No. 715,284. Patented Dec. 9, 1902.

J. W. NEWMAN.

EXHAUST WATER TRAP.

(Application filed May 6, 1901.)

(No Model.) 4 Sheets—Sheet 1.

FIG. 1

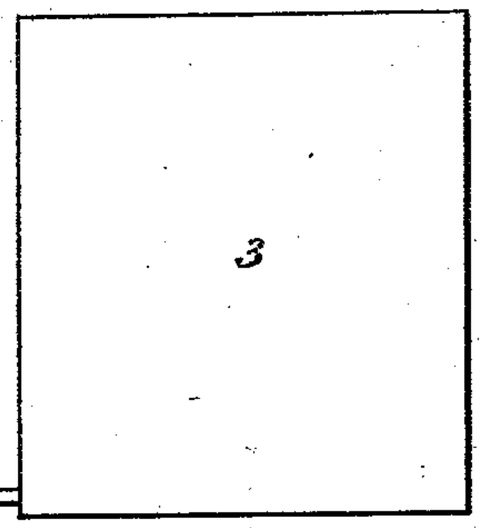

FIG. 6

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4 Sheets—Sheet 2.

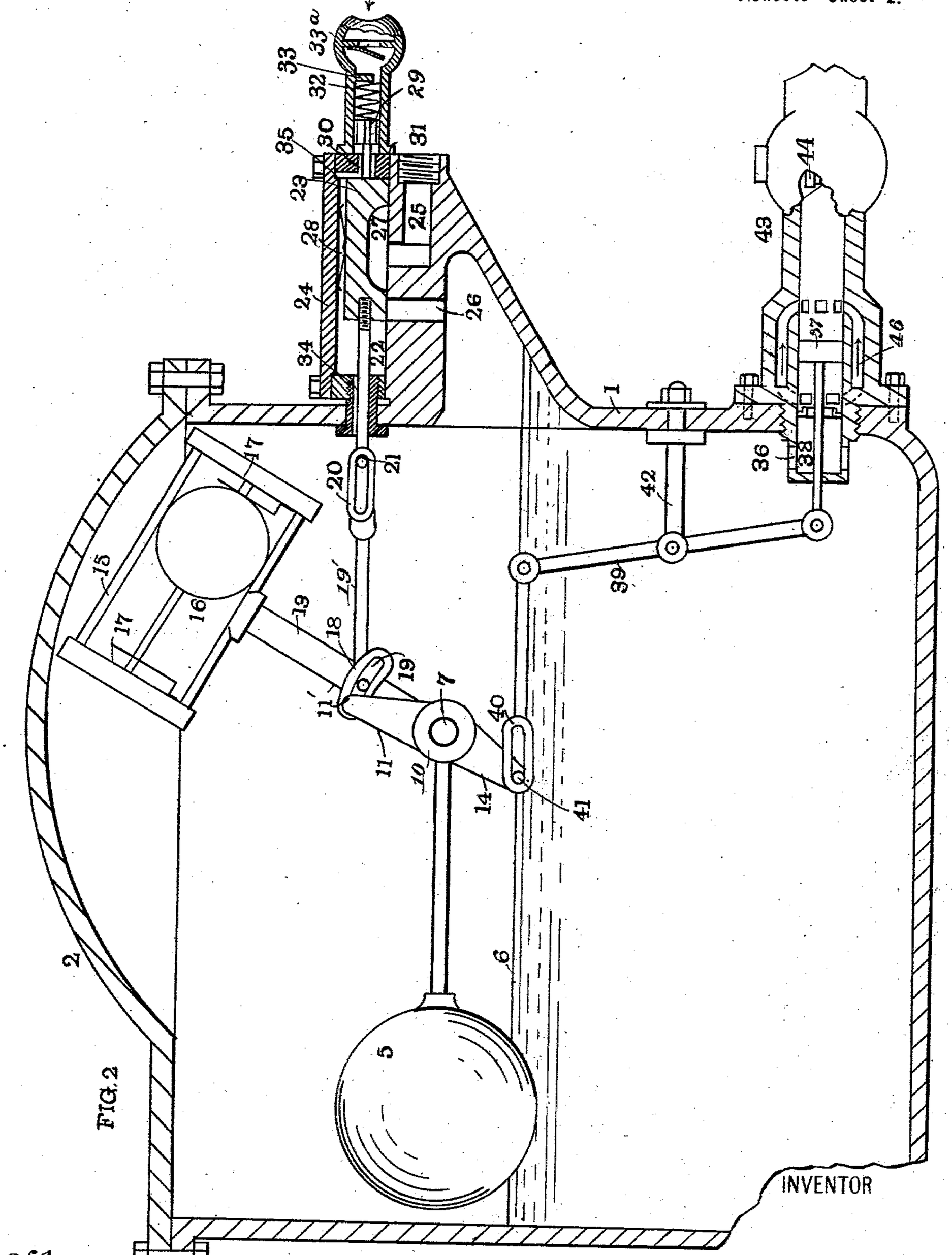

