No. 695,929. Patented Mar. 25, 1902.

J. F. HARDY.

SAFETY DEVICE FOR USE IN FILLING FLUID RESERVOIRS.

(Application filed Sept. 21, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

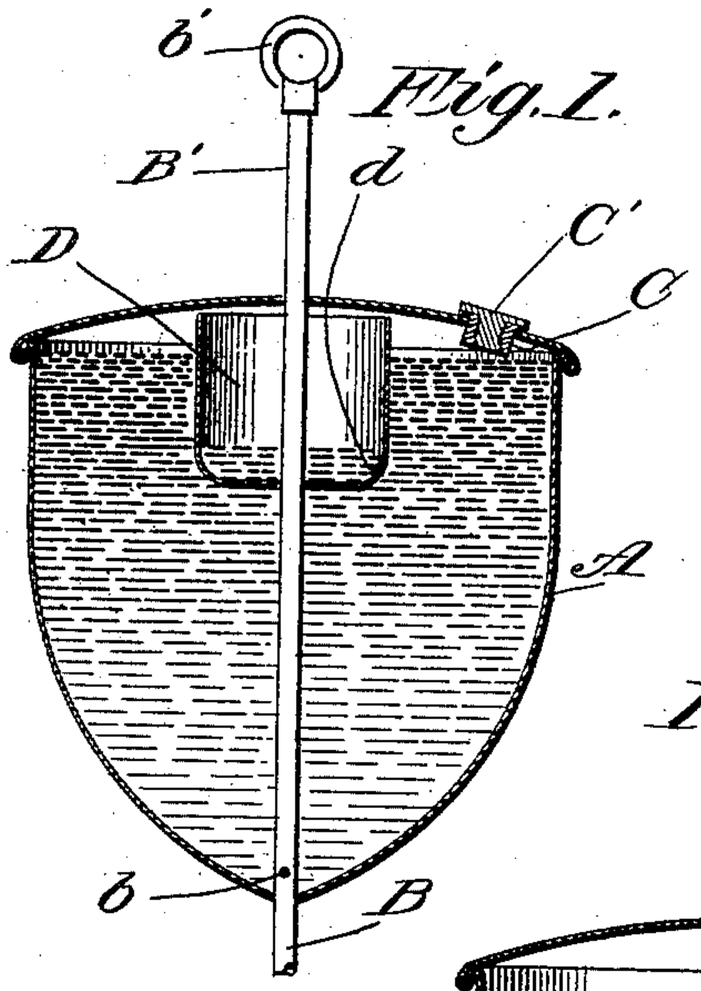

Fig. 2.

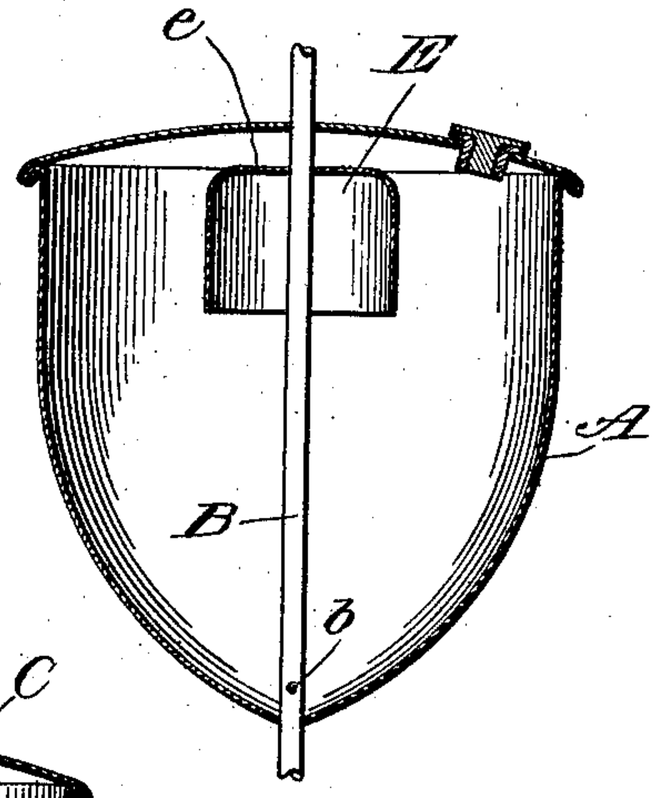

Fig. 3.

