Oct. 15, 1957 G. C. ALDOUS 2,810,056

MULTIPLE CIRCUIT TERMINAL BLOCK

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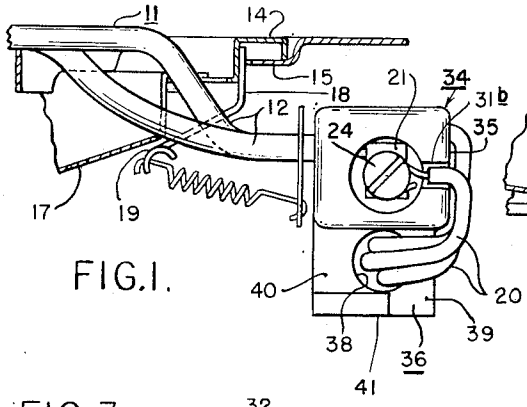


FIG. 1.

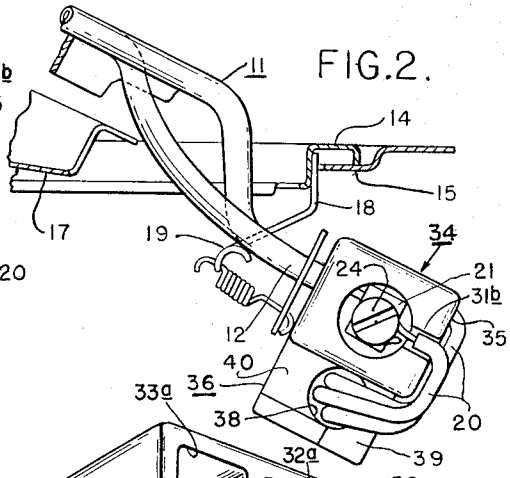
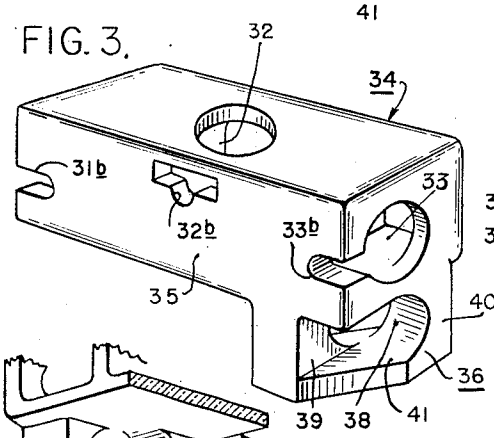


FIG. 2.

FIG. 3.



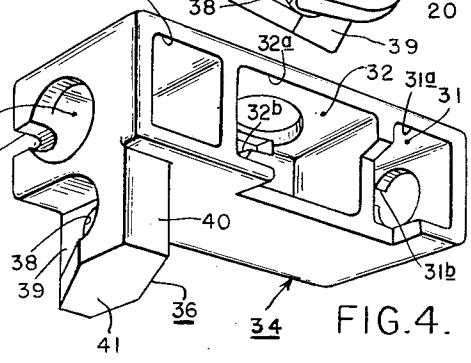


FIG. 4.

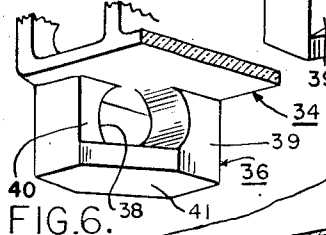


FIG. 6.

