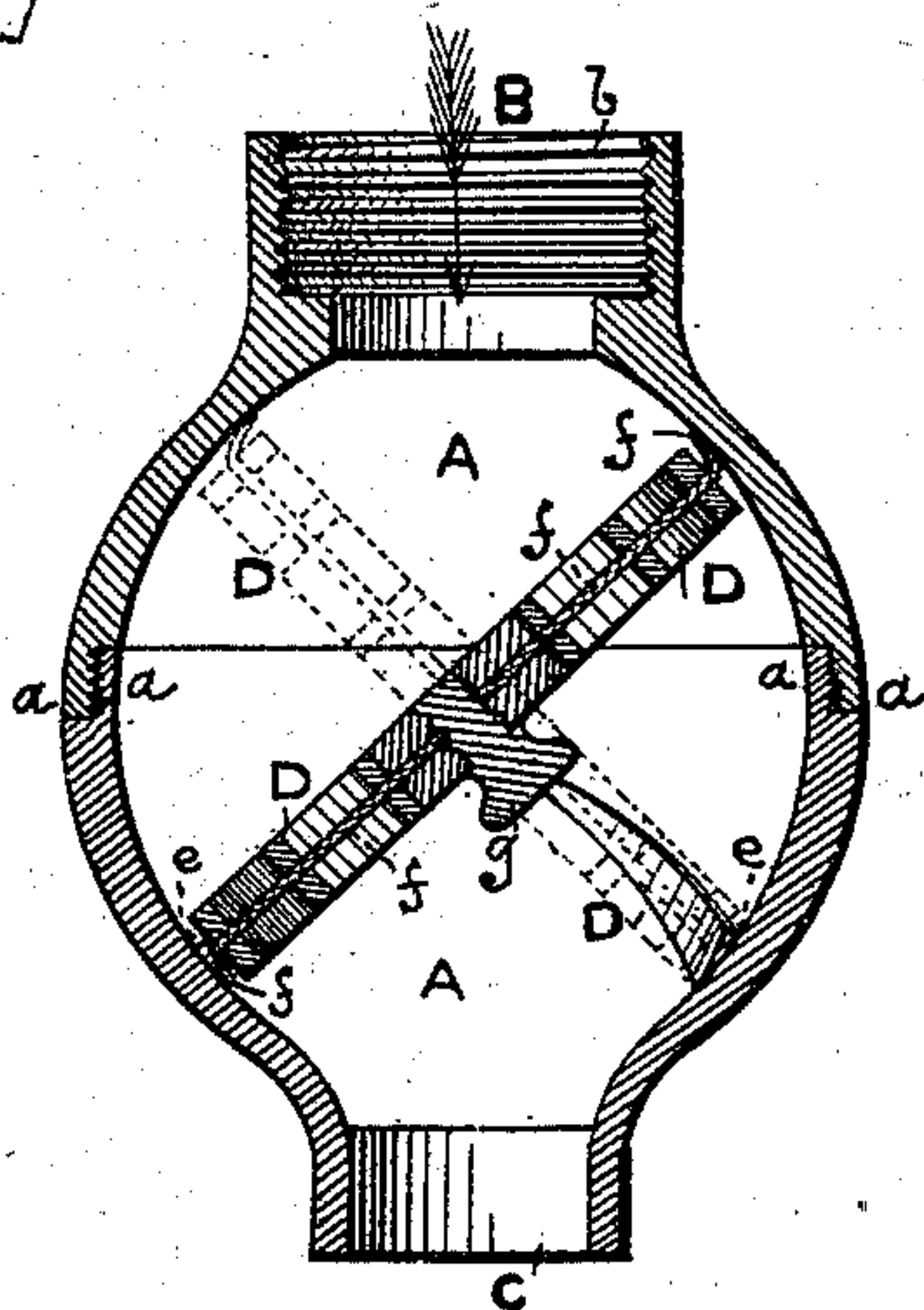


**B. FITTS & D. DAVIS, Jr.**  
**Water-Filters.**

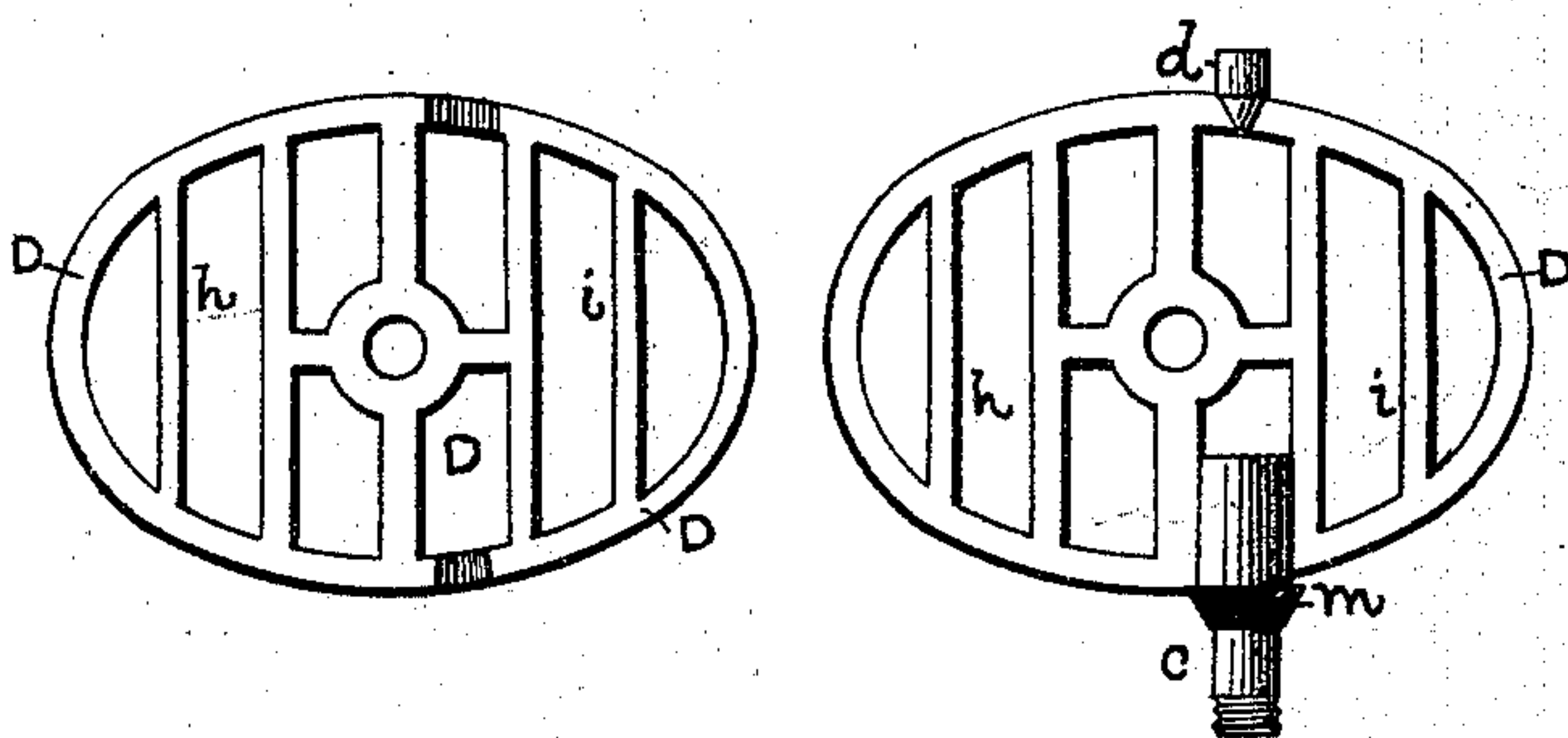
No. 146,442.

Patented Jan. 13, 1874.

*Fig. 1.*



*Fig. 2.*



WITNESSES:

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# UNITED STATES PATENT OFFICE.

BENAI AH FITTS AND DANIEL DAVIS, JR., OF WORCESTER, MASSACHUSETTS,  
ASSIGNORS TO UNION WATER-METER COMPANY, OF SAME PLACE.

## IMPROVEMENT IN WATER-FILTERS.

Specification forming part of Letters Patent No. **146,442**, dated January 13, 1874; application filed  
December 8, 1873.

*To all whom it may concern:*

Be it known that we, BENAI AH FITTS and DANIEL DAVIS, Jr., of Worcester, in the county of Worcester and State of Massachusetts, have invented certain Improvements in Water-Filters, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a vertical section taken through the center of a filter having our improvements applied thereto, showing in dotted lines the filtering apparatus reversed in order to cleanse the filter; and Fig. 2, a plan of the two halves of the filtering diaphragm or grate detached from the filtering-vessel and from each other in order to show their construction.

Our invention relates to a new and improved mode of constructing a reversible filter for the mechanical separation from water of the impurities held in suspension therein, and of cleansing the same when its pores on one side have become obstructed by the silt or other impurities; and it consists, first, in the use of an elongated or oval-shaped pivoted and reversible filtering-diaphragm in connection with a filtering-vessel whose greater internal diameter shall be less than the greater diameter or length of the diaphragm; secondly, in eccentrically mounting this reversible filtering-diaphragm in the shell of the filter, so that that portion which lies above its axis shall present a greater area to the pressure of the water than that portion which lies below, by which arrangement the diaphragm is held firmly in place against, and all around, the inner face of the shell, thereby preventing the escape of water to the eduction-opening of the filter without first passing through the straining material; and, thirdly, in combining with the diaphragm and filtering material one or two pairs of ribs, so arranged on the inner face of the filtering-vessel as that the outer edge or periphery of the filtering material will be firmly compressed between the periphery of the diaphragm and the inclosed face of the ribs, and thus prevent the passage of unfiltered water between them.

