No. 861,586. PATENTED JULY 30, 1907.

G. H. GILMAN.

FILTER.

APPLICATION FILED NOV. 1, 1906.

Fig. 2

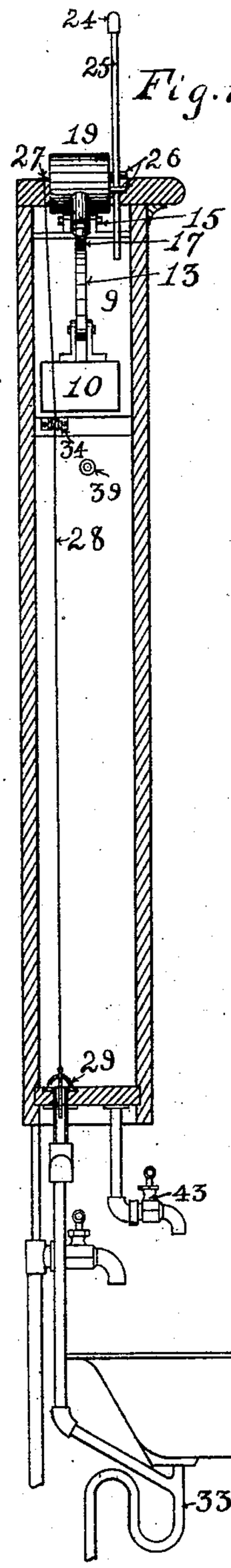


Fig. 1

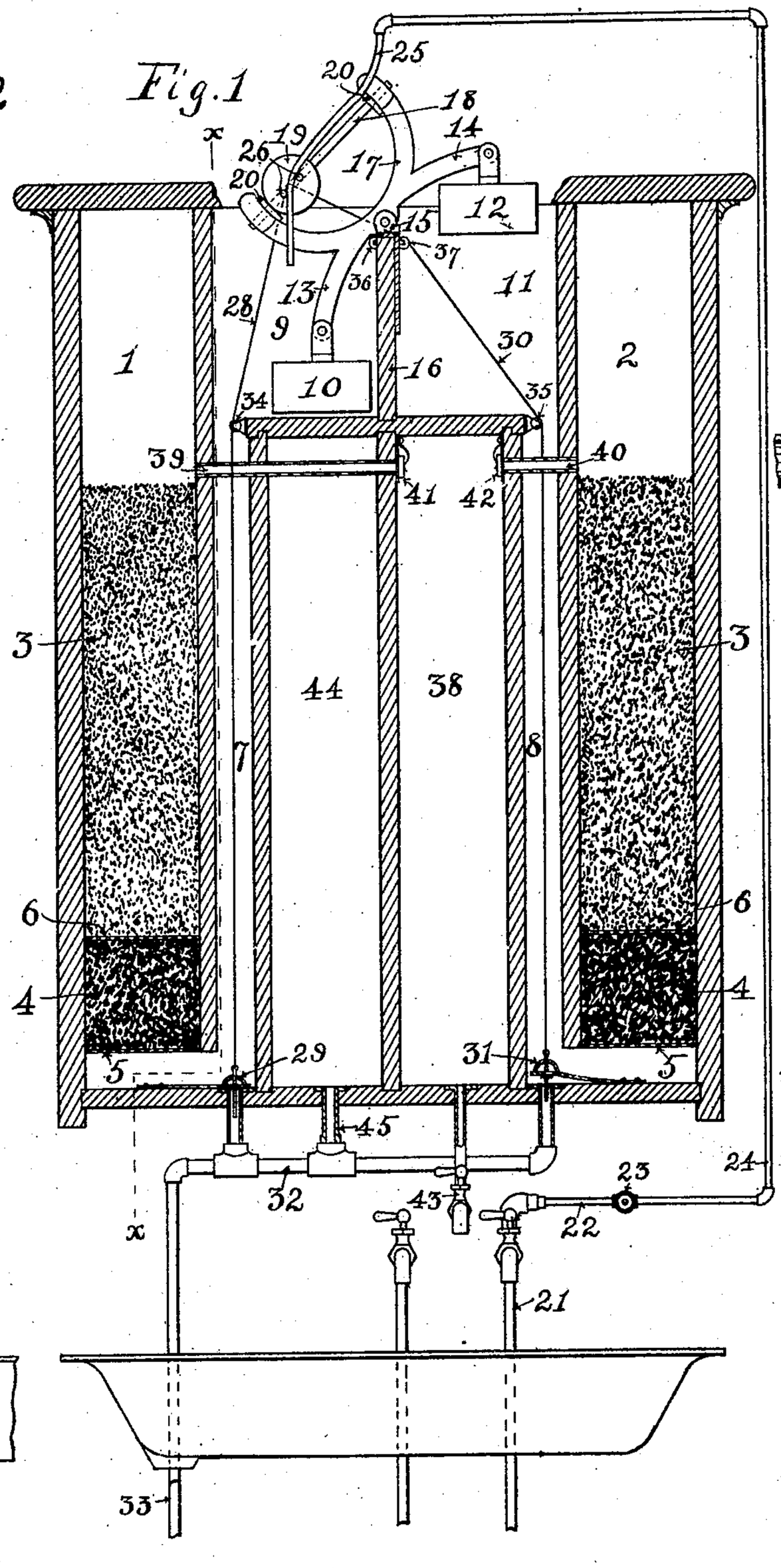


Fig. 3

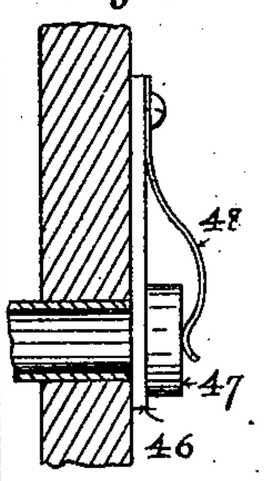
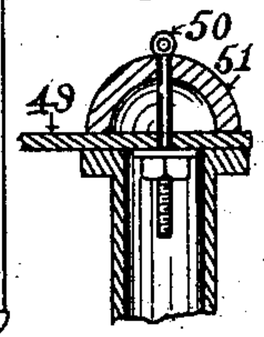


Fig. 4



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UNITED STATES PATENT OFFICE.

GEORGE H. GILMAN, OF BUFFALO, NEW YORK, ASSIGNOR TO GILMAN AUTOMATIC FILTER COMPANY, OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

FILTER.

No. 861,586. Specification of Letters Patent. Patented July 30, 1907.

Application filed November 1, 1906. Serial No. 341,614.

To all whom it may concern:

Be it known that I, GEORGE H. GILMAN, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Filters, of which the following is a specification.

My invention relates to filters, and has for its object the production of a filter which is thoroughly effective, automatic in operation and automatically self-cleaning.

Referring to the drawings herewith, Figure 1 is a vertical section. Fig. 2 is a section on the line *x*—*x*, Fig. 1, looking to the right. Fig. 3 is a detail of my inlet valves. Fig. 4 is a detail of one of my outlet valves.

In the drawings I have shown my invention applied to a cabinet form of filter which may be placed, as shown, over a kitchen sink and secured to the wall. This is a typical adaptation of my invention.

Two vertical chambers, 1 and 2, similar in construction contain the filter-material, which, as shown, consists of charcoal at 3 and sand at 4. I consider this the most effective combination, but it will be evident that I may substitute any other desired medium, such as porous stone or artificial stone such as the Pasteur clay. The bottoms of the chamber 1 and 2 are screen-closed by screens 5 preferably made of copper, and similar screens of copper 6, separate the charcoal and sand. I preferably employ copper for this purpose because nearly all impure waters contain a small amount of chemicals which act upon the copper, producing certain copric compounds which destroy germs in the water.

