

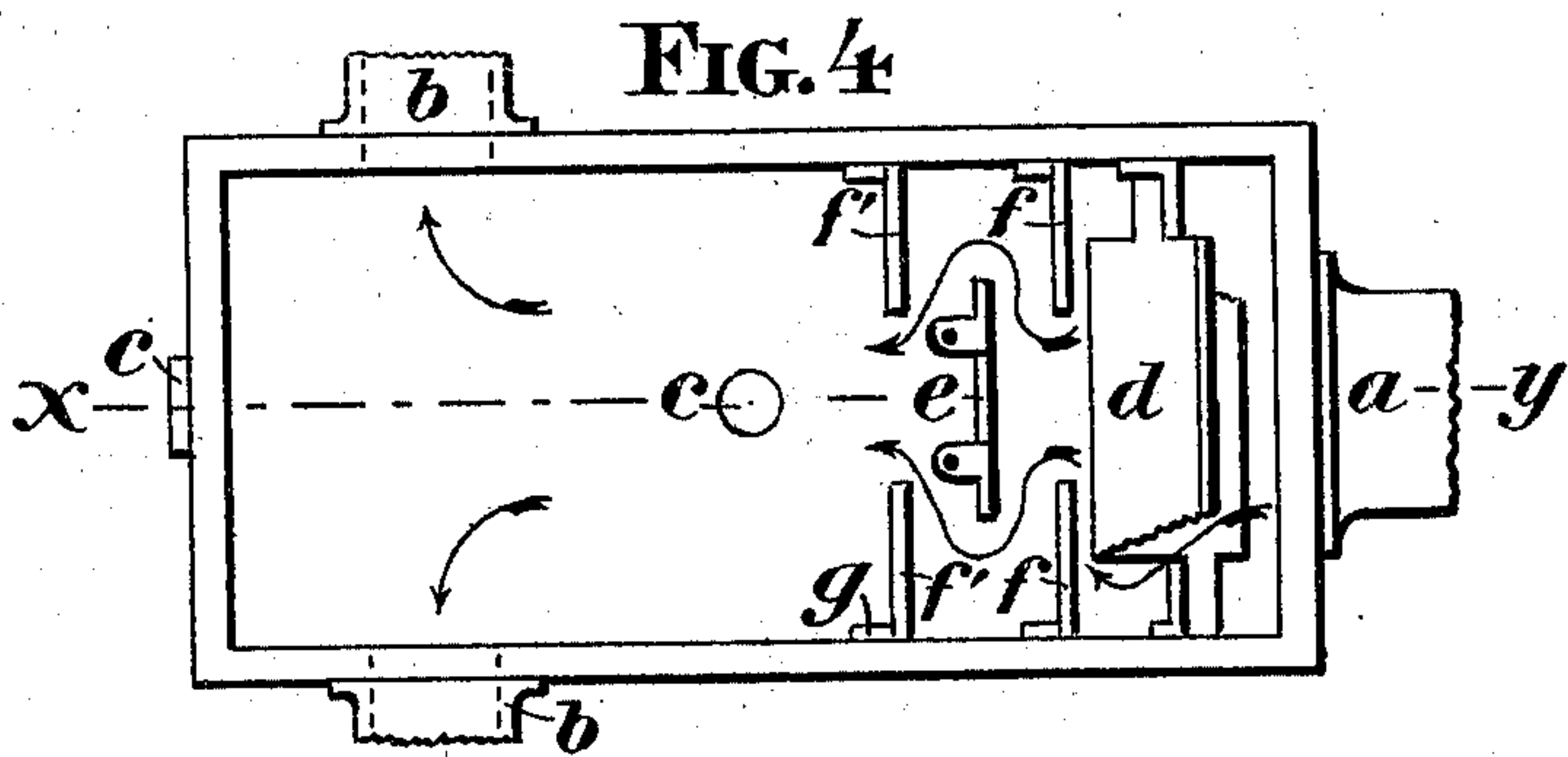