To enable others skilled in the art to make, construct, and use our invention, we will now proceed to describe its parts in detail.

By reference to Fig. 1, it will be seen that the filtering-vessel A is made in two parts, which are securely connected to each other by means of a male and female screw-thread, as shown at *a*, and so as to form, in any well-known method, a water-tight joint. The upper half is provided with an induction-opening, B, and a female screw-thread, *b*, whereby to secure it to the water-cock, while the lower half is provided with an eduction-opening, C, for the passage of the filtered water. In the side of the lower half, near its upper edge, is pierced a hole for the reception of the pivotal pin *c*, to which the thumb lever or screw is secured that operates or turns the diaphragm. On the opposite side of the same half is cut a vertical slot—from its upper edge downward to a point in the same horizontal plane as the opening on the other side—the lower end of which acts as the bearing of the other pivotal pin *d*, thereby forming the two bearings of the pivotal pins of the diaphragm D. In the drawings, the lower half of the filtering-vessel is represented as being provided with two ribs, *e*, arranged opposite to each other, the inner faces of which are inclined with a curve eccentric to the center of motion of the diaphragm D; or the inner face of the shell A itself may be so curved as to effect the same object—that is to say, to compress the outer periphery of the filtering-disk *f* between its inner face and the periphery of the diaphragm; but we prefer to make it with ribs arranged eccentrically, as above described. The other or upper half of the vessel A may be similarly provided, if desired; but it is not deemed as essential as the other, because of the position of the outer edge of the filtering material; yet it may be well to provide both of them with ribs, or to so curve the face of the vessel as to effect the same purpose. These ribs also serve the purpose of arresting the movement of the diaphragm on either side, thereby giving effect to the eccentric arrangement of the pivotal pins, in order to close, by means of the diaphragm, the free passage of the unfiltered water to the eduction-opening. The diaphragm D itself is oval or elliptical in form, as seen in Fig. 2, although it, as well as the vessel itself, may be made in any other suitable form, so



long as the length of the greater diameter of the diaphragm D shall exceed the length of the corresponding diameter of the vessel A, whether the form of the latter partakes of the character of a square or a circle, or of an oblong or ellipse. The diaphragm consists of a piece of felted cloth, of suitable size and shape, firmly secured between two perforated clamp-plates or grate-bars, D, by means of a screw, *g*. On one of these is cast, or otherwise secured, two pivotal pins, *c* and *d*, which have their bearings, as before described, in the lower half of the vessel A, suitable depressions being made in the under side of the other half to receive the upper side of these pins, that the two halves may fit snugly together and clamp the filtering-disk *f* firmly between them.

In arranging the diaphragm in the vessel, the longer portion *h* is made the upper end, and the shorter, *i*, the lower end. By this means the upper half exposes a greater area between its periphery and the pivotal pins to the pressure of the water, and thereby insures a tight joint all around. The pivotal pin *c*, inasmuch as it projects through the side of the vessel A, is provided with a packing, *m*, to make a tight joint. The other requires none. The packing may be a properly-shaped india-rubber ring, or it may be made of any other suitable material.

The vessel A and the diaphragm-plates D may also be made of any suitable material, such as brass or other non-poisonous metal or material.

The operation is simple: The diaphragm D, being arranged as shown in full lines, Fig. 1, is allowed to remain in that condition until the pores of the filter *f* become foul or clogged up. It is then turned to the position shown in

dotted lines in the same figure by turning the thumb-lever or pulley on the end of the pivotal pin *c*, that projects through the side of the filter. This allows the water to pass through the filter from the opposite side, it in its passage washing out the silt or other impurities, and cleansing the face last used, and so on, back and forth, as occasion may require, the diaphragm at no time ever performing a full revolution, because of its diameter exceeding that of the vessel, thereby retaining its longer portion *h* in the upper end of the vessel, whereby the pressure of the water is made to keep the diaphragm firmly in proper position to perform its work, and which it could not possibly do were the ends reversed, or of an equal length and area.

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

1. A filter having an elongated reversible filtering-diaphragm, so that while its lesser diameter shall snugly fit the sides of the filtering-vessel, its greater diameter shall exceed the corresponding diameter of said vessel, for the purposes set forth.

2. A reversible filtering-diaphragm, D, having its pivotal pins *c* and *d* arranged eccentrically, as and for the purpose set forth.

3. One or two pairs of ribs, *e*, substantially as described, in combination with a pivoted reversible filtering-diaphragm, D, and vessel A, for the purpose set forth.

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