

R. C. CLAUS.
SAFETY DEVICE FOR HEATERS.
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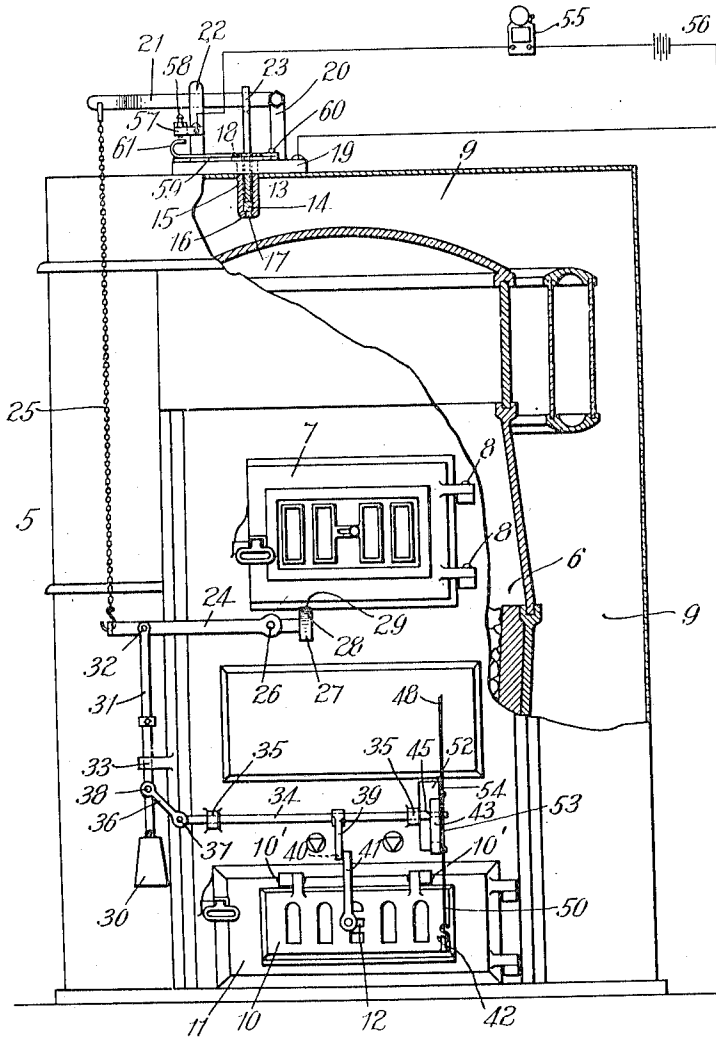


Fig. 1.

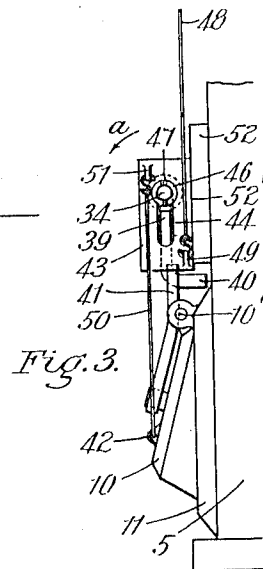


Fig. 3.

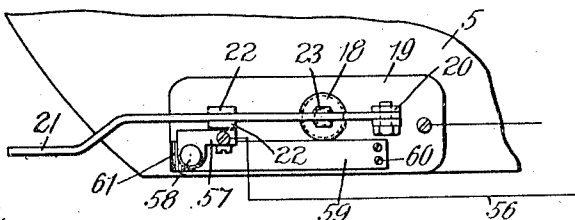


Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

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SAFETY DEVICE FOR HEATERS.

1,048,659.

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To all whom it may concern:

Be it known that I, ROBERT C. CLAUS, a citizen of the United States, residing at Belmont, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Safety Devices for Heaters, of which the following is a specification.

This invention relates to new and useful improvements in safety devices for heaters, the object being to provide a device which is adapted to manipulate the draft and check draft of a heater at a predetermined degree of heat which may be set lower than the danger point of the heater to which said device is to be attached, and diminish the heating power of the heat creating instrumentalities.

