

March 1, 1960

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2,926,656

SAFETY DEVICE FOR STOVES

Filed Dec. 19, 1958

2 Sheets-Sheet 1

FIG. 2.

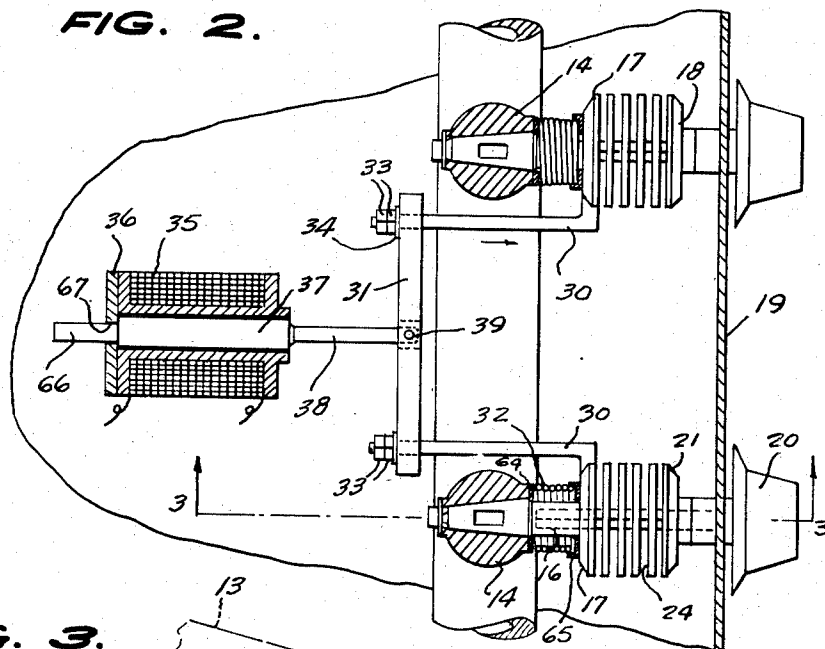


FIG. 3.

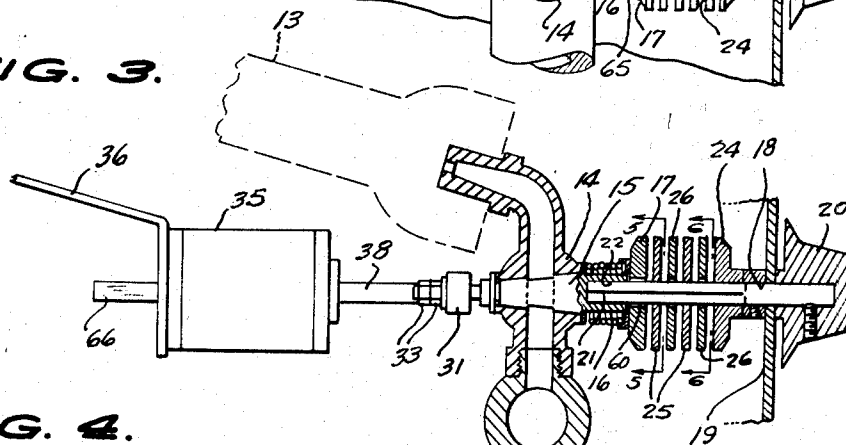
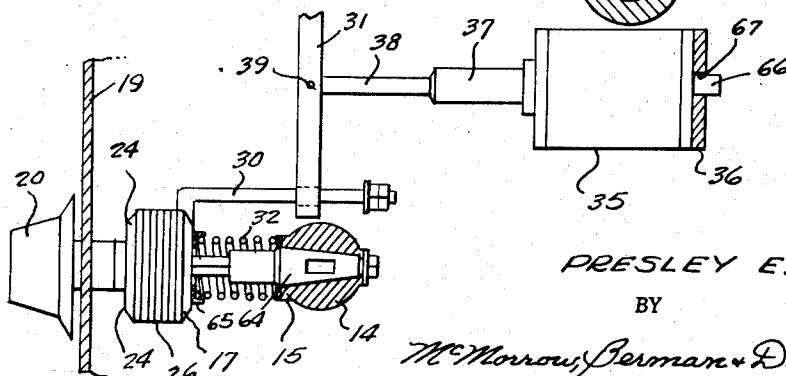


FIG. 4.



