(No Model.)

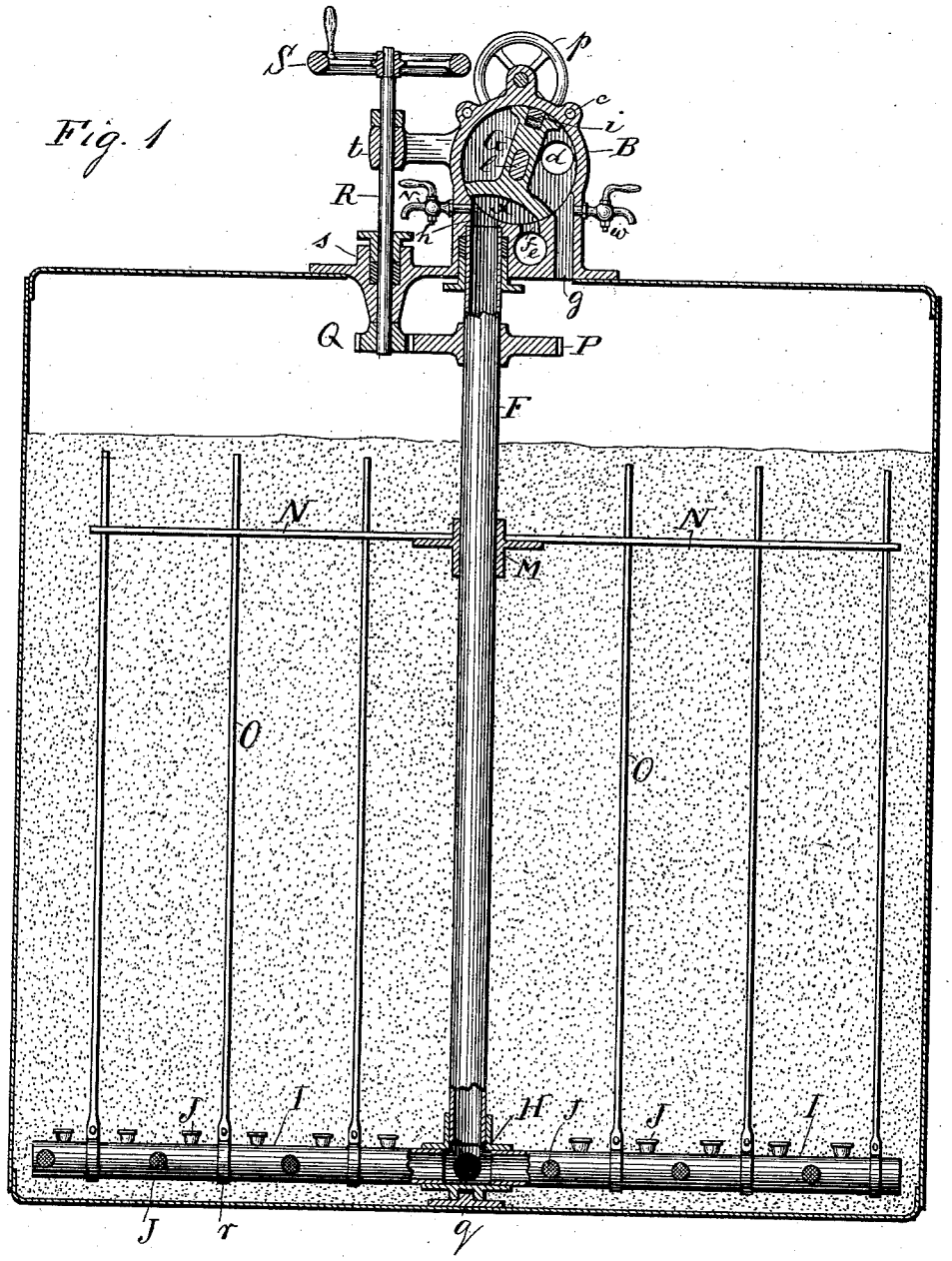
2 Sheets—Sheet 1.

O. H. & I. H. JEWELL.

FILTER.

No. 418,186. Patented Dec. 31, 1889.

