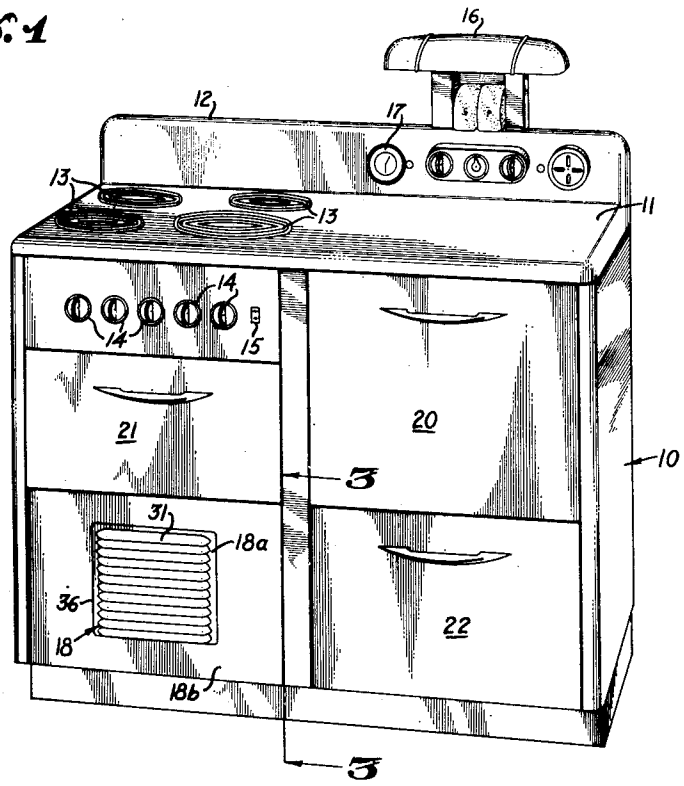
Nov. 15, 1949 W. E. CRANSTON, JR 2,487,855

KITCHEN RANGE

Filed Aug. 11, 1947 4 Sheets-Sheet 1

Fig. 1



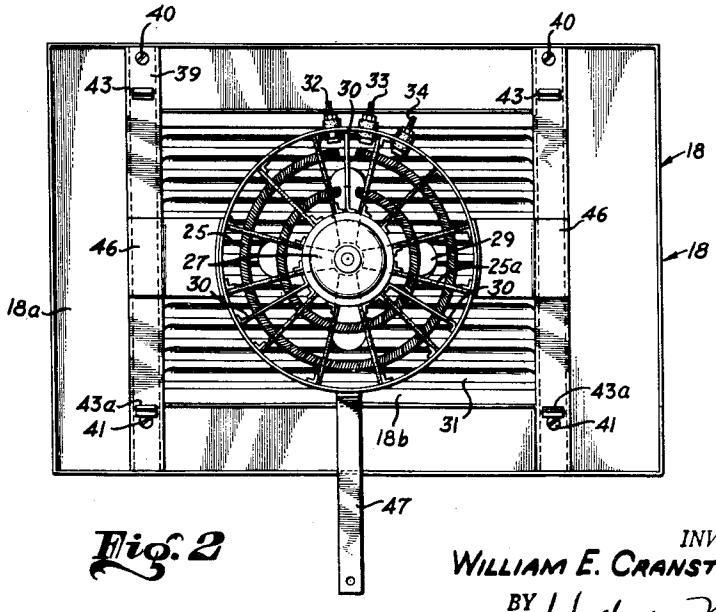


Fig. 2

INVENTOR:
WILLIAM E. CRANSTON JR.
BY Hudner, Mabley and Beehler
ATTORNEYS.

