617. Patented Mar. 20, 1888.

Fig 3

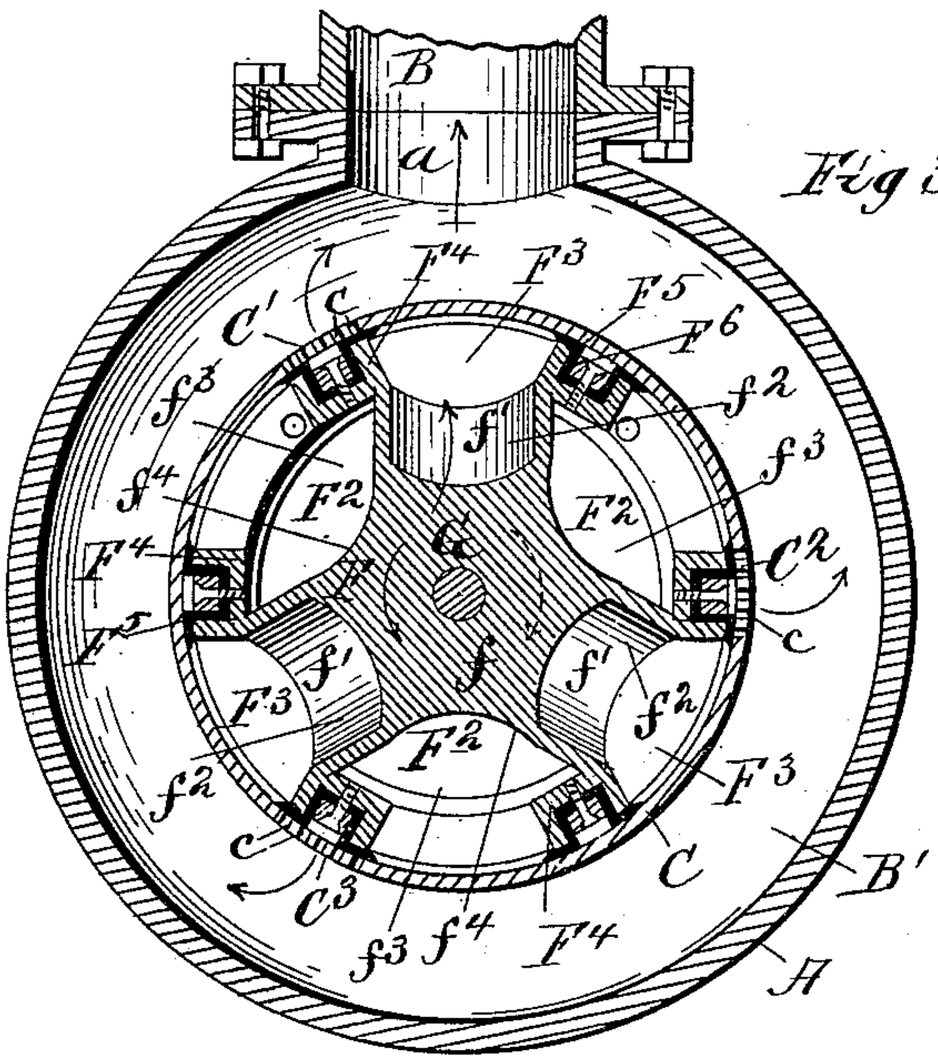


Fig 5

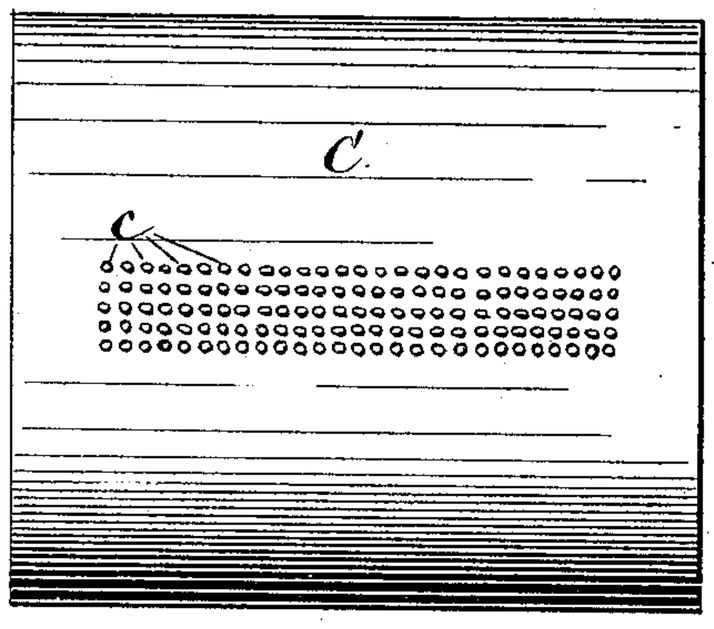


Fig 6

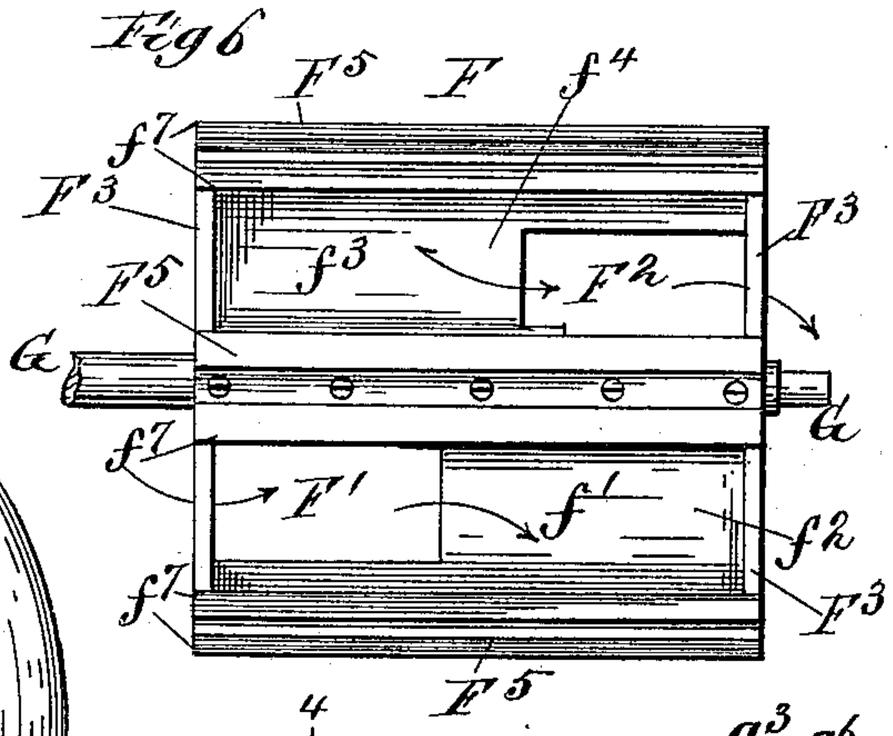


Fig 4

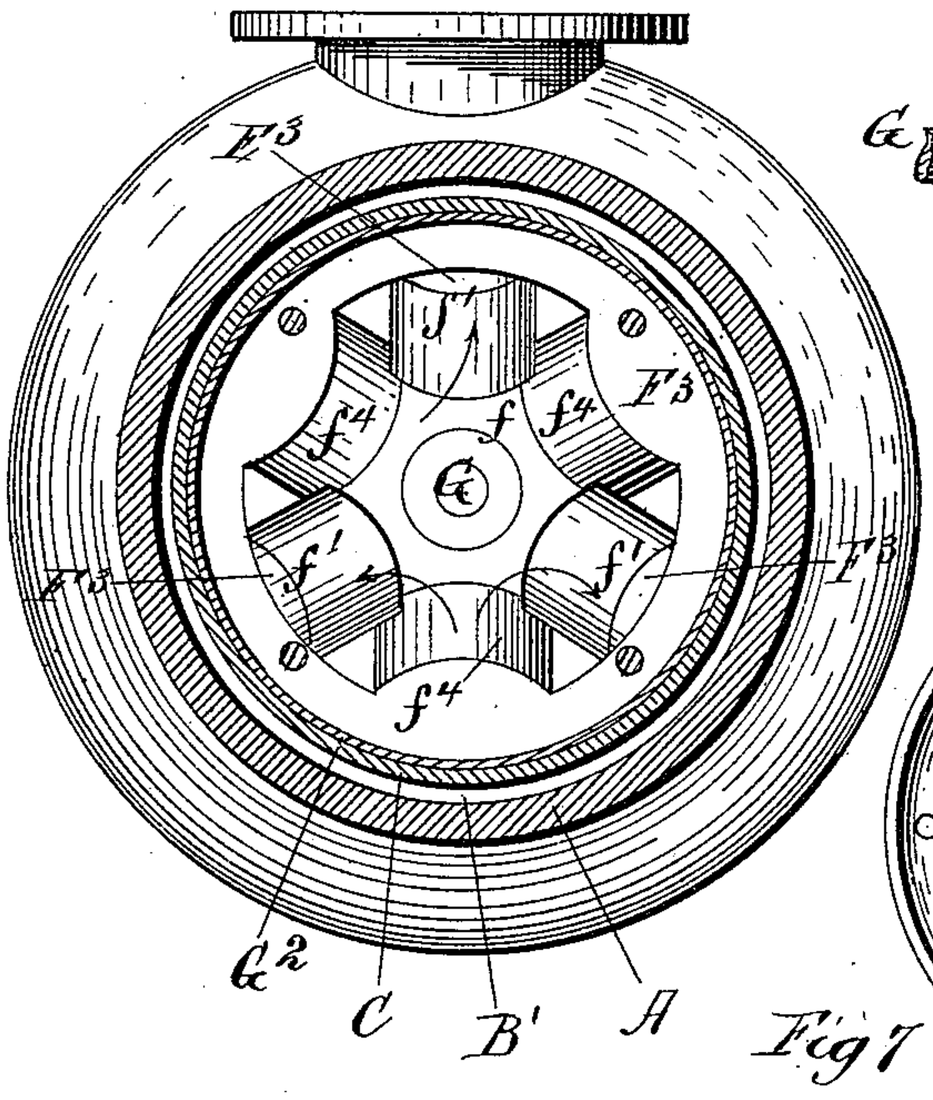


Fig 7

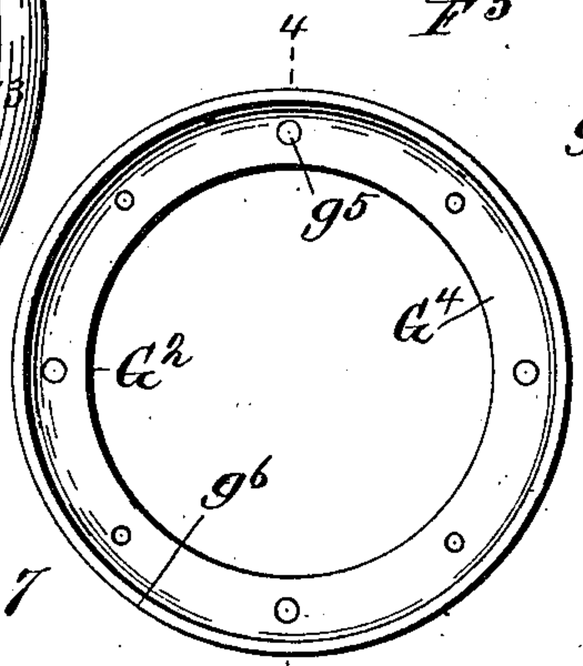
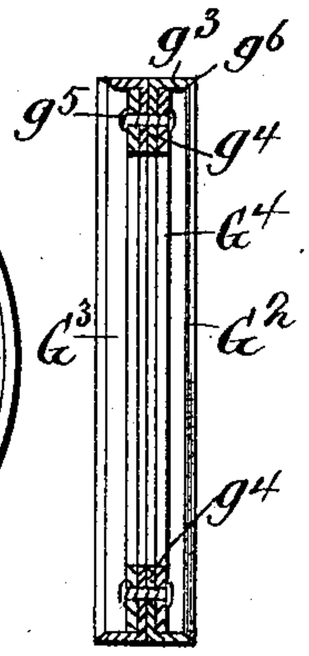


Fig 8.



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Annie Miller.

Inventor,
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By Cobourn & Thacher.
Attorneys.

UNITED STATES PATENT OFFICE.

RALPH L. TEED, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO ALEXANDER McGUIRE, OF SAME PLACE.

HYDRAULIC VALVE.

SPECIFICATION forming part of Letters Patent No. 379,617, dated March 20, 1888.

Application filed September 19, 1887. Serial No. 250,140. (No model.)

To all whom it may concern:

Be it known that I, RALPH L. TEED, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Hydraulic Valves, which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of an apparatus embodying my invention; Fig. 2, a sectional view of the same, taken on the line 1 1 of Fig. 1; Fig. 3, a sectional view taken on the line 2 2 of Fig. 2; Fig. 4, a sectional view taken on the line 3 3 of Fig. 2; Fig. 5, a detail view of the valve-casing detached; Fig. 6, a detail view of the valve detached; Fig. 7, a detail view of the packing detached; Fig. 8, a sectional view of the same, taken on the line 4 4 of Fig. 7; and Fig. 9, a detail view of a portion of Fig. 3 on an enlarged scale.

Like letters refer to like parts in all the figures of the drawings.

