April 10, 1951 E. C. HARTLEY ET AL 2,548,368

ATTACHMENT FOR TANKS THROUGH WHICH THE TANK MAY BE FILLED

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Fig. 2.

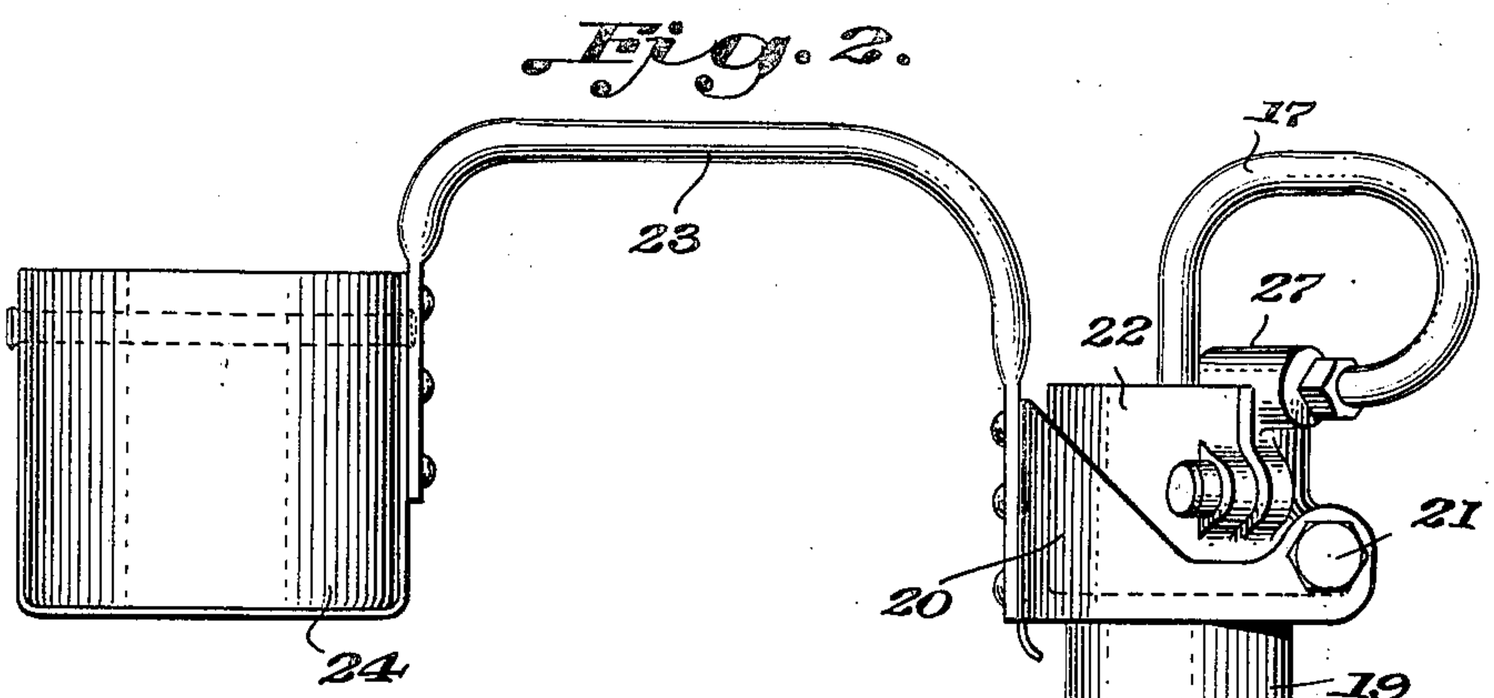

Fig. 1.

