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2,995,649

REFRIGERATION APPARATUS

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5 Claims. (Cl. 240-4)

This invention relates to refrigeration apparatus and more particularly to an improved, illuminated cabinet structure for domestic refrigerators and the like.

It is common practice to provide a domestic refrigerator with a source of illumination which is energized when the cabinet door is opened to illuminate the interior of the refrigerator and its contents. This invention provides improved means for illuminating the refrigerator interior and for enhancing the appearance of the refrigerator through decorative illumination.

In accordance with the invention, a distributed light source, such as a neon tube, is disposed about the access opening for the refrigerator cabinet and located behind a light permeable frame which closes the space between the front edges of the cabinet inner and outer shells. The light permeable frame permits the passage of light from the light source to the interior of the refrigerator cabinet for functional illumination purposes and has a major portion of its surface area arranged at nearly right angles to the plane of the cabinet access opening so that the light passing through this major portion of the frame can pass rearwardly to the cabinet interior. The frame also preferably possesses a minor translucent portion which is arranged more nearly parallel to the plane of the cabinet access opening and which is adapted to be illuminated by the distributed light source to provide a decoratively lighted frame area at the access opening.

Among the several features of the invention is a novel supporting arrangement for the distributed light source and in which utilization is made of insulated spacer members connecting the cabinet inner and outer shells. Another feature of the invention is the utilization of the metal inner and outer cabinet shells as a protective enclosure for a high voltage type, distributed light source and its associated electrical apparatus, such as a high voltage transformer.

Other features, as well as the objects and advantages of the invention, will become apparent from the following detailed description in which reference is made to the accompanying drawings, wherein:

FIG. 1 is a front perspective view of a refrigerator cabinet embodying the illuminated cabinet structure of this invention;

FIG. 2 is an enlarged fragmentary sectional view through the lower wall of the refrigerator cabinet taken as indicated by the line II—II in FIG. 1;

FIG. 3 is a horizontal sectional view through a side wall of the cabinet and taken as indicated by the line III—III in FIG. 1; and

FIGS. 4 and 5 are fragmentary elevational views illustrating spring clips that are employed to support the distributed light source within the cabinet. FIG. 4 is taken substantially as indicated by the line IV—IV in FIG. 3.

The refrigerator illustrated in FIG. 1 includes a cabinet 10 having a food storage compartment 11 which is accessible through the front of the cabinet by means of a hinged door 12. The cabinet 10 is con-

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structed of spaced inner and outer metal shells, designated 13 and 14 respectively, which are separated by heat insulation 15. The front edges of the inner and outer shells 13 and 14 possess spaced flanged portions 16 and 17, respectively, which surround the cabinet access opening and are arranged in planes which are substantially parallel to the plane of the access opening. The flanged edge 17 of the outer shell is disposed forwardly of the flanged edge 16 of the inner shell and the space between the shells is bridged by a frame 18 constructed of heat insulating material. The frame 18 is formed in several parts, which may include four elongated strips 19, which extend parallel to the walls of the cabinet 10, and four gussets 20, which cover the joints between the strips at the corners of the cabinet. Alternatively, the frame may be molded in several parts with lapped joints, or may be molded or vacuum formed in one piece.

Each strip 19 of the frame 18 has a bifurcated outer edge 21 which engages the flanged portion 17 of the cabinet outer shell. The inner edge of each frame strip 19 preferably extends at right angles to the plane of the cabinet access opening and is secured to the flange portion 16 of the cabinet inner shell by means of suitable fasteners, such as screws (not shown).

