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BUTTER STORAGE IN A REFRIGERATOR

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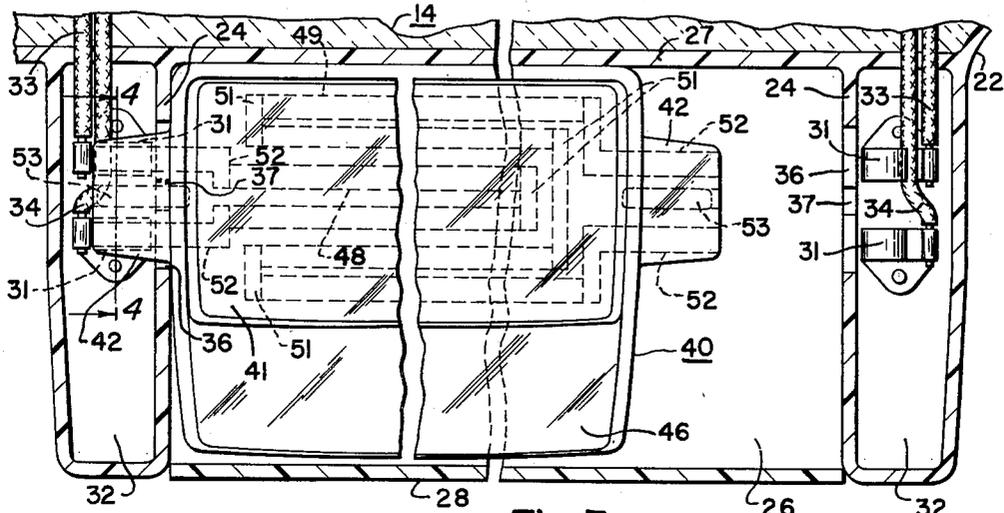


Fig. 3

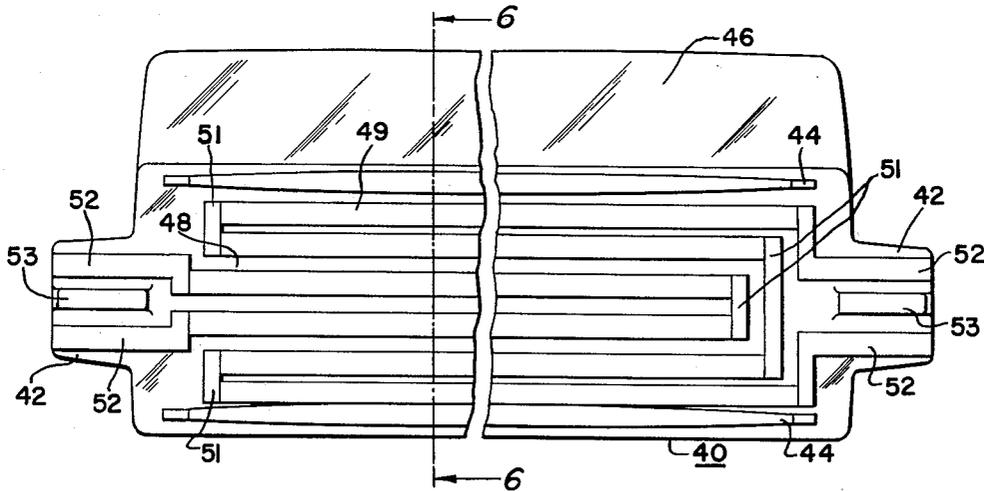


Fig. 5

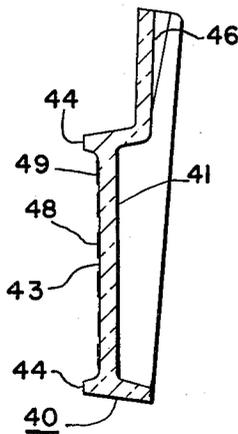


Fig. 6

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BUTTER STORAGE IN A REFRIGERATOR**Everett C. Armentrout, New Carlisle, Ohio, assignor to
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This invention relates to refrigeration and particularly to storing and conditioning butter while it is being cooled in a household refrigerator.