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FIG. 1.

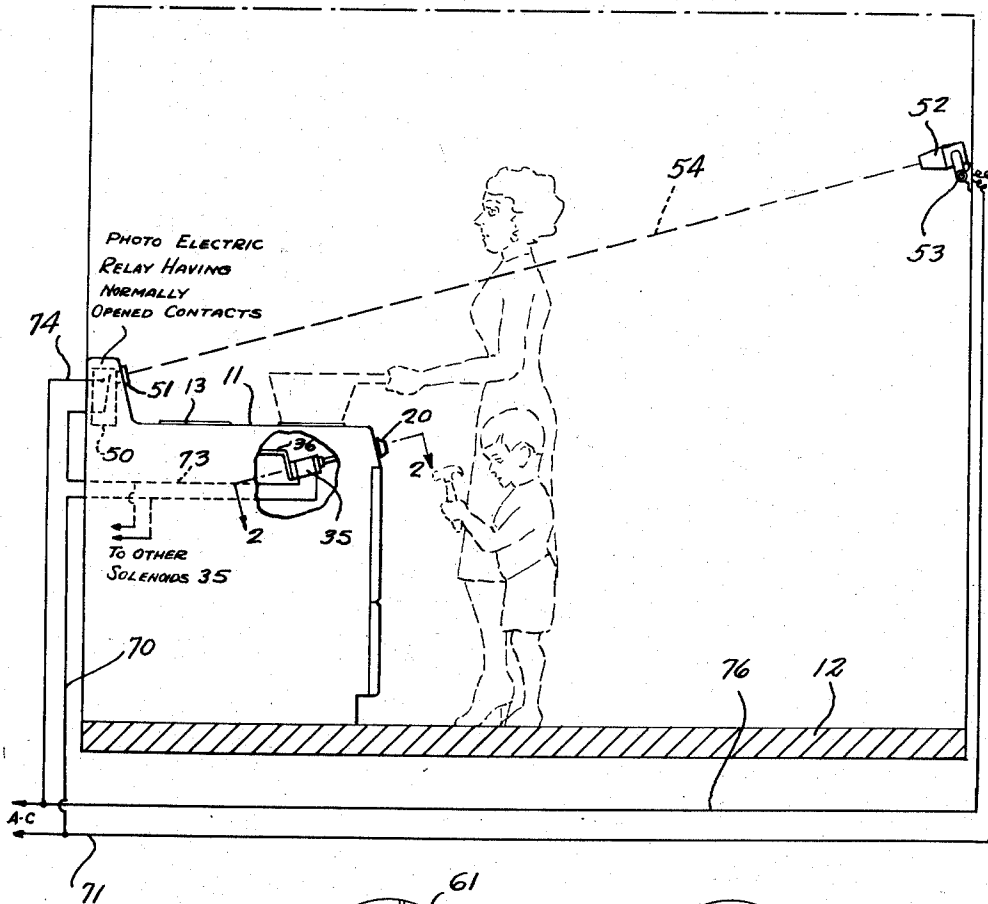
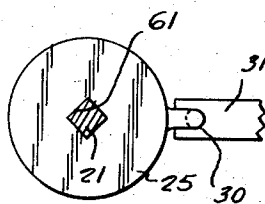


FIG. 5.

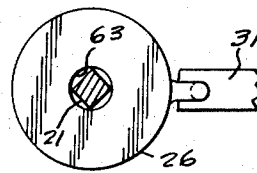


FIG. 6.

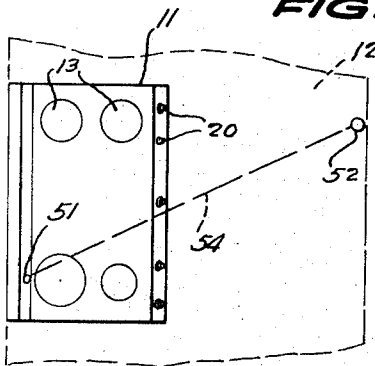


FIG. 7.