The frame 18 functions as a non-heat-conductive closure for the front edges of the walls of the refrigerator cabinet 10 and also functions as a light permeable shield or cover for a distributed light source 22, which is disposed directly behind the frame 18 in a position to emit light through the frame into the food storage compartment 11. In order to permit light from the light source 22 to pass directly into the interior of the cabinet 10, a major portion of each strip 19 is formed of transparent or translucent material and is arranged at a steep angle to the plane of the cabinet access opening, nearly at right angles thereto. This major portion of each strip 19 is identified by the numeral 23 in the drawings. Each frame strip 19 has a minor portion 24 thereof extending along its outer edge 21 which is preferably formed of a translucent material, so that this portion of the strip is illuminated by the light source 22 to provide a decorative frame of light about the cabinet access opening. For economy of manufacture, the frame strips 19 are of homogeneous construction and are molded or extruded from a translucent plastic material, such as polystyrene. The corner gussets 20 are also made from the same or a similar light permeable material.

The distributed light source 22 is preferably an elongated neon or fluorescent lamp filled with one or more inert gases and shaped in a manner to fit into the space between the cabinet inner and outer shells 13 and 14 and surround or encompass the access opening of the cabinet. The light source 22 is conveniently supported in a position to direct light through the frame 18 interiorly of the cabinet 10 by means of metal clips 26 or similar fasteners disposed at spaced intervals along the light source 22 in positions to grip plate-like spacer members 27, which are secured to the forward flanged portions 16 and 17 of the inner and outer cabinet shells by means of screws, as shown in FIG. 3. It will be noted that the light source 22 is positioned well forward of the front edge 16 of the cabinet inner shell 13, and nearer to the planes of the walls of the inner shell than to the planes of the walls of the outer shell 14, so that the inner shell

does not obstruct the passage of light to the cabinet interior.

Spacer members 27, such as those illustrated in FIGS. 3 and 4, are conventionally utilized in domestic refrigerator cabinets for the purpose of supporting the cabinet inner shell 13 in proper spaced relation to the outer shell 14. For the present application, the spacer members 27 are preferably formed of a material, such as glass reinforced polyester resin, having both heat and electrical insulating characteristics to prevent the transfer of heat into the interior of the refrigerator cabinet and to electrically isolate the light source 22 from electrical conductive portions of the cabinet 10, such as the inner and outer metal shells 13 and 14. The distributed light source 22 is energized from a normal household supply of electrical current, usually 110 volts A.C., through a high voltage transformer 28 which is connected to the ends of the light source 22 by high voltage leads 29 (see FIG. 2). The transformer 28 is preferably located within one of the walls of the refrigerator cabinet 10 between the inner and outer shells 13 and 14 which define the cabinet walls. In this location, the cabinet shells 13 and 14 provide a protective enclosure for the transformer 28, the high voltage leads 29 and the distributed light source 22, so that the likelihood of the user of the refrigerator coming in contact with high voltage electricity is remote.

If desired, different decorative effects can be created with the illuminating structure of this invention by providing the light source 22 with a tinted coating or by utilizing colored plastic materials in the fabrication of the frame 18, either within the frame strips 19 and gussets 20 or by means of surface coatings for these frame parts. By such means, the interior of the cabinet 10 can be illuminated with light of a particular color, for example, a color which enhances the appearance of food-stuffs stored within the compartment 11, and the same rative portions 24 of the frame strips 19. It can be seen that numerous color combinations for functional and decorative purposes can be achieved.

From the foregoing it will be apparent this invention provides a novel approach to the functional illumination of refrigerator cabinet interiors and further enhances the appearance of refrigerator cabinets through the medium of decorative illumination.

While the invention has been shown in but one form it will be obvious to those skilled in the art that numerous changes can be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. A refrigerator cabinet having a storage compartment provided with an access opening at the front thereof, said cabinet including spaced inner and outer shells of opaque material having corresponding front edge portions disposed in spaced relation to each other and in planes substantially parallel to the plane of the cabinet opening, the edge portion of said outer shell being located forwardly and outwardly of the corresponding edge portion of said inner shell, a frame of translucent heat insulating material having inner and outer marginal edges respectively engaging the front edge portions of said inner and outer shells, said frame having a major portion of the exterior surface thereof arranged more nearly at right angles to the plane of said access opening than parallel thereto, a distributed light source encompassing said access opening and located behind said frame, and means for supporting said light source in a position forwardly of the front edge of said inner shell to direct light through the said major portion of said frame rearwardly into said compartment to illuminate said compartment and forwardly through the frame for decorative illumination.

