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P. G. DARLING

VALVE LIFTING DEVICE

Filed April 14, 1922

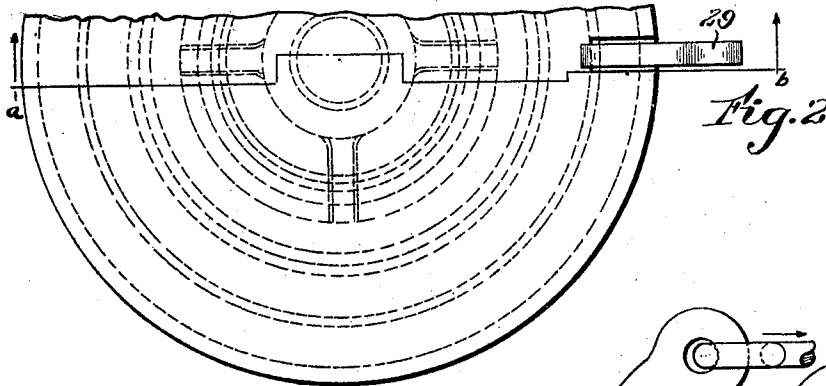


Fig. 2

Fig. 1

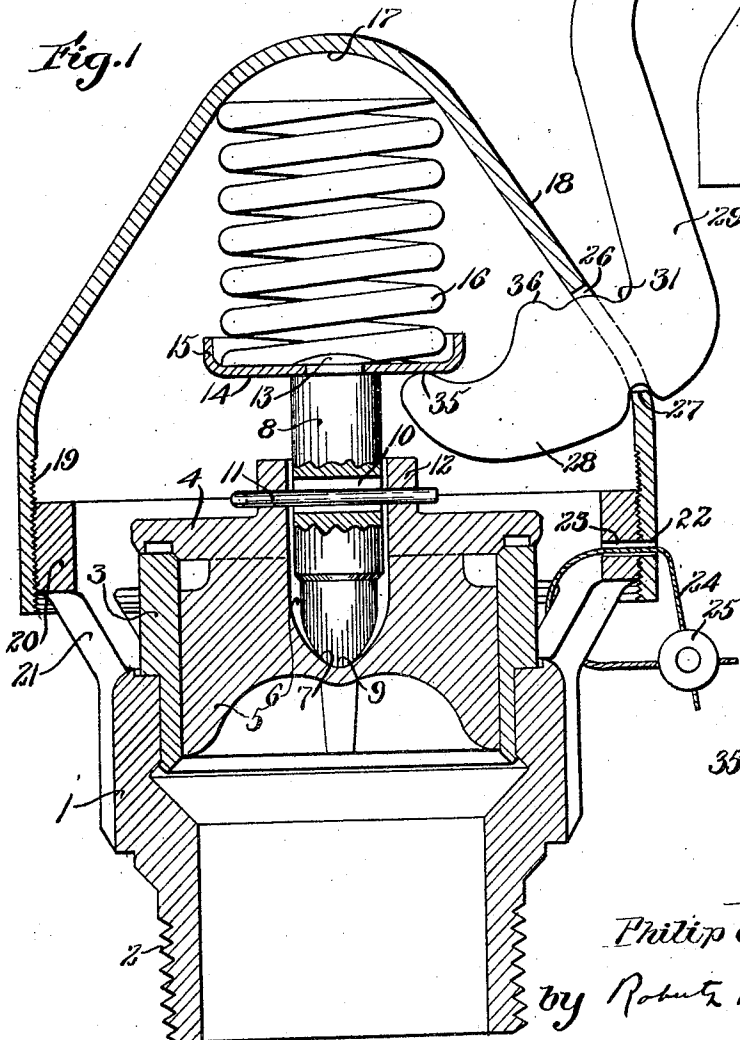


Fig. 3

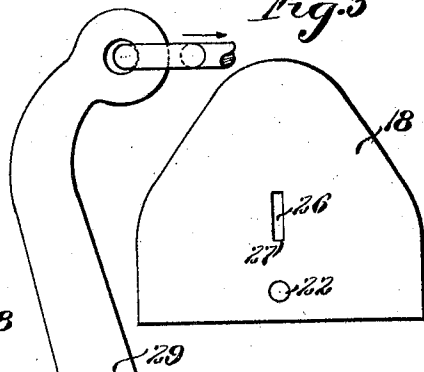
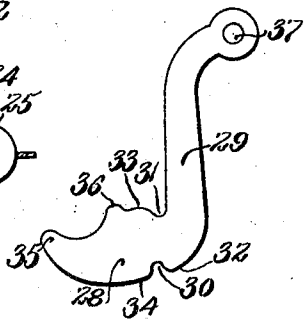


Fig. 4



Inventor;
Philip G. Darling,

by Robert Robert & Lusk
his attys.

UNITED STATES PATENT OFFICE.

PHILIP G. DARLING, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO MANNING, MAXWELL & MOORE, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

VALVE-LIFTING DEVICE.

Application filed April 14, 1922. Serial No. 552,475.

To all whom it may concern:

Be it known that I, PHILIP G. DARLING, a citizen of the United States of America, and resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented new and useful Improvements in Valve-Lifting Devices, of which the following is a specification.

This invention concerns safety valves and relates more particularly to valve lifting means whereby the valve proper may be lifted manually from its seat.

In the joint application of Philip G. Darling and Carl H. Graesser, Serial No. 491,614, filed August 11, 1921, there is shown and described a novel construction for house heater safety valves wherein means is provided for manually lifting the valve from its seat, such manual lifting of the valve being desirable from time to time in order to insure against sticking of the valve to its seat by accumulations of rust or mineral salts. In the device referred to the means employed for lifting the valve comprises a lever projecting through a slot in the valve casing and having an integral tongue engageable with the interior surface of the valve casing for preventing withdrawal of the lever from the slot. The present invention is intended as an improvement over the arrangement just referred to, the controlling lever being simplified by the elimination of the retaining tongue, but without sacrificing the function of the latter, while at the same time the additional function of preventing overthrow of the valve, with excessive compression of its spring, is secured.

