

No. 654,043.

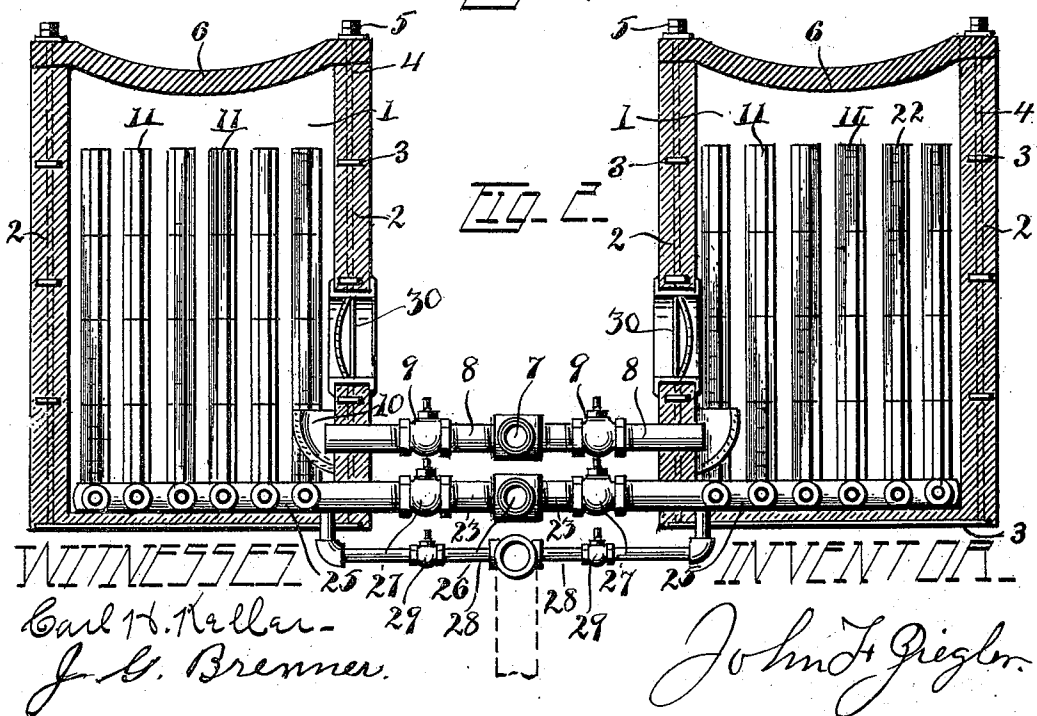
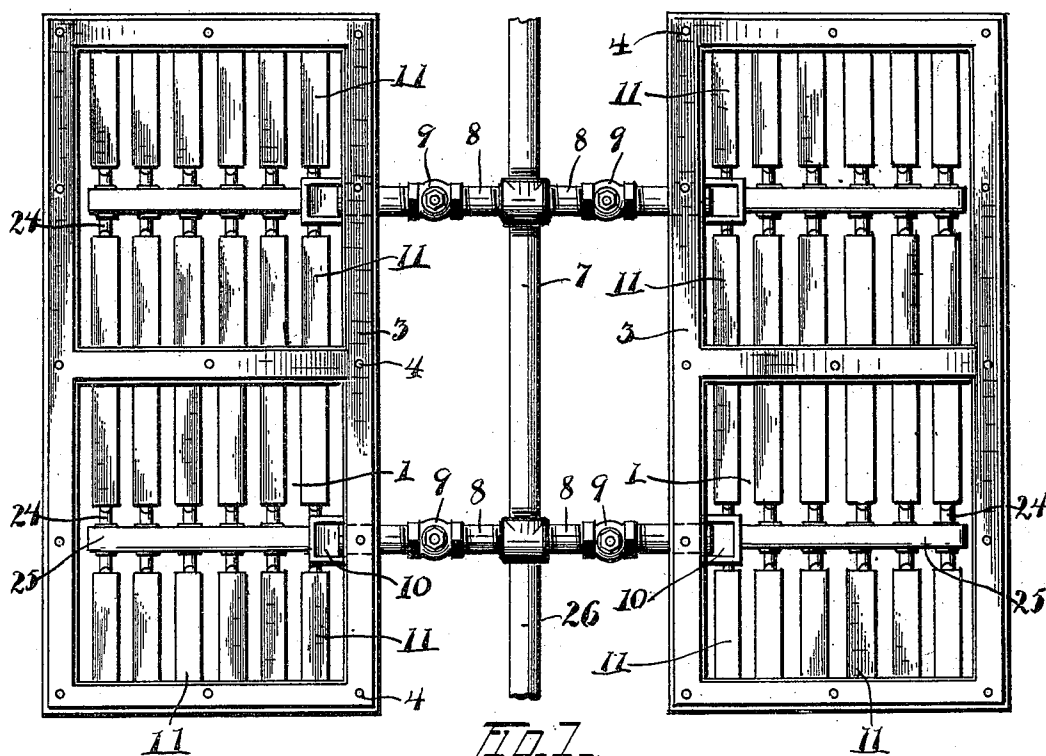
Patented July 17, 1900.

