

J. E. WILLIAMSON.
FILTER.

(Application filed Nov. 21, 1899.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 1.

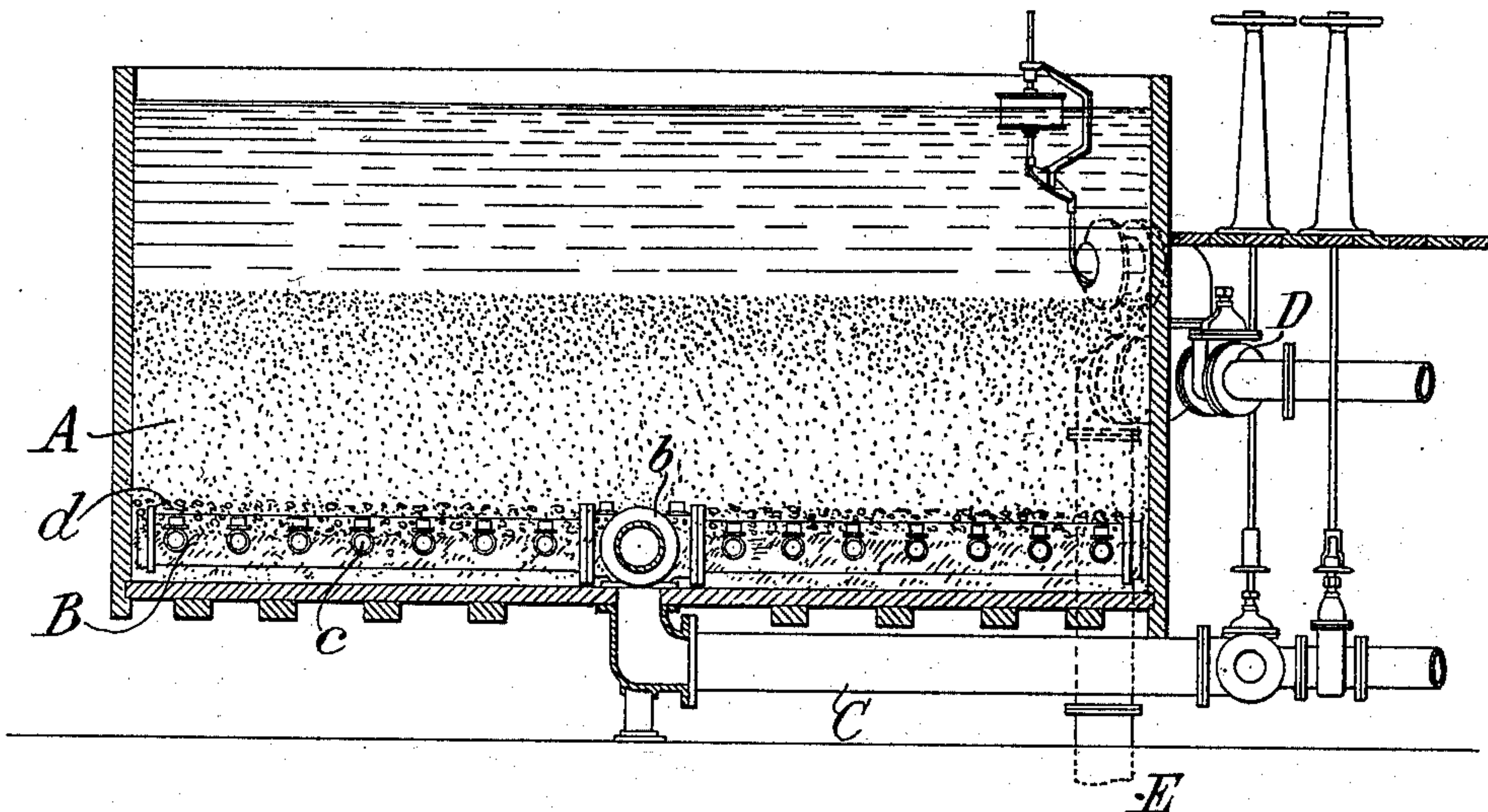
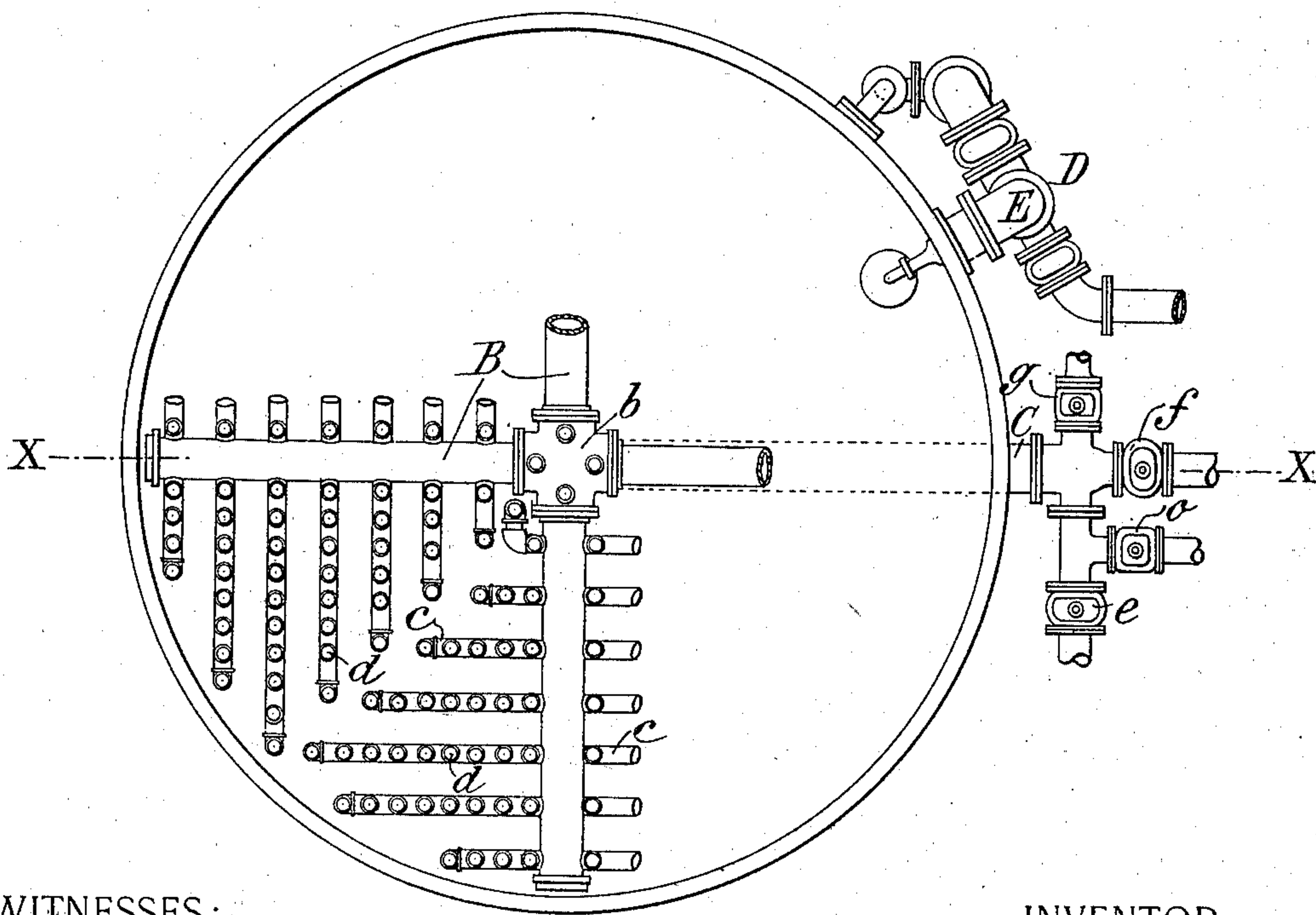


