

Dec. 19, 1939.

F. M. HEATH

2,183,677

WATER CONTROL FOR FLUSH TANKS

Filed Sept. 2, 1939

4 Sheets-Sheet 1

Fig. 1.

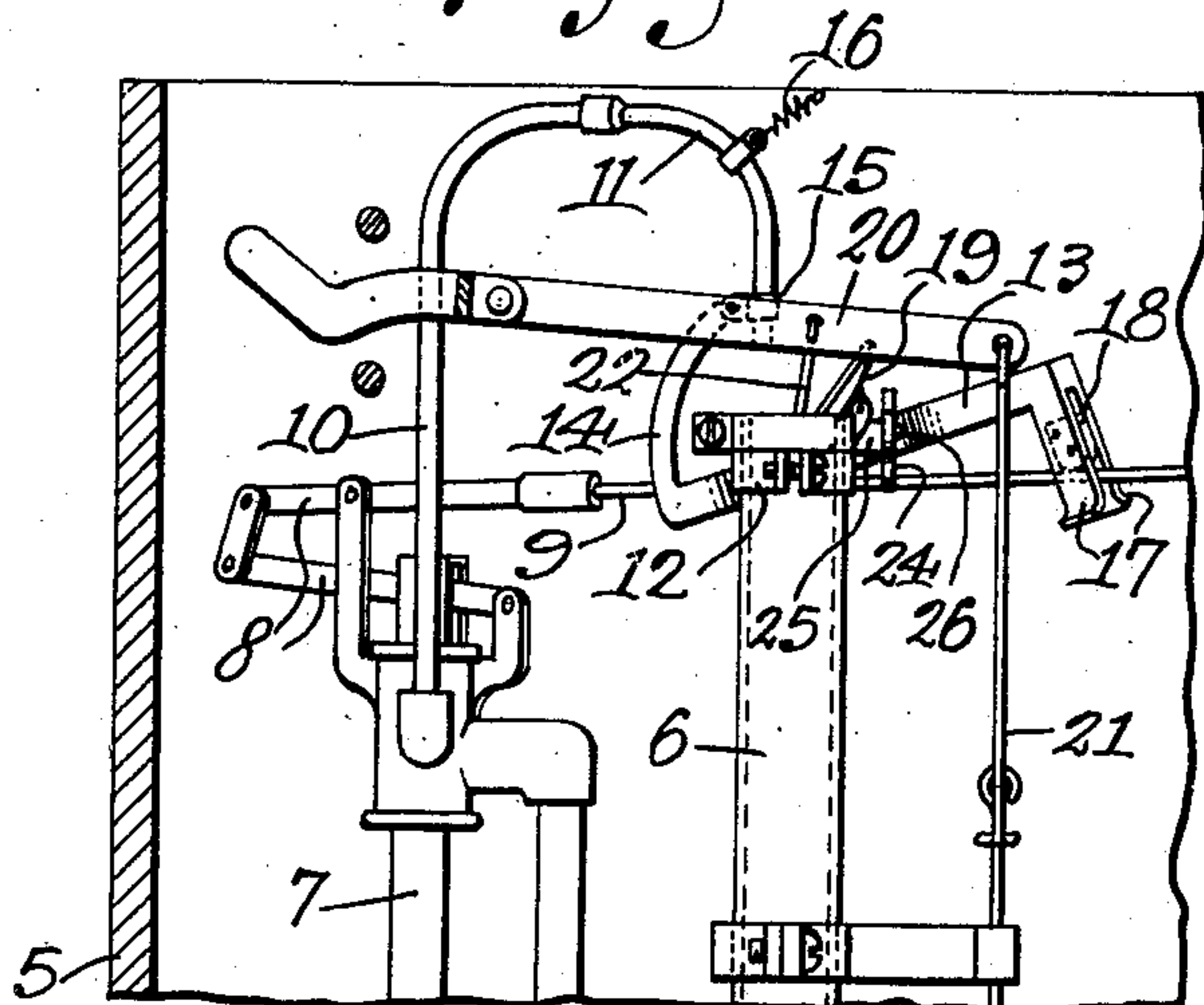


Fig. 2.

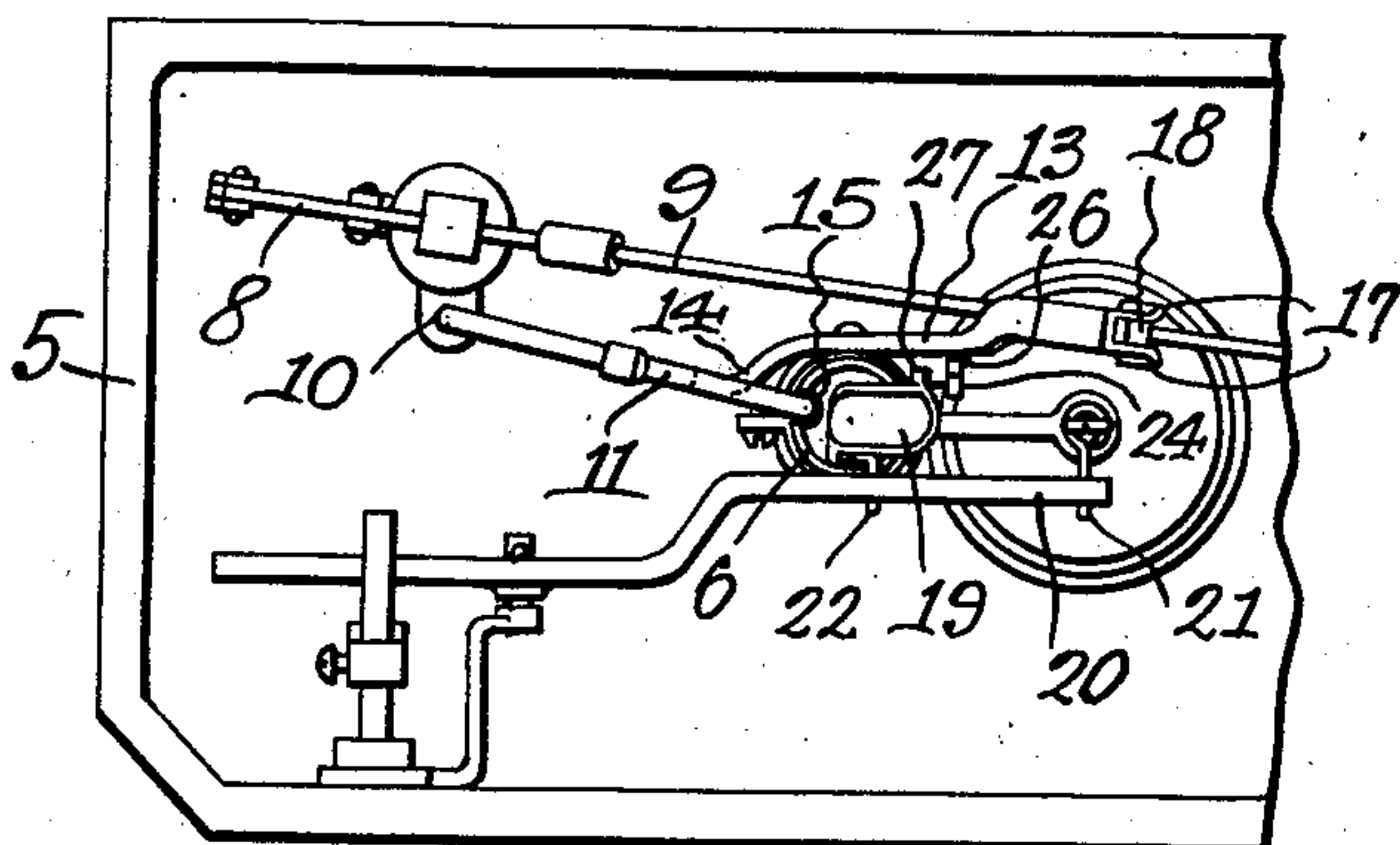


Fig. 3.

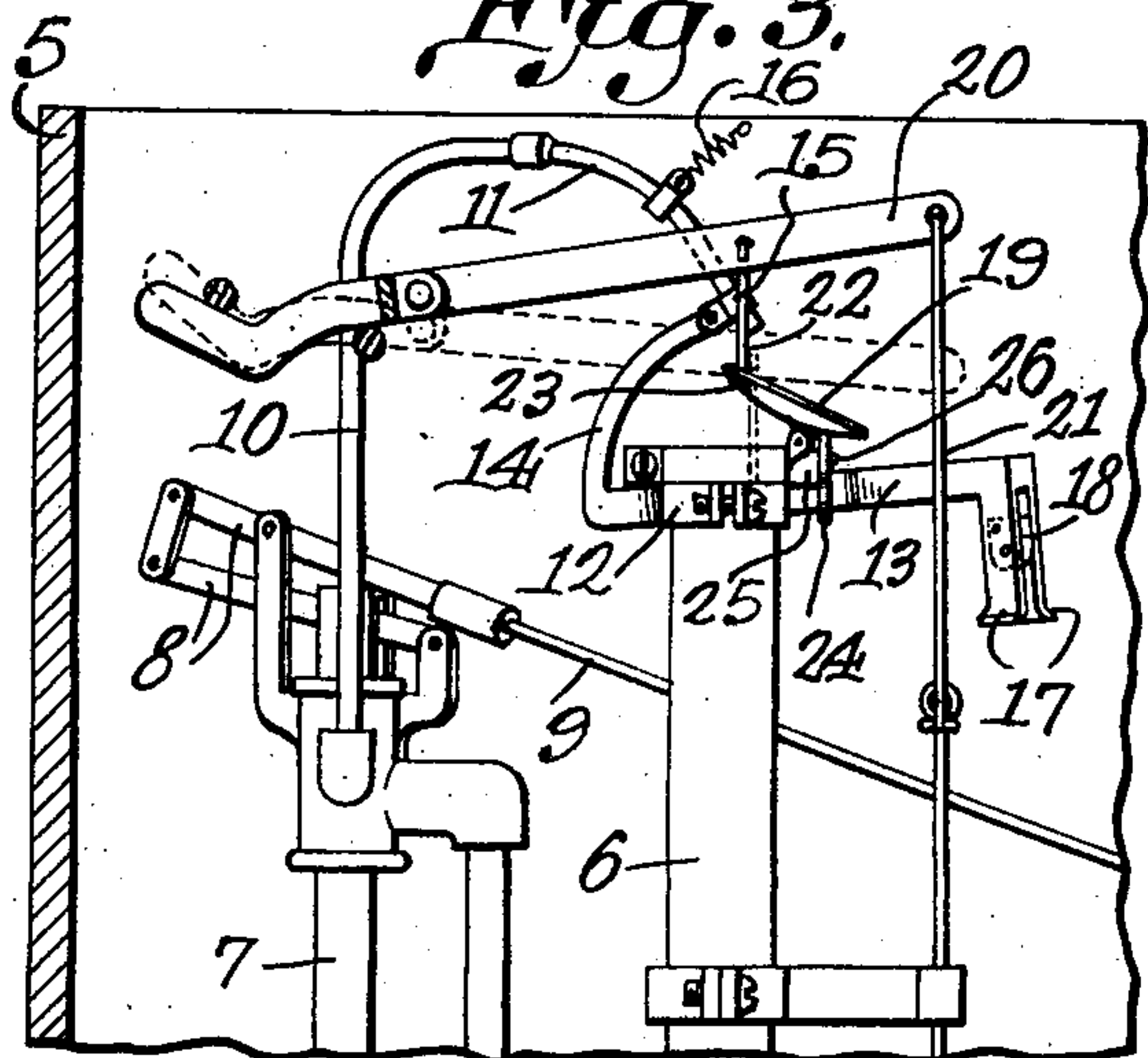


Fig. 4.

