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DISPLAY WARMER

2 Sheets-Sheet 1



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DISPLAY WARMER

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2 Sheets-Sheet 2

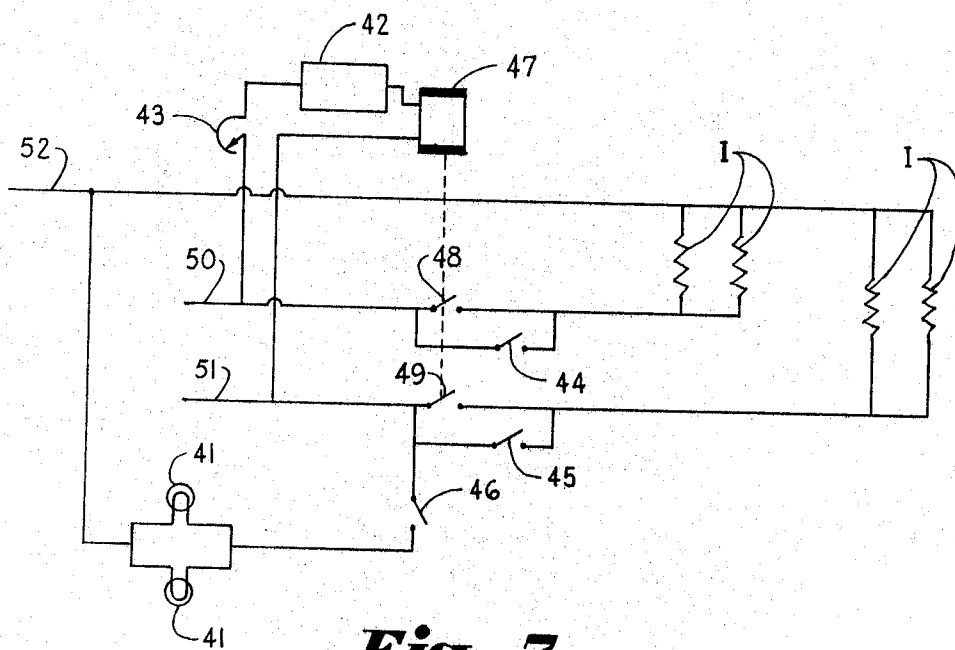


Fig. 3.

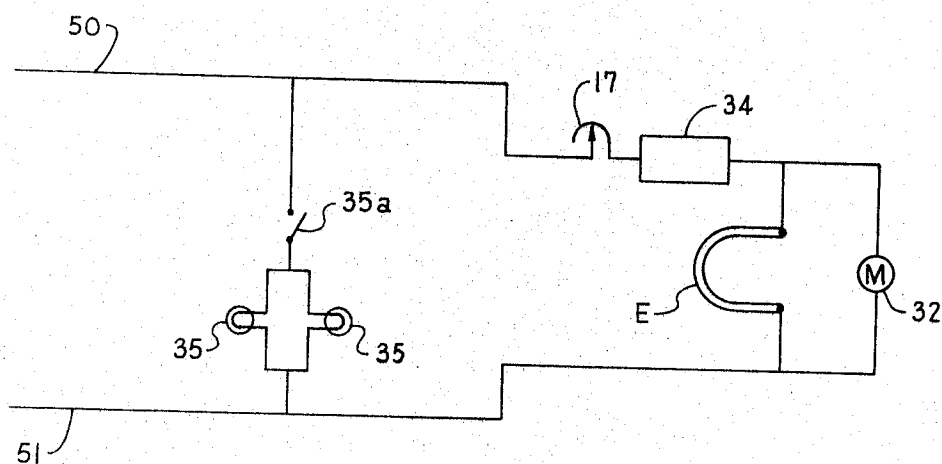


Fig. 4.

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DISPLAY WARMER

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3 Claims. (Cl. 219-214)

This invention relates to food warmers and more especially to such a device wherein a display warmer is positioned upon a storage warmer and receives heat therefrom for maintaining relatively even heat in the display warmer.

