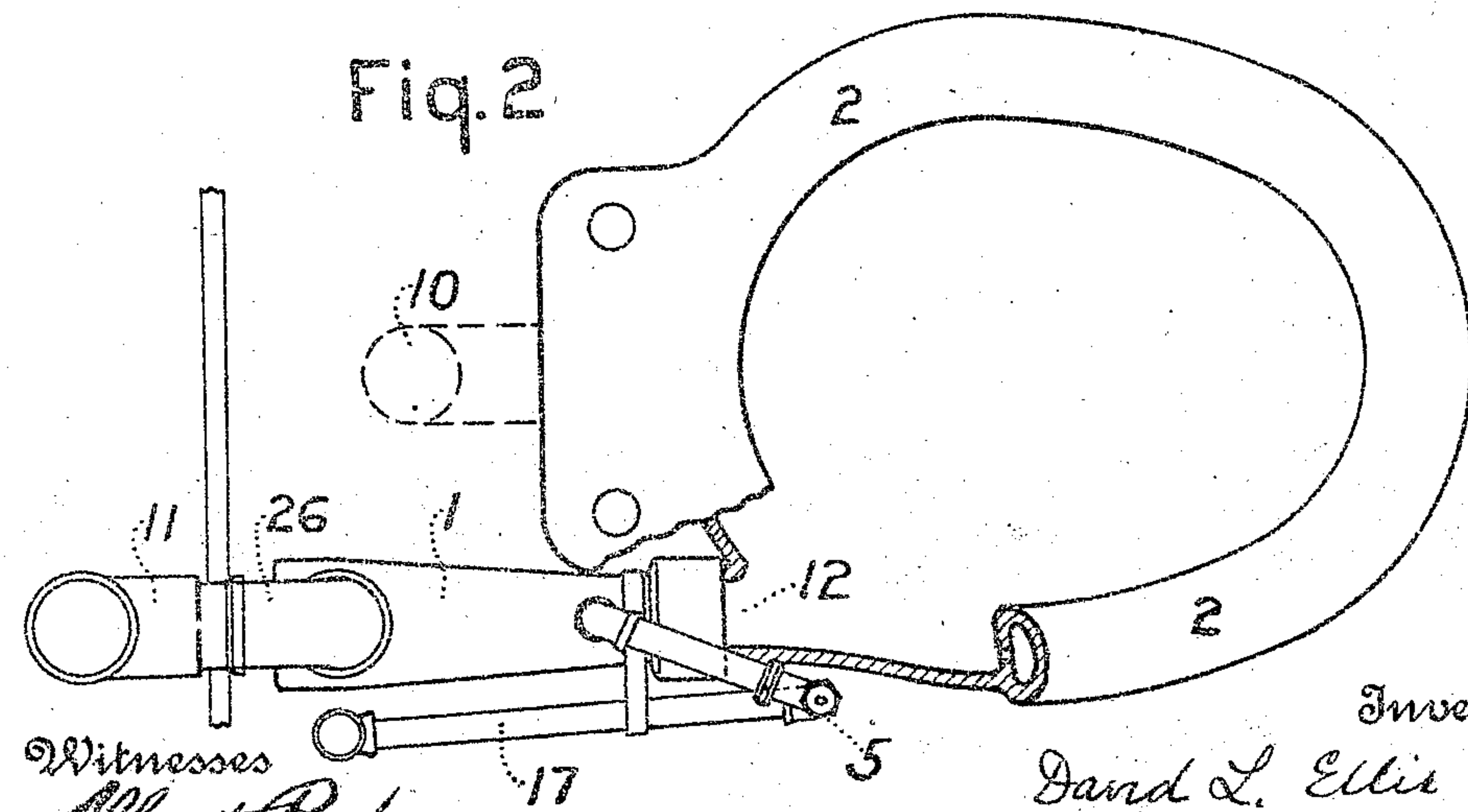
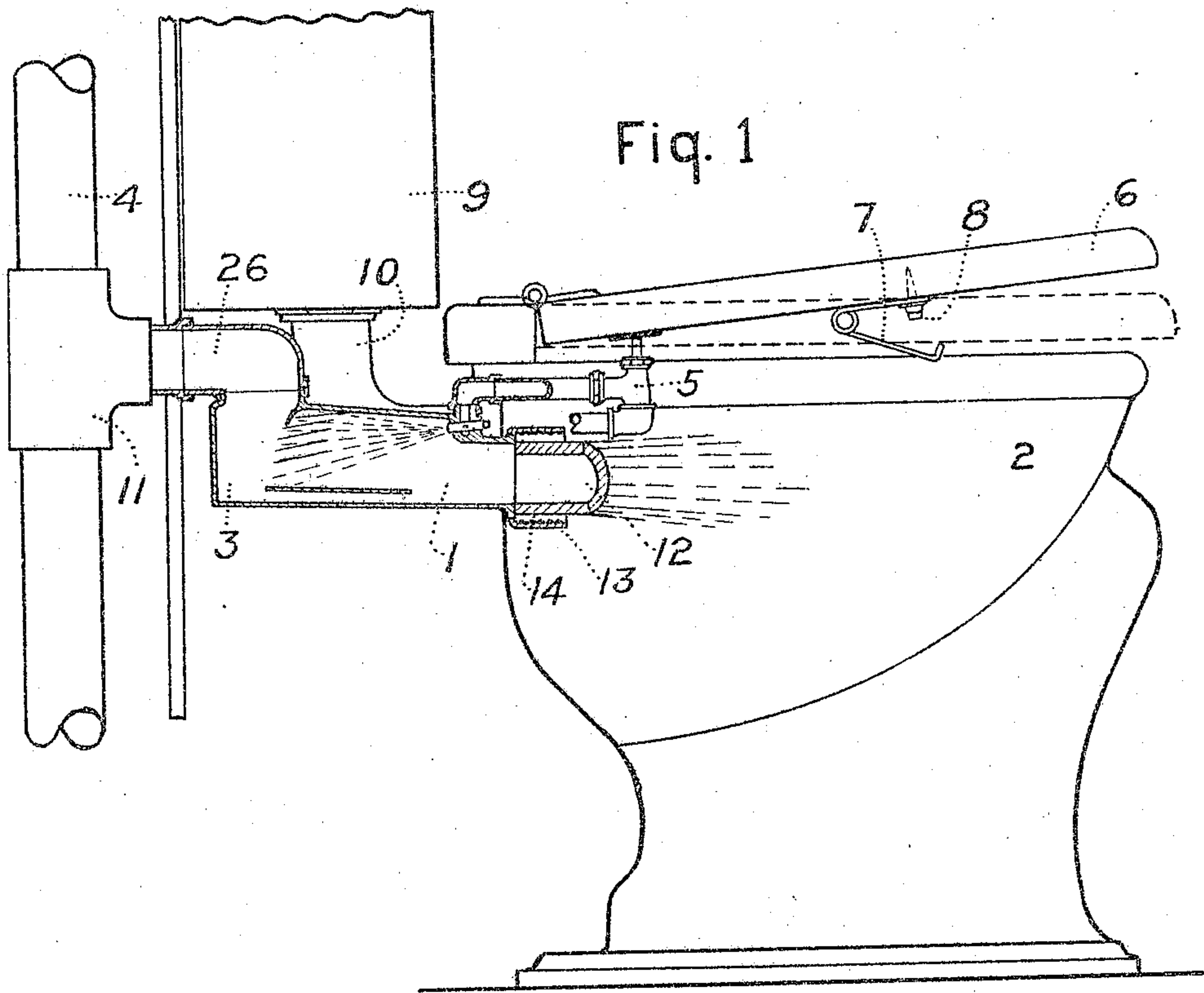


