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F. W. ROBERTSHAW & F. S. McTIGHE.

VALVE FOR TANKS.

APPLICATION FILED SEPT. 19, 1906.

FIG. 4

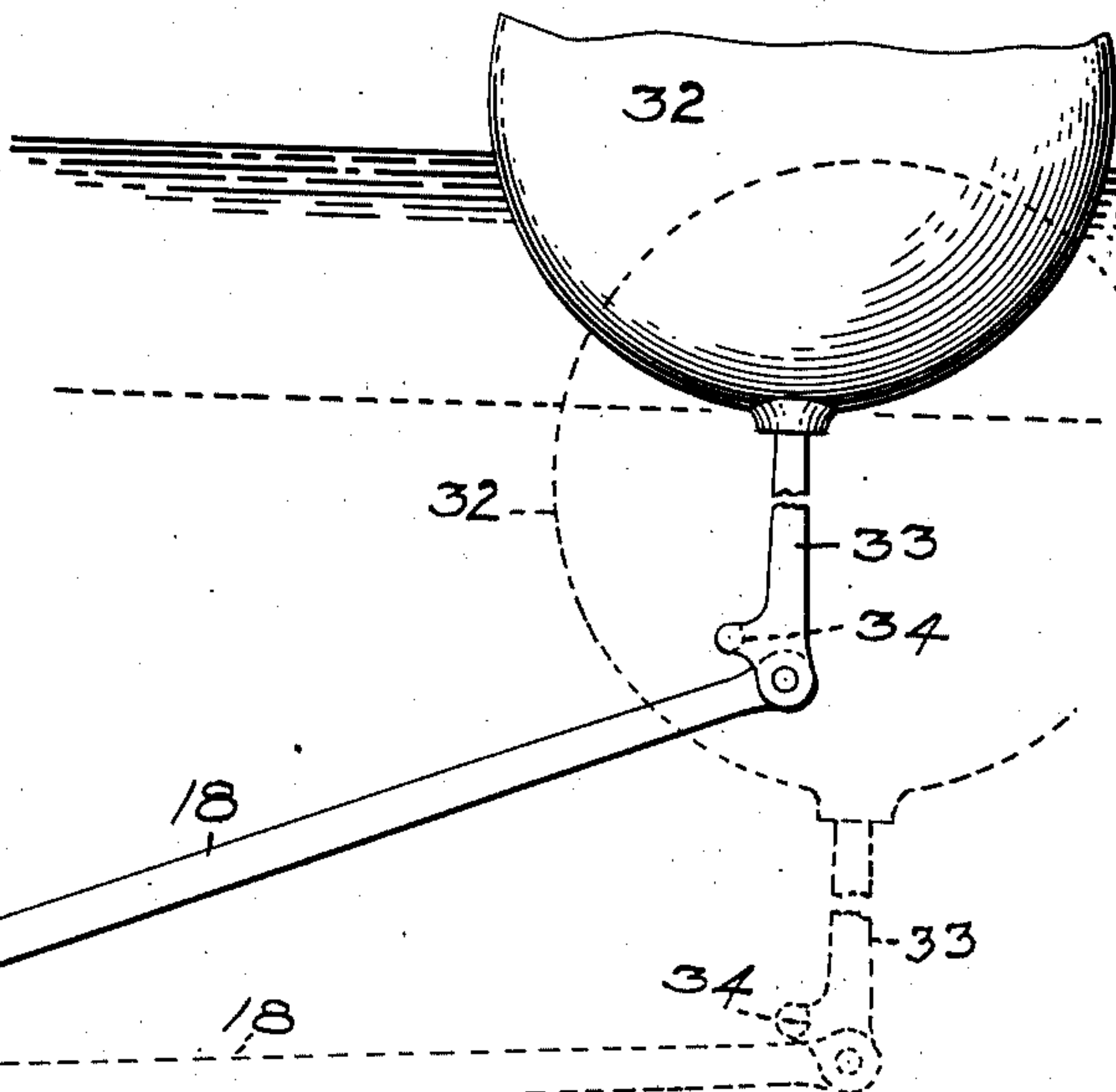
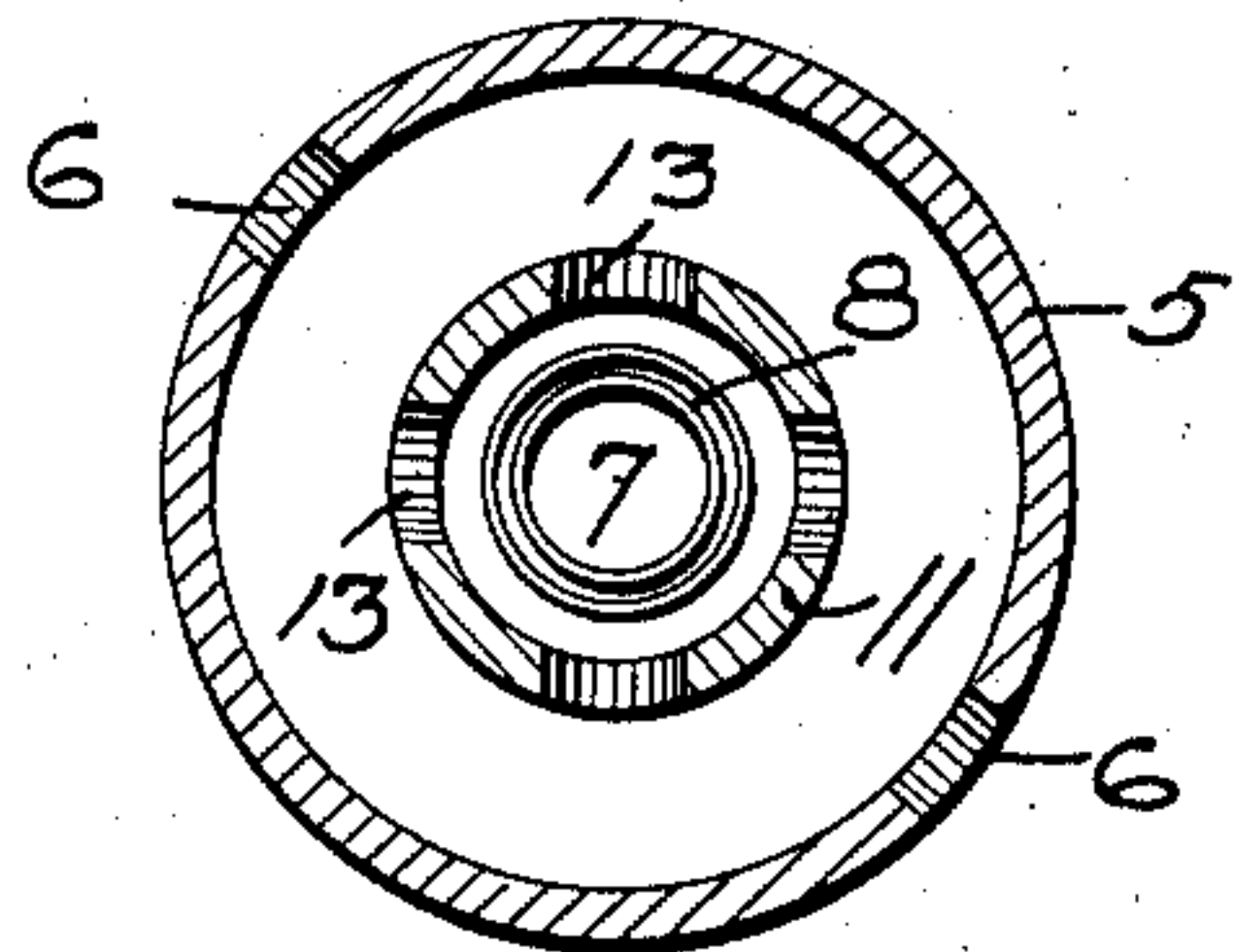