Nov. 15, 1949 W. E. CRANSTON, JR 2,487,855

KITCHEN RANGE

Filed Aug. 11, 1947 4 Sheets-Sheet 2

Fig. 4

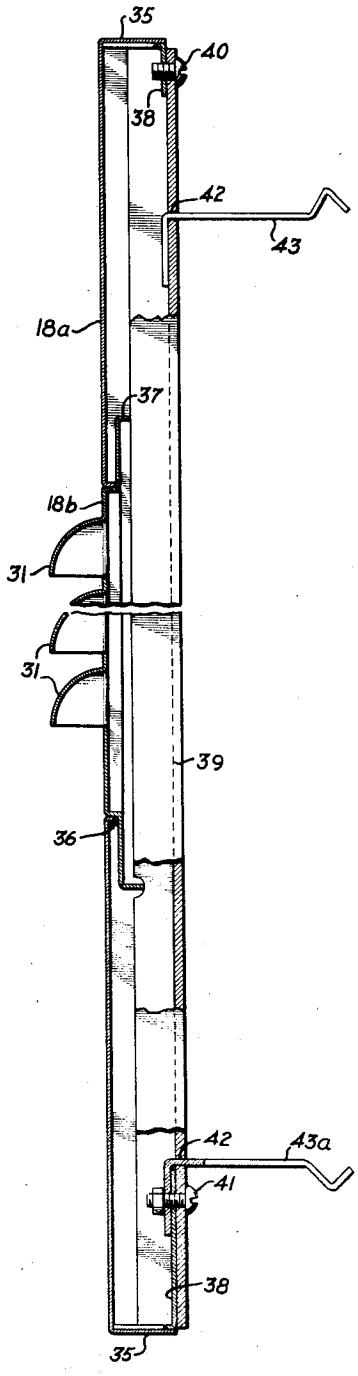
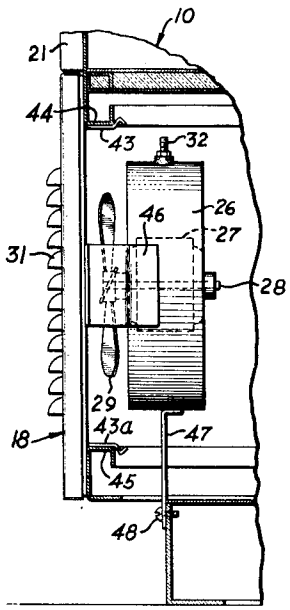


