Jan. 13, 1959 W. R. FRANCIS 2,868,936

HEATING PANEL

Filed April 1, 1957

FIG. 1.

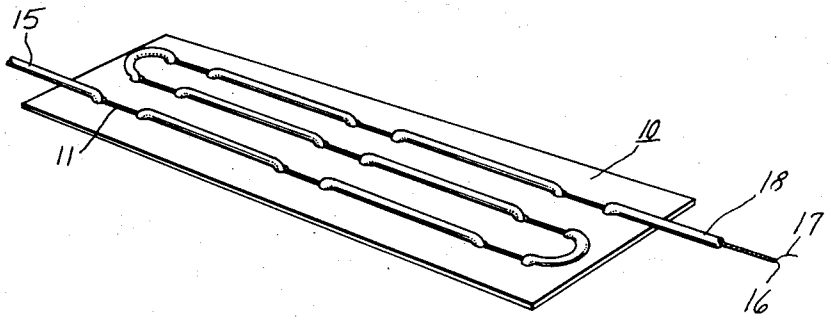


FIG. 2.

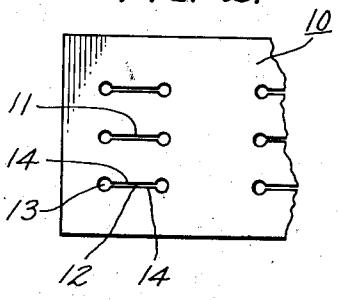


FIG. 3.

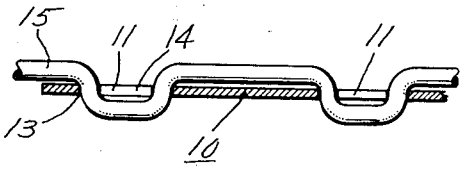
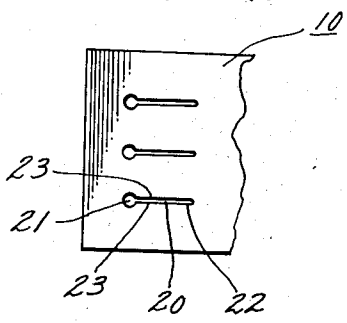


FIG. 4.



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HEATING PANEL

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5 Claims. (Cl. 201—69)

This invention relates to heating panels and particularly to inexpensive methods of mounting heater wire on thin panel members.

Modern day electric refrigerators utilize a large number of heating panels built into the walls of the cabinet to prevent ice from forming on the inner surfaces as well as to raise the temperature in certain areas of the cabinet for conditioning special foods such as leafy vegetables and butter. Such heaters have been designated mullion heaters and this invention relates to a type of mullion heater that is especially useful in electric refrigerators.

In the past, the most common method of mounting the heater wire was to sew it to a heavy sheet aluminum paper or fiber to be later fastened within the walls of the cabinet. The sewing method requires a great deal of labor and is a rather slow operation. This invention is to replace the sewing operation by forming special slots in an insulating panel member so that intermediate portions of the heater wire may be forced through the slots and be confined therein.

The primary object of this invention is to provide a heating panel with special holding slots so that spaced portions of heater wire may be quickly confined in the slots.

A further object of this invention is to provide a heating panel with small slots that are arranged in ranks and files so that a single force may be used to drive intermediate portions of the heater wire through the slots while the main portion of the wire remains on one side of the panel.

This invention is related to a simple method of assembling a heater wire to a supporting panel. Special slots are used in the panel so that intermediate portions of the wire are forced through the slots and fastened therein. These slots provide a pair of resilient flaps that will open up to admit the wire to pass through and then they will automatically close again to trap the wire therein.

My invention will be better understood from the following description taken in connection with the accompaning drawing and its scope will be pointed out in the appended claims.

Figure 1 is an isometric view of a heating panel member embodying my invention.

Figure 2 is a partial plan view of the panel of Figure 1 showing the nature of the slots formed therein.

Figure 3 is a cross-sectional view taken through the longitudinal center line of the tandem slots showing the wire confined therein.

