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M. W. MAIER

3,169,517

COOKING RANGE OF THE SLIDING DRAWER TYPE

Filed Jan. 10, 1963

2 Sheets-Sheet 1

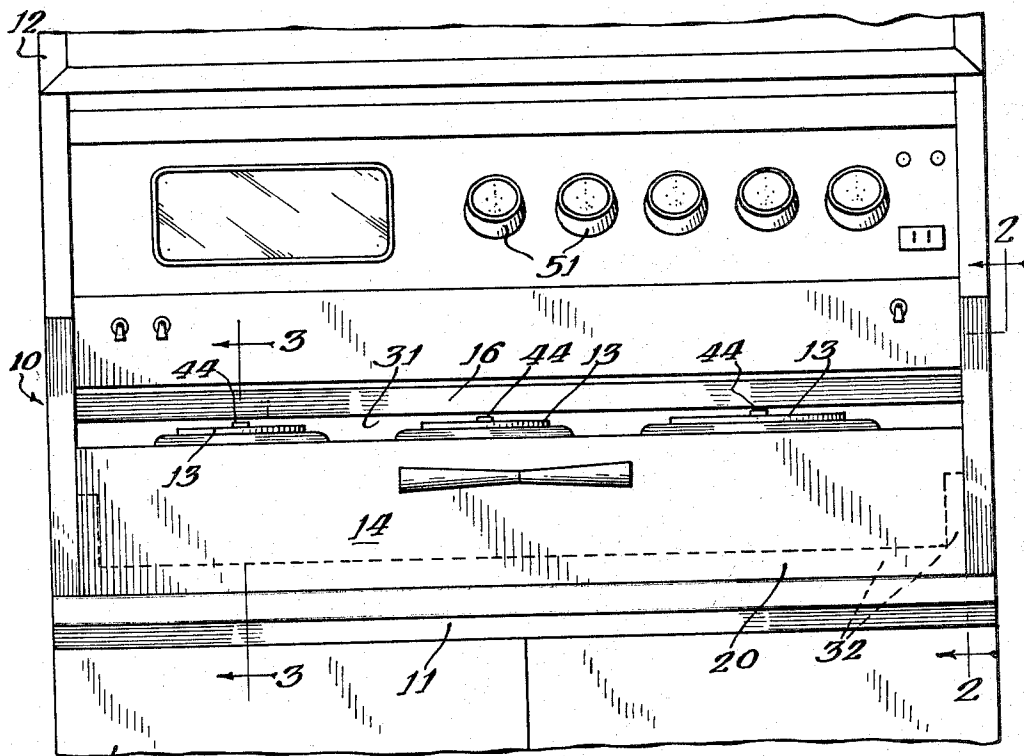


FIG. 1

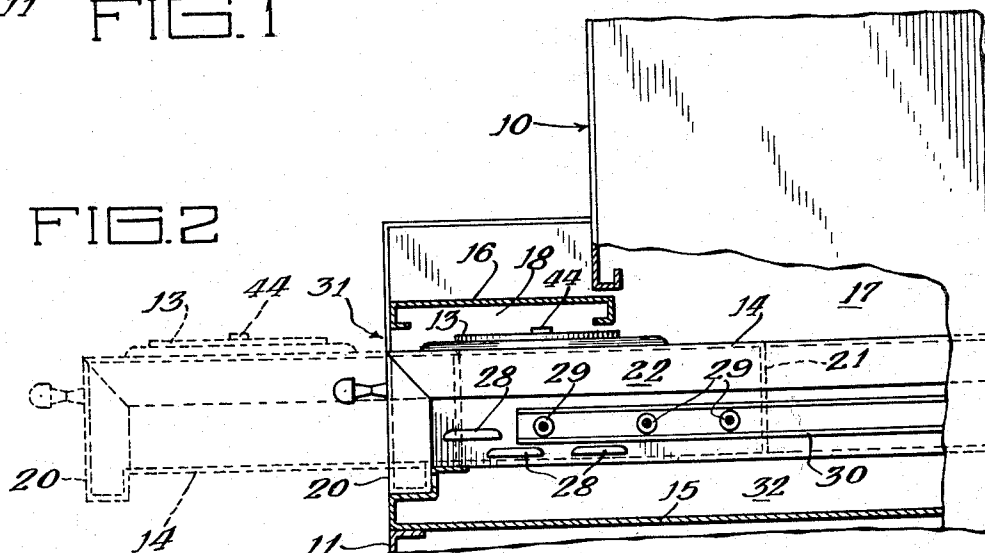


FIG. 2

Inventor:  
Michael W. Maier  
By: Zahrl, Baker, York,  
Jones & Dillman  
Attorneys