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1

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SAFETY DEVICE FOR STOVES

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4 Claims. (Cl. 126—42)

This invention relates to cooking ranges, and more particularly to a safety device for preventing small children from operating the controls of a cooking range when an adult is not present to supervise same.

A main object of the invention is to provide a novel and improved safety device for preventing operation of the controls of a cooking range by a small child, the device involving simple components, being easy to install, and greatly reducing the risk of accidents heretofore caused by children operating the controls of a cooking range in the absence of an adult.

A further object of the invention is to provide an improved protective system for locking the controls of a cooking range so as to prevent operation thereof by a small child, the system involving inexpensive components, being reliable in operation, and being inconspicuous in appearance so that it is relatively unnoticeable and so that a child may not readily defeat same.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a vertical cross sectional view taken through a portion of a kitchen provided with a cooking range in which is installed an improved safety device according to the present invention, and illustrating the manner in which the light beam controlling the safety device may be interrupted only by an adult.

Figure 2 is an enlarged cross sectional view taken on the line 2—2 of Figure 1, showing some of the details of the valve-locking means forming part of the safety system illustrated in Figure 1, the locking means being shown in released position.

Figure 3 is an enlarged cross sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a fragmentary cross sectional view, similar to Figure 2, but showing the elements in their normal locked positions.

Figure 5 is an enlarged cross sectional detail view taken on the line 5—5 of Figure 3.

Figure 6 is an enlarged cross sectional detail view taken on line 6—6 of Figure 3.

Figure 7 is a top plan view, to a reduced scale, of the cooking range of Figure 1, showing a typical arrangement of the photo-electric sensing beam which may be employed in accordance with the present invention.

Referring to the drawings, 11 designates a cooking stove of substantially conventional construction which is mounted on a kitchen floor 12. The cooking range 11 is provided with the usual burners 13, each of which is controlled by a conventional valve 14.

The valve 14 of each burner is provided with a conical apertured rotor 15 and with a stem 16. Associated with each stem 16 is an operating shaft 18 which is rotatably mounted in the upper front wall portion 19 of the stove 11 and which is provided on its outer end with a knob 20. The shaft 18 is squared at its inner portion, as shown at 21. Stem 16 is formed with a square bore 22 which receives the square portion 21 of shaft 18. The squared

2

portion 21 of the shaft extends through a circular aperture 60 formed centrally in the main clutch disc element 17 disposed adjacent the end of stem 16. Secured on the shaft 18 adjacent the front wall 19 is another clutch disc element 24.

Alternating intervening clutch discs 25 and 26 are provided on the squared portion 21 of shaft 18 between the clutch disc elements 17 and 24, the disc elements 25 having square central apertures 61 slidably and non-rotatably receiving the squared shaft portion 21, and the disc elements 26 having circular central apertures 63 rotatably and slidably receiving said squared shaft portion, as shown in Figures 5 and 6.

The clutch disc elements 17 associated with each pair of valves 14, 14 are rigidly secured to respective arms 30, 30 which extend slidably through the end portions of a bar 31, as shown in Figure 2, the arms 30, 30 extending parallel to the associated shafts 18, 18 and being provided at their ends with retaining nuts 33, retaining the ends of the bar 31 in operative engagement with the respective arms 30, 30 and enabling the arms 30, 30 to be retracted, namely, to be moved toward the left, as viewed in Figure 2 by the bar 31 in a manner presently to be described.

A pair of nuts 33, 33 are preferably provided, said nuts being threadedly engaged on the ends of the rod members 30 and locking each other on said rod members. Washers 34 may be provided on the rod members between the nuts 33 and the bar 31, as shown in Figure 2.

Surrounding each valve stem member 16 is a relatively heavy coiled spring 32, the spring bearing between a first bearing washer 64, disposed adjacent the associated valve 14, and a cup-like second bearing washer 65 disposed against the clutch disc element 17. Thus, the springs 32 bias the clutch disc elements 17 toward the right, as viewed in Figure 2, namely toward locking positions wherein the disc segments 25 and 26 are tightly clamped between the opposing main clutch disc elements 17 and 24.