FIG. 2.



WITNESSES:

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No. 653,160.

Patented July 3, 1900.

J. E. WILLIAMSON.

FILTER.

(Application filed Nov. 21, 1899.)

(No Model.)

2 Sheets—Sheet 2.

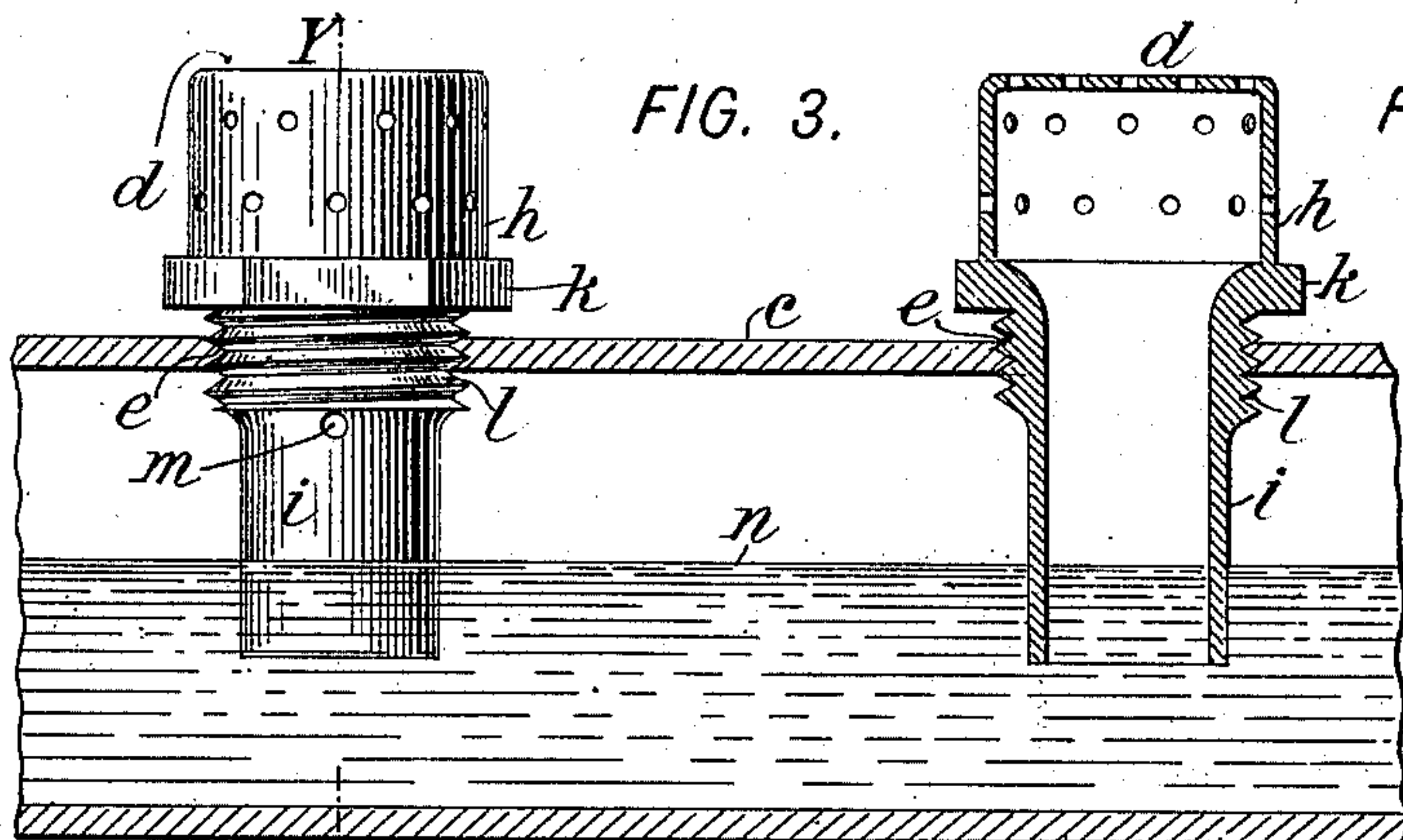


FIG. 3.

