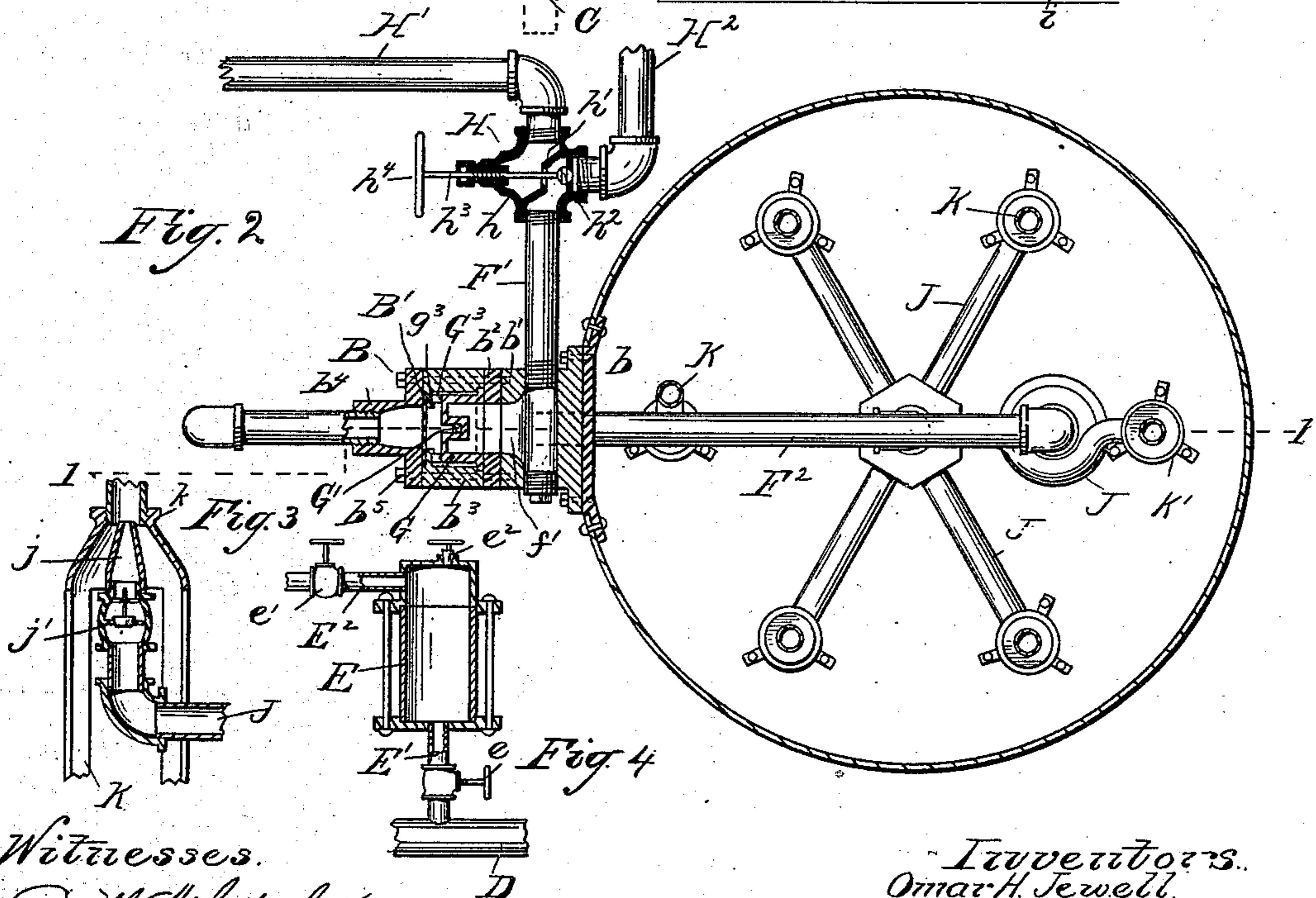