When displaying a plurality of stacked layers of eatables, there is the problem of maintaining a constant temperature therein. Prior warmers result in the top layers being overheated so as to produce undesired cooking, while the bottom layers are underheated with the possibility of spoilage. The desired temperature is in the vicinity of 150 degrees throughout all the layers. By carrying the eatables on a heated tray and providing a heating source above the layers of eatables and placing a thermostat in the housing to operate the heating elements above, substantially constant temperature may be maintained. When the warmer is used in grocery stores, for example, it is sometimes desired that the front doors be removed for easy access. Under such conditions it is necessary that the upper heating elements remain on constantly. This is especially desirable in air-conditioned stores. Some states require that doors be placed on the display case, and also require that the eatables be maintained at a temperature above 145 degrees. This problem is met by providing a conduit or enclosure having ports therein and an opening adjacent its upper extremity for directing air longitudinally across the trays and upon the underside of the upper tray which acts as a heating source for an upper display housing by circulating the air in such a manner that temperature can be maintained above 145 degrees.

Accordingly, it is an important object of this invention to provide a display warmer providing relatively uniform constant temperature even when eatables are stacked therein.

Another important object of the present invention is to provide a display warmer affording a source of heat below and above the eatables and providing storage space below also heated by the source of heat below.

Another object of the invention is the provision of a display warmer providing a brilliantly illuminated glass display enclosure capable of maintaining relatively uniform constant temperature even in air-conditioned areas.

Yet another important object of the invention is the provision of a display warmer having the above advantages employing an upper heating means providing light and quick recovery heat and having a relatively uniformly heated lower storage compartment maintained at a constant temperature by a single heat source, employing a blower, air guides and passageways, which also heats the lower portion of the glass enclosure above the storage compartment.

Another object of the invention is to provide a novel structure for a display warmer having a glass enclosed portion with doors capable of maintaining uniform controlled temperature even when the doors are open or removed.

The construction designed to carry out the invention will be hereinafter described, together with other features thereof.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings forming a part thereof, wherein an example of the invention is shown and wherein:

FIGURE 1 is a perspective view illustrating a display

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warmer constructed in accordance with the present invention,

FIGURE 2 is a perspective view, at an enlarged scale with parts broken away illustrating the heating means carried primarily in the lower storage compartment and its manner of heating the lower portion of the upper display compartment,

FIGURE 3 is a schematic diagram illustrating the electrical components associated primarily with the upper display compartment, and

FIGURE 4 is a schematic diagram illustrating the electrical components associated primarily with the lower storage compartment.

The drawings illustrate a display warmer including a lower storage housing A. Vertically spaced intermediate trays B are carried within the lower storage housing. The trays are displaced from the sides of the housing defining passageways for the flow of air. Positioned above the intermediate trays is an upper tray C which extends across the upper portion of the housing forming a top therefor. An enclosure D is disposed within the housing, having discharge means including ports therein directing air longitudinally across the intermediate trays and toward the underside of the upper tray. A first electrical heating means E is carried within the enclosure D. A blower F is positioned within the storage housing and discharges air directly into the enclosure to produce heated air. The heated air is forced by the blower to flow from the housing, out of the ports therein, across the intermediate trays, and upon the underside of the upper tray thus, heating eatables carried on the intermediate trays and causing the upper tray to become a heat source. The heated air after passing over the intermediate trays flows through the passageways between the ends of the trays and the sides of said storage housing returning to the blower. An upper display housing G is carried above and in vertical alignment with the first housing. A glass door H is carried within a side portion of the second housing to provide access to eatables being carried therein. A second electrical heating means I is carried within the top portion of the second housing for heating the eatables carried therein. Such second heating means includes quartz elements which provide both heat and light. The heated upper tray C of the first housing supplements the second electrical heating means I to produce uniform heat in the display housing. Thus, eatables may be stored and maintained at an even temperature by the first electrical heating means in the storage housing until needed in the display housing where such may then be stored for easy access by the customer and be maintained at an even temperature by the upper tray and the second electrical heating means.