Fig. 3

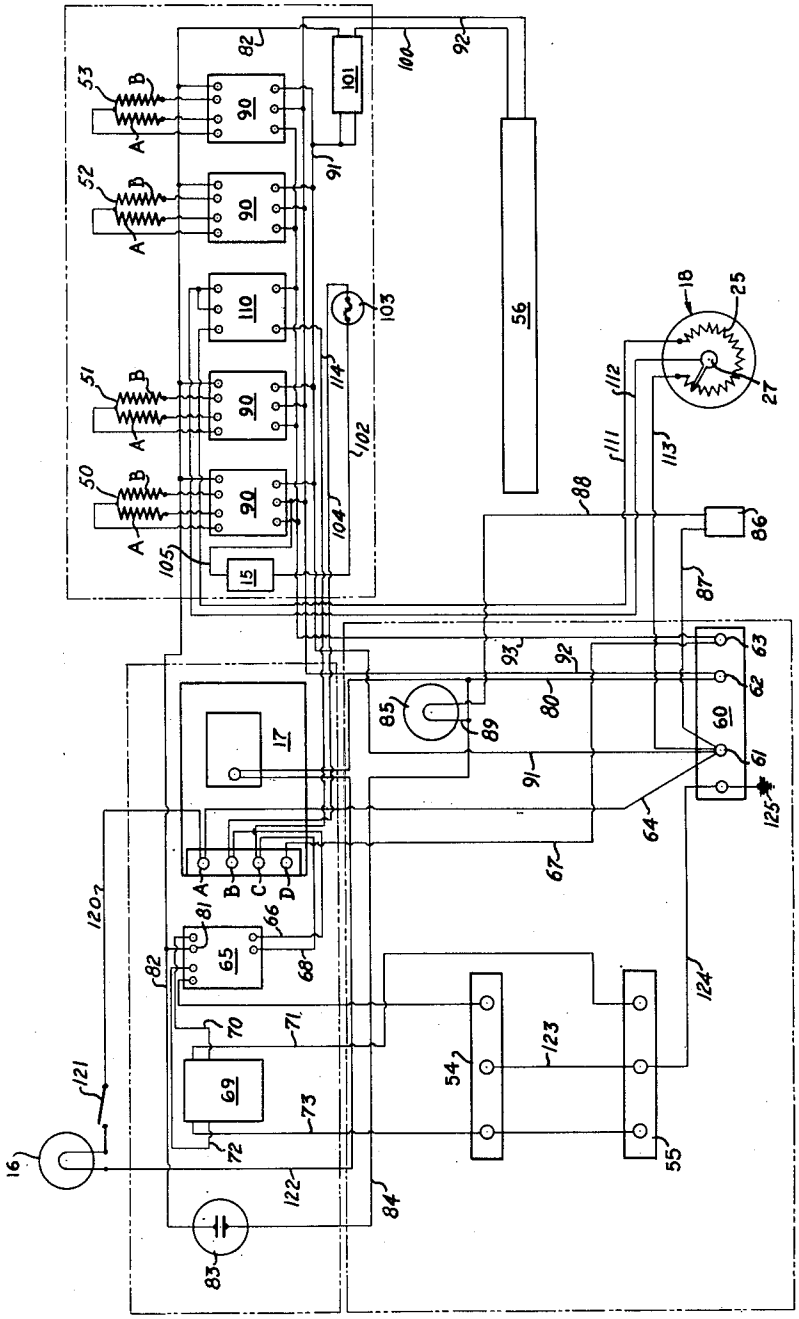


INVENTOR:
WILLIAM E. CRANSTON JR.
BY Hubner, Mathis and Buehler
ATTORNEYS.

Nov. 15, 1949 W. E. CRANSTON, JR 2,487,855

KITCHEN RANGE

Filed Aug. 11, 1947 4 Sheets-Sheet 3



INVENTOR:
WILLIAM E. CRANSTON JR.
BY Hudson, Mobley and Bechtel
ATTORNEYS.

Nov. 15, 1949 W. E. CRANSTON, JR 2,487,855

KITCHEN RANGE

Filed Aug. 11, 1947 4 Sheets-Sheet 4

Fig. 6

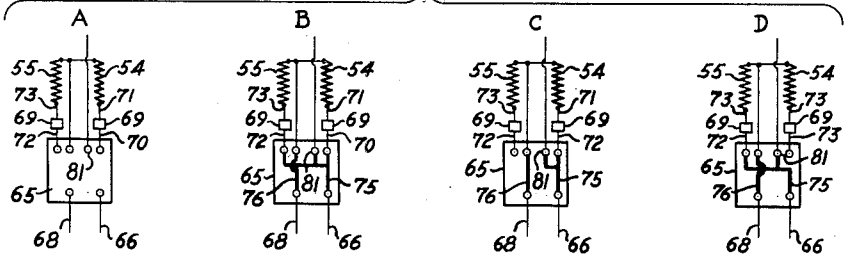


Fig. 7

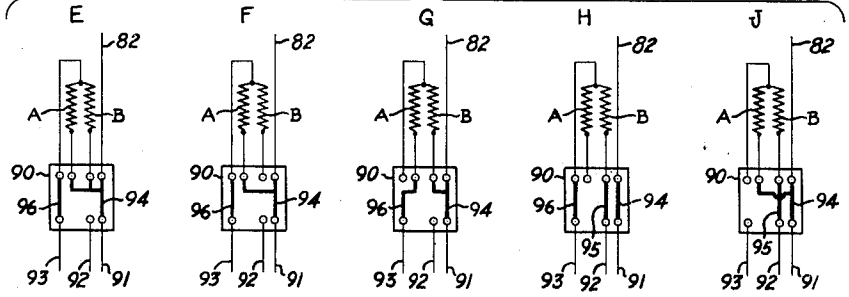
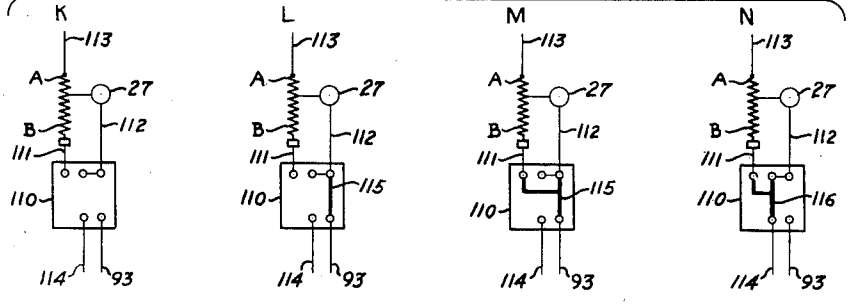


Fig. 8



INVENTOR:
WILLIAM E. CRANSTON JR.
BY Hudson, Mabley and Beehler
ATTORNEYS.

