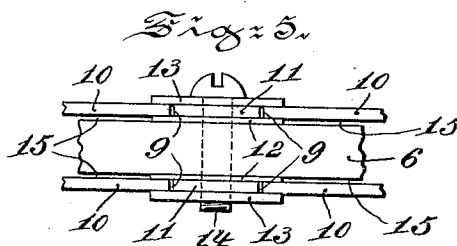
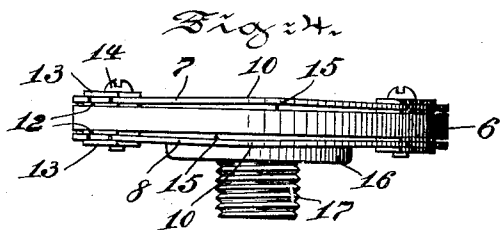
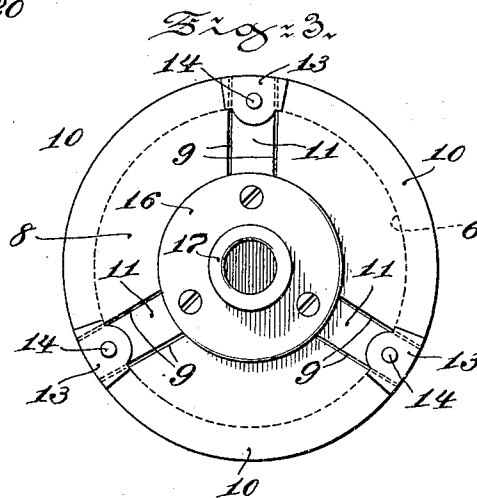
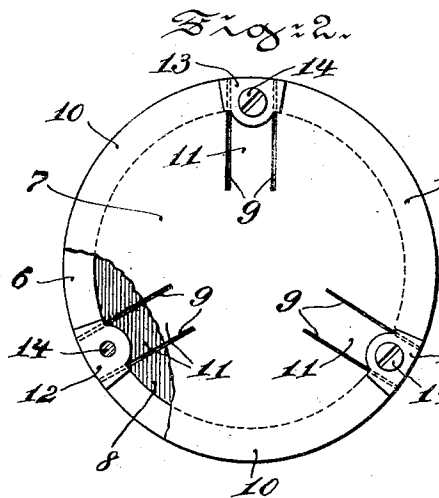
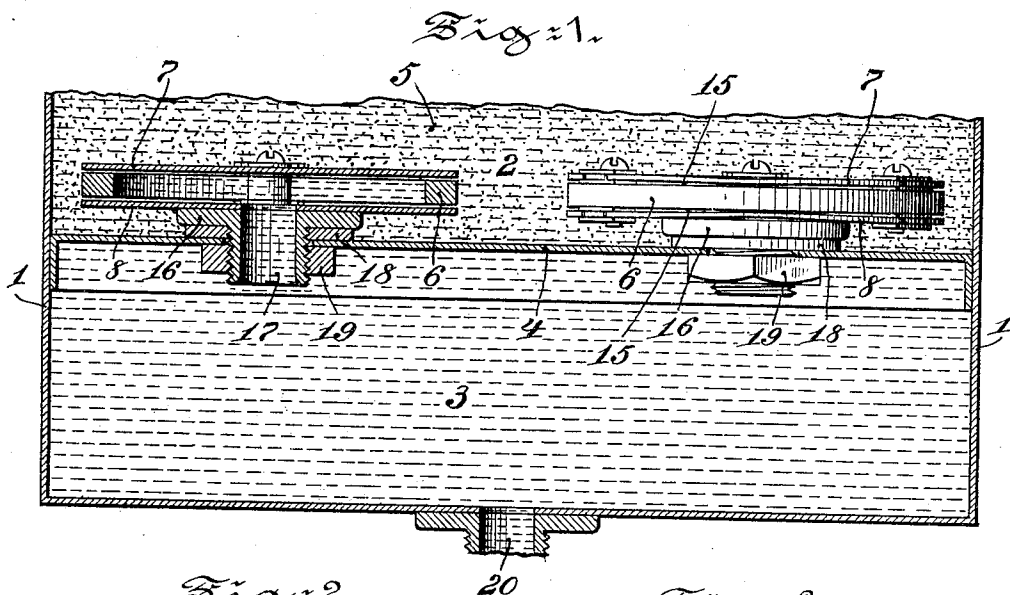


No. 814,211.

PATENTED MAR. 6, 1906.

C. HUNGERFORD.
FILTER VALVE.

APPLICATION FILED DEC. 16, 1905.



Witnesses:
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UNITED STATES PATENT OFFICE.

CHURCHILL HUNGERFORD, OF PHILADELPHIA, PENNSYLVANIA, AS-
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CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

FILTER-VALVE.

No. 814,211.

Specification of Letters Patent.

Patented March 6, 1906.

Application filed December 16, 1905. Serial No. 291,972.

To all whom it may concern:

Be it known that I, CHURCHILL HUNGERFORD, a citizen of the United States, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Filter-Valves, of which the following is a full, clear, and exact description.