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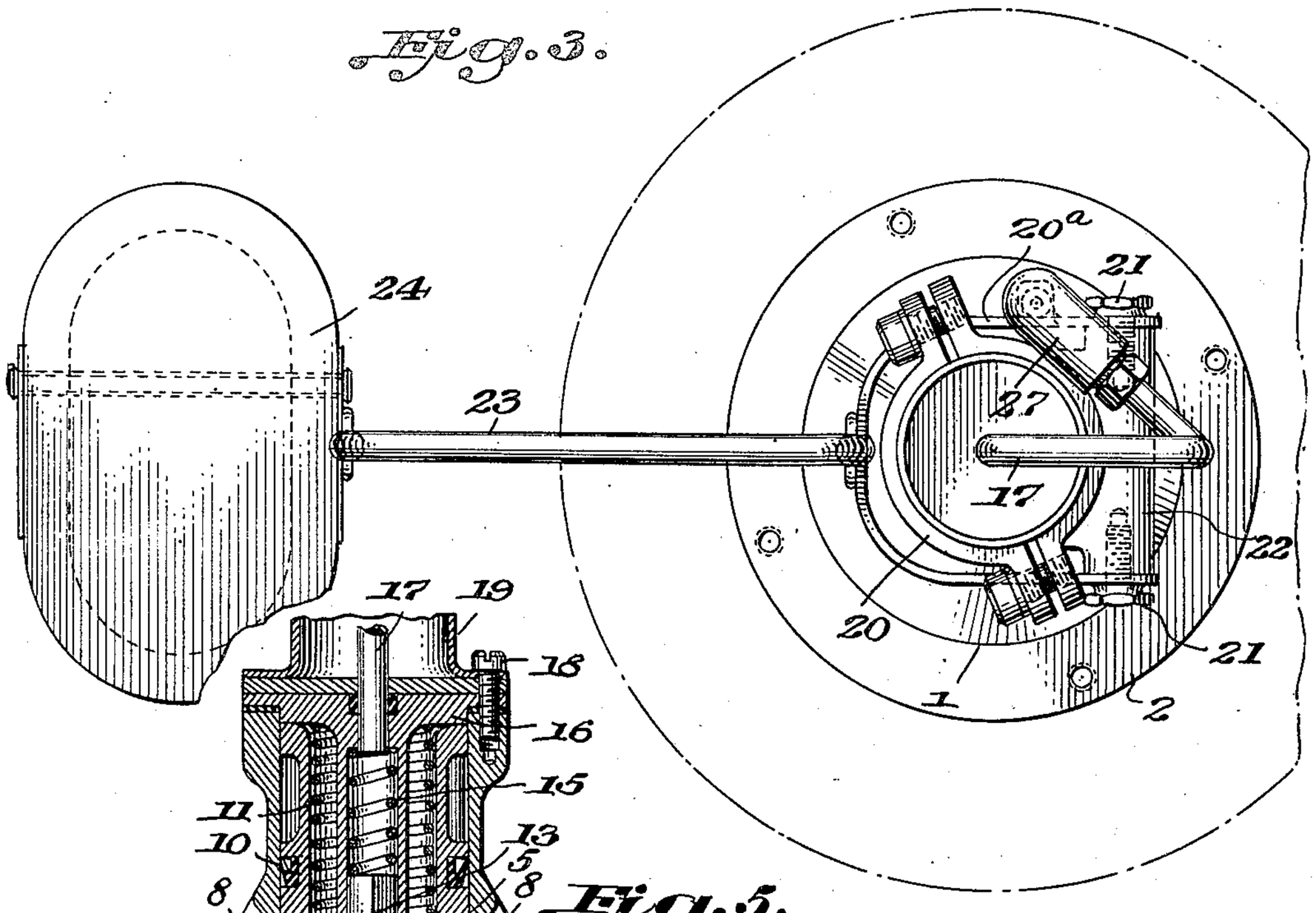
Fig. 3.