J. F. ZIEGLER.
FILTER.

(Application filed Apr. 5, 1899.)

(No Model.)

2 Sheets—Sheet 1.



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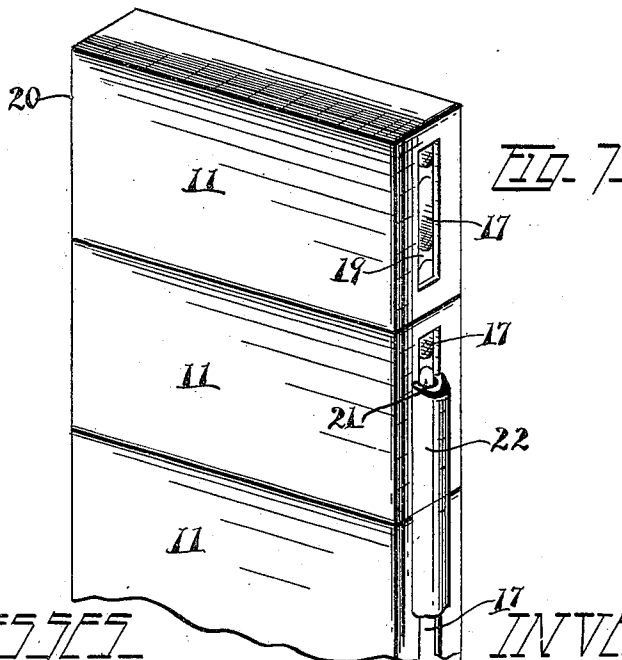
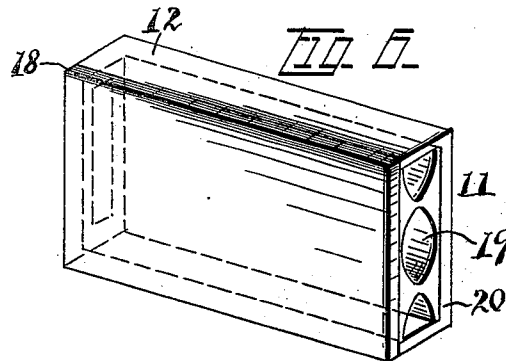
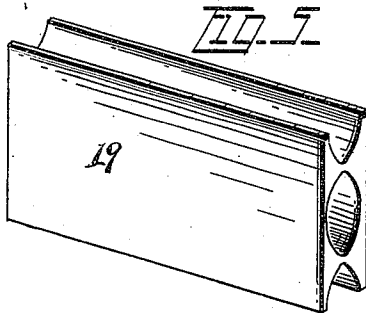
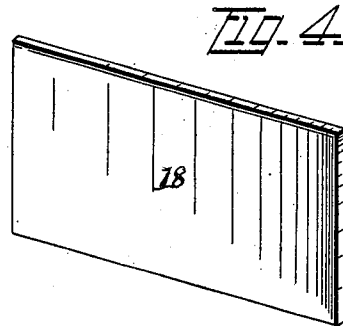
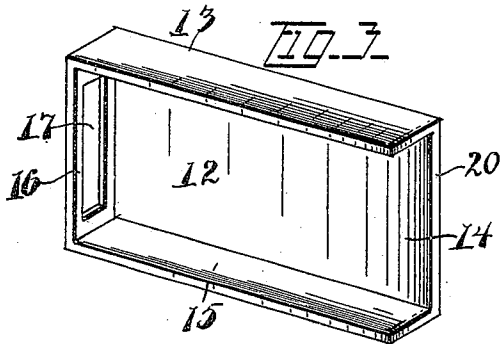
J. F. ZIEGLER.

FILTER.

(Application filed Apr. 5, 1899.)

(No Model.)

2 Sheets—Sheet 2.



WITNESSES

Carl H. Keller.
J. G. Brenner.