No. 860,197.

PATENTED JULY 16, 1907.

D. L. ELLIS.
VENTILATING APPARATUS.
APPLICATION FILED FEB. 16, 1906.

4 SHEETS—SHEET 1.



Witnesses
Albert P. Jones
E. W. Cady

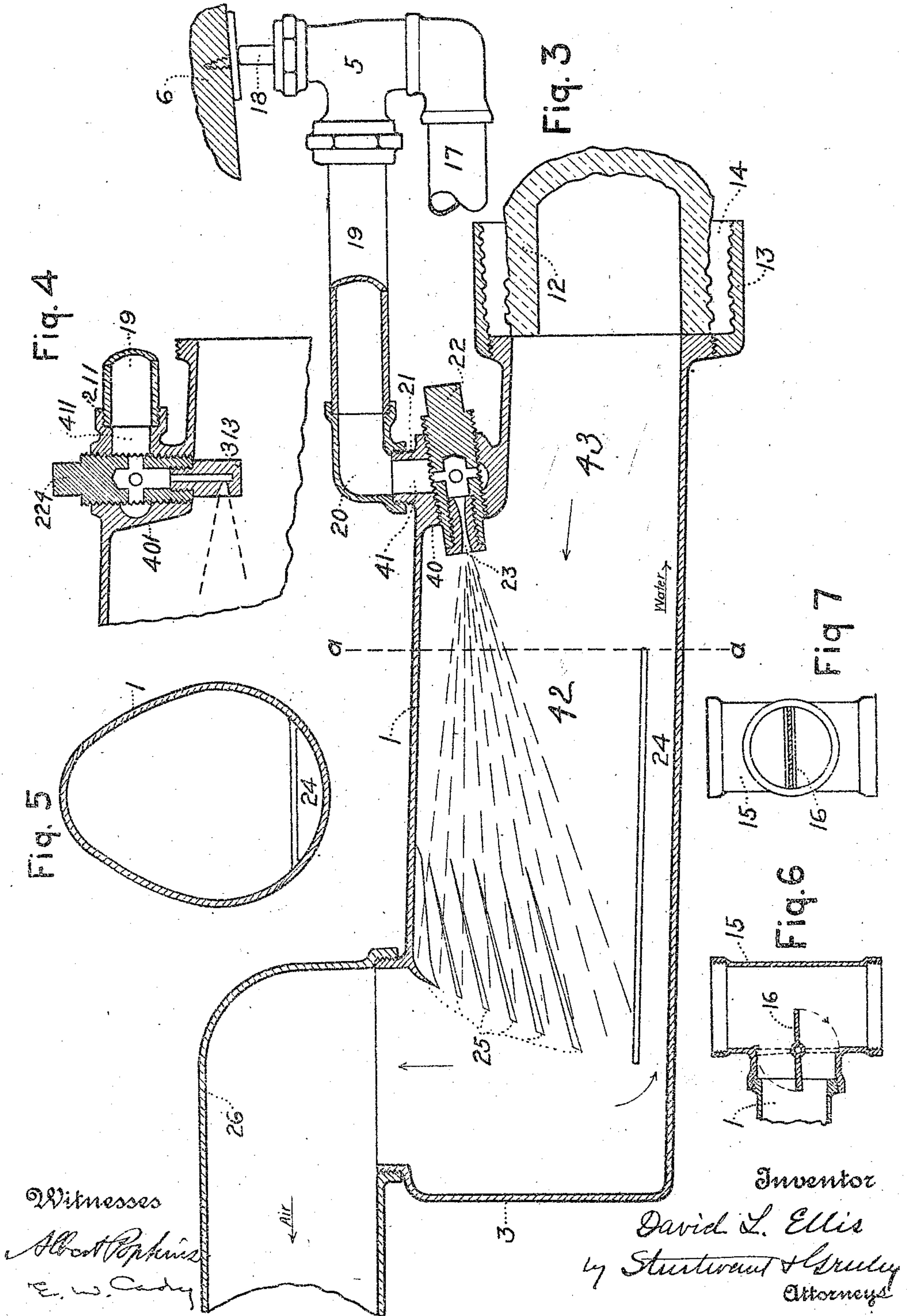
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4 SHEETS—SHEET 2.