Patented Nov. 15, 1949 2,487,855

UNITED STATES PATENT OFFICE

2,487,855

KITCHEN RANGE

William E. Cranston, Jr., Los Angeles, Calif., assignor to Thermador Electrical Manufacturing Company, Los Angeles, Calif., a corporation of California

Application August 11, 1947, Serial No. 767,983

6 Claims. (Cl. 219—39)

1

My invention relates to a new and novel electrical range and electrical circuit therefor.

An object of my invention is to provide a domestic electric range having in combination with the usual hot plates and ovens a means for circulating either warm or cool air about the kitchen which may be controlled either manually or automatically by means of a time clock switch.

A further object of my invention is to provide a new and novel means for mounting an air warming and circulating means in the cabinet of an electrical range.

I have provided a heating element which is located adjacent the front of the fan which warms air passing over it when energized. It will be understood by those skilled in the art that when the electrical heating element is energized for the purpose of distributing warm air about the kitchen, the speed of the fan must be relatively slow but that the fan must be run at a relatively higher speed in order to effectively function as a cooling medium.

A further object of my invention is to provide an air heating and flow inducing means as an integral part of a range wherein the air flow inducing means operates at relatively slow speeds while the heating means is energized, but which operates at relatively higher speed when functioning as a cooling or ventilating means.

A still further object of my invention is to provide an air heating and flow inducing means which may be readily installed in a range cabinet as a unitary structure and which may be easily removed for servicing.

Other and further objects and advantages of my invention will become apparent from the drawings and specifications relative thereto.

In the drawings:

Figure 1 is an isometric drawing of a range embodying my invention.

Figure 2 is an elevational view from the back showing the details of mounting for the heating and air circulating means.

Figure 3 is a sectional view taken on line 3—3 of Figure 1.

Figure 4 is an enlarged sectional detail of the mounting panel for the air heating and circulating means.

Figure 5 is a schematic electrical diagram of my new and novel electrical range.

Figure 6 is a schematic diagram showing the details of the oven control switch.

Figure 7 is a schematic diagram showing the details of the electric plate switches.

2

Figure 8 is a schematic diagram of the two speed control circuit for the fan.

Referring specifically to the drawings, Figure 1 represents a range adapted for domestic use which embodies the features of my invention and comprises essentially a cabinet, designated generally 10, having a top plate 11, a back guard 12, electrical resistance type heating elements 13 disposed in the top 11, switches 14 for controlling the heating elements 13, a convenience outlet 15, a work light 16, a time control clock 17, and a room heating and cooling unit 18.

The cabinet 10 is of usual construction and has an oven door 20, a warming oven 21, and utility drawer 22.

Referring more specifically to Figures 2, 3 and 4, the heating and cooling unit 18 comprises an electrical resistance element 25 mounted on a frame 26. It will be understood by those skilled in the art that the element 25 must be insulated by any suitable or conventional manner from the frame 26. Such methods are well known in the art, the details of which may comprise radial supports 25a formed of mica or other suitable material. A motor 27 having a shaft 28 is disposed concentric with the elements 25 and is adapted to rotate a fan 29 which is disposed in front of the element 25 and adapted to cause upon rotation a flow of air past the coil 25. The motor 27 is suspended from the frame 26 by the radial supports 30. The heating and cooling unit just described is mounted behind the louvers 31 by means to be described later. Terminals 32, 33 and 34 are provided to connect the electrical circuit, which will be explained later, to the heating unit and motor 27.

The details of the mounting for the heater and fan and louver panel 18 are shown in Figures 2, 3 and 4. The louver panel is formed in two sections 18a and 18b. Section 18a is a substantially rectangular shaped panel having inturned flanges 35 around the periphery thereof and formed with a centrally disposed aperture 36 adapted to receive the louvered section 18b. The louvered section 18b is formed with inturned flanges 37.