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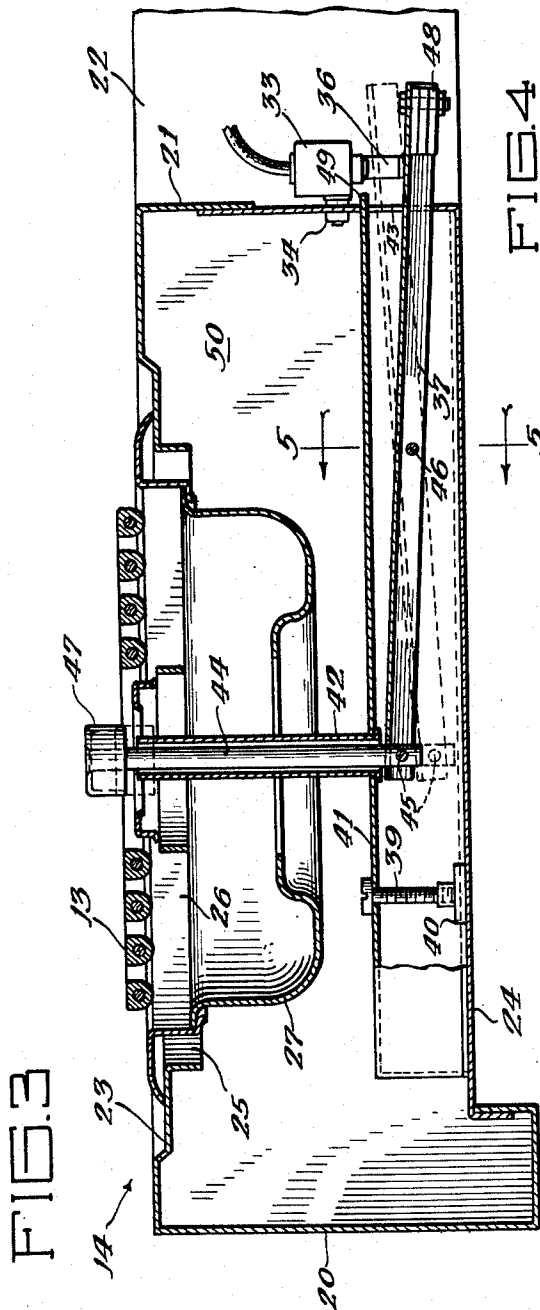


FIG. 4

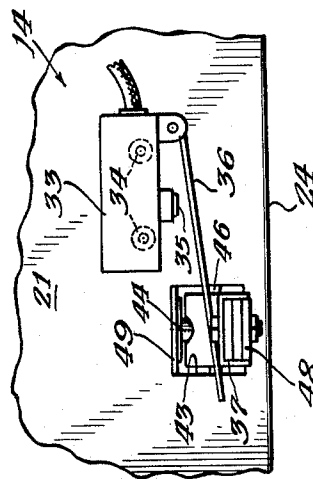


FIG. 5

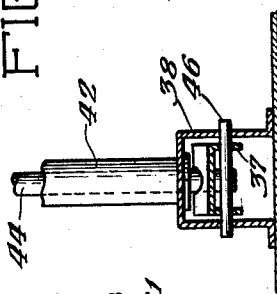
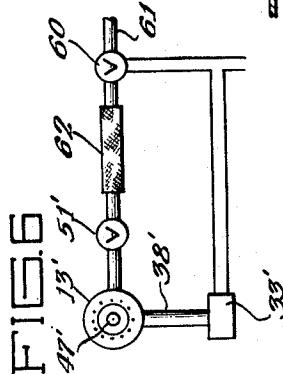