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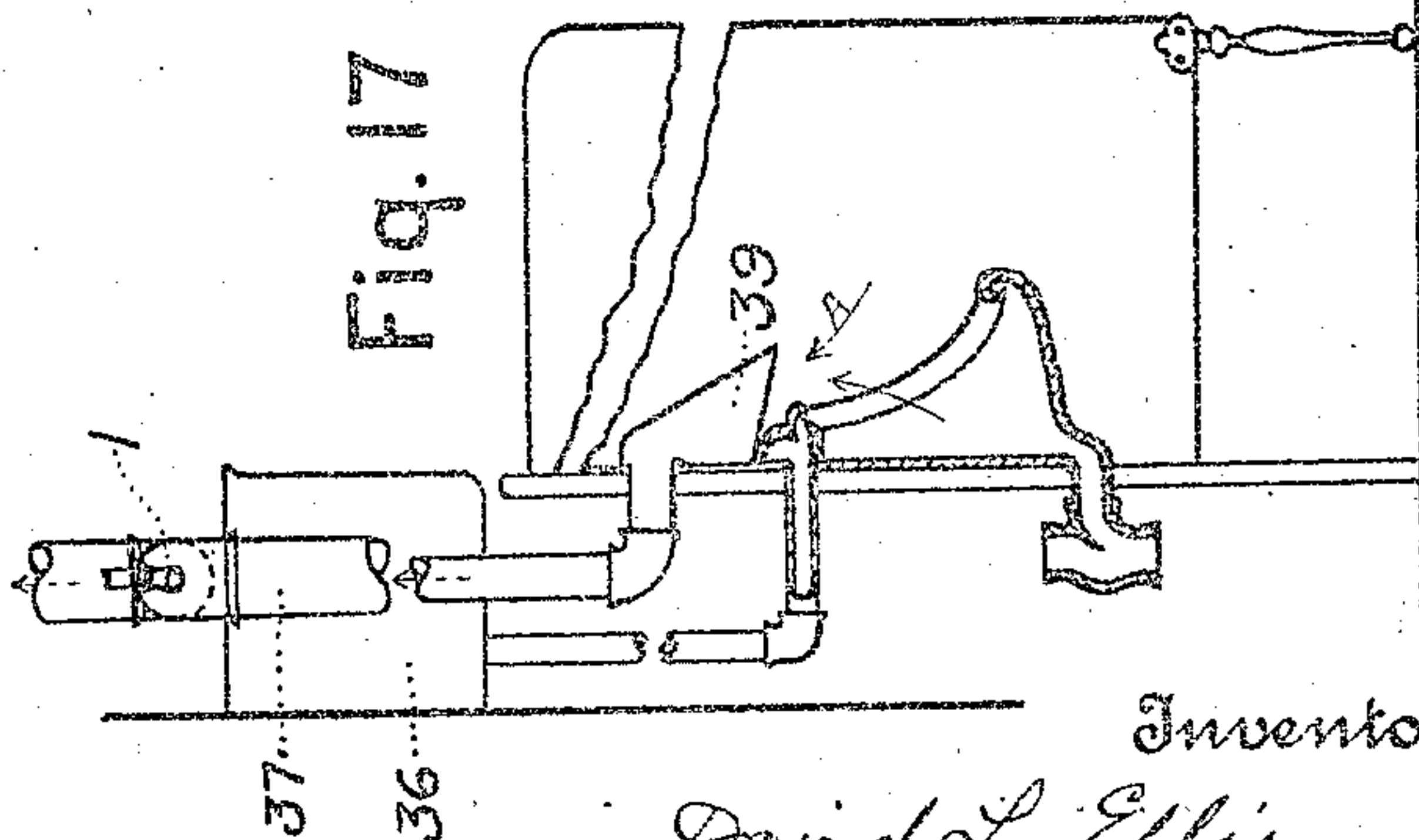
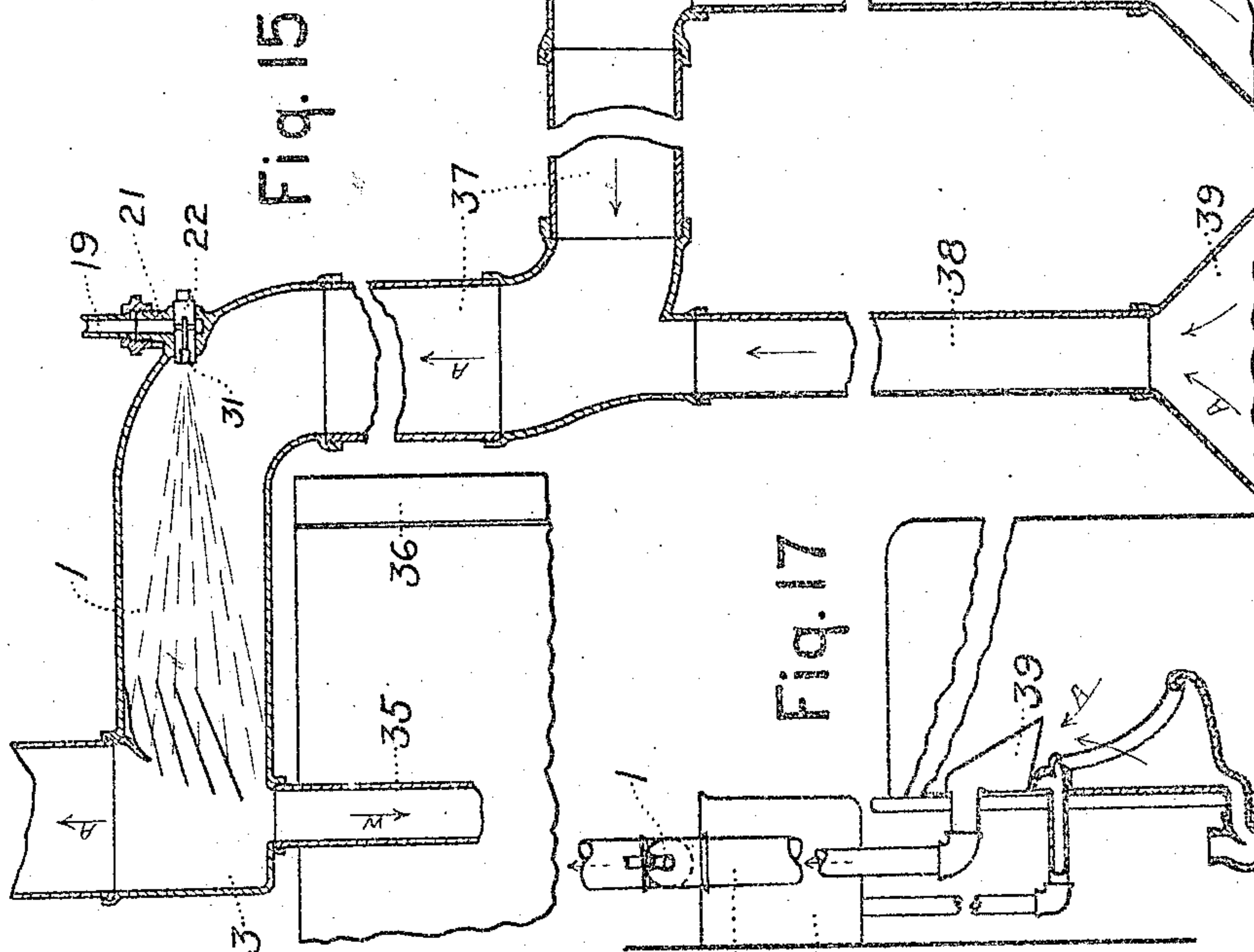
