

(No Model.)

L. SMITH.

ECCENTRIC SHAPED FILTER.

No. 268,304.

Patented Nov. 28, 1882.

Fig. 1.

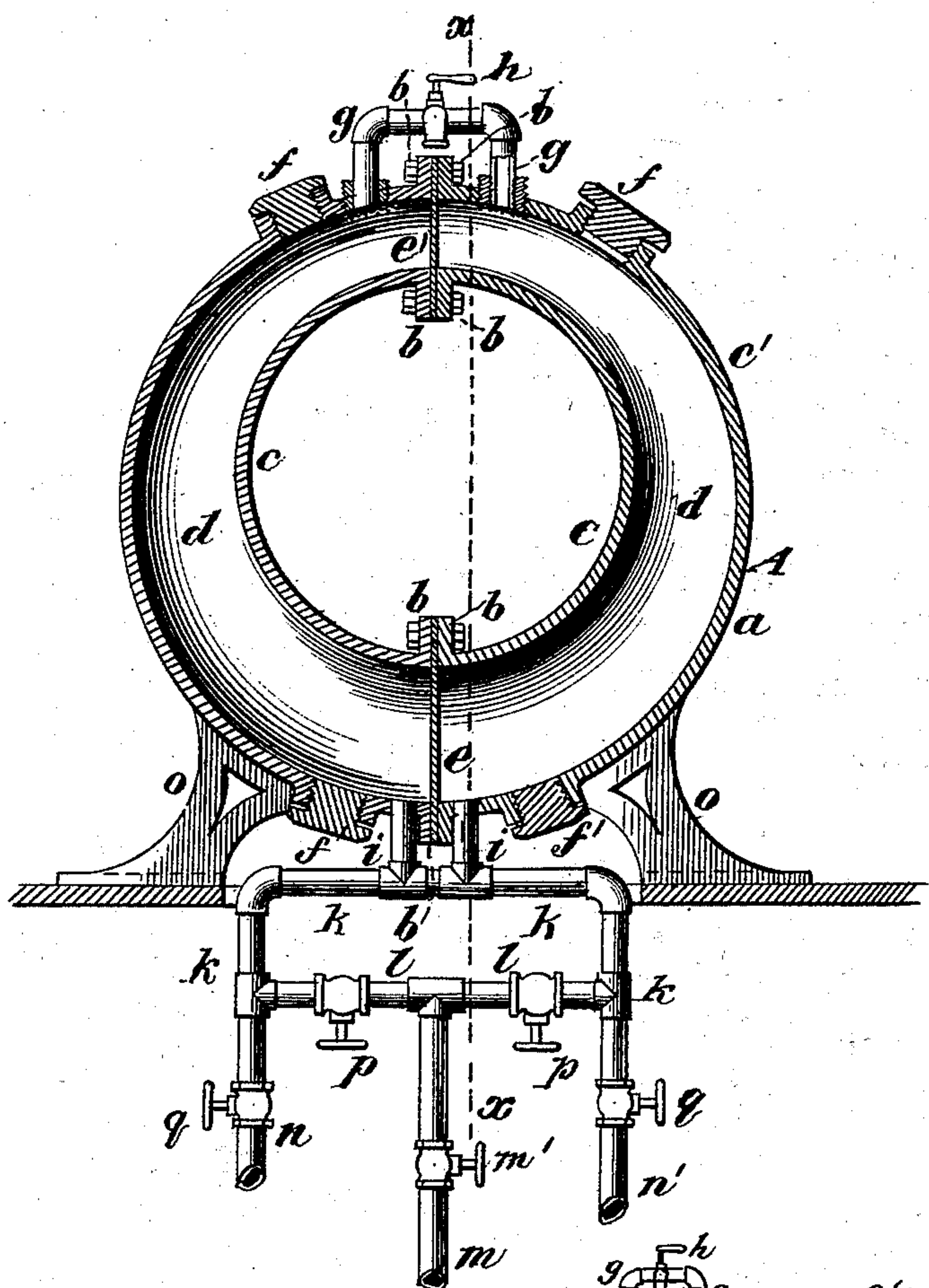


Fig. 2.

