Aug. 25, 1931. G. H. STEVENS 1,820,403

SAFETY VALVE

Filed March 27, 1928

Fig. 1.

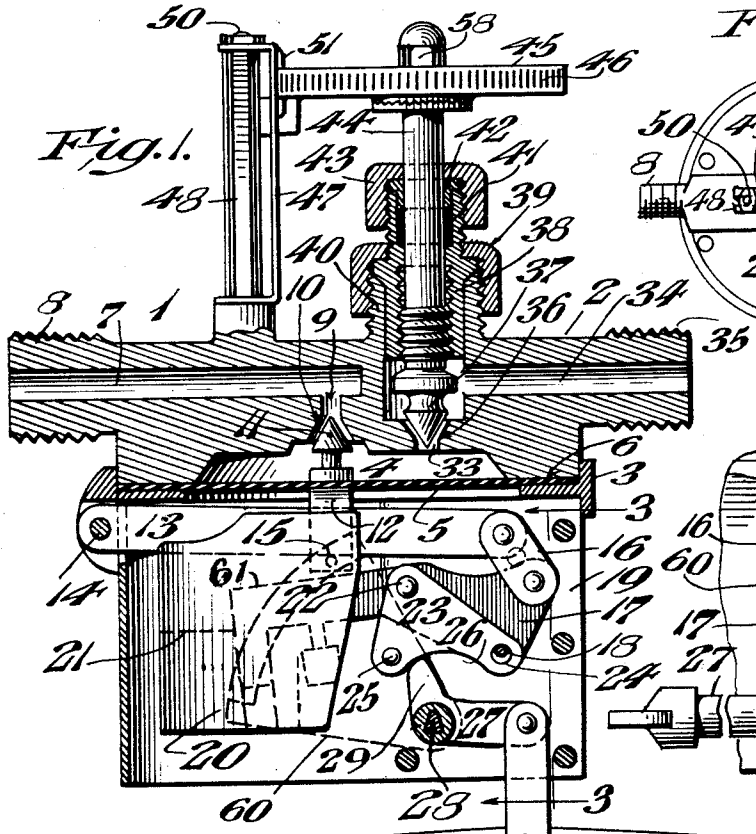


Fig. 2.

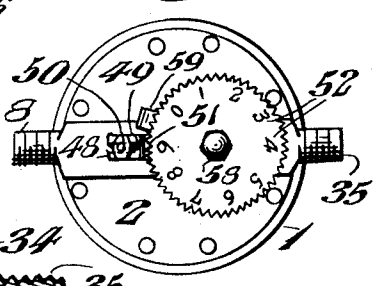
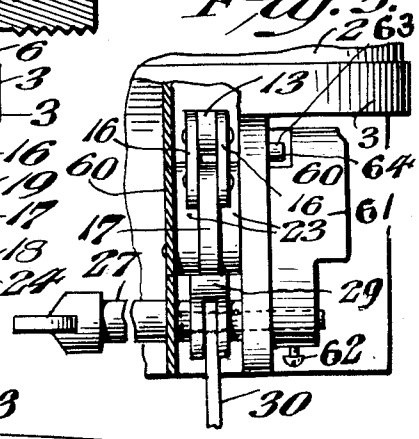


Fig. 3.



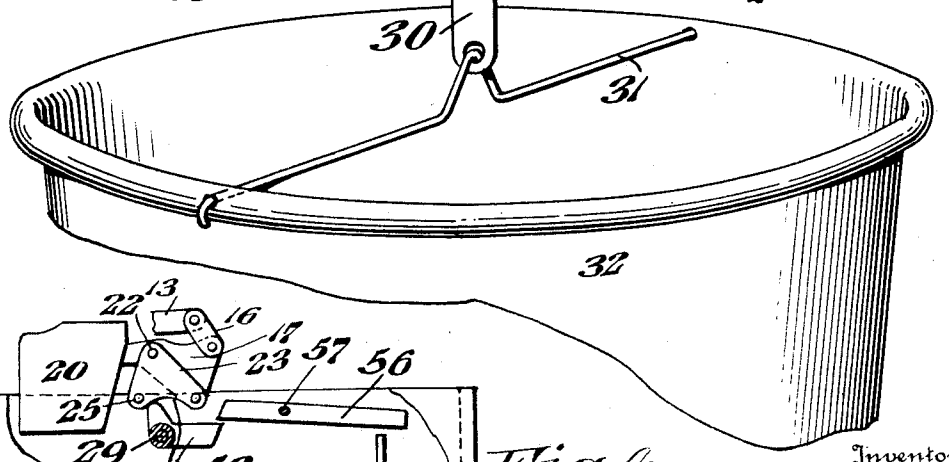
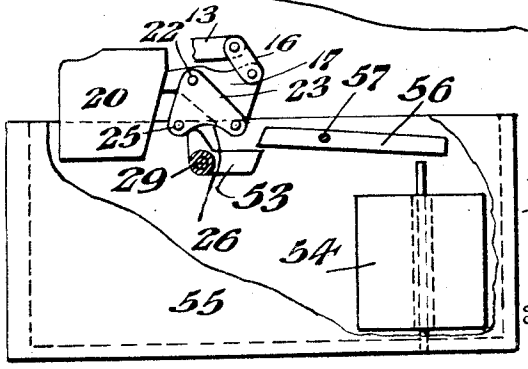


