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N. J. SMITH

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REFRIGERATING APPARATUS

Filed Nov. 14, 1958

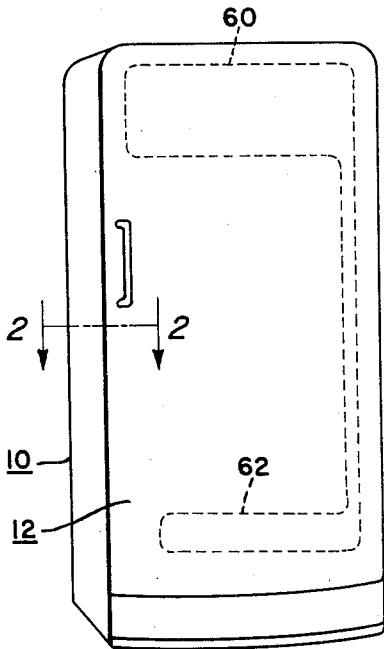


Fig. 1

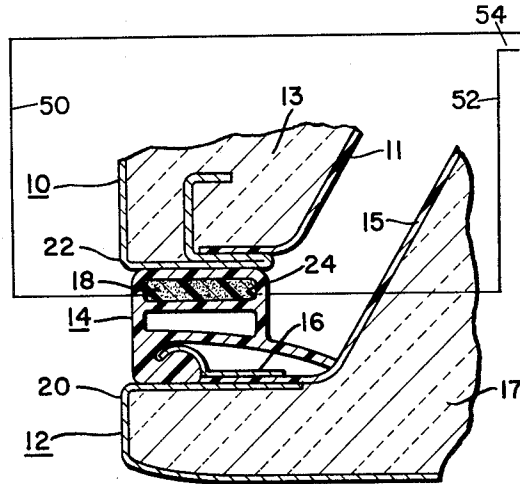


Fig. 2

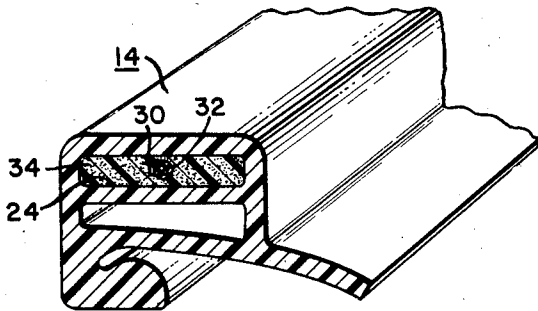


Fig. 3

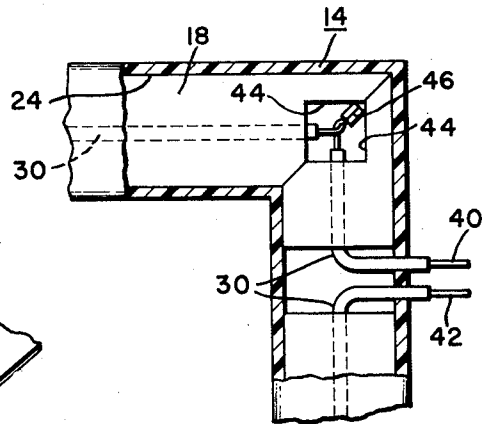


Fig. 4

INVENTOR.

Nelson J. Smith

BY *Edwin S. Dykburg*
His Attorney

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3,055,193

REFRIGERATING APPARATUS

Nelson J. Smith, New York, N.Y., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

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This invention relates to refrigerating apparatus and more particularly to a refrigerator door seal having a combination magnet and strip heater incorporated therein for holding the door closed and for preventing the condensation of moisture on the door seal and the surfaces adjacent the door seal.

More particularly it is an object of this invention to provide a sealing strip for a refrigerator door wherein a combination bar type magnet and strip heater is incorporated in the door seal so as to extend around the entire edge of the door opening.

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

In the drawings:

FIGURE 1 is a perspective view showing a household refrigerator incorporating the invention;

FIGURE 2 is a fragmentary sectional view showing the relationship between the strip heater and the door seal in a preferred embodiment of the invention;

FIGURE 3 is a fragmentary perspective view showing still another modification;

FIGURE 4 is a fragmentary plan view with parts broken away showing the mitered corner of a door seal and the electrical connections to the strip heater.

Referring now to the drawing wherein a preferred embodiment of the invention is shown, reference numeral 10 designates a conventional refrigerator cabinet having a door 12 provided for closing the front opening of the cabinet. As shown in FIGURE 2, the cabinet 10 includes the usual inner liner 11 and insulation material 13 in the space between the inner and outer walls of the cabinet. The door 12 includes the usual inner panel 15 and insulation material 17 between the inner and outer walls of the door. An extruded rubber-like door seal 14 which may be made of any well known plastic material of the type now commonly used in modern door seals is carried by the door in the conventional manner and is arranged to seal the door opening when the door is in its closed position. For purposes of illustration, FIGURE 2 shows a door seal of the type which is held in place by means of a door seal clamping bracket 16 whereas the door seal could be held in place in any other well-known manner.