In the accompanying drawings wherein the present improvement is illustrated,—

Fig. 1 is a vertical cross section, on a line such as *a—b* of Fig. 2, through a house heater safety valve showing the present invention as applied thereto, the parts being shown in the position which they occupy just at the instant of lifting the valve from its seat;

Fig. 2 is a fragmentary, plan view of the structure shown in Fig. 1;

Fig. 3 is a side elevation, to smaller scale, showing the casing employed for enclosing the movable parts of the valve; and

Fig. 4 is a side elevation, also to small scale, showing the valve lifting lever.

Referring to the drawings, a valve housing is shown at 1, this housing being pro-

vided with screw threads at 2 for engagement with a boiler fitting or the end of a suitable pipe. The valve housing is provided with a ring 3, the upper edge of which constitutes an annular valve seat. Cooperating with this valve seat is a valve comprising the disk 4 and the guide wings 5, the latter slidably engaging the inner surface of the ring 3 and maintaining the valve in proper axial alignment with the bore of the housing. This valve is furnished with an axially disposed socket 6, the lower end of which is shaped to provide a cup-like pocket 7. Seated in this socket is a spindle 8, the lower end 9 of which is rounded and rests within the pocket 7, the spindle, however, being of a diameter slightly less than that of the socket, thus permitting slight lateral movement of the spindle with respect to the walls of the socket. The spindle is provided with a transverse opening 10 through which loosely passes a cotter pin 11 secured in aligned openings in a flange 12 upstanding from the valve disk 4. The cotter pin as thus disposed serves to connect the spindle 8 with the valve so that upon lifting of the spindle the valve may be raised from its seat, the loose fit of the cotter pin with opening 10, however, permitting lateral movement of the spindle without affecting the position of the valve.

