

No. 858,401.

PATENTED JULY 2, 1907.

R. R. LAMB.

VALVE.

APPLICATION FILED DEC. 19, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

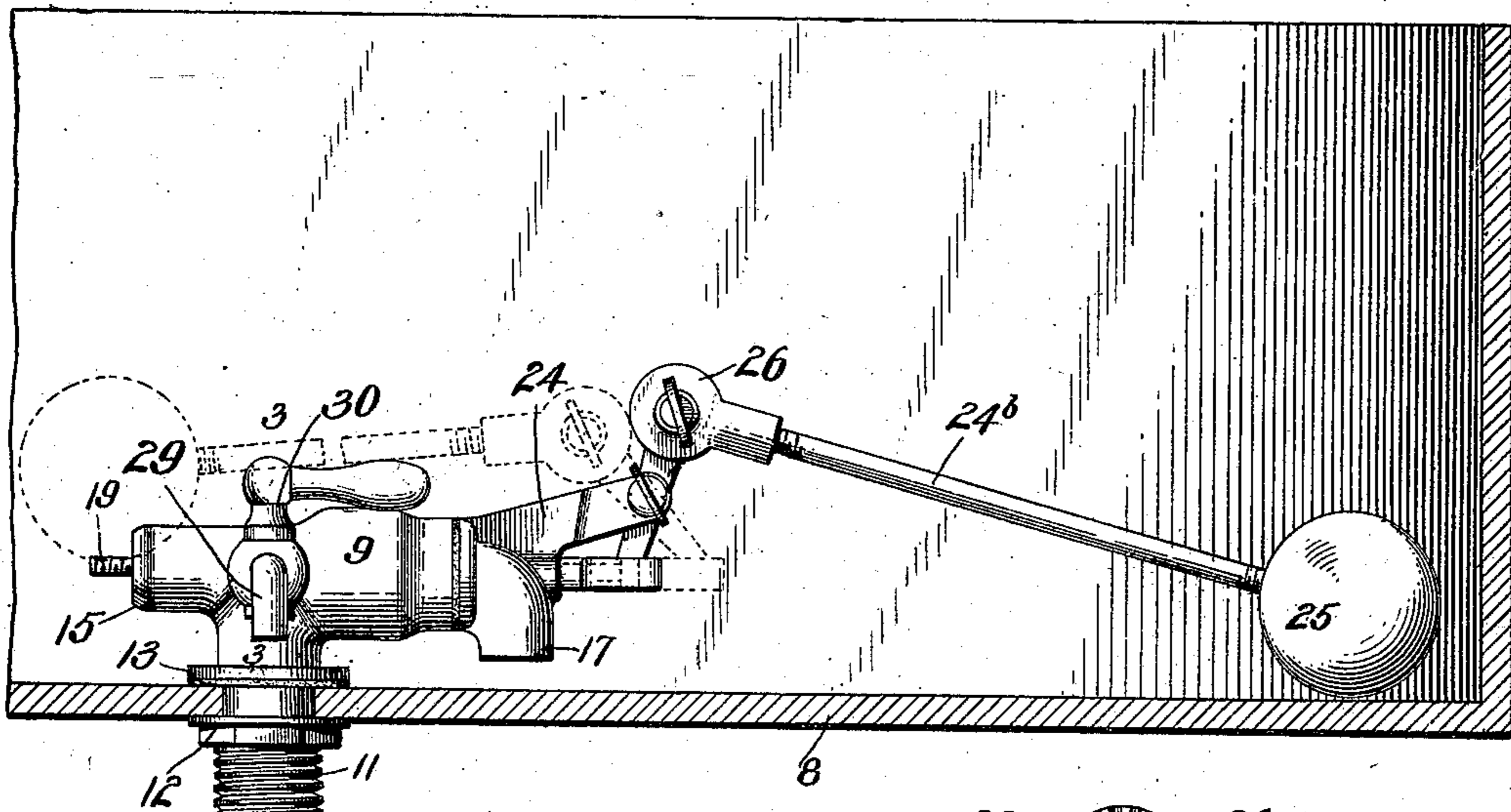


Fig. 2.