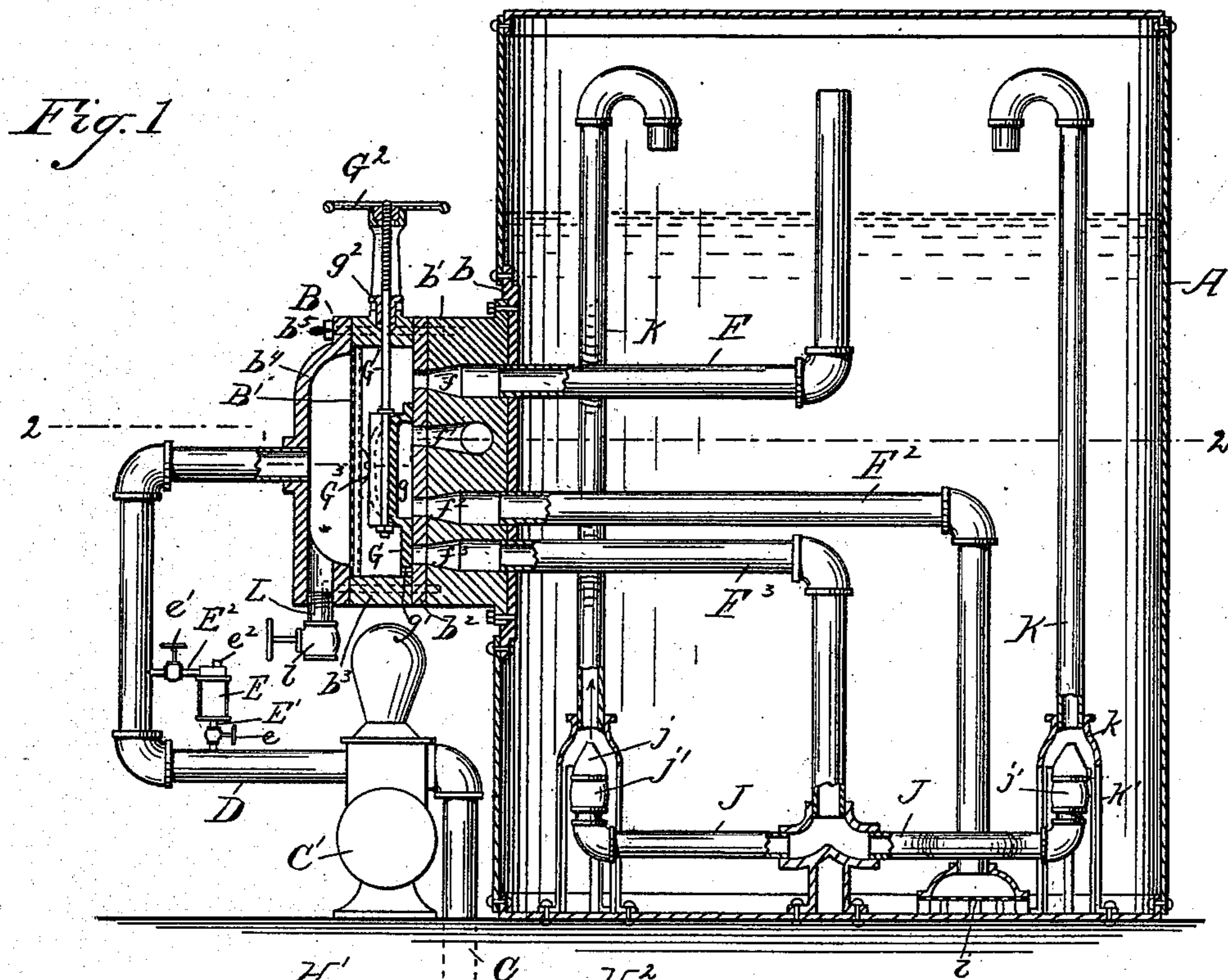