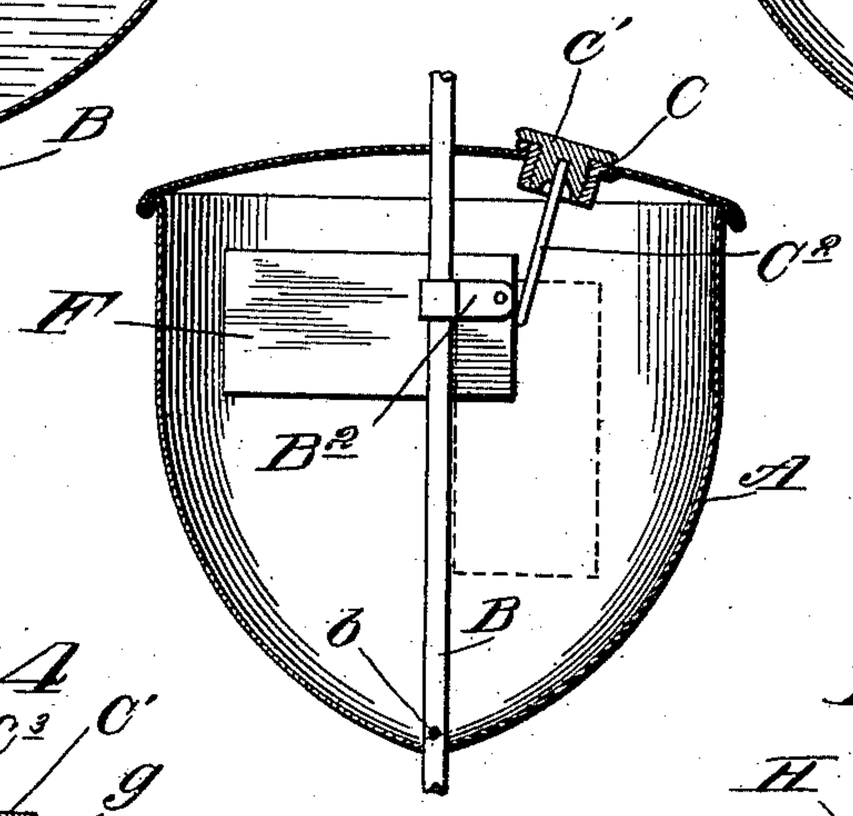

Fig. 4.

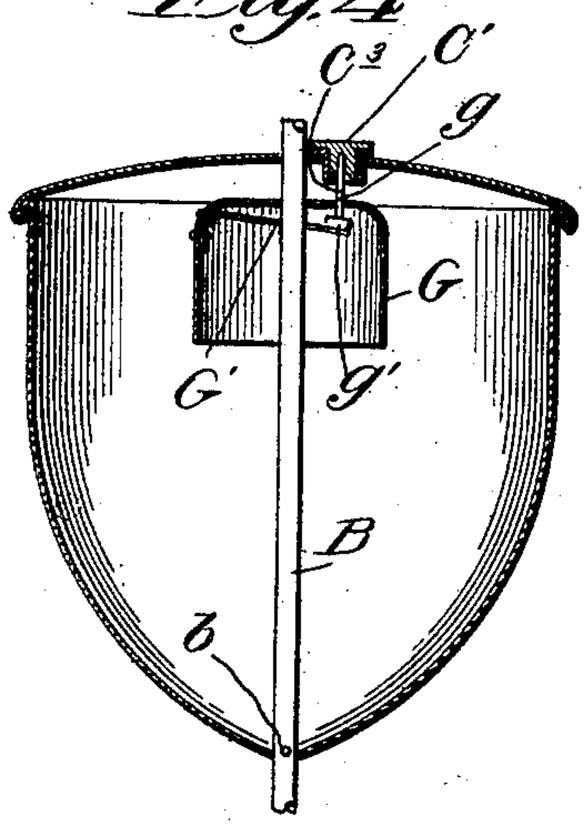

Fig. 5.