The upper end of the spindle is riveted, as indicated at 13 to a disk 14 having upwardly flanged edges as shown at 15. Seated upon the upper surface of the disk, and within the flange thereof, is the coil spring 16, the upper end of which bears against the inner hemispherical surface 17 of a casing 18 formed from sheet metal, or as a casting, as preferred. The casing is screw-threaded at its lower edge as shown at 19 for engagement with external screw threads upon a ring 20 supported, by means of a series of legs 21, upon the valve housing 1. Preferably the fitting, the legs and the ring are integral, although this is not essential. After the assemblage and adjustment of the valve parts, aligning holes 22, 23 are drilled in the casing 18 and ring 20 respectively, a cord or wire 24 is passed through the holes and the ends of such cord or wire are secured together by a seal 25.

The casing 18 is furnished with a narrow vertical slot 26 having a lower, substantially

horizontal edge 27. Passing through this slot is a valve lifting lever comprising a lifting arm 28 and an actuating arm 29, such arms being disposed substantially at right angles to each other. This lever is preferably formed as a stamping from sheet metal, all of its parts lying substantially in the same plane. At a point adjacent to the junction of the arms 28 and 29, a pivoting notch 30 is provided, this notch, when the parts are in operative position, seating over the edge 27 of the slot 26. The edge 27 thus serves as a fulcrum upon which the lever may turn.

At a point substantially opposite the notch 30, a second notch 31 is provided, the latter notch being of such depth that the width of the lever between the inner end of such notch and a point such as 32 upon the opposite edge of the lever is less than the vertical height of the slot 26. To the left of the notches 30, and 31, as viewed in Fig. 4, the lifting arm 28 is of a width, between the points 33 and 34, greater than the vertical height of the slot 26. The lifting arm 28 is provided with a toe 35 which may engage the under surface of disk 14 and between such toe 35 and the notch 31 an outstanding stop lug 36 is provided. This lug is adapted to engage the inner surface of casing 18, and thereby prevent excessive movement of the lifting lever. If desired, the end of the actuating arm 29 may be provided with an opening 37 for the attachment of a cord or chain.

In assembling the valve mechanism above described—it being assumed that the parts are disassembled—the valve is first seated upon the ring 3, the spindle 8 is placed within the socket 6 and the cotter pin 11 inserted for securing the valve and the spindle together. The disk 14 having previously been secured to the spindle, the spring 16 is placed thereon, and the actuating arm 29 of the valve lifting lever is now inserted from the inside of the casing 18 through the opening or slot 26 until the notch 30 is caused to engage over the edge 27, such movement being facilitated by the provision of the notch 31 which engages the upper edge of the slot during the final stage of the positioning of the lever and just prior to the entry of edge 27 into notch 30. The arm 29 is now swung back into substantial engagement with the inclined outer surface of the casing, and the casing is then slipped down into position over the ring 20. The casing is now rotated until the tension of spring 16 has been adjusted to the desired degree, whereupon the holes 22 and 23 are drilled in the casing and ring and the cord 24 and seal 25 are applied, the sealing of the parts serving to prevent improper adjustment of the spring tension by unauthorized persons. In the normal position of the parts

the arm 29 rests against the outer surface of the case in order to remove the pressure of the toe 35 from the valve disk, as such pressure might be sufficient to cause the valve to simmer when near the popping point. As shown in Fig. 1, the arm has been swung outwardly and away from the casing 18 thereby bringing the toe 35 into engagement with the surface of disk 14 ready for lifting the latter. Upon further outward and downward movement of arm 29 the plate 14 is lifted, thus, by means of spindle 8 and cotter pin 11, lifting the valve disk 4. Upon release of the lever arm 29 the spring 16 immediately returns the valve 4 to its seat and at the same time returns the lifting lever to normal position. With the parts assembled as shown in Fig. 1 it is impossible to withdraw the valve lifting lever from the casing by reason of the width of the arm 28 between the points 33, 34, nor is it possible to push it inwardly to a sufficient extent to disengage the notch 30 from the edge 27 due to the interference of the lifting arm 28 with parts of the valve. The lifting lever as thus provided is exceedingly simple in form and may be constructed cheaply, as by a stamping operation, while the arrangement described makes it certain that the lever will always remain in operative position and cannot be removed by maliciously inclined persons.