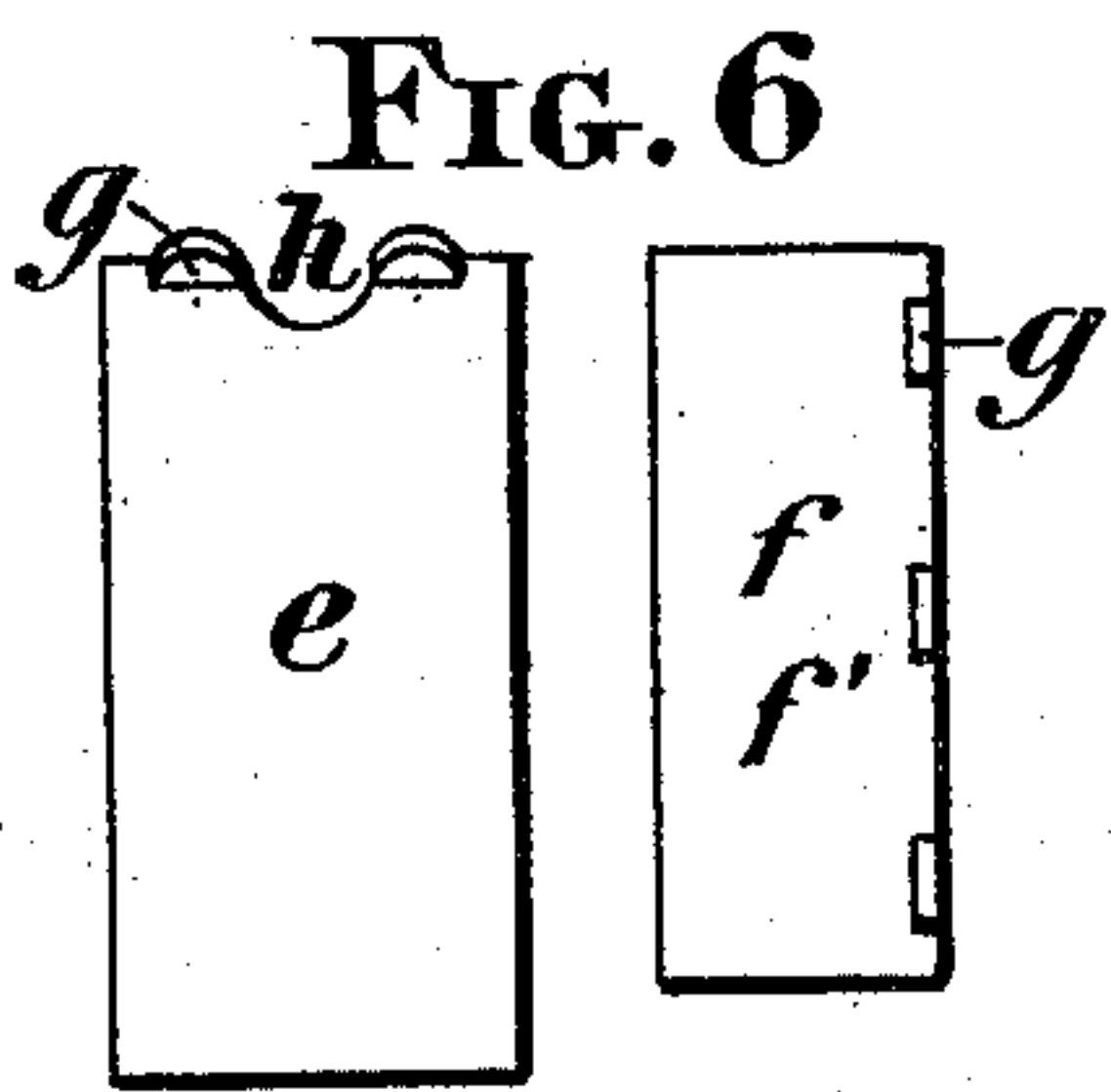