Conduits 7 and 8 lead downwardly from the central, top portion of the filter and lead to the chambers 1 and 2, respectively. The upper end of the conduit 7 connects with a float-chamber 9, in which a float 10 operates; and the upper end of the conduit 8 connects with a float-chamber 11, in which a float 12 operates. The floats 10 and 12 are pivoted to rocker arms 13 and 14, which are pivoted in a bearing block 15 which is secured to the partition 16 which separates the two chambers 9 and 11. Integral with or connected to the arms 13 and 14 is a yoke 17 which supports a square rod 18, and slidably mounted on this rod 18 is a ball or weight 19. Buffers or cushions 20 are placed over the rod 18 within the yoke 17 to receive the blows of the weight 19 as it moves from side to side. It will now be evident that when one of the floats, say the float 10, is raised the yoke 17 will be rocked, and as soon as the rod 18 passes sufficiently past the horizontal position, the weight 19 will slide to the other side of the yoke.

21 is the ordinary cold water supply pipe, supplying water under pressure. From this pipe a branch pipe 22 leads to a valve 23 and a pipe 24 leads up to and connects with a hose 25. This hose passes between two pipes 26, secured to the weight 19, so that when the weight 19 is at the left, as shown, the hose 26 will discharge into the chamber 9, and when the weight 19 is at the right the hose will discharge into the chamber 11.

Connected to the weight 19, upon its back side (see Fig. 2) is a pin 27. To this pin 27 is secured a wire 28 which connects with a valve 29 in the bottom of the conduit 7; and to this pin 27 is secured a wire 30 which connects with a valve 31 in the bottom of the conduit 8. The valves 29 and 31 connect with an eduction pipe 32 which connects with the sink waste-pipe 33 above the trap. The wires 28 and 30 pass over proper guide rollers 34, 35, 36, 37. It will now be seen that movement of the weight 19 will open and close the valves 29 and 31 alternately.