I am aware of the fact that refrigerators have heretofore been provided with a butter storage compartment. Such a compartment has been located within the refrigerated food storage chamber or on a door thereof and exposed to the temperature in the chamber. Butter so stored is at too low a temperature to permit spreading thereof when removed from the refrigerator. Therefore, these compartments are generally artificially or electrically heated to maintain butter stored therein at approximately 65° F. so that the butter will be at a proper spreading temperature upon immediate removal thereof from a refrigerator cabinet. In electrically heating a butter compartment within a refrigerated chamber of a refrigerator, a thermostatic switch has been associated with a heater for the compartment to control energization and de-energization of the heater in response to temperature changes within the compartment to constantly warm the butter to spreading temperature while being stored. This is an expensive arrangement which, in addition to increasing the cost of a butter warming compartment, is also a source of trouble resulting in service calls by a service man. Such an arrangement is not infallible and is not entirely satisfactory because a user of a refrigerator may desire to at one time or another store butter in a compartment of a refrigerator at different warming temperatures or at a temperature whereby the butter is not warmed at all.

An object of my invention is to provide an arrangement for electrically heating and warming butter stored in a refrigerated chamber of a refrigerator which eliminates the use of an expensive temperature responsive control or thermostatic switch associated with the butter heating means.

Another object of my invention is to provide a warmer for butter stored in a refrigerated chamber of a refrigerator cabinet with two separate independent electric resistance type heater units of unlike heating intensity and to selectively connect either unit to a source of electric current supply to at one time warm the butter for maintaining same at a predetermined moderate temperature in the chamber and to at another time warm the butter in the chamber to a temperature differing from said moderate temperature.

A further object of my invention is to provide a butter supporting dish adapted to be removably positioned in and exposed to the low temperature in a refrigerated chamber of a refrigerator cabinet having an electrical receptacle means in the chamber which dish carries or has mounted thereon a first and second electric resistance heater unit each having an individual connector selectively connectable to the electrical receptacle means for at one time energizing the first unit and heating butter on the dish to a predetermined temperature and for at another time energizing the second unit to heat butter on the dish to a temperature differing from said predetermined temperature.

A still further and more specific object of my invention is to provide a butter storage compartment within and exposed to the cool air in a refrigerated chamber of a refrigerator with a butter supporting dish removably located in the compartment and carrying two separate in-

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dependently energizable heater units of different heating intensity with respect to one another each having a connector at ends of the dish adapted to be selectively connectable with an electrical receptacle means at sides of the compartment by shifting the dish therein for energizing either of the two units and warming butter on the dish to different temperatures in accordance with the heating intensity of the energized heater unit and wherein the dish may occupy a position within the compartment in which position neither of the units is energized.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

FIGURE 1 is a front view of a household refrigerator cabinet showing the cabinet door open and a butter storage compartment in the inner face of the door;

FIGURE 2 is an enlarged fragmentary broken sectional view taken on the line 2—2 of FIGURE 1 through a portion of the refrigerator cabinet door showing a butter storage compartment incorporated therein with a butter dish supported in the compartment;

FIGURE 3 is a view similar to FIGURE 2 showing the butter dish shifted in the compartment to connect an electric heater unit on the dish with terminals of an electrical receptacle;

FIGURE 4 is a fragmentary sectional view taken on the line 4—4 of FIGURE 3 showing connectors on the butter dish engaging terminals of an electrical receptacle associated with the butter storage compartment;

FIGURE 5 is a bottom view of the butter receiving dish showing the arrangement of electric heater units thereon; and

FIGURE 6 is a sectional view through the butter dish taken on the line 6—6 of FIGURE 5.

Referring to the drawings, for illustrating my invention, I show in FIGURE 1 thereof a household refrigerating apparatus which includes a cabinet 10 having refrigerating system shown diagrammatically associated therewith. The refrigerator cabinet 10 has a plurality of insulated walls defining a food storage chamber 11 therein and a machine compartment below this chamber closed at its front by a removable panel 12. Food storage chamber 11 has a plurality of food supporting shelves disposed one above the other therein and this chamber is normally closed by an insulated door structure 14 hingedly mounted on cabinet 10, by hinges 15, for horizontal swinging movement relative thereto. The refrigerating system associated with refrigerator 10 includes a motor-compressor unit 16, a refrigerant condenser 17 and a refrigerant evaporator 18. Evaporator 18 is mounted in chamber 11 and is preferably of the bonded together sheet metal type bent or shaped to provide a freezing compartment within the food storage chamber having its open front normally closed by a door 19. The elements of the refrigerating system associated with cabinet 10 are connected in communication with one another in closed refrigerant circulating fashion by pipes or conduits and unit 16 together with condenser 17 are usually located in the machine compartment behind panel 12. Intermittent operations of the motor-compressor unit 16 may be controlled in any suitable or now well known conventional manner to cause evaporator 18 to cool air within the food storage chamber 11, say, for example, between 37° and 42° F. Door structure 14 has a resilient rubber-like gasket 20 mounted on its inner surface near the peripheral edges thereof in any suitable manner which gasket is adapted to sealingly engage the front wall of cabinet 10 when door 14 is closed as is conventional in the art. In present day refrigerators, butter is usually