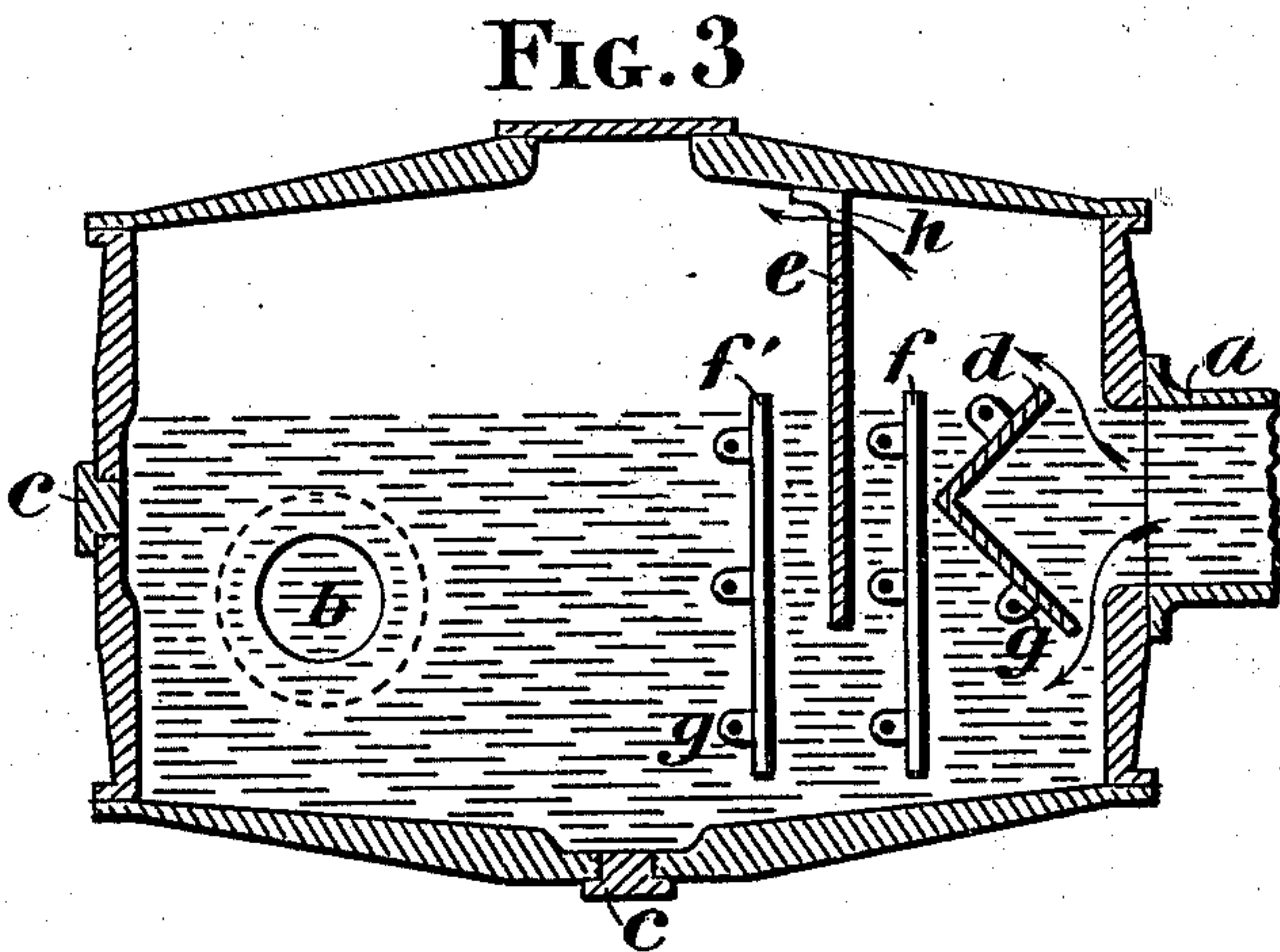
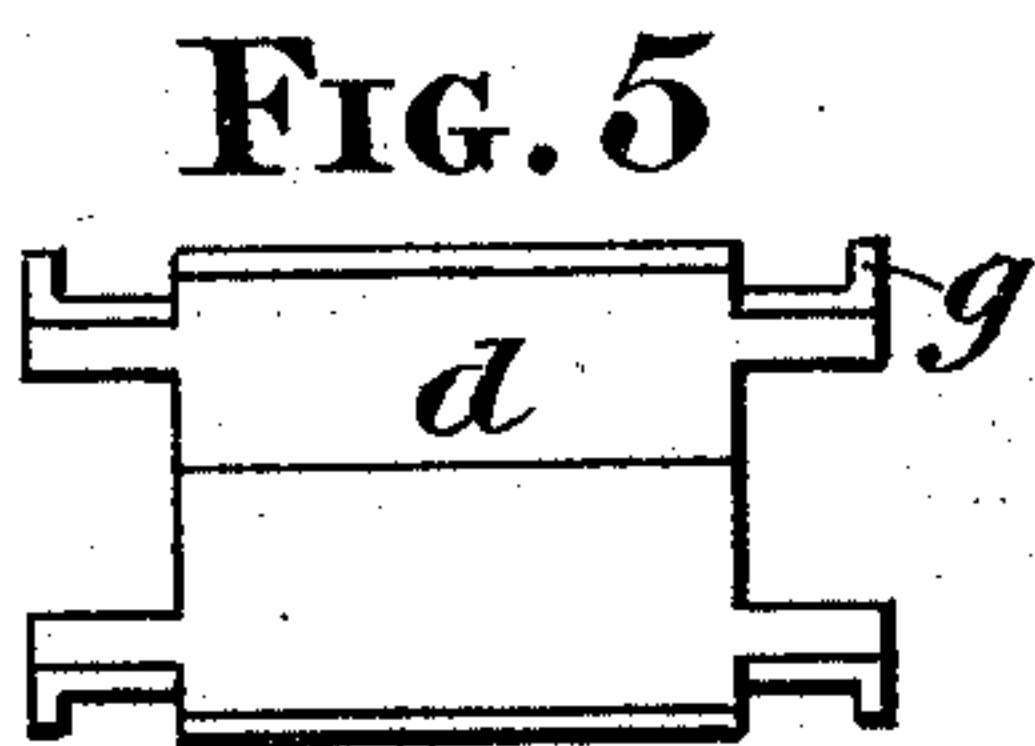
