

I. FILSON.
SAFETY DEVICE FOR HEATERS.
APPLICATION FILED NOV. 6, 1907.

969,466.

Patented Sept. 6, 1910.

3 SHEETS—SHEET 1.

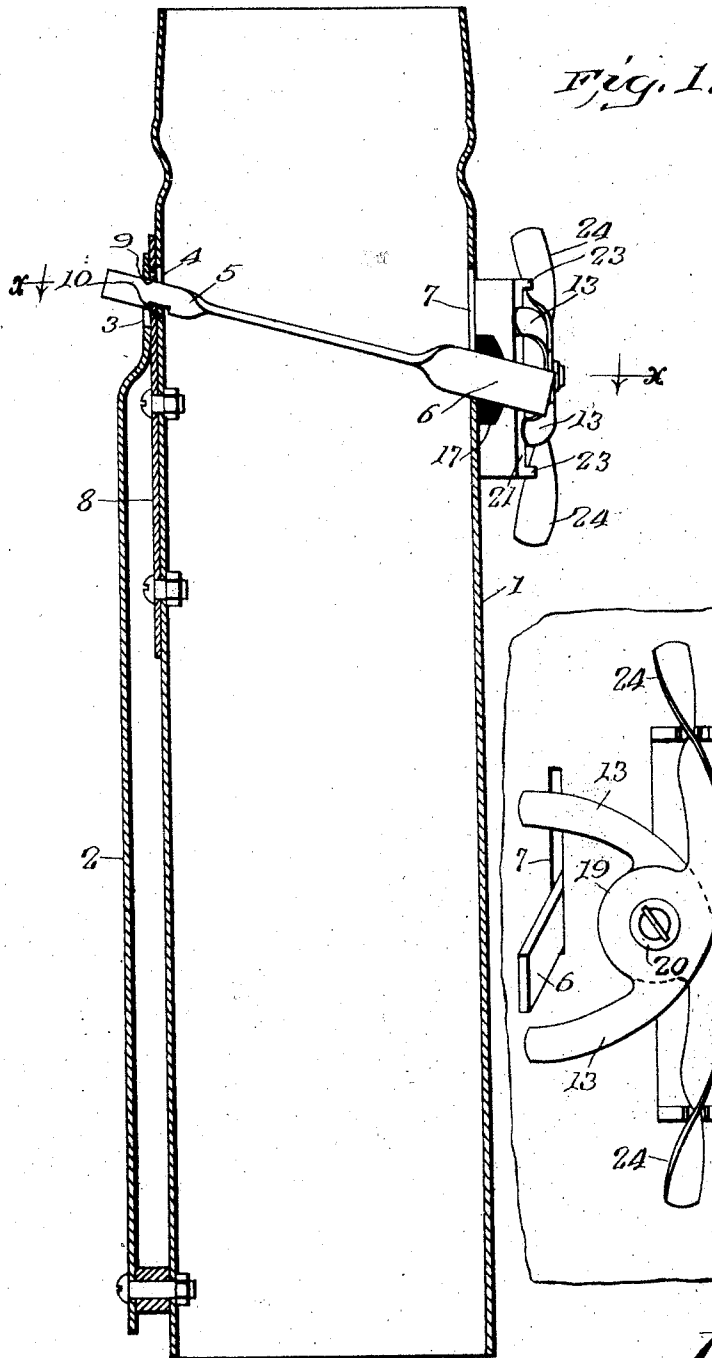


Fig. 1.

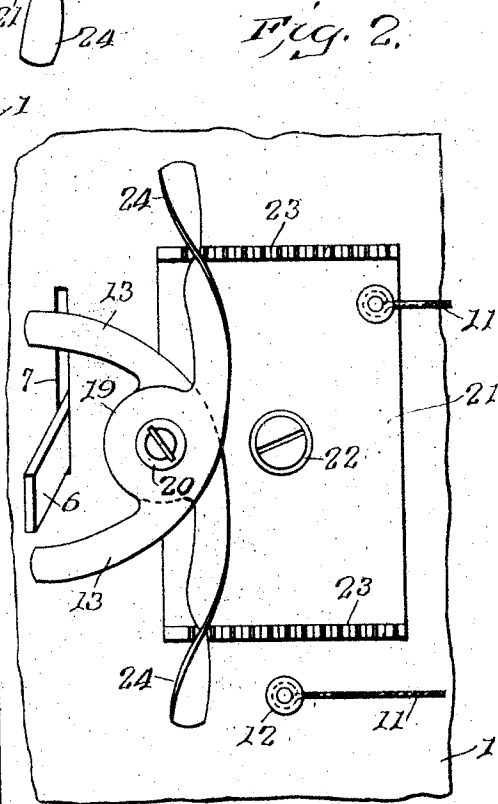


Fig. 2.

