Sept. 16, 1969 R. T. JAHR 3,467,938

REFRIGERATOR DOOR GROUNDING ARRANGEMENT

Filed Sept. 11, 1967

FIG. 2

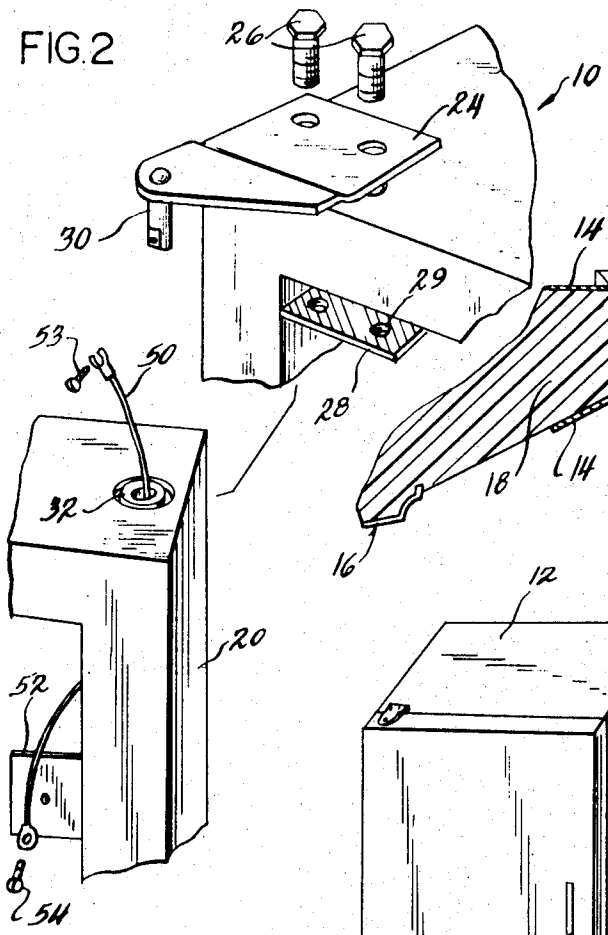


FIG. 3

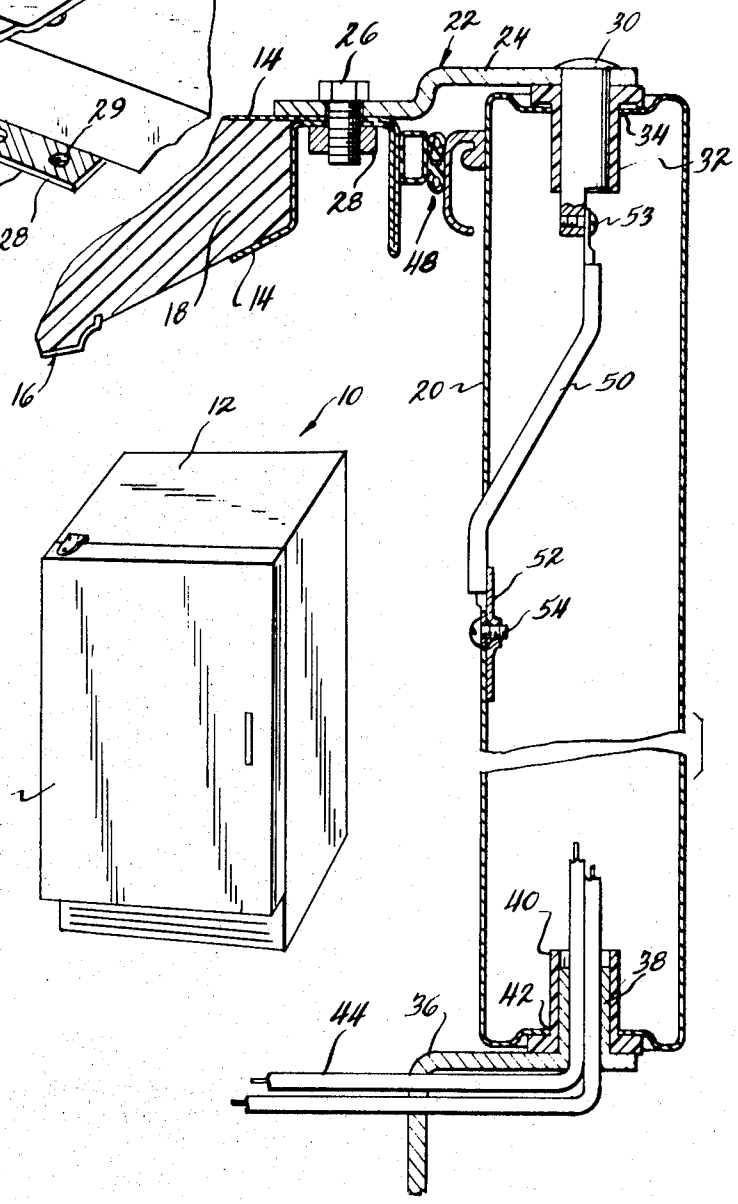


FIG. 1

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REFRIGERATOR DOOR GROUNDING ARRANGEMENT

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ABSTRACT OF THE DISCLOSURE

A refrigerator comprising an open-sided cabinet having an outer metallic shell and a door having an outer metallic shell pivotally supported on said cabinet for closing the open side of the cabinet. Means are provided for electrically grounding the door to the cabinet. Such grounding means includes top hinge means secured in electrical contact with the outer shell of the cabinet, the top hinge means having a pivot pin projecting downwardly therefrom, ground tab means secured in electrical contact with the outer shell of the door and a ground wire connected between the pivot pin and the ground tab means.

BRIEF SUMMARY OF THE INVENTION

This invention relates to a refrigerator cabinet, and more particularly, to an improved refrigerator cabinet having grounding means between the cabinet and the door thereof. Refrigerators today often have electrical components such as lights, ice makers, and controls in the door thereof. Since the door is normally pivotally mounted in plastic bearings on the cabinet for maximum service life and free operation, it is isolated electrically from the cabinet. If an individual were to touch the handle of the door which has an electrical short in it and at the same time come into contact with the cabinet, it might be possible to subject such person to line voltage. Obviously, such potential safety hazard is undesirable and must be obviated.

The device includes, in a refrigerator having a hinged door and electrical components in the door with conductors extending thereto through one hinge, a grounding wire secured to the metallic shell of the door and secured to a hinge pin which nests in an insulative bushing in the door and is part of a second hinge secured to the metallic shell of the refrigerator cabinet.

An object of the present invention is to provide a refrigerator having an open-sided cabinet closed by a door, wherein both the door and the cabinet being made from a sheet metal outer shell, with means for grounding the door to the cabinet to prevent shocking the user in the event of an electrical short in the door.