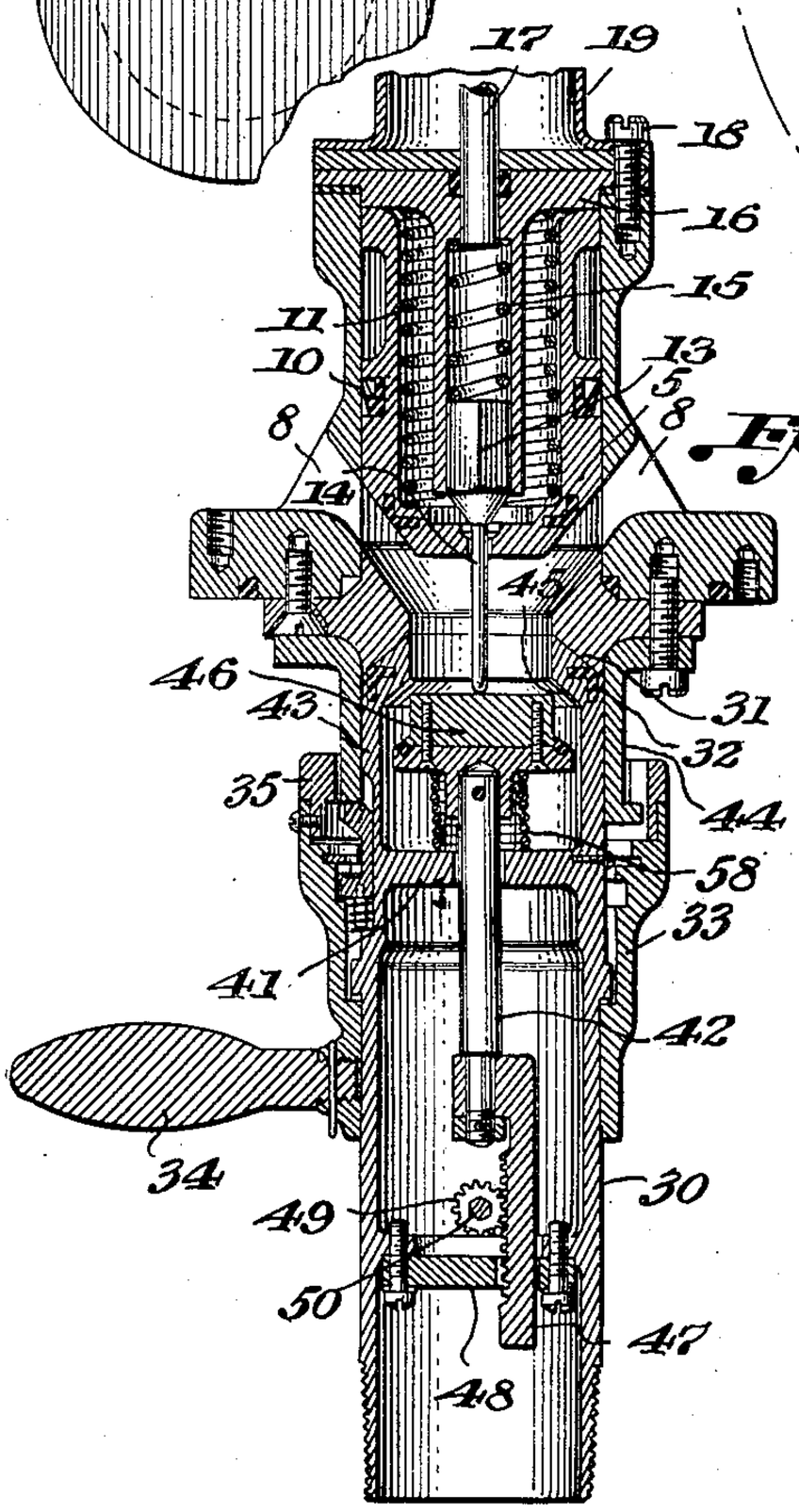


Fig. 5.

Fig. 4.

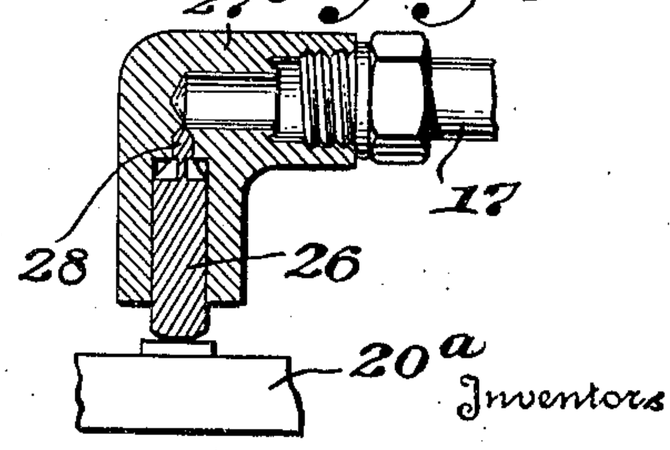


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Fig. 6.