L-shaped brackets 38 are secured to the inturned flanges 35. A pair of channels 39 are secured to the brackets 38 and extend vertically the full length of the panel 18. The channels 39 may be secured by any suitable means, such as bolt 40 and nut and bolt assembly 41. Such method is preferred over spot welding or the like because the panel 18a and the bracket 38 are usually covered with porcelain.

The channels 39 are formed with slots 42 and are adapted to receive spring clips 43 and 43a. The spring clips 43 and 43a are L-shaped and have the short leg of the L disposed through the slots 42 and bear against the channel 39. The long leg of the L is deformed into a V-shaped segment. In spring clip 43 the V is inverted; while in the spring clip 43a, the V is right side up.

The purpose of such an arrangement is apparent in Figure 3, where it will be seen that the V of the spring clips are adapted to be sprung behind beams 44 and 45 which constitute a part of the frame of the stove, thereby holding panel 18 securely in place.

A pair of brackets 46 extend outwardly and forwardly from the frame 26 and are securely fastened to the channel members 39 by such means as spot welding. A depending brace 47 is securely fastened to the frame 26 and extends downwardly to a point below the beam 45 where it is secured to the base of the stove by means of a bolt 48.

Thus it will be seen that the heating and ventilating means are securely fastened into the stove by a relatively simple arrangement and that the assembly can be installed or removed by the manipulation of but one bolt.

Referring more specifically to Figure 5, the electrical circuit contained in my new and novel range comprises a plurality of electrical hot plates 50, 51, 52 and 53. Whereas, I have shown schematically all of the hot plates as being the same, it will be understood that the size and type is optional or that one or more may be what is termed a deep well cooker, rather than a surface type. Each of the hot plates is formed with two resistance units designated A and B. It will be understood that a reference to resistance unit 50A or 50B will refer to the respective resistance elements in the heating plate 50. The range is also provided with a broiling element 54 and a roasting element 55, both disposed in the oven 20.

A low heat element 56 is disposed in the warming oven 21. The heating and cooling unit 18 is represented in Figure 5 schematically and is designated by the same numerals; that is, resistance coil 25 and motor 27.

The oven circuit is as follows: The source of power, such as service from the main lines of the house, is connected to a terminal block 60 and is of the usual three-wire service connecting to terminals 61, 62 and 63, it being understood that terminal 62 is what is commonly termed as the neutral line. The terminal 61 is connected to the control clock 17 by means of conductor 64 and thence to the oven controlled switch 65 by conductor 66. Terminal 63 is connected to the control clock by conductor 67 and thence to the oven control switch 65 by conductor 68. The oven control switch 65 is connected to the broiling and roasting elements 54 and 55 in series with a thermal overload protection 69 of any standard or suitable type by means of conductors 70, 71, 72 and 73.

Referring to Figure 6, I show the details of switch 65. Figure 6 shows this switch in its four positions. Position A is the "off" position where the lines 66 and 68 are not connected to any of the terminals of either element 54 or 55. Position B shows the switch with the switching busses 75 and 76 connected in such a manner that both elements 54 and 55 are in parallel. Position C shows the switch in position where busses 75 and 76 are connected only to element 54. Element 55 is not energized. Position D shows the switch in position where the switch busses 75 and 76 are connected to element 55 only and element 54 is de-energized. It will thus be understood that the oven has four stages; that is, off, broil, bake or both baking and broiling, and may be energized for fast heating of the oven compartment.

It will be understood that the time control clock 17 may be of any standard commercial type having a two-pole switch with contacts A, B, C and D. In the "on" position, contacts A and B are connected and contacts C and D are connected. The clock motor operates on 110 volts and may be connected internally to either terminal A or C and has a neutral return by means of conductor 80 to the terminal 62.

As will be noted in Figure 6, the control switch 65 is provided with a terminal 81 which is connected to conductor 66 in all three of the "on" positions. The terminal 81 is connected to a conductor 82 which energizes a pilot light 83, herein represented as a neon globe tube, it being understood, of course, that any suitable type pilot light can be used. The pilot 83 is provided with a neutral return 84 which connects it to terminal 62. The oven is also provided with a light 85 which is connected to a standard single pole switch 86 and is energized by means of line 87 connected to terminal 61 and conductor 88. The oven light 85 has a neutral return 89 which is connected to terminal 62 by means of conductors 84 and 89.