By the provision of the hump or lug 36 upon the edge of the lever the movement of the latter is limited so that excessive compression of the spring 16, with possible breakage of the latter, is prevented. Thus it is unnecessary to employ a spring whose coils are closed at the instant of maximum compression, which for certain mechanical reasons is very desirable. Moreover, by securing the spindle 8 to the valve in the manner herein shown, the application of the spring pressure at a point below the valve seat is assured, and this, together with the loose connection employed, serves to avoid any cramping of the valve upon its seat.

What I claim and desire to secure by Letters Patent of the United States is:

1. In combination with a valve casing having an elongated slot therein, a valve controlling lever comprising a lifting arm and an actuating arm, the lever having a pivoting notch adjacent to the junction of said arms, the width of the actuating arm adjacent to the notch being slightly less than the length of the slot, and the width of the lifting arm adjacent to the notch being greater than the length of the slot.

2. A valve controlling lever for safety valves comprising an actuating arm and a lifting arm, said lever having a pivoting notch in one edge adjacent to the junction of its two arms, and also having a notch in its opposite edge opposed to the pivoting

notch, and a stop lug projecting from the lifting arm at a point adjacent to said last named notch.

3. In combination with a valve casing
5 having a narrow vertical slot therein, a valve controlling lever having a pivoting notch in one side for engagement with the edge of the slot, and a stop element projecting from the opposite side of the lever and
10 engageable with the inner wall of the casing to prevent overthrow of the lever.

4. In combination in a valve mechanism having a valve, a seat therefor, and a casing for covering said valve and seat, a valve
15 controlling lever comprising a lifting arm and an actuating arm, said lever having a pivoting notch adjacent to the junction of said arms, and a stop element moving with the lifting arm and engageable with the
20 inner surface of the casing to prevent over-lift of the valve.

5. In combination with a valve casing having a spring pressed valve therein, a controlling lever for moving the valve in
25 opposition to its spring, said lever comprising a lifting arm arranged within the casing and having an element engageable with the valve, and an actuating arm disposed outside the casing, said lever having a pivot-
30 ing notch for engagement with the lower edge of a vertical slot in the casing, and a stop lug projecting from the lifting arm and engageable with the inner surface of the casing to prevent over compression of
35 the spring.

6. In combination with a valve casing having a vertical slot of fixed length therein, a reciprocable valve in said casing, and a controlling lever for manually lifting the
40 valve comprising integral lifting and actuating arms of sheet material lying substantially in the same plane, said lever hav-

ing a pivoting notch adjacent to the junction of its arms, said notch engaging over the lower edge of the slot in the casing. 45

7. In combination, a valve mechanism having a valve seat, a valve normally engaging said seat, a casing for covering the valve and seat, said casing having a slot of fixed length therethrough, and a valve con- 50
trolling lever comprising lifting and actuating arms arranged substantially at right angles to each other and positioned within and without the casing, respectively, said lever having a pivoting notch adjacent to 55
the junction of its arms constructed and arranged to seat over the lower edge of the slot in the casing, such edge constituting a fulcrum for the lever.

8. In combination with a valve mecha- 60
nism having a valve and a seat therefor, a casing for enclosing said valve and its seat, said casing having a slot of fixed length, and a valve lifting lever of sheet material extending through the slot in the casing 65
and having all its parts disposed in the same plane, said lever being provided with elements serving to prevent its removal from the casing after assemblage of the parts. 70

9. In combination with a valve mechanism having a valve, a seat therefor and a casing enclosing the valve and seat, and a valve lifting lever of sheet material having one arm disposed within the casing and 75
another arm projecting through a slot of fixed length in the casing, the first named arm being of such dimensions as to prevent withdrawal of the lever through the slot after assemblage of the parts. 80

Signed by me at Bridgeport this 11th day of April, 1922.

PHILIP G. DARLING.