Figure 4 is a plan view similar to Figure 2 showing a modification of the slots in the panel.

Referring in detail to the drawing and particularly to Figure 1, a panel **10** of semi-rigid fiber board is provided with a series of special slots **11** arranged in three rows of three slots each to form ranks and files in the panel. Figure 2 provides a better illustration of slots since their form is a critical feature of this invention. Each slot **11** has a narrow central gap **12** and an enlarged portion 13 at each end. This configuration establishes

two opposed resilient latching portions or flaps **14** which are separated by the gap **12** and flanked by the end portions **13**. The heater wire **15** is made to be very flexible with a small insulating core **16** of fiber glass or similar material with a very fine resistance conductor **17** helically wound over the core with narrow spacing between the turns, and finally an insulating sheath **18** of rubber or vinyl material.

The heater wire **15** is assembled in the slots by taking an intermediate portion of the wire and forcing it between the two resilient flaps **14** until the wire is confined in the enlarged end portions of the slot so that the flaps **14** are allowed to spring back and latch the wire in place. Only a small fraction of the wire extends through the slots in the panel as is seen in Figure 1. The greater amount of the wire is held against the top face of the panel so that the heat generated will be reflected in the proper direction.

Figure 4 shows a modified slot **20** which is similar to slot **11** except that there is only one enlarged end **21**. This slot **20** might be properly defined as a keyhole slot with a narrow gap **22** separating a pair of opposed resilient flaps **23**. This slot **20** will function in a manner similar to slot **11** in that the wire will be confined in the enlarged end portion **21** and will hold the flaps **23** slightly apart at the opposite end of the slot as the wire returns to the top side of the panel.

The primary advantage of the present invention is its ease of manufacture. The wire will be forced into the slots by a simple bumping tool (not shown) instead of using a slow and expensive sewing operation. The particular design of the slots allows the wire to snap into place and be held therein without any additional holding means.

Modifications of my invention will occur to those skilled in this art, and it is to be understood, therefore, that this invention is not limited to the particular embodiments disclosed, but that it is intended to cover all modifications which are within the true spirit and scope of this invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A mullion heater comprising an insulating panel having a flexible heater wire mounted in a series of slots, each slot having a narrow central gap and an enlarged portion at each end, the enlarged portions being of a size larger than the diameter of the heater wire while the narrow gap is smaller than the diameter of the wire, whereby an intermediate portion of the wire may be forced through the slot until it is confined at spaced points in the enlarged portions of the slot.

2. A mullion heater comprising an insulating panel having a flexible heater wire mounted thereon by means of a series of slots, some of which are in tandem arrangement, each slot having a narrow elongated gap and at least one enlarged end portion, the enlarged portion being of a size larger than the diameter of the heater wire while the narrow gap is smaller than the diameter of the wire, whereby an intermediate portion of the wire may be forced through the slot until it is confined in the enlarged end portion of the slot.

3. A flexible heater wire mounted in a series of slots arranged in rank and file on an insulating panel, each slot having a narrow central gap and an enlarged portion at each end, the enlarged portions being of a size larger than the diameter of the heater wire while the narrow gap is smaller than the diameter of the wire, so that intermediate portions of the wire may be forced through the slots until they are confined in the enlarged end portions thereof, whereby the majority of the wire is arranged on one side of the panel.

4. A heating panel comprising a thin insulating sheet

with a flexible heater wire mounted in a series of slots which are arranged in several files, each slot having a long narrow gap and an enlarged portion at one end, the enlarged portion being of a size larger than the diameter of the heater wire while the narrow gap is smaller than the diameter of the wire, whereby intermediate portions of the wire may be forced through the slot until it is confined in the said enlarged portion.

5. A heating panel comprising a thin board member with a flexible heater wire mounted in a series of slots

in the board, each slot having a pair of opposed resilient flaps that are separated by a narrow gap that is smaller than the diameter of the wire, whereby intermediate portions of the wire may be forced between the flaps until the wire is confined by the natural closing action of the flaps.

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