It will be noted that when the springs 32 are in their locking conditions, for example, as shown in Figure 4, the clutch members 17 are tightly pressed against the remainder of the clutch assembly, being thus clamped to the opposing clutch disc members 24. Since rotation of the members 17 is prevented by the connections of said members to the bar 31 through the arms 30, this prevents the valves 14 from being operated unless a relatively large amount of torque is applied to the knob 20, such amount being beyond the strength of a child. Therefore, in order to release the valve it is necessary to retract the bar member 31, namely, move the bar member to the position thereof shown in Figure 2, wherein the force acting on the disc elements 17 is overcome and the springs 32 are compressed.

Associated with each pair of valves 14, 14 as illustrated in Figure 2, is a solenoid 35 which is mounted in the upper portion of the range on an axis substantially parallel to and coplanar with the axis of the associated pair of valves 14, 14. Thus, the solenoid 35 may be secured to a bracket 36 which is in turn rigidly secured to any suitable stationary portion of the frame of the range 11. The plunger 37 of the solenoid 35 is provided with a forwardly extending first portion 38 which is pivotally connected at 39 to the intermediate portion of the associated bar member 31, the bar member 31 being however non-rotatable around the axis of the solenoid plunger 37. The plunger 37 is provided with a second extension 66 extending axially therefrom opposite to the portion 38, said extension 66 being non-circular in cross section, for example, being of square cross section, and slidably engaging in a correspondingly shaped non-circular opening 67 provided in the bracket member 36. Thus, rotation of the plunger member 37 around its own axis

3

is prevented, although the plunger member may move in its axial direction.

Any other suitable means may be provided for preventing rotation of the plunger member 37, since such rotation is undesirable because the clutch members 17 must be supported against rotation to prevent operation of the associated valves 14 by a child when the springs 32 are in their expanded positions, such as the position illustrated in Figure 4.

As will be readily apparent from Figures 2, 3 and 4, when the solenoid 35 is not energized, the plunger 37 thereof is free to move forwardly and thus the springs 32 are free to expand and to exert clamping pressure on the outer clutch disc members 17. Under these conditions a considerable amount of torque will be required to rotate the knobs 20, the required amount being greater than ordinarily can be furnished by a child. Therefore, opening of the valves 14 is prevented unless a very considerable amount of torque is applied to their associated knobs. However, when the solenoid 35 is energized, the associated plunger 37 is retracted, whereby the bar 31 exerts rearward thrust on the associated rod members 30, 30, said thrust being transmitted to the clutch disc elements 17, 17 and acting to compress the locking springs 32, 32, releasing the discs 25 and 26 and allowing the valve-operating knobs 20 to be easily rotated.

Designated at 50 is a photo-electric relay of conventional construction of a type having normally closed contacts, the relay being mounted in the upper rear portion of the cooking stove 11, for example, in the position illustrated in Figure 1, the relay being provided with a photo-sensitive element 51 which operates to open the relay contacts responsive to reception of a beam of light thereon. Designated at 52 is a light source comprising a suitable lamp mounted in a projecting housing, also of conventional construction, the light source 52 being mounted by means of a bracket 53 on the wall of a kitchen, or on any other suitable stationary support, in a position to project a beam of light across the area forwardly adjacent to the cooking range to impinge on the photo-electric element 51, the source 52 being arranged so that the light beam, designated at 54, is at a height greater than the height of a child, but is low enough to be intercepted by an adult standing on the kitchen floor 12 in front of the cooking range.

Figure 7 illustrates one possible arrangement wherein the photo-electric element 51 is located adjacent one side of the cooking range at the rear thereof and the light source 52 is mounted on the wall so that the light beam 54 passes diagonally across the area in front of the cooking range. As illustrated in Figure 1, the light beam 54 may be inclined toward the photo-electric element 51 so that the beam will be intercepted by the upper portion of the body of an adult and will be too high to be intercepted by a child standing in front of the cooking range.

