

F. S. HAMMOND.

APPARATUS FOR THE PURIFICATION OF WATER.

APPLICATION FILED NOV. 26, 1901.

NO MODEL.

2 SHEETS—SHEET 1.

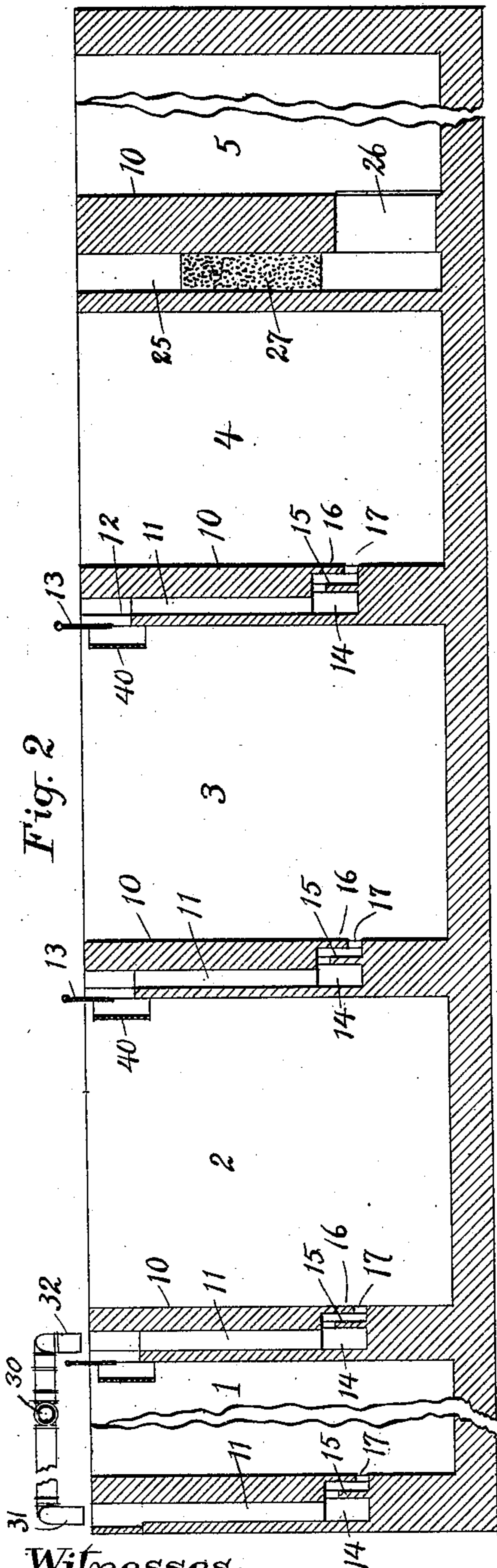


Fig. 2

