W. A. HARDWICK.

CUT-OFF FOR BARREL FILLING MACHINES.

APPLICATION FILED OCT. 2, 1908.

923,833.

Patented June 8, 1909

2 SHEETS—SHEET 1.

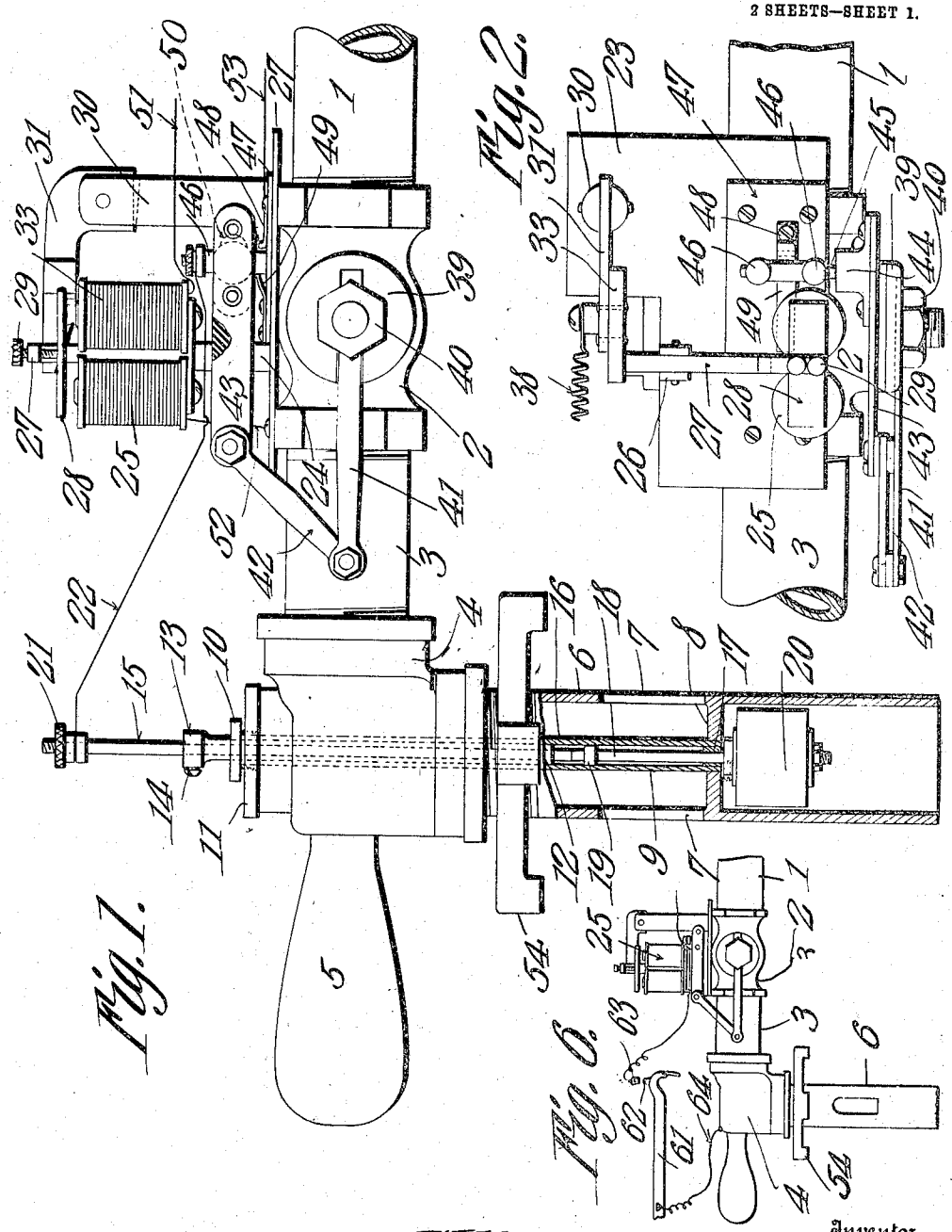


Fig. 1.