The details of the switching arrangement for the surface electric plates 13 are shown in Figure 7. The circuit comprises a switch, designated generally 90. I have used a snap switch which has five stages. It is understood that any six-stage switch with suitable internal connections is satisfactory. The switch 90 is connected to a source of power by means of lines 91, 92 and 93. It will be understood that the fall in potential between conductors 91 and 92 and between 93 and 92 is 110 volts; whereas, the fall in potential between the conductors 91 and 93 is 220 volts. The switch 90 is provided with switching busses 94, 95 and 96.

In stage E the switch bus 94 connects conductor 91 to both resistance elements 50A and 50B. It will be noted, however, that the other terminal of the elements A and B are connected to conductor 93 by switching bus 96, thereby connecting the elements A and B in parallel across the 220 volts and giving a high heating position. In position F, the switching bus 94 connects conductor 91 to element A and switching bus 96 connects the other terminal of element A to conductor 93, thereby connecting element A to the 220 volt circuit.

Position G shows the elements A and B connected in series across the 220 volt circuit by connecting busses 94 and 96 to the elements A and B and conductors 93 and 91. Position H shows the bus 96 connecting conductor 93 to one terminal of element B, the other terminal of which is connected to the neutral return 92 by means of bus 95. In position J, the elements A and B are connected in series across the 110 volt circuit by means of busses 94 and 95. As will be seen in all positions, E to J, inclusive, the bus 94 is also connected to conductor 82 which, as was heretofore explained, energizes pilot light 83. No "off" position of the switch 90 is shown. It will be understood that the switching arrangement just explained is identical for the elements 50, 51, 52 and 53. Each of the respective switches are con-

nected to the conductors 91, 92 and 93 in parallel.

The warming oven element 56 is energized by means of a conductor 100 which is connected to conductor 91 through a double-pole single-throw switch 101 and is connected to the neutral return 92. The purpose of having a double-pole single-throw switch, designated 101, is so that the pilot light 83 may be energized through conductor 82 when the warming oven 56 is energized without having a feed back through the element 56.

The convenience outlet 15 is energized by means of conductor 102 through a fuse or other safety overload protection device 103 and conductor 104 to terminal B of the control clock 17. A neutral return 105 is connected to conductor 92. Thus, it will be seen that the convenience outlet 15 is controlled by the clock 17, the advantage of this being that a coffee maker or similar device can be attached to the convenience outlet 15 and the clock 17 set for any desired time so that the coffee will be made and ready for consuming when the user of the range is ready for breakfast.

The room heating and cooling circuit as shown in Figure 8 comprises a switch 110, conductors 111, 112 and 113. The switch 110 is a snap switch and comprises four stages having switching busses 115 and 116. Position K shows the "off" position. Position L shows the bus 115 connecting the conductor 93 to conductor 112, which energizes the motor 27 by connecting it to conductor 113 through a small section A of the heating element 25. It will be understood that the internal resistance of the motor 27 is large in comparison with the resistance of the section A of the element 25 so that the principal fall in potential between conductors 113 and 93 will take place in the motor. The motor will, therefore, run at its maximum speed. The L position is the position in which the fan only operates, thereby acting as a means for cooling a kitchen.

Position M shows the motor 27 and section B of the element 25 connected in parallel, both of which are in series with section A of the element 25. The bus 115 connects conductor 93 to both conductors 111 and 112. The resistance of sections A and B are so balanced that a substantial portion of the fall in potential takes place in section A; therefore, the fall in potential across the motor 27 is substantially less than 220 volts. Hence, the motor 27 will operate at a slow speed while the resistance element 25 is energized. Position N shows the bus 116 connected to a conductor 114 and to the conductors 111 and 112. The conductor 114 is energized by being connected to terminal 63 through the electric control clock 17. Thus, it will be seen that in position N, the motor 27 and heating element 25 are controlled by the time clock so that if desired the user may turn the switch 110 to a position where the motor and heating element will be energized and set the clock 17 to energize the motor 27 and heating element 25 at any desired time so that the kitchen will be warmed before the user arises.

A utility light 16 is energized by being connected to terminal 61 through conductor 64 to terminal A of the time clock through a conductor 120, switch 121 and a neutral return 122 which is connected to the conductor 80 at the neutral terminal of the clock 17.