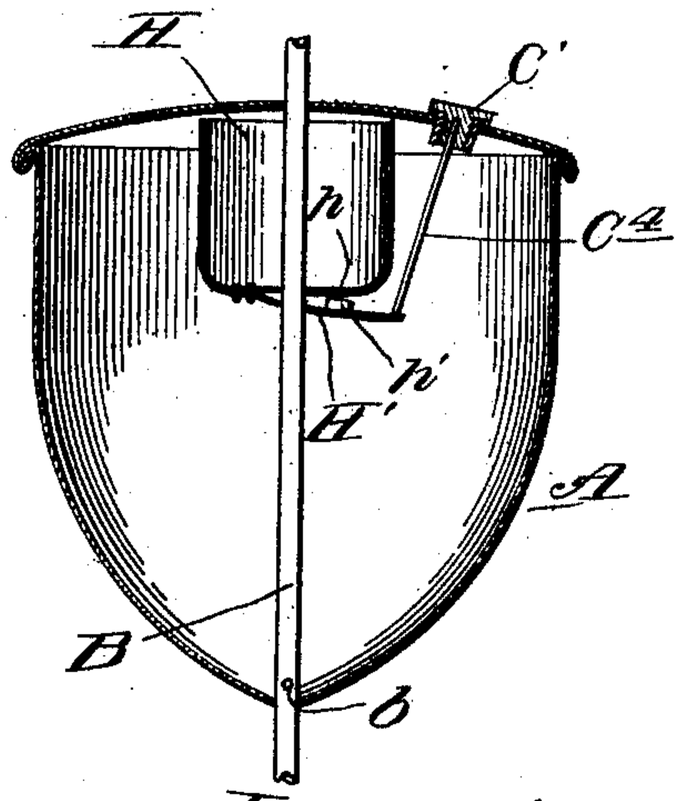

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Fig 6

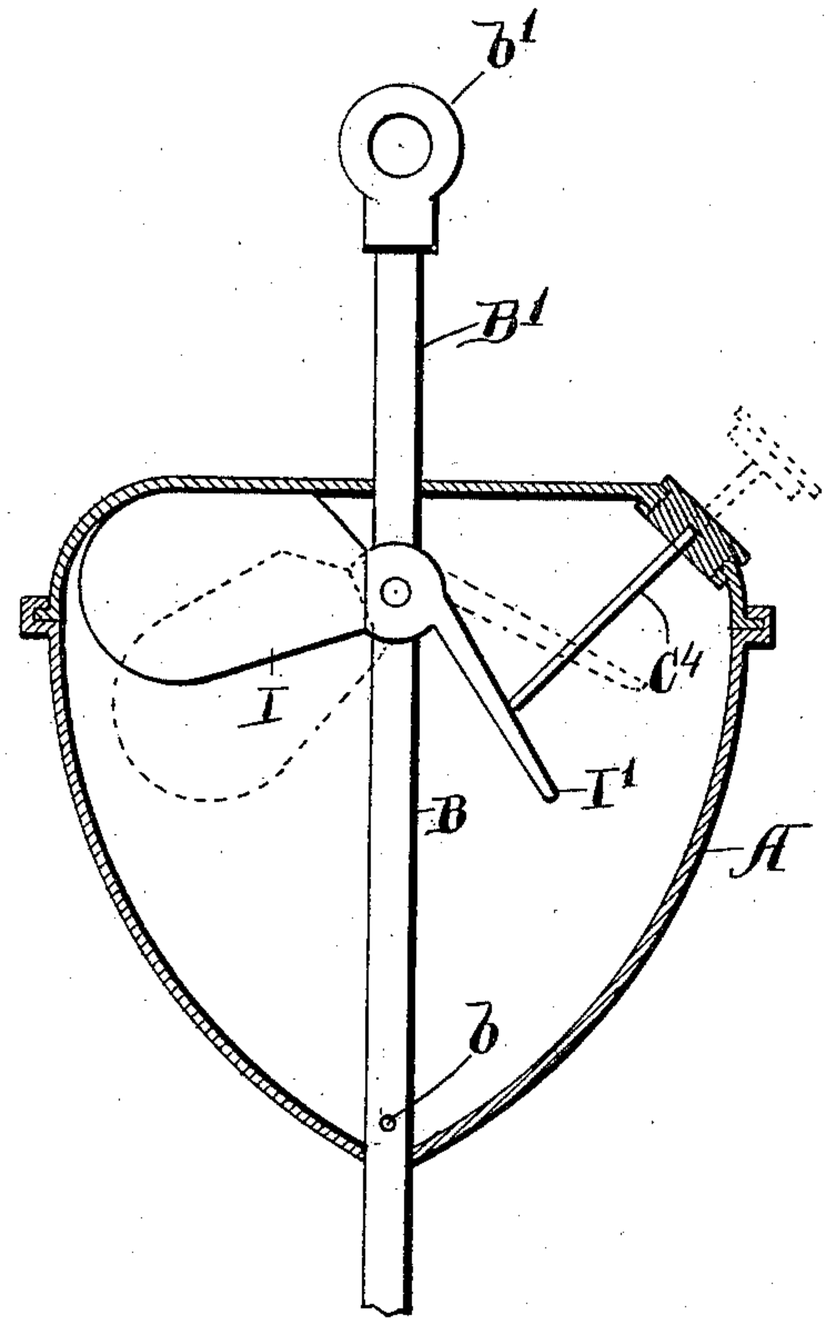