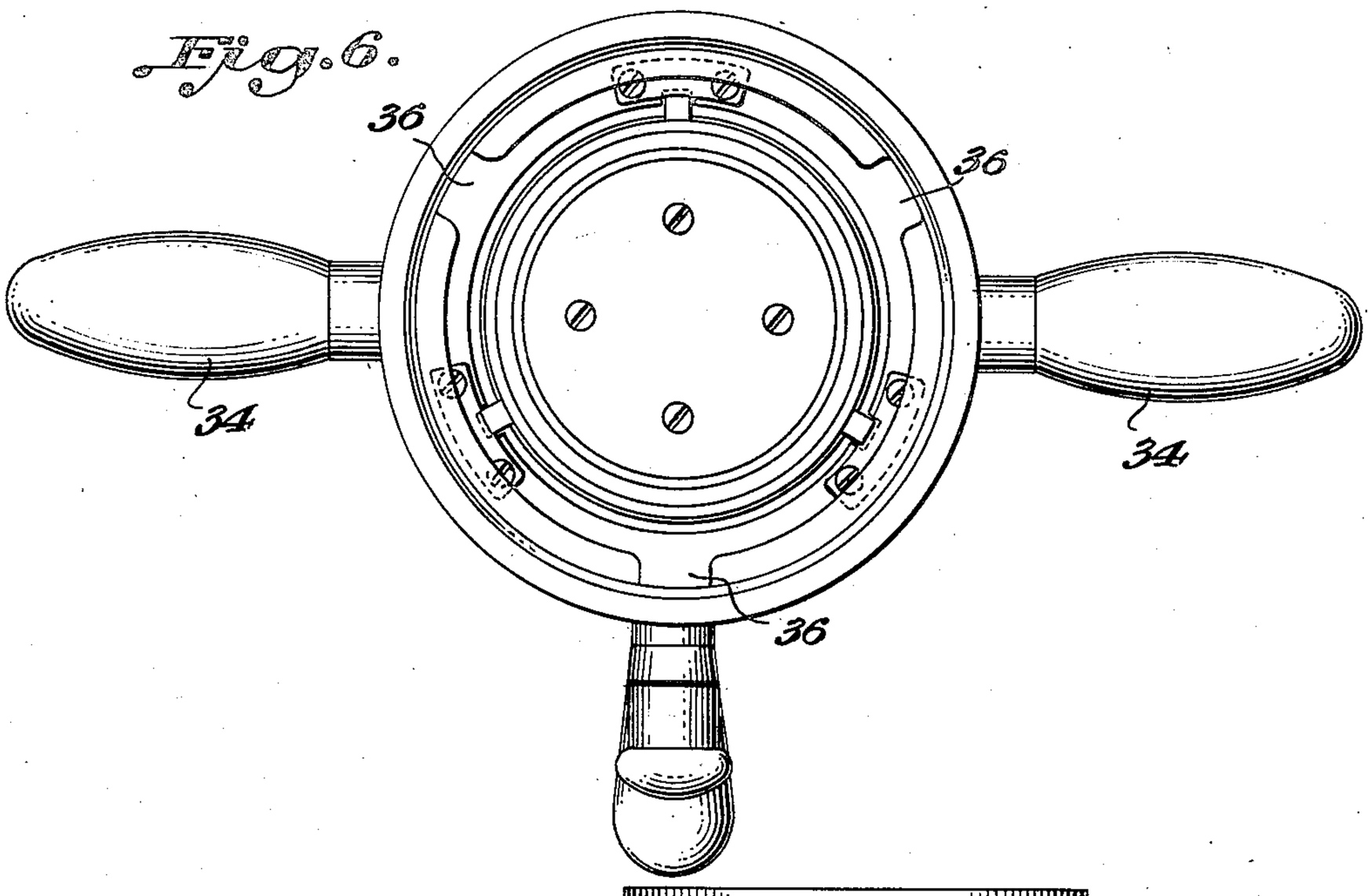


Fig. 7.

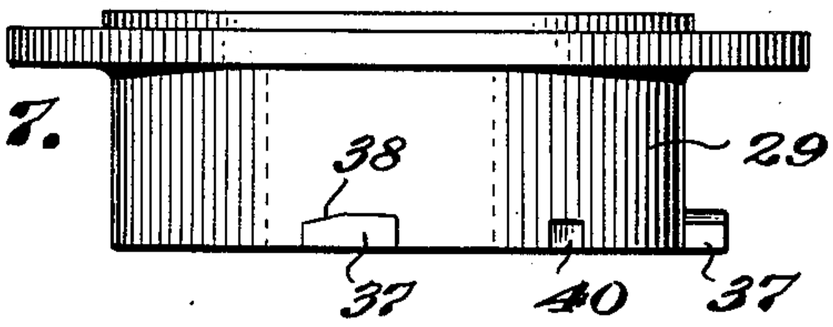


Fig. 8.

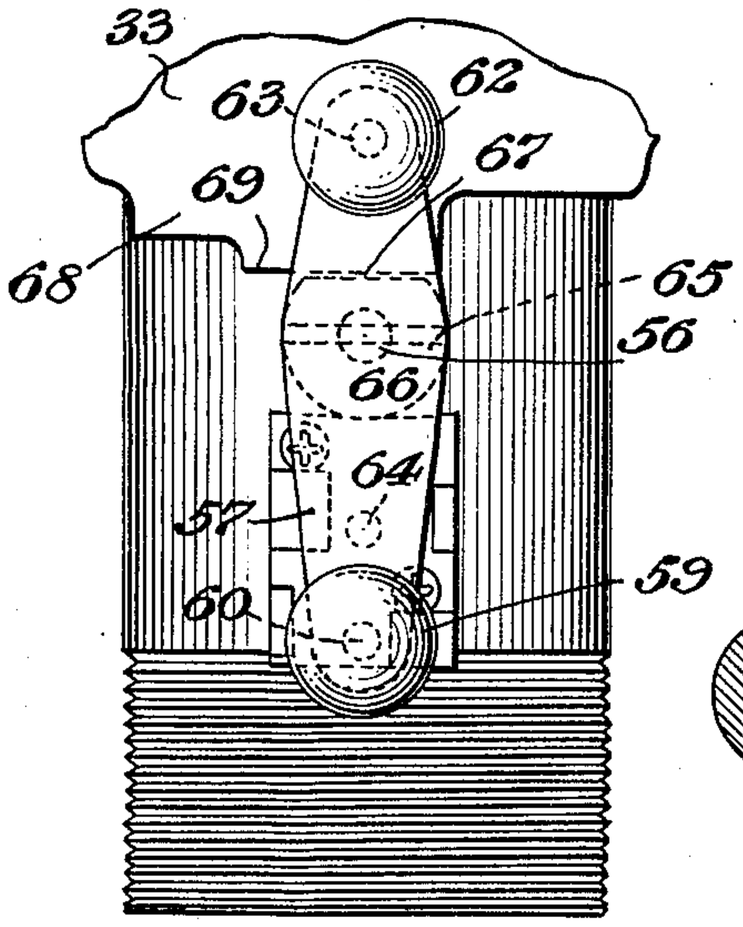
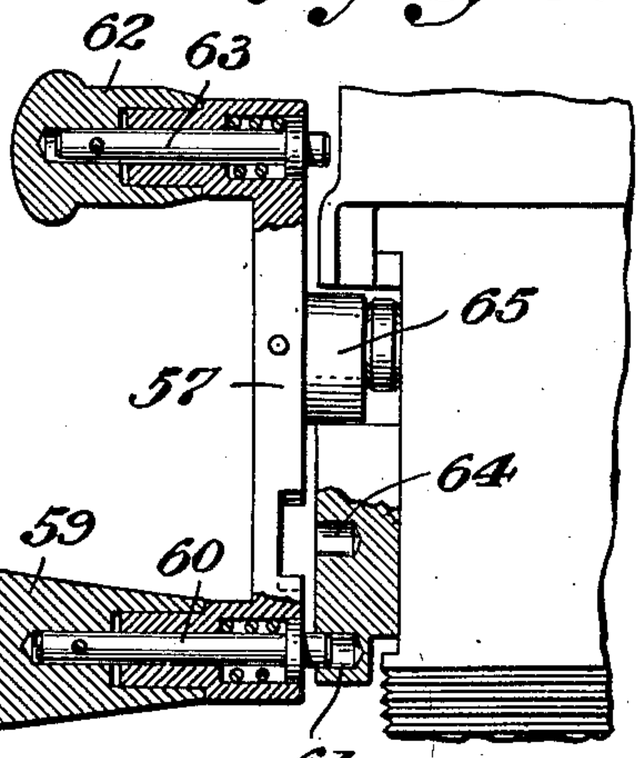


Fig. 9.