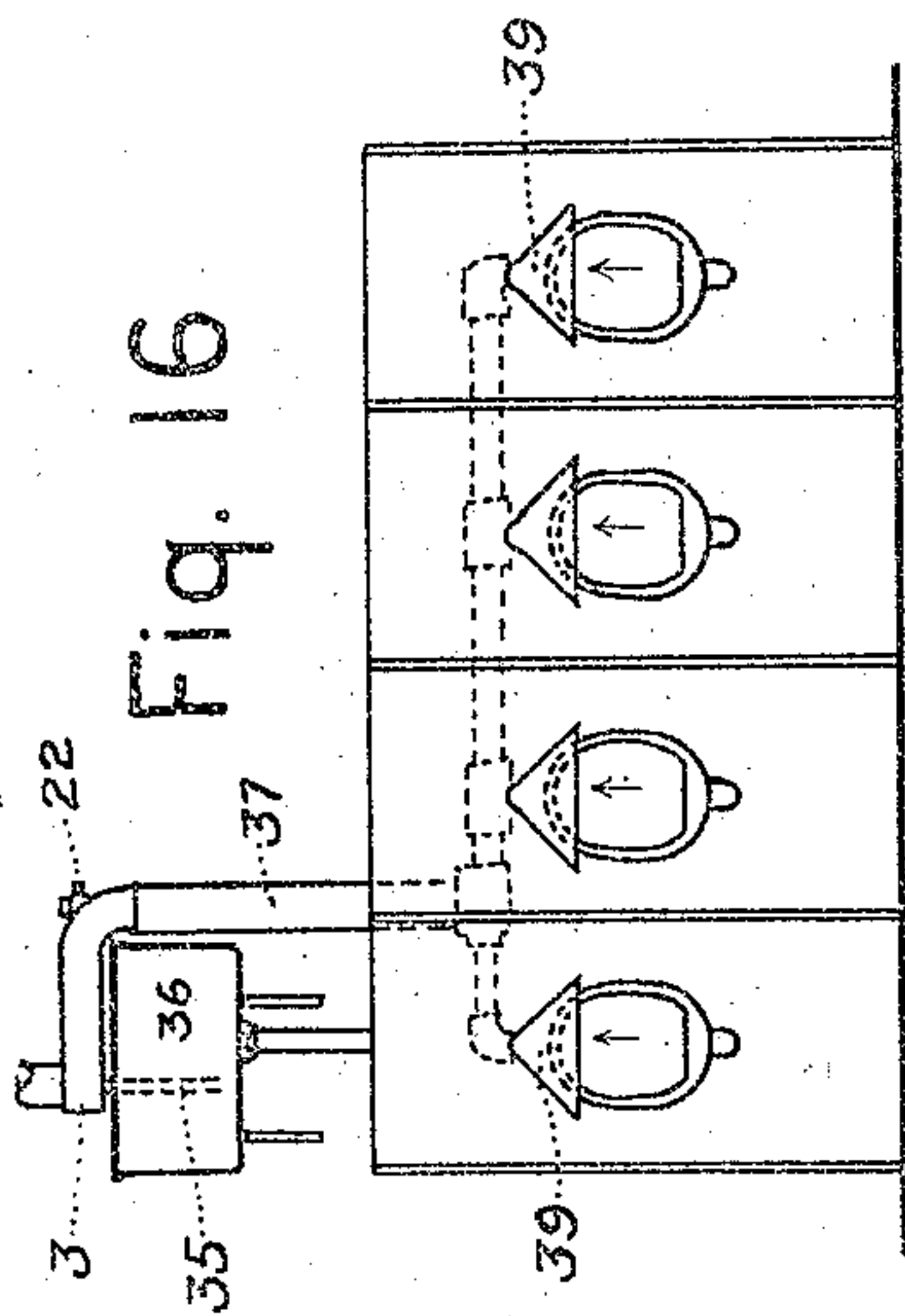
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4 SHEETS--SHEET 4.



