F. B. LEOPOLD.

CONTROLLER FOR FILTERS.

APPLICATION FILED FEB. 1, 1908. RENEWED APR. 13, 1911.

992,888.

Patented May 23, 1911.

2 SHEETS—SHEET 1.

FIG. 1

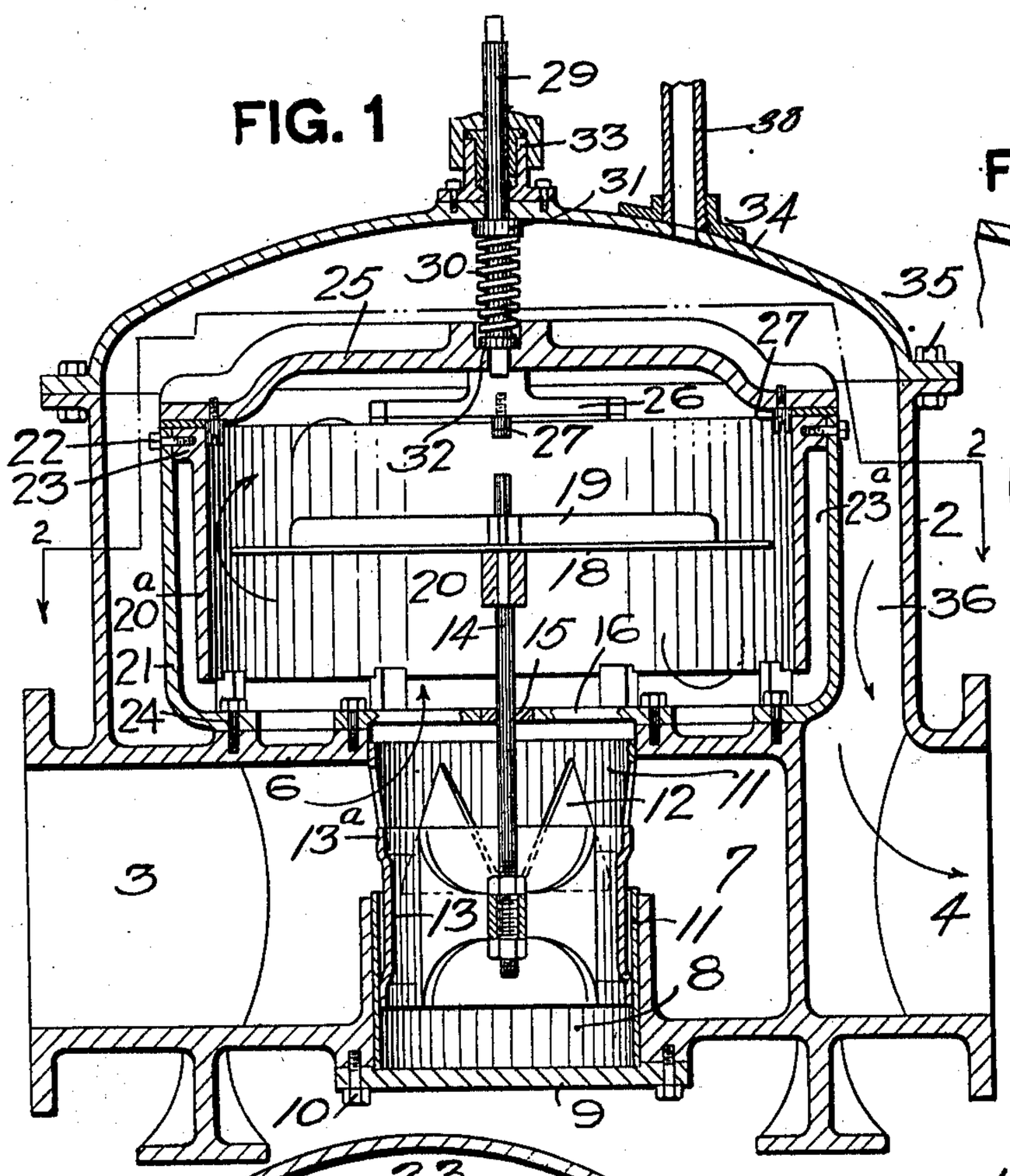


FIG. 3

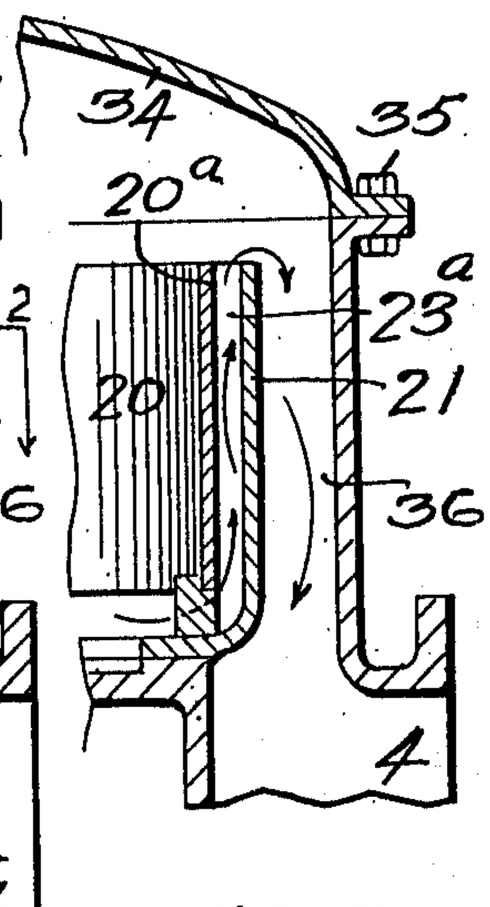
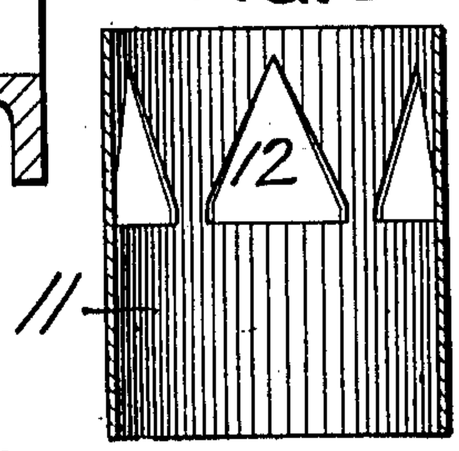