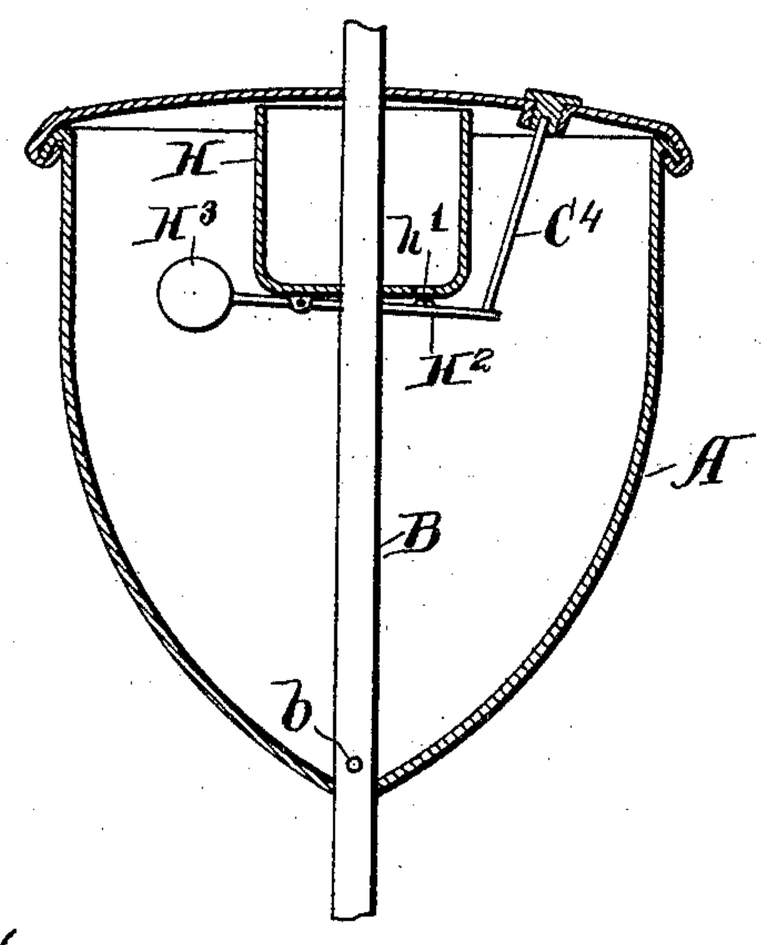


Fig 7



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UNITED STATES PATENT OFFICE.