Witnesses
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UNITED STATES PATENT OFFICE.

DAVID L. ELLIS, OF DETROIT, MICHIGAN.

VENTILATING APPARATUS.

No. 860,197.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed February 15, 1906. Serial No. 301,263.

To all whom it may concern:

Be it known that I, DAVID L. ELLIS, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new
5 and useful Improvements in Ventilating Apparatus, of which the following is a description, reference being had to the accompanying drawing, and to the letters and figures of reference marked thereon.

My invention relates to improvements in ventilating
10 appliances for the ventilation of water closet bowls, urinals and like devices in which foul odors are created or produced, though it is not limited to use with such devices, but may be used for the ventilation of bath rooms, kitchens or other rooms which it is desired
15 to ventilate.

The invention relates particularly to the class of ventilating devices in which a jet or spray of water discharged under pressure in a chamber or tube induces a current of air in the direction of the discharge, drawing
20 in or exhausting from the closet bowl or other vessel, or room, to which the device may be connected, the foul odors or gases which are to be disposed of, and it is the object of the invention to produce a simple and inexpensive device for this purpose which will be capable in operation of securing an effective exhaustion
25 of the foul odors or gases with the least expenditure of water, which will be quickly freed of the water used and in which all the operating parts will be carried by a single casting and will be so arranged that they may
30 be readily gotten at for cleaning or repair without disturbing the device as a whole.

A further object of the invention is to so construct the device that it may be readily attached to any of the forms of closet bowls in use without change in construction so that it may be carried in stock by plumbers
35 and connected up, whatever construction of bowl may be used, without the necessity for special forms for different bowls.

A further object of the invention is to provide means
40 for controlling the water supply by the pressure of the closet seat which will be simple, positive and not liable to get out of order or need attention.

A further object of the invention is to provide in connection with the ventilating device, as applied to
45 closet bowls, improved means for holding up the seat when not in use, so that waste of water is prevented, and means by which the seat is guided and held firmly in place when depressed and injury to the bowl, if carelessly slammed down, is prevented.

With these and other objects, hereinafter explained, in view, my invention consists in the construction and combination of elements hereinafter set forth and particularly pointed out in the claims.