The lower housing A has insulated side walls 10, and an insulated rear wall 11 which, together with a front panel 11a and a base 15, define a substantially rectangular warmer. The side and rear walls are constructed of two spaced sheet metal members 12 and 13 with insulation 14 therebetween. A pair of sliding glass doors 16 are carried in the rectangular opening permitting entrance to the interior of the storage housing A. A temperature control knob 17 is carried by the front panel 11a. The temperature of the lower housing is controlled by manipulation of the control knob 17, as discussed below.

Within the base of the storage housing A are a pair of spaced elongated rectangular members 18 and 19. A transversely disposed rectangular conduit 20 is positioned and communicates between the members 18 and 19 adjacent the side wall 10. The space 21 between the rectangular members 18, 19 and 20 constitutes a return path or passageway for air being circulated by the blower F. The purpose of such a passageway is described in more detail below. A panel 20a having vents 20b therein is

supported by the rectangular members 18, 19 and 20 and defines the upper portion of the passageway. The base 15 of the housing has an insulated wall portion 22, defining the lower portion of the passageway 21. Insulation for the wall portion 22 is illustrated at 23.

The vertically spaced intermediate trays B are carried on runners 24 within the storage housing A on both sides of the housing. The runners 24 are displaced from the side walls by spacers 25 through which pass suitable fastening means 25a to fasten the runners to the walls. The passageways between the runners and the side walls 10 constitute part of the return path for the heated air being circulated in the housing. A pair of transversely disposed standards 26 carry the runners in the medial portion of the housing. The runners are spaced from the standards in the same manner as the runners from the side walls 10. The runners are U-shaped enabling the trays to be slid out of the housing.

Positioned above the intermediate trays is an upper tray C which extends across the upper portion of housing A forming a top therefor and providing a heated base or bottom for the upper display case G. The manner in which the upper tray C is heated is discussed below in connection with the discussion of the heated air flow. Eatables, not shown, such as chickens, pies, barbecue and the like are carried on the intermediate trays in the lower housing. The eatables in the lower housing are kept at a constant temperature by the passage of warm air. In the upper housing, eatables, not shown, are stacked on the heated upper tray C.

The enclosure D is carried vertically within the medial portion of the storage housing A. The enclosure D has a plurality of vertically spaced ports 27 therein which direct air longitudinally across the intermediate trays. Discharge means for the enclosure include a pair of arcuate baffle plates 28, positioned back to back within the medial portion of the open top of the enclosure D as by welding as at 28a. The baffle plates form vents or openings to direct heated air flowing from the discharge means up and across the bottom surface of the upper tray C for heating same. The lower portion of the vertical enclosure D is closed by a horizontal plate 28b. A perforated plate 29 is positioned below the enclosure D on each side thereof. Air in the space 21 in the left-hand side of the housing A flows through the perforated plate 29 and is returned through the opposite perforated plate (not shown) to the blower F on the right-hand side of the housing. If desired, two blowers may be used, one on the left-hand side of the housing and the other on the right-hand side, rather than cause air to pass between the two sides.

The first electrical heating means E is carried within the enclosure D. The heating means E includes a Calrod heating element which heats the air passing through the enclosure D. Air is forced into the lower portion of the enclosure D above the base plate 28b by the motor driven blower F. An insulated hose 30 fits into an entrance port 30a in the base of the discharge conduit. The impeller type blower F has a funnel shaped intake 31 which is in communication with space 21 in the base of the housing A as at 31a. The motor 32 for the blower is carried in the rectangular conduit 18 which has screen covered vents 33 for permitting air to cool the motor. The air coming in through the vents 33 is excluded from the interior of the housing by the rectangular member 18.