Witnesses

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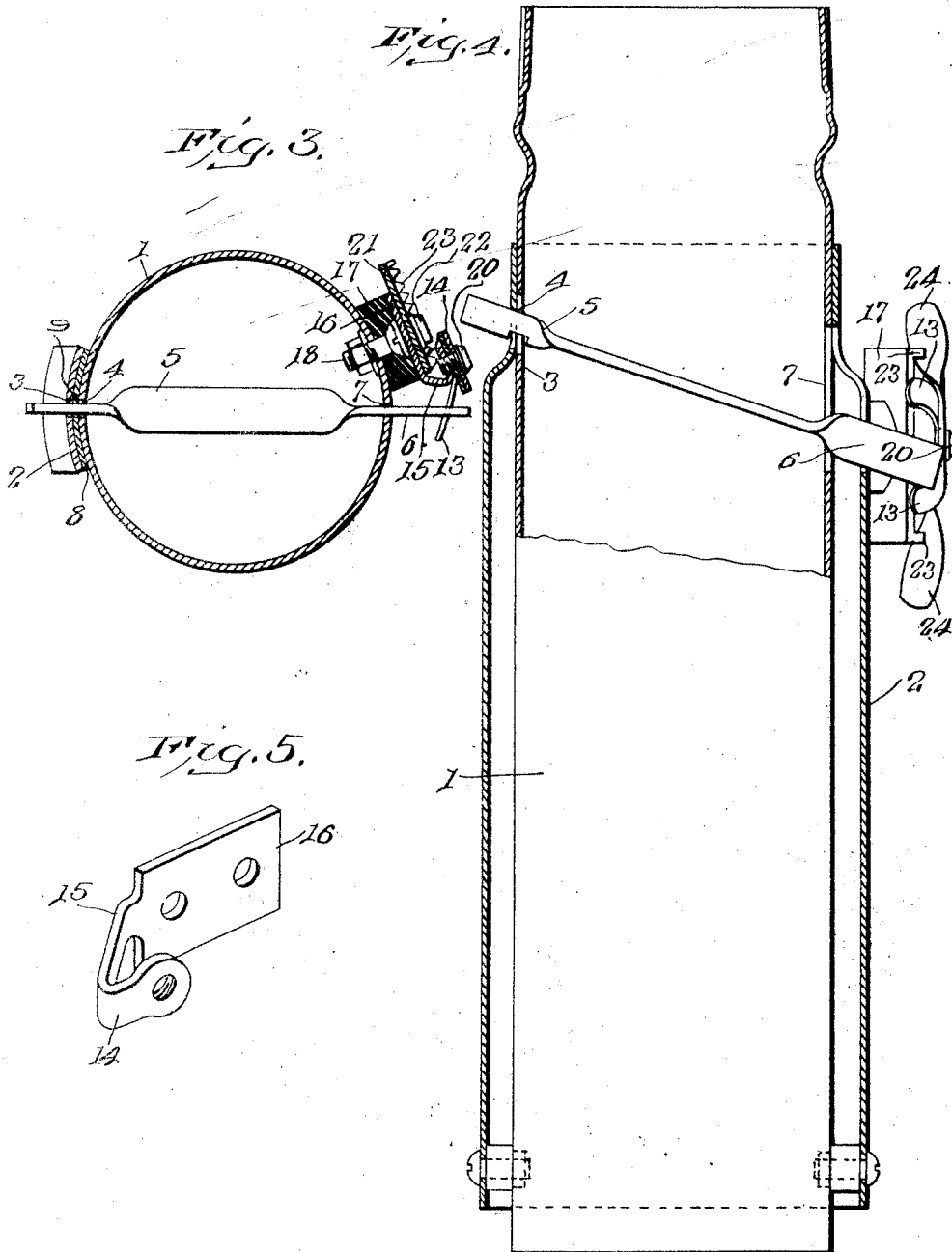
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3 SHEETS—SHEET 2.



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3-SHEETS-SHEET 3.