JOHN F. HARDY, OF MONTICELLO, INDIANA.

SAFETY DEVICE FOR USE IN FILLING FLUID-RESERVOIRS.

SPECIFICATION forming part of Letters Patent No. 695,929, dated March 25, 1902.

Application filed September 21, 1900. Serial No. 30,711. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. HARDY, of Monticello, in the county of White and State of Indiana, have invented certain new and useful Improvements in Safety Devices for Use in Filling Fluid-Reservoirs; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a novel safety device for use in filling liquid-reservoirs, and is designed to prevent the escape of liquid from the reservoir upon expansion of the liquid therein after the reservoir has been filled. The device as herein shown is constructed to be applied to the fount or reservoir of a hydrocarbon-burner.

It is a well-known fact that hydrocarbon liquids, such as gasolene, expand greatly in volume upon the application of heat thereto, and it is a matter of practical observation that many accidents in the handling of hydrocarbon-burners are due to the fact that in filling the fount the same are filled to such a level so that the heat of the burner when lighted causes expansion of the liquid and forces some of the liquid out of the reservoir, which escaped liquid becomes ignited, with the result of igniting articles about the same and in many cases causing large loss of property and life.

The object of this invention is to provide means which without attention or volition on the part of the person filling the reservoir renders it impossible for the reservoir to be filled so full as to permit escape of the liquid when the same has become expanded in the manner set forth, and thereby entirely do away with this factor of danger in the use of hydrocarbon-burners.

A device embodying my invention consists generally of a shiftable body which when the reservoir is being filled is located below the highest level to which the reservoir can be filled and which when the reservoir is filled shifts to a higher position and is displaced by a like volume of liquid in the reservoir, thereby lowering the general level of the liquid in the reservoir, the parts being so proportioned that the final level of the liquid is below the danger-point. Said shiftable body may be a volume of air or a body of greater ponderability than air, as a weight or float.

While I have illustrated in the drawings my invention as applied to the fount or reservoir of a hydrocarbon-burner, it will be apparent that the same may be used in other connections where it is desired to prevent the escape of liquid from a reservoir after the same has been filled.

In the drawings, Figure 1 is a central vertical section of a hydrocarbon-fount provided with my invention. Figs. 2, 3, 4, and 5 are similar sections showing various modifications of the invention. Fig. 6 is a central vertical section of a fount or reservoir, in which my improvements are shown as having the form of a pivoted weight. Fig. 7 is a like view in which a pivoted weight is employed to actuate a valve embodying my improvements.

As shown in Fig. 1, A designates a hollow receptacle which may be made of any form desired and is herein shown as made of convenient form for use with a hydrocarbon-burner, and B designates a pipe designed to lead from the reservoir to the burner. Said pipe B passes upwardly through the interior of the reservoir A and is provided inside the reservoir, near the lower end thereof, with a small opening *b*, through which the gasolene passes from the reservoir into the pipe. Said pipe B is continued upwardly through the upper wall of the reservoir and constitutes at its upper end a hanger B′, provided with a ring *b*′, by which the same may be suspended from a ceiling or like place. The upper wall of said reservoir is provided with a filling-nozzle C, which is normally closed by a plug C′. The safety device in this instance consists of a receptacle D, which is open at one end and closed at its other end. The receptacle is fixed stationary within the reservoir with its open end directed upwardly and with the rim surrounding said open end near the top wall of the reservoir. In the present instance the receptacle is held in place by means of the pipe C, said pipe passing through the closed end wall and fitted thereto in any suitable manner. The receptacle D is provided near its lower part with a small opening *d*, thereby providing communication between the receptacle and the reservoir at a