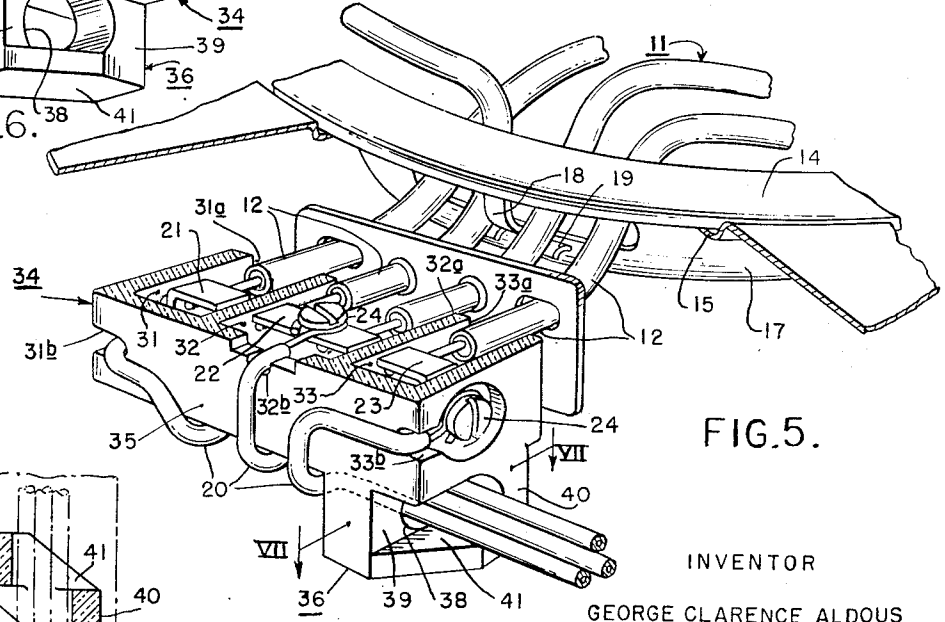


FIG. 5.

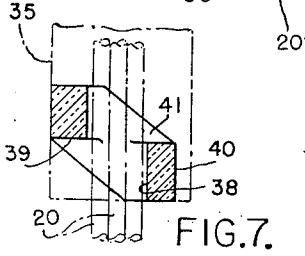


FIG. 7.

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MULTIPLE CIRCUIT TERMINAL BLOCK

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4 Claims. (Cl. 219—37)

This invention relates to an improved electrically insulating terminal block for use with a surface heating unit of an electric range.

It is an object of this invention to reduce the number of failures of electrical lead-in wires in connections for movably supported electric heaters.

A further object of this invention is to improve the construction of an insulating terminal block for a surface heating unit to reduce the number of failures of lead wires due to flexing and twisting caused by movement of the heaters.

This invention is particularly applicable to a surface unit of the type shown in Sutherland Patent No. 2,457,007, issued December 21, 1948, and assigned to the assignee of the present invention. The Sutherland patent discloses a heater that may be pivotally moved so as to impose stresses on the flexible electrical lead wires within the terminal block adjacent to the terminals of the heater. Screws that secure the wires to the terminals often mark the wire and weaken it in such a manner that continued flexing or twisting of the wire will cause fatigue failure at the point of marking after a relatively small number of pivoting movements of the heater.

Attempts have been made to overcome the problem of failure in lead wires in electric surface units by providing terminal blocks into which the flexible wires enter in a direction generally parallel to the pivotal movement of the heater. This modification alone, however, is not sufficient to prevent the stresses from being applied to the ends of the wires adjacent the terminals of the heater.

In accordance with the present invention, a supporting bracket for a cable of flexible lead wires is attached to the insulating terminal block in such a manner that the wires from the heater terminals will be bent in a tortuous path before leaving the terminal block in a direction generally parallel to the pivotal axis of the heater so as to prevent undue flexing and very materially reduce stresses in the wires adjacent the terminals within the block.

These and other objects are effected by the invention as will be apparent from the following description taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a partially cutaway vertical section of a surface heating unit with the terminal block construction shown in full lines;

Fig. 2 is a section similar to that of Fig. 1 but with the heater in a pivoted position and a reflecting pan partially removed;

Fig. 3 is a perspective view of the terminal block shown in Figs. 1 and 2, showing the side remote from the heating unit;

Fig. 4 is a perspective view of the terminal block shown in Fig. 3, showing the side that receives the terminal portions of the heater;

Fig. 5 is a perspective view of the heater shown in Fig. 1 with the range platform and the upper side of the terminal block cut away;

Fig. 6 is a perspective view of a portion of the terminal block as seen looking in the opposite direction from the views in Figs. 3 and 5; and

Fig. 7 is a vertical section of the terminal block taken along the line VII—VII of Fig. 5, with the general outline of the block and the lead-in wires in dot-dash lines.

Referring to Fig. 1 of the drawings, a surface heating unit comprises a coiled sheathed heater **11** having an upper flat vessel-contacting portion and terminal portions **12** extending therebeneath and to one side. The heater is supported in an opening in the top surface of a range by an annular ring **14** that rests on a flange **15** forming the rim of the opening. Also supported by the ring **14** is a reflector pan **17** extending beneath the heater. Adjacent portions of the reflector pan **17** and the ring **14** are notched to provide an opening therebetween to accommodate the terminal portions **12** of the heater.