FIG. 5



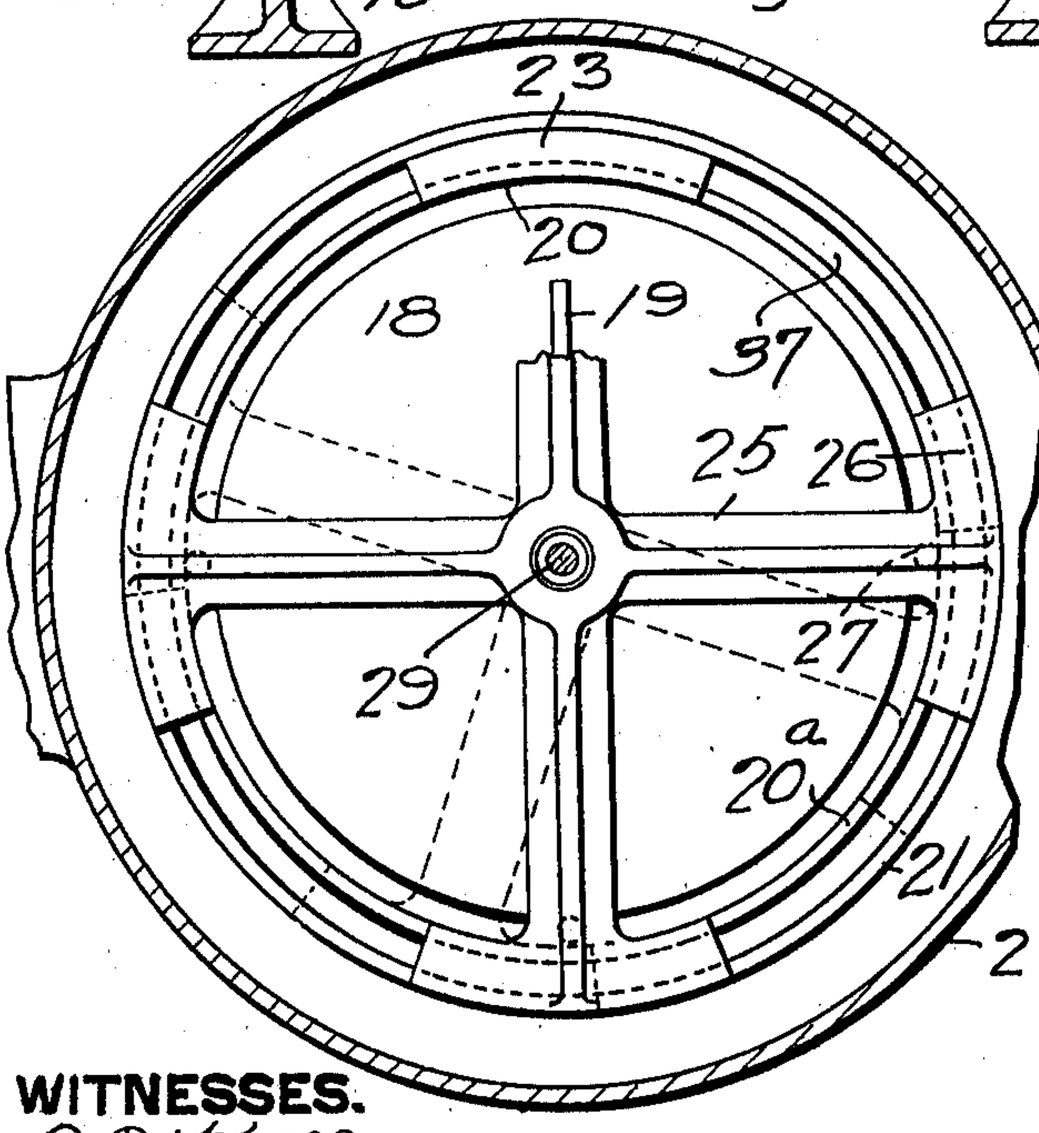
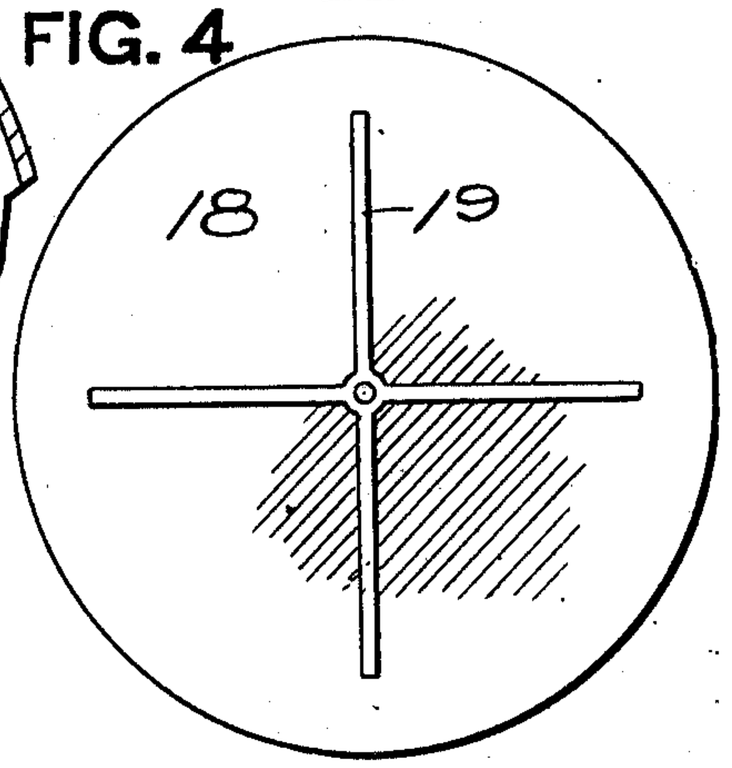


FIG. 4



WITNESSES.