FIG. 4.

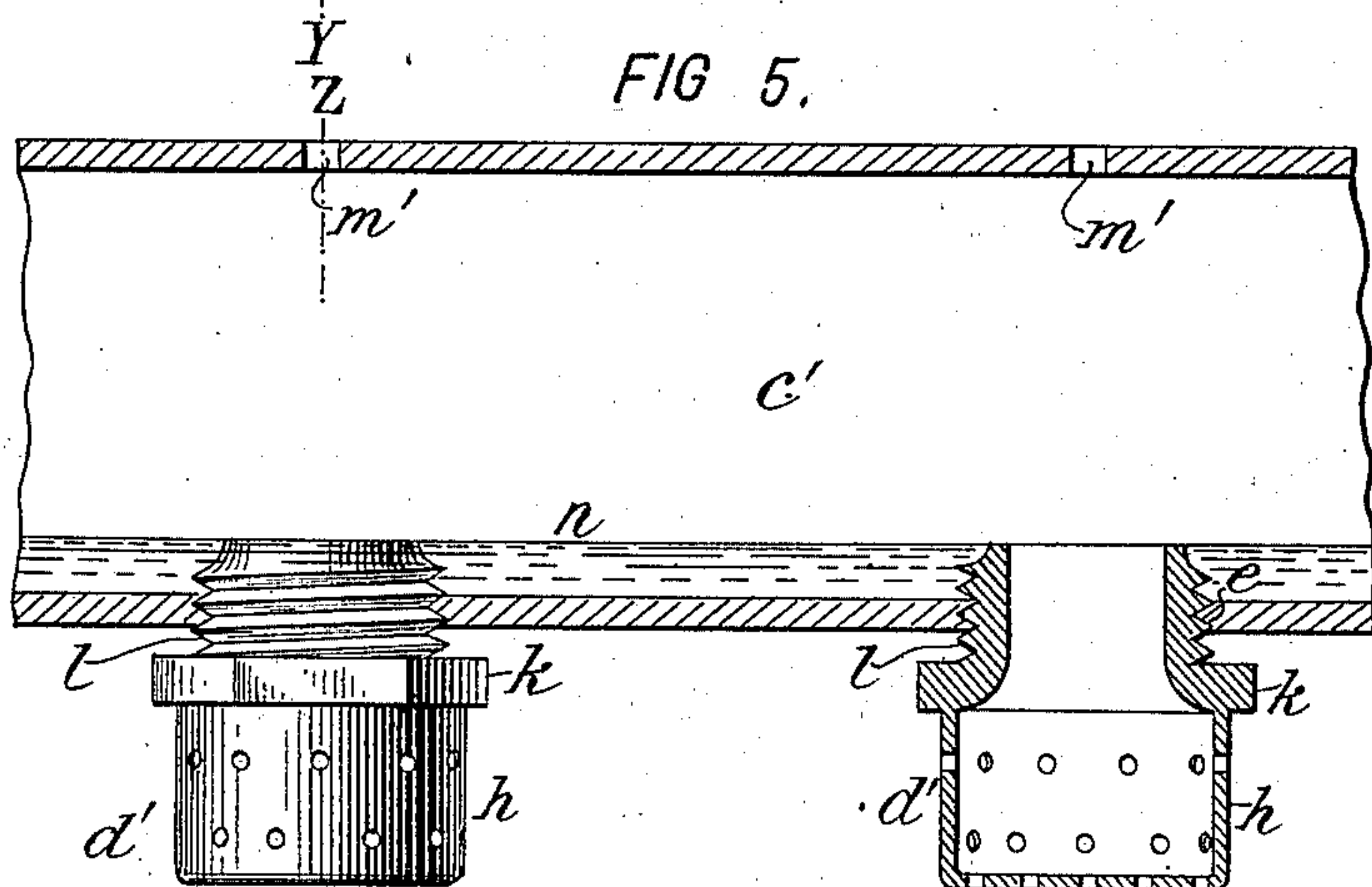
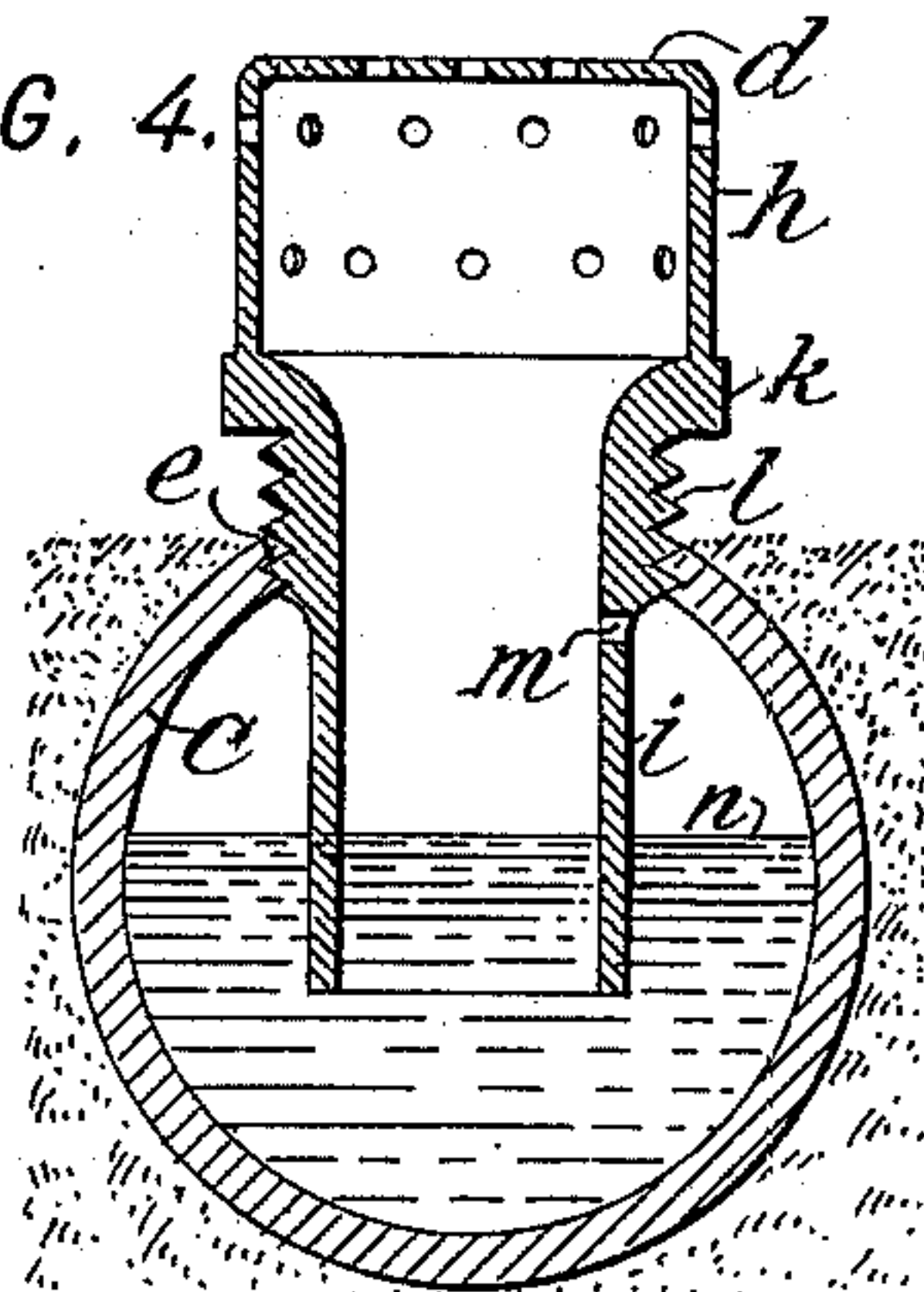


