

No. 616,100.

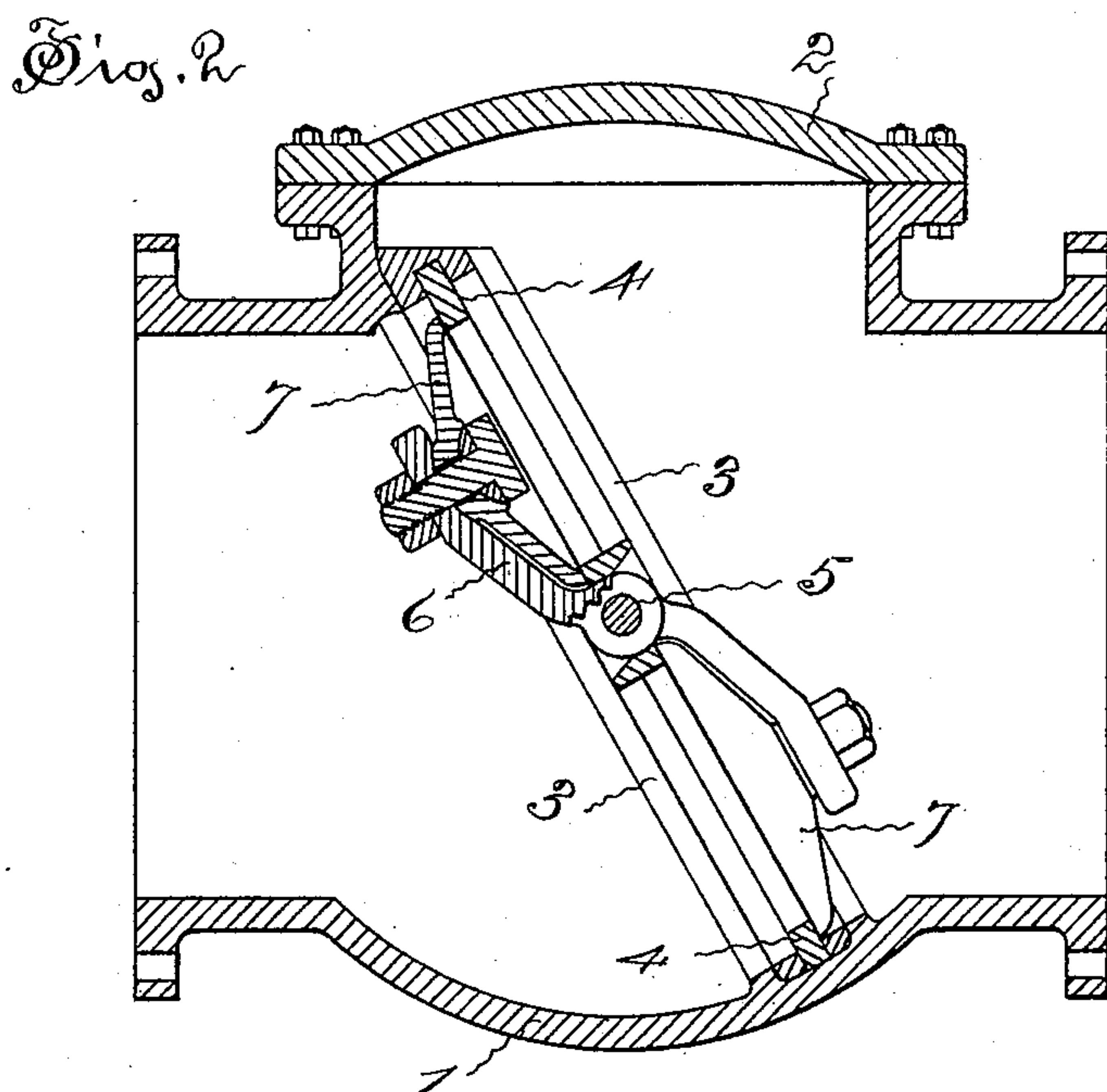
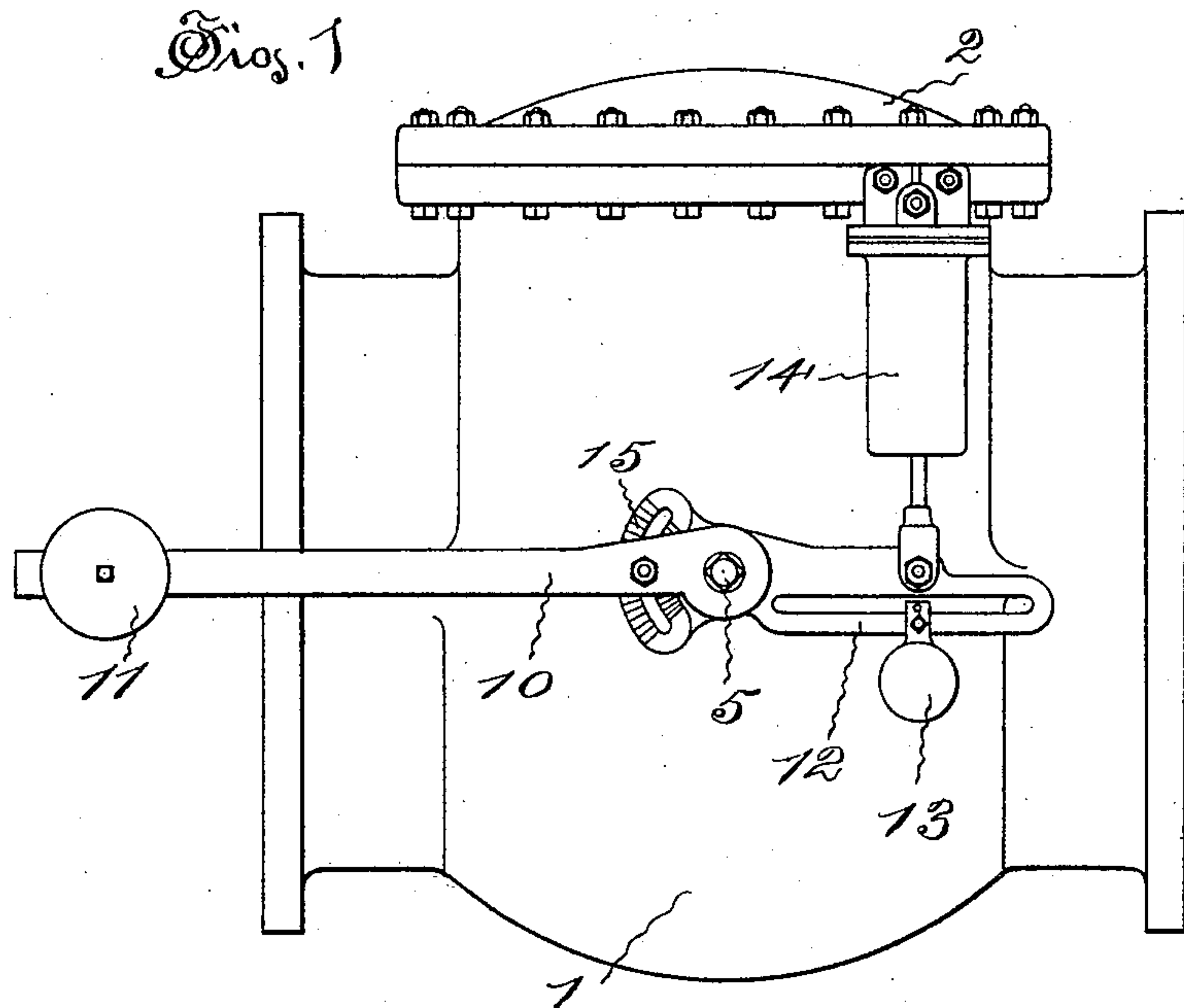
Patented Dec. 20, 1898.