FIG. 1

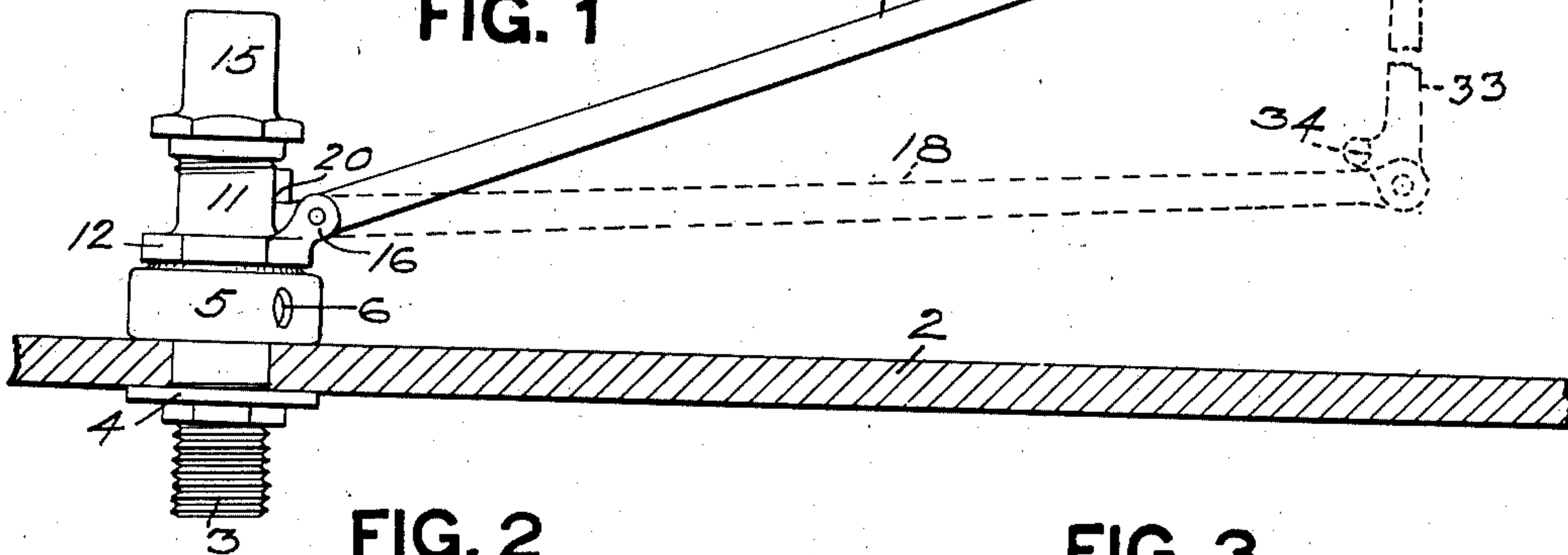