FIG. 5.

FIG. 6.

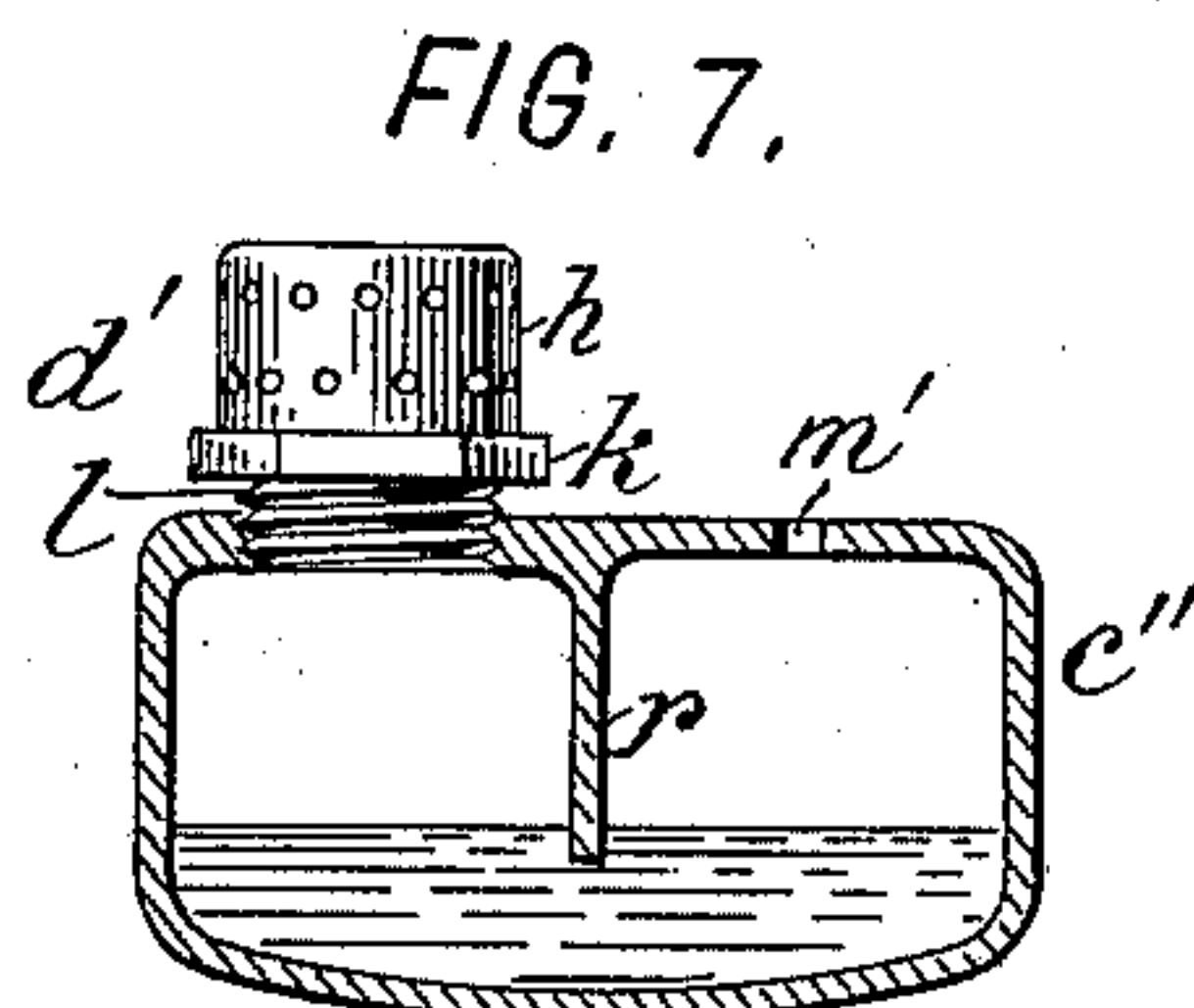
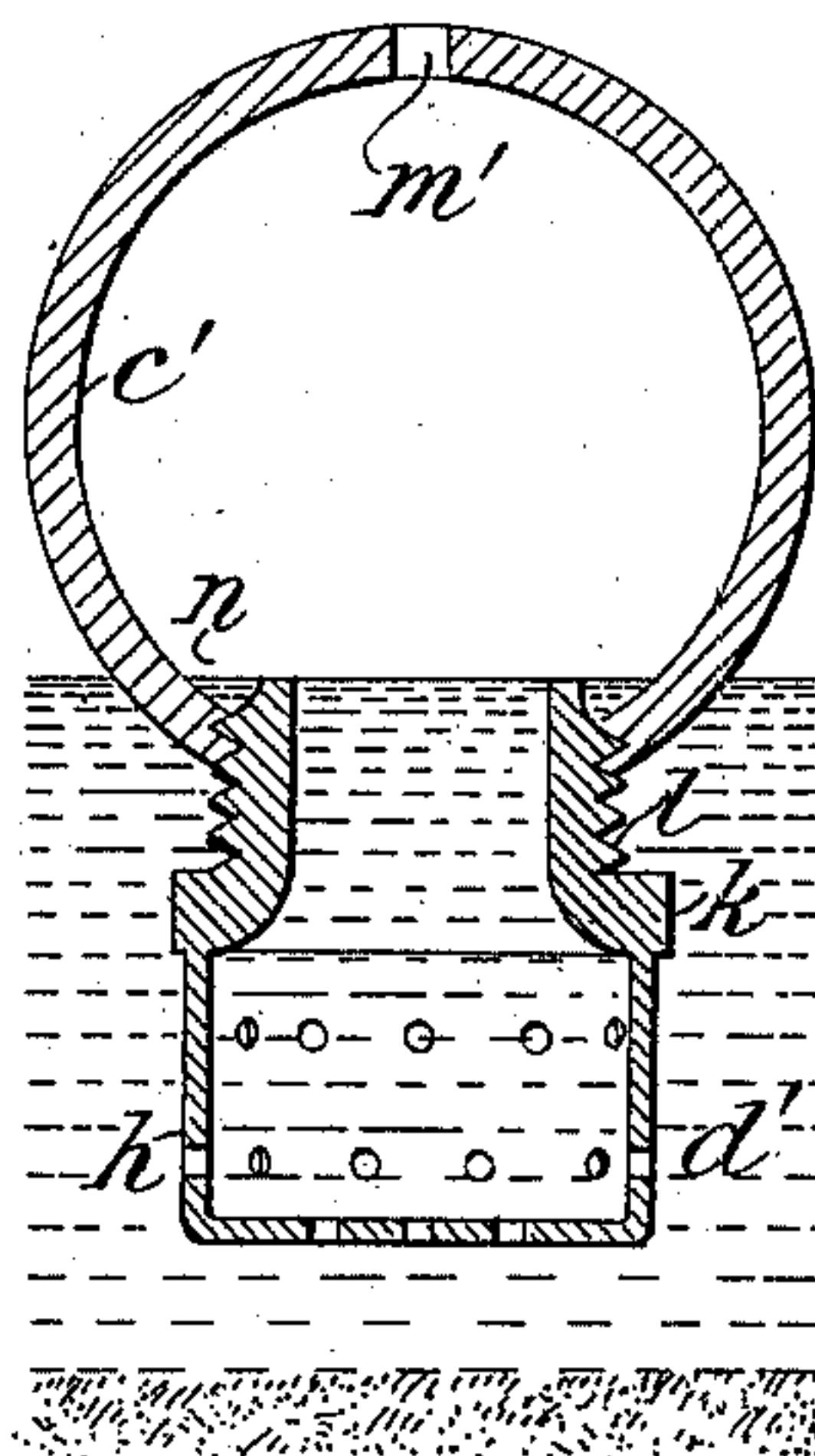


FIG. 7.