FIG. 2

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FIG. 5

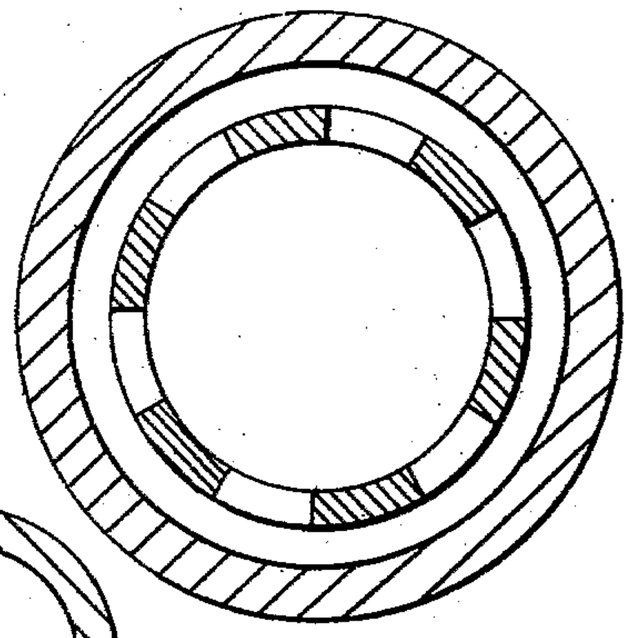
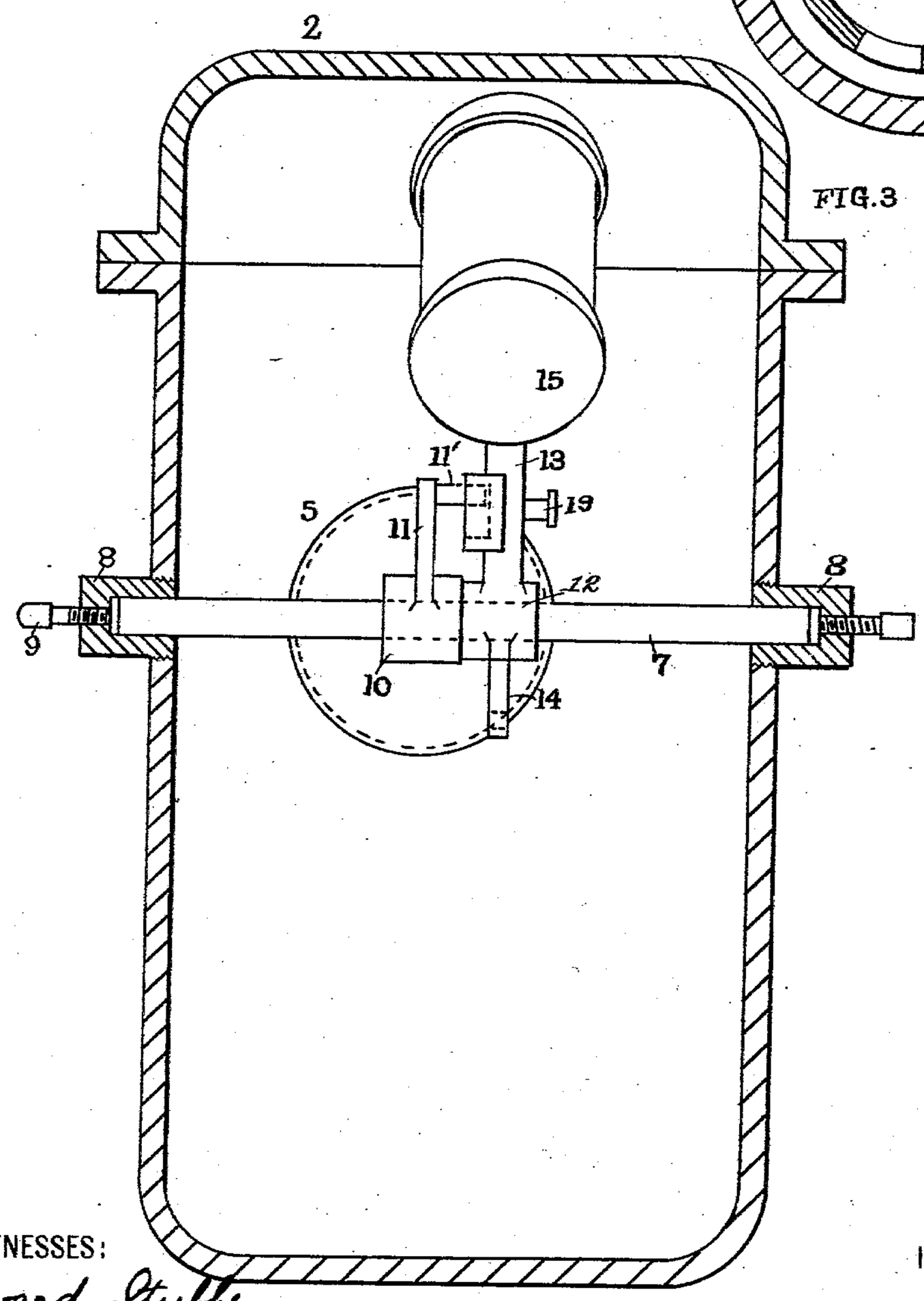