My invention relates to hydraulic valves for elevators, and has for its object to provide a valve of this description which shall be simple and effective in operation and shall be so constructed as to prevent leakage from wear or other causes; and to these ends my invention consists in certain novel features, which I will now proceed to describe, and will then particularly point out in the claims.

In the drawings, A represents the outer casing, which is preferably cylindrical in its general form, and is provided at its upper end with an opening, *a*, which communicates with the pipe B, which leads to the elevator-cylinder. The casing A is open at each end, and within the said outer casing, A, is arranged an inner casing, C, cylindrical in form both internally and externally, and extending across the interior of the casing A from one end to the other, its ends fitting within the openings at the ends of the outer casing, whereby a space, B′, is formed between the inner and outer casings, which space is inclosed by the two casings and surrounds the inner casing. Communication between the space B′ and the interior of the inner casing is established by means of three ports, C′, C², and C³, each port consisting, preferably, of a series of apertures, *c*, arranged as shown in Fig. 5, and extending along the inner casing, C, in general parallelism with the axis thereof. The three ports C′, C², and C³ are arranged, as shown in Fig. 3, at equal distances from each other, around the circumference of the casing C.

The opening at one end of the casings A and C communicates with the main water-supply pipe D. Connection is preferably made at this point by means of a cylindrical supply-chamber, D′, into the bottom of which the supply-pipe D opens, and which is of an internal diameter equal to the internal diameter of the internal casing, C. The external casing, A, is provided with a circular flange, *a′*, and the chamber D′ is provided with a similar flange, *d*, the said chamber being connected to the outer casing, A, by means of bolts *d′*, passing through the two flanges. The opening at the other end of the casings A and C communicates with the exhaust-pipe E, which is connected to the outer casing by similar flanges and bolts. Any other suitable means of connection for these parts may of course be substituted for that shown and described.

Within the inner casing, C, is arranged the valve proper, F. This valve is secured upon a shaft, G, the inner end of which shaft is mounted in a suitable bearing, *g*, carried by the exhaust-pipe E, as shown in Fig. 2 of the drawings. At its outer end the shaft G is mounted in a bearing, *g′*, in the supply-chamber D′, a stuffing-box, *g²*, being provided at this point to prevent leakage. The shaft G is of course provided with the usual wheel, G′, or other means for actuating it.

The valve F is divided by means of a central partition, *f*, into two spaces, F′ and F², the former communicating with the supply and the latter with the exhaust, the two said spaces having no communication with each other. The space F′ is provided with a series of three extensions or passages, *f′*, which extend from the central partition, *f*, to the other end of the valve. These passages are cut off from the space F² by a curved and inclined wall, *f²*, the sides of which extend upward to the periphery of the valve. The end of the passages *f′* are closed by the ring-shaped end

portion, F^3, of the valve at that end. The space F^2 is provided with three similar passages, f^3, which extend to the other end of the valve, being cut off from the space F′ by means of walls f^4, and being closed at their ends by the ring F^3 at that end of the valve. The passages f and f^3 alternate with each other on opposite sides of the central partition, f, and between each pair is arranged a longitudinal partition, F^4, so that there are six of these longitudinal partitions. In order to prevent leakage from one side to the other of these partitions, a suitable packing is provided, the form which I prefer being that shown in detail in Fig. 9 of the drawings. A seat, f^5, is formed in the partition F^4, in which is arranged a U shaped packing, of leather or other suitable material, F^5, which is retained in position by a clamping-piece, F^6, secured by screws f^6. The ends of the packing F^5 are carried outward beyond the partition F^4 at the sides thereof, and are beveled off, as shown at f^7, these beveled ends resting upon the interior surface of the casing C, and being held against the same by the pressure of the water, so as to effectually prevent any leakage at this point. Each partition, with its packing, is of sufficient size to close any one of the ports C′, C^2, and C^3 when brought opposite the same. It will be observed that the space F′, with its passages f', communicates only with the supply, while the space F^2, with its passages f^3, communicates only with the exhaust.

In order to prevent leakage between the valve F and the casing C, I provide at each end of the valve a packing, which in its preferred form is constructed in the following manner: I provide two rings, G^2 and G^3, of leather or other suitable material, each provided with a body portion, g^3, fitting against the inner surface of the cylinder, and with a flange, g^4, at right angles thereto. The flanges g^4 are placed back to back, as shown in detail in Fig. 8 of the drawings, and while in this position are clamped between rings G^4 and secured by bolts or rivets g^5. The projecting edges of the body portions g^3 are beveled off, as shown at g^6. The entire packing device is secured to the end ring, F^3, of the valve in any suitable manner, and when in this position the body portions g^3 will be held by the water-pressure firmly against the interior wall of the casing C and will effectually prevent leakage in either direction. This packing may of course be made in a single piece, instead of in two separate portions.