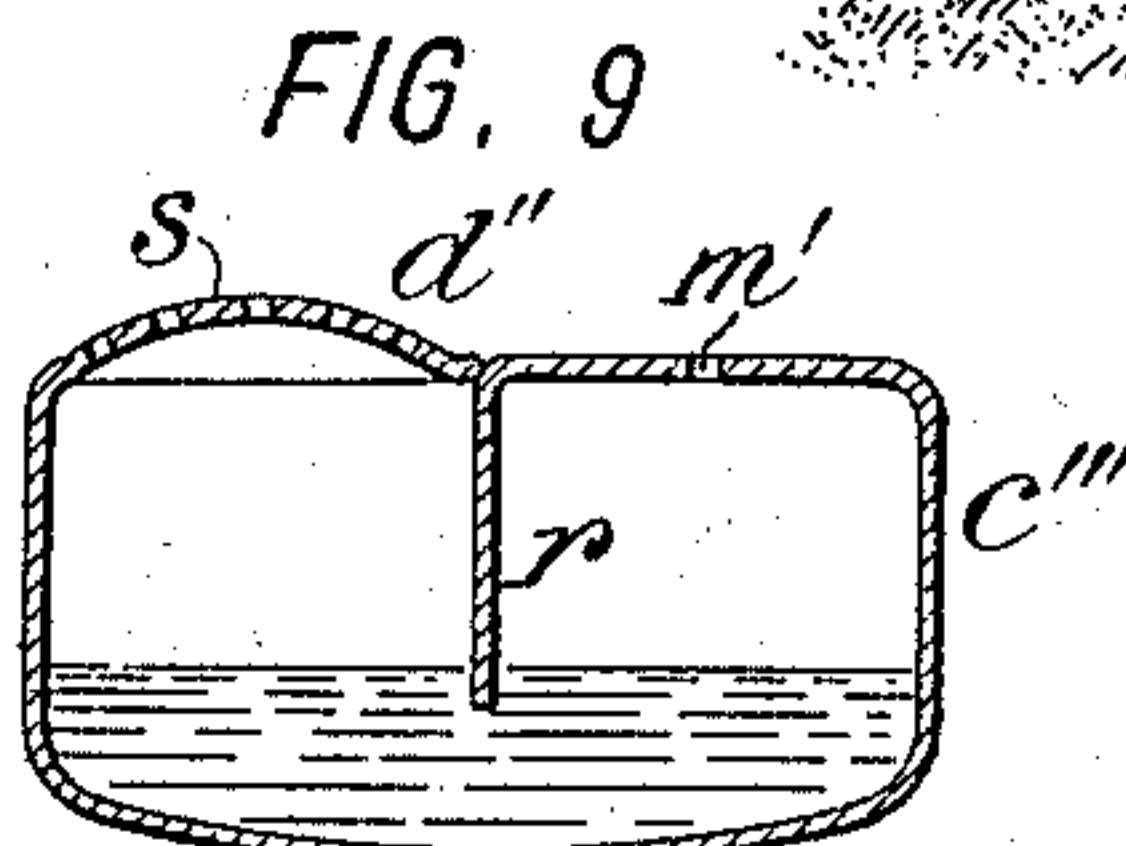


FIG. 9.

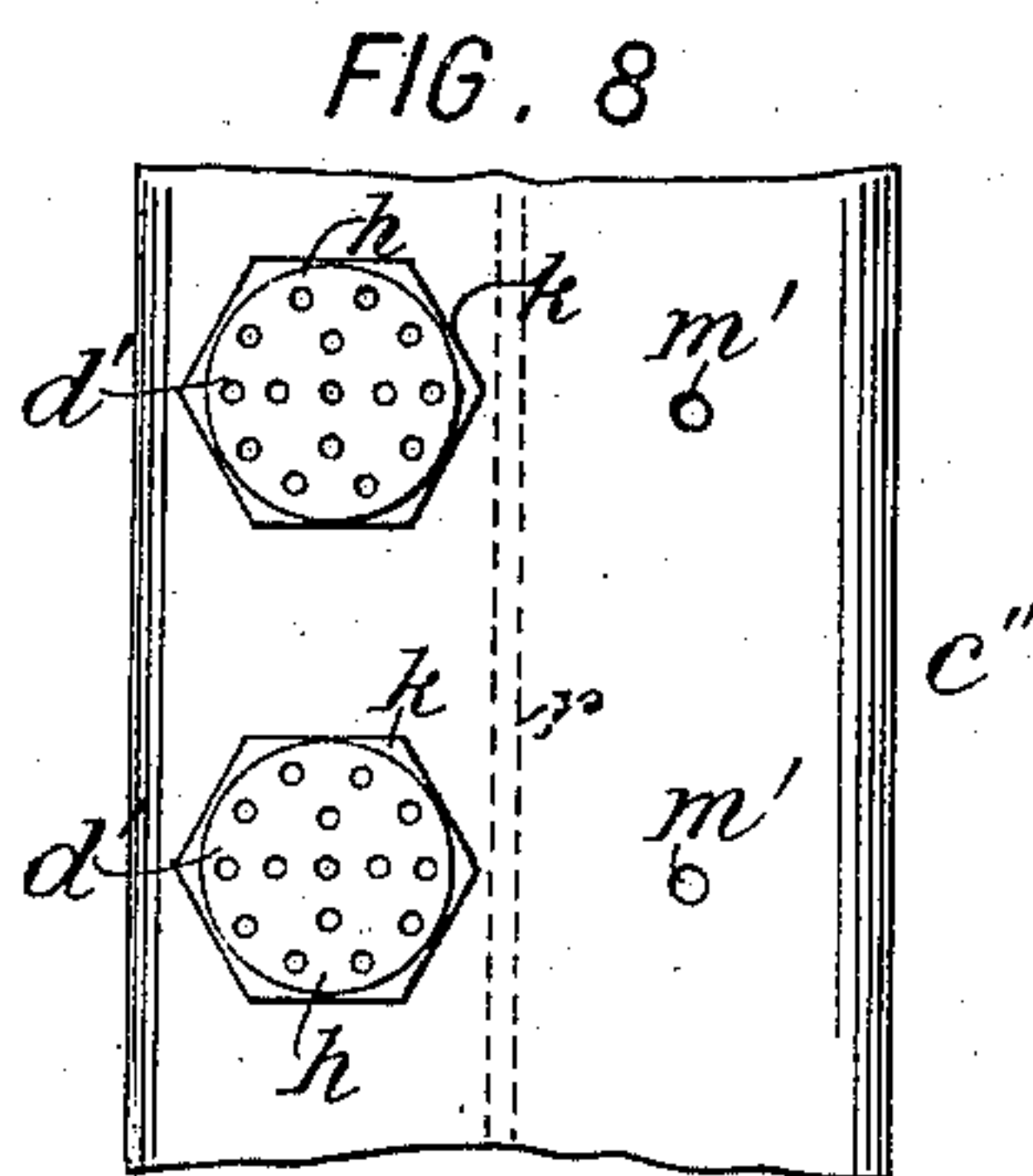


FIG. 8.