W. F. HARRISON.
BACK PRESSURE VALVE.

(Application filed Sept. 30, 1897. Renewed Nov. 12, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:
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William F. Harrison,
Harry P. Williams
att.

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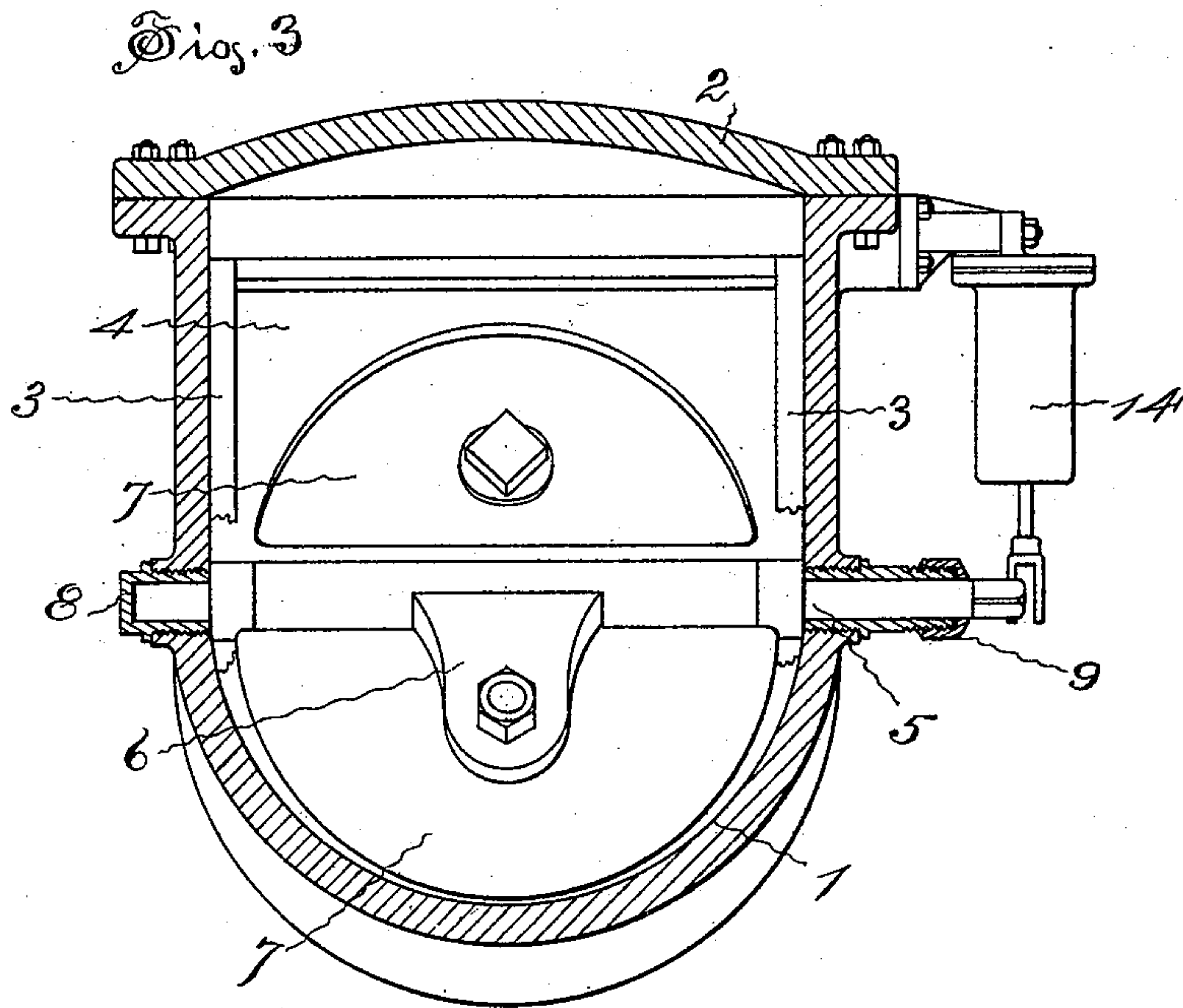
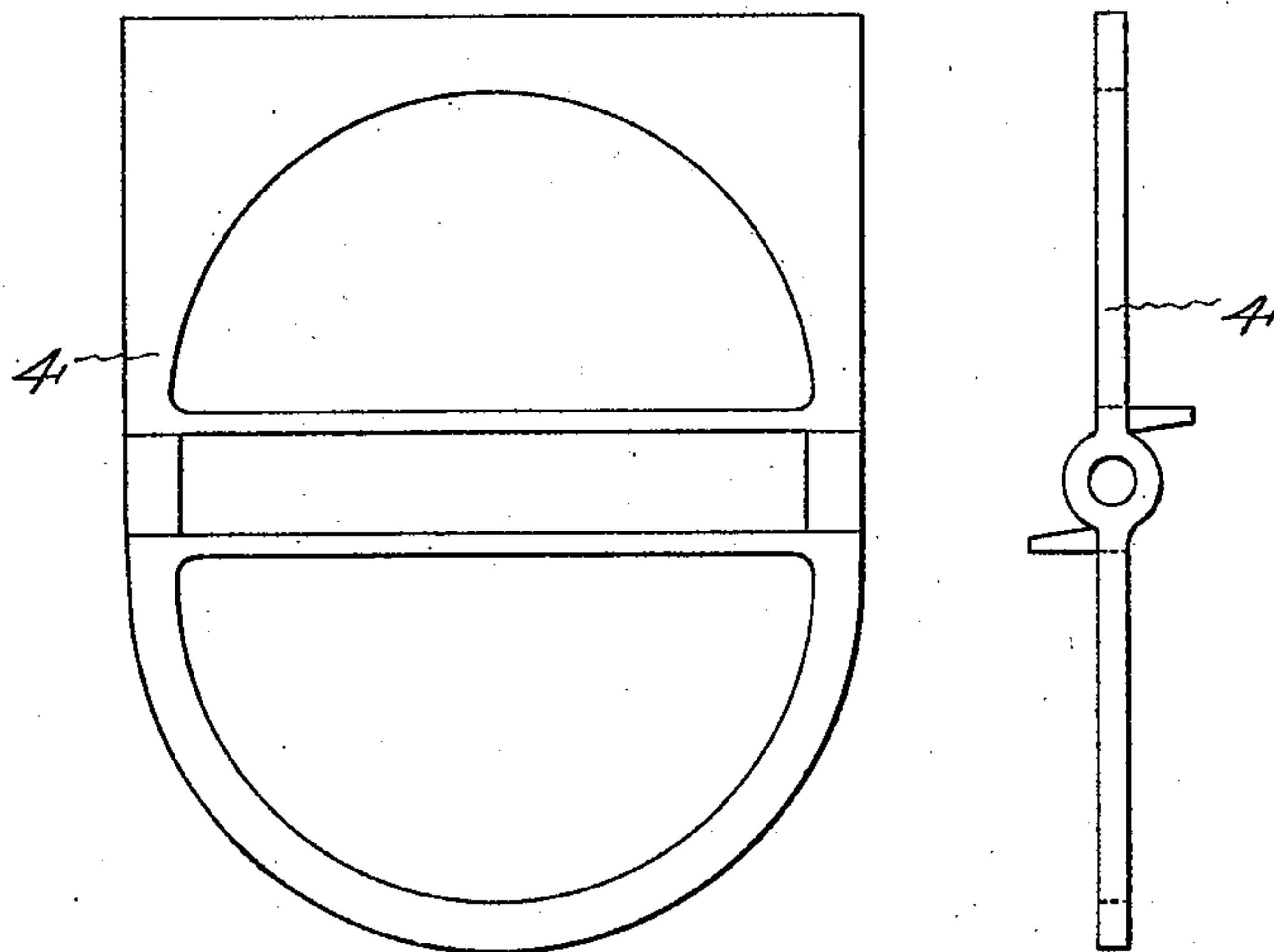