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FIG. 2

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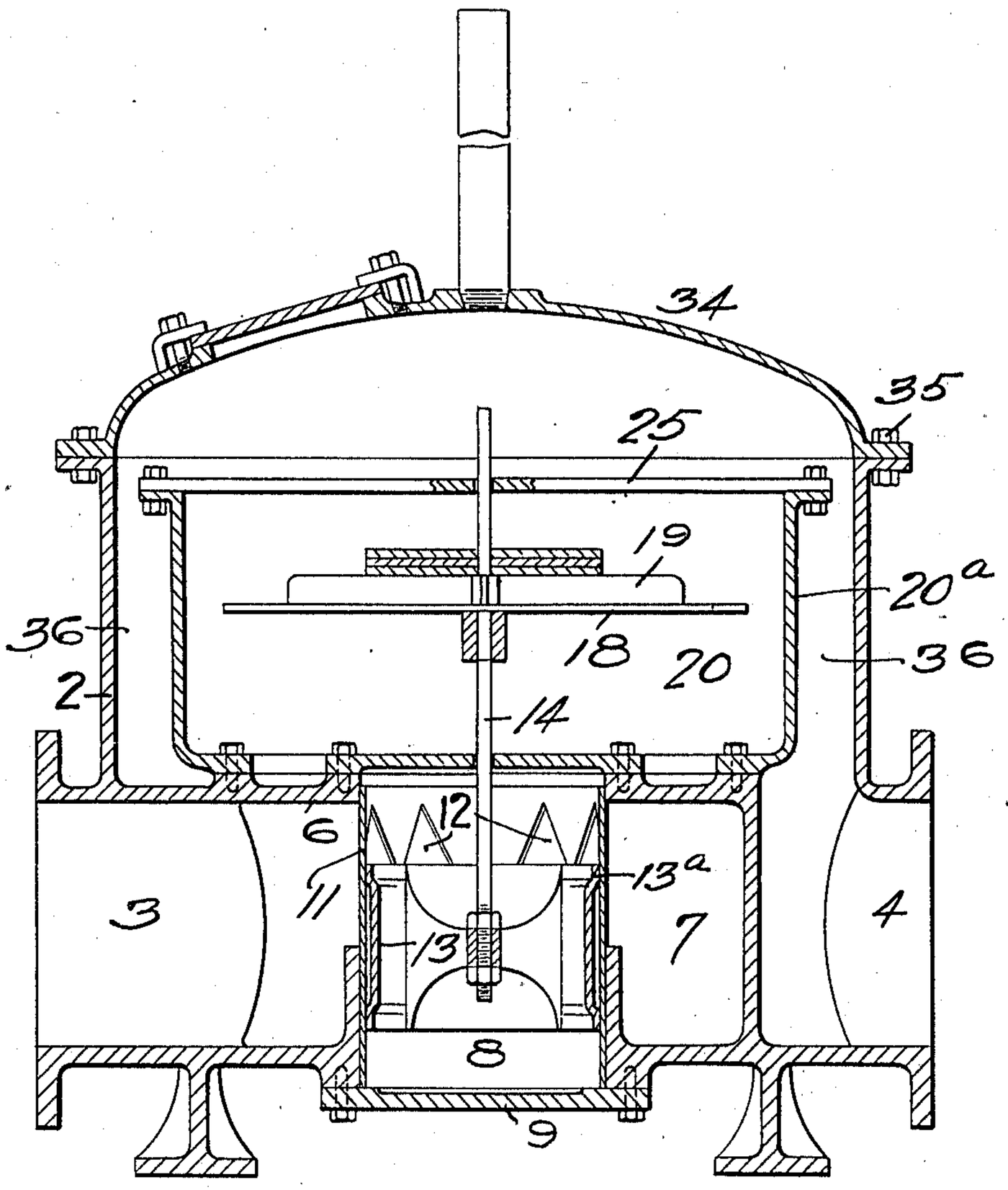
2 SHEETS—SHEET 2.

FIG. 6



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UNITED STATES PATENT OFFICE.

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CONTROLLER FOR FILTERS.

992,888. Specification of Letters Patent. Patented May 23, 1911.