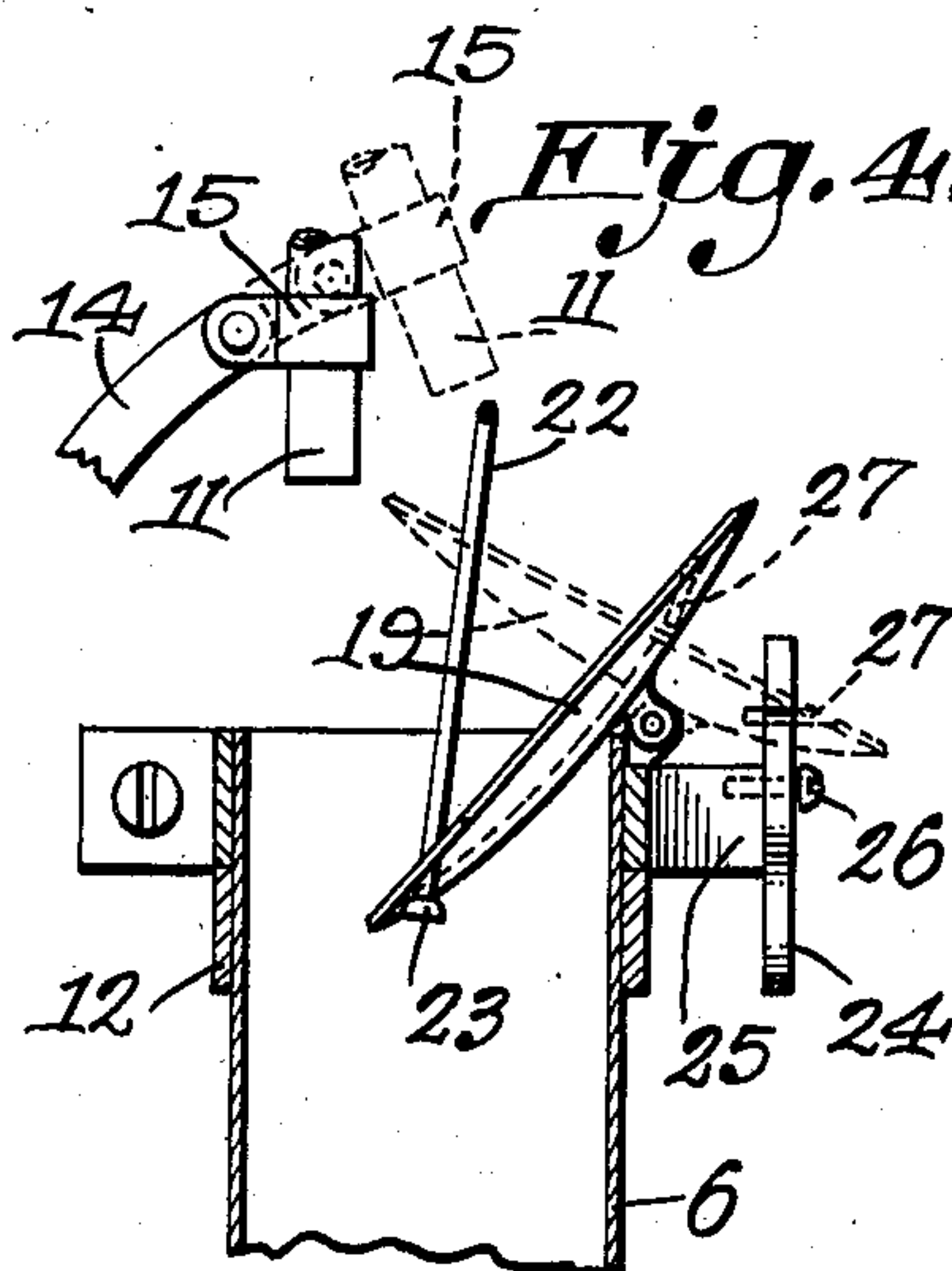


Fig. 5.

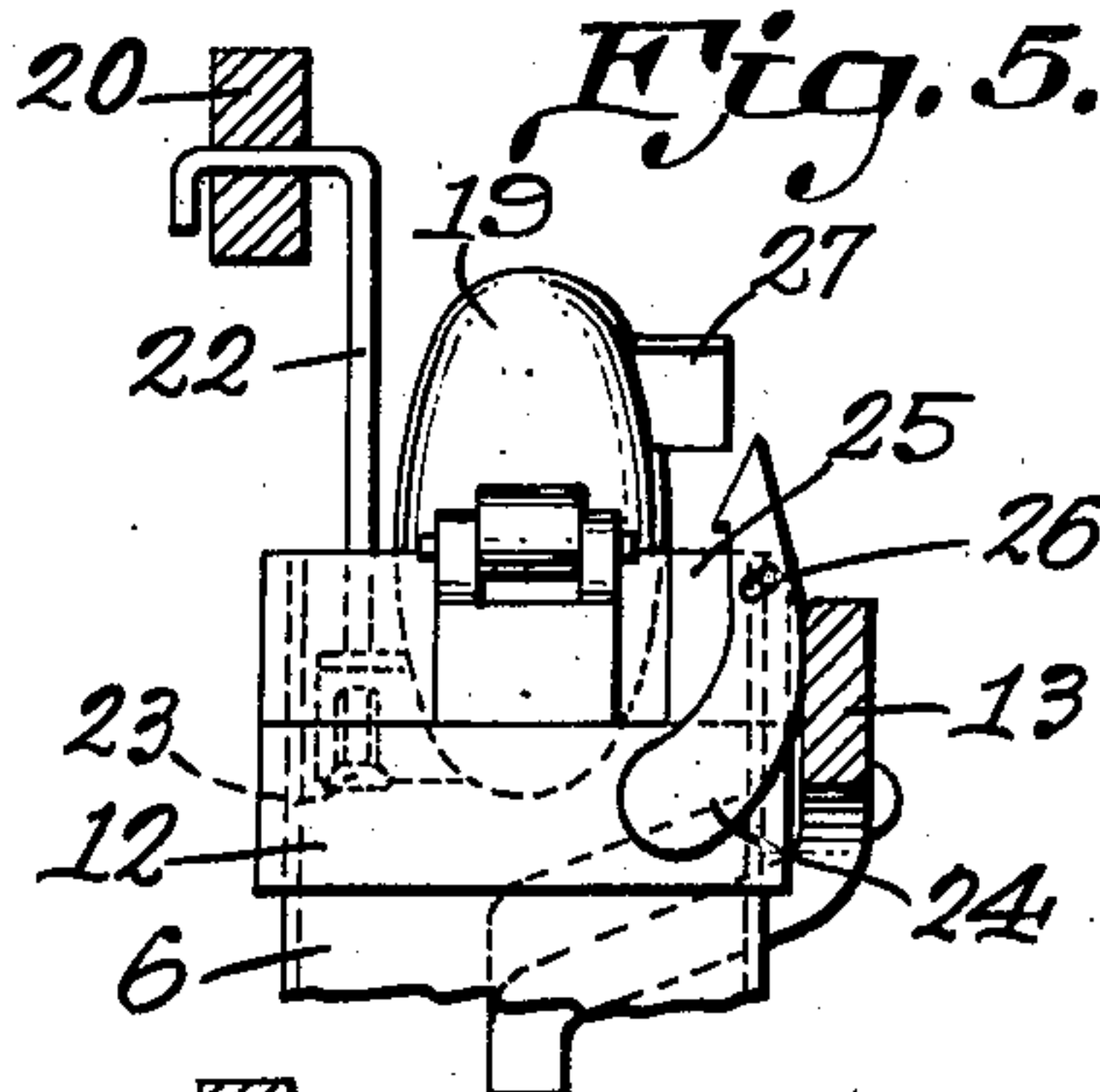
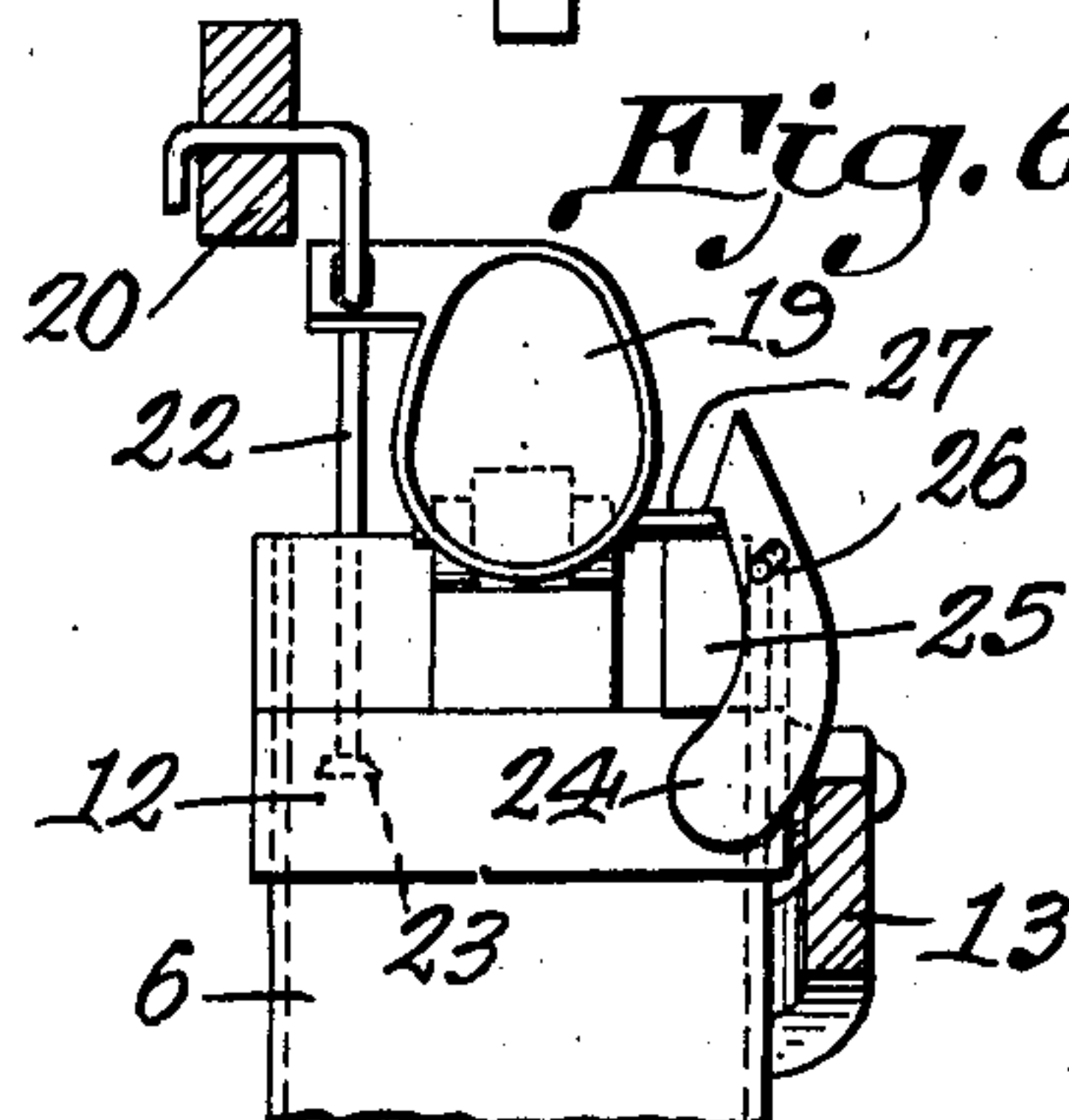