Fig. 2.

Fig. 6.

Witnesses

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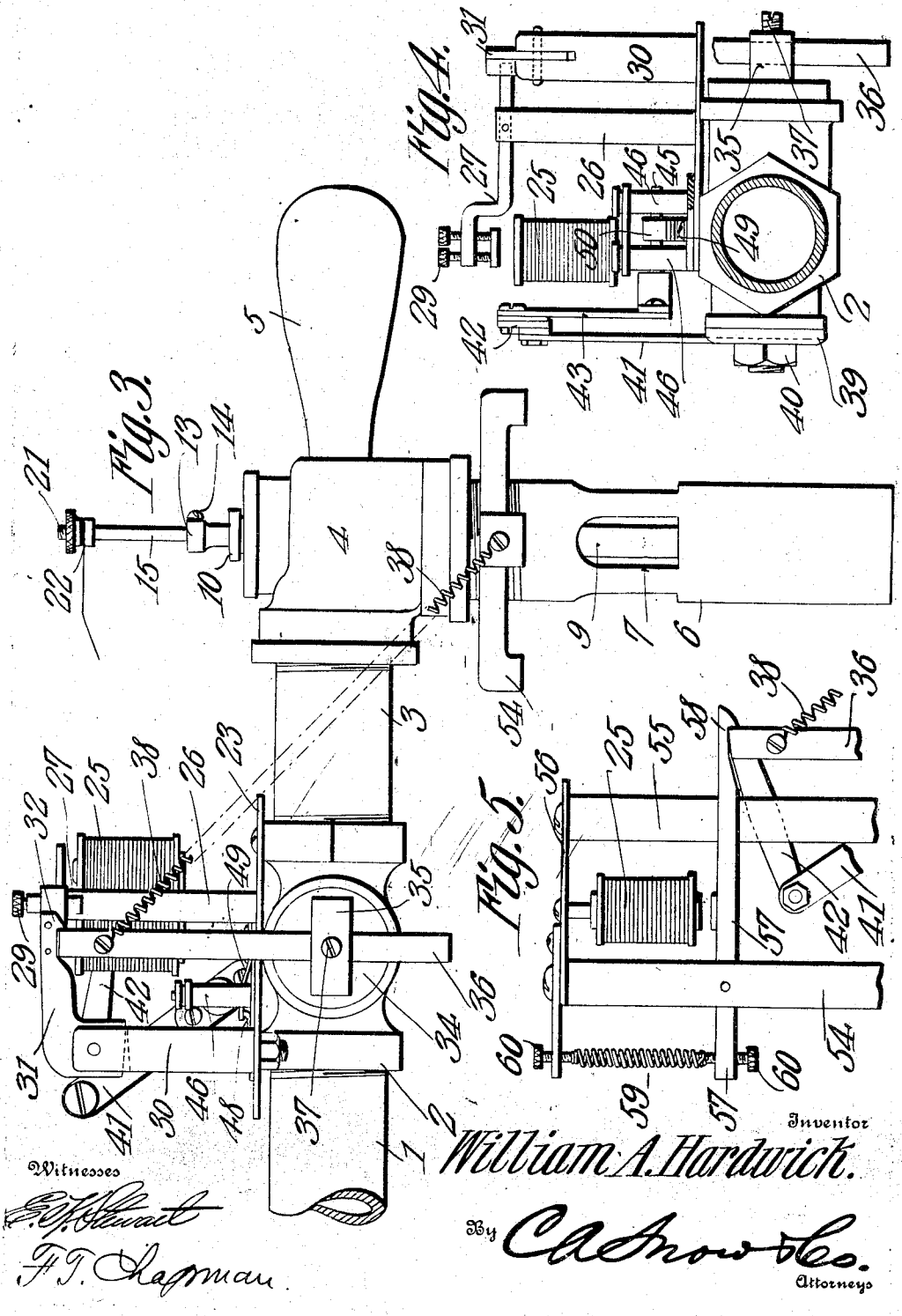
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UNITED STATES PATENT OFFICE.