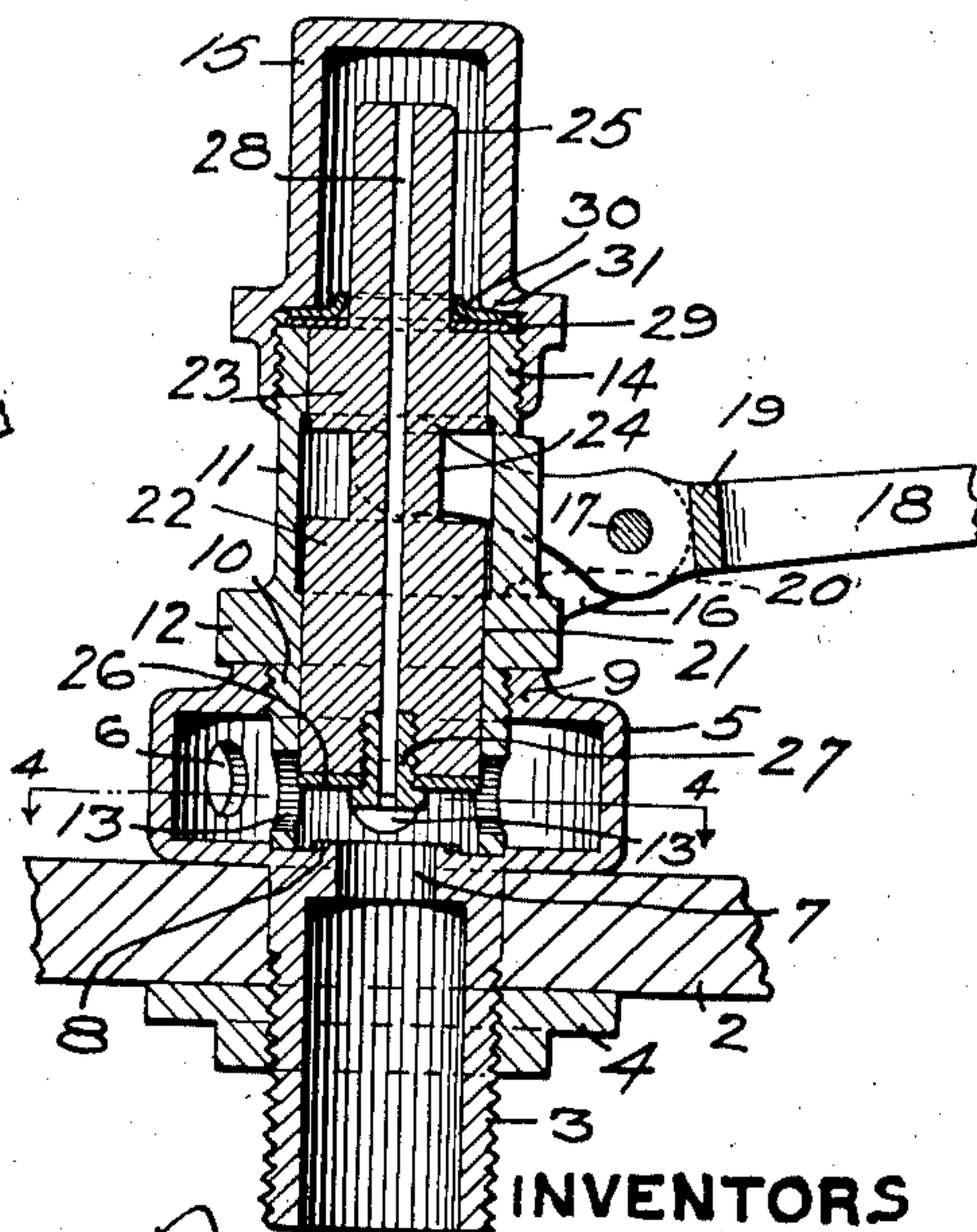