Fig. 6.



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Fig. 7.

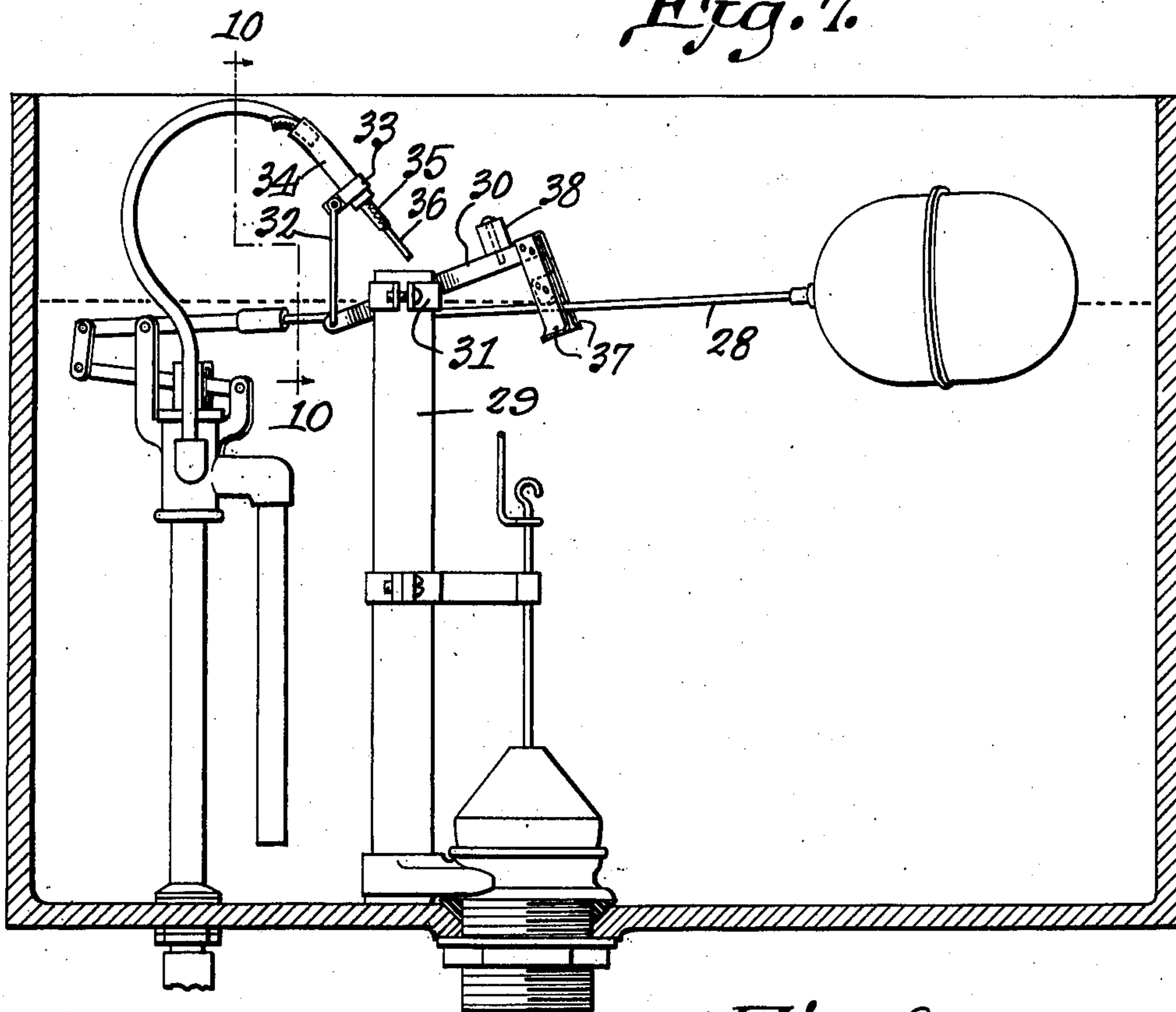


Fig. 8.

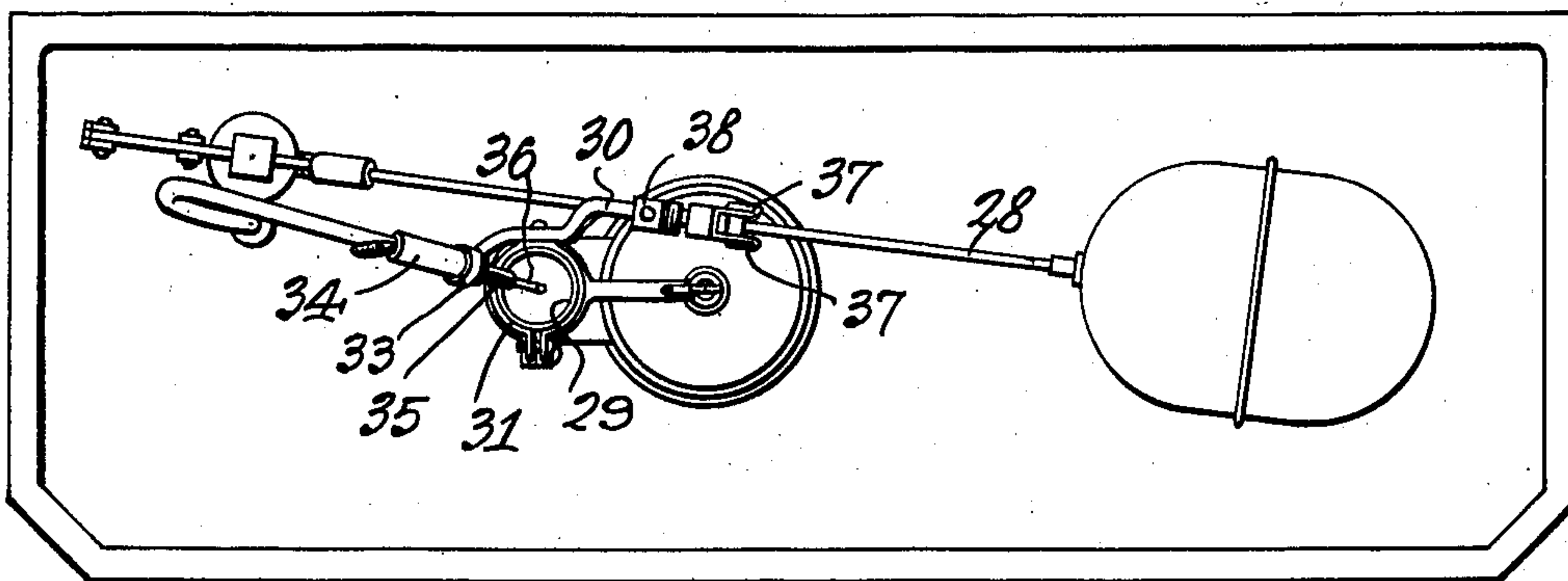
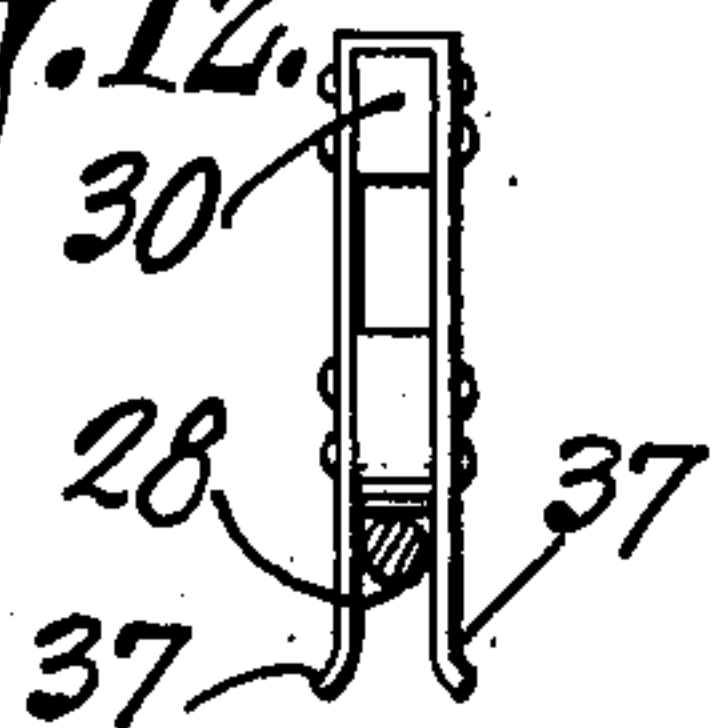
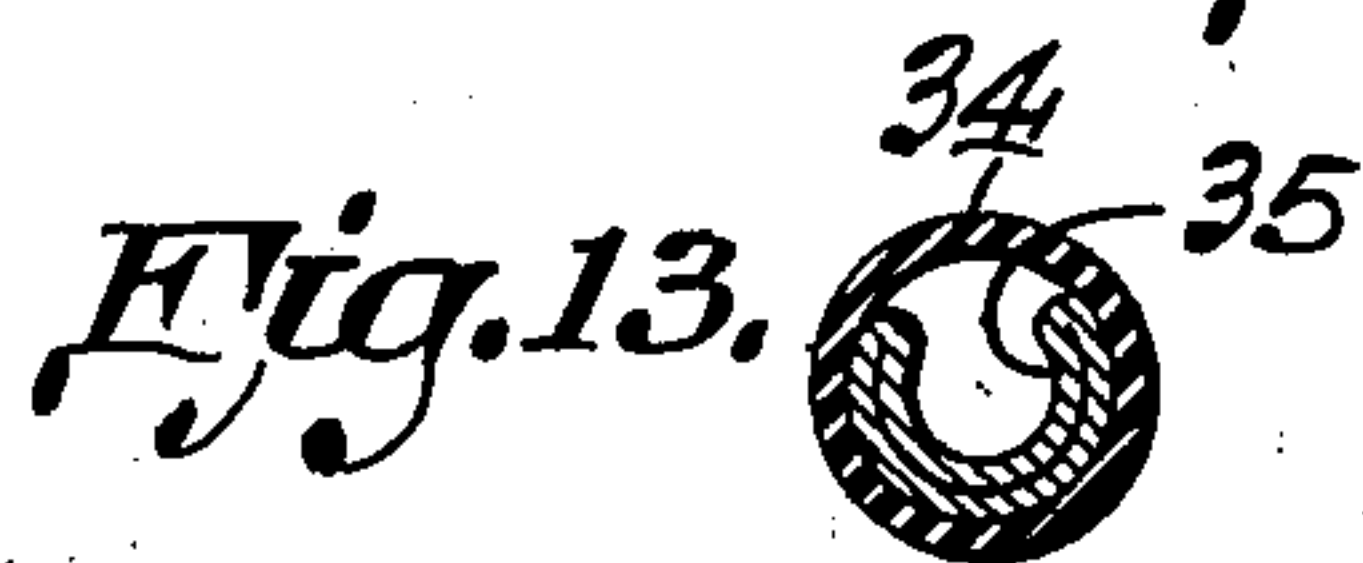