Referring to the drawings—Figure 1 is a side elevation of an ordinary closet bowl, showing my ventilating

device in place, the ventilating device being shown partly in section. Fig. 2 is a top plan view of a closet bowl having my ventilating device attached, the closet bowl shown having its local vent on the left. Fig. 3 is a vertical sectional view of the ventilating device, 60 showing it full size. Fig. 4 is a vertical sectional view, showing a modified form of the water connection and spraying plug. Fig. 5 is a vertical section on line *a—**a* of Fig. 3. Fig. 6 is a vertical sectional view of a connection for use in connecting the ventilating device with the flush pipe. Fig. 7 is a front view of the construction shown in Fig. 6. Figs. 8, 8^a and 8^b are detail views of the spring for holding up the seat, Fig. 8 being a side view, Fig. 8^a a plan, and Fig. 8^b being a front view of the spring. Figs. 9, 9^a and 9^b are detail 70 views showing the bumper used to prevent injury to the bowl when the seat is slammed down, Fig. 9 being a plan, Fig. 9^a a cross sectional view on line *b—b* of Fig. 9 and Fig. 9^b being a cross section on line *c—c* of Fig. 9. Figs. 10, 10^a, 11, 11^a, 12, 12^a, 13 and 14 are detail sectional views, showing modified forms of the spraying plug. Fig. 15 is a sectional view showing the ventilating device applied to a battery of urinals. Figs. 16 and 17 are views in front and side elevation showing the arrangement of the device as applied to urinals. 80

In the drawings, 1 is the spray chamber of my ventilating device, shown in Figs. 1, 2 and 3, connected at its intake end with the closet bowl 2.

3 is the discharge end of the spraying chamber connected by an elbow and ordinary piping with the vent 85 pipe 4. The construction of the spray chamber will be hereinafter described in detail.

5 is the water controlling device or valve operated by the closet seat 6.

7 is the spring secured to the under side of the seat 90 for holding the seat in raised position out of operative contact with the valve and 8 is the bumper, also secured to the under side of the seat to form a cushion for the bowl when the seat is forced down.

9 is the flush tank shown in Fig. 1 arranged as is 95 common in closets of the low down type.

10 is the flush pipe leading from the flush tank to the bowl; 11 is a fitting secured to the vent pipe 4, connected by pipe 26 with the spray chamber 1; 12 is the local vent connection of the closet bowl 2. To this 100 local vent connection, the intake end of the spray chamber is connected by ring 13, screw threaded on the end of the spray chamber and corrugated on the interior of the portion fitting over the local vent 12, to which it is cemented by plaster of paris 14. The end 105 of the spray chamber on which the ring 13 fits has its center below the vertical center of the spray chamber, so that the lowest point of opening in it is on a line with the bottom of the spray chamber and thus water discharged into the spray chamber will flow freely into 110

the local vent and be discharged into the bowl. In different constructions of closet bowls the local vent differs somewhat in size and shape and it will therefore be necessary to provide rings differing somewhat in the shape and size of the portion which fits over the local vent, but the screw connection should be made standard, so that no change in the spray chamber need be made to fit different bowls.

The spray chamber 1 comprises an enlarged section shown at 42 into which leads an inlet conduit 43, the area of which is considerably less than the area of the enlarged section 42. The walls of the inlet conduit merge into the walls of the enlarged section, the two being formed in one piece, by way of a substantially vertical connecting wall; and through this connecting wall passes the devices hereinafter disclosed for discharging a jet of water in the form of spray longitudinally of the spray chamber as shown in Fig. 3. It will be seen that this construction results in a spray chamber in which the inlet for the gases is unobstructed by the nozzle through which the water is discharged thereinto, and that the passage through which the gases pass is at no point of lesser area than the area of the inlet opening.

In constructions in which a bowl not having a local vent is used, the intake end of the spray chamber may be connected directly to the flush pipe by means of the connection shown in Figs. 6 and 7. In this arrangement a special fitting 15 is used having a flap valve 16 so arranged that it will be closed by the water when the flushing is going on so as to prevent water from entering the discharge end of the spray chamber. In this arrangement, it will be understood that the ventilating device draws the foul odors or gases from the bowl through the same openings through which the flush water enters and, of course, while the flushing is going on the ventilating device cannot operate to draw off the gases. This is not of importance, however, as the gases will have been removed before the flushing takes place. This modification will be used in case the ventilating device is to be attached to bowls already installed which are not provided with local vents. Where new work is to be installed, it will be preferable to use bowls having local vents and to connect the ventilating device with the local vent as shown in Figs. 1 and 2.

The water controlling valve 5 is connected by pipe 17 with the water supply pipe and is connected by pipe 19 with the spud 21 on top of the spray chamber the pipes 17 and 19 forming a supply conduit through which water is supplied to the spray chamber 1. The pipe 19 serves to support the valve in position to have its projecting stem 18 pressed downward to open the valve by the depression of the seat 6. The valve 5 is of any usual construction having the valve below its valve seat so that it will be normally held closed by the water pressure. The stem 18 is surrounded with a stuffing box of usual construction to prevent leakage.

The wall of the spray chamber 1 that connects the inlet 43 with the enlarged section 42 is provided with an offset or shoulder 40 in which is formed a water chamber 41 and said offset is provided with a spud 21 to which, when the spud projects upward as shown in Fig. 3, is screwed an elbow 20 to which the pipe 19 is connected. If desired, the spud may project hori-

zontally as shown at 211 in Fig. 4 from a modified form of offset or shoulder 401 having a water chamber 411, in which case the pipe 19 may be connected directly with said spud without necessitating the use of the elbow 20.