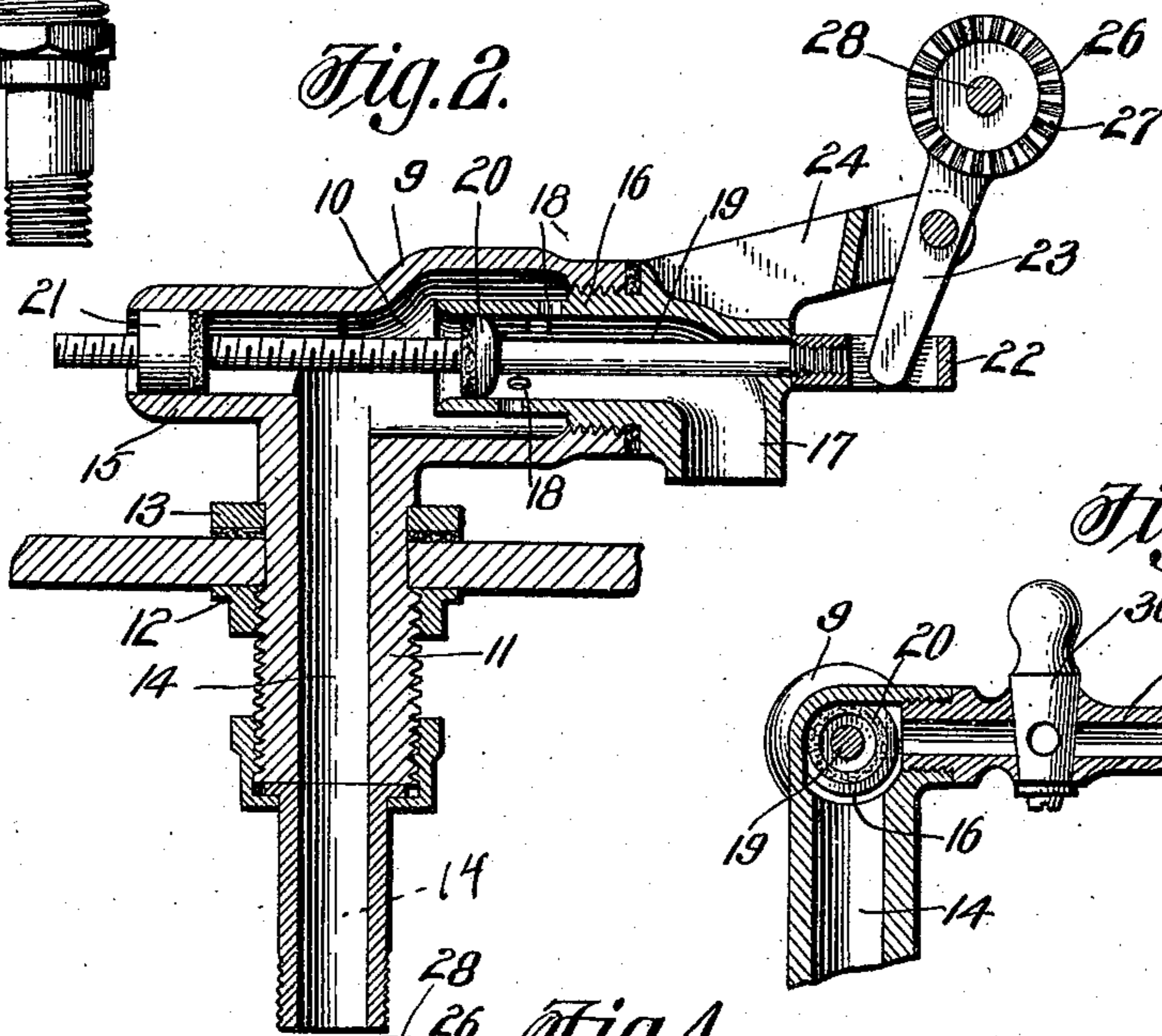


Fig. 3.