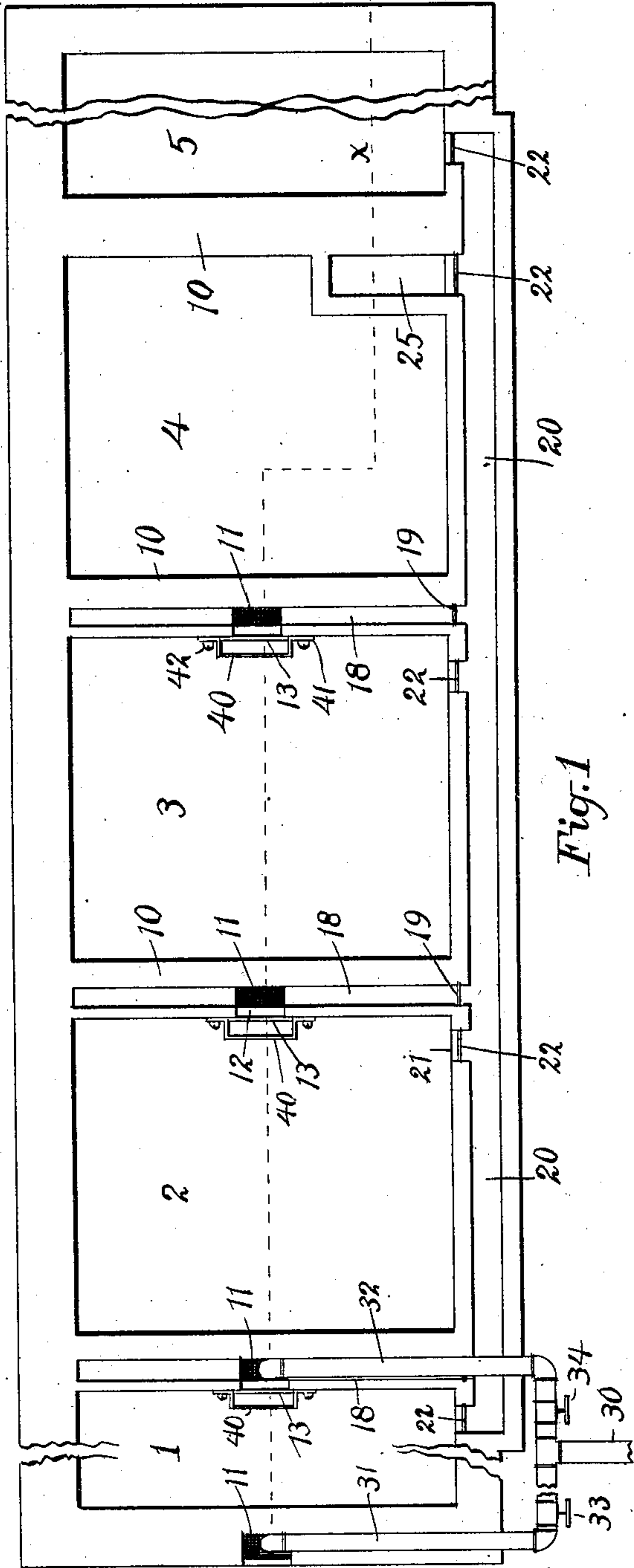


Fig. 1

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No. 744,193.

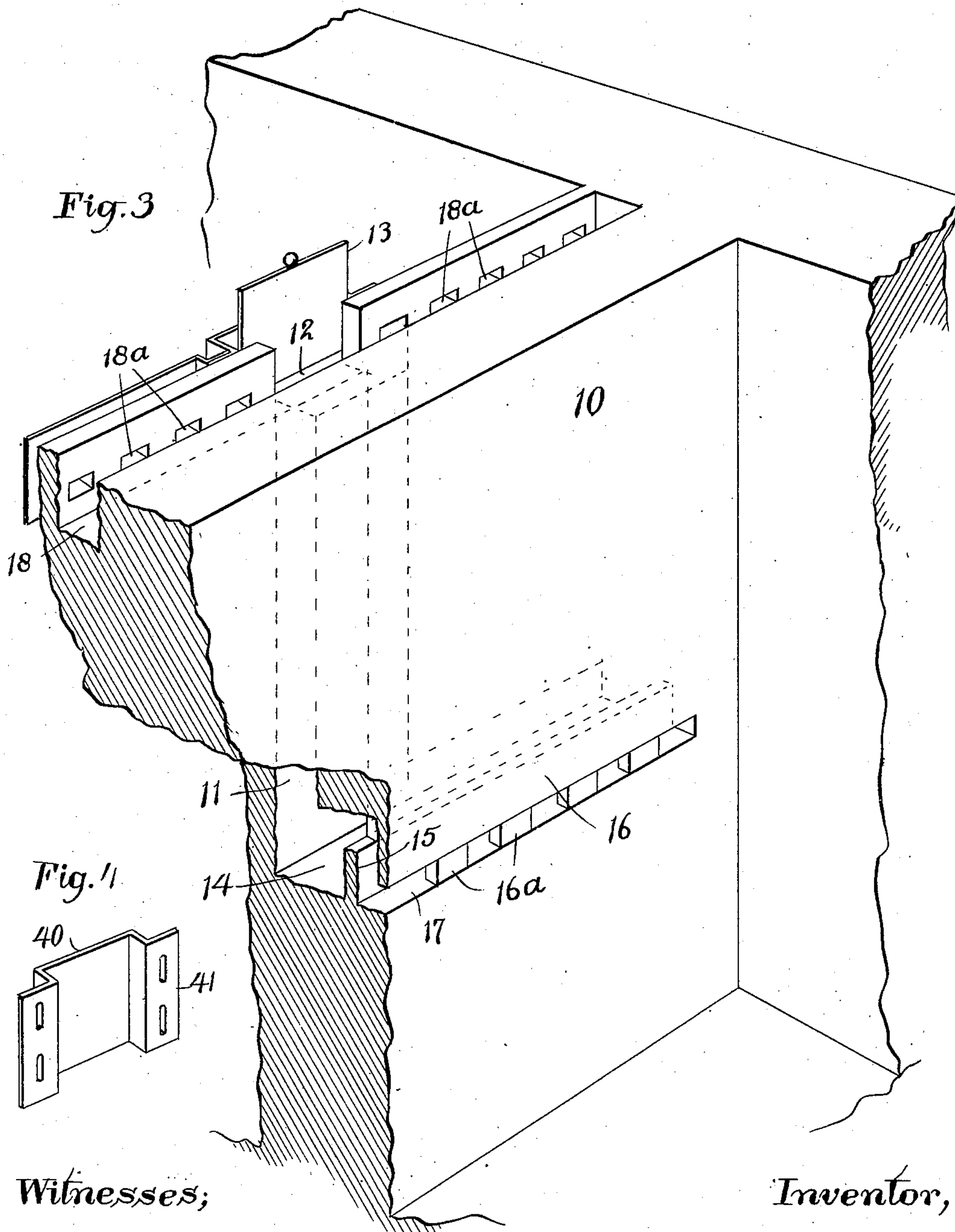
PATENTED NOV. 17, 1903.