Application filed February 1, 1908, Serial No. 413,894. Renewed April 13, 1911. Serial No. 620,909.

To all whom it may concern:

Be it known that I, FREDERICK B. LEOPOLD, a resident of Sewickley, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Controllers for Filters; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to controllers for use in connection with filters.

My invention comprises the novel features hereinafter set forth and claimed.

In the accompanying drawing Figure 1 is a vertical sectional view of my improved controllers; Fig. 2 is a cross section on the line 2—2, Fig. 1; Fig. 3 is a vertical sectional view of a portion of the outer and inner casings showing the manner of communication between the two; Fig. 4 is a plan view of the disk; Fig. 5 is a vertical section of the bushing; Fig. 6 is a vertical section of a modified form of my invention.

In the drawings, the numeral 2 designates a suitable shell or casing, composed of a single casting, having the inlet 3 and the outlet 4. The casing 2 is provided with a diaphragm 6 which forms the annular passage 7 for the water to direct the same up into the controller. Within the casing is the bore 8 closed at its bottom by the plate 9, secured to said casing 2 by the screws 10.

Fitting within the bore 8 is the bushing 11 having the openings 12. Within the bushing 11 is the valve 13, which is adapted to control the openings 12 in the bushing 11. The openings 12 are preferably triangular, or tapering, in shape and as the valve 13 moves over said openings the admission of the water is more gradual. The valve 13 has the shoulders 13^a which form the bearing faces of said valve in contact with the inner walls of the bushing 11 and the friction is reduced. Secured to the valve 13 is the stem 14 which passes up through a bushing 15 in the yoke 16, secured to the casing 2 in any suitable manner.

Secured to the upper end of the valve stem 14 is the disk 18 provided with the strengthening radial ribs 19. The disk 18 is located in the chamber 20, said chamber being formed by the ring 20^a secured to the inner casing 21 by means of the screws 22. The upper rim of the ring 20^a has the flanges 23 into which the screws 22 enter to support the said ring 20^a within the casing 21. These flanges 23, when said ring is secured to the casing 21, form the annular passage 23^a. The inner casing 21 is secured to the outer casing 2 by the screws 24. Resting upon the upper rims of the ring 20^a and the inner casing 21 is the spider 25, said spider having the arcs 26 which are adapted to normally rest upon the flanges 23 and on the upper rim of the ring 20^a, as well as upon the upper edge of the inner casing 21. The arcs 26 form a valve for controlling the amount of water which passes through the passage 23^a. Idlers 27, projecting downwardly from the arcs 26 of the spider 25, are adapted to engage the inner face of the ring 20^a to reduce the friction in turning the spider 25, as hereinafter fully set forth.

In the middle of the spider 25 is an opening 28 through which the stem 29 passes. Surrounding said stem is the spring 30 which is interposed between the loose collar 31 and the shoulder 32 on said stem. The stem 29 passes up through a suitable stuffing box 33. The action of the spring 30 is to normally force the spider 25 into close contact with the upper rims of the ring 20^a and the inner casing 21. A cover plate 34 is secured to the outer casing 2 by means of the bolts 35. The cover plate 34 is provided with the air outlet 38. This outlet permits of the escape of the air which will be freed from the water due to the surging of the water over the inner casing into the annular chamber 36.

When my improved controller is in use, the water enters the inlet 3, and passing into the annular chamber 7 passes thence through the openings 12 in the bushing 11 into the inner casing 21. The main body of water ascends into the disk chamber 20 and, passing around the disk 18, passes out the upper end of said chamber and overflows the sides of the inner casing 21 into the space 36 between the inner and outer casings 21 and 2. As stated above, the water ascends in the disk chamber 20 and the greater portion of the water passes up around the disk 18,

while a portion may be compelled to pass up into the annular passage 23^a, whence it flows through the openings 37 in the upper rim of the ring 20^a and descends into the annular chamber 36. From the annular chamber 36 the water passes down and out by way of the outlet 4.