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CUT-OFF FOR BARREL-FILLING MACHINES.

No. 923,833. Specification of Letters Patent. Patented June 8, 1909.

Application filed October 2, 1908. Serial No. 455,882.

To all whom it may concern:

Be it known that I, WILLIAM A. HARDWICK, a citizen of the United States, residing at Memphis, in the county of Shelby and State of Tennessee, have invented a new and useful Cut-Off for Barrel-Filling Machines, of which the following is a specification.

This invention has reference to improvements in barrel filling machines and its object is to provide a device which will cut off the flow of liquid into barrels or other containers when the proper level therein has been reached.

In the present invention a valve is provided between a source of supply and the barrel or other container in the conduit for the fluid and this valve when open is maintained in the open position against a force tending to close it by a suitable latch. When the fluid level has been reached at which point it is desired to cut off the flow of the liquid then the rise in fluid level causes the closure of an electric circuit by means of which the valve is released to the force tending to close it and furthermore the electric circuit is broken by the closure of the valve so that the electric energy is not wasted.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings,

Figure 1 is a side elevation partially in section of the improved cut off device as viewed from one side, the position of the parts shown being that which they assume when the valve is closed. Fig. 2 is a plan view of a portion of the structure shown in Fig. 1. Fig. 3 is a side elevation of the structure shown in Fig. 1 but viewed from the opposite side and with the parts in position assumed when the valve is open. Fig. 4 is an end elevation of the structure shown in Fig. 1 with parts broken away, and Fig. 5 is a view of a modified form of a portion of the structure. Fig. 6 is a view showing the invention adapted for determining quantities of liquids by weight instead of level.

Referring to the drawings there is shown a supply pipe 1 which is assumed to come from a suitable source of supply of liquid to be stored in barrels or other containers. The supply pipe 1 is connected to a valve 2, which in general may be of ordinary type, but has certain attachments which will be referred to hereinafter. Leading from the valve 2 is a nipple 3 connected to a casting 4 which in general shape is that of an ordinary ell. Connected to the casting 4 opposite the point of entrance of the nipple 3 is a handle 5 by means of which the structure may be placed in a barrel through the bung hole or may be transported from place to place. Leading from the casting 4 at a point at right angles to the entrance of the nipple 3 is a pipe 6 of such size and length as to be readily introducible into a barrel through the bung hole thereof and to extend down into the barrel a suitable distance below the highest predetermined liquid level when the barrel is as full as desired.

In using the term barrel throughout this description it is understood to indicate any type of container, and the term is used for convenience of description since the invention is by no means limited to use in barrels only.

The pipe 6 has its sides pierced by openings 7 and below these openings the pipe is provided with a web or diaphragm 8. There is a tube 9 secured at the lower end in the web or diaphragm 8 and this tube extends up through the casting 4 where it enters a bushing 10 screwed into a neck 11 formed on the corresponding portion of the casting 4. Inside the tube 9 is an insulating sleeve 12 extending up through the bushing and there formed with a head 13 for the reception of a set screw 14, and extending through the insulating sleeve 12 is a rod 15 of conducting material held in place in the sleeve by the set screw 14. The lower end of this rod as indicated at 16 is exposed beyond the sleeve 12. The lower end of the tube 9 is provided with a bushing 17 and through this bushing there extends another rod 18 carrying near its upper end a bushing 19 serving to center the rod in the tube 9. The lower end of the rod 18 below the diaphragm 8 carries a float 20 housed within the pipe 6 which is extended sufficiently below the diaphragm to guide the float 20 throughout the extent of its vertical movement. The upper end of the rod 15 is provided with a clamp nut 21 for securing one end of a conductor 22 thereto, the purpose of this conductor appearing hereinafter.