Fig. 4



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UNITED STATES PATENT OFFICE.

WILLIAM F. HARRISON, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE
PRATT & CADY COMPANY, OF SAME PLACE.

BACK-PRESSURE VALVE.

SPECIFICATION forming part of Letters Patent No. 616,100, dated December 20, 1898.

Application filed September 30, 1897. Renewed November 12, 1898. Serial No. 696,318. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. HARRISON, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Back-Pressure Valves, of which the following is a specification.

The invention relates to a balanced back-pressure valve; and the object is to provide a simple, inexpensive, and durable valve of this nature which can by any one be closely balanced and accurately adjusted, so that under the predetermined conditions and pressures it will surely operate in an easy but rapid and positive manner.

The organization of the invention illustrated in the accompanying drawings has a body with an interior dividing-diaphragm that has ports and valve-seats around the ports and that supports a rock-shaft which in the interior bears valve-disks in such manner that they oscillate on opposite sides of the diaphragm toward and from different ports when in action, said shaft being connected on the exterior of the body with suitable balancing and motion-controlling mechanisms, as more particularly hereinafter described, and pointed out in the claims.

Figure 1 of the views is a side elevation of a valve embodying the invention. Fig. 2 is a central longitudinal section, and Fig. 3 is a transverse section, of the same. Fig. 4 shows a face and an edge view of the diaphragm removed from the valve-body.

The body 1 of the valve may be cast to shape of iron, brass, or other suitable metal, with screw-threaded or flanged ends, as desired, for attachment to the pipes of the system with which the valve is to be used. A cap 2 is fitted on the body, and in the interior are ribs 3, arranged to form a groove between them. A diaphragm 4, of sufficient strength, is placed with its edges in the groove between the ribs, so as to divide the interior into two chambers. To prevent the leakage of fluid from one chamber to the other around the diaphragm, its edges are sealed in the groove by lead, composition, or any other suitable packing. There are two openings or ports of different size

through the diaphragm, and on opposite sides around these ports the valve-seats are formed.