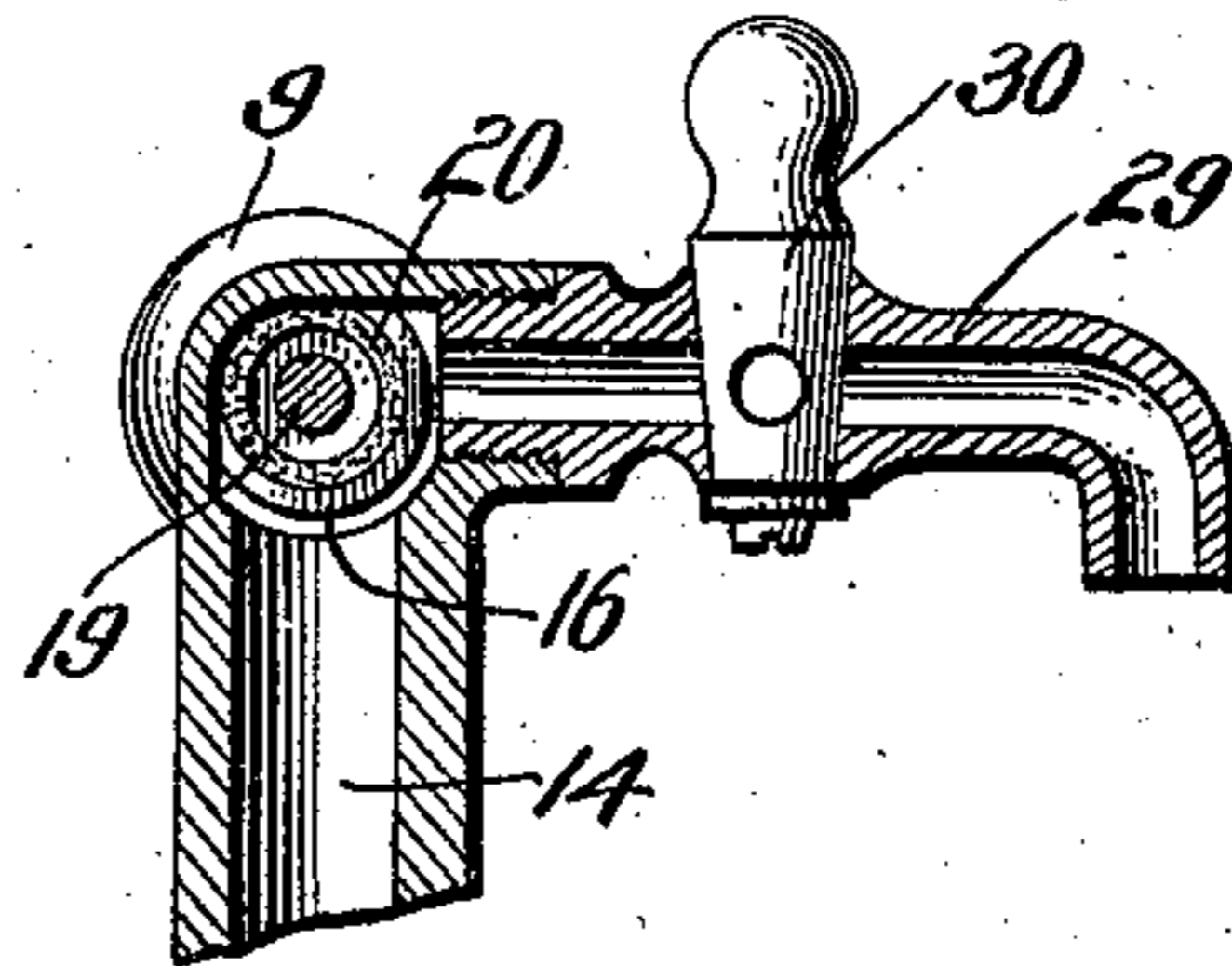
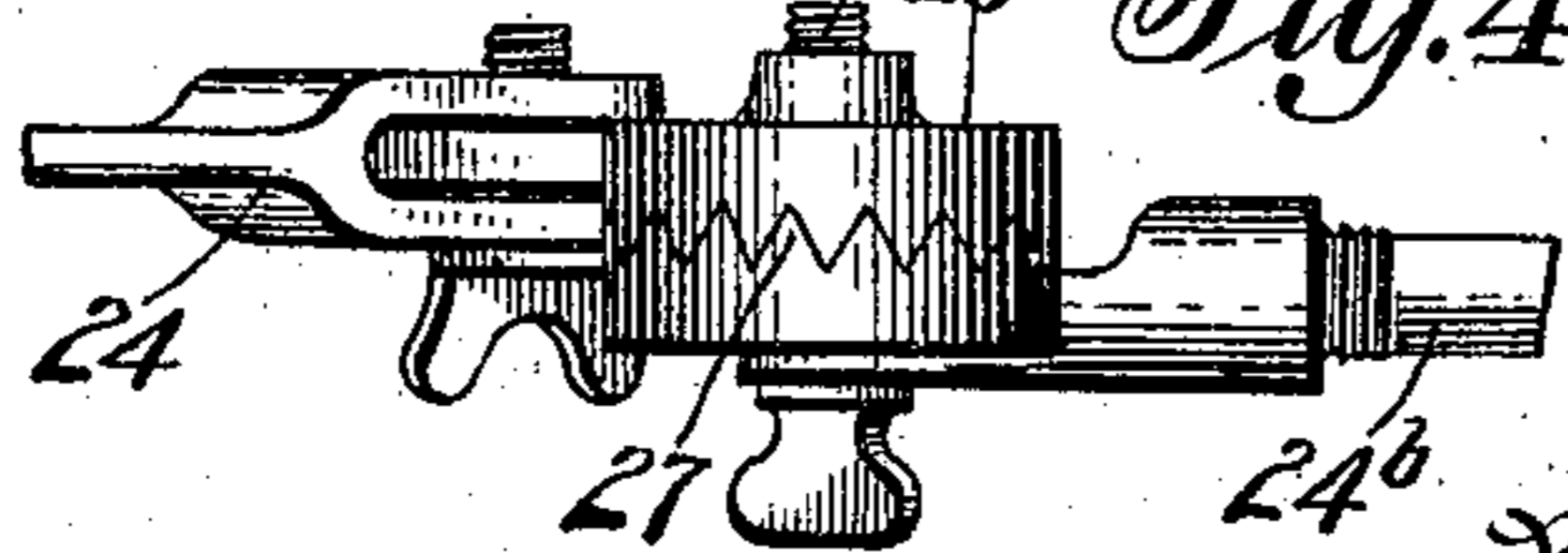