A safety ground is provided for the oven elements by means of conductors 123 and 124 which are grounded at 125.

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

1. In a domestic range having a cabinet formed with an open back and an aperture, an air heating and flow inducing unit mounted in said cabinet and adapted to cause a flow of air from said open back to said aperture, said air heat and flow inducing unit comprising a frame, an electrical resistance unit insulatedly mounted on said frame, an electrical fan supported by said frame and disposed adjacent said electrical resistance unit and adapted to cause a flow of air by said resistance unit, and a plurality of spring clips adapted to secure said air heating and flow inducing means in said cabinet adjacent said aperture.

2. In a cabinet having an aperture therein, structural members defining said aperture, a panel having marginal portions adapted to overlie said aperture and abut against said structural members, said panel being formed with louvers for the transmission of air, a plurality of oppositely disposed resilient clips secured to said panel and adapted to engage said structural members and to hold said panel in position to enclose said aperture, a frame secured to said panel adapted to be positioned inside said aperture when said panel is in position, an electrical fan carried by said frame and adapted to cause a flow of air outwardly from said cabinet through said louvers, an electrical resistance unit insulatedly mounted in said frame concentric with said electrical fan adapted upon energization to warm said air flowing through said louvers, and switching means adapted to selectively energize said fan or said fan and said heating unit.

3. In a cabinet construction having a substantially rectangular aperture therein defined by peripheral ledges, a panel adapted to overlie said ledges and completely enclose said aperture, said panel being formed with a centrally disposed aperture, a louvered section having peripheral flanges and adapted to fit in said panel aperture with said flanges underlying said panel in abutting relation thereto, a plurality of resilient clips secured to said panel and adapted to resiliently engage the peripheral edges of said cabinet aperture to retain said panel in position, a frame secured to said panel, an electrical fan adapted to cause a flow of air from said cabinet through said louvered section supported by said frame member, and an electrical resistance unit concentric with said fan adapted to warm the air flowing through said louvers.

4. An air flow inducing and heating unit adapted for installation in a rectangular supporting frame having plain outwardly extending marginal surfaces therefrom, said unit comprising a rectangular panel adapted to abut against and overlie the marginal surfaces of said frame, said panel being formed with a centrally disposed louvered section, a frame supported by said panel and adapted to support an electrical fan adjacent said louvered section to cause a flow of air through said louvers upon energization of said fan, an electrical resistance unit supported by said frame adapted to heat air flowing through said louvers, a plurality of resilient clips adapted to resiliently engage the peripheral edges of said rectangular opening, and switching means to selectively energize said electrical fan or said electrical fan and said resistance unit simultaneously.

5. An air flow inducing and heating unit adapted for installation in a rectangular supporting frame having plain outwardly extending

marginal surfaces therefrom, said unit comprising a rectangular panel adapted to abut against and overlie the marginal surfaces of said frame, said panel being formed with a centrally disposed louvered section, a frame supported by said panel and adapted to support an electrical fan adjacent said louvered section to cause a flow of air through said louvers upon energization of said fan, an electrical resistance unit supported by said frame adapted to heat air flowing through said louvers, resilient means adapted to resiliently engage at least one peripheral edge of said rectangular opening, and switching means to selectively energize said electrical fan or said electrical fan and said resistance unit simultaneously.

6. An air flow inducing and heating unit adapted for installation in a rectangular supporting frame having plain outwardly extending marginal surfaces therefrom, said unit comprising a rectangular panel adapted to abut against and overlie the marginal surfaces of said frame, said panel being formed with a centrally disposed louvered section, a frame supported by said panel and adapted to support an electrical fan adjacent said louvered section to cause a flow of air through said louvers upon energization of said fan, an electrical resistance unit supported by said frame adapted to heat air flowing through said louvers, and resilient means adapted to resiliently engage at least one peripheral edge of said rectangular opening.

WILLIAM E. CRANSTON, JR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,533,098	Carmean et al.	Apr. 14, 1925
1,967,757	Losee	July 24, 1934
1,998,670	Goshorn et al.	Apr. 23, 1935
2,078,548	Strawser	Apr. 27, 1937
2,120,795	Boothby	June 14, 1938
2,221,647	Mooney	Nov. 12, 1940