Fig. 12.



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Fig. 9.

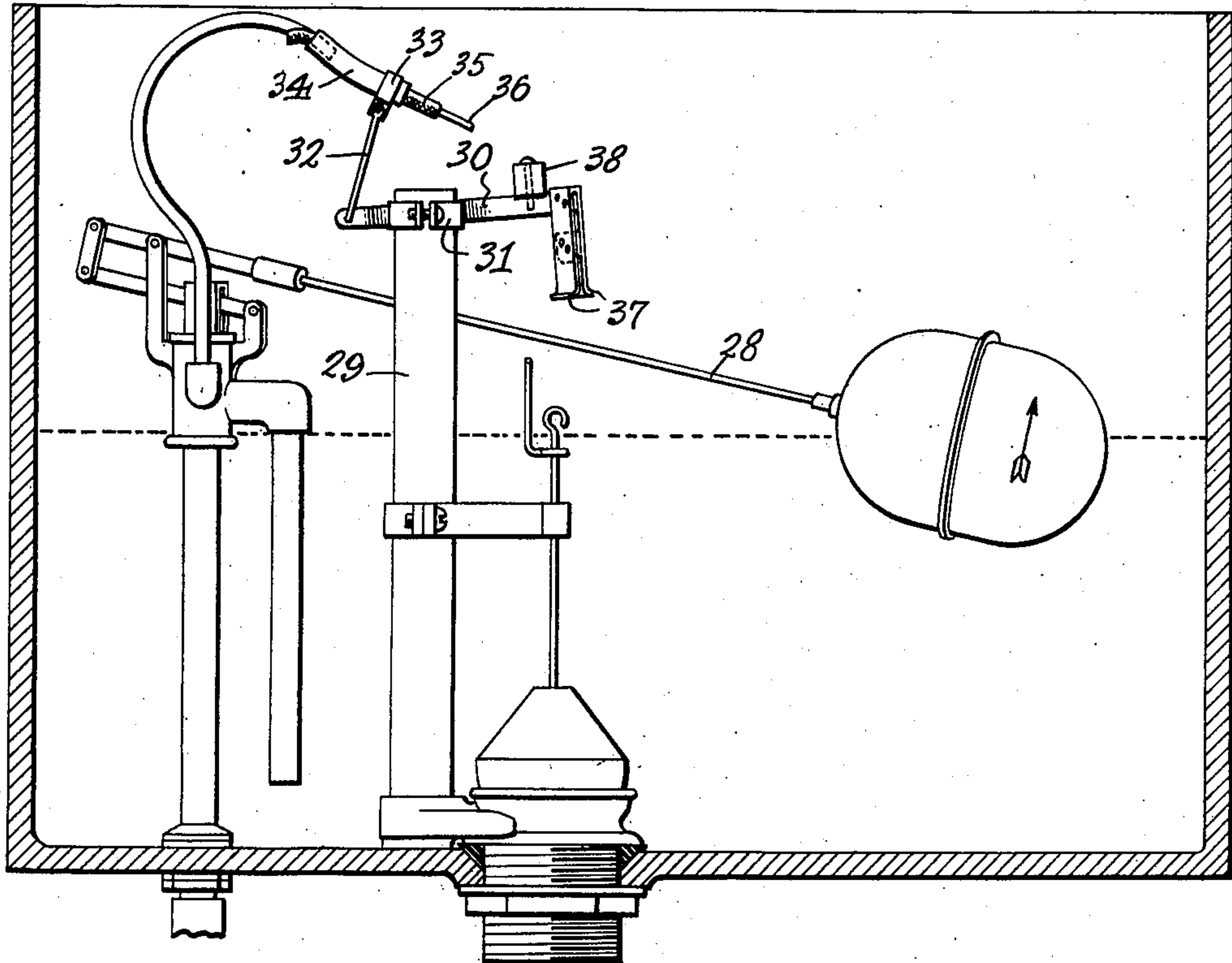


Fig. 10.