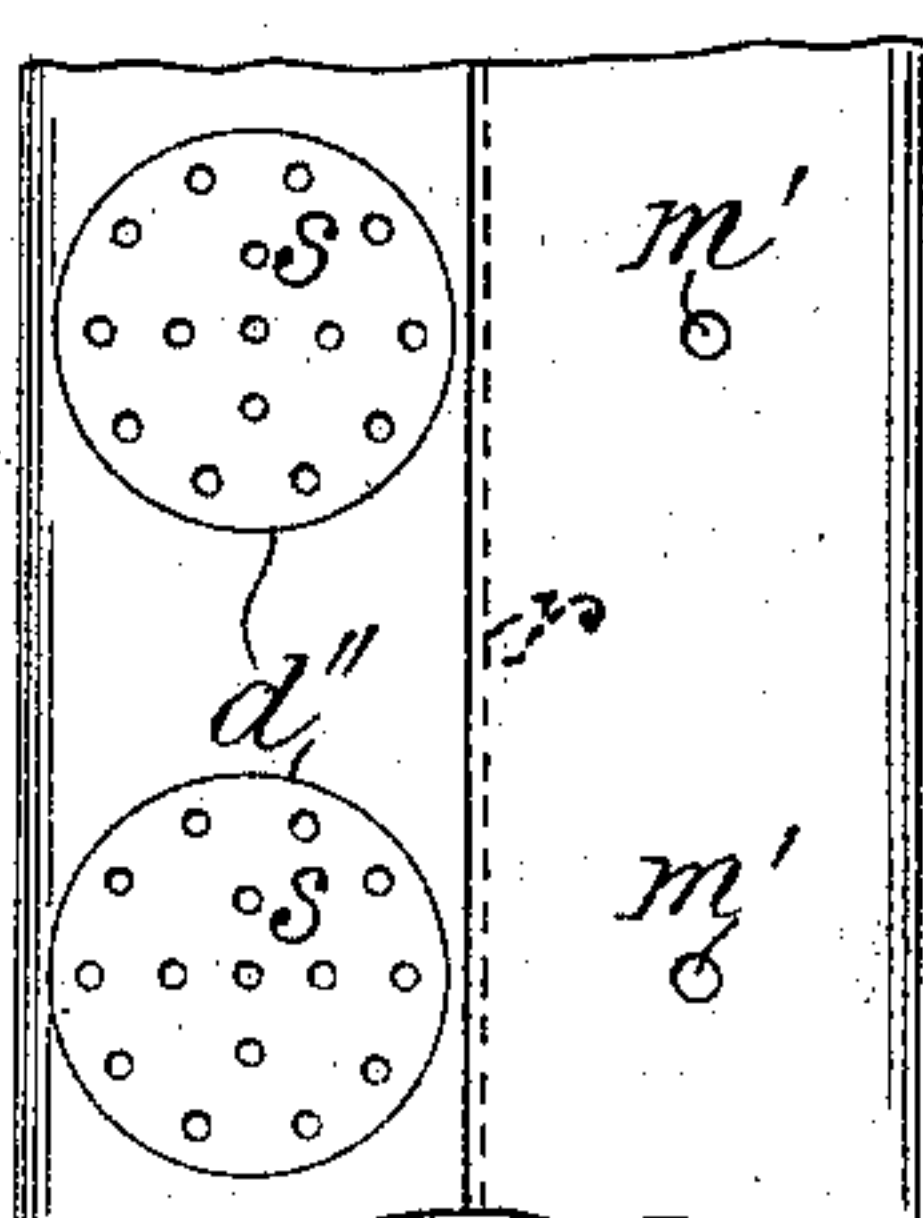


FIG. 10.

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UNITED STATES PATENT OFFICE.

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FILTER.

SPECIFICATION forming part of Letters Patent No. 653,160, dated July 3, 1900.

Application filed November 21, 1899. Serial No. 737,749. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. WILLIAMSON, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Filters and other Devices, of which the following is a specification.

My invention relates to cleaning apparatus for filters, and is designed to overcome the defects existing in these devices as heretofore constructed and to simplify and cheapen the construction of the filter.

After a filter has been in use for a certain length of time the filtering material becomes clogged up with impurities and it is necessary to clean it out and to remove these impurities. This is done by forcing water through the pipes located at the bottom of the filtering-tank, which are provided with upwardly-projecting nozzles, each nozzle having a sieve-like cap. To complete the operation of cleaning, a current of air is preferably forced through the filtering material after it has been flushed with water, the air serving to oxidize any impurities which may still remain in the mass or to effect a certain scouring of the material. It is imperative that the air-currents should permeate the entire mass, the same quantity of air being forced through each nozzle. If the air were to be conducted through the same pipe as that which conducts the water in the filter as ordinarily constructed, the major portion of it would all escape through those nozzles which are nearest the main pipe, because of the large cross-sectional area of this pipe and of the nozzles. It has therefore been found desirable to employ a second system of piping for the air, consisting of tubes of smaller diameter placed inside of the water-pipes. My invention is designed to do away with this second system of piping, and this end is accomplished by the peculiar construction and arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 is a cross-section through a filter on line X X in Fig. 2. Fig. 2 is a plan view of the filter, showing the arrangement of the pipes and nozzles. Fig. 3 is a section through one of the pipes, showing one of my improved nozzles in outline and one of the said nozzles in cross-section. Fig. 4 is a cross-section of

Fig. 3 on the line Y Y. Fig. 5 is a view of a modified arrangement. Fig. 6 is a cross-section of Fig. 5 on line Z Z. Figs. 7 and 8 and Figs. 9 and 10, respectively, are views of further modifications.