F. S. HAMMOND.
APPARATUS FOR THE PURIFICATION OF WATER.

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NO MODEL.

2 SHEETS—SHEET 2.



Witnesses;

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UNITED STATES PATENT OFFICE.

FRANK S. HAMMOND, OF MALDEN, MASSACHUSETTS.

APPARATUS FOR THE PURIFICATION OF WATER.

SPECIFICATION forming part of Letters Patent No. 744,193, dated November 17, 1903.

Application filed November 26, 1901. Serial No. 83,814. (No model.)

To all whom it may concern:

Be it known that I, FRANK S. HAMMOND, a citizen of the United States, residing at Malden, in the county of Middlesex, State of Massachusetts, have made certain new and useful Improvements in Apparatus for the Purification of Water, of which the following is a full, clear, and exact description.

This invention is in the line of means for purifying water in which the same is permitted to flow successively through several settling-tanks and finally through a filter.

My invention relates to means for better conducting the water from tank to tank and to certain improvements in details of construction hereinafter set forth.

Referring to the drawings forming part of this specification, Figure 1 is a plan view of my apparatus complete with the exception of certain parts being represented as broken out for the purpose of shortening the drawing. Fig. 2 is a longitudinal section of the same on the line X X. Fig. 3 is a perspective view of the water-conducting arrangement, and Fig. 4 is a perspective view of the scum-deflector.

I show in the drawings a series of tanks arranged tandem and with their walls preferably constructed from concrete of quite substantial thickness. Extending alongside of these tanks near the tops thereof is a trough 20, having openings 21 communicating with each of the tanks and normally closed by vertically-sliding gates 22. In four of the partition-walls 10, as shown, are formed channels 18 within the top edges thereof, each channel communicating with said trough 20, but normally closed therefrom by gates 19. Each channel extends for preferably the entire length of the partition containing it and communicates at its center with a well 11, descending within the partition for approximately two-thirds of the latter's height. At its lower end this well opens into a horizontal passage 14, extending for nearly the entire width of the partition, such passage communicating with the tank at one side of the partition through a narrow slit 17, equal in length to the length of said passage and formed by the thin shield 16, preferably of brick and supported at intervals by somewhat widely-separated bricks 16^a, so that said narrow slit 17 is rather a succession of nar-

row holes than a continuous slit. Built up from the bottom of the passage 14 and reaching nearly to its top is a second thin shield 15, preferably constructed of brick and with an occasional brick between its upper edge and the top of the said passage. Either by introducing more bricks or by otherwise constricting the space between the shield 15 and the upper face of the passage 14 I still more perfectly accomplish the purpose for which the parts are designed, which is to retard the flow of water from the slit 17 and prevent the same from entering a tank with any substantial current. The upper end of the well 11 is made to communicate with the top of the tank on the opposite side of the partition 10, with which the slit 17 communicates, the opening 12 therefor being provided with a sliding gate 13 for its closure when desired.