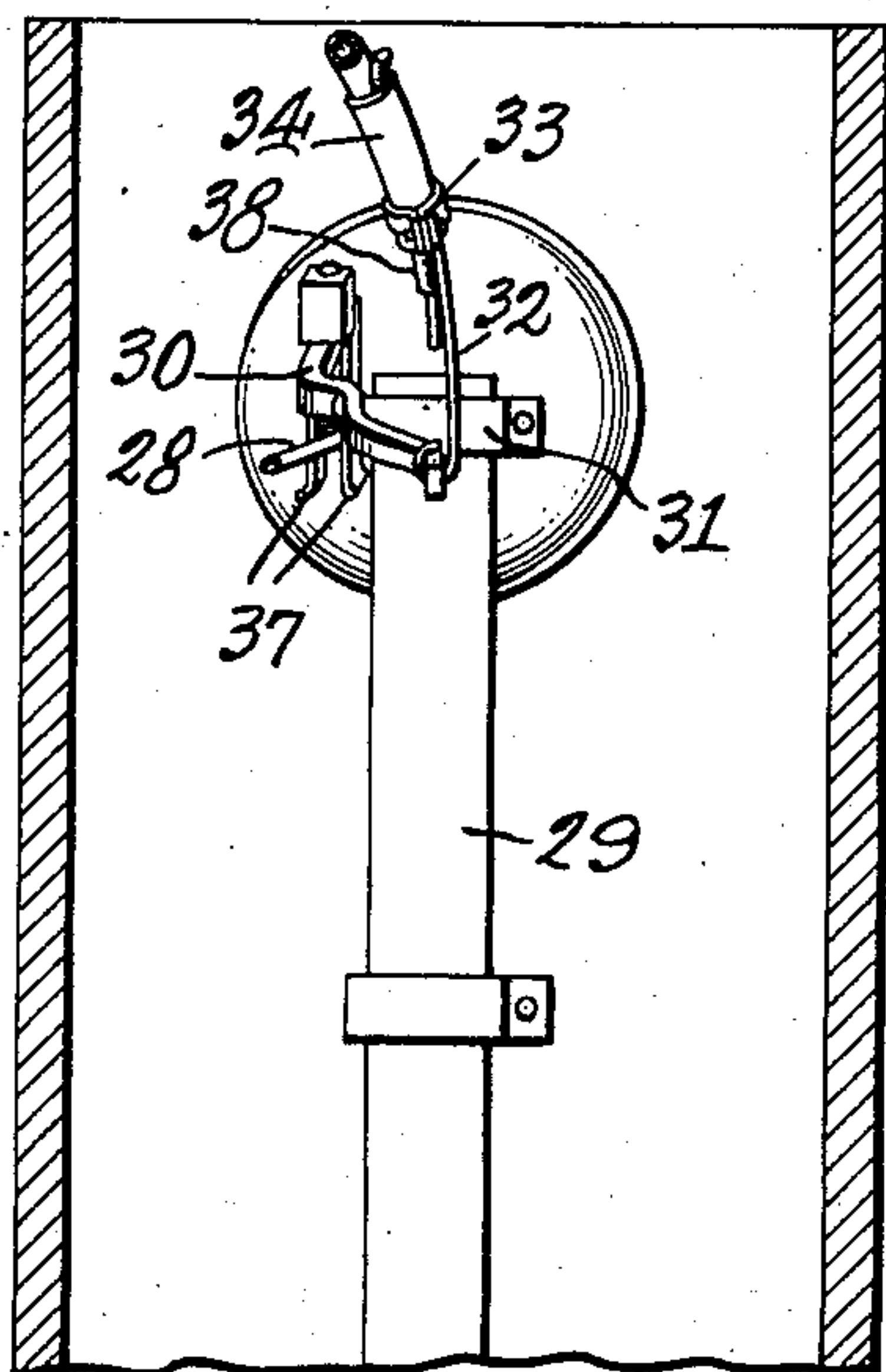
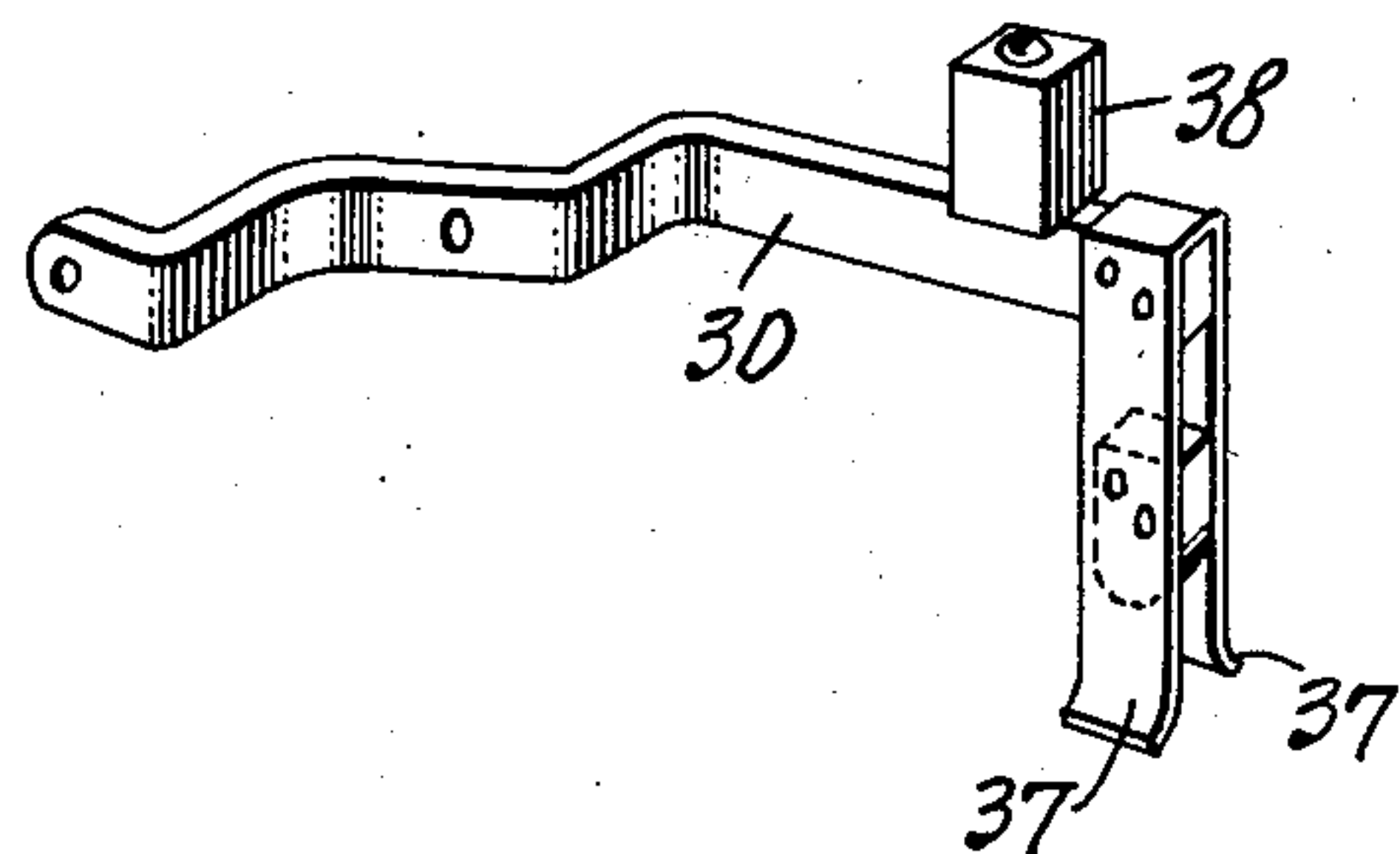


Fig. 11.