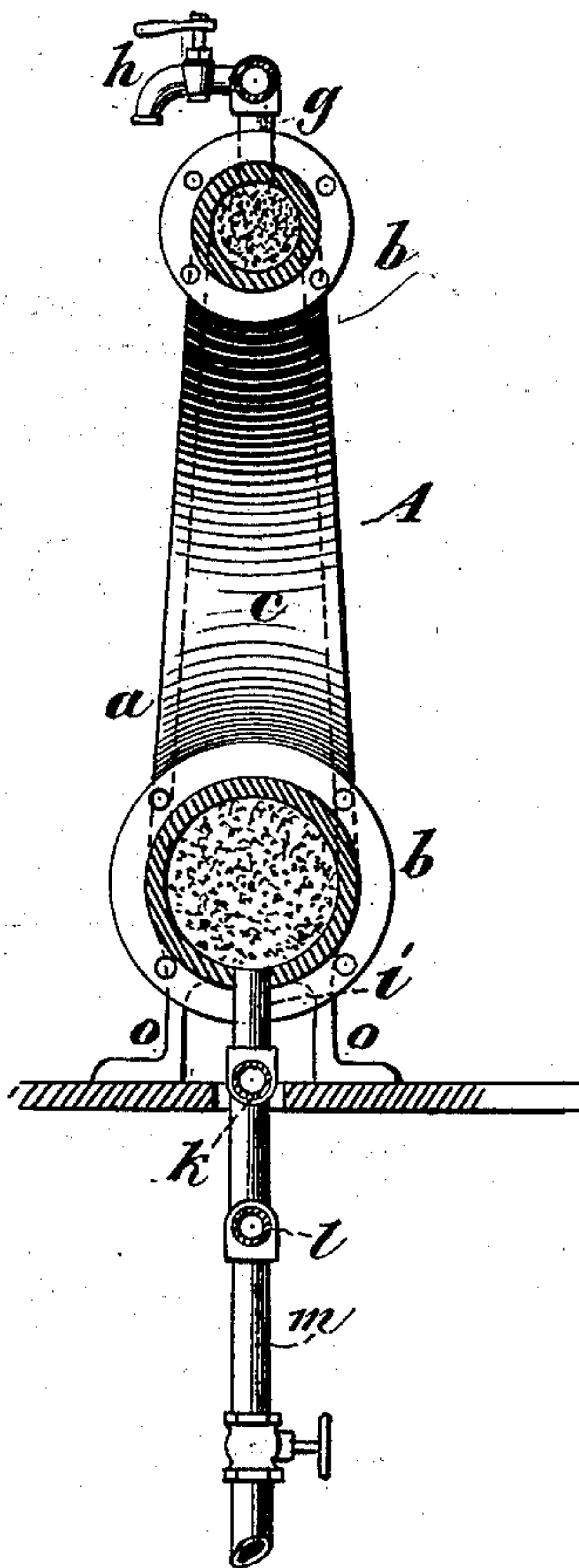
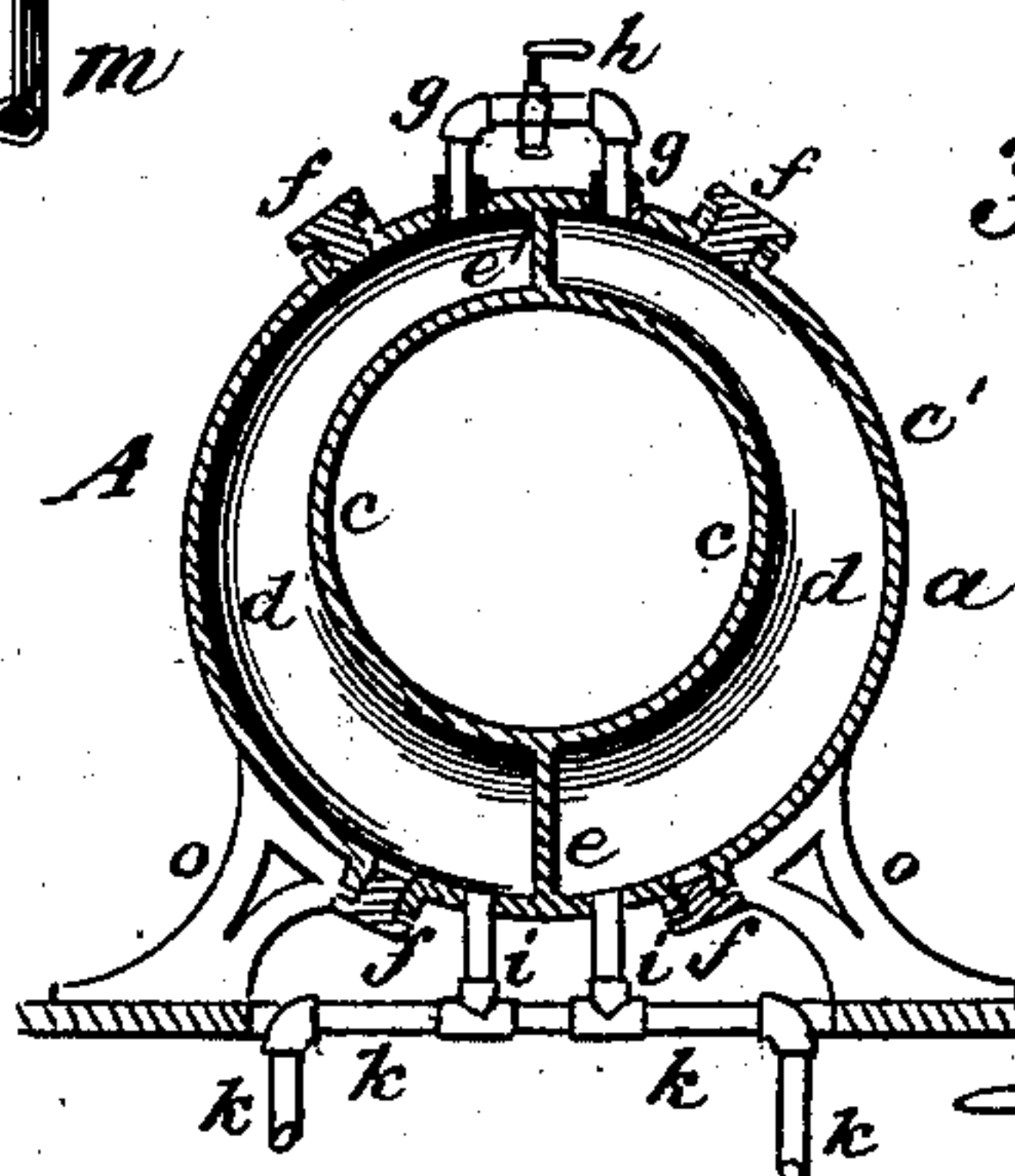