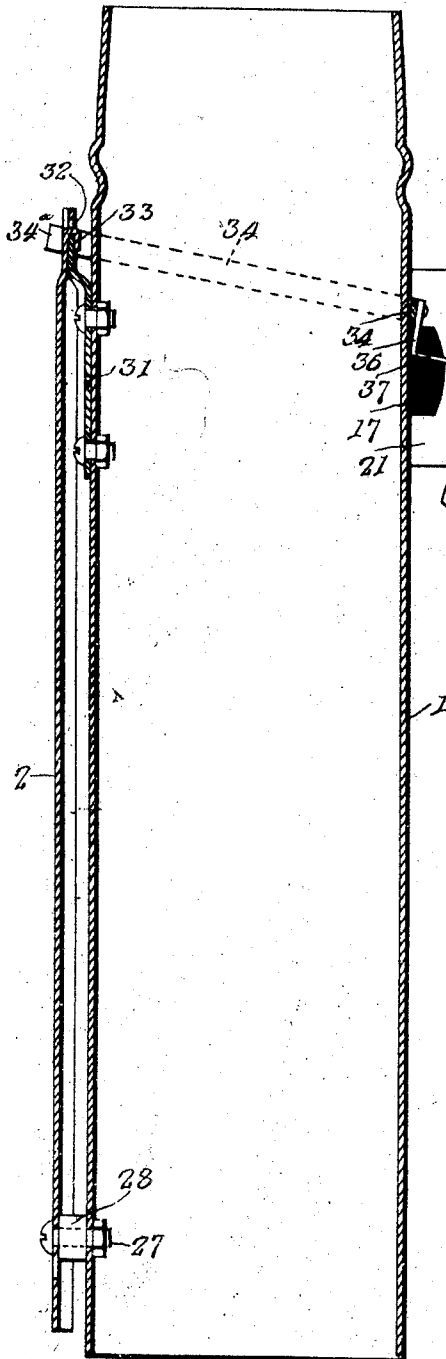


Fig. 6.

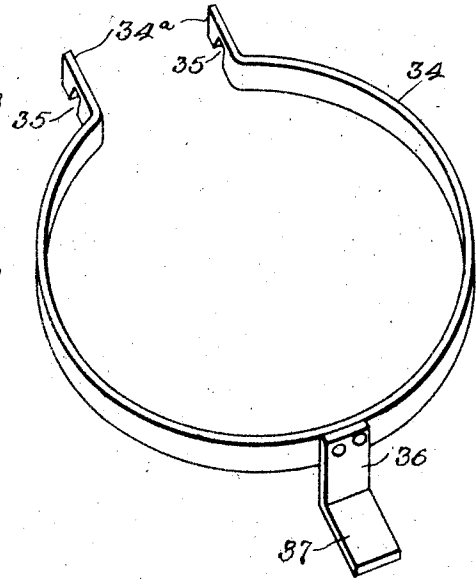


Fig. 7.

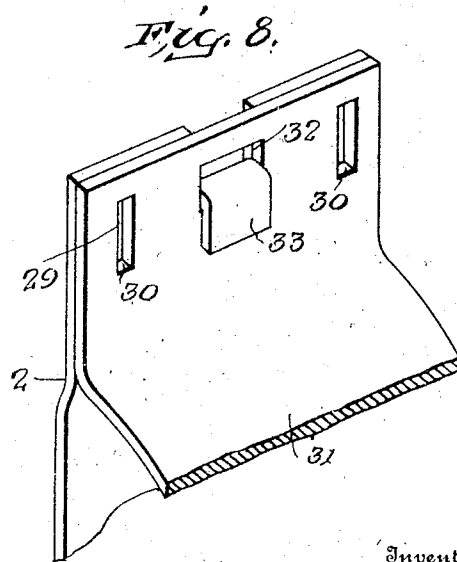


Fig. 8.

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UNITED STATES PATENT OFFICE.

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SAFETY DEVICE FOR HEATERS.

969,466.

Specification of Letters Patent.

Patented Sept. 6, 1910.

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To all whom it may concern:

Be it known that I, IRA FILSON, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Safety Devices for Heaters, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to safety devices for heaters, and more particularly for use in connection with that class of heaters which employ gas as a fuel. The pressure in the main supplying gas for this purpose, and particularly where natural gas is used, is subject to fluctuations, the pressure sometimes falling to such an extent as to extinguish the flame in the heater, and, at other times, increasing to such an extent as to increase the flame and overheat the stove sufficiently to set fire to the building.

The object of this invention is to overcome these difficulties by providing a device which may be attached to the outlet or stove pipe for the heater and which will be actuated by the variations of the heat within the pipe to close an electric circuit, which circuit may be connected either to a suitable alarm or to an automatic cut-off for shutting off the supply of gas; further, to provide such a device which will be positive and accurate in its action; which can be adjusted to close the circuit at different degrees of temperature; which will be compact and neat in appearance; and which may be manufactured and installed at a low cost.