Fig. 1



Witnesses:
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H. Weatherwax

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By Wm H. Lotz
Attorney

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3

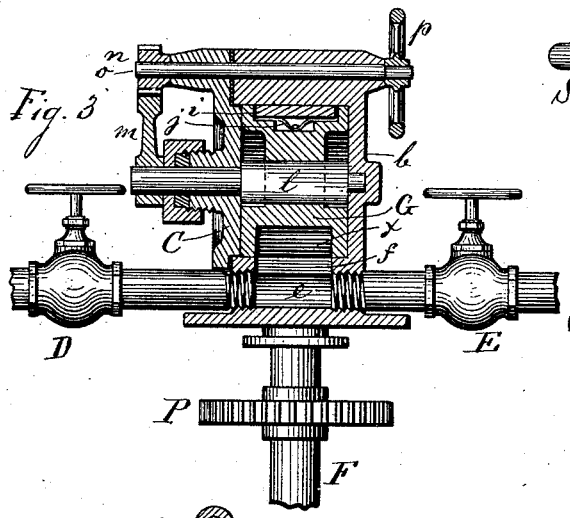


Fig 4

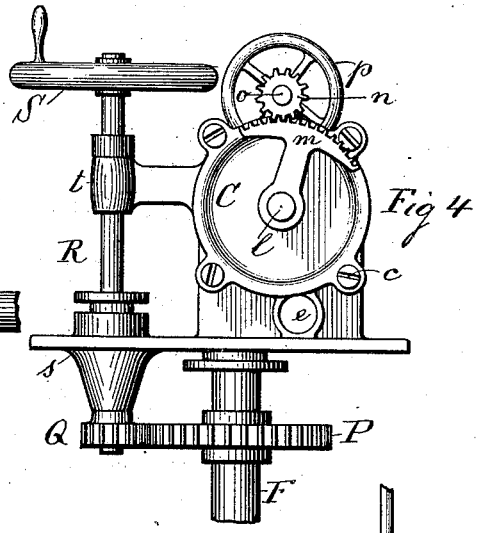


Fig. 5

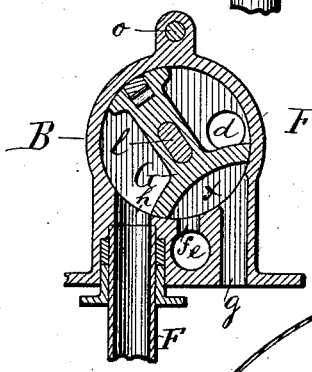


Fig. 6

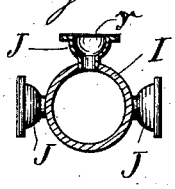


Fig. 7

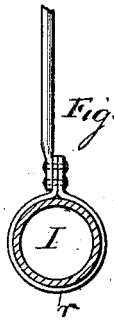
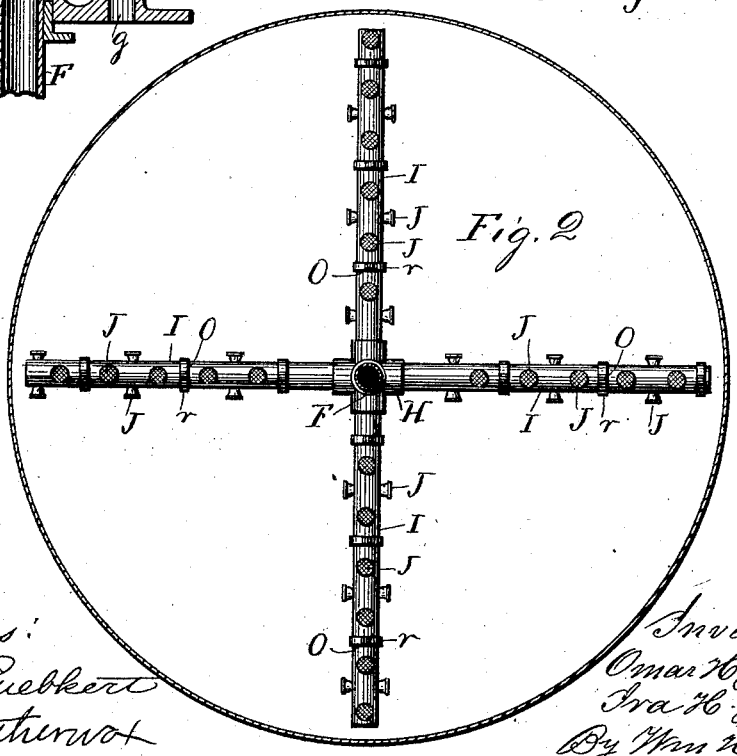


Fig. 2



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Attorney

UNITED STATES PATENT OFFICE.

OMAR H. JEWELL AND IRA H. JEWELL, OF CHICAGO, ILLINOIS.

FILTER.

SPECIFICATION forming part of Letters Patent No. 418,186, dated December 31, 1889.