FIG. 6



Inventor:  
Michael W. Maier  
By: Zeph, Baker, York,  
Jones & Dittmar  
Attorneys

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## COOKING RANGE OF THE SLIDING DRAWER TYPE

Michael W. Maier, Beaver Dam, Wis., assignor to Malleable Iron Range Company, Beaver Dam, Wis., a corporation of Wisconsin

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This invention relates to improvements in cooking ranges of the sliding drawer type, and in particular to an improved safety disconnect therefor.

In this type of range, the surface units are mounted in a slidably arranged drawer or the like. This drawer type range is common in so-called "built-in" and "wall mounted" ranges, as well as in free standing ranges of various types. In this arrangement, the surface units, when not in use, are pushed rearwardly into a recess in the body of the range where they are hidden from view, thus contributing to a neater appearance of the kitchen as a whole.

In ranges of this type, there are two hazardous conditions which are to be avoided. The first condition is that of permitting one or more surface units to remain energized when the drawer is closed. This condition can be referred to as the generated heat hazard.

The second condition is that of permitting one or more surface units to radiate heat when the drawer is closed. This too is a hazard, because the excessive heat developed in the confined space may cause ignition of spilled grease or food, even though the circuit is de-energized. Surface units are designed to have high caloric capacity; it requires from three to five minutes for a surface unit to come to room temperature when exposed and vented. However, in a confined space, the cooling off is much slower; the entire area including the drip pan beneath the unit will be rapidly elevated to a temperature of several hundred degrees within a minute or so after the drawer is closed, and may remain at that dangerous temperature for as long as fifteen minutes.

The difference in the rate of cooling off is partially accounted for by the fact that the usual venting arrangements for drawer mounted burners are necessarily cut off by the closing of the drawer, and partially by the fact that the drawer itself is an enclosed structure which, when received in a recess, is confined at the bottom and at both sides.

This second condition can be referred to as the ambient heat hazard. In addition to its being a fire hazard, it causes rapid aging and deterioration of electrical insulation and damage to enameled and painted parts.

The ambient heat hazard is encountered much more frequently than the generated heat hazard. It is primarily under the operator's control, and stove makers customarily furnish warnings against closing the drawer while the surface units are still hot.

Ranges of this type are customarily provided with a safety disconnect which is actuated by drawer movement. This prior art device is designed to guard against only the generated heat hazard, but it affords no protection against the ambient heat hazard.

It is an object of my invention to provide an improved range construction which provides positive protection against the generated heat hazard, and which also materially decreases the likelihood of the occurrence of the ambient heat hazard.

According to my invention, this objective is obtained by providing a safety disconnect which is actuated by the removal of the pan from the surface unit. Although, as pointed out above, the closing of the drawer, which initiates the hazardous condition, is under the operator's

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control, nevertheless, when the range is provided with my improved disconnect, the likelihood of doing this through inadvertence is materially reduced.

For example, the situation that occurs rather commonly is that the housewife has inadvertently left the burner energized. This is discovered when the time comes to push in the drawer. But the mere act of turning off the control switch just before the drawer is closed does not avoid the ambient heat hazard of excessive temperature within the range body.

However, when the range is equipped with my invention, as soon as the pan is removed from the surface unit, the latter begins to cool with the result that after cleaning up the kitchen and when the time comes to close the drawer the surface units will all be at room temperature. The element of inadvertence has been eliminated.

Another object of my invention is to provide a pan-operated disconnect in which the switch mechanism is located at a point which is sufficiently remote from the surface unit that it will not be materially affected by the heat radiated from the surface unit. This is accomplished by the use of a simple mechanical linkage in the form of a vertically moving plunger located concentrically with the convolutions of the surface unit, and a rearwardly extending lever connecting the plunger with the switch which is mounted on the rear of the drawer in a low heat zone.