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UNITED STATES PATENT OFFICE

2,548,368

ATTACHMENT FOR TANKS THROUGH WHICH THE TANK MAY BE FILLED

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Application November 14, 1947, Serial No. 786,004

10 Claims. (Cl. 137—68)

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The invention relates to new and useful improvements in an attachment for tanks through which the tank may be automatically filled to a predetermined level.

An object of the invention is to provide an attachment which may be connected to a wall of a tank for the filling of the tank, which attachment includes a main valve automatically opened by the pressure on the fluid supplied and automatically closed when the tank is filled to a predetermined level and which also includes an auxiliary valve controlled passage through the main valve with a means for positively opening the auxiliary valve when the tank is to be filled.

A further object of the invention is to provide an attachment of the above type wherein the auxiliary valve is opened by the attaching of the nozzle to the tank for the filling thereof.

A still further object of the invention is to provide an attachment of the above type wherein the nozzle supplying fluid to the tank is provided with a valve for stopping the flow of fluid from the nozzle and wherein means is provided for preventing detachment of the nozzle until the valve has been moved to closed position.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

The improved attachment includes a housing which may be attached to either the top, the side or the bottom wall of a tank, but for the purpose of illustration is shown and will be described as attached to the bottom wall.

In the drawings:

Figure 1 is a vertical sectional view through an attachment for the filling of a tank through the bottom thereof with the main valve in closed position and the nozzle attached;

Figure 2 is a view in side elevation showing the float-controlled pilot valve which automatically controls the closing of the main valve when the tank is filled;

Figure 3 is a plan view of the pilot valve and the operating mechanism therefor;

Figure 4 is a view in section showing the pilot valve as moved to closed position by the lifting of the float;

Figure 5 is a view similar to Figure 1 but showing the means for actuating the nozzle valve and also showing the said nozzle valve as open and the main valve open so that the filling of the tank is being accomplished;

Figure 6 is a plan view of the nozzle detached from the tank;

Figure 7 is a side view of the sleeve which is secured to the valve housing and to which the nozzle is adapted to be attached;

Figure 8 is a side view of a portion of the nozzle showing the operating means for opening and closing the nozzle valve; and

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Figure 9 is a view partly in side elevation and partly in section to illustrate the locking means which holds the devices for controlling the nozzle valve in open and closed position.

The improved attachment includes a housing which is adapted to be attached to any wall of a tank but, as illustrated, it is attached to the bottom wall of the tank. The housing has a filling opening at the lower side thereof which is surrounded by a valve seat and an inwardly opening valve is normally spring pressed against said seat for closing the inlet. The housing is provided with ports leading to the tank and when the main valve is seated, these ports are covered. The main valve has a passage therethrough controlled by an auxiliary valve so that when the auxiliary valve is moved to open position, fluid may enter the chamber above the valve through said passage. The chamber above the valve is connected to a pipe leading to the upper side of the tank where there is a pilot valve controlled by a float. The nozzle through which the tank is filled is provided with a valve for stopping flow of liquid through the nozzle. This valve is provided with means which engages a stem carried by the auxiliary valve so that when the nozzle is connected to the tank, the auxiliary valve would be moved to open position and thus permit fluid to flow out from the under side of said main valve to the chamber above the same. Means is provided whereby the nozzle valve is opened manually and closed manually. There is means associated with the means for closing the valve which prevents a detaching of the nozzle until the nozzle valve is fully closed.

Referring more in detail to the drawings, the improved attachment for filling tanks through the bottom thereof includes a housing 1 indicated in broken lines, which housing is attached to the bottom wall of the tank and, as shown, the housing depends from the bottom of the tank. The housing may be said to be in two sections, the section 1 shown in broken lines and section 2 which is shown in section in Figure 1. This housing section 2 has an opening therethrough at the bottom and mounted on the under side of this housing section 2 is a ring member 3. The under face of this ring member 3 tapers outwardly in an upward direction and provides the valve seat indicated at 4. The opening through this ring member 3 is the filling opening. This filling opening is controlled by a main valve 5. The main valve has an upwardly extending sleeve portion 6 which slides freely within a cylindrical chamber 7 formed in the upper part of the housing section 2. At the lower portion of the housing section 2 are ports 8, 8 which lead to the tank.