The object is further to provide means adapted to give warning of the approach of the temperature of said heater to said danger point.

This invention consists in the combination and arrangement of parts by which the above objects and certain other objects hereinafter appearing are attained, as set forth in the following specification and particularly pointed out in the claims.

Referring to the drawings: Figure 1 is a front elevation partly in section of a heater embodying my invention. Fig. 2 is a plan view of the actuators of said device shown in connection with the heater embodying my invention, with a portion of the heater broken away to save space. Fig. 3 is a detail side elevation illustrating the connections to the draft door actuating means.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings 5 is a heater embodying in its construction a fire pot 6 which is connected in the usual manner to a flue, not shown in the drawings, said fire pot being provided with a door 7 which is pivoted at 8, 8.

For convenience of illustration, I have shown my device in connection with a hot air furnace having a fluid heating chamber 9 encircling the fire pot 6. The heater is also provided with a draft door 10 which is preferably pivoted upon the ash pit door 11, said draft door also being provided with a draft slide 12 of well-known construction.

In the operation of heaters of the class shown and also of hot water heaters, and steam heaters, a great many fires are started by the overheating of said heaters, caused often times by the forgetfulness of the operator, by ignorance as to the danger point or for various other reasons, and the usual condition of the furnace or heater, at a time when said overheating takes place, would be to have the draft door, draft slide or ash pit door open, the furnace door closed and the flue drafts open.

When the danger point is approaching, the quickest and surest way of cooling off a heater, of the class described, which has become overheated is to close the means admitting a current of air upwardly through the fire pot, which in this instance would be the draft slide 12 or draft door 10, and open the door 7 which would admit a current of air into and across the top of the fire pot thereby cooling off the interior of said pot or creating a draft which would carry the hot gases out through the flue and up the chimney.

To accomplish the results just mentioned, I have provided a means 13 rendered effective by a creation of heat within said fire pot to an abnormal degree, or in other words to a predetermined degree of temperature which may be considered the limit of safety for said heater, adapted to close one and open the other of said air admitting means, said means 13 embodying in its construction a fusible element 14 which may be formed of a material adapted to fuse at a temperature commensurate with the surroundings or the construction of the heater to which said device is attached. Said fusible element is preferably mounted within a cylindrical cage 15 having an inwardly projecting flange 16 capable of supporting said fusible element, said flange forming a hole 17 of sufficient size to permit said element, in its melted state, to escape therethrough. The opposite end of said cage is provided with an outwardly extending flange 18.

A bracket 19 is mounted at the top of the heater 5 and is provided with a hole of sufficient size to admit the cylindrical portion of said cage and is in alinement with a corresponding hole in said heater casing. The cage 15 is inserted in said holes with the end containing said fusible element extending into the fluid heating chamber 9 in close

proximity to the walls inclosing the fire pot 6, and with the outwardly extending flange 18 engaging the base of the bracket 19. This cage fits loosely within the holes in said bracket and said heater casing and is adapted to be quickly removed to replace the fusible element 14 in case said element has become melted. The bracket 19 is provided with a lug 20 to which is pivoted a lever 21 guided between the lugs 22, 22 and adapted to be retained within the position illustrated in Fig. 1, which is the normal position thereof, by a rod 23 forked at its upper end to engage said lever and extending into the cage 15 and adapted to be sustained by the fusible element 14. The outer or free end of the lever 21 is connected to a lever 24 by a chain 25.

The lever 24 is pivoted at 26 to the front of the heater 5 and is provided with a wedge shaped end 27 which is normally held in the position illustrated in Fig. 1 by the lever 21 through the chain 25, said position being such that the point 28 of the wedge 27 is slightly below the lower edge of the door 7 and in alinement with a recess 29 formed upon the lower inner margin of said door. A weight 30 is connected through a rod 31 and a pin 32 to the lever 24 at a point adjacent the outer free end thereof, said rod being guided at its lower end in a lug 33 which prevents said weight from swinging relatively to said lever.

