No. 629,377. Patented July 25, 1899.

E. A. LELAND.

WATER PURIFYING APPARATUS.

(Application filed Feb. 8, 1899.)

(No Model.)

Fig. 1.

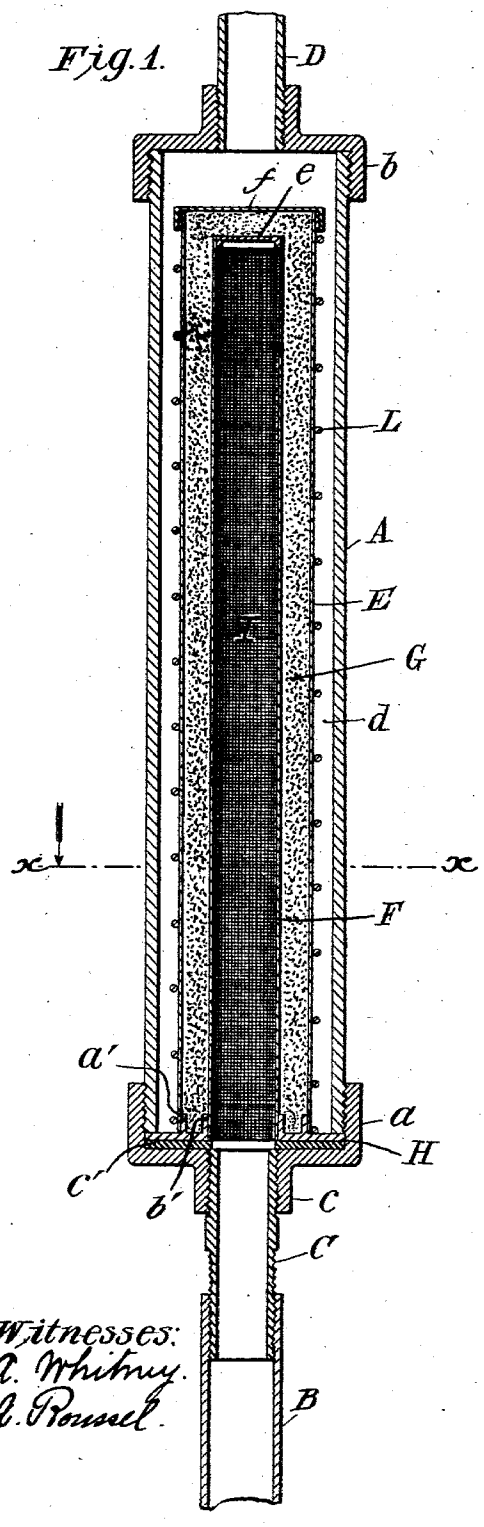


Fig. 2.

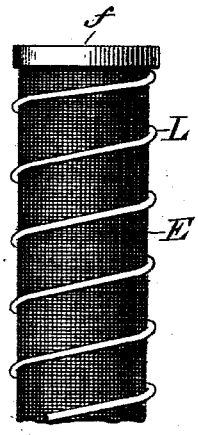
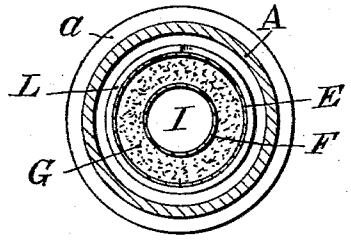


Fig. 3.



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UNITED STATES PATENT OFFICE.

EDWIN A. LELAND, OF GREAT BARRINGTON, MASSACHUSETTS, ASSIGNOR TO THE LELAND FILTER COMPANY, OF SAME PLACE.

WATER-PURIFYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 629,377, dated July 25, 1899.

Application filed February 8, 1899. Serial No. 704,898. (No model.)

To all whom it may concern:

Be it known that I, EDWIN A. LELAND, a citizen of the United States, residing at Great Barrington, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in Water-Purifying Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a longitudinal sectional view of an apparatus made according to my invention. Fig. 2 is a side view of one part of said apparatus. Fig. 3 is a transverse sectional view taken on the line *x x* of Fig. 1.

The object of this invention is to provide a strong, simple, efficient, and durable apparatus for separating impurities from water and other liquids and one which may be conveniently taken apart for examination or repairs whenever desired or necessary. It comprises certain new and useful combinations of parts hereinafter fully described and particularized.