The valve sleeve 6 is provided with an annular recess in which is located the gasket 10. This

gasket is so shaped that it engages the inner face of the cylindrical chamber 1. The valve is moved into engagement with the seat 4 by means of a spring 11. The valve has a passage 12 therethrough so that fluid may pass from the under side of the valve into the chamber above the valve. This passage is controlled by an auxiliary valve 13 having a depending stem 14 which extends through the passage. This stem is smaller in diameter than the passage so that the fluid may enter the upper chamber through the passage, although the stem at all times extends through this passage. There is a spring 15 bearing upon the upper side of the auxiliary valve 13.

The upper end of the housing section 2 is closed by means of a cover plate 16. This cover plate has a depending sleeve in which the auxiliary valve 13 is carried.

Attached to the cover plate 16 is a pipe 17 which extends to the upper end of the tank. The cover plate is secured to the upper end of the housing section 2 by means of bolts 18. A protection sleeve 19 is attached to the cover plate by these bolts 18 and extends upwardly to a point adjacent the upper side of the tank. This protection sleeve prevents the pipe 17 from being disturbed and also serves as a mounting for a float lever 20. The float lever 20 is pivoted at 21 to a bracket 22 secured to the upper end of the protective sleeve 19. The float lever 20 is yoke shaped and carries an arm 23 to which a float 24 is attached. The arm 20a of the yoke carries a plate 25 which is adapted to contact a pilot valve 26. On the upper end of the pipe 17 is an elbow 27 having a seat 28 with which the pilot valve 26 makes contact. When the float is lowered and the plate is moved from contact with the valve, the valve will move by gravity to open position.

This valve 26 is irregular in cross section so that when it is in open position, there is free passage from the pipe to the tank. When the valve is closed, then the pipe is sealed at the upper end.

Attached to the under side of the valve housing and the ring member 3 is a sleeve 29. This sleeve is for the purpose of permitting a nozzle to be attached to the housing in sealed connection therewith for supplying fluid to the tank through the inlet opening in the housing. The nozzle includes an inner sleeve member 30 which freely fits within the housing sleeve 29. On the under face of the ring member 3 and surrounding the inlet opening therethrough is a seat 31. The end of the inner sleeve 30 of the nozzle engages this seat and a gasket 32 serves to seal the connection. Mounted on the inner sleeve 30 is an outer sleeve 33 to which are secured handles 34, 34. Attached to the outer end of the outer sleeve 33 is a ring 35. This ring projects inwardly and is provided with slots 36, 36. Preferably there are three of these slots.

The housing sleeve 29, as shown in Figure 7, is provided with projecting lugs 37, 37. There are three of these lugs and they pass through these slots and then the nozzle is turned so as to bring the ring over the lugs. The lugs are tapered, as indicated at 38, so that the turning of the nozzle sleeve 29 will force the inner sleeve firmly against the seat on the ring 3.

In order to prevent the inner sleeve from turning on the seat during the attachment of the nozzle to the housing, locking dogs 39 are provided which are mounted in channels extending lengthwise of the inner sleeve 30. There are

three of these dogs. The housing sleeve 29 is provided with three slots, one of which is shown at 40 in Figure 7. When the nozzle is moved into the housing sleeve 29, these dogs will engage the slot and this will prevent the inner sleeve from turning when the outer sleeve is turned about the outer sleeve for the locking of the nozzle to the housing.

The inner sleeve 30 has a spider partition extending across the same indicated at 41. Mounted for reciprocation in this spider partition is a valve stem 42 carrying a valve 43 at the upper end thereof.

The valve 43 is provided with a gasket 44 which engages a valve seat 45 on the inner face of the end member of the sleeve 30. The valve is provided with a filler head 46 which moves up into the opening in the end of the sleeve 30 and substantially fills the opening when the valve is closed so as to leave very little space between this filler head and the under face of the main valve when said main valve is seated.

The valve stem is connected to a rack bar 47 which is carried in a spider partition 48. The rack bar meshes with a gear 49 carried by the shaft 50. The shaft 50 extends through the wall of the sleeve 30 and rigidly fixed to the shaft is a crank lever 57. This crank lever serves as a means for turning the shaft for moving the valve toward and from its seat. There is a spring 58 surrounding the valve stem and disposed between the valve and the spider partition 41 which normally presses the valve toward its seat.

The movements of the nozzle valve, however, are controlled by the crank lever 57. There is a handle member 59 connected to one end of this crank lever having a yieldable locking pin 60 therein adapted to engage a recess 61 when the valve is in closed position. There is a second handle 62 provided with a locking pin 63 which engages the recess 64 when the valve is moved to open position.

Mounted on the shaft 50 is a collar 65. This collar is rigidly attached to the shaft and is provided with a circular portion 66 and with a flat segmental portion 67. The outer sleeve 33 is provided with a projecting portion 68 having a flat face 69. When the sleeve is in the position shown in Figure 8, the flat face 69 is opposed to the flat face 67 and this prevents the turning of the shaft for the opening of the valve. When the outer sleeve 33 is rotated on the inner sleeve for connecting the nozzle to the tank, then the flat face 69 will move out of engagement with the flat face 67 and this will permit the shaft to be turned for the opening of the valve, then the circular portion will move into the path of the projection 68 so that the outer sleeve cannot be turned for detaching the nozzle from the housing until the crank lever is turned to move the nozzle valve to completely closed position.