FIG. 3



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4 Sheets—Sheet 4.

FIG. 4.

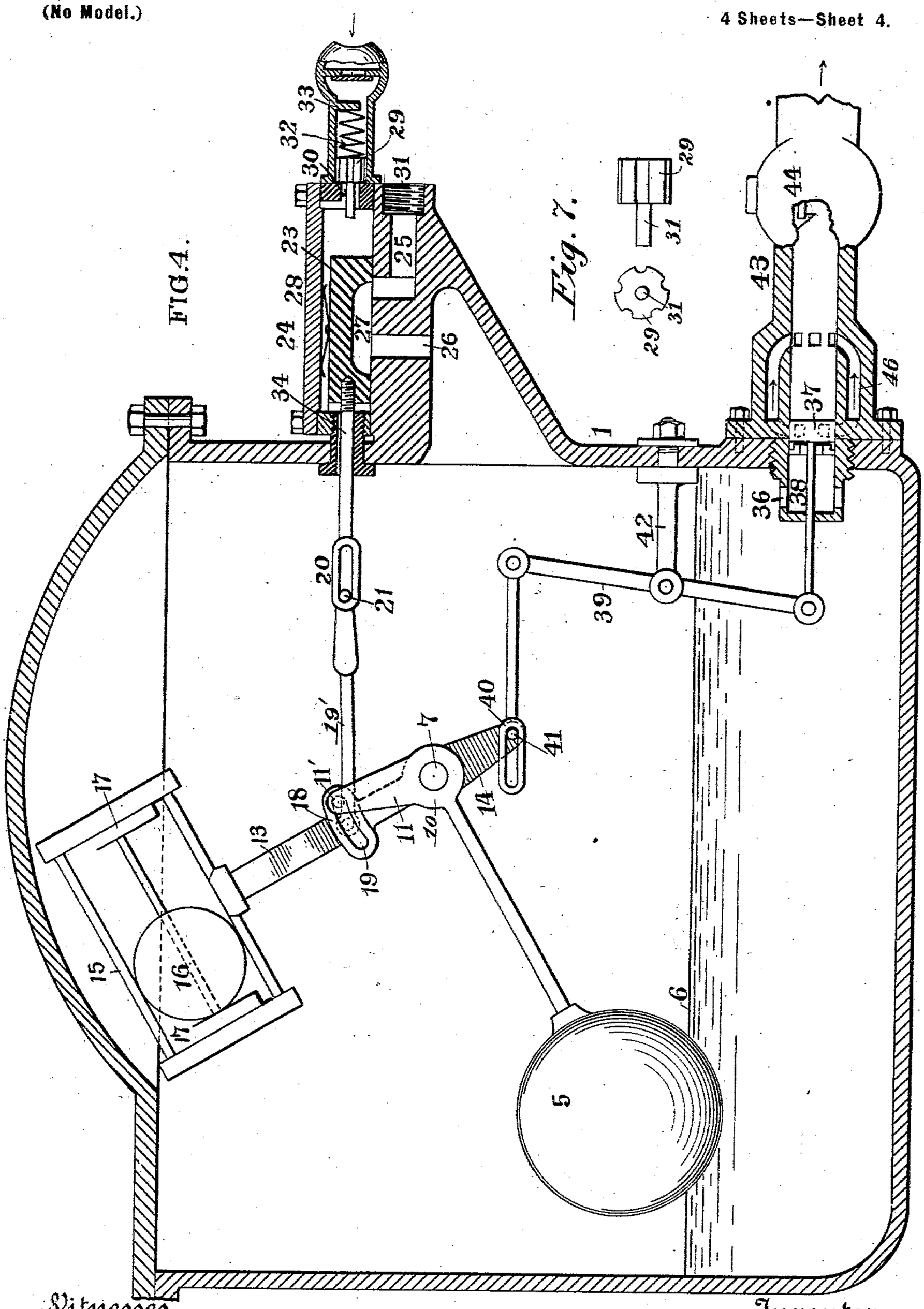

Fig. 7.

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Inventor
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By his Attorney
Edward P. Thompson

UNITED STATES PATENT OFFICE.

JOHN W. NEWMAN, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE NEWMAN MANUFACTURING COMPANY, OF ELIZABETH, NEW JERSEY, A CORPORATION OF NEW JERSEY.

EXHAUST-WATER TRAP.

SPECIFICATION forming part of Letters Patent No. 715,284, dated December 9, 1902.

Application filed May 6, 1901. Serial No. 58,952. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. NEWMAN, a citizen of the United States of America, and a resident of Elizabeth, New Jersey, (post-office address, Murray-street Power-House, Elizabeth, New Jersey,) have invented certain new and useful Improvements in Exhaust-Water Traps, of which the following is a specification.

My invention relates to automatic apparatus adapted to exhaust liquid from a separator, vacuum-pan, or from any reservoir containing liquid, whether the pressure in said reservoir is the same as or is below or above atmospheric pressure.