Fig. 4.



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UNITED STATES PATENT OFFICE

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SAFETY VALVE

Application filed March 27, 1928. Serial No. 265,122.

The object of this invention is to devise a novel construction of a safety valve which is controlled by the liquid flowing into a receptacle and controlled by a key which becomes a part of the mechanism, and when removed the valve cannot be opened.

A further object of the invention is to devise a novel safety valve in conjunction with which a regulating valve is employed.

With the above and other objects in view as will hereinafter more clearly appear, my invention comprehends a novel construction of a safety valve.

It further comprehends a novel safety valve actuated by the flow of liquid into a receptacle which latter is connected to a key carried by a valve so that the valve will automatically close when a predetermined weight of liquid has been discharged from the valve, and the valve is opened by manually actuating the key.

Other novel features of construction and advantage will hereinafter more clearly appear in the detailed description and the appended claims.

For the purpose of illustrating the invention, I have shown in the accompanying drawings typical embodiments of it, which, in practice, will give reliable and satisfactory results. It is, however, to be understood that these embodiments are typical only and that the various instrumentalities of which my invention consists can be variously arranged and organized, and the invention is not therefore, limited to the precise arrangement and organization of these instrumentalities as herein set forth.

Figure 1 is a sectional view of a safety valve embodying my invention in conjunction with a receptacle which is to be filled.

Figure 2 is a top plan view of a portion of the valve mechanism.

Figure 3 is a section on line 3—3 of Figure 1.

Figure 4 is a side elevation partly broken away of another embodiment of the invention.

Similar numerals of reference indicate corresponding parts.

Referring to the drawings:—

1 designates a valve mechanism embodying my invention. The valve is provided with a sectional casing consisting of the upper casing section 2, and the lower casing section 3 which are secured together by means of suitable fastening devices, see Figure 2.

The upper casing section 2 is chambered as at 4 and beneath the chamber is disposed a diaphragm 5 which closes the lower end of the chamber 4 and is secured in position by the laterally extending flange 6 of the casing section 3 and the juxtaposed portion of the casing section 2.

The top section 2 is provided with an inlet passage 7, the outer portion of which is formed by a threaded boss 8 which adapts the valve to be connected with the source of liquid supply.

The inlet passage 7 communicates with a port 9 having a valve seat 10 which is controlled by means of a valve 11 which, as illustrated, is a conical valve to conform to the contour of the valve seat 10.

The valve has its stem fixed in any desired manner to the diaphragm 5, and the stem is bifurcated to form the spaced arms 12 through which passes a lever 13 which is fulcrumed at 14 to the casing section 3.

The lever 13 also bears on the pin 15 which passes through the member 12 of the stem. The stem proper of the valve is preferably terminated in proximity to the top face of the lever 13. The lever 13 is connected by the links 16 with one end of a lever 17 which is fulcrumed at 18 on a plate 19 which is connected in any desired manner to the bottom casing section 3.

The free end of the lever 17 has fixed to it a weight 20, and this weight is slotted in its top face, as at 21 in order to render the mechanism more compact.

The weight lever 17 has pivotally connected to it, at 22, the arms 23 which are provided with an opening 24 of greater diameter than the diameter of the pin which forms the fulcrum 18. The arms 23 are rigidly connected by pins 25. The bottom faces of the arms 23 are curved as at 26 in order to form a curved bearing or cam face.

27 designates a key having at one end angularly inclined arms and having its sleeve portion provided with a polygonally shaped recess adapted to receive the key pin 28 which latter, as shown, is triangular in cross section. One of the arms 29 has its free end rounded and engaging the cam or bearing face 26 of the arms 23. The key pin 28 has fixed to it a counter balancing weight 61 which is secured in its adjusted position by means of a fastening device 62. A stationary pin 63, see Figure 3, is adapted to cooperate with a shoulder 64.