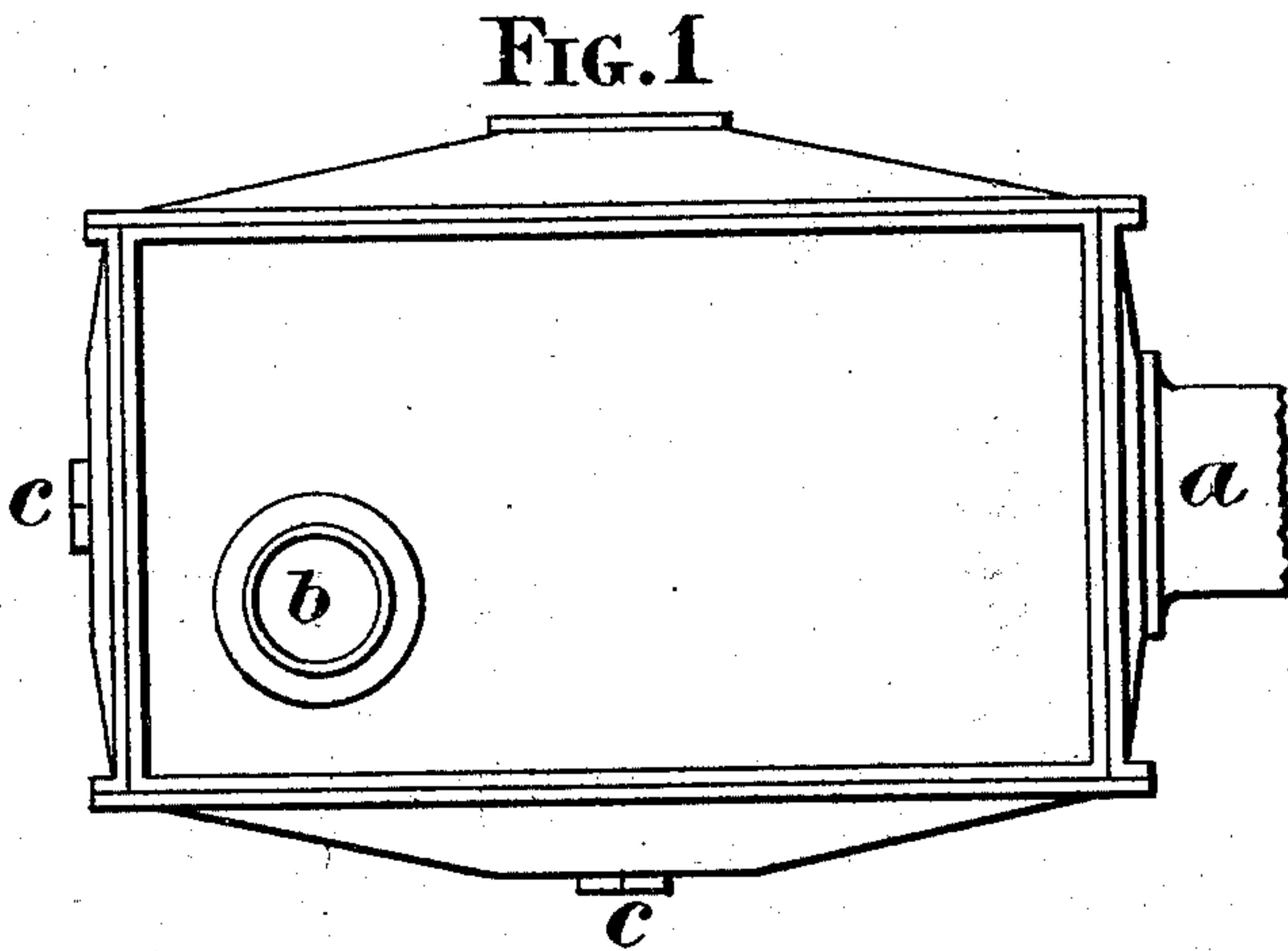