FIG. 2

FIG. 3



INVENTORS

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FREDERICK W. ROBERTSHAW, OF BRADDOCK, AND FRANK S. MCTIGHE, OF PITTSBURG, PENNSYLVANIA; SAID MCTIGHE ASSIGNOR TO SAID ROBERTSHAW.

VALVE FOR TANKS.

No. 864,262.

Specification of Letters Patent.

Patented Aug. 27, 1907.

Application filed September 19, 1906. Serial No. 335,320.

To all whom it may concern:

Be it known that we, FREDERICK W. ROBERTSHAW, a resident of Braddock, in the county of Allegheny and State of Pennsylvania, and FRANK S. MCTIGHE, of Pittsburg, county and State aforesaid, have invented a new and useful Improvement in Valves for Tanks; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to valves and more particularly to valves which are to be used in connection with flushing tanks where a float is employed to actuate the valve through a suitable lever connected thereto.

The object of our invention is to provide a valve of this character so balanced as to act uniformly whether the pressure be increased or diminished, and at the same time provide a valve in which the number of parts are reduced to a minimum and the valve guided accurately to its seat and securely seated thereon.

To these ends our invention comprises the novel features hereinafter fully described and claimed.

In the drawings, Figure 1 is a section of a tank partly broken away showing our improved valve applied thereto. Fig. 2 is an enlarged vertical section of the valve showing the valve closed. Fig. 3 is a like view showing the valve open. Fig. 4 is a section on the line 4-4, Fig. 3.

The numeral 2 designates a portion of the bottom of a suitable flushing tank. Passing through a suitable opening in the bottom of said tank is the threaded tail-piece 3 provided with the jam-nut 4. A suitable supply pipe is connected up to the tail-piece 3. Connected to the tail-piece 3 and preferably formed integral therewith, is the chamber 5 having the openings 6. An opening 7 forms communication between the tail-piece 3 and the chamber 5, and surrounding said opening is the valve seat 8. The chamber 5 has the threaded neck 9 with which the threaded portion 10 on the sleeve 11 engages. A collar 12 on the sleeve 11 bears against the neck 9 when said sleeve is screwed into engagement with the chamber 5. At the lower end of the sleeve 11 are the openings 13 which bring the lower end of said sleeve into communication with the chamber 5 when the valve is raised, as fully hereinafter set forth.

At the upper end of the sleeve 11 is the threaded portion 14 with which the cap 15 is adapted to engage. Lugs 16 are formed on the sleeve 11 and pivoted to said lugs, by means of the pin 17, is the float lever 18. The inner end of the float lever is bifurcated, as at 19, and extends within the openings 20 of the sleeve 11.

Within the sleeve 11 and fitting neatly therein so as to be properly guided thereby, is the valve 21. This valve 21 has the collars or rings 22 and 23 which engage the inner walls of the sleeve 11 and has the reduced por-

tions 24 and 25. The bifurcated end of the float lever 18 enters the space formed by the reduced portion 24 55 and engages the lower face of the collar 23 so as to provide for the raising of the valve, as fully hereinafter set forth.

A rubber washer 26 is secured to the lower end of the collar 22 by means of the screw 27, said washer 60 being adapted to rest upon the valve seat 8 when the valve is closed and form a tight connection therewith. A passageway 28 is formed in the valve 21 extending from one end thereof to the other and bringing the tail-piece 3 into communication with the cap 15. 65

A ring 29 is interposed between the cap 15 and the sleeve 11 surrounding the neck 25 of the valve. A leather or like flexible washer 30 is interposed between the ring 29 and the shoulder 31 on the cap 15. This washer 31 forms a water tight connection that pre- 70 vents the escape of the fluid from the cap 15 and cuts off the chamber in said cap from the interior of the sleeve 11. In this manner the pressure in the cap 15 is not permitted to act on the area of the upper face of the collar 23, but is confined to the area of the upper 75 face of the neck 25. The washer 30 being flexible, when pressed down at its outer edges by the shoulder 31 of the cap 15, acts to cup the washer and said washer remains effective until it has been so worn as to be pressed down into a horizontal position when it may 80 be readily renewed.

Connected to the outer end of the float lever 18 is the ordinary ball-float 32 which is carried by the arm 33 pivoted to the end of the lever 18. A stop-pin 34 85 acts to prevent said ball from falling in one direction while the movement of the ball against the inner wall of the tank acts to prevent the ball from falling in the opposite direction.