A in Fig. 1 represents the bed of filtering material.

B is the system of pipes at the bottom of the tank, these pipes radiating from a central union *b* and branching out into smaller pipes *c*, provided with the nozzles *d*. The filtered water passes through the nozzles and pipes and through the central union into a main pipe *C*, leading to the exterior of the tank and connected at this point to a union having three branches and valves *e*, *f*, and *g*, another union and valve *o* being inserted in one of the branches, and tubes leading in different directions from the valves and union.

While the operation of filtering is going on the valves *e*, *f*, and *g* are closed and the filtered water passes out through the valve *o*.

D represents the supply-pipe system, provided with a water-pipe *E* and the usual regulating-valve for maintaining the water at a constant level.

The valve *g* is connected to an air-supply pipe and the valve *f* to a wash-pipe, through which pipes air and water respectively may be forced.

As shown in Fig. 3, the nozzles or strainers *d* consist of a perforated cap *h* and a tubular extension *i*, provided with screw-threads *l*. Between these two parts is a hexagonal flange *k*, adapted to receive a wrench for the purpose of screwing the nozzles into the pipes *C*. The extension *i* is made long enough to extend down into the pipe to a considerable distance. A small opening *m* is provided in the part *i* at a point inside of the pipe *C* for the purpose which will be presently explained.

When the filter is to be cleaned, the valve *o* is closed and the valve *f* opened, thus causing a backflow of water under pressure through the piping system and the nozzles and cleaning the filtering-bed. The valve *f* is then closed and the valve *e* opened, so that the water can be drained out. Enough water will remain in the pipes, however, to cause its level *n* to be higher than the lower opening of the nozzle extension *i*, thus forming a

complete water seal for this opening. After closing the valve *e* the air-valve *g* is opened and the air rushes in under pressure from the air-supply. By reason of the water seal in the pipes it will be seen that the cross-sectional area through which the air may escape has been reduced by the volume of water left in the pipes to the openings *m*, and the air is consequently forced to enter the nozzle through the small ingress-opening *m*. By this reduction of area a practically-even distribution of the air-currents throughout the entire system is obtainable with any ordinarily-obtainable pressure of air.

5 In the modification shown in Figs. 5 and 6 the nozzles *d'* are inverted, so that their tubular interiors are sealed by the water left in the pipe. The air-opening *m'* is in this modification formed in the pipe *c'* instead of being
20 in the nozzle. Here, again, the water left in the pipe forms a seal for the nozzle, reduces the cross-sectional area through which the air must pass, and forces it to pass through the small openings *m'*.

25 Figs. 7 and 8 show a modification in which an approximately-rectangular pipe *c''* is provided with a longitudinal central partition-wall *r*, which extends to below the water-level. The nozzle or strainer *d'* is here
30 placed at one side of this partition-wall, and a small opening *m'* is formed in the top of the pipe at the other side of such wall. The water passes through the full cross-section of the pipe, whereas the air-pipe is connected
35 only with the right-hand side, and the air is thus forced through the reduced section bounded by the water seal and passes out through the small openings *m'*.

40 Figs. 9 and 10 show a modification similar to that shown by Figs. 7 and 8. The entire pipe *c'''* is formed of a strip of sheet metal bent into the shape shown and provided at intervals with strainers *d''*, consisting of perforated circular bulges or projections *s*, formed
45 by stamping, which bulges are the equivalents of the nozzles before described.

Other modifications within the scope of my invention will readily suggest themselves to the skilled mechanic, and I do not wish to limit
50 myself to the precise constructions shown.

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

1. A system of piping, nozzles on the branches of said piping, an air-supply and a
55 water-supply leading into the piping, means for forming a water seal in the piping to restrict its cross-sectional area, and a small air-

passage located above said water seal, substantially as described.

2. A system of piping, an air-supply, and a 60 water-supply connected to said piping, nozzles on the branches of said piping, and means for restricting the cross-sectional area of said piping through which the air may pass, substantially as described. 65

3. A system of piping, an air-supply and a water-supply connected therewith, valves for controlling said air-supply and said water-supply respectively, a drain-pipe for allowing the water to escape, a valve for said drain-pipe, nozzles on the branching of the piping system, projections extending inwardly into the said piping, and air-passages suitably located to allow the air from the air-supply to be forced out. 70 75

4. A system of piping suitably located under a bed of filtering material, an air-supply and a water-supply connected with said piping, suitable means for controlling said air-supply and water-supply, nozzles on the 80 branches of the piping, and extensions on said nozzles projecting into the pipes.

5. A system of piping located under a bed of filtering material, an air-supply and a water-supply connected to said system of piping, 85 suitable means for controlling the water-supply to form a water seal in the piping, nozzles on the branches of said piping, extensions on said nozzles projecting into the pipes and below the said water seal, and small air-passages in the sides of said nozzles above the water seal. 90

6. A nozzle consisting of a sieve-like cap, means for fastening the nozzle to a filter-pipe below said cap, and a tubular extension below 95 said fastening means.

7. A nozzle consisting of a sieve-like cap, means for fastening the nozzle to a filter-pipe below said cap, a tubular extension below said fastening means, and an opening in the side 100 of said tubular extension.

8. A nozzle consisting of a sieve-like cap, a flange below said cap, a tubular extension below said flange, and external screw-threads formed on said tubular extension above its 105 end, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES E. WILLIAMSON.

Witnesses:

GEORGE H. FRASER,
THOMAS F. WALLACE.