The blower forces air through the corrugated insulated tube 30 into the lower portion of the enclosure D, across the heating element E. The heated air passes out of the ports 27 across eatables (not shown) carried on the intermediate trays B. Heated air coming out of the discharge means including the baffles 28 is directed upon the underside of the upper tray causing the upper tray C to become a heat source for the upper display housing G. The heated air after passing over the intermediate trays B and the underside of the upper tray C flows down-

ward through the passageways or spaces between the ends of the intermediate trays B and the sides 10 of the housing. The air on the right-hand side of the housing then passes through vents 20b in the base panel 20a into the space 21 and is returned to the funnel shaped intake 31 of the blower F. The air on the left-hand side of the housing after passing through the spaces between the ends of the trays and the side wall 10 flows through the vents in the base panel 20a, the apertures in the perforated plates 29 and is returned to the space 21 on the right-hand side of the housing. If a larger volume of heated air is needed, a second blower may be placed on the left-hand side of the housing A as described above.

The heated air circulating through the lower housing maintains the eatables at a substantial uniform temperature. The particular temperature that is desired in the lower housing A is selected on the heat control dial 17. A thermostat 34 is carried in the upper part of the housing and controls the energization of the heating element E to maintain the temperature selected on dial 17. Light bulbs 35 are carried on the side wall 10 to illuminate the lower housing. The energization of the light bulbs 35 is controlled by the electrical switch 35a mounted adjacent dial 17 on the front panel.

When the warmer is used in a grocery store, for example, the lower housing A is normally used for storing cooked eatables and the upper housing provides a self-service display warmer. It is necessary to keep the eatables in the display housing G at a temperature high enough so that the eatables will not spoil, but the temperature should not be such that the meat will continue cooking in the display housing.

Heretofore, it has been difficult to maintain stacked eatables at an even temperature. Such is especially true when the display facility is open. Frequently, one layer of the eatables is overheated while another is underheated. The subject invention meets these problems by providing a heated lower tray C to supplement heating elements in the upper part of the display housing.

The upper or display housing G in the subject warmer is carried above and in vertical alignment with the lower housing A. The housing G includes an insulated top 36 supported by vertically inclined corner posts 37. Positioned between adjacent corner posts on both ends of the housing are glass panels 38. Sliding glass doors H are carried on both sides of the upper housing G for providing access to the eatables carried therein. The top 36 of the housing G is constructed of spaced sheet metal plates 39 with insulation 40 therebetween. Lamps 41 are carried on both ends of the upper housing G adjacent the top providing illumination for the upper housing. Quartz heating elements I are longitudinally spaced in alignment across the underside of the top 36. The quartz heating elements, when energized provide both light and heat. The energization of the quartz heating elements is controlled by the thermostat 42, shown in broken lines, preferably positioned in the medial portion of the upper housing. The desired temperature of the upper housing is selected on the dial 43 and the thermostatically controlled heating elements I maintain the upper housing at such temperature. Electrical control switches 44 and 45 are carried on the front of the upper housing to control the energization of the quartz heating elements manually. The details of such are discussed below in connection with FIGURE 3. Electrical switch 46 controls the energization of the lamps 41. It is important that the heating elements can be controlled manually so that when it is desired that the doors, for example, be left open or removed, the heating elements can remain on constantly. This is especially true when the warmer is located in air-conditioned surroundings. Because of the quick recovery characteristics of quartz heating elements such are especially desirable for the heating means of such a display warmer.

The electrical circuits for the warmer are illustrated

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in FIGURES 3 and 4. The input lines 50 and 51 are across 220 volts and between lines 50 or 51 and line 52 there is a 110 volt drop. FIGURE 3 illustrates the wiring diagram for the upper housing G. The control dial 43 is connected in series with the thermostat 42 between the 220 volt lines 50 and 51. Connected in series with the thermostat 42 is a relay 47 which operates switches 48 and 49. Thus, when the thermostat 42 is closed indicating the housing is below the desired temperature, relay 47 is energized closing switches 48 and 49. The closing of switches 48 and 49 connects the quartz heating elements I across the lines 50 and 52 and 51 and 52, respectively. The first and fourth quartz heating elements are controlled by relay switch 48, whereas, the second and third are controlled by switch 49. Switch 44 shunts relay switch 48 so that the second and third of the aligned quartz heating elements can also be manually controlled. Switch 45 shunts relay switch 49 so that the first and fourth of the aligned quartz heating elements can be manually controlled. The lamps 41 are connected across lines 51 and 52 in series with switch 46 so that such are energized illuminating the upper housing when switch 46 is closed.