Through the water chamber 41 extends the spraying plug 22, the plug being preferably tapered as shown and arranged to screw into a correspondingly tapered opening in the walls of the water chamber. The plug may be arranged to project into the spray chamber in a direction longitudinal of the spray chamber at a slight inclination to the axis of the chamber as shown in Fig. 3, or the arrangement may be slightly modified and have the form illustrated in Fig. 4. In either case, the discharge orifice or nozzle 23 of the spraying plug is so arranged as to throw the spray longitudinally of and towards the discharge end of the spray chamber, and to distribute the spray in such manner as to completely fill the discharge end of the chamber with spray.

The bottom line of the spray chamber is inclined toward the intake end and the spray chamber is provided in the portion into which the spray is discharged with a return passage 24 for water formed by a horizontal diaphragm near the bottom. The spray chamber is also preferably provided near the discharge end with a series of inclined plates or deflectors 25 for collecting the water of the spray. These plates are for the purpose of separating the water from the gases. They are arranged in a position slightly inclined from the horizontal and sloping slightly toward the discharge end of the spray chamber, so that water collected by them will readily run off. The arrangement of the plates disclosed produces an effective separating device and one that offers minimum obstruction to the gases as they flow through the spray chamber.

26 is an elbow leading from the opening in the top of the discharge end of the spray chamber, to which the piping leading to the vent pipe is connected.

The spring 7 shown in detail in Figs. 8, 8^a and 8^b, is secured to the under side of the seat by screws 27, passing through coils 7', formed at the ends of the springs. The spring is of a single piece of wire coiled at 7² to form springs, the portion between the coils 7² being bent to form a bail 7³ adapted to bear against the upper edge of the bowls.

The bumper 8 shown in detail in Figs. 9, 9^a, and 9^b, consists of a plate attached to the under side of the seat having a central opening in which a suitably shaped piece of rubber is firmly held.

Figs. 10 to 14 inclusive show modified forms of plug and nozzle for discharging water into the spray chamber. In Fig. 10 the spraying plug 221 is shown as provided with two passages 30, and said plug is provided with a nipple 32 upon which is a cap 31 having a central tapered discharge orifice, in which orifice a deflecting spindle 33 is located. This spindle may be removable as shown at 331 Fig. 10^a. The spindle in either case is of such diameter relative to the discharge orifice in the cap 31 that an annular space is provided for the discharge of the water and the form of the spindle and orifice is such that the stream of water discharged is of conical form.

In the form shown in Fig. 11, the plug 222 is pro-

vided with a single passage 301, and the cap 311 is provided with a series of orifices 321 so arranged that the streams issuing therefrom will impinge at a central point; or, the holes may be divergent so as to spread the streams as indicated in Fig. 11^a.

In the form shown in Fig. 12, the spraying plug 223 is provided with a passage 302, into the threaded outer end of which is screwed the nozzle 312, which nozzle has a divergent recess as shown, with which communicate one or a plurality of passages through which the water passes, as indicated in Figs. 12 and 12^a respectively.

In the construction shown in Figs. 3 and 13, the discharge nozzle or orifice 23 is shown as formed in a piece removable from the spraying plug, and is constricted midway of its length.

In the form shown in Figs. 4 and 14 the plug 224 is shown as provided with a removable tip 313 having a laterally opening orifice communicating with the water supply passage 303 within the spraying plug.

Figs. 15, 16 and 17 show a sectional view of the apparatus applied to a battery of urinals in a modified form without the return passage for the water, and in which the water discharges through the pipe 35 into the flushing tank 36 used to flush the urinals intermittently.

22 is the spray plug; 19 is the water connection having a water supply pipe leading thereto.

37 is the main suction pipe leading out to the different urinals which can be made of any regular piping or tubing with fittings for the connection of the various individual intake pipes 38. On the lower end of each intake pipe, 38, a suitably shaped hood is attached directly over the urinal bowls to better facilitate the collecting of the odors. These hoods 39 will necessarily be made in different forms and shapes to fit the different styles and shapes of urinals. In some cases hoods are made a part of the urinal bowl in which case the pipes 38 will be attached directly thereto.

The operation of the ventilating device will be readily understood from the above description. Briefly stated, the operation is as follows: On the depression of the seat 6 by the weight of the person using the closet, the valve stem 18 will be forced downward against the pressure of the water opening the valve and permitting water to flow to the water chamber 41 from which it passes to the spraying plug 22 and is discharged through the nozzle 23 in the form of spray toward the discharge end of the spraying chamber creating an air current towards the vent pipe and drawing in air through the local vent from the interior of the bowl, the air so drawn in carrying with it any foul odors or gases present in the bowl. The spray condenses in the deflector plates 25 and the water drips downward and flows through the return passage 24 back to the bowl. When the seat is freed from pressure, it is immediately raised by the spring 7 relieving the valve stem 18 from pressure whereupon the valve is at once closed by the water pressure.