(No Model.)

O. H. & I. H. JEWELL.  
WATER FILTER.

No. 413,671.

Patented Oct. 29, 1889.



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# UNITED STATES PATENT OFFICE.

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TO THE JEWELL PURE WATER COMPANY, OF SAME PLACE.

## WATER-FILTER.

SPECIFICATION forming part of Letters Patent No. 413,671, dated October 29, 1889.

Application filed August 16, 1888. Serial No. 277,362. (No model.)

*To all whom it may concern:*

Be it known that we, OMAR H. JEWELL and IRA H. JEWELL, citizens 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 Water-Filters, which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional view of an apparatus embodying our invention, taken on the line 1 1 of Fig. 2; Fig. 2, a plan section taken on the line 2 2 of Fig. 1; Fig. 3, a detail sectional view of one of the injector-nozzles and its check-valve, and Fig. 4 a detail sectional view of the chemical-tank and its connections.

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

Our invention relates to filtering apparatus, and more particularly to that class in which the water to be filtered is forced through the sand, gravel, or other suitable filtering medium in order to remove the impurities therefrom.

Our present invention is in the nature of an improvement upon the apparatus set forth in Letters Patent Nos. 377,387 and 377,388, granted February 7, 1888, to Omar H. Jewell, and has for its object to increase the efficiency of the apparatus therein shown and described, and at the same time to simplify the construction.

To these ends our invention consists in certain novel features, which we will now proceed to describe, and will then particularly point out in the claims.

In the drawings, A represents the filter-tank, which is closed both at the top and bottom, and is filled with sand, gravel, or other suitable filtering material. At some suitable point on this tank, and preferably at the side thereof, there is arranged a valve-chest B, with which all the various pipes of the filter are connected. This valve-chest is preferably connected to the filter-tank A by means of a suitable saddle  $b$ , bolted to the tank and carrying the base  $b'$  of the valve-chest. To the front of this base there is attached the valve-seat  $b^2$ , which is preferably constructed of brass or other non-corrosive material, and in front of this valve-seat is arranged the body

$b^3$  of the valve-chamber, which is closed at its front end by means of a cap or cover  $b^4$ . The whole valve-chest is secured together by means of suitable bolts  $b^5$ , or in any other suitable manner.

B' represents a strainer constructed of wire-gauze or other suitable material, and preferably clamped between the cap  $b^4$  and the body  $b^3$  of the valve-chest.

C represents the suction-pipe of a suitable pump C', from which leads a supply-pipe D, which opens into the valve-chamber through a suitable aperture in the cap  $b^4$  thereof. At one of the bends of said pipe there is arranged a chemical-tank E, constructed of glass or other suitable material, and having at its lower end a pipe E', leading to the horizontal portion of the pipe D, and provided with a suitable valve  $e$ . From the top of the chemical-tank E a pipe E<sup>2</sup> leads to the upright portion of the pipe D, said pipe E<sup>2</sup> being provided with a valve  $e'$ .

$e^2$  indicates a suitable filling-plug, which may be removed in order to fill the chemical-tank, said plug being subsequently replaced to close the same when filled.

The valve-chest B is provided with four ports  $f, f', f^2$ , and  $f^3$ , and there is arranged within the said valve-chamber a slide-valve G, provided on its inner face with a groove  $g$ , of sufficient length to connect either the ports  $f$  and  $f'$  or the ports  $f'$  and  $f^2$ . The said valve is also provided at its lower end with an extension  $g'$ , which, when the valve is in the position shown in Fig. 1, will close the lower port  $f^3$ . The valve G is operated by means of a valve-rod G', which is threaded at its upper end and passes through a suitably-threaded hand-wheel G<sup>2</sup>, by means of which the said valve may be moved in a vertical direction. A suitable stuffing-box  $g^2$  is provided at the point where the valve-rod passes through the valve-chest, in order to prevent leakage. The valve G is held against its seat by means of springs G<sup>3</sup> at the sides thereof, against which suitable projections  $g^3$  on the valve-chest bear.