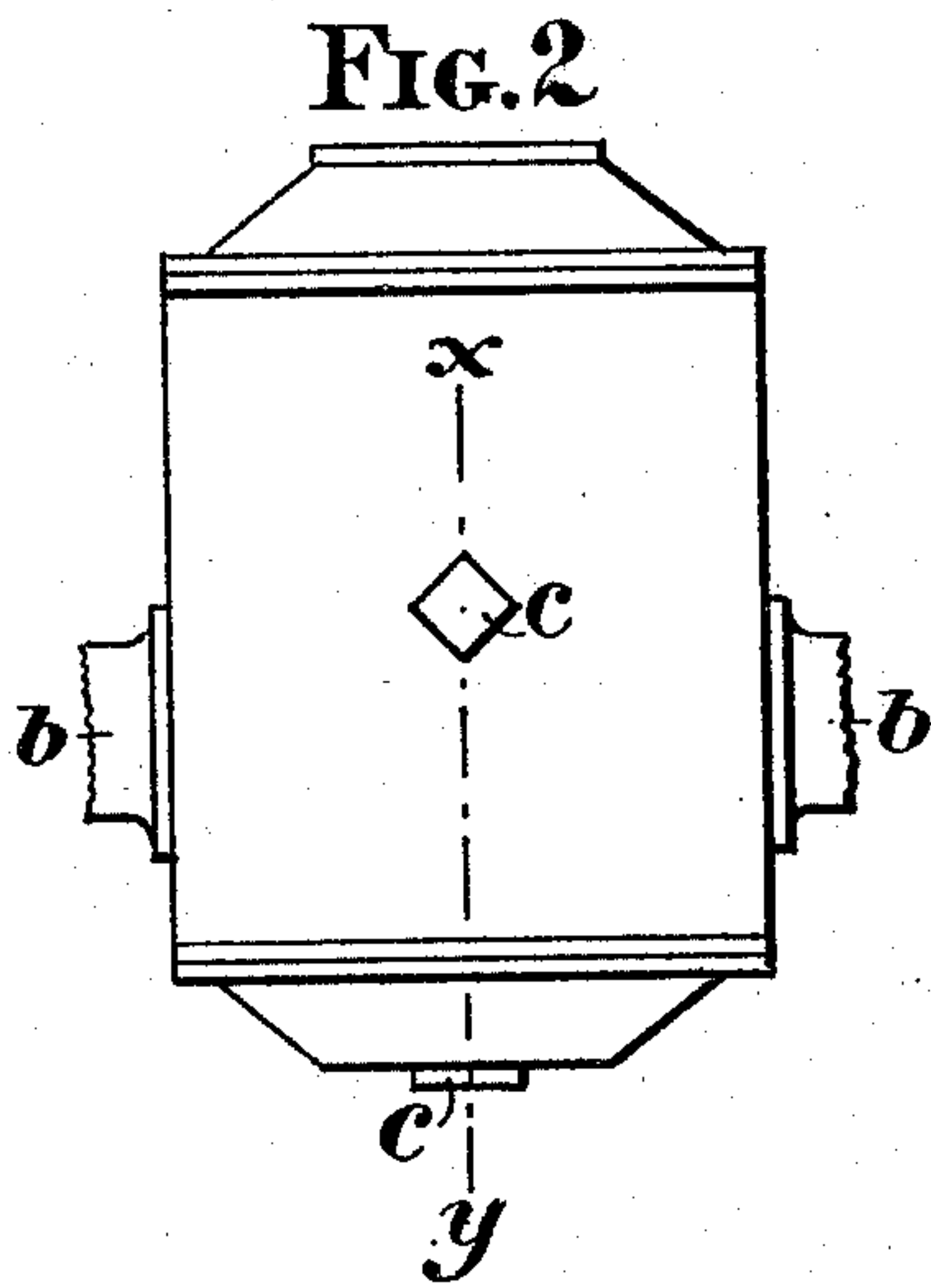
(No Model.)