point below the open end of said receptacle. In the use of the device, assuming that the reservoir A is empty, the plug C′ is removed and the oil poured into the reservoir therethrough until the reservoir and pipe B connected therewith are filled to the highest point at which the reservoir may or will ordinarily be filled—to wit, the lowest part of the nozzle C. By reason of the fact that the liquid may be poured into the reservoir much more rapidly than the same will be passed through the opening *d* in the receptacle D there will remain in said receptacle a body of air for a short time after the reservoir has been filled to its maximum available capacity or to the level of the filling-nozzle C, it being obvious that said receptacle, by reason of the presence of the body of air therein and of the construction which temporarily retards the passage of the liquid to said receptacle, does not at the time of the filling of the reservoir constitute as an entirety an available part of the reservoir for the liquid. The plug is now screwed into the nozzle, and in the short period next following the filling of the reservoir the air in the receptacle D will be displaced by a like volume of the liquid within the reservoir surrounding the receptacle until the level of the liquid in said reservoir and the receptacle D are equalized, the liquid passing through said opening *d* and the air escaping from the upper end of the receptacle. This operation will obviously lower the general level of the liquid within the reservoir, and the size of the receptacle D is so proportioned with respect to the size of the reservoir that the final level of the liquid thus reached will be below the danger-point.

In Fig. 2 the construction is similar to that shown in Fig. 1, with the exception that the receptacle E therein shown is reversed in position from that illustrated in said Fig. 1. In said figure the receptacle E is provided in its top wall with a minute orifice *e*. In this construction when the reservoir is being filled the air contained within the receptacle E is driven upwardly through the said orifice *e*; but by reason of the size of the orifice the reservoir may be completely filled before a considerable quantity of air is driven out of said receptacle. The displacement of the air in said receptacle by the liquid is effected in this construction after the nozzle C′ has been inserted into place in the same manner as in the construction shown in Fig. 1. It will be observed that in this construction the orifice *e* must be made very small, so as to prevent a too-rapid escape of the air from the receptacle E.

In Fig. 3 is shown a receptacle F, which is pivoted near one end thereof to a support B^2, connected with the pipe C. Said receptacle is open at one end and closed at its other and is designed when the reservoir is empty to hang in a vertical position, as indicated in dotted lines in said Fig. 3, with its open end downwardly. If found desirable, the receptacle F may be retained in its depending position by the application of a suitable spring. (Not shown.) With this construction when the reservoir is filled the body of air within said receptacle F is not displaced by the liquid, but remains therein and will not be displaced until the receptacle assumes a horizontal or substantially horizontal position. As a means of effecting the displacement of the air by the liquid within the reservoir I provide the plug C′ of the filling-nozzle C with a pin C^2, which is adapted to strike the receptacle F in such manner as to tilt the same to a horizontal position, as shown in full lines in Fig. 3, and in which position the body of air will escape from the receptacle and be displaced by a like volume of the liquid, which, as it will be obvious, will reduce the general level of the liquid in the reservoir, as in the constructions above described.

In Fig. 4 is shown a modification of the construction shown in Fig. 2, the construction being different from that shown in Fig. 2 only in the fact that the orifice of the receptacle is closed by a positively-actuated valve, which valve is opened at the time the plug is inserted into the filling-nozzle. As shown in said figure, G designates a downwardly-opening receptacle, which is provided in its closed end wall with an orifice *g*. Said orifice is designed to be normally closed by a valve *g*′, which is fixed to the end of and is held normally to its seat by means of a spring G′ and is designed to be moved away from its seat against the action of said spring by a pin C^3 on the plug C′. In the use of this device when the reservoir is being filled the plug will of course be removed and the aperture *g* will be closed by the spring-pressed valve and will be held closed until after the reservoir is filled to the highest point and the plug inserted into place. Upon the insertion of the plug into the nozzle the pin C^3 thereof will bear against the valve and open the same, and thereby permit the displacement of the air within the receptacle G by a like volume of liquid within the reservoir and lower the general level of said liquid.