With these objects in view my invention consists in certain novel features of construction and in certain parts and combinations hereinafter to be described, and then more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical section, taken centrally through a stove pipe equipped with my invention; Fig. 2 is a side elevation of a portion of the pipe, showing the adjustable contact fingers; Fig. 3 is a transverse sectional view, taken on the line *x x* of Fig. 1 and looking in the direction of the arrows; Fig. 4 is a vertical sectional view of a slightly modified form of the invention; Fig. 5 is a detail view of the supporting arm for the contact fingers; Fig. 6 is a longitudinal sectional view of another modification of the inven-

tion; Fig. 7 is a detail view of the modified form of lever employed in the device shown in Fig. 6; and Fig. 8 is a fractional detail view showing the support for the lever of Fig. 7.

In these drawings, I have illustrated one embodiment of my invention which, in its preferred form, consists of a thermostat comprising two members, one of which is adapted to expand to a greater extent than the other, and a lever connected with said thermostat in such a manner that it will be moved by the unequal expansion of the members of said thermostat and adapted, when so moved, to close an electric circuit which is adapted to actuate a suitable alarm or cut-off mechanism. As shown in these drawings, a heat conducting pipe, such as the stove-pipe 1, comprises one of the members of the thermostat, the other member 2 being secured preferably to the outer side thereof and spaced some distance therefrom for the greater portion of its length, but having its upper end bent inwardly to a position close to the outer surface of the pipe 1. This member is secured near its lower end to the pipe 1 and has its upper end free to move vertically of said pipe. The member 2 may be of any suitable construction, but preferably consists of a bar of relatively small width secured at its lower end to the pipe 1, but may, if desired, be constructed in the form of a sleeve extending entirely around the pipe 1, as shown in Fig. 4. The member 2 is provided near its upper end with a vertical slot 3, adapted to lap or extend over a portion of a similar slot 4 formed in one side of the pipe 1 and adapted to receive the adjacent end of a lever or bar 5, which extends through the slots 3 and 4 to a point beyond the same and has its other end 6 extending through a slot 7 in the opposite side of the pipe 1 and somewhat greater in length than the slot 4. A reinforcing plate 8 is preferably secured to the outer wall of the pipe 1 adjacent to the slot 4 and has formed therein a slot 9 of less length than the slot 4 and adapted to register therewith, the edges of said reinforcing plate extending beyond the edges of the slot 4 and engaging the edges of the lever 5 and holding the same out of engagement with the wall of the slot 4. The lever 5 is preferably provided with a notch or recess 10, formed in its upper edge

and adapted to engage with the upper wall of the slot 3 in the member 2 to limit the longitudinal movement of said lever.

The two members of the thermostat may, if desired, be formed of different materials having different coefficients of expansion, but this is not necessary in the construction here shown, as the pipe 1, which forms one member of the thermostat, is subjected directly to the heat passing from the heater and expands more rapidly than does the member 2, which is removed some distance beyond the outer wall thereof and has but a limited contact therewith. Thus, the pipe 1 will expand, and, as that portion thereof containing the slot 4 moves upwardly, the lower wall of the slot 9 in the reinforcing member 8 will engage the lower edge of the member 5 and move the same about its pivotal center, formed by the engagement of the upper edge thereof with the upper wall of the slot 3 in the member 2, thus causing the opposite end 6 of the lever to rise. The cooling of the pipe causes the same to contract and reverses the movement of the lever 5.

A suitable circuit closing device is mounted on the outer wall of the pipe 1 near the slot 7 therein and is connected to one side of a circuit 11, the opposite end of which is connected to the pipe 1 by means of a suitable binding post 12. This circuit closer preferably consists of one or more arms 13, of brass or other suitable material, pivotally mounted upon the outer arm 14 of a substantially U-shaped member 15, the other arm 16 of which is secured to a block of insulating material 17, which, in turn, is secured to the pipe 1 by means of a suitable bolt 18, the head of which is countersunk into the block of insulating material to such an extent that it is out of contact with the arm 16 of the U-shaped member 15. The arms 13, which are preferably two in number, are curved and have their forward ends, which form the contact arms, adapted to extend on opposite sides of the outer end 6 of the lever 5 and their opposite ends extended and adapted to engage suitable stops to retain the contact fingers in their adjusted positions. These arms also have apertured lugs 19, formed intermediate their ends adapted to receive the screw 20, by means of which the arms are pivotally connected to the arm of the member 15. Any suitable form of stop may be used to limit the movement of the arms about their pivotal centers, but I prefer that shown herein which consists of a plate 21, of brass or other suitable material, secured to the insulating block 17 by means of a suitable screw 22 and having its outer edges turned outwardly at substantially right angles to the body portion thereof and provided with teeth 23, forming notches adapted to receive the edges of the