The specific embodiment of the nozzle attaching means and the means for preventing the nozzle from being detached until the nozzle valve is closed is the invention of Robert H. Davies and is shown and described in application Serial No. 754,302, filed June 12, 1947, now Patent No. 2,519,358 granted August 22, 1950.

The operation of the device is thought to be obvious from the description given above. In Figure 1, the main valve is shown as closed and the nozzle has been attached ready for the opening of the nozzle valve for the filling of the tank. It is assumed that at this time the tank is empty or partially empty and that the float has dropped

so that the valve **26** is released and the tube **17** is open at its upper end to the tank. When the nozzle is attached, the stem **14** of the auxiliary valve is contacted by the filler head of the nozzle valve and raised to the position shown in Figure 1. As noted, when the valve is in this position, there is a restricted passage through the main valve from the under side thereof to the upper side thereof. After the nozzle has been fully attached by the turning of the outer sleeve **33**, then the projection **68** has moved away from the collar **65** so that the shaft **50** can be turned for opening the nozzle valve. When the nozzle valve is opened, fluid under pressure from the supply will pass said nozzle valve and engage the main valve and lift it from its seat. Some of the fluid will pass through the restricted opening in the valve to the upper side thereof. The passage through the tube **17** when the pilot valve is open is considerably larger than the restricted passage through the valve and therefore the pressure on the upper side of the valve will be less than the pressure on the lower side of the valve and this is what moves the valve to open position.

When the tank is filled, the float **24** will be raised to the position shown in Figure 2 and this will cause the contact plate **25** to engage the valve **26** and move it to closed position. As soon as the tube is closed, then the pressure of the fluid passing through the restricted opening to the upper side of the valve will balance or exceed the fluid pressure against the under side of the valve and the valve will move to closed position. When a spring is used, this will aid in the moving of the valve to closed position. When the gasket carried by the valve contacts with the valve seat, this will reduce the area on the under side of the valve contacted by the fluid pressure relative to the area on the upper side of the valve and this will firmly hold the valve seated, while the fluid pressure is on. The nozzle cannot be detached until the nozzle valve has been moved to closed position and the collar **65** turned to a position where the flat face thereof will be opposed to the flat face **69** on the sleeve. This permits the nozzle to be detached by the turning of the outer sleeve **33** for bringing the slots **36** into register with the lugs **37** on the housing sleeve **29**.

The space between the filler head and the main valve is a limited space and therefore very little fluid will be trapped in said space. The fluid which may be trapped therein does not interfere with the closing of the nozzle valve, as the restricted opening through the valve is still free. When, however, the nozzle is detached and the stem **14** released, then the spring above the auxiliary valve will force it downwardly until it comes into engagement with the seat at the upper side of the restricted opening through the said valve. This will completely close the auxiliary passage and prevent any dripping of liquid therefrom.

It is obvious that many changes may be made in the details of construction of the present embodiment of the invention without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. A filling attachment for tanks comprising a valve housing having an inlet port, a main valve within the housing for closing said port, said housing having openings for connecting the inlet port to the interior of the tank to which the device is to be attached, said main valve defining with said housing a pressure chamber, said main valve having a restricted opening connecting the inlet port and the pressure chamber, a guide member extending from a wall of said pressure chamber toward said main valve, an auxiliary valve supported by said guide member for controlling the passage of fluid through said restricted opening in the main valve, said housing having a passage for connecting the pressure chamber with the interior of the tank to which the attachment is to be connected, and a float controlled pilot valve for closing said passage.

2. A filling attachment for tanks comprising a valve housing having an inlet port, a main valve within the housing for closing said port, said housing having openings for connecting the inlet port to the interior of the tank to which the device is to be attached, said main valve defining with said housing a pressure chamber, said main valve having a restricted opening connecting the inlet port and the pressure chamber, a guide member extending from a wall of said pressure chamber toward said main valve, an auxiliary valve supported by said guide member for controlling the passage of fluid through said restricted opening in the main valve, said housing having a passage for connecting the pressure chamber with the interior of the tank to which the attachment is to be connected, and a float controlled pilot valve for closing said passage, said auxiliary valve having a stem extending through said opening whereby the auxiliary valve may be moved to open position.

3. A filling attachment for tanks comprising a valve housing having an inlet port, a main valve within the housing for closing said port, said housing having openings for connecting the inlet port to the interior of the tank to which the device is to be attached, a spring for moving the valve toward the seat, said main valve having a sleeve projecting therefrom and forming with said housing a chamber in the inner side of the valve, said main valve having a restricted opening connecting the inlet port with the pressure chamber, a guide member extending from a wall of said pressure chamber toward said main valve, an auxiliary valve supported by said guide member for controlling the passage of fluid through the restricted opening, said housing having a passage for connecting the pressure chamber with the interior of the tank to which the attachment is to be connected, a float controlled pilot valve for closing said passage, said housing having means for connection with a filler nozzle, and means on the auxiliary valve directly engageable by a nozzle when connected to the housing for positively opening the auxiliary valve.