38 is the filtered water reservoir, which is closed except for the pipes 39 and 40 which lead in from the chambers 1 and 2. The pipes 39 and 40 are provided with valves 41 and 42 which prevent back flow from the reservoir 38.

43 is the cock by which the filtered water may be drawn from the reservoir 38.

44 is a chamber which may be used for ice to cool the filtered water. A drip-pipe 45 connects this chamber with the eduction pipe 32.

By reference to Fig. 3 it will be seen that the valves 41 and 42 comprise rubbers 46 which shut down over the ends of the pipes 39 and 40, backed by weights 47 and light springs 48. This construction gives a simple and effective valve which responds readily to in-flow of water and prevents out-flow.

By reference to Fig. 4 it will be seen that the valves 29 and 31 comprise similar rubbers 49 which are secured to the base of the conduits 7 and 8 at the same little distance from the eduction pipes and which shut down over the eduction pipes. To these rubbers are secured, by eye-bolts 50 cup-shaped weights 51.

A sufficient amount of slack should be given the wires 28 and 30 (not shown in the drawings) so that when the yoke 17 shifts in response to the lift of one of the floats the valve (29 or 31) then closed will not be opened until the weight 19 slides over on the rod 18. Otherwise the alternation of operation, as hereafter described would be prevented.

Having now described the parts, I will next describe the operation. Assuming the filter ready to be started with the parts in the position shown in the drawings, water is admitted past the valve 23, flows through the pipe 24 and tube 25 and falls into the chamber 9. From this it passes down into the conduit 7, up through the filter-material 4 and 3, through the pipe 39, past the valve 41 and into the reservoir 38. This continues until the reservoir 38 is filled. The fit of the valves 41 and 42, while sufficient to prevent back-flow of water,

is not sufficiently close to prevent escape of air as displaced by the inflow of water. When the reservoir 38 is filled the level of the water will rise in the chambers 1 and 9 until the float 10 is lifted sufficiently high to cause the weight 19 to slide to the other side of the yoke 17. This will cause the yoke 17 to swing to the opposite extreme limit and carry the hose 25 over the chamber 11, cause the wire 28 to open the valve 29 and allow the valve 31 to close by gravity. The water contained by the chamber 9 and the conduit 7 will then flow out through the pipe 32 and the head of water in the chamber 1, which is filtered water, will flow down through the filter-material and out the same passage, washing out and cleansing the filter-material thoroughly and well. Thus the filter of chamber 1 is cleaned. Water now flows through the hose 25, into chamber 2, down through conduit 8, up through the filter-material in chamber 2, and if any water has been used out of the reservoir 38, refills it through the pipe 40. When the reservoir is again filled the level of water rises in chambers 11 and 2, until the float 12 causes the weight 19 to slide back on the rod 18, carrying the hose 25 over chamber 9, opening the valve 31 and closing the valve 29. The head of filtered water in chamber 2 will then wash the filter-material of that chamber. It will then be seen that the filter is automatic in operation; that the reservoir is always kept filled; that the filters automatically cleansed and washed with filtered water; and that the rapidity of operation may be regulated by the valve 23 which regulates the supply of water.

Having thus described my invention, I claim:

1. In combination with a filter chamber, filter-material therein contained and a reservoir, automatic means for forcing water upwardly through the filter material to fill said reservoir and to supply a head of filtered water above the filter-material, means for automatically cutting off the water supply when said reservoir is filled and said head is established and for automatically causing said head of filtered water to flow back through said filter-material to wash the same.

2. A filter comprising two filter chambers, filter-material in each, a reservoir, a source of water supply, automatic means for directing said water supply alternately through said filter chambers to fill said chamber and to supply a head of filtered water above the filter-material, and automatic means for permitting the head of filtered water to flow back through the filter-material to wash the same when said water supply is directed to the other filter chamber.

3. A filter comprising two filter chambers, filter-material in each, a reservoir, a source of water supply, conduits leading said water supply into the bottom of said filter chambers, pipes supplied with check-valves leading from said filter chambers into said reservoir, float-valve chambers situated over said conduits, floats therein, shifting mechanism actuated by said floats which directs said water supply alternately from one float chamber to the other and valves in the bottoms of said conduits actuated by said shifting mechanism.

4. A filter comprising two filter chambers, filter-material in each and open areas above the filter-material, a reservoir, a source of constant water supply and means for regulating the volume thereof, conduits leading said water supply into the bottoms of said filter chambers, pipes leading from said filter-chambers into said reservoir, check valves in said pipes to prevent back-flow of water from said reservoir but permitting escape of air therefrom, float valve chambers situated over said conduits and on a level with the upper open areas of said filter chambers, floats in said float chambers, shifting mechanism actuated by said floats which directs said water supply alternately from one float chamber to the other, and valves in the bottoms of said conduits actuated by said shifting mechanism.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

GEORGE H. GILMAN.

Witnesses:
GEORGE W. SHEPARD,
MYRON P. BUSH.