Fig. 4.



Ralph R. Lamb, Inventor

Witnesses

M. C. Lyddane.
B. H. Foster.

By

E. G. Siggers
Attorney

No. 858,401.

PATENTED JULY 2, 1907.

R. R. LAMB.
VALVE.

APPLICATION FILED DEC. 19, 1904.

2 SHEETS—SHEET 2.

Fig. 6.

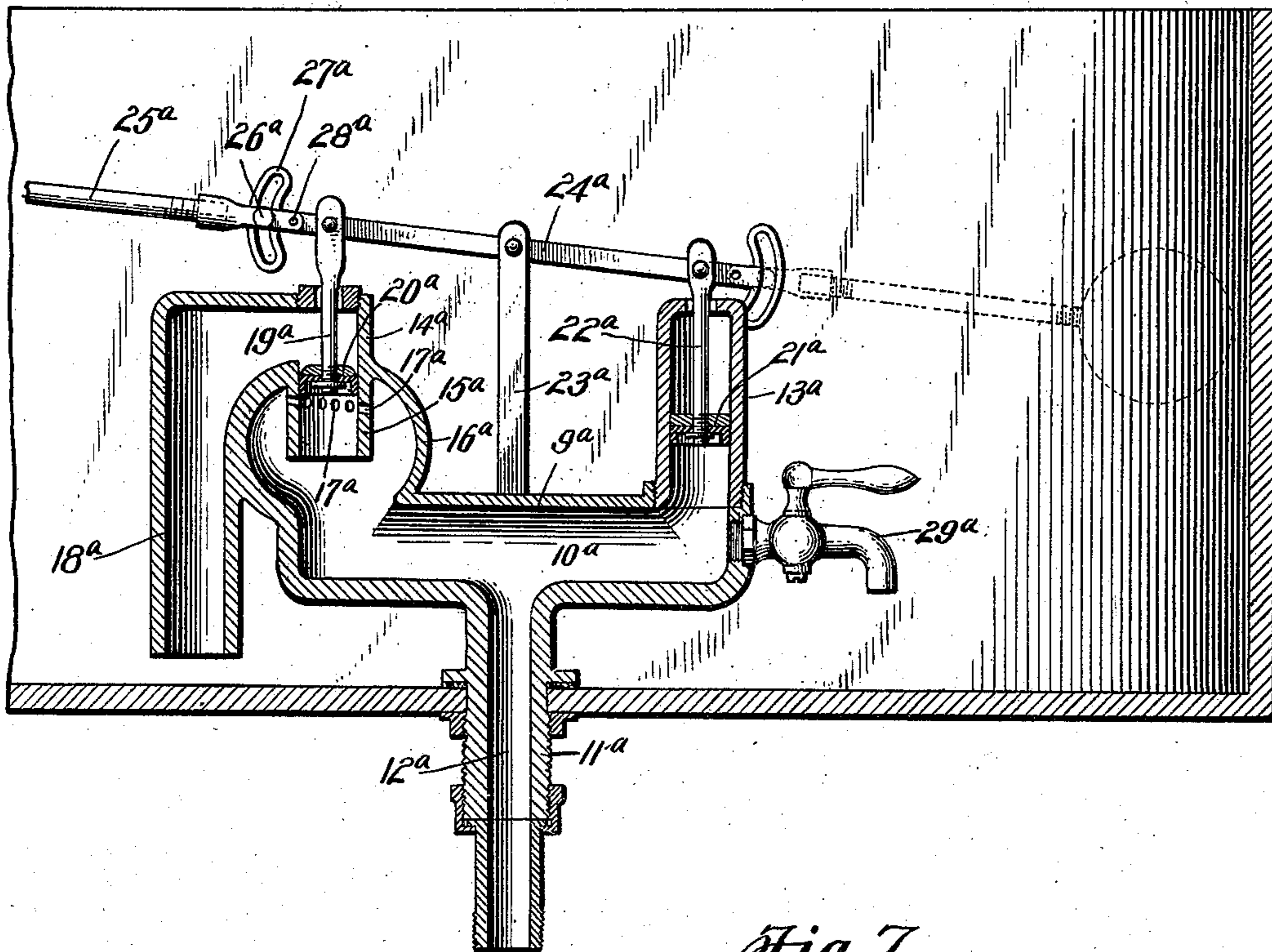


Fig. 7.

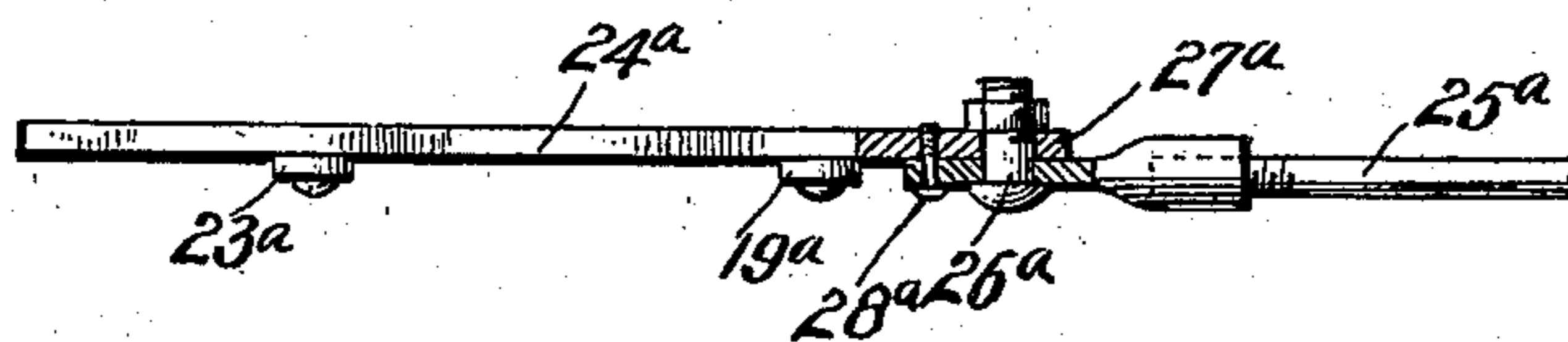
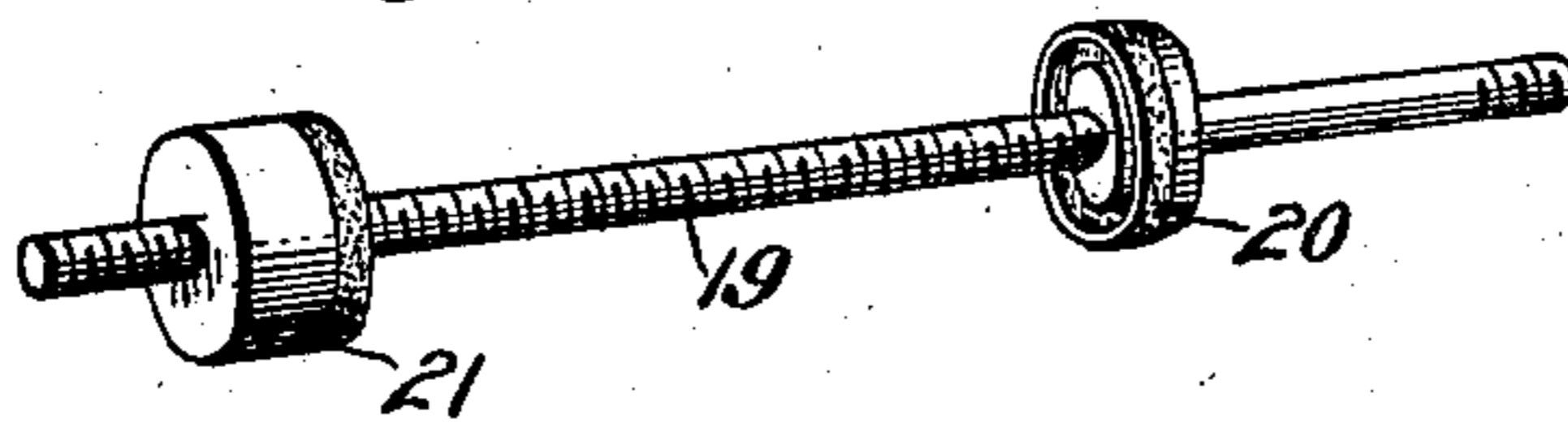


Fig. 5.