The operation of the device is as follows: When the parts are in the position shown in the drawings, the flow of water in any direction is checked and the apparatus is stationary. Upon rotating the valve in the direction of the arrow shown in full lines in Fig. 3 the space F′ and its passages f' will be placed in communication with the ports C′, C^2, and C^3, and the water will flow from the supply-pipe D through the space F^3 and its passages f', and through the ports C′, C^2, and C^3 into the space B′, from which it will pass through the pipe B to the cylinder of the elevator. When it is desired to check the flow, the valve is turned back into the position shown in full lines, when all the ports will be closed and the flow of water will cease. When it is desired to operate the apparatus in the opposite direction, the valve is turned in the direction shown by the dotted arrow in Fig. 3, when the space F^2, with its passages f^3, will communicate with the ports C′, C^2, and C^3, and the water will flow back through the pipe B and space B′, and, passing through the ports, will flow through the passages f^3 and space F^2 to the exhaust-pipe E. It will thus be seen that a very slight motion of the valve in either direction will either supply or exhaust the cylinder, and that the flow of water may be readily stopped by bringing the valve into the position shown. Heretofore one of the great disadvantages attendant upon the use of rotary valves of this description has been the leakage due to the wear of the parts, this leakage arising from the fact that the contact-surfaces between the valve and its casing are metal upon metal, which in course of time will be so worn by the presence of sand or other gritty substances in the water as to destroy the fit of the parts and render the valve useless on account of its leakage. By the construction of parts which I have devised, in which leather or other soft and flexible packings are employed, which are held to their place by the pressure of water upon them, and which will not be worn by the sand or grit contained in the water, I am enabled to produce a valve which will not wear loose, but which will, on the other hand, continue tight and prevent all leakage. Moreover, it will be seen that by removing the supply-chamber D′ the entire valve F may be readily removed and replaced, when it is desired to inspect or repair the same, without affecting the remaining parts.

It is obvious that various modifications in the details of construction and arrangement of the parts may be made without departing from the principle of my invention, and I therefore do not wish to be understood as limiting myself strictly to the precise details hereinbefore described, and shown in the drawings.

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

1. In a hydraulic valve, the combination, with the cylindrical inner casing, open at its ends, the outer casing of equal length surrounding the same and forming a water-space connected to the hydraulic cylinder, and ports formed through the inner casing and connecting its interior with said water-space, of a rotary valve arranged within the inner casing and provided with a space connected to the supply and with a space connected to the exhaust, said spaces opening at the respective ends of the valve and casing, said valve being adapted to either close the said ports or to place either of said spaces in communication

therewith, substantially as and for the purposes specified.

2. In a hydraulic valve, the combination, with the cylindrical inner casing provided with a series of ports and open at its ends, of the outer casing surrounding the same and forming a water-space connected to the hydraulic cylinder, and the rotary cylindrical valve fitting within the inner casing, open at its ends, and provided with the central partition, f, having extended walls f^2 and longitudinal partitions F^4, whereby the said valve is provided with a space, F', at one end, having passages f', and connected to the supply, and a space, F^2, at the other end, having passages f^3, and connected to the exhaust, substantially as and for the purposes specified.

3. The combination, with the cylindrical inner casing and the rotary valve arranged therein, of a double packing at each end of the valve, constructed of leather or other suitable material, and having its free edges extending in opposite directions and held against the inner wall of the casing by the pressure of the water, substantially as and for the purposes specified.

4. The combination, with the valve F and casing C, of a packing-ring secured to each end of the valve, and consisting of the rings G^2 and G^3, having each a body portion, g^3, beveled at g^6, to bear against the casing, and a flange, g^4, the said flanges being clamped between rings G^4, substantially as and for the purposes specified.

5. The combination, with the cylindrical casing C, of the valve F, having central partition, f, and spaces F' and F^2, with passages f' and f^3, respectively, and the intermediate longitudinal partitions, F^4, each provided with a double packing, F^5, of leather or other suitable material, held against the inner wall of the casing by the pressure of the water, substantially as and for the purposes specified.

6. In a hydraulic valve, the combination, with the cylindrical casing C, of the valve F, having central partition, f, and spaces F' and F^2, with passages f' and f^3, respectively, the intermediate longitudinal partitions, F^4, having groove or seat f^5, the U-shaped packings F^5, having projecting beveled ends f^7, and the clamping-pieces F^6, for securing the packings in their seats, substantially as and for the purposes specified.

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Witnesses:
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ALEX. MCGUIRE.