INVENTOR

John F. Ziegler

UNITED STATES PATENT OFFICE.

JOHN F. ZIEGLER, OF TOLEDO, OHIO.

FILTER.

SPECIFICATION forming part of Letters Patent No. 654,043, dated July 17, 1900.

Application filed April 5, 1899. Serial No. 711,771. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. ZIEGLER, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have
5 invented certain new and useful Improvements in Filters; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to
10 make and use the same.

My invention relates to a filter, and more particularly to a filter for municipal purposes and where a great volume of liquid material is to be purified. For this purpose I employ
15 a plurality of independent cells having a common source of liquid material and a common outlet for the same after being purified.

My invention has for one object to supply a filter for municipal purposes so constructed
20 that by a simple operation the process of cleaning is effected.

A further object is to supply a filter for municipal purposes which shall be extremely simple in construction, efficient in operation, and
25 of minimum cost for the purpose employed.

A further object is to furnish a filter for municipal purposes which shall yield a maximum output for minimum space employed.

A further object is to furnish a means for
30 cleaning or, if necessary, repairing the separate cells without the necessity and consequent inconvenience of throwing the remaining cells out of operation, by which a constant supply of pure water is at all times insured.
35

A further object is the employment of a filtering-shaft which shall resist great pressure without collapsing.

With these objects in view I employ the
40 parts and combination of parts as hereinafter shown, described, and claimed.

In the drawings, Figure 1 is a longitudinal sectional plan view of my filter, showing the independent cells thereof, having therein
45 the filtering-shafts, also showing the supply thereto and the outlet therefrom. This view also discloses the metallic plates which I build into the masonry surrounding the separate cells to resist the pressure which they are subjected to. Fig. 2 is an elevation in vertical
50 section of my filter, in which is disclosed the general construction thereof. Figs. 3 and 4 I

combine to form the shell of the filtering-shaft. Fig. 5 is the interior arched portion of the filtering-shaft. Fig. 6 is the shell with the
55 arched portion therein. Fig. 7 is an isometric view showing the filtering-shafts as they are placed in the cells, also showing the means employed for conveying the purified water from the interior of the filtering-shafts to the
60 outlet-pipe, the channel on the front of the filtering-shafts being cut away.

In constructing my filter I build up a series of independent cells 1, having surrounding
65 walls 2. Walls 2 are constructed of masonry laid in courses. Between the courses I employ plates 3, punched out at intervals to receive upright rods 4. Rods 4 are securely
70 anchored to the bottom plates, which extend across filter-cell underneath all filter-shafts and pipes, and after the walls are built to the proper height they are securely bolted down by means of nuts 5 on the upper ends thereof. The roof of the separate cells is a metal
75 plate 6 in the form of an inverted arch to resist the pressure from within.

7 is a pipe from the source of unfiltered water delivered under pressure. 8 represents
80 branch pipes therefrom leading into the interior of the filtering-cells 1, the passage for water therein being controlled by valves 9. At the entrance of pipes 8 into the cells 1 I place deflectors 10 to spread the water, so as to break the force thereof on entering the cells.

11 represents filtering-shafts placed one
85 upon the other. I employ a plurality of these side by side, bringing them as close together as possible to create a great capacity. In building filtering-shafts 11 I employ a shell 12, having sides 13, 14, and 15, respectively, and an
90 end portion 16, having an orifice 17 therein. Shell 12 is composed of porous potters' material. 18 is a slab, also made of the same material, to be placed upon shell 12 in such a manner as to form a rectangular hollow shaft, with
95 the end thereof being left open. In this form I employ the shaft for ordinary purpose in gravity-filters. Where the shafts are subjected to great pressure, as in municipal filters, I find it imperative to insert in this hollow shaft an
100 interior portion 19, which has an arched contour, by which the possibility of collapsing under pressure is entirely overcome. Shaft 12, slab 18, and portion 19 are assembled while

still in a plastic state, thereby forming a homogeneous mass, after which it undergoes the process of drying and burning. These shafts are placed within the cells 1, the ends 20 thereof being rigidly secured to walls of the cells by cementation, thereby effectually sealing them against the passage of impure water. The filter-shafts being assembled one above the other, the orifices 17 are brought into
 10 alinement with channels 21, formed by an arched covering 22, the upper portion thereof being sealed by cementing. Channels 21 lead into pipes 23 through the medium of nipples 24 and hollow casings 25. Pipes 23 are connected with main delivery-pipe 26, the pas-
 15 sage of water thereto from the separate cells being controlled by valves 27.