The key 27 has a laterally extending arm connected at its end to a link 30 the lower end of which is connected with the bail 31 of a receptacle 32. The chamber 4 of the valve communicates by means of a port 33 with a discharge passage 34, the outer portion of which is in the form of a threaded boss 35 so that a suitable discharge connection can be connected with it if desired.

The port 33 merges into a valve seat 36 which is controlled by means of a valve 37 having its stem in threaded connection with a bushing 38 which is shouldered at its upper end and secured in position by means of a nut 39 engaging said shoulder and in threaded engagement with a threaded boss 40 rising from the top face of the top casing section 2.

The upper end of the bushing 38 is recessed to receive the packing 41, against which bears a packing washer 42 which is retained in position by means of a nut 43 which is in threaded engagement with the outer end of the sleeve 38.

The stem 44 of the valve carries at its upper end a disc 45 the outer periphery of which is serrated, as at 46, in order to engage with a projection on a detent 47, which is in the form of a spring having a base flange at its lower end which is fixed with respect to the top casing section 42 by means of a post 48 secured to such top casing section.

The upper end of the spring 47 is bifurcated, as at 49, see Figure 2, and is guided by a pin 50 which extends into the post 48. The spring is provided at its upper end with a deflected portion 51 which engages with a tooth in the disc 45. The top face of the disc is provided with graduations 52 in order that the extent of opening of the valve 37 may be visibly indicated.

In the embodiment seen in Figure 4, the construction is the same as that seen in Figure 1 except as to the construction and control of the key. In this embodiment, 53 designates a key which instead of being controlled by a receptacle carried by it, it is controlled by a float 54 within a tank 55, the float actuating a lever 56 fulcrumed at 57 so that the key 53 will be depressed and the weight 20 released.

The operation will now be readily apparent to those skilled in the art and is as follows:—

When the key 27 is in the position seen in Figure 1, it is retained in such position with the free end of the lever 26 in contact with the curved bearing face of the arms 23 carried by the weighted lever 17, so that the inlet port 9 is open.

Assuming that the parts are in the position seen in Figure 1, it will be seen that the liquid entering the passage 7 passes through the chamber 4 to a port 33 and is fed to a suitable place of use, by way of the passage 34. Liquid from any desired source is fed to the receptacle 32.

As soon as a predetermined weight of liquid has been discharged into the receptacle 32, it will be apparent that the key 27 will be rocked with its key pin 28 thereby causing the lever 17 to be rocked, and this movement of the lever 17 acting on the links 16, will cause the lever 13 to be rocked upwardly on its fulcrum 14 and the valve 11 will move towards its seat 10, and contacting with such seat will stop the flow of liquid through the port 9. The weight 20 retains the parts in this closed position of the valve until the key has been reset by the operator.

The discharge of liquid through the discharge port 33 can be varied by adjusting to any desired extent the valve opening, by actuating the disc 45 which forms a grasping handle, and this disc can be set for any desired valve opening of the port 33.

When the receptacle 32 has received the predetermined weight of liquid, the bearing arm of the lever portion of the key 27 will move out of engagement with the links 23 and permit the weight 20 to drop, thereby causing the valve 11 to move into its closed position.

It will be apparent that in accordance with my present invention, a receptacle can be automatically filled or partly filled with liquid, and as soon as the predetermined weight of liquid is received in the receptacle, the valve will automatically close.

The amount of oil to be used is first determined, after which the top nut 58 is loosened and the disc 46 turned to the left until its stop member 59 stops against the upright post 48, after which the nut 58 is tightened.

In both of the embodiments of my invention as herein shown, the key forms an integral part of the mechanism. In the embodiment seen in Figure 1, the key is permanently attached to the receptacle and must be removed with it when liquid is to be emptied. In the embodiment seen in Figure 4 the key cannot be turned to open position and left there while the liquid is in the tank. In each embodiment the key can be removed

when it is desired to render the valve inoperative or the mechanism controlled thereby, such as for example an oil burner.

The bail 31 is preferably connected with the link 30 in such a manner that the receptacle can be partly rotated.

It will be seen that the controlling valve is of the diaphragm valve type and depends for its action on weights and not on the action of springs.

It will be apparent from the foregoing, that, in accordance with my present invention the communication between the inlet and discharge passage of the valve mechanism is controlled by a system of weighted levers, and a key or controlling member is employed to which the receptacle is connected. The safety valve herein disclosed, although, not limited to such use, is especially designed for use with oil burners. The overflow from the oil burner is discharged into the receptacle 32, and the passage 34 leads to the burner, so that, in case the burner is extinguished, the feed of oil to the burner is automatically stopped.