Still another object of my invention is to provide a switch actuating mechanism which is protected from drip-page which would tend to impede the free movement of parts. According to this aspect of my invention, the actuating lever and the pivot are totally enclosed in a housing, and the plunger is enclosed within a tube. This arrangement also provides an inexpensive means for maintaining the plunger in its upright position.

Other objects are to provide an enclosed switch actuating mechanism which can be readily assembled into the drawer, and which avoids the use of springs in the high heat area immediately adjacent the surface unit, and which is operative even though the pan bottom is warped.

Other objects, features and advantages will become apparent as the description proceeds.

With reference now to the drawings in which like reference numerals designate like parts:

FIG. 1 is an elevation of a portion of a cooking range embodying my invention;

FIG. 2 is a section taken along line 2—2 of FIG. 1;

FIG. 3 is a vertical section showing the drawer, taken along line 3—3 of FIG. 1;

FIG. 4 is a fragmentary rear elevation of the drawer of FIG. 3; and

FIG. 5 is a section taken along line 5—5 of FIG. 3.

FIG. 6 is a diagrammatic view of an arrangement for applying the invention to a gas burning range.

With reference now to FIGS. 1 and 2, the reference numeral 10 designates a range body which is structurally independent from and disposed above a base 11. The range body 10 may either be supported on the base or hung from the wall. In this type of range, the oven 12 is customarily disposed above the surface heating units 13, and the latter are disposed in a slidably mounted drawer 14.

The structure of the range body 10 includes an imperforate bottom wall 15, and a shelf 16 which is spaced above the same. Rearwardly of the shelf 16 is a vented chamber 17 which extends between the bottom wall 15 and the oven 12. The space between the shelf 16 and the bottom wall 15 forms a recess 18 which extends between the front of the range and the vented chamber 17, and in which the drawer 14 is slidably mounted.

The structure of the drawer 14 includes a front wall 20,

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a back wall 21, side walls 22, a top wall 23 and a bottom wall 24, thus providing an enclosed sheet metal structure of substantial rigidity. The top wall 23 is provided with openings 25 in which the surface units are mounted by suitable spiders 26. An annular drip pan 27 is removably disposed beneath each surface unit. The drawer 14, when in open position, is a vented structure due to the provision of vent openings located at various points in the front, bottom or side walls, as exemplified by the louvers 28 shown in FIG. 2. Thus, when the surface units 13 are operating, air circulates upwardly through the louvers 28 and the annular drip pan 27, and out through the openings 25.

The range body 10 includes suitable drawer supporting means such as the rollers 29 which extend into channels 30 located on the side walls 22. In order to support the drawer when in its extended position, the side walls 22 and channels 30 are extended rearwardly beyond the back wall 21 as shown in FIG. 3.

The space between the shelf 16 and the drawer 14 provides a vent opening 31 for the chamber 17. When the drawer is in its extended position, the space 32 at the sides of and beneath the drawer provide additional venting means for the chamber 17.

Thus incident to the closing of the drawer 14, the drawer vents 28 are cut off, as well as any air currents in the space 32, with the result that if one or more of the surface units 13 are hot when the drawer is closed, the temperature of the side and bottom walls 22, 24, will be rapidly increased due to lack of air circulation.

Therefore, the space 50 enclosed by the drawer 47 constitutes a high heat zone when the drawer is closed and the venting arrangements cut off. Even when arrangements are made for the circulation of air through the space 32, the parts located within the drawer are subject to a rapid increase in temperature when the drawer is closed. It can also be pointed out that in this built-in type of range it is required that the bottom wall 15 as well as the side walls of the range body be imperforate; all venting arrangements have to communicate with the front, top, or rear of the range body, with the result that there is little latitude of design as compared with the usual type of cooking range.

A separate safety disconnect is provided for each one of the surface units 13, and since all are identical, only one will be described. The safety disconnect comprises a disconnect switch 33 and switch actuating means.

As shown in FIG. 3, the disconnect switch 33 for the surface unit 13 is mounted on and spaced from the back wall 21 of the drawer 14 by means of a suitable bracket or stud 34. An important feature of the present invention is that the switch 33 is located on the external surface of the back wall 21 so that it is remote from the high heat zone 50. In other words, it is subject to the ambient temperature of the chamber 17 rather than the enclosed space 50. Thus the disconnect switch 33 and the resilient switch arm 36 will not be subject to extreme temperatures of the type which might impair their efficiency or cause deterioration of their insulating or resilient properties, as the case may be.