Application filed November 1, 1889. Serial No. 328,960. (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 of America, both residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Filters, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to apparatus for filtering water, so arranged that with reversing the feed the impurities accumulated therein can be washed out; and it is our object to provide such an apparatus that is more simple in its construction and more perfect in its operation, and in which the filtering-sand can be stirred by mechanical means for thoroughly washing and separating therefrom all impurities collected therein while reversing the circulating current; and with these objects in view our invention consists of the novel devices and combinations of devices hereinafter described and specifically claimed.

In the accompanying drawings, Figure 1 represents a transverse vertical section through the center of the apparatus with the valve in position for filtering water; and Fig. 2 a sectional plan of the lower part of the filtering-tank. Fig. 3 is a longitudinal vertical section, Fig. 4 an elevation, and Fig. 5 a transverse vertical section, of the valve adjusted for reversing the feed for cleansing the apparatus. Fig. 6 is a cross-section of one of the strainer-pipe arms with strainers attached, and Fig. 7 a sectional elevation of one of the stirrer-bars as coupled to one of the strainer-pipe arms.

Corresponding letters of reference in the several figures of the drawings designate like parts.

A denotes a cylindrical tank hermetically closed on top, where upon its center it has secured the valve-casing B. This casing B is bored out cylindrical, with one end closed by a plate *b*, cast solid with the casing, and with a cover C, fitted against its opposite or otherwise open end and secured by screws *c*.

In the rigid cover *b* is the water-inlet opening *d*, to which the water-supply pipe will be connected, and through the bottom of the valve-casing, in about the center thereof and vertically between the bore of the casing and the base thereof, is the transverse port *e*, communicating through a port *f* with the valve-chamber, and having coupled to one end a stop-valve D, connecting through a pipe with the purified-water reservoir, and having coupled to its opposite end a valve E, communicating through a pipe with the sewer. To one side of this port *e* is provided a vertical port *g*, extending from the valve-chamber through the base of the casing, and to the opposite side of port *e* is another vertical port *h*, leading from the valve-chamber into a stuffing-box that provides a water-tight bearing for an upright hollow shaft F, that will be hereinafter described.

Inside the valve-casing B is fitted a ⊥-shaped valve G, the base of which provides a cavity of a width to cover the openings of either ports *f* and *g* or of ports *f* and *h*. The top of this valve G is grooved for a packing-strip *i*, pressed against the bore of the casing B by a spring *j*. This valve G has a central oblong slot for the flattened portion of valve-stem *l*, fitted therein, which valve-stem *l* at one end has a pin entering a socket in plate *b* of the valve-casing, while its shank is projected through a stuffing-box of cover C, and has mounted upon its exterior end a segment-gear *m*, engaging a pinion *n*, mounted upon the end of a shaft *o*, that is pivoted in eye-lugs of the casing B and cover C, with a hand-wheel *p* mounted upon its opposite end in a manner that with turning hand-wheel *p* in one direction or another the valve G will be oscillated to cover either ports *f* and *g* or ports *f* and *h*.

The hollow shaft F is secured with its bottom end into a star-coupling H, pivotally supported on a nipple-plate *q*, and into this star-coupling are secured four (more or less) pipes I, radially extending to near the cylindrical wall of tank A, where their ends are closed, the upper end of hollow shaft F being pivoted in a stuffing-box of ports *h* of the valve-casing B, thus providing communication between this port *h* and the pipes I. Each of such pipes I has screwed in top and both sides a series of strainers J, each consisting of a cup-shaped casting having a screw-nozzle at one end for securing it into a tap-hole of pipes I, and having fixed over its expanded and flanged opening a fine-wire screen *y*.

Above star-coupling H is mounted upon shaft F a flanged sleeve M, having secured flat radial arms N, one vertically above each pipe I, and a series of rods O are vertically secured by passing the upper ends thereof through holes in arms N, and by connecting their lower ends by means of collar-straps 5, riveted thereto and sleeved upon the pipes I. Below the top plate of tank A is also mounted upon hollow shaft F a spur-wheel P, meshing with a pinion Q, mounted upon a vertical shaft R, pivoted in a stuffing-box *s* in the base-flange of the valve-casing and in an eye-bracket *t* of casing B, and having mounted on its upper end a crank-wheel S, by turning which shaft F, with radial pipes I, arms N, and vertical rods O, will be rotated.