It will be noted that by the arrangement of the spraying plug in an offset or shoulder, an unobstructed passage for the entrance of the gases from the bowl is afforded. By so constructing the nozzle 23 that the spray is distributed over the entire cross sectional area of the chamber, a strong draft is created with the use of

very little water. I have found that in the use of my device, 5 cubic feet of air will be drawn in for each gallon of water.

The spraying plug being distinct from the water controlling valve and being so arranged as to be readily accessible without disturbing the connections of the spraying chamber, may be readily withdrawn for cleaning or repair.

It will, of course, be understood that I do not desire to be limited to the precise form or arrangement of parts shown in the drawings as it will be obvious that both form and arrangement may be varied without departing from the spirit of the invention.

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

1. The combination in a ventilating apparatus, of a spray chamber having an offset or shoulder formed in its walls with a water chamber formed therein and a tapered opening through the walls of the water chamber, and a tapered spraying plug fitting said opening, extending through the water chamber, having openings communicating with the water chamber and having its discharge end within the spray chamber.

2. The combination in a ventilating device, of a spray chamber; a water chamber formed therein; an opening extending through the wall of said spray chamber and intersecting said water chamber; a spraying plug located in said opening; and a passage communicating with said water chamber and extending through said plug and terminating in a nozzle, the arrangement of the parts being such that said nozzle will discharge a jet of water in the form of spray longitudinally of said chamber.

3. The combination in a ventilating device, of a spray chamber; a water chamber formed therein; an opening extending through the wall of said spray chamber and intersecting said water chamber, the axis of said opening extending in a direction longitudinal of said spray chamber; a spraying plug located in said opening; and a passage communicating with said water chamber and extending through said plug and terminating in a nozzle, whereby said nozzle will discharge a jet of water in the form of spray longitudinally of said chamber.

4. The combination in a ventilating device, of a spray chamber; gas inlet and outlet passages therefor; means for discharging a jet of water in the form of spray longitudinally of said chamber; and a plurality of plates located in said chamber and extending longitudinally thereof and past which the mingled spray and gases flow, whereby minimum obstruction is encountered by the gases as they flow through the spray chamber.

5. The combination in a ventilating device, of a spray chamber; gas inlet and outlet passages therefor; means for discharging a jet of water in the form of spray longitudinally of said chamber; and a plurality of plates located in said chamber and past which the mingled spray and gases flow, said plates extending longitudinally of said chamber and being inclined slightly from the horizontal, whereby minimum obstruction is encountered by the gases as they flow through the spray chamber.

6. The combination in a ventilating device, of a spray chamber; gas inlet and outlet passages therefor; means for discharging a jet of water in the form of spray longitudinally in said chamber; and a plurality of plates located in said chamber and past which the mingled spray and gases flow, said plates extending longitudinally of said chamber and sloping slightly toward the outlet passage, whereby minimum obstruction is encountered by the gases as they flow through the spray chamber.

7. The combination in a ventilating device, of a spray chamber comprising an enlarged section; an inlet conduit formed integrally with and of lesser area than said enlarged section and merging therewith; and a nozzle located in the portion of the wall of said spray chamber that connects said inlet conduit and enlarged section and adapted to discharge a jet of water in the form of spray longitudinally of said enlarged section.

8. The combination in a ventilating device, of a spray chamber comprising an enlarged section; an inlet conduit formed integrally with and of lesser area than said enlarged section and merging therewith; and a nozzle located in the portion of the wall of said spray chamber that connects said inlet conduit and enlarged section and adapted to discharge a jet of water in the form of spray longitudinally of said enlarged section, the axes of said inlet conduit and enlarged section being parallel and the lower portions of the walls thereof being upon the same level.

9. The combination in a ventilating device, of a spray chamber; gas inlet and outlet passages therefor; means for discharging a jet of water in the form of spray longitudinally of said chamber; a plurality of plates located in said chamber and extending longitudinally thereof and past which the mingled spray and gases flow; a coupling member for connecting said inlet passage with a closet bowl; a conduit for supplying water to said spray chamber; and a valve controlled by the closet seat for controlling the flow of water through said supply conduit.

10. The combination in a ventilating device, of a spray chamber; gas inlet and outlet passages therefor; means for discharging a jet of water in the form of spray longitudinally of said chamber; a plurality of plates located in said chamber and past which the mingled spray and gases

flow, said plates extending longitudinally of said chamber and sloping slightly toward the outlet passage; a coupling member for connecting said inlet passage with a closet bowl; a conduit for supplying water to said spray chamber; and a valve controlled by the closet seat for controlling the flow of water through said supply conduit.

11. The combination in a ventilating device, of a spray chamber comprising an enlarged section; an inlet conduit formed integrally with and of lesser area than said enlarged section and merging therewith; a nozzle located in the portion of the wall of said spray chamber that connects said inlet conduit and enlarged section and adapted to discharge a jet of water in the form of spray longitudinally of said enlarged section; a coupling member for connecting said inlet conduit with a closet bowl; a water supply conduit for said nozzle; a valve controlled by the closet seat for controlling the flow of water through said supply conduit; and a discharge conduit leading from said spray chamber.

In testimony whereof I affix my signature, in presence of two witnesses.

DAVID L. ELLIS.

Two witnesses:
E. W. Cady,
A. P. Greeley.