Another object of the present invention is to provide an improved refrigerator cabinet construction having grounding means between the door and the cabinet, such grounding means being inconspicuous and being easy to install in refrigerators during manufacture so as to obviate a possible hazardous condition. Other objects and advantages of the present invention will become more apparent hereinafter.

BRIEF DESCRIPTION OF THE DRAWING

In the drawing there is illustrated a presently preferred embodiment of the present invention wherein like numerals refer to like elements in the different views.

FIG. 1 is a perspective view of a refrigerator embodying the present invention;

FIG. 2 is an exploded perspective view of a portion of the refrigerator cabinet illustrating the grounding means of the present invention; and

FIG. 3 is a cross-sectional view of the refrigerator cabinet with parts broken away to better illustrate the present invention.

DESCRIPTION OF THE INVENTION

Referring now to the drawing, there is illustrated a refrigerator **10** having a cabinet **12** provided with an open side. The term "refrigerator" as used in the present specification includes not only a conventional refrigerator having a single compartment for containing product to be refrigerated, but also a refrigerator-freezer or a freezer unit for storing commestibles. The refrigerator **10** includes an insulated cabinet having an open side and a door pivotally secured to the cabinet for closing the open side. Refrigeration components are housed in the cabinet for refrigerating the interior thereof. Such components include a refrigerant compressor, condenser, expansion means and evaporator interconnected in the usual manner.

The cabinet **12** is formed of inner and outer shell **14** and **16**, with at least the outer shell being made from metal. The space between the inner and outer shell is filled with a suitable insulating material, as for example, a polyurethane foam as is commonly employed today. The door **20** which is adapted to close the open side of the cabinet **12** is hinged at the top and at the bottom to the cabinet for free swinging movement. The door **20** may be similarly fabricated from inner and outer shells. The outer shell is preferably of metal. The shells of the door are spaced apart by an insulating material, and recesses may be provided in the inner liner or shell for receiving product to be stored and for accommodating electrical components, such as light, butter compartment controls, a heater or the like.