Ralph R. Lamb, Inventor

By

E. G. Siggers

Attorney

Witnesses

W. C. Lyddane

B. L. Foster

UNITED STATES PATENT OFFICE.

RALPH ROVER LAMB, OF CHICAGO, ILLINOIS.

VALVE.

No. 858,401.

Specification of Letters Patent.

Patented July 2, 1907.

Application filed December 19, 1904. Serial No. 237,553.

To all whom it may concern:

Be it known that I, RALPH ROVER LAMB, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Valve, of which the following is a specification.

This invention has particular relation to float-operated valves or ball-cocks for flushing apparatus, though perhaps useful for other analogous purposes.

One of the objects is to provide valve mechanism of a novel and simple nature that is balanced by the pressure of water, so that no great power is necessary to operate the same and such power can remain constant without regard to the degree of water pressure. Thus, the apparatus can be connected up with any water system without the necessity of adjusting the operating means to suit the different pressures.

Another object is to provide mechanism which can be readily employed either as a manually started or as an automatic periodically operated flushing apparatus.

Two embodiments of the invention are illustrated in the accompanying drawings, wherein:

Figure 1 is a sectional view through a tank, showing one of said embodiments in elevation. Fig. 2 is a sectional view on an enlarged scale through the mechanism. Fig. 3 is a cross sectional view taken on the line 3—3 of Fig. 1. Fig. 4 is a detail top plan view of the joint between the arms of the float lever. Fig. 5 is a detail perspective view of the valve stem with the valve and plunger thereon. Fig. 6 is a sectional view through the other embodiment of the invention. Fig. 7 is a top plan view partly in section, showing the joint between the sections of the arm.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

Referring first to the embodiment shown in the first five figures, the tank 8 illustrated may be of any well known form or construction and located within the same is a casing 9, having a chamber 10 therein, and provided with a depending nipple 11, extending through the bottom of the tank and suitably secured by a nut and washer 12 and 13. This nipple is provided with a water supply inlet conduit 14, to which may be attached the supply pipe from a water main. Forming a part of the casing 9, and preferably made integral therewith is a guide cylinder 15, the inner end of which is open and communicates with the chamber 10, the outer end being also open and communicating directly with the interior of the tank. Another guide cylinder 16 is located in the opposite end of the casing 9, being preferably threaded therein, and having its bore of equal diameter with the bore of the cylinder 15. The inner portion of the cylinder 16 projects into the chamber 10, and has its inner end communicating therewith, while its outer end is formed into a depending spout or nozzle 17, that opens downwardly into the

tank. The inwardly projecting portion of the cylinder 16 is spaced from the surrounding walls of the chamber, and formed in the side walls of said cylinder is a series of water ports 18, that are preferably, though not necessarily, disposed in spiral relation, as illustrated in Fig. 2.

Extending longitudinally through the casing and through the cylinders is a valve stem 19, that is longitudinally slidable and carries a plunger valve 20, located in the guide cylinder 16 and movable to positions on opposite sides of the opening or ports 18 when the stem is moved. Said plunger valve comprises a guide nut of equal diameter with the cylinder bore, and a cup abutted against the inner side thereof, and also of equal diameter with the bore, as shown. Secured to said stem 19 and located in the other cylinder 15 is a plunger 21, that is also in the form of a guide nut and cup, both engaging the cylinder walls, said plunger and plunger valve being of equal diameter. One end of the stem 19 projects through the head of the spout 17 and secured thereto is a yoke 22, in which is engaged the lower end of an arm 23, pivoted between its ends upon an ear 24, carried by the casing or spout head. The arm 23 constitutes, in effect, one section of a float lever, the other section being in the form of an arm 24^b, carrying at its free end a float or ball 25. These arms are pivotally connected at their adjacent ends, said ends being provided with heads 26, having circular series of interfitting teeth 27, which normally hold the sections or arms against relative pivotal movement, the heads being united by means of a pivot and holding bolt or screw 28. A separate outlet from the chamber within the casing is through a pet cock 29, having a turning plug 30, by means of which this outlet is controlled.