When a predetermined weight has been introduced into the receptacle 32, the bearing arm of the lever 27 will move out of the path of the arm 23, thereby releasing the lever 17 so that the weight 20 can drop.

The plate 19 has connected with it and spaced from it a cover plate 60 which is preferably cut away to receive the key 28.

It will now be apparent that I have devised a new and useful safety valve which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the present instance, shown and described preferred embodiments thereof which will give in practice satisfactory and reliable results, it is to be understood that these embodiments are susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. In a valve mechanism, a casing having an inlet and a discharge passage and a valve controlling communication between said passages, a weighted system of levers controlling said valve, and a removable key in the form of a pivotally mounted lever controlled by liquid in a receptacle to automatically release said system of levers.

2. In a valve mechanism, a casing having an inlet and a discharge passage and a valve controlling communication between said passages, a weighted system of levers controlling said valve, and a removable key in the form of a pivotally mounted lever controlled by liquid in a receptacle to automatically release said system of levers, and said key being adapted to be manually actuated to reset said system of levers and retain said valve in its open position.

3. In a valve mechanism, a casing having an inlet and a discharge passage and a valve controlling communication between said passages, a weighted system of levers controlling said valve, a removable key in the form of a pivotally mounted lever controlled by liquid in a receptacle to automatically release said system of levers, a receptacle connected with said key, and a counter balance for said receptacle.

4. In a valve mechanism, a casing having an inlet and a discharge passage and a chamber in valved controlled communication with said inlet passage, a valve, a weighted system of levers tending to close said valve, a removable key in the form of a pivotally mounted lever cooperating with said system to hold said valve open, and a receptacle connected with said key and controlling its movement into its inoperative position due to the weight of liquid fed to it, and said valve being retained in its closed position when said key is removed.

5. In a valve mechanism, a casing having an inlet and a discharge passage and a chamber in valved controlled communication with said inlet passage, a valve, a weighted system of levers tending to close said valve, a removable key cooperating with said system to hold said valve in one position, a receptacle connected with said key and controlling its movement into its inoperative position due to the weight of liquid received by it, and means to regulate the communication between said chamber and said discharge passage.

6. In a valve mechanism, a casing having an inlet and a discharge passage and a chamber in valved controlled communication with said inlet passage, a valve, a weighted system of levers tending to close said valve, a removable key cooperating with said system and manually adjusted to hold said valve open, a receptacle connected with said key and controlling its movement into its inoperative position due to the weight of liquid received by it, a valve to control communication between said chamber and said discharge passage, and means to retain said last named valve in the position to which it has been adjusted.

7. In a valve mechanism, a casing having an inlet and a discharge passage and a chamber communicating with said passages, a diaphragm forming a wall of said chamber, a valve connected with said diaphragm to control passage of liquid from said inlet to said discharge passage, a weighted system of levers tending to actuate said diaphragm to close said valve, a fulcrumed member movable to a position to retain said lever system inactive and the valve open, a

removable key controlling said member and manually adjustable to hold said valve open, and a receptacle connected with said member, said receptacle when filled to a determined degree causing said member to release said system of levers and permit it to close said valve.

8. In a valve mechanism, a casing having an inlet and a discharge passage and a chamber communicating with said passages, a diaphragm forming a wall of said chamber, a valve connected with said diaphragm to control passage of liquid from said inlet to said discharge passage, a weighted system of levers tending to actuate said diaphragm to close said valve, a removable manually actuated member movable to a position to retain said lever system inactive and the valve open, and a receptacle connected with said member, said receptacle when filled to a determined degree automatically causing said member to move into a position to release said system of levers and permit it to close said valve.

9. In a valve mechanism, a casing having an inlet and a discharge passage, a valve controlling communication between said passages, a weighted system of levers controlling said valve, a fulcrumed key pin, a counterbalance on said key pin, a key removable from said key pin and cooperating with said system of levers to reset them or to release them, said key being manually movable to reset said levers, and a receptacle to receive a liquid, the liquid in said receptacle automatically controlling the movement of said key to release said levers.

10. In a valve mechanism, a casing having an inlet and a discharge passage, a valve controlling communication between said passages, a weighted system of levers controlling said valve, a fulcrumed key pin, a counterbalance on said key pin, a key removable from said key pin and cooperating with said system of levers to reset them or to release them, said key being manually movable to reset said levers, a receptacle to receive a liquid, the liquid in said receptacle automatically controlling the movement of said key to release said levers, and means to limit the movement of said counterbalance.

GEORGE H. STEVENS.