This invention relates to filter-valves, my object, as generally stated, being to provide a valve of simple and efficient construction, whereby the ports thereof through which the water passes will be automatically increased in area during the flow of water therethrough in one direction for cleaning purposes and which ports will be automatically decreased in area upon the reversal of the flow of water for filtering purposes.

The invention consists in the novel construction and combinations of parts, which will be hereinafter fully described and claimed.

In the drawings, Figure 1 is a vertical section of a portion of a filter provided with valves embodying my invention. Fig. 2 is a top view, partly broken away, of my improved valve. Fig. 3 is a bottom view of the valve. Fig. 4 is a side elevation of the valve, showing the position that the wings thereof assume during the operation of cleaning the filter. Fig. 5 is a detail of the valve in elevation.

1 designates the lower portion of a filter-tank, which is divided into two compartments 2 and 3 by a partition 4, the upper compartment 2 containing the sand 5 or other filtering medium. Mounted on the partition 4 are my improved valves, each of which is of the following construction: 6 designates an annular casing, adjacent to the upper and lower faces of which are arranged circular plates 7 and 8, the diameters of which are equal to the diameter of the casing 6; or substantially so. These plates 7 and 8 are each provided with radially-arranged pairs of slots 9, dividing the outer portion of each plate into wings 10 and intermediate portions 11. The plates are maintained a slight distance from the upper and lower faces, respectively, of the casing 6 by spacing-plates 12, arranged between said casing and plates and engaging the inner faces of the intermediate portions 11 and the adjacent edges of the wings 10.

Arranged over the outer faces of the intermediate portions 11 are plates 13, which extend over and into engagement with the adjacent edges of the wings 10. The plates 13, the intermediate portions of the plate 11, the plates 12, and the casing 6 are firmly secured together by screws 14, passing therethrough, thus providing the ports 15 between the wings 10 and the casing 6. The lower plate 8 is provided with a central opening, and surrounding this opening and secured to the plate 8 is a flange 16 on the upper end of a short pipe 17, which extends down through an opening in the partition 4 to afford communication between the compartment 3 and the interior of the valve-casing. The flange 16 rests upon a washer 18, which in turn rests upon the partition 4, and screwed on the lower end of the pipe 17 and against the partition 4 is a nut 19, by means of which the valve is firmly secured to the partition.

The operation of the valve is as follows: During the filtering operation the water to be filtered passes down through the sand 5 into the valves through the ports 15 and out of the valves into the compartment 3, from which it passes, by way of an opening 20 in the bottom thereof, to the user. During the washing operation the flow of water is reversed—that is to say, the water passes up through the compartments 3 and 2 to agitate the sand 5 and carry off the particles of dirt deposited thereon during the filtering operation. In order to agitate the sand and facilitate the cleaning operation, it is necessary that during this operation a larger volume of water passes through the filter and at a greater velocity than during the filtering operation. It is therefore necessary that the area of the valve-ports 15 be increased during the cleaning operation and decreased during the filtering operation. A wide range of automatic variation in area of the ports 15 during the filtering and cleaning operations is accomplished by my improved valve. Normally the opposing faces of the wings 10 and casing 6 are parallel to each other excepting the wings 10 of the upper plate 7, which are bowed downwardly or inwardly by the weight of the sand 5 thereon. In this position the ports 15 are sufficiently narrow to prevent any sand grains from entering the valves with the filtered water. When, however, the flow

of water is reversed and it passes out through the ports 15 at a greater velocity, the edges of the wings 10 engaged by the plate 13 will move toward each other, and said wings will
5 bow outwardly away from the casing, due to the pressure of the water, and thus automatically increase the area of the ports 15. After the filter has been cleaned the wings 10, being made of spring metal, will automatically
10 spring back to normal position, and the filtering operation is again repeated.

I claim—

1. In a filter-valve, a casing, a plate provided with slots between the edges of which
15 are formed wings arranged adjacent to the casing to provide ports between the casing and wings, and means to engage the edges of said wings adjacent to said slots to prevent movement of the engaged portions of the
20 wings away from the casing, whereby that portion of each wing between the engaged portions thereof is permitted to move toward and from the casing to increase and decrease the area of said ports, substantially as set
25 forth.

2. In a filter-valve, a casing, a plate provided with slots between the edges of which are formed wings arranged adjacent to the

casing to provide ports between the casing and wings, and plates having a fixed relation
30 to the casing and extending over the outer edges of the wings to engage and prevent movement of said edges away from the casing, whereby the central body portion of each wing may move toward and from the casing
35 to increase and decrease the area of said ports, substantially as set forth.

3. In a filter-valve, a casing, a plate divided into wings and intermediate portions by slots, said plate being arranged adjacent
40 to the casing to provide ports between the casing and wings, plates extending over the intermediate portions and the adjacent edges of the wings, and means to secure said intermediate portions and plates to the casing,
45 whereby the central body portion of each wing may move toward and from the casing to increase and decrease the area of said ports, substantially as set forth.

In testimony whereof I have hereunto affixed my signature.

CHURCHILL HUNGERFORD.

Witnesses:

JAS. C. WOBENSMITH,
A. V. GROUPE.