The operation of the apparatus is as follows: The water to be purified enters through the pipe 30 and its branch 31 and descends through the well 11 to the tank 1. From this tank the overflow passes through the well 11 and slit 17 to tank No. 2, and so on to the tank No. 4, in each case the water leaving one tank at its top and entering the following one near its bottom. The tank No. 4 is formed with a larger well 25, within which is a filter-box 27, the opening 26 from which to the tank No. 5 being preferably entirely free. As the water enters each tank through the slit 17 its energy is so reduced that there is practically no disturbance of the contents of the tank; but the particles of matter carried by the water gradually settle to the bottom of the tank, while the clearer water passes off at the top through the opening 12. When tank No. 4 is reached, there is almost no further matter carried in suspension; but whatever is here not yet precipitated is removed by the filter 27, so that the water enters the last tank through the opening 26 perfectly clear and pure. Whenever it is found essential to clean out the sediment thus deposited in the first tank, the valve 33 is closed and the valve 34 opened to permit the water to enter through the branch 32 to the well leading to tank No. 2. At the same time the gate 13 of said well is closed. This tank being suitably relieved of its accumulated deposits, the tank No. 2 is similarly enabled to

be cleaned out by closing the valve 34 and opening the valve 33 and also raising the gates 19 from the tank No. 1 to the channel or trough 20 and from said trough to the channel 18, leading to the well 11, communicating with the tank No. 3. In the same manner any one of the tanks can be put into condition to be emptied by thus shunting the flow of water around instead of through it and the work of purification continued without cessation.

As a further improvement in the construction of the apparatus I extend the channel 18 along the length of each partition (except the first, where there is none at all) and form a series of openings 18^a through the thin wall at its left, as shown in Fig. 3, a slight distance above the floor of such channel. The object of this is as follows: Ordinarily the flow of water through the opening 12 is so slow as not to create sufficient current as to materially affect the settling of the matter carried in suspension. Should, however, it be necessary to substantially increase the quantity of water passing through the apparatus per unit of time, the amount of water passing from each tank through its opening 12 will create a decided current tending toward such point, and thereby tend to carry off more or less of the suspended matter with it. To prevent this, I form the channels 18 with the series of small openings 18^a a slight distance above the floor of the channels, as above described. Then as the level of water rises in each tank and the efflux increases the excess reaches and passes through said openings 18^a to the channels 18, and, if necessary, the gates 13 are closed slightly to reduce the flow through the openings 12. It is also necessary to elevate the said openings 18^a above the floor of the channels in order that when one of the tanks is shunted out and is being cleansed the water flowing along the channel 18 from the trough 20 may not escape through said openings into such tank.

Another improvement is the locating of a scum-deflector 40 in front of each gate 13, which extends below the level of the opening 12, and hence of the water in the tank, and holds back from passing through whatever scum may collect on the surface of the water. This deflector is preferably formed from sheet metal bent into the shape of a shallow letter U with vertically-slotted flanges 41 for the reception of the securing-bolts 42, and by means of which the deflectors can be vertically adjusted to suit the normal current through the openings 12. These deflectors may also be provided for the entire series of openings 18^a, as indicated in Fig. 3; but ordinarily it is sufficient to thus shield the openings 12 alone.

What I claim as my invention, and for which I desire Letters Patent, is as follows, to wit:

1. In an apparatus for water purification, the tank having a partition formed with the vertical well receiving water, the horizontal passage extending substantially the width of the tank and communicating with the well near its center and with the tank for the greater part of its length; this latter communication being along the floor of the passage, and the passage being divided by a longitudinal shield reaching up from such floor, substantially as described.

2. In an apparatus for water purification, the tank having a partition formed of massive material, and having the central well and the horizontal passage; said passage having openings along its floor into the tank, and the longitudinal shield; both said shield and the passage-wall in which are said openings being constructed to support the partition mass above, substantially as described.

3. In an apparatus for water purification, two tanks having a common partition constructed with a channel in its top edge, a vertical well, and a horizontally-extended discharge-passage into one tank, said channel having a central opening from the other tank and a series of openings above the level of the channel's floor, substantially as described.

4. In apparatus for the purification of water, a series of tanks separated by massive partitions, one between each two tanks, and each partition being formed with a channel along its top edge opening at various points from one side, a horizontal passage near the bottom of the partition-opening at various points on the side opposite to the channel-openings, and a vertical well communicating at its top with said channel and at its bottom with said passage, substantially as described.

5. In apparatus for the purification of water, the combination of a series of tanks formed with massive partitions each having the channel in its top edge, the horizontal passage near its bottom and the vertical well joining said channel and passage; said channel having a plurality of openings through its side from one of the tanks; and a scum-deflector held a short distance from the face of said partition and having its lower edge located below the level of said openings, substantially as described.

In testimony that I claim the foregoing invention I have hereunto set my hand this 14th day of August, 1901.

FRANK S. HAMMOND.

Witnesses:

LOWELL M. MAXHAM,
A. B. UPHAM.