The object of my invention is to provide a simple mechanism as perfect in its functions as possible, automatic in action, having a capacity to exhaust water rapidly without perceptibly damaging the vacuum or pressure in the receptacle from which the water is drawn and in conjunction with which the apparatus is used. The organization includes a closed vessel located in the path of an outlet from the separator or other reservoir from which water or other liquid is to be taken and inlet and outlet ports therefor provided with suitable valves, the action of which is automatically controlled by means of a float, the position of which is determined by the quantity of water within the separator, which float actuates other mechanism hereinafter described, all working to the desired end—to wit, to permit the water in the reservoir to be drawn off and discharged automatically without breaking or substantially disturbing the vacuum or pressure within said reservoir.

In the drawings, Figure 1 is a plan view. Fig. 2 is a section, partly in elevation, showing the working parts in one position. Fig. 3 is a cross-section of the separator, some of the internal parts being shown in elevation and perspective. Fig. 4 is a view similar to Fig. 2, the parts being shown in different position. Fig. 5 is a cross-section, relatively enlarged, of one form of an outlet-passage. Fig. 6 is a conventional view of an exhaust-water trap connected up with the reservoir from which the water is to be drawn off, the said view being taken on a substantially reduced scale and showing only the exterior outline. Fig. 7 is illustrative of a detail of construction.

1 is a closed vessel. 2 is a cover which may be provided therefor.

3 is a separator.

4 is a pipe leading from the separator to a port 25 in the vessel 1.

5 is a float adapted to rest upon the water 6, that may be contained within the vessel 1.

7 is a shaft which may be pivotally supported in suitable bearings 8 in the vessel 1 and which may be adjusted, if desired, by means of suitable screws 9. The float 5 is connected by a stem to a boss 10, which bears loosely upon the shaft 7.

11 is a lever-arm projecting from the boss 10.

11′ is a pin projecting from the lever-arm 11. Upon the shaft 7 is fixedly secured another boss or hub 12, from which hub project two arms 13 and 14. Upon the arm 11 is a suitable holder 15, carrying a ball 16, the dimensions of which relatively to the holder permit the ball to move longitudinally thereof from end to end.

17 17 are suitable cushions or buffer-springs preferably provided to reduce any excessive jar or impact of the ball 16 against the ends of the holder 15. In the arm 13 there is formed a suitable slot or link, and into this slot or link 18 projects the pin 11′. By this means, although the arms 11 and 13 rotate on a common axis, these arms may partake of an independent swinging movement equal to the length of the slot in the link on the arm 13.

19 is a pin carried by the arm 13, and 19′ is an arm projecting from said pin to a link 20. The arm 19′ is connected to the link 20 by the pin 21.

22 is a valve-rod projecting from the link 20 to a valve 23. In the particular form shown this valve reciprocates in a suitable valve-chest 24, located above the port 25. In the under side of the valve 23 is a recess or elongated cavity 27. When the parts are in the position shown in Fig. 4, this cavity 27 overstands the inlet-port 25 and a second port 26, which communicates with the interior of the vessel 1. In this position liquid flowing into the port 25 is free to pass through the cavity

27 and port 26 into the vessel 1. When the valve is shifted into the position shown in Fig. 2, a portion of the valve 23 covers one of the ports—for example, 26—and closes this passage. The operation of the device will be hereinafter described. A suitable spring 28 may be provided of sufficient strength to hold the valve 23 properly to its seat.

29 is a valve, preferably of the puppet type, in the outer end of the valve-chest 24, and 32 is a spring which may be provided to cause the said puppet-valve to remain closed. A detail of this valve is shown in Fig. 7, in which the right-hand view is a side elevation and shows that the valve itself is of sufficient length to take a proper sliding bearing in its casing and is provided with grooves in the side to allow air to pass when said valve is opened for the purpose hereinafter described.

31 is a stem projecting from the valve 29 into the path of movement of the valve 23, so that when said valve 23 is in the position indicated in Fig. 2 it will unseat the valve 29. When the valve 23 is in the position shown in Fig. 4, the spring will cause the valve 29 to close the passage 30 around the stem 31. A check-valve is provided at 33ª, which permits the entrance of air, but will not permit the outflow of air.