outer ends of the arms 13 which are twisted through a quarter of a revolution, as shown in Fig. 24, to bring the edges of the arms into alignment with the notches formed by the teeth 23. The outer ends 24 of the arms 13 are moved along the teeth 23 until the contact arm 13 has been brought into the desired relation to the outer end 6 of the lever 5, and in this position it is held by the engagement of the outer ends 24 of the arms 13 with the teeth 23, the resiliency of said arms being sufficient to retain the same in engagement with the teeth.

In that form of the device above described it is necessary to form apertures or slots in the walls of the pipe, which is objectionable owing to the escape of the products of combustion through the same. In order to overcome this objectionable feature of the device I have devised a modified form of the same in which the lever extends about the outside of the pipe instead of through the same. In the preferred form of this modification, which is shown in Figs. 6 to 8 of the drawings, the bar 2 extends longitudinally of the pipe 1 in a manner similar to that shown in Fig. 1. This bar is rigidly secured at its lower end to the pipe by means of a bolt 27 and a spacing washer 28. This bar, however, instead of being bent inwardly at its upper end, is preferably substantially straight throughout its length and is provided at its upper end with suitable apertures or elongated slots 29 which are preferably two in number and are arranged near the opposite sides thereof and adapted to overlap and register with a portion of slots or apertures 30 which are formed in a part carried by the pipe 1 which part is preferably in the form of a plate 31 rigidly secured to the pipe 1 and having its upper portion bent outwardly to a position adjacent to the upper end of the bar 2. This part may, however, be a portion of the wall of the pipe itself, as shown in Fig. 4. The bar 2 is preferably slidably connected to the plate 31, which connection may be formed in any suitable manner, that preferred consisting in providing the plate 31 with an aperture 32 adapted to receive a tongue 33, which is cut out of the adjacent end of the bar 2, extended through said aperture and bent down against the side of the plate 31, as shown in Fig. 8. The lever is constructed to extend about the outside of the pipe from the support formed by the plate 31 and bar 2 to a point adjacent to the contact fingers 13 and preferably consists of a ring or band 34 of a diameter somewhat greater than the outer diameter of the pipe 1, whereby it is adapted to extend loosely about that pipe. This ring is provided on one side with one or more projections 34' adapted to engage the slots in the plate 31 and bar 2. In the present instance, these projections are formed by

bending outwardly the ends of the ring, thereby forming two projections adapted to engage the slots at the opposite sides of the supporting plate. These projections preferably have notches 35 formed therein to engage the plate at the bottom of the slot and prevent longitudinal movement of the projection in the slot. The ring 34 extends about the pipe 1 at a point above the insulating block 17 which supports the plate 21. Any suitable means may be provided to engage the contact fingers 13 when the lever 34 is moved. I have here shown this means as comprising a finger 36 secured to the lever 34 at a point adjacent to the fingers 13 and provided with a lip 37 adapted to extend outwardly between said fingers. Thus, it will be seen that, as the plate 31 moves relatively to the bar 2, due to the expansion or contraction of the pipe under the influence of the heat therein, the lever 34 will be rocked about its pivotal center and the lip 37 moved into or out of contact with the contact fingers 13.

The operation of the device will be obvious from the foregoing description of the several parts thereof, and it will be apparent that I have provided a device adapted to be secured to the outlet pipe of a gas heater which will be actuated by the rise or fall of the temperature within said pipe to close an electric circuit adapted to operate an alarm, cut-off, or similar device; and, further, it will be apparent that I have provided such a device which will be positive in its operation; which can be adjusted to actuate the alarm at the desired degree of temperature; which is compact and neat in appearance; and which is simple in construction and may be manufactured and installed at a low cost.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art. It will be obvious, for instance, that the lever instead of closing an electric circuit, as described, might control the movement of a mechanical device which would perform the same functions as the electrical device. It will also be understood that the term "slot" is employed to designate an opening of any suitable character and is not limited to the form of opening shown.