The fact that the water is admitted to the lower side of the disk 18 under a certain head, keeps said disk properly balanced so that the valve 13 controls the openings 12 in the bushing 11. As the rate of flow from the filter decreases, the head or pressure of the water entering the openings 12 decreases proportionately and the pressure on the disk 18 diminishes and the valve 13 is lowered so as to increase the size of the openings 12 to admit a uniform quantity of water to the controller. By having the triangular shaped openings 12, the increase in the size of the openings as the valve is lowered, is in a gradually increasing proportion. As the rate of flow of the water from the filter increases, the pressure on the disk 18 is greater and the valve 13 is raised to decrease the size of the openings 12. By having a portion of the water pass up through the passage 23^a, the rate of discharge of the controller may be increased as desired to the limit of the capacity of the passage 23^a.

It is apparent that by turning the spider 25 by means of the stem 29, the arcs 26 may be removed over to control the size of the openings 37 leading from the passage 23. By increasing or decreasing the size of the openings 37 the amount of water which may pass up through the passage 23^a is accurately controlled. Any air released from the water in its surging over the inner casing 20 is allowed to escape by the outlet 38 and as a consequence any churning of the disk 18 is obviated and it works steadily and positively.

In Fig. 6 I have illustrated a modified form of my invention in which the ring 20^a is dispensed with and all the water passes up and around the disk 18.

What I claim is:

1. In a controller, the combination of a suitable outer casing having an inlet and an outlet, an inner casing within said outer casing having a disk chamber therein, a disk in said chamber of smaller diameter than the disk chamber to leave a space between the periphery of said disk and the walls of said disk chamber, and a valve connected to said disk adapted to completely shut off the supply of fluid to said inner casing.

2. In a controller, the combination of a suitable outer casing having an inlet and an outlet, an inner casing communicating with said outer casing having a disk chamber communicating with the space between said inner and outer casings, a disk in said disk chamber, said disk of smaller diameter than said chamber to leave a space between the periphery of said disk and said chamber, and a valve connected to said disk adapted to completely shut off the supply of fluid to said inner casing.

3. In a controller, the combination of a suitable outer casing having an inlet and an outlet, an inner casing communicating with said outer casing at its upper end, a cylindrical shell within said inner casing forming a disk chamber therein and leaving a space between said inner casing and said shell which communicates with the space between said inner and outer casings, means for controlling the size of the communicating opening leading from said space between said shell and said inner casing to the space between said inner and outer casings, a disk in said disk chamber, said disk of smaller diameter than said chamber to leave a space between the periphery of said disk and said chamber, and a valve connected to said disk controlling the supply of fluid to said inner casing.

4. In a controller, the combination of a suitable outer casing having an inlet and an outlet, an inner casing communicating at its upper end with said outer casing, a cylindrical shell within said inner casing forming a disk chamber and a space between said shell and said inner casing, and openings at the upper end of said inner shell leading from said space into the space between said inner and outer casings, a valve controlling said openings, a disk in said disk chamber, said disk of smaller diameter than said disk chamber to leave a space between the periphery of said disk and said chamber, and a valve connected to said disk controlling the supply of fluid to said inner casing.

5. In a controller, the combination of a suitable outer casing having an inlet and outlet, an inner casing having openings leading to said outer casing, a spider having arcs adapted to move over said openings, a ring in said inner casing forming a disk chamber in said inner casing communicating with said inner and outer casings, a disk in said disk chamber, said disk of smaller diameter than said chamber to leave a space between the periphery of said disk and said chamber, and a valve connected to said disk controlling the supply of water to said inner casing.

6. In a controller, the combination of a suitable outer casing having an inlet and outlet, an inner casing, a ring in said inner casing and secured to the same forming a disk chamber communicating with the space between said inner and outer casings, said disk chamber having flanges at its upper rim forming openings leading from said inner casing to the space between said inner and outer casings, a removable spider having arcs adapted to move over said openings, a

disk in said disk chamber, the disk of smaller diameter than said chamber to leave a space between the periphery of said disk and said chamber, and a valve connected to said disk controlling the supply of water to said inner casing.

In testimony whereof, I, the said FREDERICK B. LEOPOLD, have hereunto set my hand.

FREDERICK B. LEOPOLD.

Witnesses:
ROBERT C. TOTTEN,
J. R. KELLER.