4. The combination of a tank, a housing attached to a wall of the tank and having an inlet surrounded at the inner side by a valve seat, a main valve in the housing for closing the inlet, said housing having openings leading to the interior of the tank, said main valve defining with said housing a pressure chamber, a tube attached to said housing and connected to said pressure chamber, said tube extending to a point adjacent the upper side of the tank, a float controlled pilot valve for closing the tube when the tank is filled to a predetermined level, said main valve having a restricted opening connecting the inlet port and the pressure chamber, an auxiliary valve within the housing for closing said restricted opening, a supply nozzle adapted to be detachably connected to the housing at said inlet, and means whereby the connecting of the nozzle to the tank will positively open said auxiliary valve.

5. The combination of a tank, a housing attached to a wall of the tank and having an inlet surrounded at the inner side by a valve seat, a main valve in the housing for closing the inlet, said housing having openings leading to the interior of the tank, said main valve defining with said housing a pressure chamber, a tube attached to said housing and connected to said pressure chamber, said tube extending to a point adjacent the upper side of the tank, a float controlled pilot valve for closing the tube when the tank is filled to a predetermined level, said main valve having a restricted opening connecting the inlet port and the pressure chamber, an auxiliary valve within the housing for closing said restricted opening, a supply nozzle adapted to be detachably connected to the housing at said inlet, a valve within said nozzle for controlling the flow of fluid therefrom, and means whereby said nozzle will positively open the auxiliary valve when connected to the tank.

6. The combination of a tank, a housing attached to a wall of the tank and having an inlet surrounded at the inner side by a valve seat, a main valve in the housing for closing the inlet, said housing having openings leading to the interior of the tank, said main valve defining with said housing a pressure chamber, a tube attached to said housing and connected to said pressure chamber, said tube extending to a point adjacent the upper side of the tank, a float controlled pilot valve for closing the tube when the tank is filled to a predetermined level, said main valve having a restricted opening connecting the inlet port and the pressure chamber, an auxiliary valve within the housing for closing said restricted opening, a supply nozzle adapted to be detachably connected to the housing at said inlet, a valve within said nozzle for controlling the flow of fluid therefrom, means whereby said nozzle will positively open the auxiliary valve when connected to the tank, and means for preventing the detachment of the nozzle until the nozzle valve is closed.

7. The combination of a tank, a housing attached to a wall of the tank and having an inlet surrounded at the inner side by a valve seat, a main valve in the housing for closing the inlet, said housing having openings leading to the interior of the tank, said main valve defining with said housing a pressure chamber, a tube attached to said housing and connected to said pressure chamber, said tube extending to a point adjacent the upper side of the tank, a float controlled pilot valve for closing the tube when the tank is filled to a predetermined level, said main valve having a restricted opening connecting the inlet port and the pressure chamber, an auxiliary valve within the housing for closing said restricted opening, a supply nozzle adapted to be detachably connected to the housing at said inlet, a valve within said nozzle for controlling the flow of fluid therefrom, said auxiliary valve having a stem carried thereby and projecting through the restricted opening and contacting with said nozzle valve whereby the connection of the nozzle to the tank will open said auxiliary valve.

8. The combination of a tank, a housing attached to a wall of the tank and having an inlet surrounded at the inner side by a valve seat, a main valve in the housing for closing the inlet, said housing having openings leading to the interior of the tank, said main valve defining with said housing a pressure chamber, a tube attached to said housing and connected to said pressure chamber, said tube extending to a point adjacent the upper side of the tank, a float controlled pilot valve for closing the tube when the tank is filled to a predetermined level, said main valve having a restricted opening connecting the inlet port and the pressure chamber, an auxiliary valve within the housing for closing said restricted opening, a supply nozzle adapted to be detachably connected to the housing at said inlet, a valve within said nozzle for controlling the flow of fluid therefrom, said auxiliary valve having a stem carried thereby and projecting through the restricted opening and contacting with said nozzle valve whereby the connection of the nozzle to the tank will open said auxiliary valve, and means whereby said nozzle cannot be detached from the housing until the nozzle valve is closed.

9. A filling attachment for tanks comprising in combination, a housing adapted to be attached to a wall of a tank, said housing having an inlet port, a main valve within the housing for closing said port, said housing having openings for connecting the inlet port to the interior of the tank, said main valve defining with said housing a pressure chamber, said main valve having a restricted opening connecting the inlet port and the pressure chamber, an auxiliary valve within the housing for closing said restricted opening, said housing having a passage for connecting the pressure chamber with the interior of the tank, a float controlled pilot valve for closing said passage, a supply nozzle adapted to be detachably connected to the housing at said inlet, and means whereby the connecting of the nozzle to the tank will positively open said auxiliary valve.

10. A filling attaachment for tanks comprising in combination, a housing adapted to be attached to a wall of a tank, said housing having an inlet port, a main valve within the housing for closing said port, said housing having openings for connecting the inlet port to the interior of the tank, said main valve defining with said housing a pressure chamber, said main valve having a restricted opening connecting the inlet port and the pressure chamber, an auxiliary valve within the housing for closing said restricted opening, said housing having a passage for connecting the pressure chamber with the interior of the tank, a float controlled pilot valve for closing said passage, a supply nozzle adapted to be detachably connected to the housing at said inlet, said auxiliary valve having a stem extending through said opening and contacting with said nozzle whereby the connection of the nozzle to the tank will open said auxiliary valve.

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