The entire lower housing is operated off of a 220 volt source thus, only the 50 and 51 lead lines are fed therein. Connected across lines 50 and 51 in series with lamps 35 is a switch 35a for manually energizing the same. The temperature control dial 17 is connected in series with the thermostat 34 in line 50. Thermostat 34 opens and closes line 50 depending on the temperature of the housing thereby energizing heating means E and the motor 32 for the blower F.

While a preferred embodiment of the invention has been described using specific terms, such description is for illustrative purposes only, and it is to be understood that changes and variations may be made without departing from the spirit or scope of the following claims.

What is claimed is:

1. A display warmer for eatables including, a lower storage housing, vertically spaced intermediate trays for supporting eatables carried within said lower storage housing, an enclosure within said lower storage housing having an opening therein, first electrical heating means carried within said enclosure, a blower positioned within said lower storage housing discharging air from said lower storage housing through said opening directly into said enclosure for heating said air, an upper imperforate eatable supporting tray extending across the upper portion of said lower storage housing forming a top therefor, discharge means carried by said enclosure directing heated air from said enclosure across said intermediate trays and across the underside of said upper tray to heat said upper tray and intermediate trays, an upper display housing above and in vertical alignment with said lower storage housing, said upper tray constituting a source of heat for said upper display housing, a glass door carried within a side portion of said upper display housing, second electrical heating means carried within the top portion of said upper display housing, said enclosure having a vertical compartment carried within said storage housing, and said discharge means having vent means

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within said compartment for directing the heated air across said intermediate trays and across the underside of said upper tray whereby eatables may be stored and maintained at an even temperature by said first electrical heating means in said lower storage housing until needed in the upper display housing where such may then be stored for easy access by the customer and be maintained at an even temperature by said upper tray and said second electrical heating means.

2. A display warmer for eatables including a lower storage housing, vertically spaced intermediate trays for supporting eatables carried within said lower storage housing, an enclosure within said lower storage housing having an opening therein, first electrical heating means carried within said enclosure, a blower positioned within said lower storage housing discharging air from said lower storage housing through said opening directly into said enclosure for heating said air, an upper eatable supporting tray extending across the upper portion of said lower storage housing forming a top therefor, said vertical spaced intermediate trays being displaced from the end of said housing to define passageways therebetween, said passageways providing a return path for the heated air passing over the trays to said blower, an upper display housing above and in vertical alignment with said lower storage housing, said upper tray being heated so as to constitute a source of heat for said upper display housing, a glass door carried within a side portion of said upper display housing, second electrical heating means carried within the top portion of said upper display housing, said enclosure having a vertical compartment carried within said storage housing, and discharge means having vent means within said compartment for directing the heated air across said intermediate trays and across the underside of said upper tray through said passageways to said blower, whereby eatables may be stored and maintained at an even temperature by said first electrical heating means in said lower storage housing until needed in the upper display housing where such may then be stored for easy access by the customer and be maintained at an even temperature by said upper tray and said second electrical heating means.

3. The structure as set forth in claim 2, wherein said first electrical heating means includes a thermostatically controlled Calrod heating element, and wherein said second electrical heating means includes a quartz heating element for providing light and heat in said display housing, and a thermostat carried in said display housing for controlling the second heating means.

References Cited

UNITED STATES PATENTS

2,458,190	1/1949	Newburger	219—214
3,142,748	7/1964	Warren	219—392
3,170,541	2/1965	Werner	312—116 X
3,221,729	12/1965	Beasley et al.	219—400 X
3,239,651	3/1966	Silberman	219—400 X

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