Assuming that the parts are in the relation shown in Fig. 1, and that there is no water in the tank, it will be evident that the float or ball 25, being depressed, will hold the valve and plunger in the position shown in Fig. 2. Therefore, water entering the casing through the inlet 14 can pass freely through the ports 18, and thus into the cylinder 16, from which it escapes through the spout 17 into the tank. As the level of the water in said tank rises, the float 25 will, of course, be elevated, and the ports 18 thus be successively cut off from the spout by the movement of the plunger valve 20 to positions between said ports and the spout. Consequently, the supply of water will be gradually cut off, without any hammering or quick action on the part of the valve. Moreover, it will be clear that the plunger and plunger valve being of equal diameter, the pressure of the water on the valve mechanism will be exactly balanced, and it will require merely the buoyancy of the float to close the same and the weight of said float to open the valve, no matter what the water pressure may be. This is an important feature of the invention, particularly when the simplicity of the structure is taken into considera-

tion. The mechanism as thus arranged is, of course, for use in connection with manually started flushing apparatus. In case it is desired to employ the mechanism for automatically flushing at stated periods, the arm 5 24^b of the float lever is released from the arm 23 by loosening the screw 28, and said arm 24^b is swung to an opposite position or to the position indicated in dotted lines in Fig. 1. It will therefore be clear that, when thus arranged, with the ball or float in its lowermost position, the supply of water will be cut off, and said supply is only admitted to the tank through the spout 17 when the float is elevated. The pet cock is thereupon opened to any suitable degree desired, in order to allow the continuous flow of water. With this arrangement 10 it will be apparent to those skilled in the art that, as the level of the water rises, due to the flow into the tank through the pet cock, the float will also be gradually raised, and, when the level of said water is high enough to begin the usual siphon action, the float is so arranged 15 that it will automatically open the main supply. Thereupon the siphon will be started and will not be broken until the water has been discharged from the tank and the valve 20 again moved to closed position. From this it will be seen that simple mechanism is provided 20 which can be employed either in connection with manually started or automatic periodic flushing apparatus.

The other embodiment, illustrated in Figs. 6 and 7, has substantially all the advantages hereinbefore set 30 forth. It comprises a casing 9^a, having a chamber 10^a, and a nipple 11^a, through which a fluid supply opening 12^a leads to said chamber. An upstanding guide cylinder 13^a, carried by the casing 9^a, has its inner end communicating with one end of the chamber, 35 while another guide cylinder 14^a communicates with the other end of the chamber and projects into the same, as shown at 15^a, the portion of said chamber surrounding the inwardly extending end of the cylinder 14^a being preferably enlarged, as shown at 16^a in 40 order that the walls thereof may be spaced from the walls 15^a. Said walls 15^a are provided with the usual spiral series of ports 17^a, constituting means of communication between the chamber 10^a and the interior of the cylinder, said cylinder having its outer end com- 45 municating with the downturned discharge spout 18^a.

A valve stem 19^a, mounted to slide longitudinally in the cylinder 14^a, is provided with a cup valve 20^a, movable to positions on opposite sides of the ports 17^a, while in the cylinder 13^a is a sliding plunger 21^a, carried by a stem 22^a, the plunger and valve being equal 50 in diameter, the two cylinders thus being also equal in diameter. Mounted on an intermediate portion of the casing 9^a is a standard 23^a, upon which is mounted a lever 24^a that is pivoted between its ends, this lever 55 having its arms respectively connected to the stems 19^a and 22^a. Each of such arms constitutes, in effect a section of a float lever, the other section being an arm 25^a, that carries at its free end a float or ball, while its opposite end is pivoted, as shown at 28^a, to one of 60 the arms of the lever 25^a. The said lever 24^a and float arm 25^a are thus capable of adjustment but are ordinarily held against the same by means of a suitable bolt 26^a, carried by the arm 25^a, and frictionally engaging a quadrant 27^a, carried by the lever, said bolt 65 passing through the quadrant, as shown in Fig. 7.

With the parts as shown in Fig. 6, it will of course be understood that the supply of water is cut off from the tank when the float is raised, but when employed in automatic flushing apparatus, the arm 25^a is merely changed to the opposite end of the lever 24^a, as shown 70 in dotted lines in Fig. 6, the casing 9^a being provided with a pet cock 29^a that communicates with the chamber 10^a.

It is believed that the operation of this structure will be readily understood and that a further detailed 75 description thereof is therefore unnecessary.