In the operation of a heater for the purpose of admitting a current of air through the fire pot, the draft slide 12 is sometimes employed and as a convenient method of closing said slide, I employ a slide rod 34 slidable in guides 35, 35 secured upon the front of the heater 5 and connected with the rod 31 by a link 36 pivotally connected at 37 to said slide rod and at 38 to said rod 31 and lying normally at an angle with the rod 34 with the pivot 38 above said rod. The rod 34 is adapted to be reciprocated within the guides 35 by the vertical movement of the weight 30 and rod 31 by means of the link 36 and has secured thereto a depending arm 39 provided with a laterally extending portion 40 which, during its reciprocatory movement, is adapted to engage a vertically disposed arm 41 secured to the draft slide 12.

When the draft door 10 is employed instead of the draft slide 12, and the operation of the furnace is controlled by a chain connecting a lug 42 with a damper regulator or some manually operable device, I provide a slide 43 having a slot 44 therein adapted to receive the end of the slide rod 34 which is preferably slightly reduced in size to form a shoulder 45, a washer 46 is placed upon said rod upon the opposite side of said slide from said shoulder 45 and is held thereon by a cotter pin 47. A chain 48

extending to the damper regulator or to the manually operable means is connected to a lug 49 upon said slide 43 and a second connecting means 50 is adapted to connect a lug 51, located at the upper and opposite corner of the slide 43, with the lug 42 on said draft door 10. The slide 43 is adapted to be moved upwardly upon the rod 34 by the upward movement on the chain 48 and is prevented from rocking upon said rod 34 by its engagement with the face 52' of the plate 52 secured to the front of said heater. It will be seen that the face 53 of said slide 43 and the edge 54 of the base 52 are in alinement with each other when said slide is in the position illustrated in Fig. 1 and normally remain in such an alinement. In order to warn the operator of said heater of the approach of the melting point of said fusible element 14 and thereby save said element from becoming melted, an electric bell or annunciator 55 which is preferably placed in some convenient location in the apartments of the operator of said heater and is connected through the battery circuit 56 with the base 19 constituting one terminal therefor and the insulated bracket 57 constituting the other terminal therefor, said bracket being supported upon one of the guides 22 and provided with a contact stud 58.

A thermostat 59 which is secured to the bracket 19 at 60 and provided with a curved end 61, adapted to engage the contact stud 58 by the expansion of the material constituting said thermostat, at a predetermined temperature, completes the electric circuit between the terminal in said bracket 19 and the terminal in the bracket 57 thus causing said bell 55 to be rung. Said thermostat being formed by riveting together two pieces of material of different coefficients of expansion, which, upon becoming heated unequally expand, causing the end 61 to straighten and engage the contact stud 58 mounted in the insulated bracket 57.

The operation of the device hereinbefore described is as follows: The fire is started in the fire pot, the door 7 closed and the damper on the chimney and the draft admitting means, preferably the door 10, are opened by the upward movement of the chain 48, said upward movement causing the slide 43 to slide upwardly along the face 51 of the base 52 until the same is prevented by the rod 34 engaging the lower end of the slot 44 said upward movement swinging the door 10 through the connection 50 upwardly upon its pivots 10'. The contact screw 58 in the bracket 57 is then set at a position which will permit it to be engaged by the thermostat 59 when said thermostat has become affected by a predetermined temperature, at which time the bell

55 will be rung warning the operator thereof that it is time to close the drafts of said furnace which may be done by releasing the chain 48 and allowing the slide 43 to slide downwardly.

If it so happens that the operator has forgotten that the drafts of the heater are open and should not hear the ringing of the bell 55, the temperature will continue to rise in the fluid heating chamber 9 until the fusing point of the fusible element 14 has been reached whereupon said element will melt and escape downwardly through the opening 17, and the rod 23 supporting the lever 21 and normally sustained by said element will be permitted to move downwardly in the cage 15 until stopped by the flange 16 and said lever 21 permitted to swing downwardly upon its pivot.