exposed to the low temperature within chamber 11 by being placed in a compartment provided therefor in the chamber or formed in a recess portion of the refrigerator cabinet door. Door 14 of cabinet 10 includes an outer or front metal pan 21 and an inner molded plastic panel 22 secured to one another in any suitable or conventional manner and having insulating material disposed therebetween. Inner panel 22 of door 14 has a plurality of walls providing a recess or several recesses in the inner face of the door as is also conventional in the art. For example, a portion of panel 22 of door 14 is provided with a top wall 23, upright opposed side walls 24 and a bottom support or wall 26 each extending outwardly away from a back wall 27 (see FIGURE 2) of the panel to form a recessed butter storage compartment in the door. A closure member in the form of a small molded plastic door 28 hingedly secured to one of the walls of the butter compartment in any suitable or conventional manner normally closes this compartment. The butter storage compartment is located within chamber 11 and is exposed to cool air therein when door structure 14 is closed in its normal position. In the present disclosure a set of spring contacts or metal terminals 31 are mounted upon door panel 22 within a cavity 32 in door structure 14 provided beyond each of the opposed side walls 24 of the butter compartment (see FIGURE 2). The contacts or terminals 31 and the cavities 32 form an electrical receptacle means cooperating with each of the upright butter compartment side walls 24. Wires 33 and 34 are attached to a rolled over clamping portion on the contacts or terminals 31 and lead from door 14, through its hinges 15 or other suitable means, to a source of electric current supply within cabinet 10 and utilized for energizing the motor-compressor unit 16 of the refrigerating system associated therewith. The plurality of wires 33 and 34 may be connected in parallel circuit relationship within door 14 to the source of electric current. Each opposed side wall 24 of the butter compartment has a horizontally elongated opening 36 therein provided with a vertical or depending notch 37 for a purpose to be hereinafter described.

According to my invention, I provide a butter receiving and serving dish 40 carrying or having mounted thereon two separated electric resistance type heaters or heater units each having a connector portion to be selectively connected to the electrical receptacle means associated with opposite side walls of the butter compartment for at one time warming butter on the dish to a predetermined temperature within chamber 11 and for at another time warming butter on the dish to a temperature differing from the predetermined warming temperature thereof. Thus butter dish 40 is adapted to be removably disposed in the butter compartment within door 14 of refrigerator 10. This dish is preferably formed of colored glass having good heat conductive properties. Dish 40 is provided with a recessed butter receiving top 41 connector portions 42 at ends thereof, a bottom wall 43, raised with respect to the lower portion of dish 40 by spaced part rails 44, and a handle 46 (see FIGURES 2, 5 and 6). Separate electric resistance type heaters or heater units 48 and 49 are located on the bottom wall 43 of dish 40 and consequently carried thereby and removable therewith from door 14. The heater units 48 and 49 may, insofar as my invention is concerned, be of any conventional form and are preferably of a flat wide character comprising metallic particles or powder suspended in a waterproof bonding liquid which is sprayed on the bottom wall 43 of dish 40 and permitted to dry thereon (see FIGURES 5 and 6). Each of the flat wide spaced apart straight runs of metallic resistance type heaters 48 and 49 are connected together at their ends by flat silver cross strips or tapes 51 bonded in any suitable manner to glass dish 40 and, like strip conductors 52, extend from ends of the heaters 48 and 49 along the connector end portions 42 of the dish. Heater 49 is of