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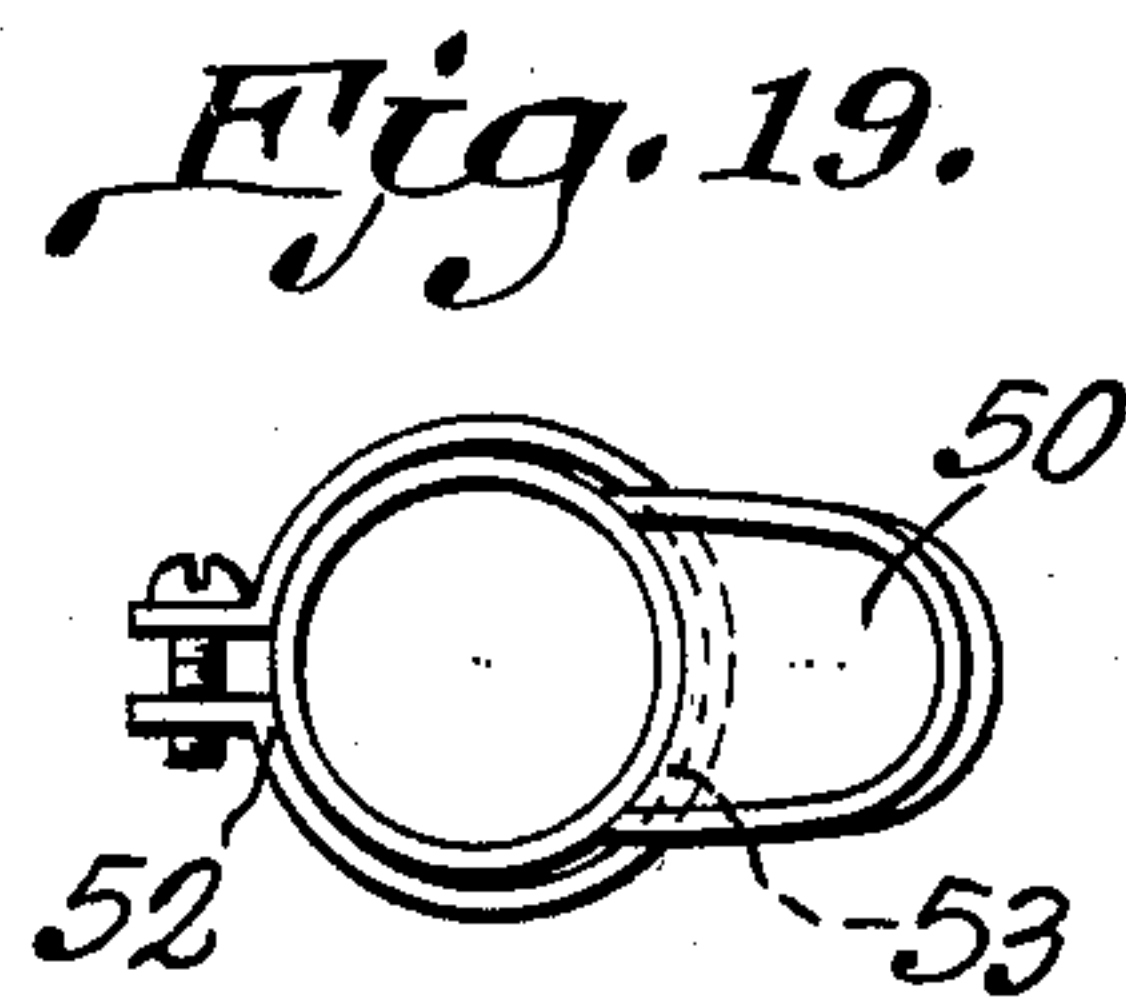
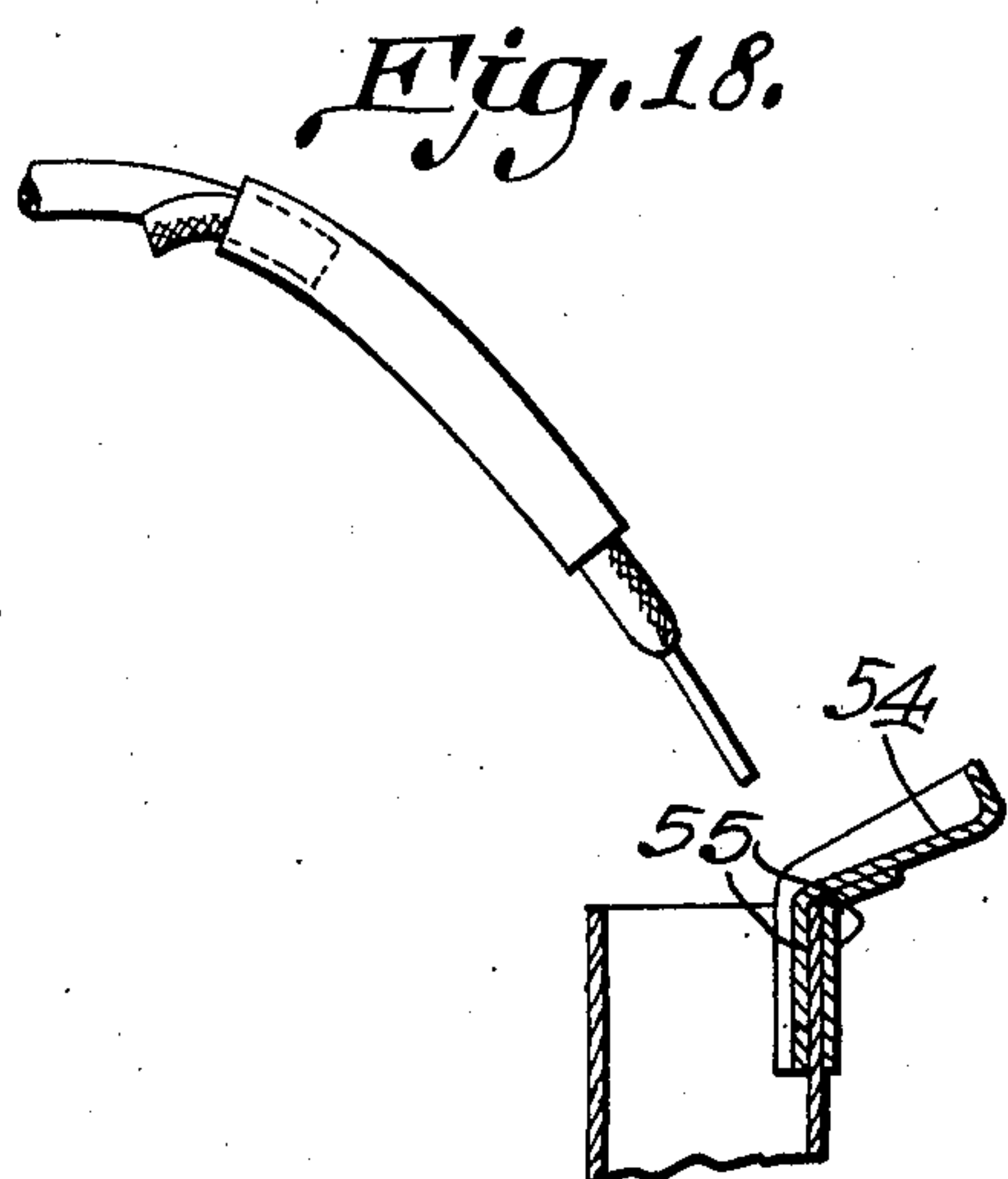
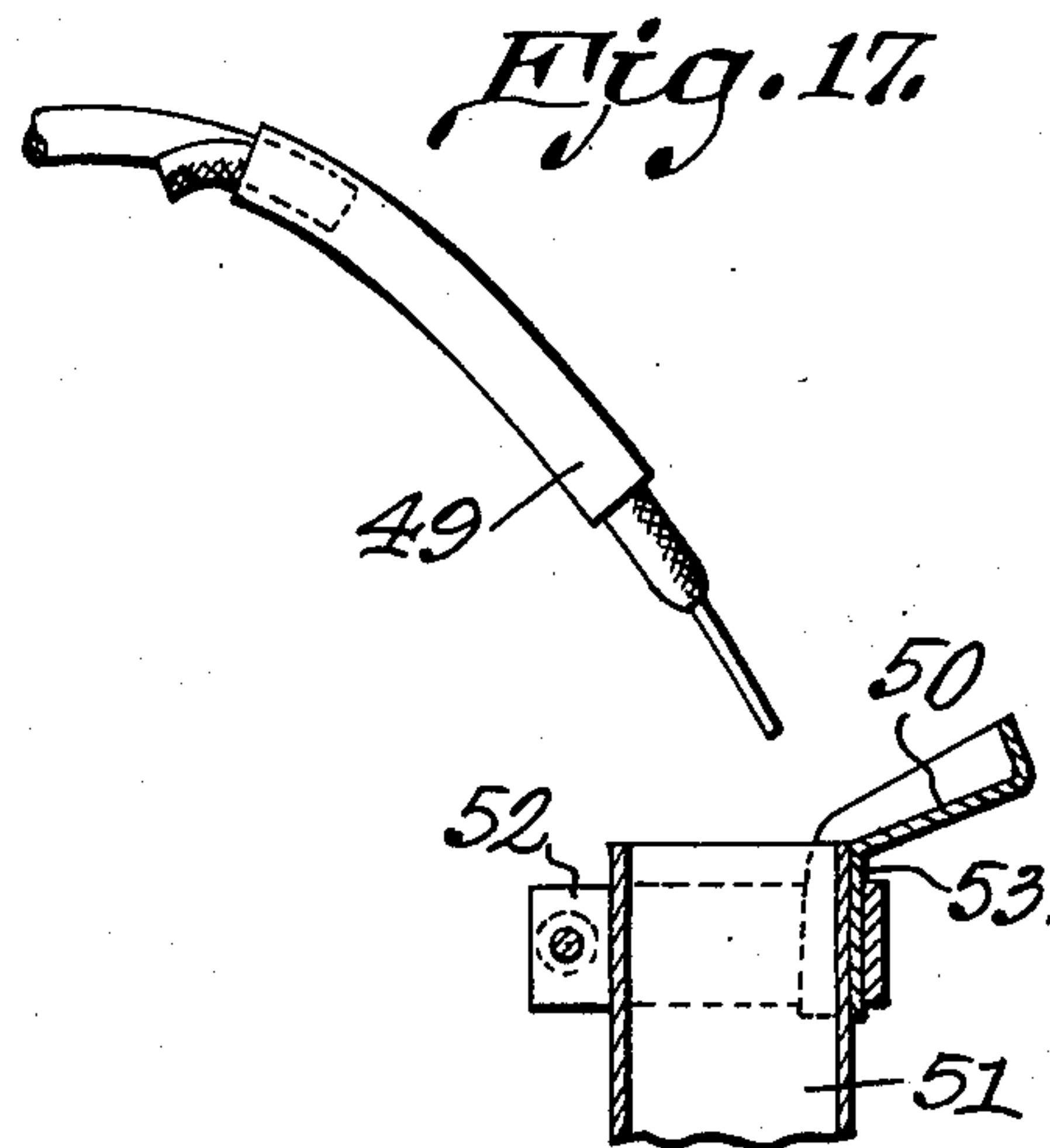
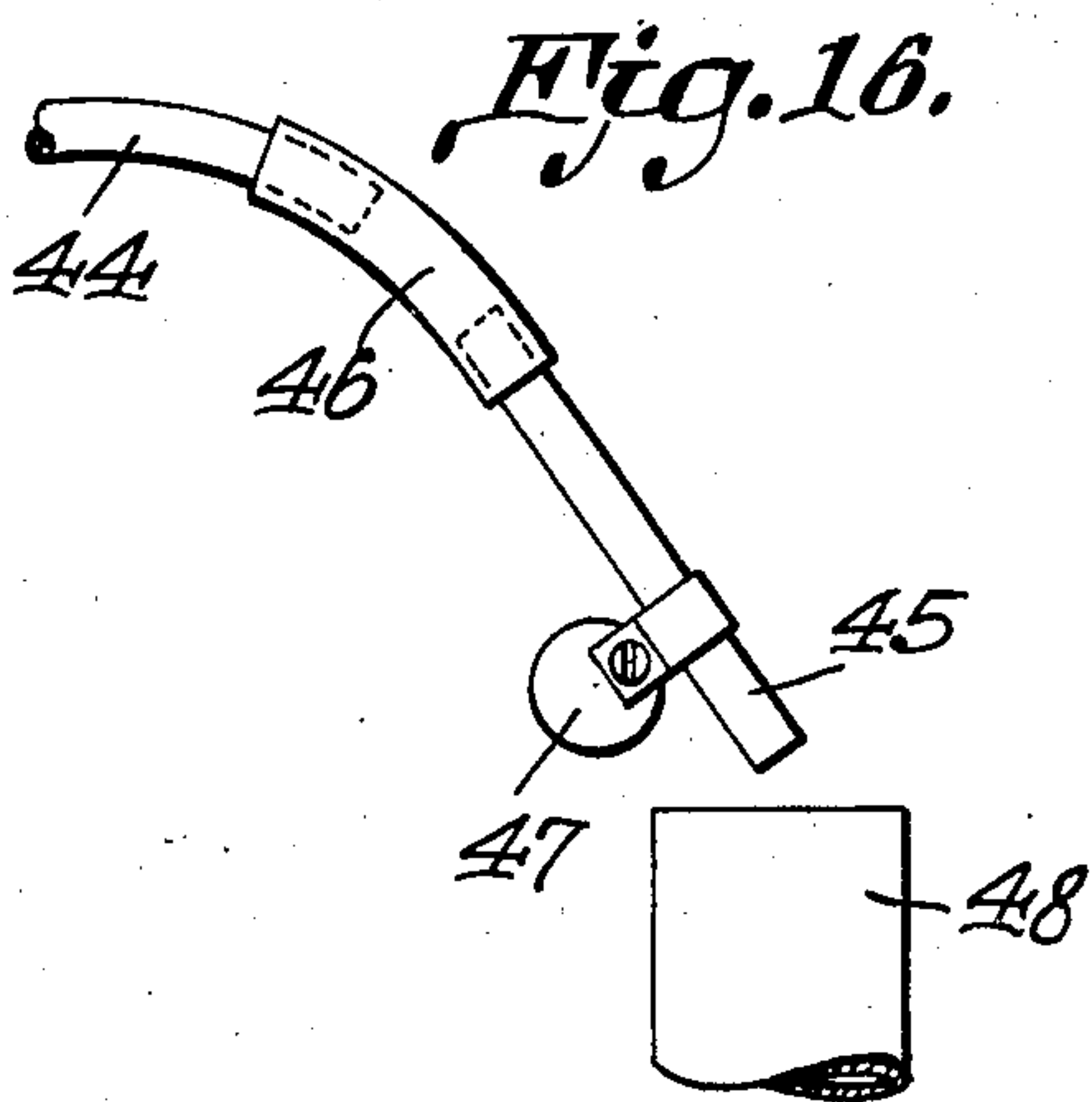
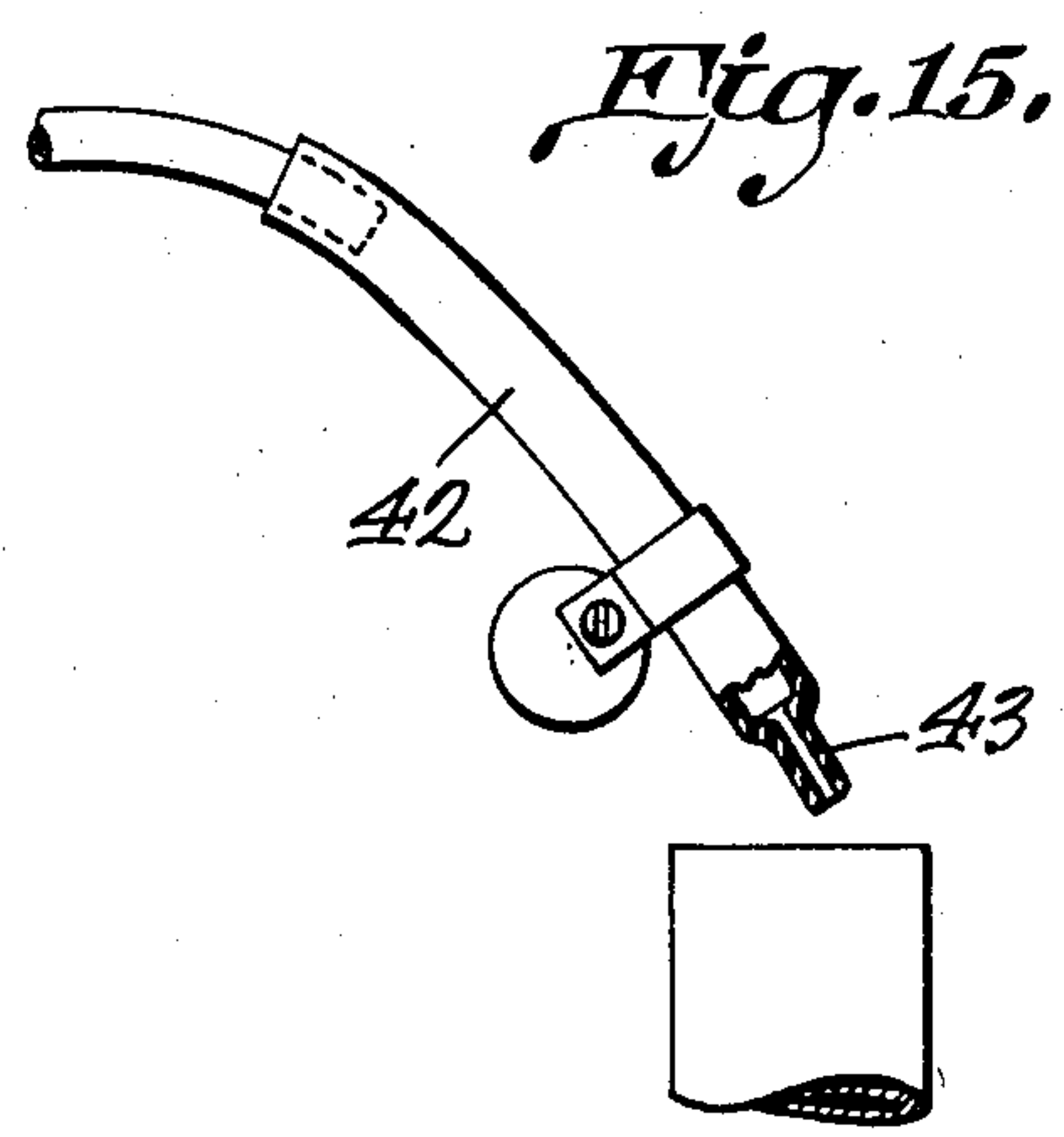
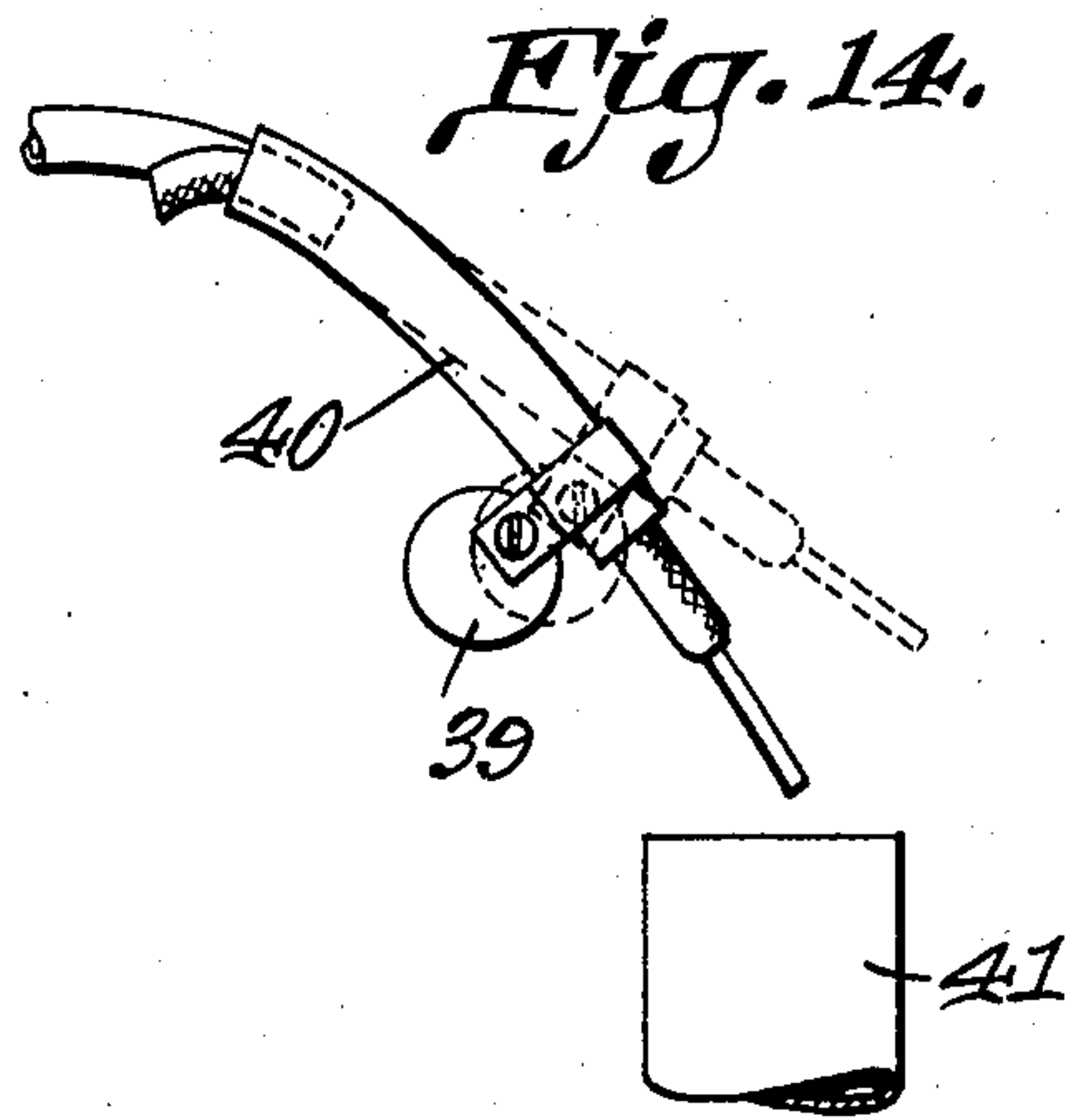
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WATER CONTROL FOR FLUSH TANKS