28 represents ordinary flush-pipes leading to the sewer, the passage being controlled by
 20 a valve 29.

30 represents manholes of ordinary construction in the masonry to admit of the interior inspection of the cells.

In operation the impure water or other liquid material is delivered under pressure to the separate cells 1 through the medium of supply-pipe 7 and branch pipes 8, the valves 9 having been opened. The force of the water as it enters the cells is broken by deflectors
 30 10. As the cells 1 are filled with water the same is held under pressure by the surrounding walls, consequently exerting pressure on exterior surfaces of the filter-shafts 11, these filter-shafts being composed of porous pot-
 35 ters' material previously prepared, as has been shown in the description. The water being under pressure percolates through the walls thereof. As I employ a great number of columns of filtering-shafts in close proximity to each other, the surface exposed under
 40 pressure is extensive, and as I may employ many columns and numbers of cells the quantity of water passing therethrough is practically unlimited. The water now being in a
 45 purified state, all vegetable and other impure foreign matter having been removed and the same deposited on the exterior walls of the filter-shafts, passes therefrom through orifices 17 into channels 21 and down through
 50 nipples 24 into casing 25 and into delivery-pipe 26, the passage thereto being controlled by valves 27, from which it is carried under pressure to the point of consumption.

After the plant has been in operation for
 55 a length of time and the impurities in the water have been deposited on the exterior surfaces of the filter-shafts the passage of water through the walls thereof is somewhat impeded and the removal of these impurities is therefore necessary. This is accomplished as follows: The supply of water to any individual cell is shut off by closing valve 9. It is also necessary to close valve 27, as the pure water in delivery-pipe is under pressure and would therefore return to the cell
 65 from which it had come. I then open valve

29, by which operation the water in the cell passes through flush-pipe 28 into the sewer or other convenient outlet. Valve 27 is now partially opened and the pure water from delivery-pipe 26 is allowed to gently return to the cell, and consequently to the interior of the filter-shafts, which on becoming filled allow the water to pass from the inner to the outer surfaces thereof, by which all impure
 75 matter thereon is removed and passes to the bottom of the cell and into the sewer. If it is desirable to inspect the interior of the cell, access thereto is gained through manhole 30. After the cleaning has been effected valve 29
 80 of flush-pipe 28 is closed and the valve 9 controlling the feed is opened, thereby again filling the cell. Valve 27, which remains in a partially-closed state, is now fully opened, thereby allowing the water to pass in a purified state into delivery-pipe 26. It will be
 85 seen that I clean one cell at a time, by which I overcome the necessity and consequent inconvenience of shutting down the plant during the process of cleaning.

It is evident that I am enabled by means of my invention to furnish an absolutely-continuous supply of pure water for municipalities.

What I claim as my invention, and desire
 95 to secure by Letters Patent, is—

1. In a filter a chamber formed by enveloping walls, a feed-pipe leading thereto, filter-shafts secured therein one above the other, said filter-shafts having orifices in the ends
 100 thereof connecting with passages having a common outlet to an exit-pipe leading from the filter-chamber, substantially as set forth.

2. In a filter a chamber composed of enveloping walls, a feed-pipe leading thereto and
 105 an exit-pipe leading therefrom, filtering-shafts secured one above the other and to the walls of the filter-chamber, said shafts having an arched interior contour, and orifices on the ends thereof leading to passages having a common outlet to the exit-pipe leading from the filter-chamber, substantially as set forth.

3. In a filter a plurality of filter-shafts having longitudinal arched passages there-
 115 through built up in the form of a pile, whereby there are formed longitudinal parallel passages and an arched covering for the ends of the passages into which the several passages empty, the whole being secured together by
 120 cementation, substantially as described.

4. In a filter a chamber composed of enveloping walls, feed-pipe leading thereto and exit-pipe leading therefrom, filter-shafts secured one above the other and to the walls
 125 of the filter-chamber, said shafts having an arched interior contour and a flattened outer contour, a plurality of these columns of filtering-shafts in close proximity to each other arranged in each chamber thereby giving a great
 130 filtering capacity substantially as described.

5. In a filter, filter-cells built up of masonry

having embodied in the walls thereof metal plates to strengthen the same, upright rods arranged so as to extend through the metal plates and the masonry, a metal plate in the
5 form of an inverted arch adapted to act as a closure for the cell and to be secured to the upright rods, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in the presence of two witnesses.

JOHN F. ZIEGLER.

Witnesses:

WM. BRADLEY,
GEO. P. KING.