When the lamp 52 is energized, the light beam 54 normally impinges on the photo-sensitive element 51, causing the photo-electric relay 50 to open its contacts. Under these conditions the solenoids 35 of the system are deenergized and the coiled springs 32 lock the valve-operating rods of the stove against operation by a child. However, if the light beam 54 is interrupted, the photo-sensitive element 51 does not receive any light, whereby the relay 50 allows its contacts to close. This energizes the solenoids 35 and causes the associated plungers 37 to retract the bar members 31 and compress the locking springs 32, as shown in Figure 2, releasing the valve-operating knobs 20 of the stove.

As shown in Figure 1, each solenoid 35 is connected to the power supply wires 71 and 76 through the contacts of the photo-electric relay 50, one terminal of each solenoid 35 being connected to the line wire 71 by a wire 70 and the other terminal of the solenoid being connected by a wire 73 to one of the contacts of the photo-electric

4

relay 50. The remaining contact of the relay 50 is connected by a wire 74 to the remaining line wire 76.

One terminal of the light source 52 is connected to the line wire 71 and the other terminal of said light source is connected to the line wire 76. Therefore, the light source 52 is normally energized and provides the beam 54 which is directed toward and impinges on the photo-sensitive element 51, normally maintaining the photo-electric relay in a condition wherein its contacts are open. However, if the beam 54 is intercepted, the photo-sensitive element 51 responds to cause relay 50 to close its contacts and energize the solenoid 35, releasing the valve-operating knob 20. However, as above explained, this can only occur when an adult occupies the space in front of the cooking range 11.

While a specific embodiment of an improved safety device for a cooking range has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In a cooking range, a movable, manually operable control member on the range in a position readily accessible by a child, a burner valve operable by said control member, locking means clampingly engaging said burner valve and normally preventing operation thereof, light-sensitive switch means, means projecting a light beam on said light-sensitive switch means across the area forwardly adjacent said control member at a height such as to be interrupted by an adult but too high to be interrupted by a child, electrically controlled means to disengage said locking means, an energizing circuit connected to said electrically controlled means and including said light-sensitive switch means, and means to energize said electrically controlled means responsive to the interruption of said light beam.

2. In a cooking range, a movable, manually operable control member on the range in a position readily accessible by a child, a burner valve operable by said control member, normally de-energized electrical means engaging said valve and preventing operation thereof, means to release said valve responsive to the energization of said electrical means, light-sensitive switch means having normally open switch contacts, means projecting a light beam on said light-sensitive switch means across the area forwardly adjacent said control member at a height such as to be interrupted by an adult but too high to be interrupted by a child, an energizing circuit connected to said electrical means and including the contacts of said light-sensitive switch means, and means to close said contacts and energize said electrical means responsive to the interruption of said light beam.

3. In a cooking range, a manually movable valve element controlling fuel to said range and in a position readily accessible by a child, electromagnetic brake means engaging said valve element and preventing operation thereof except when the brake means is energized, a photo-electric switch device having a light-sensitive element, a light source mounted to project a light beam on said light-sensitive element across the area forwardly adjacent the cooking range at a height greater than the height of a child but low enough to be interrupted by an adult, said switch device being non-conductive when the beam impinges on said light-sensitive element, and an energizing circuit connected to said electro-magnetic brake means through said photo-electric switch device, whereby said brake means will be energized only when said light beam is interrupted.

4. In a cooking range, a rotatable valve control element controlling fuel to said range and in a position readily accessible by a child, movable restraining means engaging said valve control element and normally preventing rotation thereof, a solenoid having a plunger, means

5

mounting said solenoid adjacent said rotatable valve control element, means coupling said plunger to said restraining means and being constructed and arranged to disengage said restraining means from the valve control element responsive to energization of said solenoid, light-sensitive switch means, means projecting a light beam on said light-sensitive switch means across the area forwardly adjacent said valve control element at a height such as to be interrupted by an adult but too high to be inter-

5

6

rupted by a child, an energizing circuit connected to said solenoid and including said light-sensitive switch means, and means to energize said solenoid responsive to the interruption of said light beam.

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