The disconnect switch 33 includes a plunger 35 and a switch arm 36 pivotally mounted on a switch body which extends laterally and is engaged by a lever 37 mounted in a housing 38.

The housing 38 is an inverted U-shaped metal member which is secured to the bottom wall 24 of the drawer 14 by means of one or more screws 39 which take into sockets 40 spot welded to the bottom wall 24. The upper wall 41 of the housing 38 is provided with an opening in which is mounted an upright tube 42, the lower end of the tube 28 being flanged and suitably spot welded to the upper wall 41. The back wall 21 of the drawer 14 is provided with an opening 43 which communicates with the interior of the housing 38 and through which the lever 37 extends.

A plunger 44 is disposed within the upright tube 42 and

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is linked by means of a pin 45 to the front end of the lever 37. The lever is mounted on a horizontal pivot pin 46 which extends through the side walls of the housing 23. The plunger 44 extends about a quarter of an inch or more above the level of the surface unit 13 and is provided at its top with a cup-shaped cap 47 which is larger in diameter than the diameter of the tube 42, thus serving as a means for preventing food and drippings from entering the space between the plunger 44 and the tube 42.

Plunger 44 is maintained in its elevated position by means of counterweights 48 or other means located at the rear end of the lever 37, thus avoiding the use of spring biasing means located in the high heat zone 50.

The parts are totally enclosed by the housing 38 and the tube 42 so that no food or drippings can clog the tube or the pins 45 and 46. Nevertheless, the arrangement is such that the switch actuating mechanism is easily assembled with the drawer for the reason that the lever 37 and its associated parts are preassembled with the lever housing 38 and tube 42 to form a single subassembly. All that is required in securing the subassembly 37-38-42 to the drawer 11 is the insertion of the screw 39 into its socket 40. It will be noted that the upper wall 41 of the housing 38 is extended through the back wall opening 43 to provide a lip 49 which maintains the rear end of the housing 38 in its desired position.

In order to accommodate pans which have warped bottoms, the switch plunger 35 is located so that it will be engaged and operated into its "on" position by only a slight displacement of the switch arm 36, and the switch arm 36 is made of resilient spring stock so that the flexure thereof will take up the rather considerable overthrow of the lever 37 when a nonwarped pan bottom causes depression thereof to a flush position. Since the switch arm 36 is located outside of the high heat zone 50, its resilience will not be affected by the temperature of the burner.

The disconnect switch 33 is connected in series circuit with the surface unit 13 and with one of the control switches 51 by suitable conductors, not shown, which are provided with heat resistant insulation in the high heat zone 50.

The present invention is also applicable to surface units of the gas burner type, the disconnect switch 33' controlling a solenoid operated valve 60 in the gas line 61, as shown in FIG. 6. In this arrangement, the gas surface unit 13' is located in the drawer 14 and an extensible gas connection 62 is interposed between the control valve 51', also mounted on the drawer, and the solenoid operated valve 60 which is located in the range body. The extensible gas connection 62 permits movement of the drawer between its open and closed position, and may be any suitable type, such as a telescopic connection, an articulated connection, or a section of flexible tubing, as shown.

In operation, when the drawer 14 is in its extended position, as shown by the broken lines in FIG. 2, the surface unit 13 is normally de-energized except during such periods as a pan rests on the surface unit 13 and depresses the plunger 44. Before the drawer can be closed, it is necessary to remove the pan from the surface unit 13, and this automatically opens the disconnect switch 33. If the surface unit has not previously been de-energized by the control switch 51, the act of pan removal will bring this fact to the housewife's attention with the result that the drawer can be left in its extended position for the short length of time it takes to permit the surface unit to drop to substantially room temperature when exposed and vented.

However, even if the drawer is closed immediately after pan removal, the disconnect switch 33 is not subject to the ambient heat of the high heat zone 50.