From the foregoing it is thought that the construction, operation, and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be 80 understood that various changes in the size, shape, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described my invention, what I claim 85 as new and desire to secure by Letters Patent, is:

1. In apparatus of the class described, the combination with a casing having a chamber, of a water supply conduit communicating therewith, guide cylinders located in the casing and having bores of equal diameter, said cylinders having communication at their inner ends with the chamber and having their outer ends opening exteriorly of the casing, one of said cylinders having a port in its side wall communicating with the chamber, a plunger valve slidable in the latter cylinder to positions on opposite sides of the port, a counterbalancing plunger of equal diameter with the plunger valve and slidably mounted in the other cylinder, said plunger and plunger valve having sliding water-tight engagements with the cylinders, connections between the plunger and plunger valve for simultaneously moving them and maintaining them in balanced condition at all times, said connections extending exteriorly of the casing, and a float coupled to the exterior portions of the connections and moving the same to thereby move the plunger valve and plunger. 90 95 100 105

2. In apparatus of the class described, the combination with a casing having a chamber, of a water supply conduit communicating therewith, aligned guide cylinders located in the opposite ends of the casing and having bores of equal diameter, said cylinders having communication 110 at their inner ends with the chamber and having their outer ends opening exteriorly of the casing, one of said cylinders having a port in its side wall communicating with the chamber, a stem extending longitudinally through the cylinders and chamber, a plunger valve mounted on the stem and slidably mounted in the cylinder having the port, said valve comprising a guide nut of equal diameter with the cylinder bore, and a cup abutted against the nut and engaging the cylinder walls, a plunger mounted on the stem and slidably fitted in the other cylinder and comprising a guide nut of equal diameter with the cylinder bore and a cup abutted against the nut and engaging said cylinder walls, said valve and plunger being of equal diameters and having their cups disposed in opposition to each other, and a pivoted float having a connection with one end of the stem. 115 120 125

3. In apparatus of the class described, the combination with a casing having a chamber provided with an enlargement at one end and an open-ended cylinder at the other end, of another cylinder threaded into the enlarged end of the casing and having its inner portion spaced from the adjacent walls of the chamber, said cylinder being provided with a lateral inlet port and terminating at its outer end in an exposed depending spout, a bracket carried by the projecting portion of said spout, a float pivoted on the bracket, a stem connected to the float, slidably passing through the spout, and longitudinally through the cylinder, the chamber, and the opposite cylinder, and plungers connected to the stem and respectively operating in the cylinders, one of said plungers constituting a valve and being movable to 130 135 140

positions on opposite sides of the port, said stem, plungers, and float being removable with the cylinder and spout when the same is unscrewed.

4. In apparatus of the class described, the combination
5 with a casing having a cylinder provided with a lateral
inlet port and a discharge spout, of a slidable cupped
plunger valve movable in the cylinder to positions on oppo-
10 site sides of the port, a stem connected to the valve and
slidably projecting through the casing, a yoke carried by
the exposed end of the stem and a float lever, said lever
comprising an arm detachably and pivotally supported be-
tween its ends upon the casing, said arm having one end
loosely engaged in the yoke of the valve stem and having a
15 circular series of teeth at its other end, a float arm having
a series of teeth at one end that adjustably interlock with
the teeth of the first mentioned arm, a pivot connecting
the arms, said pivot being disposed concentrically to the
series of teeth and holding said teeth in interfitting en-
20 gagement, and a float carried by the free end of the float
arm.

5. In apparatus of the class described, the combination
with a tank of a casing located therein, and having sepa-
rate outlets separately communicating with the tank, a

manually actuated valve for controlling one outlet, a
movable valve for closing the other outlet, a float, and 25
means connecting the float in different relations to said
movable valve in order that said valve may be opened or
closed upon the elevation of the float.

6. In apparatus of the class described, the combination
with a tank of a casing, having a supply chamber pro- 30
vided with an outlet delivering into the tank, a manually
operated faucet connected to the casing, communicating
with the chamber and delivering into the tank, an auto-
matic valve controlling the outlet from the chamber, a
pivotally supported arm connected to the valve, a float 35
having an arm, and means for connecting the arm of the
float on either side of the pivot of the first mentioned arm,
whereby the valve can be either opened or closed upon the
elevation of the float.

In testimony, that I claim the foregoing as my own, I 40
have hereto affixed my signature in the presence of two
witnesses.

RALPH ROVER LAMB.

Witnesses:

JAMES T. LAWRENCE,
WADE K. LAWRENCE.