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4 Sheets-Sheet 4



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WATER CONTROL FOR FLUSH TANKS

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Application September 2, 1939, Serial No. 293,291

10 Claims. (Cl. 4—18)

This invention relates to water closet flush tanks, the primary object of the invention being to provide means for conserving water, and at the same time insuring a water seal in the trap of the bowl supplied with water from the flush tank.

An important object of the invention is to provide means for causing water usually directed into the overflow pipe of a flush tank, during the flushing operation, and which is wasted, to flow directly into the flush tank, and then at a predetermined time, flow into the overflow pipe of the flush tank, for supplying only a sufficient quantity of water to the bowl used with the flush tank, to provide the usual water seal.

Another object of the invention is to provide a movable pipe section, and means controlled by the usual flush tank float, for actuating the flexible pipe section to control the distribution of the water passing through the flexible pipe section, thereby insuring a positive and accurate operation of the device at all times.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein described, may be made within the scope of what is claimed, without departing from the spirit of the invention.

Referring to the drawings:

Figure 1 is a fragmental sectional view through a flush tank, illustrating a control device constructed in accordance with the invention, as mounted therein.

Figure 2 is a plan view thereof.

Figure 3 is an elevational view of the control mechanism, illustrating the spoon-shaped deflector as moved to a position to deflect the water into the flush tank.

Figure 4 is a fragmental detail view illustrating the spoon-shaped deflector as moved to a position to discharge the water directly into the overflow pipe of the flush tank.

Figure 5 is a view illustrating the deflector as released from the latch member associated therewith and which operates to hold the deflector in a position to direct the water into the overflow pipe.

Figure 6 is a view illustrating the latch member in its active or holding position.

Figure 7 is a sectional view through a flush tank illustrating a modified form of the invention.

Figure 8 is a plan view thereof.

Figure 9 is a sectional view through a flush tank illustrating the flexible pipe section as moved to a position to direct the flow of water into the tank.

Figure 10 is a section on line 10—10 of Figure 7.

Figure 11 is a perspective view of the actuating arm used in connection with the flexible pipe section.

Figure 12 is an end elevational view of the actuating arm.

Figure 13 is a sectional view taken through the flexible pipe section.

Figure 14 is an elevational view illustrating a modified form of the invention.

Figure 15 is a further modified form of the invention.

Figure 16 is a still further modified form of the invention.

Figure 17 is an elevational view illustrating a still further modified form of the invention.

Figure 18 illustrates another modified form of the invention.

Figure 19 is a plan view illustrating the form of the invention as shown by Figures 17 and 18.

Referring to the drawings in detail, in the preferred form of the invention, the tank is indicated by the reference character 5, the reference character 6 designating the usual overflow pipe of the flush tank.

The reference character 7 designates the inlet pipe which is supplied with the usual valve mechanism not shown, the valve being actuated by means of the levers 8 that in turn are controlled by the action of the float rod 9 moved upwardly by the usual float, not shown.

Extending upwardly from the inlet pipe 7 is a curved pipe 10 which in the ordinary flush tank structure, is constructed to discharge a stream of water directly into the overflow pipe of the flush tank, during the entire flushing operation, and which results in an appreciable loss of water, due to the water passing from the flush tank and bowl associated therewith, during the time when the water is passing from the flush tank in the usual manner.

In the present invention I have provided a flexible pipe section 11 which is secured to the pipe 10 in any suitable manner, the discharge end of the flexible pipe section being under normal conditions, directed downwardly to discharge water directly into the upper end of the overflow pipe 6, as clearly shown by Figure 1 of the drawings.

Pivotally mounted on the split band 12 which is mounted adjacent to the upper end of the overflow pipe 6, is an operating arm 13 that has its curved end 14 connected with the flexible pipe section 11, at 15. A spring indicated at 16 has connection with the flexible pipe section 11 and acts to normally pull the flexible pipe section against the action of the operating arm 13.