The door **20** may be pivotally secured to the cabinet **12** by means of upper and lower hinges. In accordance with the present invention, the upper hinge is formed in a particular manner so as to accommodate grounding means for grounding the door **20** to the cabinet **12**. The upper hinge or top hinge **22** comprises a top hinge plate **24** secured at one end in electrical contact with the metal outer shell **14** of the cabinet **12** by means of bolt **26** and tapping plate **28**. The tapping plate **28** is made from metal and is provided with tapped openings **29** which engage and receive the threads on the bolt **26**. The hinge plate **24** is in direct contact with the outer metallic shell **14** and the tapping plate **28** is also in direct contact with the outer shell **14**. To insure good electrical contact between the tapping plate **28** and the cabinet **12**, the top surface of the tapping plate is serrated and the area of the outer shell flange **15** engaged by the tapping plate **28** is not painted.

Depending downwardly from the hinge plate **24** is a hinge pin or pivot pin **30** which is adapted to be received within an insulated bearing **32** disposed in an opening **34** in the door **20**.

At its lower end the door **20** is pivotally supported by lower hinge means including a hinge pltae **36** having a hollow hinge pin portion **38** extending upwardly therefrom. The hinge pin portion **38** is received within an insulated bearing **40** disposed in an opening **42** in the bottom of the door **20**. The hinge pins **30** and **38** are aligned with one another, and their axes are coaxial so as to define the axis of rotation of the door.

The insulated bearings **32** and **40** may be molded from a suitable plastic, for example, nylon.

The hinge pin portion **38** of the lower hinge means **36** is hollow and defined by an annular sleeve having an opening therethrough for receiving electrical wire means **44** which connect the power source in the refrigerator cabinet with electrical components in the door. Such power source may typically be 115 volts.

Provided between the front of the cabinet and the rear

of the door are suitable gasketing means **48** for providing a thermal insulating shield between the door and the cabinet. The gasketing means include complementary sealing points which extend entirely about the open side of the cabinet between the cabinet **12** and the door **20**.

Considering again the arrangement for grounding the door **20** to the cabinet **12**, a grounding wire **50** extends between the hinge pin **30** and a grounding tab **52** secured to the outer metal liner of the door in electrical contact therewith. Suitable means are provided for securing the ends of the grounding wire **50**, which may be formed from stranded wire, to the pin **30** and the grounding tab **52**. Such means may include screws **53** and **54**. The grounding wire will be subject to minimum turning or twisting stress and thus will not be prone to mechanical failure.

There is provided by the present invention simplified grounding means for grounding the door to the cabinet in a refrigerator cabinet construction so as to obviate possible hazardous conditions in the event there is a short in the door, and the user contacts the door and the cabinet at the same time. Normally, the outer shell or outer case of the cabinet **12** is grounded through the electric service cord to the household electrical system. By virtue of the present invention, the door is grounded to the cabinet by means including a ground wire electrically connected at one end to the door and at the other end to a hinge pin that is in turn electrically connected to the outer metallic shell of the refrigerator cabinet. The novel arrangement makes maximum use of existing components and accomplishes the desired result in a relatively simple, inconspicuous manner so as not to mar the aesthetic appearance of the refrigerator cabinet.

I claim:

1. In a refrigerator comprising a cabinet formed with an open side and a door pivotally supported on said cabinet for closing said open side, said cabinet and said door each having a metallic shell, electric wire means extending from the cabinet into the door for connection of operative electrical components in said door to a source of electrical power in the cabinet, the improvement comprising means for grounding the refrigerating door in the event

of a short in the electrical wire means in the door, such grounding means comprising a hinge member secured to the cabinet in electrical contact with the metal shell of the cabinet, said hinge member including a hinge pin extending therefrom, said door having an opening therein in alignment with the hinge pin, and an insulated bearing in said opening for receiving said hinge pin, grounding tab means on said door in electrical contact with the said metal shell of the door and ground wire means connecting the grounding tab means to the hinge member.

2. A refrigerator as in claim **1** including a metallic tapping plate having threaded openings therein secured to the cabinet in electrical contact with the metallic shell, said hinge member including a metal plate, and bolt means extending through the metal plate and cabinet into engagement with the threaded openings in the tapping plate for securing the hinge means to the cabinet in electrical contact therewith.

3. A refrigerator as in claim **1** wherein the door is pivotally supported at its lower end by hinge means including a hollow hinge pin, the electric wire means extending from the cabinet into the door through said hollow hinge pin for providing power to the electrical components in such door.

4. A refrigerator as in claim **3** wherein the door is pivotally supported on the cabinet at each end in insulated bearings, whereby the door is electrically insulated from the cabinet except for the grounding means.

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