When our improved valve is in use and the water is at its normal height in the tank the valve and its 90 parts will assume the position shown in Fig. 2 in which the valve is closed. In this case, the water passing up through the tail-piece 3 passes up through the passage 28 into the cap 15. As the area of the neck 25 is the same as the area of the opening 7, the same 95 pressure will be upon the upper end of the valve as upon its lower end which acts to balance the valve when on its seat. If, however, the water is withdrawn from the tank in the ordinary manner and the float 32 descends to the position indicated in dotted lines, 100 Fig. 1, the valve will be raised by the lever 18 to the position indicated in Fig. 3. With the valve in this open position, the water then passes up through the opening 7 into the sleeve 11 whence it passes by the 105 openings 13 and 6 into the tank. As the water raises in the tank, the float 32 is raised with it, but owing

to the entire area of the main valve-body or the collar 22 being exposed to the pressure of the water entering the opening 7 as compared to the area of the neck 25, the downward movement of the valve is retarded

5 by the pressure of the water against the lower face of the valve which, accordingly retards the upward movement of the float 32 and permits the water entering said tank to rise to a higher point on the float, creating a greater upward pressure against said float. As soon,

10 however, as the valve closes the openings 13 this accumulated pressure upon the float is overcome by the upward movement of the float, and as said float rises with the increased pressure the valve 21 is lowered positively and seated securely. Said float, however, does

15 not rise to its normal height but has a constant pressure exerted upwardly against it which acts to hold the valve securely in place. The valve is seated with this stored up pressure exerted by the float and is consequently seated positively and securely so that

20 there is no vibration of the lever 18 or valve, which ordinarily occurs when the valve is nearly seated and a hissing or whistling sound is made which is very objectionable, as well as permitting the water to seep around the valve seat and wear out the same.

25 When the valve is seated, it is properly balanced owing to the fact that the area of the opening 7 corresponds to the area of the neck 25 of the valve, and by the use of the washer 30 leakage from the cap 15 is practically precluded. The valve is guided within

30 the sleeve 11 by the collars 22 and 23, and no wobbling or displacement of the valve occurs so that it always seats itself with great accuracy and consequently the wear on the parts is greatly reduced.

What we claim as our invention is:

35 1. The combination of a tank, or reservoir, a valve casing having a supply opening, a chamber having an opening leading to said tank, a sleeve extending down within said chamber and having an opening leading into said chamber, a valve in said sleeve controlling said last

40 named opening and said supply opening, a lever and float, the area of the lower face of said valve when raised

being greater than the area of the upper end of said valve exposed to a like pressure, whereby the downward movement of the valve is retarded and the water rises to a higher point on said float.

2. The combination of a valve casing having inlet and outlet ports, a valve controlling said ports having a reduced or neck portion, a cap engaging said casing and forming a chamber to receive said neck portion, the main body of said valve below said neck being of increased diameter, said increased diameter being directly surrounded and guided to its seat by said casing the exposed area of the lower end of said valve when seated being equal (or approximately) to the area of the neck of said valve exposed to the same pressure, and a ring of flexible material surrounding said neck portion and interposed between said cap and said casing.

3. The combination of a valve casing having inlet and outlet ports, a valve controlling said ports having a reduced or neck portion, a cap engaging said casing and forming a chamber to receive said neck portion, the main body of said valve below said neck being of increased diameter, said increased diameter being directly surrounded and guided to its seat by said casing the exposed area of the lower end of said valve when seated being equal (or approximately) to the area of the neck of said valve exposed to the same pressure, a rigid ring surrounding said neck portion, a ring of flexible material surrounding said neck portion, said rings being held between said casing and said cap.

4. The combination of a valve casing having inlet and outlet ports, a valve controlling said ports having a reduced or neck portion inclosed by said casing, the main body of said valve below said neck being of increased diameter, said increased diameter being directly surrounded and guided to its seat by said casing, the exposed area of the lower end of said valve when seated being equal or approximately to the area of the neck of said valve exposed to the same pressure, and means for cutting off communication between the upper portion of said casing containing said neck portion and the lower portion of said casing containing the main body of said valve.

In testimony whereof, we the said FREDERICK W. ROBERTSHAW and FRANK S. MCTIGHE have hereunto set our hands.

FREDERICK W. ROBERTSHAW.
FRANK S. MCTIGHE.

Witnesses:

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ROBERT C. TOTTEN.