F indicates a pipe leading from the port  $f$  into the filter-tank A, and thence upward nearly to the top of the same.

F' indicates a pipe leading laterally out-

ward from the port  $f$  and connected to the pure-water and waste pipes, in the manner hereinafter described.

$F^2$  indicates an outlet-pipe connected to the port  $f^2$ , and extending into the filter-tank A, and downward therein almost to the bottom.

$F^3$  indicates a wash-pipe connected to the port  $f^3$ , and extending into the filter-tank, and then downward almost to the bottom of the same.

The pipe  $F'$  is provided with a three-way valve H, by means of which it may be connected either to the pure-water-supply pipe  $H'$  or to the waste-pipe  $H^2$ . This three-way valve consists of a suitable casing  $h$ , connected at one end to the pipe  $F'$  and at the other end to the pipe  $H'$ , the pipe  $H^2$  being connected to it at a point intermediate between the two, as shown. A transverse diaphragm  $h'$ , provided with a suitable valve-aperture, passes diagonally across the interior of the valve-casing, and a similar valve-aperture is formed in the casing at the point which the waste-pipe  $H^2$  is connected to the same, this latter valve-aperture being arranged immediately opposite the former one.  $h^2$  indicates a valve adapted to close either of these valve-apertures, being provided with a threaded valve-stem  $h^3$  and wheel  $h^4$ , by means of which it is operated in the usual manner.

The pipe  $F^2$  is provided at its lower end with a screen  $i$ , which serves to prevent the entrance of sand or other substances into the pipe. From the lower end of the pipe  $F^3$  branch pipes J radiate outward, six of these branch pipes being shown in the present instance, although any desired number may be employed. The outer end of each branch pipe J is turned upward, as shown, and is provided with a jet-nozzle  $j$ , in the rear of which is arranged a check-valve  $j'$ , which serves to prevent the entrance of sand into the said pipe.

In conjunction with the radiating branch pipes J' we employ a corresponding series of what are known as "siphon-pipes" K, extending upward from the nozzles therein to the top of the tank and being there bent downward, as shown. Each pipe K is supported on a suitable cage  $K'$ , the upper end of which incloses and is contracted around the nozzle  $j$ , as shown at  $k$ .

L indicates an outlet-pipe arranged at the lower end of the cap of the valve-chest B in front of the screen  $B'$  therein, the same being provided with a valve  $l$ , by means of which it may be opened or closed, as desired.

The operation of the apparatus is as follows: When in the act of filtering, the parts of the apparatus are in the position shown. The water to be filtered is drawn from any suitable course through the suction-pipe C by means of the pump  $C'$ , and is forced thence through the supply-pipe D into the valve-chamber. During its passage through the said supply-pipe it takes up from the chem-