B. F. SMITH.

SAND AND AIR SEPARATOR FOR ARTESIAN OR DRIVEN WELLS.

No. 545,026.

Patented Aug. 20, 1895.



WITNESSES:

*J. P. Suverkrop*  
*A. M. Deaslee*

*Benjamin F. Smith* INVENTOR

BY

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# UNITED STATES PATENT OFFICE.

BENJAMIN F. SMITH, OF SOMERVILLE, MASSACHUSETTS.

## SAND AND AIR SEPARATOR FOR ARTESIAN OR DRIVEN WELLS.

SPECIFICATION forming part of Letters Patent No. 545,026, dated August 20, 1895.

Application filed December 10, 1894. Serial No. 531,360. (No model.)

*To all whom it may concern:*

Be it known that I, BENJAMIN F. SMITH, of Somerville, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Sand and Air Separators for Artesian or Driven Wells, of which the following, taken in connection with the accompanying drawings, is a specification.

It is an established fact that water derived from driven or Artesian wells contains a much larger proportion of air than lake or river water, and frequently contains sand or other earthy matter, especially when first used. These must be extracted or separated from the water before it passes through the pumps, particularly in city or other large water-supplies where the head pumped against is considerable. Otherwise the air will cause thumping and the sand will cut and wear out the water end and the valves of the pump, causing breakdowns and necessitating constant repairs.

My invention is intended to obviate these difficulties by separating the air and sand from the water, as will be described hereinafter.