A is an external shell, preferably of cylindric shape. The ends of this shell are formed of removable screw-caps *a* and *b*, as shown on Fig. 1. That end of the shell at which the liquid to be purified is admitted should be provided with a union joint or coupling *c*, by which the apparatus may be detachably connected with any suitable inlet or supply pipe B. This may most conveniently be provided by means of a double-ended screw-section C, one end of which screws into the cap *a* and the other into the end of the inlet-pipe B and which is so proportioned that it may on occasion be turned out of and away from the cap *a* to separate the apparatus from the supply-pipe, which done the apparatus may itself be unscrewed from the outlet-pipe D, to which the opposite end cap of the shell is screwed, as shown in Fig. 1.

Within the shell is placed a foraminated partition E, between which and the inner wall of the shell is a space *d*. Placed within the partition E is another, F, of like foraminated character and of such diameter as to provide between the two said partitions E and F a chamber G. At one end the two partitions E F rest against a disk H, which has two concentric flanges *a' b'*, one contiguous to the end of the partition E, the other to that of the partition F. The said ends are brazed, soldered, or otherwise united to the two flanges *a' b'*, and thereby hold both partitions in place. The periphery of the disk H is interposed between the end of the shell A and the adjacent screw-cap *a*, so that the disk, with the attached partitions, is firmly held in place. When desired, a washer *c'* may be placed behind the disk H and compressed with it in order to the more securely close the joint. The upper ends of the foraminated partitions are closed, as shown at *e* and *f* in Fig. 1. The space or chamber I within the inner partition E communicates with the inlet or supply pipe B. The interior of the shell A at its opposite end communicates with the outlet-pipe D. The annular space G between the two partitions is filled with sand, gravel, or any other suitable filtering material. Said material may be of a character to secure merely the separation of mechanical impurities, or it may, if desired, consist of bone-black or other substance capable of chemically affecting the liquid passed through it to neutralize, separate, or destroy such dissolved impurities as would escape the more straining action of a merely mechanically-operating filter. The foraminated partitions may be of any suitable material; but in practice wire-cloth or wire-gauze of mesh corresponding to the character of the filtering material and to that of the work desired is very much to be preferred. Around the outside of the outermost foraminated partition is placed a strengthening-frame L, which is most conveniently and economically provided by a spiral wire securely wound around the said partition, as more fully shown in Fig. 2. The purpose of this frame is to resist pressure from within and to prevent the radial expansion or rupture of the foraminated partitions when the liquid to be purified is urged into and through the apparatus under great or inordinate pressure.

In the operation of the apparatus the water or other liquid to be purified enters the chamber I from the inlet-pipe B and, filling said chamber, passes first through the interstices of the inner foraminated partition F,

thence through the filtering or purifying material in the chamber G, and thence through the interstices of the outer foraminated partition E into the annular space between the latter and the shell A, and thence to the outlet D, the liquid being filtered or purified during its passage through the purifying material, as explained. It will be observed that as the liquid passes through said material it meets with less and less resistance as it spreads from the narrow confines by the inner foraminated partition to the broader area of the outer partition through the purifying material, although the latter be of the same character and density throughout, and is distributed through and in contact with a continuously-increasing proportionate quantity of the purifying material. The end *f* of the filtering-chamber between the foraminated partition being closed against passage of the liquid, as hereinbefore set forth, the liquid is caused to expand radially and is directed through the foraminated partitions and through the mass of the purifying material, whereas if the said end of said chamber were open or foraminated the inflowing current of liquid being projected along the straight axis of the chamber I would be driven with a too great velocity to and through the end of the said chamber, thereby escaping the mass of the purifying material and being itself but imperfectly purified in passing through the apparatus.

What I claim as my invention is—

1. The combination with an external shell having inlet and outlet passages, a foraminated partition placed within said shell and having a space between itself and the shell, a foraminated partition of smaller diameter placed within the outer partition and with a space between itself and the said outer partition for the reception of a purifying material, of a disk having flanges to which adjacent ends of the two partitions are secured, and a screw-cap annexed to clamp the periphery of the disk between itself and the end of the shell to hold the partitions in position within the shell, substantially as herein set forth.

2. The combination with an external shell having inlet and outlet passages, a foraminated partition placed within the shell, closed at its end nearest the outlet by the shell and providing a space between itself and said shell, a foraminated partition of smaller diameter placed within the outer partition and providing a space between itself and the outer partition for the reception of a purifying material, of a disk having flanges to which the ends of the two partitions nearest the inlet of the shell are secured, a screw-cap arranged to clamp the periphery of the disk between itself and the end of the shell to relieve the partitions in place, and a spiral wire wound around the outer partition to resist the radial pressure of a liquid directed through the said partitions, substantially as herein set forth.

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