Upon the downward movement of the lever 21 the chain 25 connecting the lever 24 permits said lever to be rocked upon its pivot 26 by the weight 30, said rocking movement causing the wedge 27 to engage the inner margin of the door 7 through the recess 29 and swing said door outwardly upon its pivots 8, 8 thus admitting a current of air therethrough across said fire pot consequently cooling the walls extending above said fire pot.

Simultaneously with the rocking of the lever 24, the slide rod 34 through the link 36 is moved toward the right of Fig. 1 and the shoulder 45 on said rod forces the slide 43 to the right until said slide has disengaged the face 51 of the base 52 when said slide will be rotated in the direction of the arrow "a", upon the end of said rod 34 by the weight of the door 10 permitting said door to close. In case the slide 12 happens to be open at the same time that the door 10 is open, the movement of the arm 39 on the rod 34, against the upwardly extending arm 41 secured to said slide will cause said slide to be closed thus checking the draft through the fire pot 6.

When the heater has become sufficiently cooled to permit the closing of the door a new fusible element 14 is placed within the cage 15 and the lever 21 moved to its normal position and sustained therein by the rod 23 engaging said new fusible element. The slide 43 is rotated upon the rod 34 back to its normal position as illustrated in Figs. 1 and 3 thereby permitting the rod 34 to be moved to the left, the weight 30 to be elevated by the lever 24 and the wedge 27 to be moved out of contact with the recess 29 thus permitting said door 7 to be closed.

The foregoing detailed description has been given for clearness of understanding only, and no undue limitations should be understood therefrom, but the claims should be construed as broadly as permissible in view of the prior art.

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

1. The combination with a heater having a fire pot and a door opening into said fire pot, of means adapted to engage the inner margin of said door to open the same, a fusible element in connection with said heater, and means rendered active by the fusing of said fusible element, adapted to operate said door opening means.

2. The combination with a heater embodying in its construction, a fire pot, a door therefor, a pivot for said door, and a fluid heating chamber, of a fusible element adapted to fuse at a predetermined temperature, disposed within said heating chamber, and means actuated by the fusing of said element adapted to swing said fire pot door upon said pivot outwardly relatively to said fire pot.

3. The combination with a heater having a fire pot and a door therefor opening into said fire pot, a wedge adapted to be inserted between said door and the adjacent wall of said heater, a fusible element located adjacent to said fire pot, and means actuated by the fusing of said fusible element to insert said wedge between said door and said adjacent wall, whereby said door will be forced open.

4. The combination with a heater embodying in its construction, a fire pot, a door therefor, and a fluid heating chamber, of a fusible element, a cage adapted to support said element within said chamber, a lever, means sustained by said fusible element, and adapted to retain said lever in its normal position, a second lever, a wedge carried by said second lever adapted to engage the inner margin of said door, means to rock said second lever and means operatively connecting said first and second levers.

5. The combination with a heater embodying in its construction, a fire pot, a door therefor, and means to admit a current of air through said fire pot, of a lever, a wedge carried by said lever adapted to engage the inner margin of said fire pot door, a weight capable of actuating said wedge lever to open said door, a slide operatively connected to said weight adapted to close said air admitting means, and means disposed adjacent to said fire pot rendered effective by the creation of a predetermined degree of heat within said fire pot, adapted to release said weight whereby said wedge and slide are actuated.

6. The combination with a heater embodying in its construction, a fire pot, a door therefor, and a fluid heating chamber, a fusible element, a depending cage detachably mounted upon the exterior of said heating chamber, projecting into said chamber and having an inwardly projecting flange

adapted to support said fusible element, a rod extending into said cage and sustained by said fusible element, a lever pivoted upon said heater adapted to be retained in its
5 normal position by said rod, and mechanism connected with said lever adapted to be actuated by the fusing of said element to actuate said door.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses. 10

ROBERT C. CLAUS.

Witnesses:

CHARLES S. GOODING,
SYDNEY E. TAFT.