greater resistance capacity with respect to heater 48 and, consequently, upon energizing either of them, the heating intensity of heater 49 is more than heater 48 for the purpose of my invention. The sprayed on metallic containing liquid and the tape-like silver strips 51 and 52 after being applied and bonded to glass dish 40 are waterproof and the dish may be washed in a detergent water solution without damaging or causing components of the electric heater units 48 and 49 to loosen from the dish. In order to insure isolation of the metallic conductors 52 from one another at the connector end portions 42 of dish 40, an elongated boss 53 is provided centrally on the underside of connector portions 42. This boss 53 is receivable in notch 37 of opening 36 in walls 24 of the butter compartment and also serves to guide the connector portions 42 of dish 40 into openings 36 to connect the conductor strips 52 with contacts or terminals 31 of the electrical receptacles. Heaters or heating units 48 and 49 are protected against being frictionally scraped or rubbed, upon sliding or shifting butter dish 40 on a supporting surface, by the rails 44 along the bottom of the dish.

Having described the constructional arrangement of the present disclosure, I will now explain the utility and selective cooperation of various elements of the arrangement. Dish 40 with a substantially one-quarter pound slab or stick of butter thereon is placed in the storage compartment on door structure 14 and supported on the support or bottom wall 26 thereof. If the stick of butter on dish 40 is not to be removed from the refrigerator for a long period of time, the dish may remain on support or bottom wall 26 of the compartment in a central position therein as shown in FIGURE 2 of the drawings. In this supported position of dish 40, neither of the heater units 48 and 49 thereon are energized and the butter is maintained at a low temperature more desirable for long storage and preservation thereof. However, the user of refrigerator 10 may at one time desire to store and condition the butter at a temperature suitable, upon immediately removing dish 40 from the refrigerator, to permit of its being cut into small chunks for mixing with other ingredients in preparing certain food products for cooking or the user of the refrigerator may desire to store and condition the butter at a higher temperature suitable for at another time, upon removing dish 40 from the refrigerator, spreading butter on slices of bread or the like. My arrangement takes care of this selective desirability by permitting alternative energization of the different intensity heater units 48 and 49 carried by dish 40. The opposite inner side walls 24 of the butter compartment may each be provided with suitable letters or words, such, for example, as "Warm" and "Warmer" to indicate the direction in which dish 40 should be shifted or slid on its support to energize one or the other of the heaters 48 and 49. In the present disclosure, if the butter on dish 40 is to be warmed to a moderate temperature within chamber 11 of cabinet 10, the dish is shifted on support or wall 26 to the left as viewed in FIGURE 2 of the drawings. The handle 46 on dish 40 is grasped by a person's hand and force applied thereto for moving connector portion 42 at the left hand end of the dish into opening 36 of the electrical receptacle means at the left side of the butter compartment. Dish 40 is guided during its shifting or sliding movement by engaging rear wall 27 of the butter compartment and by the boss 53 entering notch 37 in opening 36. When the raised part of dish 40, spaced from its end, strikes wall 24, connector portion 42 on the dish is fully inserted into the receptacle means and conductor strips 52 engage the contacts or terminals 31 (see FIGURE 4) to energize heater unit 48 which unit is of lesser heating intensity than unit 49. Energization of unit 48 causes same to generate heat and this heat is conducted through the glass of dish 40 to the stick of butter thereon for warming the butter to said predetermined moderate temperature while ex-

posed to the low temperature within chamber 11. If butter on dish 40 is desired to be warmed to a different or higher temperature than said moderate temperature within chamber 11, such, for example, as to 65° F., for permitting its being spread, immediately upon removal thereof from refrigerator 10, on slices of bread or the like, then heater or heat unit 49, which is of greater intensity than unit 48, should be energized. Therefore, handle 46 on dish 40 is grasped by a person's hand and force applied thereto to shift the dish to the right as viewed in FIGURE 2 of the drawings. This shifting of dish 40 disconnects the conductors 52 at the left hand end thereof from contacts or terminals 31 at the left side of the butter compartment and moves connector portion 42 on the right hand end of dish 40 into opening 36 at the right side of the compartment. Here again when the raised part of dish 40, spaced from its end, strikes the right side wall 24 of the butter compartment, the dish is fully inserted into the electrical receptacle means and the conductor strips 52 engage contacts or terminals 31 to energize heater unit 49 which is of greater intensity than unit 48. Heat generated by unit 49 is conducted through glass dish 40 to the stick of butter thereon for warming the butter in chamber 11 to a higher or different temperature than can be accomplished by energizing heater 48. Handle 46 on dish 40 insures proper positioning of the dish within the butter compartment on door 14 to permit sliding of the dish in either horizontal direction on support 26 to align the connector ends 42 of the dish with openings 36 in opposite side walls 24 of the compartment and to permit registration and engagement of conductors 52 with terminals 31 of the opposed electric receptacle means.