ical-tank E the necessary amount of the chemical contained therein. The amount of the chemical delivered is controlled by means of the valves  $e$  and  $e'$ , the connection of the pipes  $E'$  and  $E^2$  being such that a pressure due to the action of the pump is equalized on both the top and bottom of the tank, allowing the chemical contained in said tank to pass downward into the supply-pipe B and to mingle with the water contained therein. As the water from the supply-pipe D enters the valve-chamber it must first pass through the screen  $B'$ , which serves to prevent any large objects from entering the valve-chamber proper, and thus clogging the ports or injuring the valve or preventing its operation. The pipe L serves to remove these large objects and clean out that portion of the valve-chamber in front of the screen. Passing through the valve-chamber, the water enters the port  $f$ , and, passing through the pipe F, enters the filtering-chamber at the top thereof. It is then forced down through the filtering material contained in the tank, and, passing through the screen  $i$ , enters the outlet-pipe  $F^2$ , whence it passes through the port  $f^2$ , the groove  $g$  in the valve G, and the port  $f'$  to the pipe  $F'$ . The valve  $h^2$  being in the position shown, the filtered water passes into the pure-water pipe  $H'$ , and is thence delivered to the desired point or points. When the filtering material in the tank has become clogged and it is desired to wash the same, this operation is performed by rotating the hand-wheel  $G^2$  until the valve G is brought into position with its groove  $g$  connecting the port  $f$  and  $f'$ . When in this position, the downward extension  $g'$  of the said valve will close the port  $f^2$  and the port  $f^3$  will be opened. The water supplied by the pump will then pass through the said port  $f^3$  into the wash-pipe  $F^3$  and through the branch pipes J thereof, escaping in the form of a jet through the nozzles  $j$ . This jet, entering the siphon-pipes  $k$ , will draw along with them the filtering material, and will carry the same upward through the said pipes and discharge it at the top of the tank. This operation continues until the filtering material is thoroughly washed and the impurities passing off with the waste water, which escapes through the pipe F, port  $f$ , groove  $g$  in the valve G, and port  $f'$  into the pipe  $F'$ . During this operation of washing, the valve  $h^2$  is moved into a position to close the pure-water pipe H and open the waste-pipe  $H^2$ , through which the wash-water escapes and is discharged at any desired point.

It will be seen that by the employment of a slide-valve in connection with a valve-chamber provided with suitable ports, to which chamber all of the various pipes of the filter are connected, we are enabled by the movement of this single valve to shift the apparatus from the filtering to the washing position, the only additional change necessary being the shifting of the valve  $h^2$ . The appa-

ratus is thus greatly simplified both in its construction and operation, and we are enabled to dispense with a great number of the valves hitherto employed.

5 The construction and arrangement of the chemical-tank relatively to the supply-pipe forms a simple and at the same time efficient means for supplying chemicals to the water, if desired.

10 The washing apparatus within the tank serves to thoroughly agitate and cleanse the filtering material in a rapid and efficient manner.

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

20 Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a water-filter, the filter-tank, in combination with the valve-chest, the sliding valve G, arranged therein and recessed as described, the water-supply pipe opening into said valve-chest on one side of the valve, the four ports, and the four pipes connected to said ports, three of them—to wit, the wash-pipe and inlet and outlet pipes—extending into the tank, and the fourth connecting with the pure-water and waste pipes, substantially as and for the purposes specified.

35 2. In a water-filter, the filter-tank A, in combination with the valve-chest B, the recessed slide-valve G, arranged therein, and the supply-pipe D, said valve-chest being pro-

vided with the ports  $f$ ,  $f'$ ,  $f^2$ , and  $f^3$ , the inlet-pipe F, outlet-pipe  $F^2$ , and wash-pipe  $F^3$ , connected, respectively, to the ports  $f$ ,  $f^2$ , and  $f^3$ , and extending into the filter-tank, and the pipe  $F'$ , connected to the port  $f'$ , substantially as and for the purposes specified.

3. In a water-filter, the filter-tank, in combination with a single discharge-pipe leading from said tank and providing a single and common outlet for both the filtered water and the wash-water, a pure-water-supply pipe and a separate waste-pipe, both having a common junction with the said discharge-pipe outside of the filter, and a three-way valve at the junction of the said three pipes, substantially as and for the purposes specified.

4. In a water-filter, the filter-tank, in combination with the discharge-pipe  $F'$ , forming the only outlet for both filtered water and wash-water from the tank, a pure-water-supply pipe  $H'$  and a waste-pipe  $H^2$ , separate from each other, and a three-way valve H, into the casing of which the pipe  $F'$ , the waste-pipe  $H^2$ , and the pure-water pipe  $H'$  all open, the two former into one and the same chamber and the latter into the opposite chamber, and provided with two seats for the valve, one in the diaphragm which divides the casing into chambers and the other at the junction between the wash-pipe and said casing, substantially as and for the purposes specified.

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Witnesses:

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