Mounted on the valve 2 is a plate 23 carrying a post 24 supporting an electro magnet 25 preferably of the horse shoe type. At a point sufficiently removed from the magnet there is another post 26 carried by the plate

23 and to this post is pivoted a lever 27 one end of which carries an armature 28 in operative relation to the polar ends of the magnet 25, the said armature being carried by adjusting screws 29 so that its relative distance to or from the magnet poles may be determined. The plate 23 also carries another post 30 to which is pivoted an arm 31 having its free end formed into a hook or latch 32 and this arm 31 has attached to its free end at one side of the hook 32 a block 33 overriding the corresponding end of the armature lever 27, the construction being such that when the magnet 25 is energized and the armature 28 is attracted thereby the end of the lever 27 beneath the block 33 will be lifted and the latch end 32 of the arm 31 will also be lifted.

The valve 2 is provided with the usual taper plug 34 having at one end a stem 35 pierced for the passage of a bar 36 which is held to the stem by a suitable set screw 37. The bar 36 is of such length that when the valve is moved to the open position the free end of this bar will engage behind the tooth 32 on the end of the arm 31 to be held thereby against the action of a spring 38 connected at one end near one end of the bar 36 and at the other end to a fixed portion of the structure. The tendency of the spring is to move the bar 36 to a position to close the valve and when the valve is opened with the bar 36 caught by the latch end of the arm 31 then the spring is under such tension that when the bar 36 is released from engagement by the latch end of the arm 31 the spring will move the valve until the latter is in the closed position. The other end of the valve plug is provided with the usual washer 39 and nut 40 and the washer 39 is recessed to receive one end of an arm 41, this arm being held in the recess in the washer by the nut 40. The free end of the arm 41 is connected by a link 42 to the free or outer end of a rock arm 43 fast on a hub 44 which in turn is secured to a shaft 45 mounted in suitable bearings in posts 46 rising from a plate 47 of insulating material fast on the plate 23. This insulating plate 47 carries a fixed terminal 48 and a spring terminal 49 in the path of the free end of which the fixed terminal 48 is located, and the tendency of the spring terminal 49 is to move away from the fixed terminal 48. Mounted on the shaft 45 is a cam 50 the purpose of which will presently appear. A leading in wire 51 coming from a suitable source of electric energy is connected to one terminal of the magnet 25 and the other terminal of the magnet 25 is connected by a conductor 52 to the metal plate 23. The other leading in wire 53 is connected to the fixed terminal 48 and the conductor 22 is connected to one of the posts 46 which together with the shaft 45 and cam 50 are of metal. The arm or lever 43 is of insulating material.

Fast to the pipe or tube 6 is a spider 54 adapted to rest on the barrel or other container adjacent to the opening through which the pipe 6 is inserted. This will hold the structure in proper relation to the walls of the barrel without preventing the exit or entrance of air. Let it be supposed that the barrel is empty and that the valve is closed and that the pipe 6 is inserted through the bung hole of the barrel and the leading in wires 51 and 53 are connected up to a suitable source of electric current. The bar or arm 36 is moved against the action of the spring 38 until it is latched by the hook end 32 of the arm 31 thus opening the valve to the flow of liquid from the reservoir to the barrel. The opening of the valve at the same time causes the arm 41 to be moved toward an upright position and through the link 42 has forced the arm or lever 43 to an upright position thus bringing the cam 50 in engagement with the spring contact 49 and forcing the latter into engagement with the stationary contact 48. The circuit may now be traced from the leading in wire 51 to the magnet 25 thence to the plate 23 and through the metal structure of the device to the pipe 6 and rod 18. On the other side the circuit may be traced from the leading in conductor 53 to the contact 48 thence through the contact 49 to the cam 50 and shaft 45 to the post 46 then by conductor 22 to the rod 15. However, since the float 20 is now in the lowermost position because of the absence of fluid in the barrel the circuit is broken between the rod 18 and the rod 15.