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

1. In a device of the character described, the combination, with a thermostat comprising a plurality of members, each member being provided with a part having a slot therein, one of said members being adapted to expand to a greater extent than the other and having its slotted portion movable relatively to the other member, a lever ex-

tending through said slots fulcrumed on one of said members and adapted to be engaged by the other, whereby the unequal expansion of said members will move said lever about its pivotal center, and means controlled by the movement of said lever for closing an electric circuit.

2. In a device of the character described, the combination, with a pipe having a part provided with a slot, a member secured to the outer wall of said pipe and having a slot therein, a lever extending through the slots in the part carried by said pipe and in said member and adapted to be engaged by the walls of said slots, of a contact finger adjustably mounted near the end of said lever.

3. In a device of the character described, the combination, with a pipe having a part provided with a slot, a bar connected at its lower end to said pipe, spaced some distance therefrom and having a slot near the upper end thereof, a lever extending through the slots in the part carried by said pipe and in said bar and fulcrumed on the wall of one of said slots and adapted to be engaged by the wall of the other slot, and a contact arm adjustably mounted on the wall of said pipe and adapted to be engaged by said lever.

4. In a device of the character described, the combination, with a stove pipe, a lever carried thereby, and means controlled by the variation of the heat in said pipe for actuating said lever, of a plurality of contact arms connected with an electric circuit and pivotally mounted on said pipe intermediate their ends, each having one end extending adjacent to said lever, and stops adapted to engage the other ends of said arms to retain the same in their adjusted positions.

5. In a device of the character described, the combination, with a stove pipe, a lever carried thereby, and means controlled by the variation of the heat in said pipe for actuating said lever, of a plurality of contact arms connected with an electric circuit, pivotally connected to said pipe and having their outer ends extending on opposite sides of said lever, a plate secured to said pipe, and a plurality of stops carried thereby and adapted to be engaged by the inner ends of said pivoted arms.

6. In a device of the character described, the combination, with a stove pipe, a lever carried thereby, and means controlled by the variation of the heat in said pipe for actuating said lever, of a block of insulating material secured to said pipe, a substantially U-shaped supporting member having one arm secured to said insulating material, a pair of contact arms connected with an electric circuit, pivotally connected to the other arm of said U-shaped member and having their

outer ends extending on opposite sides of said lever and their inner ends extended to form adjusting means, and a plate secured to said block, having its edges upturned and provided with teeth adapted to form stops and to be engaged by the inner ends of said arms.

7. In a device of the character described, a pipe, a plate carried thereby, a bar extending longitudinally of said pipe at a distance therefrom, connected at one end to said pipe and slidably connected at the other end to said plate, said plate and said bar having overlapping slots therein, a lever extending through said slots and adapted to be actuated by the movement of one of said members relatively to the other, and means controlled by the movement of said lever for actuating signal mechanism.

8. In a device of the character described, a pipe, a plate carried thereby, a bar extending longitudinally of said pipe at a distance therefrom, connected at one end to said pipe, slidably connected at the other end to said plate and having an aperture therein near the end of said plate, a lever extending about said pipe having one end extending through the aperture in said bar and adapted to be engaged by said plate, and means controlled by the movement of said lever for actuating signal mechanism.

9. In a device of the character described, a pipe, a plate carried thereby, a bar extending longitudinally of said pipe at a distance therefrom, connected at one end to said pipe, slidably connected at the other end to said plate and having apertures there-

in near the end of said plate, a lever surrounding said pipe having projections extending through the apertures in said bar and adapted to be engaged by the said plate, and means controlled by the movement of said lever for actuating signal mechanism.

10. In a device of the character described, a pipe, a plate carried by said pipe and having apertures therein, a fixed bar extending longitudinally to said pipe and having apertures therein near the apertures in said plate, a lever extending loosely about said pipe, having its ends bent outwardly and extending through the apertures in said plate and said bar, said lever being pivotally supported by one of said members and adapted to be engaged by the other of said members, and means controlled by the movement of said lever for closing a signal circuit.

11. In a device of the character described, a pipe, a bar extending longitudinally to said pipe, one of said members being movable relatively to the other under the influence of heat, a lever extending loosely about said pipe, pivotally mounted on one of said members and operatively connected to the other of said members, whereby the movement of one of said members relatively to the other will move said lever about its pivotal center, and a mechanism adapted to be controlled by the movement of said lever. In testimony whereof, I affix my signature in presence of two witnesses.

IRA FIELSON.

Witnesses:

FRANCIS M. HAGAN, Jr.,
HARRIET L. HAMMAKER.