Near the middle of the diaphragm across the body there extends a shaft 5, upon which is a sleeve provided with arms 6. To these arms by any convenient devices are secured the valve-disks 7. The arms extend in such directions and the valve-disks are so attached that when shut one disk seats on the upper port on one side of the diaphragm and the other disk seats on the lower port on the opposite side of the diaphragm. The lower opening through the diaphragm shown in the views is larger than the upper, and the valve-disks vary in size correspondingly, so that they will oscillate under the necessary pressures in the proper directions.

The shaft 5 extends through the walls of the body, and at one end there is a suitably-packed cap 8, while at the other end there is a stuffing-box 9. The end of the shaft outside of the stuffing-box is preferably square, and on this is fitted an arm 10, that is provided with a movable balancing-weight 11. Connected with the weight-arm is a counterbalancing-lever 12, which is provided with a movable counterbalancing-weight 13 and is connected by a rod with a piston movable in a cushioning-cylinder or dash-pot 14, secured to the outside of the valve-body. The arm 10 is preferably connected with the lever 12 by a bolt and adjusting-segment 15. The balancing-weight 11 and the counterbalancing-weight 13 can be so moved that they act against each other to just the desired degree, and the arm 10 can be connected with the lever 12 by adjusting the bolt along the marked segment so that the cushioning action of the dash-pot can be utilized to properly allow the valve to close tightly with a quick and yet easy and noiseless movement. The balancing-weight 11 can be moved on the arm 10, and the counterbalancing-weight 13 can be moved along the lever 12 until the valve is exactly balanced, and then the counterbalancing-weight can be moved outward until it reaches a position which will give the necessary balance for the desired back pressure. The weight 11 retains the valve closed until the predetermined back pressure is reached. Then the valve

opens under the influence of the fluid-pressure acting upon the excess area of one disk over the other. After opening and relieving the pressure the disks are closed positively and surely by the balancing-weight 11, the action of the dash-pot insuring that the closing movement, even if strong, be smooth and easy and the closing noiseless.

This valve is durable and efficient and can be finely adjusted so that it will operate positively and noiselessly at any desired pressures. It is inexpensive to manufacture, and it can be made in any ordinary sizes. Different diaphragms, with ports that vary in relative size, can be provided for the same bodies, so that the valve can with but little labor be adapted to a wide range of pressures and can be adjusted with great nicety so as to successfully operate under a variety of conditions. On account of the close balancing and compensating arrangement of the parts this valve can be made very efficient as well as durable.

I claim as my invention—

1. A back-pressure valve having a body with grooves in its walls oblique to the fluid-way, a diaphragm with two ports removably placed with its edges in the grooves so as to divide the interior into two chambers, a rock-shaft extending at substantially the middle of the diaphragm, across the interior and through one wall, rocker-arms projecting from the shaft into different chambers, a valve-disk loosely connected with each arm on the same side of the diaphragm as the arm so as to move in opposite directions from and toward reverse sides of the diaphragm in opening and closing the ports, and balancing means outside of the body and connected with the rock-shaft, substantially as specified.

2. A back-pressure valve having a body with inclined grooves in its inner wall, a cap removably secured to the body, a diaphragm with ports removably placed with its edges so as to divide the interior into two chambers, fusible metal surrounding the edges of the diaphragm in the grooves, a shaft movably

supported by the diaphragm and having an end extending through the wall of the body, arms projecting from the shaft on opposite sides of the diaphragm in the interior of the body, a valve-disk loosely connected with each arm and supported within different chambers so as to move in opposite directions from and toward reverse sides of the diaphragm in opening and closing the ports, and a weighted balancing-arm outside of the body and connected with the shaft, substantially as specified.

3. A back-pressure valve having a body, a diaphragm with ports dividing the interior into two chambers, valve-disks connected together and supported within different chambers so as to move in opposite directions from and toward reverse sides of the diaphragm in opening and closing the ports, a weighted balancing-arm connected with the disks, and a weighted balancing-lever connected with the balancing-arm, substantially as specified.

4. A back-pressure valve having a body, a diaphragm with ports dividing the interior into two chambers, valve-disks connected together and supported within different chambers so as to move in opposite directions from and toward reverse sides of the diaphragm in opening and closing the ports, a weighted lever connected with the disks, and a dash-pot piston connected with the lever, substantially as specified.

5. A back-pressure valve having a body, a diaphragm with ports dividing the interior into two chambers, valve-disks connected together and supported within different chambers so as to move in opposite directions from and toward reverse sides of the diaphragm in opening and closing the ports, a weighted balancing-arm connected with the disks, a weighted balancing-lever connected with the balancing-arm, and a dash-pot piston connected with the lever, substantially as specified.

WILLIAM F. HARRISON.

Witnesses:

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