Fig. 3.



Witnesses.  
A. Ruppert,  
Eugene Barusi

Inventor.

Lyman Smith  
per O.E. Duffy  
att'y



# UNITED STATES PATENT OFFICE.

LYMAN SMITH, OF KANSAS CITY, MISSOURI.

## ECCENTRIC-SHAPED FILTER.

SPECIFICATION forming part of Letters Patent No. 268,304, dated November 28, 1882.

Application filed November 4, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, LYMAN SMITH, of Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Eccentric-Shaped 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 make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

The object of this invention is to improve, simplify, and cheapen the construction of double-chambered filters, in which the water or other liquid is forced upward through sand or other filtering material; and it consists in certain novel features, which will be hereinafter fully described, in reference to the accompanying drawings, in which—

Figure 1 is a vertical diametric section of a double-chambered filter constructed according to my invention, and Fig. 2 is a transverse section of the same on the broken line *xx* of Fig. 1. Fig. 3 shows a vertical section of the eccentric-shaped filter cast in one piece.

The letter *A* indicates an annular casing composed of two halves, *a a*, joined together by flanges and bolts, as shown at *b b*. The inner wall, *c*, of the casing is eccentric with relation to the outer wall, *c'*, so that the space between these two walls is vertically wider at the bottom than it is at the top, and this annular space is divided into two chambers, *d d*, by means of partitions *e e'*, consisting of plates having their margins clamped between the flanges of the two halves of the casing at the bottom and top. I thus form two curved chambers exactly similar in shape and capacity, and each decreasing gradually in diameter from bottom to top. In chambers of this tapering construction the rising water has a continual tendency to pack the sand or other granular filtering material, so that it will not be displaced upward by the water-flow, and the curved shape of the walls causes also an opposition to the rising of the said material.

The filter may be constructed of any material—earthenware or metal—and may be cast in one piece. When cast in a single piece a suitable core is made, conforming to the concen-

tric shape of the vessel. The core-sand can be readily removed through the plug-holes for the plugs *ff'*. The partition can also be cast with either of these sections, in which case packing is not required.