The construction shown in Fig. 5 is similar to the construction shown in Fig. 4, with the exception that it is applied to an upwardly-opening receptacle H, similar to that shown in Fig. 1, instead of a downwardly-opening receptacle. In this construction the receptacle H is provided in its lower wall with an orifice *h*, which is normally closed by a valve *h*′, held to its seat by means of a spring H′ and depressed from its seat by means of a rod C^4, connected with the filling-nozzle plug C′, as in the construction previously described. The operation of this device is similar to that shown in Fig. 1, with the exception that the body of air in the receptacle H is not displaced until the valve is positively opened.

It is obvious that the valves shown in Figs. 4 and 5 may be held closed by means of a

weight instead of a spring. Such a construction is shown in Fig. 7, wherein the arm H^2, on which the valve h' is mounted, is pivoted to the casing H and is provided at one end with a weight H^3, adapted to hold the valve closed, the opposite end of said arm being adapted for engagement by the pin C^4 of the closing-plug when the plug is in position to hold the said valve open against the action of the weight. It will be furthermore obvious that the object for which the several constructions illustrated are designed may be effected in many different ways from that herein illustrated. For instance, the body which is adapted to be displaced by the liquid to lower the level of the liquid in the receptacle may consist of a pivoted weight or float in the reservoir—such, for instance, as is shown in Fig. 6, wherein I designates a weight pivoted to the discharge-pipe B of the reservoir and provided with a rearward extension or tailpiece I', adapted for engagement by the pin C^4, attached to the filling-nozzle plug in such manner that the weight will be held upwardly out of the fluid when the filling-plug is in place, but when the filling-plug is removed is permitted to drop downwardly, as indicated in dotted lines in said Fig. 6. The reservoir is filled while the weight is in its downward position, and when the weight is thrown upwardly in the position indicated in full lines it will be obvious that the level of the liquid in the reservoir will be lowered to an extent corresponding to the volume of the weight submerged.

The main or principal advantage of my invention is that the effectiveness of its operation is not dependent upon the will or volition of the person filling the reservoir, so that its object cannot be defeated by forgetfulness or inattention on the part of such person. The factor of danger in this respect may therefore be entirely removed with the addition of little cost to the device and with no extra attention on the part of the person using the same.

The several forms in which my invention is shown embodied in the drawings are merely instances of a number of different ways in which my invention may be applied and are not to be treated as limiting the invention only to the forms or embodiments so shown. It will be understood, on the other hand, that the invention may be embodied in various other forms of devices and is limited to the forms illustrated only as such forms are herein made the subject of specific claims.

It is obvious that the operation of both forms of the device—to wit, that shown in Figs. 1 and 2 and that shown in Figs. 3 to 7, inclusive—are automatic in action—that is to say, no act is required on the part of the person replenishing the reservoir to effect the result sought beyond that required for completing the replenishment of an ordinary reservoir and putting the same in condition for use. It is to be understood, therefore, that the term "automatic," as herein used, is intended to cover any means or mechanism which is actuated or set in motion by any or all the usual or required operations which are necessary to complete the replenishment of a reservoir. If necessary, for instance, to provide such reservoir with a cover or closure in its ordinary use, said term may include any means or mechanism set in operation by the usual act of closing the reservoir.

I claim as my invention—

1. A fluid safety-reservoir provided with means for retaining therein a shiftable body with its principal part below the highest level to which the reservoir may be filled, at the time the reservoir is being filled, and which, at the time the reservoir is filled, has its principal part located below the level of the fluid, the parts being arranged to permit the reservoir to be filled to its maximum available capacity at the time of such filling, and said body thereafter shifting upwardly and having its principal part emerged from the body of the fluid to permit the general level of the fluid in the reservoir to be lowered.

2. A fluid-reservoir provided with means for retaining therein a shiftable body with its principal part below the highest level to which the reservoir may be filled, at the time the reservoir is being filled, and which, at the time the reservoir is filled, has its principal part located below the level of the fluid, and means causing said body to thereafter automatically shift upwardly, with its principal part emerged from the body of the fluid to permit the general level of the fluid in the reservoir to be lowered.

3. The combination with a fluid-reservoir and a discharge-pipe leading therefrom, of means acting to limit the supply of fluid to the reservoir during the replenishment thereof, and constructed to automatically lower the level of the fluid within the reservoir after the replenishment thereof.