In the accompanying drawings, Figure 1 represents a side elevation, and Fig. 2 a rear elevation, of my sand and air separator for Artesian or driven wells. Fig. 3 is a longitudinal section through the center of Figs. 2 and 4 on the lines X Y, showing the interior of the chamber partially filled with water and the position of the deflectors. Fig. 4 is a plan of the chamber with the cover removed and partly broken away, showing the interior of the chamber and arrangement of the deflector-plates. Fig. 5 is a front elevation of one of the deflector-plates, and Fig. 6 rear elevations of the other deflector-plates.

Similar letters of reference indicate similar parts in the several figures.

The separator is an air-tight chamber and may be of any suitable form or material, it being shown in the drawings as rectangular in form. This chamber is provided exteriorly with an inlet-pipe *a* from the source of supply, but it may have two or more.

*bb* are outlets to the pump or pumps, which are not shown, and *cc* are removable plugs.

Referring to Figs. 3 and 4, it will be seen that the first deflector *d* is V-shaped in form;

that it is secured within the chamber laterally thereof, with its interior angle opposing the central line of the inlet *a*, and that the deflector proper is in length about two-thirds the width of the chamber. Passages are thus formed around it on all sides. The second and fourth deflectors consist of plain plates *ff* and *f'f'*, secured to the sides of the chamber in such manner that water or air can pass under, over, and between them. The third deflector *e* is a plain plate secured to the top wall of the chamber and extending downwardly between the deflectors *f* and *f'* and opposite the spaces between the opposing edges of the plates *ff* and *f'f'*, respectively. All the deflectors are provided with lugs *g*, by means of which, and suitable securing devices, they are attached to the walls of the chamber. The deflector *e* is cut away at its upper edge, as shown at *h*, to form a passage for air that may be deflected upwardly by it.

The operation of the device is as follows: By inspection of Figs. 3 and 4 it will be seen that the water, upon entering the chamber through the inlet-pipe *a*, strikes the surface of the first deflector *d*, having free passage all around it. The air contained in the water is deflected upwardly by the upper inclined surface of *d*, sand or heavy impurities being deflected downwardly by the lower face of *d*. After passing around *d* the water impinges upon the deflectors *ff*. These further tend to break the air-bubbles contained in the water and throw the current against *e*. Passing around and underneath *e*, the water has to pass the deflectors *f'f'*, which deflect it toward the center of the chamber on the same level as it entered at *a*, from whence it quietly passes to the outlets *bb*, which are placed considerably below the inlet-pipe *a*, this being done to prevent the access of air to the pump or pumps as long as any water is coming from the source of supply.

By further inspection of Figs. 3 and 4 it will be seen that the air deflected in the direction of the upwardly-pointed arrows either passes around the deflector *e* or through the opening *h* in the upper end of *e* to the upper part of the chamber, from whence it is exhausted by a vacuum-pump or connection with condenser in the usual manner and which it is unnecessary to show. The sand



and other impurities take the direction of the arrow pointing downwardly and settle at the bottom, whence they are removed when necessary by a siphon or other suitable device  
5 through one or both of the openings closed by the removable plugs *c c*. It will be seen that the water is not forced over either of the deflectors at a higher level than it would naturally assume in coming from the inlet  
10 into the chamber.

Having described my invention, I claim—

In a device for separating air and sand or other earthy material from water, the combination with an air tight chamber having inlet  
15 and outlet openings, of a V-shaped deflector opposing the inlet opening and secured within

the chamber to have passages on all sides thereof, a series of deflector plates *f* and *f'* secured to the sides of the chamber to form passages over, under and between them, and 20 a deflector plate *e* secured to the upper wall of the chamber and extending downwardly between the deflector *f* and *f'* substantially as described.

In testimony whereof I have signed my 25 name to this specification, in the presence of two subscribing witnesses, on this 24th day of November, A. D. 1894.

BENJAMIN F. SMITH.

Witnesses:

J. P. SUVERKROP,  
A. M. PEASLEE.