34 is a slot or groove in the bushing around the valve-stem 22 and connecting the interior of the valve-chest 24 with the interior of the vessel 1.

In the lower part of the vessel 1 is an outlet-port 36, provided with a suitable valve 37. In the particular construction shown this valve is of the piston type and is provided with a rod 38, pivoted to a rocking lever 39, in turn mounted on a support 42. The lever 39 is pivoted to a rod having a link 40, and 41 is a pin carried by the arm 14. The casing within which the valve 37 moves is provided with cored-out passages 46, so that when the valve is in the position shown in Fig. 2 the water may flow freely through the outlet 38 and passages 46, around the valve 37, and out through a pipe 43, in which a suitable check-valve may be located at 44, which check-valve permits the outflow of the contents of the vessel 1, but will prevent the influx of any fluid, liquid, or air.

The operation of the apparatus is as follows, referring particularly to Figs. 2 and 4. In Fig. 4 liquid from the separator may be assumed to be flowing into the vessel 1 through the port 25, cavity 27, and port 26. In this position the valve 37 is closed, as is also the valve 29. Consequently whether there is a pressure or a vacuum in the reservoir from which the liquid is flowing the said pressure or vacuum will not be disturbed. In this position there is an equilibrium in the pressure in the said reservoir and the interior of the vessel 1. Consequently the water may flow into said vessel. As the vessel gradually fills up the float 5 is lifted. This lifting movement of the float 5 swings the arm 13 to the upright position and the pins 21 and 41 move in the links 20 and 40, but do not disturb the valves 23 or 37. When the float has been lifted to a point where the arm 13 is just past the vertical, the weight 16 falls to the right, and by its impact against the right-hand end of the holder 15 as viewed in Fig. 4 it swings the arms 13 and 14 still farther and quickly moves the valves 23 and 37 into the position shown in Fig. 2, in which the valve 23 closes the admission-passage by closing the port 26, while the valve 37 opens the outlet, whereupon the water flows out of the vessel 1 through pipe 43 and past check-valve 44. When applied to a vacuum, it is manifest that some means must be provided to break the vacuum within the vessel 1 in order that the liquid may freely flow out. This is accomplished by the valve 23 hitting against the valve 29, opening the same and allowing air to pass into the vessel through the check-valve at 33ª and the passage in the valve-chest at the right-hand end thereof and the groove 34. As the float descends the arms 13 14 are rocked until they are swung to the upright position and past the same. This movement does not disturb the position of the valves 23 37; but after the vertical position is reached the weight 16 rolls to the left and by impact against the left-hand end of the holder 15 as viewed in Fig. 2 rocks the arms 13 and 14 still more and quickly shifts the valves 23 and 37 to the position shown in Fig. 4, whereupon the outlet is closed and the inlet opened. This action is kept up intermittently and automatically.

Manifestly the particular construction of the valves is not material. These elements and others may be modified in a variety of ways without departing from the spirit and scope of my invention.

I claim as my invention—

1. In an exhaust-water trap, the combination of a closed vessel, a float within the same, a device controlled by the rising and falling thereof jointly with gravity also inclosed within the same, inlet and outlet ports and valves therefor provided in said closed vessel said valves being connected up with said device by intermediate mechanism also within said vessel and means for automatically admitting air to said vessel during the period of exhausting liquid therefrom.

2. The combination of a float, an unstable-equilibrium device controlled by the rising and falling thereof jointly with gravity, a closed vessel having inlet and exhaust valves which are connected up with said device with intermediate mechanism, and a vent-valve controlled by said inlet-valve.

3. The combination of a reservoir having an outlet-pipe 4, belonging to a separator, vacuum-pan, or the like, a valve-chest having a valve 23, a closed vessel 1 having a port leading to said outlet-pipe 4 and governed by a valve in said valve-chest, an exhaust valve and port for said vessel 1 below the first-named valve and port, a vent for the vessel

1 provided with a valve which is governed by the valve 23, and means controlled by the rising and falling of the water in the vessel 1 for opening and closing the aforesaid valves.