The operation of the apparatus will be as follows, to wit: The valve G being adjusted by hand-wheel *p* to be on the position as shown by Fig. 1, and the valve E being shut, the water to be purified, fed in through opening *d*, will flow through port *g* of the valve-casing into tank A, filled with sand and fine gravel, to a line above the upper ends of rods O, and as the tank thus is entirely filled with water the same will filter through the sand and gravel, will then pass through the strainers J into pipes I, and will thence rise in hollow shaft F, to escape through port *h*, and through ports *f* and *e* and valve D, to be discharged into the pure-water reservoir. The filtering will thus continue incessantly until the impurities from the water thus filtered have accumulated in the tank to a degree necessitating a discharging of such impurities and of washing out the tank and cleaning the sand and gravel, for which purpose the valve D is shut and the valve E is opened, and the valve G is adjusted by turning hand-wheel *p* to the position shown in Fig. 5, when the water fed into the valve-chamber through opening *d* will enter port *h*, will be forced through upright shaft F down into radial pipes I, and thence through strainers J, to rise through the sand, escaping through port *g* into ports *f e*, and thence through valve E into the sewer, carrying with it all impurities; and for the purpose of thoroughly washing the sand and gravel during this operation of impurities gathered therein that otherwise might be detained by the gravity and solid packing of the sand and gravel, the crank-wheel S is to be turned for rotating the shaft F, and with it the radial pipes I and rods O, thereby loosening and stirring the sand and gravel for the upward flow of water to carry with it all light matter deposited between the grains of the sand and gravel. A small test-cock *v* is tapped through the wall of casing B into port *h*, through which samples of filtered water can be drawn, and another test-cock *w* is tapped in the opposite side of the casing into port *g*, through which samples of water can be drawn before being filtered. The test-cock *w* will also be of advantage for examining whether the impurities have all been washed out before the valve G is readjusted again for filtering, and after such readjustment the water remaining from the wash-out in the hollow shaft F and in the radial pipes I must be discharged into the sewer through valve E before this valve E is closed and the valve D is opened for discharging the water into the pure-water reservoir again, which can be determined by drawing samples through cock *v*.

It will be readily seen that a filter thus arranged with a single valve for reversing the flow of the water through the filter by degrees by means of a hand-wheel and gearing, so as to prevent a heavy shock of the water in the pipes, and with the device for stirring the filtering material during a wash-out, will be easily managed by any unskilled person and will be under easy control, while at the same time it will purify the water thoroughly without frequent renewal of the filtering material. This stirring device can be rotated with great ease during the time the current of water is reversed, whereby the sand and gravel will be held in suspense by the up current to become a liquid mass.

What we claim is—

1. The combination, with a filtering-tank provided with upright pipe F and branch pipes I, having strainer-cups, of valve-casing B, having water-supply opening *d*, port *h*, communicating with pipe F, port *g*, communicating with the filtering-tank, and port *f*, communicating with water-discharge port *e*, and of oscillating valve G, having cavity *x*, that will provide communication between either ports *f g* or *f h*, substantially as and for the purpose set forth.

2. The combination, with a filtering-tank provided with upright pipe F and branch pipes I, having strainer-cups, of valve-casing B, having water-supply opening *d*, port *h*, communicating with pipe F, port *g*, communicating with the filtering-tank, and port *f*, communicating through port *e* with valves D and E, one for the purified water and the other for the wash-out water, and of oscillating valve G, having cavity *x*, that will provide communication between either ports *f g* or *f h*, substantially as and for the purpose set forth.

3. The combination, with a filtering-tank provided with upright pipe F and branch pipes I, having strainer-cups, of valve-casing B, having water-supply opening *d*, port *h*, communicating with pipe F, port *g*, communicating with the filtering-tank, and port *f*, communicating with water-discharge port *e*, and of valve G, having cavity *x*, that will provide communication between either ports *f g* or *f h*, and having mounted upon its stem for oscillation the segment-gear *m*, engaging pinion *n*, that is operated by hand-wheel *p*, all substantially as set forth.

4. The combination of tank A, upright tubular shaft F, with radial pipes I, having strainers J, with arms N and vertical bars O, and with gear-wheel P, engaging pinion Q, operated by crank-wheel S, and of suitable valves

for regulating the circulation of the water, substantially as set forth, for the purpose specified.

5. The tank A, having upright tubular shaft F, with radial pipes I, provided with strainers J, with arms N and vertical bars O, and with gear-wheel P, engaging pinion Q, operated by crank-wheel S, and in combination therewith the valve-casing B, having water-supply opening *d*, port *h*, communicating with tubular shaft F, port *g*, communicating with tank A, and port *f*, communicating with water-discharge port *e*, and of oscillating valve G, having cavity *x*, that will provide communication between either ports *f g* or *f h*, all substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

OMAR H. JEWELL.
IRA H. JEWELL.

Witnesses:
WILLIAM H. LOTZ,
OTTO LUEBKERT.