It should, from the foregoing, be apparent that I have provided a unique arrangement within a refrigerator for warming butter exposed to the refrigerated chamber therein to selected different temperatures to meet the desires of a user of the refrigerator. My selective butter warming arrangement is accomplished without employing an expensive temperature responsive thermostat means in the electric circuit of a butter warmer. The butter heating units are on and carried by the butter receiving dish as distinguished from mounting such units in or on walls of a butter storage compartment. My improved device provides three selective storage and conditioning arrangements for butter in a refrigerated chamber of a refrigerator whereby the butter is storable therein at a low temperature, at a moderately warmed temperature and at a different or higher temperature for the various purposes hereinbefore set forth. The arrangement disclosed is unique and provides a novel combination with a household refrigerator in which certain results are obtained in a new and cheaper fashion requiring no thermostat or adjustable switch for a butter warming heater.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. A refrigerator provided with a food storage chamber therein and having a refrigerating system associated therewith including a refrigerant evaporator cooling air in said chamber, a support on a part of said refrigerator normally exposed to the cool air within said chamber, a butter receiving dish adapted to be removably located on said support, two separate unconnected electric resistor heating means secured to and carried by said dish, either one of said heating means being adapted to be independently energized while the other is de-energized, a source of electric current supply for said heating means, said electric current supply comprising an electrical receptacle at each opposed side of said support having terminals attached to said source, connectors disposed at each

opposite end of said dish for said two separate heating means, the length of said dish intermediate said opposite ends thereof being less than the distance between said sides of said support whereby the dish is selectively shiftable therealong while supported thereon, said dish being shiftable in a direction along the support to move one end thereof against one side of said support with said connector at this one dish end connected to the terminals of one of said receptacles for energizing one of said two heating means and warming butter on the dish within said chamber to a predetermined temperature, said dish being shiftable in another direction along the support to disconnect said connector at said one end thereof from the terminals of said one receptacle for de-energizing said one of said two heating means, and said dish also being further shiftable in said another direction along the support to move its other end against the side of said support opposed to said one side thereof with said connector at this other dish end connected to the terminals of the other of said receptacles for energizing the other of said two heating means and warming butter on the dish within said chamber to a temperature differing from said predetermined warming temperature.

2. A refrigerator provided with a food storage chamber therein and having a refrigerating system associated therewith including a refrigerant evaporator cooling air in said chamber, a support on a part of said refrigerator normally exposed to the cool air within said chamber, a butter receiving dish adapted to be removably located on said support, two separate unconnected electric resistor heating means secured to and carried by said dish, either one of said heating means being adapted to be independently energized while the other is de-energized, one of said heating means being of greater heating intensity than said other heating means, a source of electric current supply comprising an electrical receptacle at each opposed side of said support having terminals attached to said source, connectors disposed at each opposite end of said dish for said two separate heating means, the length of said dish intermediate said opposite ends thereof being less than the distance between said sides of said support for supporting the dish thereon in a position in which said connectors are aligned with said receptacles but are unconnected thereto whereby butter on the dish is chilled to substantially the same temperature as the temperature of cool air in said chamber and whereby the dish is selectively shiftable along the support, said dish being shiftable in a direction along the support to move one end thereof against one side of said support with said connector at this one dish end connected to the terminals of one of said receptacles for energizing said other heating means and warming butter on the dish within said chamber to a predetermined temperature, said dish being shiftable in another direction along the support to disconnect said connector at said one end thereof from the terminals of said one receptacle for de-energizing said other heating means, and said dish also being further shiftable in said another direction along the support to move its other end against the side of said support opposed to said one side thereof with said connector at this other dish end connected to the terminals of the other of said receptacles for energizing said one heating means and warming butter on the dish within said chamber to a higher temperature than said predetermined warming temperature.

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