4. The combination of an outlet-pipe 4 belonging to a separator, vacuum-pan or the like, a closed vessel 1, having an inlet-valve with its port communicating with said outlet, and having an exhaust-valve with its port below the first-named valve, and means controlled by the rising and falling of water in said vessel, for alternately opening and closing said inlet-valve and simultaneously alternately closing and opening said exhaust-valve, and a vent-valve so located that the air entering through the same presses the first-named valve upon its seat.

5. The combination of an outlet-pipe of a separator, vacuum-pan or the like, a closed vessel 1, having a port communicating with said outlet, a slide-valve for opening and closing said port, a valve-chest containing said valve, and communicating with said vessel through a second port 34, an air-vent for the valve-chest having a valve with a projection or pin in the path of said slide-valve, which has a rod 22 entering said vessel, a link 20 carried by said rod, a box containing a movable weight connected rigidly to a shaft 7 at a distance therefrom and on the upper side thereof and adapted to fall to either side of its central vertical position, a link 18 on the arm 13 which connects said box to said shaft, a rod pivoted to the arm 13 and carrying a pin engaging with the link 20, an arm 14 forming an extension to the rod 13, an exhaust-valve for the vessel 1 controlled by the movements of the rod 14 through intermediate mechanism, a boss loose on the shaft 7 and having arms, one of which is terminated by a float and the other carrying a pin which engages with the slot 18.

6. The combination of a float, an unstable-equilibrium device controlled thereby, a closed vessel having admission and exhaust valves and means connected with said unstable-equilibrium device and with said valves for automatically opening and closing the same, and means for allowing a limited amount of free independent movement of said unstable-equilibrium device relatively to each of said valves, said vessel inclosing all of said parts.

7. In a device of the character described, a closed vessel having inlet and outlet passages, valves therefor, a float within said vessel and a supplemental operating device for moving said valves, said supplemental operating device being controlled by said float, said vessel inclosing all of said parts.

8. In an apparatus of the character described for removing liquids from reservoirs wherein the pressure is the same as or greater or less than the normal atmospheric pressure, a vessel, an inlet-passage and a separate outlet, a valve controlling the outlet-passage, a float within said vessel and controllable by the level of the liquid therein, an arm extending from said float and a pivotal connection therefor, a supplemental controlling device mounted concentrically with the pivotal connection for said float-arm, a connection between said float-arm and said supplemental controlling device said parts having limited independent movement connections between the supplemental controlling device and each of said valves, and means to permit said supplemental controlling device to have limited independent movement relatively to the movement of said valves, said vessel inclosing all of said parts.

9. In an apparatus of the character described for removing liquid from reservoirs in which the pressure is the same as or is less or more than normal atmospheric pressure, a closed vessel, an inlet-passage for affording communication with said reservoir, a separate outlet-passage, a valve for controlling each of said passages, a float within said vessel, a supplemental valve-controlling device in turn controlled by said float, and an air-vent valve supplementing the aforesaid valves, and means for operating the same.

10. In an apparatus of the character described, a closed vessel, a passage in communication with the receptacle to be drained, a valve for controlling the same, a separate outlet-passage and a valve for controlling the same, and float-controlled mechanism for closing the valve in the passage leading to the reservoir and simultaneously opening the valve in the outlet-passage and vice versa, an air-inlet passage from the atmosphere into said vessel, a valve therein and means for controlling the same, and an outwardly-closing check-valve in said passage, and an inwardly-closing check-valve in said outlet-passage.

In testimony whereof I have hereunto subscribed my name this 13th day of April, 1901.

J. W. NEWMAN. [L. S.]

Witnesses:
CHAS. A. SEELEY,
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