At the free end of the operating arm 13, are spaced fingers 17 between which the bearing block 18 is positioned, the outer ends of the fin-

gers being curved laterally so that they will be guided over the float rod 9, insuring the true operation of the operating lever at all times.

Pivotaly mounted on the split band 12 is a spoon-shaped deflector plate 19, the pivotal connection between the deflector plate 19 and split band 12, being near one end of the deflector plate, to cause the deflector plate to normally swing to a position as shown in full lines in Figure 4 of the drawings, but permit the deflector plate to swing upwardly to a position as shown in dotted lines in Figure 4 of the drawings, to deflect the water into the flush tank proper.

The usual trip arm 20 of a flush tank valve operating mechanism is indicated at 20, and has connection with the valve rod 21. Connected with the trip arm 20 is a rod 22 that extends through an opening formed adjacent to one end of the deflector plate 19, the rod 22 being formed with a head 23 at the free end thereof, to engage the outer surface of the deflector plate to move the deflector plate from the position as shown in full lines in Figure 4 of the drawings, to the position shown in dotted lines.

Associated with the deflector plate is a latch member indicated at 24, the latch member being pivotaly connected to the laterally extended lug 25, by means of the pin 26 which is shown as extended through an elongated opening formed in the latch member, the elongated opening being disposed at an oblique angle with respect to the edges of the latch member.

Due to the mounting of the latch member, it will be seen that when the deflector plate has been moved to its dotted line position, the latch member will hook over the flange 27 formed on the deflector plate 19, and hold the deflector plate in its dotted line position. It follows that as the operating arm 13 moves upwardly, the operating arm will move the latch member causing the latch member to disengage the flange 27, releasing the deflector plate allowing the deflector plate to swing to the position shown in full lines in Figure 4 of the drawings. This movement of the deflector plate occurs when the tank is substantially full, with the result that the water passing through the pipe 10 will be directed against the deflector plate which in turn directs the water through the overflow pipe and into the bowl used with the flush tank, providing a liquid seal. In the modified form of the invention shown by Figure 7 of the drawings, the float rod is indicated by the reference character 28, and operates adjacent to the overflow pipe 29.

The operating arm indicated at 30 is pivotaly connected to the split band 31 which is clamped around the overflow pipe 29. One end of the operating arm 30 is formed with an opening through which one end of the rod 32 extends, the opposite end of the rod 32 being connected to the split band 33 which is positioned on the flexible pipe section 34. Extending into the flexible pipe section 34 is a member 35 which is substantially trough-shaped, as clearly shown by Figure 13 of the drawings, there being provided a rigid extension 36 extending from the member 35, to direct water passing through the member 35, to the overflow pipe 29.

Spaced fingers 37 are formed on one end of the operating arm 30, and straddle the float rod 28, so that as the float rod moves vertically, a relative movement of the flexible pipe section 34 will be insured. Due to this con-

struction, it will be seen that when the float carried at the free end of the rod 28, has moved to the limit of its upward movement, the flexible pipe section 34 will be moved to a position as shown by Figure 7 of the drawings, directly over the upper end of the overflow pipe 29. As the float moves downwardly following the level of the water as it is discharging from the tank, it will be seen that the flexible pipe section 34 will move upwardly to cause the water discharging from the end thereof, to be directed past the open end of the overflow pipe 29, and directly into the flush tank.

As the water level rises, the flexible pipe member will gradually move to a position directly over the overflow pipe. It will of course be understood that the latter movement of the flexible pipe section is so timed that water will be discharged into the overflow pipe, only at a time when the tank has been practically filled. This of course will supply the necessary quantity of water to insure a water seal within the bowl used in conjunction with the flush tank. In this form of the invention a weight indicated by the reference character 38 is secured to the operating arm 30 near the outer end thereof, to urge the arm 30 to its normal or horizontal position.

As shown by Sheet 4 of the drawings, I have provided movable pipe sections as connected with the pipe of a flush tank used for directing a quantity of water to the overflow pipe thereof, and in the forms of the invention shown by Sheet 4 of the drawings, I provide a weight 39 as connected with the flexible pipe section 40, the weight acting to normally hold the pipe section 40 in such a way that the water discharging therefrom will be directed into the overflow pipe, to supply the necessary water for a water seal in the bowl used with the flush tank. The weight in this form of the invention is of a predetermined character, and is sufficiently heavy to cause the pipe 40 to bend as shown by Figure 14. When the water is directed to the pipe, the pressure is such as to cause the pipe section 40 to straighten as shown in dotted line in Figure 14, to the end that the water discharging through the pipe section 40 will be directed past the upper or open end of the overflow pipe, which in the present showing is indicated by the reference character 41. It is obvious that as the water pressure is reduced, due to the flush tank becoming filled, the weight 39 will overcome the water pressure, allowing the pipe section 40 to bend to a position as shown in full lines in Figure 14.

In Figure 15 of the drawings, I have employed a flexible pipe section 42 secured to the end of the pipe supplying water to the overflow pipe of a flush tank, the end of the pipe section 42 being reduced as at 43 to cause the water passing through the pipe section 42 to be formed into a substantially small stream.

In Figure 16 of the drawings, I have illustrated rigid pipe sections 44 and 45 which are connected by a flexible tubing 46 so that the pipe section 45 will move under the action of the weight 47, to cause the water flowing therethrough, to be directed into the upper end of the overflow pipe 48. When the water pressure passing through the pipe 44 is at its height, as at the time when the tank is beginning to fill, the water pressure will cause the pipe section 45 to straighten to a degree, to cause the water passing therefrom to

be directed into the flush tank, beyond the upper end of the overflow pipe 48.

In Figure 17, I have illustrated a movable pipe section 49 which directs water into the tray 50 which is secured to the upper end of the overflow pipe 51, by means of the split band 52, which is shown as clamping the flange 53 of the tray 50.

As shown by Figure 18, the tray which is indicated at 54 is provided with spaced flanges 55 which permit the tray to be readily positioned over the upper edge of the overflow pipe with which it is used.

From the foregoing it will be seen that due to the construction shown and described, the water which ordinarily is wasted through the overflow pipe during the emptying of the flush tank, is directed to the tank proper, and that when the tank is practically filled, the reduced pressure of the water passing through the pipe which feeds the overflow pipe, will allow the movable pipe section to swing downwardly, directing a volume of water to the overflow, to supply the necessary water to provide a water seal in the bowl used with the flush tank.

What is claimed is:

1. The combination with a flush tank overflow pipe and water feed pipe for directing water to the overflow pipe, of a flexible pipe section connected to the free end of said water feed pipe and adapted to direct water to said overflow pipe, and means controlled by the action of the water passing into the flush tank for moving said flexible pipe section to discharge water either into said overflow pipe or directly into said tank at predetermined intervals.

2. The combination with a flush tank overflow pipe and water feed pipe for directing water to the overflow pipe, of a movable pipe section secured to the free end of said pipe, the discharge end of said pipe normally overlying the open end of the overflow pipe, and means controlled by the action of the water passing into the flush tank for moving said movable pipe section to discharge water either into said overflow pipe or directly into said tank at predetermined intervals.

3. The combination with a flush tank overflow pipe and water feed pipe for directing water to the overflow pipe, of a movable pipe section secured to the free end of said water feed pipe, means for moving the movable pipe section to discharge water at intervals either into the flush tank or into the overflow pipe, and said means embodying a float-controlled lever movable with the rise and fall of the water in said flush tank.

4. The combination with a flush tank overflow pipe and water feed pipe for directing water to the overflow pipe, of a movable pipe section secured to the free end of said water feed pipe and forming a continuation of said water feed pipe, a lever pivotally mounted on said overflow pipe and connected with the movable pipe section, whereby the movable pipe section is moved to direct water either into the overflow pipe or directly into the flush tank, and float-controlled means in the flush tank for moving said lever to operate said movable pipe section.

5. The combination with a flush tank overflow pipe and water feed pipe for directing water to the overflow pipe, of a movable pipe section secured to the free end of said water feed pipe and forming a continuation of said water feed pipe,

whereby water may be directed into the overflow pipe or into the flush tank, means for moving the movable pipe section, said means embodying levers controlled by the action of a float operating in the flush tank.

6. The combination with a flush tank overflow pipe and water feed pipe for directing water to the overflow pipe, of a movable pipe section secured to the free end of said water feed pipe and forming a continuation of said water feed pipe, a pivoted deflector plate mounted at the upper end of the overflow pipe and adapted to direct water passing from the water feed pipe either into the overflow pipe, or directly into the flush tank, and means for operating said deflector plate, said means embodying a float-controlled lever operated by the rise and fall of the water level within the flush tank.

7. The combination with a flush tank overflow pipe and water feed pipe for directing water to the overflow pipe, of a movable pipe section secured to the free end of said water feed pipe and forming a continuation of said water feed pipe, said movable pipe section adapted to direct water either into the overflow pipe or exteriorly of the overflow pipe directly into the flush tank, and means controlled by the action of the water passing into the flush tank, for moving the movable pipe section to a position directly over the overflow pipe, or to a position to discharge water beyond the side of the overflow pipe.

8. The combination with a flush tank overflow pipe and water feed pipe for directing water to the overflow pipe, of a movable pipe section secured to the free end of said water feed pipe and forming a continuation of said water feed pipe, a pivoted deflector plate mounted at the upper end of the overflow pipe, said movable pipe section adapted to discharge water onto the deflector plate to direct water either into the overflow pipe or directly into the flush tank, and float-controlled means for swinging the deflector plate to various positions of adjustment.

9. The combination with a flush tank overflow pipe and water feed pipe for directing water to the overflow pipe, of a movable pipe section secured to the free end of said water feed pipe and forming a continuation of said water feed pipe, a spoon-shaped deflector plate pivotally mounted at the upper end of said overflow pipe directly under the discharge end of the movable pipe section and adapted to receive water from said water feed pipe to direct the water either into the overflow pipe or directly into the tank, means for operating said deflector plate, said means embodying a float-controlled rod movable by the rise and fall of the water level within said tank, and a latch member for holding said deflector plate in a position to discharge water directly into the flush tank, for a predetermined period of time.

10. The combination with a flush tank overflow pipe and water feed pipe for directing water to the overflow pipe, of a movable pipe section secured to the free end of said water feed pipe and forming a continuation of said water feed pipe, a deflector plate mounted at the upper end of the overflow pipe, said movable pipe section adapted to discharge water onto the deflector plate to direct water either into the overflow pipe or directly into the flush tank.

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