Although only a preferred embodiment of my invention has been shown and described herein, it will be understood that various modifications and changes may

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be made in the construction shown without departing from the spirit of my invention as pointed out in the appended claims.

I claim:

1. A cooking range comprising, in combination, a range body, a drawer slidably mounted therein, said drawer including a bottom wall, a back wall having an opening therein, a top wall having an opening therein, and side walls, drawer venting means arranged for exposure when said drawer is extended, a surface heating unit disposed in said top wall opening, a disconnect switch for said surface unit mounted externally on the back wall at a point adjacent said back wall opening, and switch actuating means extending between said surface unit and said switch and comprising a housing disposed beneath said surface unit and extending rearwardly to said back wall opening, an upright tubular member mounted on the upper wall of said housing, a lever pivotally mounted in said housing and having a rear end portion which extends through said back wall opening and engages said switch, a plunger rod disposed in said tubular member and maintained thereby in an upright position, and having its lower end engaging said lever, and means biasing said lever and said plunger rod into a normal position wherein the upper end of said plunger rod projects through said surface unit for engagement by a pan in order that said engagement may close said disconnect switch, whereby removal of said pan from said surface unit incident to the closing of said drawer will restore said lever and said plunger rod to said normal position and cause operation of said disconnect switch to render inoperative said surface unit at a time when said venting means are exposed.

2. A cooking range as claimed in claim 1 in which said bottom wall is provided with a screw threaded socket, and in which said housing is in the form of an inverted U-shaped member disposed on said bottom wall above said socket, and a screw extending through the upper wall of said U-shaped member and taking into said socket whereby said lever housing is removably mounted on said bottom wall.

3. A cooking range as claimed in claim 1 in which said biasing means comprises a counterweight mounted on said rear end portion of said lever for maintaining said plunger in elevated position.

4. A cooking range as claimed in claim 1 in which said disconnect switch includes a pivotally mounted resilient switch arm having its outer end overlying said lever whereby depression of said plunger will tend to flex said switch arm to accommodate overthrow of said plunger and lever beyond the switch actuating position of said switch arm.

5. A cooking range as claimed in claim 1 in which said surface heating unit is a gas surface unit, and including a gas line to supply said surface unit, a solenoid operated valve in said gas line and mounted in said range body, extensible gas connection means extending from said solenoid operated valve to said surface unit, and an elec-

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tric circuit including said solenoid operated valve and said disconnect switch, whereby the operation of said disconnect switch incident to said pan removal will close said solenoid operated valve and cut off the gas supply to said surface unit.

6. A cooking range comprising an oven, a vented chamber disposed below said oven, a recess extending horizontally between the front of said range and said vented chamber and providing an inlet vent for said chamber, and a drawer slidably mounted in said recess, said drawer including a bottom wall, a back wall having an opening therein, a top wall having an opening therein, and side walls, drawer venting means arranged for exposure when said drawer is extended, a surface heating unit disposed in said top wall opening, a disconnect switch for said surface unit mounted externally on the back wall at a point adjacent said back wall opening and projecting into said vented chamber when said drawer is closed, and switch actuating means extending between said surface unit and said switch and comprising a lever pivotally mounted on said bottom wall and having a rear end portion which extends through said back wall opening and engages said switch, an upright plunger rod having its lower end connected to said lever, and means biasing said lever and said plunger rod into a normal position wherein the upper end of said plunger rod projects through said surface unit for engagement by a pan in order that said engagement may close said disconnect switch, whereby removal of said pan from said surface unit incident to the closing of said drawer will restore said lever and said plunger rod to said normal position and cause operation of said disconnect switch to render inoperative said surface unit at a time when said drawer venting means are exposed.

7. A cooking range as claimed in claim 6 in which said surface heating unit is a gas surface unit, and including a gas line to supply said surface unit, a solenoid operated valve in said gas line and mounted in said range body, extensible gas connection means extending from said solenoid operated valve to said surface unit, and an electric circuit including said solenoid operated valve and said disconnect switch, whereby the operation of said disconnect switch incident to said pan removal will close said solenoid operated valve and cut off the gas supply to said surface unit.

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