2. A refrigerator cabinet having a storage compartment provided with an access opening at the front thereof, said cabinet including spaced inner and outer

shells of opaque material having corresponding front edge portions disposed in spaced relation to each other and in planes substantially parallel to the plane of the cabinet opening, the edge portion of said outer shell being located forwardly and outwardly of the corresponding edge portion of said inner shell, a plurality of heat insulating spacer members disposed about said opening and extending between said inner and outer shells, a frame of translucent heat insulating material having inner and outer marginal edges respectively engaging the front edge portions of said inner and outer shells, said frame having a major portion of the exterior surface thereof arranged more nearly at right angles to the plane of said access opening than parallel thereto, a distributed light source encompassing said access opening and located behind said frame, and means for supporting said light source on said spacer members in a position forwardly of the front edge of said inner shell to direct light through the said major portion of said frame rearwardly into said compartment to illuminate said compartment and forwardly through the frame for decorative illumination.

3. A refrigerator cabinet having a storage compartment provided with an access opening at the front thereof, said cabinet including spaced inner and outer shells of opaque material having corresponding front edge portions disposed in spaced relation to each other and in planes substantially parallel to the plane of the cabinet opening, the edge portion of said outer shell being located forwardly and outwardly of the corresponding edge portion of said inner shell, a frame of translucent heat insulating material having inner and outer marginal edges respectively engaging the front edge portions of said inner and outer shells, said frame having a major portion of the exterior surface thereof arranged more nearly at right angles to the plane of said access opening than parallel thereto, said frame also having a minor surface portion arranged more nearly parallel to the plane of said access opening than at right angles thereto, a distributed light source encompassing said access opening and located behind said frame, and means for supporting said light source in a position forwardly of the front edge of said inner shell to direct light rearwardly through the said major portion of said frame to illuminate said compartment and forwardly through said minor portion of the frame to decoratively illuminate said minor portion of the frame.

4. A refrigerator cabinet having a storage compartment provided with an access opening at the front thereof, said cabinet including spaced inner and outer shells of opaque material having corresponding front edge portions disposed in spaced relation to each other and in planes substantially parallel to the plane of the cabinet opening, the edge portion of said outer shell being located forwardly and outwardly of the corresponding edge portion of said inner shell, a plurality of heat insulating spacer members disposed about said opening and extending between said inner and outer shells, a strip of translucent heat insulating material extending around at least the top and the sides of said access opening and having inner and outer edges thereof respectively engaging the front edge portions of said inner and outer shells, a distributed light source disposed between said strip and said spaced members and being coextensive in length with said strip, and means for supporting said light source on said spacer members in a position forwardly of the front edge of said inner shell to direct light rearwardly through said strip to illuminate said compartment and forwardly through said strip for decorative illumination.

5. A refrigerator cabinet having a storage compartment provided with an access opening at the front thereof, said cabinet including spaced inner and outer metal shells having corresponding front edge portions disposed in spaced relation to each other and in planes substantially parallel to the plane of the cabinet opening, the edge por-

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tion of said outer shell being located forwardly of the corresponding edge portion of said inner shell, a heat insulating strip having inner and outer edges thereof respectively engaging the front edge portions of said inner and outer shells, said strip being constructed at least in part of light-permeable material, a high voltage distributed light source disposed behind said strip and adapted to emit light through said strip to illuminate said compartment, a transformer for converting ordinary household electrical energy to high voltage energy for energizing said light source, and a pair of electrical leads connecting said transformer to said light source, said transformer being disposed between the metal inner and outer

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shells of the cabinet, whereby said cabinet shells are utilized as a protective enclosure for said transformer and said leads.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

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It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 37, after "same" insert -- or a different color light can be emitted from the deco- --; column 4, line 64, for "spaced" read -- spacer --.

Signed and sealed this 12th day of December 1961.

(SEAL)

Attest:

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USCOMM-DC