4. A fluid-reservoir provided with a discharge-passage and with means for automatically lowering the level of the fluid in the reservoir after the reservoir has been filled, while retaining the entire volume of the fluid within the reservoir.

5. A fluid-reservoir provided with a discharge-passage, a chamber containing a body of air and means affording communication between said reservoir and chamber, said body of air being located above said communicating means, and said means being constructed to temporarily retard the entrance of fluid to the said air-chamber while the reservoir is being filled, and after such filling permitting a portion of said fluid to enter said chamber to thereby displace a quantity of said body of air whereby the general level of the fluid in said reservoir is lowered.

6. A fluid-reservoir provided with a discharge-passage, a chamber containing a body of air, said discharge-passage being independent of said chamber, and means affording

communication between said reservoir and chamber, said means being constructed to temporarily retard entrance of fluid to said air-chamber while the reservoir is being filled and after said filling permitting a portion of such fluid to enter said chamber to thereby displace a quantity of the said body of air, whereby the general level of the fluid in said reservoir is lowered.

7. A fluid-reservoir provided with a discharge-passage and communicating with a chamber which is constructed to retain therein a body of air above the level of the discharge-opening of the reservoir, when the reservoir is being filled, and means automatically causing the body of air to be thereafter displaced by a like volume of fluid from the reservoir to lower the general level of the fluid within the reservoir.

8. A fluid-reservoir communicating with a chamber which is constructed to retain therein a body of air above the discharge-orifice of the reservoir, at the time the reservoir is being filled, and provided with a discharge-passage independent of said chamber adapted to communicate directly with a burner, and means automatically causing the body of air to be thereafter displaced by a like volume of fluid from the reservoir to lower the general level of the fluid in the reservoir.

9. A fluid-reservoir communicating with a chamber having its principal part located below the highest level to which the reservoir may be filled, and above the level of the discharge-orifice of the reservoir, and means automatically causing a body of air in said chamber to be thereafter displaced by a like volume of fluid from the reservoir.

10. A fluid-reservoir communicating with a chamber which is constructed to retain therein a body of air during the time the reservoir is being replenished and automatic means thereafter effecting an interchange of the air and fluid, whereby the general level of the fluid in the reservoir is lowered.

11. The combination with a fluid-reservoir, of a chamber having its principal part located below the highest level to which the reservoir may be filled, said chamber being provided at its top and bottom with openings through which it communicates with the reservoir, one of said openings being made of such size relative to the size of the filling-opening of the reservoir and to the capacity of the chamber, that the filling of the chamber is appreciably retarded as compared with the flow of fluid to the reservoir.

12. The combination with a fluid-reservoir, of a chamber therein which has an opening at its top located above the highest level to which the reservoir may be filled and provided in its bottom with an opening through which it communicates with the reservoir, said last-mentioned opening being made of such size relative to the size of the filling-orifice of the reservoir and the capacity of the chamber that the filling of the chamber by the entrance of fluid through the opening is appreciably retarded as compared to the flow of fluid to the reservoir.

13. The combination with a fluid-reservoir, of a discharge-pipe passing upwardly therethrough and means supported on said pipe within the reservoir acting to limit the supply of fluid to the reservoir during the period of replenishment thereof, and constructed to bring the final level of the fluid in the reservoir a distance below the filling-orifice thereof.

14. The combination with a fluid-reservoir, of a feed-pipe passing upwardly therethrough and provided inside the reservoir with an orifice through which the fluid is discharged from the reservoir, and a casing supported on said pipe which has communication with the reservoir through an opening of such size relative to the size of the filling-orifice of the reservoir and the capacity of the chamber that the filling of the chamber by the entrance of fluid through the opening is appreciably retarded as compared with the flow of fluid to the reservoir and said chamber being provided also with another opening located above the highest level to which the reservoir may be filled.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 19th day of September, A. D. 1900.

JOHN F. HARDY.

Witnesses:
WILLIAM A. HALL,
THOMAS J. GRAYDON.