Each of the chambers *d d* has a screw-tap, *f*, at the top, for filling in the filtering material, and a similar tap, *f'*, at the bottom, for removing the same. At the top the two chambers are connected by an outside arch-pipe, *g*, from the top of which a draw-off cock, *h*, projects laterally, and at the bottom each chamber has an inlet-pipe, *i*, the two inlet-pipes leading from a common loop-pipe, *k*, the opposite ends of which are connected by a cross-pipe, *l*, with which is connected the main supply-pipe *m*. The ends of the loop-pipe *k* are also connected with exit-pipes *n* and *n'*, which are used for taking off the foul water when the chambers are being cleaned out. The casing stands on legs *o o*, between which the lower pipe-connections are arranged. The main supply-pipe and the cross-pipe *l* are provided with cocks *p* on each side of the supply-pipe, between it and the loop-pipe *k*, and the exit-pipes *n* and *n'* are provided with cocks *g g*.

In using the filter both the chambers *d d* are to be filled with sand or other granular filtering material about as high as the taps *ff*, the cocks *g g* in the exit-pipes, in the supply-pipe, and *p p* in the cross-pipe are opened. The water will then flow from the supply-pipe in both ways through the cross-pipe *l* and loop-pipe *k*, and through the inlet-pipes *i i* to both chambers *d d* simultaneously, and, rising through the filtering material, reaches the top of the chambers in a purified state and thence flows into the arch-pipe, whence it may be drawn off as desired by means of the draw-off cock *h*. At the junction of the arch-pipe with the chambers suitable screens, *s s*, are provided to prevent the filtering material from rising into said pipe.

When it is desired to wash the filtering material or the chambers, that of each chamber may be washed separately without interfering with the filtering operation of the other chamber. For instance, to wash out the chamber at the left, the cock *g* in the exit-pipe *n* is opened, and the cock *p* in cross-pipe *l* at the left of the supply-pipe *m* is closed. Then sup-



ply-water will be cut off from the left-hand chamber, but will continue to flow to the right-hand chamber, and from it will pass through the arch-pipe *g* in a filtered and pure condition, and flow downward through the chamber on the left and off through its pipe *i*, the left-hand portion of the loop-pipe *k* and exit-pipe *n*, and may be left to flow until the filtering material in said left-hand chamber becomes thoroughly clear of matter which has accumulated therein as a result of the filtering of water. The washing is performed with pure filtered water, which leaves no deposit behind it, and the filtering material is therefore thoroughly cleansed. It will be seen that the washing may be continued as long as desired, and during its continuance there will be no interruption of the operation of the right-hand chamber or of the supply of filtered water which may be obtained from the draw-off cock *g*. The manner of washing out the right-hand chamber will be obvious.

To remove the filtering material, the taps *f' f'* at the bottom of the chambers are to be separately opened, and water may be caused to flow downward through each chamber separately, as when simply washing the material. The bottom taps being then closed and the top taps opened, fresh filtering material may be placed in the chambers.

The casing may be formed of either sheet or cast metal, or of earthenware, in two parts, as shown in the drawings; or it may be cast of metal in one piece, including the partitions which separate the two chambers. In the latter case the core-sand is readily removed through the apertures left for the screw-taps.

I am aware that double-chambered filters arranged to permit water to flow from one through the other for washing out are old and well-known, and I do not claim such a filter broadly.

What I claim is—

1. A double-chambered filter formed of the annular casing having the eccentric inner wall and the space within said casing divided into two chambers by the partitions *e* and *e'*, which form respectively common bottom and top plates for the two chambers, substantially as described.

2. A double-chambered filter composed of two curved chambers having their bottoms closed by a common bottom plate, and decreasing in diameter gradually from bottom to top, substantially as described.

3. The double-chambered filter herein described, consisting of the annular casing divided by the partitions *e* and *e'*, to form two chambers, which are connected at top by the arch or pipe *g*, provided with a draw-off cock, and having at their bottoms the inlet-pipes *u*, connecting with a loop-pipe, *k*, said loop-pipe having its ends connected by a cross-pipe into which leads a supply-pipe, and also with exit-pipes, said cross-pipe, supply-pipe, and exit-pipes being provided with suitable cocks, for the purpose set forth.

4. A filter for filtering fluids, consisting of two semicircular sections, each section having a tapering inner chamber and induction and education openings for water and filtering material, said sections forming, when combined, an eccentric-shaped vessel with duplex inner tapering chambers, and connected as described.

5. An article of manufacture consisting of two semicircular tapering chambers provided with two partitions and independent induction and education passages, the whole cast in one piece, as described.

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

LYMAN SMITH.

Witnesses:

B. F. MORSELL,  
O. E. DUFFY.