The seal 14 incorporates a combination bar magnet and strip heater 18 which extends the full length of the seal and serves to maintain the door seal heated at all times so as not only to prevent condensation of moisture on that portion of the door seal exposed to the room air but also to prevent the accumulation of moisture on the door and cabinet surfaces 20 and 22 respectively which are located adjacent the door seal. When the refrigerator door 12 is in the closed position, the bar magnet 18 is attracted by the cabinet face 22 which serves as an armature for the bar magnet. The main body of the door seal 14 is made of extruded plastic material having a bulblike portion for receiving the bar magnet and strip heater 18 as best shown in FIGURE 2 of the drawing. It will be noted that the combination magnet and strip heater 18 shown in FIGURE 2 is mounted in a pocket 24 provided directly in the door seal 14 whereby the strip heater is at all times in intimate thermal exchange rela-

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tionship with the material forming the door seal. The magnet may be made of any well known material such as the materials disclosed in United States Patents 1,982,690 and 2,105,658. Sealing strip magnets are now commercially available and need no further description. The magnet material is preferably compounded of magnetic and electrically conductive particles so as to serve as a conductor which can be heated by passing a current through the same. Thus the magnet serves the dual function of a strip heater and a means for holding the door closed. The combination bar magnet and heater 18 is connected to a power source 54 by means of conductors 50 and 52 attached to opposite ends of the member 18 as shown. The door seal serves to conduct a portion of the heat to the surfaces 20 and 22 contacted by the door seal and thereby prevent the exposed surfaces 20 and 22 from becoming cold enough to cause moisture in the room air to condense thereon.

By virtue of the above described arrangement it is apparent that the combination bar magnet and strip heater 18 is supported directly by the door seal without the need for extra mounting clips and the like and is effective to heat not only the exposed door seal surface but also the surfaces 20 and 22 while also serving to hold the door in the closed position.

FIGURE 3 of the drawing shows a slightly modified door seal arrangement wherein the strip heater 30 is a separate wire mounted in an aperture 32 formed directly in the bar magnet 34. For purposes of illustration the aperture 32 for the heater wire has been shown as passing through the center of the bar magnet whereas it could be located elsewhere. Insofar as certain aspects of the invention are concerned the heater wire could be placed in a groove formed in one edge of the bar magnet or it could be imbedded in the magnet when the magnet is formed.

FIGURE 4 of the drawing illustrates one manner of mitering the corners of sealing strips having a combination bar magnet and strip heater of the type shown in FIGURE 3 of the drawing. As best shown in FIGURE 4 of the drawing, the bar magnets are cut away for a short distance at one point so as to make it possible to bring out the necessary electrical leads 40 and 42 which are adapted to be connected to a source of power so as to supply current to the heating element 30 which extends throughout the entire periphery of the door seal. FIGURE 4 also shows the manner in which the heating wires are electrically connected at the point where a mitered joint is formed in the door seal gasket and the bar magnets disposed within the door seal gasket. Thus at the mitered joint each of the bar magnets is cut away as indicated at 44 so as to expose the ends of the heater wire. These ends are then fastened together by any suitable means such as by a metal clip 46.

The refrigerator shown in FIGURE 1 is intended to represent a conventional refrigerator wherein a conventional refrigerant system including a refrigerant evaporator 60 is arranged for cooling the interior of the usual food compartment of the refrigerator and wherein liquid refrigerant is adapted to be supplied to the evaporator by means of conventional refrigerant liquefying apparatus 62 mounted in the lower portion of the cabinet 10 in the usual manner.

While the forms of embodiment of the invention as herein disclosed constitute preferred forms, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. In a refrigerator, a cabinet member having an insulated food storage compartment provided with an opening in one wall thereof, a door member for closing said opening, refrigerating apparatus including an evaporator

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for cooling said compartment, a sealing strip carried by one of said members for sealing said door opening, an armature carried by the other of said members, a magnet carried by said sealing strip for holding the door seal in contact with said armature and energizable for heating said sealing strip and the adjacent surfaces on said cabinet member and said door member so as to prevent condensation of moisture thereon, and means for connecting said magnet to a source of electrical energy.

2. In combination a refrigerator cabinet including an outer shell member, an inner shell member, insulation between said inner and outer shell members; said cabinet having an access opening therein; a door for closing said access opening; said door comprising an outer panel, an inner panel, insulation between said panels; an extruded sealing strip arranged between said door and said cabinet for preventing the escape of air between said cabinet and said door when said door is in closed position; a bar magnet carried by said sealing strip for holding said door closed and for heating said sealing strip and the adjacent surfaces on said cabinet member and said door member; and means for connecting said bar magnet to a source of electrical energy.

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3. A sealing strip for use in a refrigerator cabinet and the like comprising a bulb portion, a strip heater carried by said sealing strip for applying heat to said sealing strip, said strip heater comprising a molded strip having magnetic and electrically conductive particles imbedded therein so as to form permanent magnet means for biasing said sealing strip in contact with a metallic portion of said cabinet, and means for connecting said strip heater to a source of electrical energy.

4. In combination an extruded sealing strip having a bulb portion, a permanent bar magnet disposed within said bulb portion and compounded so as to serve as a conductor which can be heated by passing a current there-through, and means for passing electrical current through said bar magnet so as to heat said sealing strip.

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