When the fluid level in the barrel has reached the proper height then the rod 18 is brought into contact with the lower end of the rod 15 and the circuit is completed thus energizing the magnet 25 and causing the attraction of the armature 28 thus rocking the armature lever on its pivot and thereby lifting the arm 31 so that the tooth 32 is no longer in engagement with the arm or bar 36. The spring 38 now acts to move the valve plug from the open toward the closed position. At the same time this movement is acting through the arm 41 and link 42 to move the arm 43 to the position shown in Fig. 1, thereby moving the cam 50 out of engagement with the spring contact 49 and the latter then moves away from the permanent contact 48 thus rupturing the circuit at this point. This means that even though the circuit be maintained between the rod 18 and the rod 15 by the uplifting action of the float 20, as soon as the valve has been actuated the circuit is broken between the contacts 48 and 49 and so there is no waste of current because of the closure of the circuit between the rods 15 and 18 and the maintaining of these two contacts in engagement.

In Fig. 5 there is shown a slight modification of the electro-magnetic part of the struc-

ture. There are two posts 54, 55 carrying a plate 56 from which the magnet 25 is hung. The post 54 carries an armature lever 57 having one end formed into a hook 58 for engaging the bar 36. The armature lever 57 at the end remote from the hook 58 is under the control of a spring 59, the tension of which may be regulated by screws 60.

The operation is, in general, the same as in the structure of the other figures.

Instead of causing the closing of the valve by the rise in liquid level, the weight of the liquid may be utilized for the same purpose. In Fig. 6 there is shown a scale beam 61 which may be taken as indicative of any suitable scales. The scale beam carries a circuit terminal 62 in the path of which is another terminal 63 to which the conductor 22 may be attached. The scale beam 61 is also electrically connected to the metallic portion of the valve structure or to the other side of the circuit by a conductor 64 or otherwise. When a container on the scale platform has received a predetermined weight of fluid the circuit is completed by the movement of the scale beam and the flow of liquid is stopped the same as with the other structures shown. Of course, the showing of Fig. 6 is illustrative only and the circuit may be closed through any other moving part of the scales instead of through the scale beam.

What is claimed is:—

1. In a device of the character described, a pipe adapted to be inserted in a container, a float housed in said pipe, another pipe connected to the first named pipe at the end remote from the float, a valve in the second named pipe, means tending to close said valve, means for holding the valve in the open position, an electro-magnetic means for releasing the valve from said holding means and mounted on the second pipe adjacent to the valve, means controlled by the float to close the circuit to the electro-magnetic means, and means under the control of the valve for opening the circuit when the valve is moved to the closed position.

2. In a device of the class described, a valve, an arm carried by said valve, a latch carried by the valve structure for holding the arm when the valve is in the open position, a spring for returning the valve to the closed position, an electro magnet carried by the valve structure, an armature for said electro magnet, an armature lever carrying said armature and having the end remote from the armature in operative relation to the latch, another arm carried by the valve plug, a cam actuated by said last named arm, and electric circuit terminals in the circuit of the magnet controlled by the cam.

3. In a device of the class described, a valve having an arm at each end of the valve plug, a spring tending to move the valve to closed position, a latch for holding the valve in the open position and engaging one of the arms, an electro magnet controlling the latch and circuit terminals controlled by the other arm for breaking the circuit at said circuit terminals when the valve is closed.

4. In a device of the class described, a valve, a pipe connected to the valve and designed to be inserted in a container, a yielding member carrying a circuit terminal, a relatively fixed circuit terminal in the path of the yielding terminal, means tending to close the valve normally, a latch for holding the valve in the open position, electro magnetic means for operating the latch to release the valve, connections between the fixed circuit terminal and the electro magnetic means, other circuit terminals carried by the valve, and means under the control of the valve for opening the circuit at the last named circuit terminals when the valve is closed.

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

WILLIAM A. HARDWICK.

Witnesses:
J. H. LECOQ,
C. H. CASEBOLT.