During normal cooking operations, the reflector pan **17** becomes covered with dirt and grease. As described in the above-mentioned patent, the heater **11** may be pivoted to permit removal of the reflector pan **17** for cleaning and also to provide access to the chamber beneath the heater. When the front portion of the heater **11** is raised, the terminal portions **12** at the rear will be pivotally supported by a bracket **18** of inverted T-shape suspended from the ring **14**. A cross bar **19** of the bracket engages the two central heater terminal portions seen in Fig. 5. Since the heater is not rigidly supported during its pivotal movement, the pivotal axis may shift in the vicinity of the crossbar **19**, but remains generally parallel thereto. The pivotal movement of the heater **11** about an axis generally parallel to the crossbar **19** of the bracket **18** imposes twisting and flexing stresses on flexible lead-in wires **20**.

The heater terminals comprise electrically conducting connector strips **21**, **22**, **23** welded to rigid conductors extending from the ends of the sheaths at the terminal portions of the heater. Screws **24** are threaded in these connector strips to secure the ends of the insulated lead-in wires **20**. The heater **11** in the present illustration comprises two separate sheathed elements, one end of each being connected to the center connector strip **22** and the other ends being connected to the outer strips **21**, **23**, respectively.

The heater connector strips **21**, **22**, **23** are housed in a row of separate compartments **31**, **32**, **33** along the major axis in an elongated electrically insulating block **34** of ceramic material. For the compartments **31**, **32** and **33** there are provided access openings **31***a*, **32***a* and **33***a*, respectively, in the side of this block **34** adjacent the heater to permit insertion of the heater terminals. The opposite side **35** of the block has openings **31***b*, **32***b* and **33***b* into the compartments **31**, **32**, **33**, respectively, through which the ends of the wires **20** extend. The top side and ends of the blocks are provided with openings permitting insertion of a screwdriver or other tool to securely fasten the wires **20** to the strips **21**, **22**, **23**.

In accordance with this invention there is attached integrally to the under side of the block **34** near one end thereof a lead-in wire supporting bracket **36** having a passage **38** therein parallel to the longitudinal axis of the block and parallel to the axis about which the heater pivots. The bracket **36** limits movement of the lead-in wires transversely of the longitudinal axis of the block.

The bracket **36** is formed by two portions **39** and **40** depending from the lower side of the block **34** and joined at their lower ends by a bottom portion **41**. The portions **39** and **40** are disposed on opposite sides of the vertical plane through the longitudinal axis of the block and are axially offset with respect to each other, as shown in Fig. 7, so that passage **38** is formed by engagement of the parts of a two-piece mold. The adjacent sides of the members **39** and **40**, normal to the longitu-

dinal axis of the block, are substantially coplanar as indicated in Fig. 7.

In the illustrated embodiment of the invention, all of the wires 20 extend from the compartments 31, 32, 33 through one side 35 of the block. Each wire 20 is bent first with a portion thereof extending parallel to the side 35 and it is again bent with a portion extending parallel to the under side of the block and through the passage 38. The passage 38 is located relative the openings in the side 35 of the block so that each wire leading from the heater terminals must extend along two non-parallel sides of the block before extending through the passage 38. It is not necessary that the wires be held close to the sides of the block except for neatness and to reduce the lengths of wire required.

The bending of the wires about the block in a tortuous path that includes bends of substantially 90° in at least two different planes very greatly reduces the stresses that can be transferred from the cable to the ends of the wires 20 within the terminal block during normal use of the surface unit heater.

Servicing of broken lead wires has been one of the most serious field problems facing range manufacturers. The use of a terminal block made in accordance with this invention has increased the life of heater connections many times and has helped tremendously in reducing the number of service calls necessary to maintain range equipment in satisfactory operating condition.

While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What is claimed is:

1. In a surface heating unit, the combination of an electric heater, a plurality of terminals rigidly attached to said heater, means for supporting said heater for pivotal movement about a horizontal axis, an insulating terminal block housing said terminals, a separate lead-in wire electrically connected to each of said terminals, each of said wires extending into said block through an opening in a side thereof, a bracket attached to another side of said block for supporting said lead-in wires and having a wire passage therein parallel to said axis and to said other side, said wires extending from said terminals to the outside of said block and then through said passage.

2. In a surface heating unit, the combination of an electric heater, terminal portions of said heater extending beneath and to one side thereof, said heater being supported for pivotal movement about a horizontal axis, an insulating terminal block having a plurality of separate compartments each having an opening in one side of said block to receive one of said terminal portions, a bracket attached to a second side of said block for supporting lead-in wires and having a passage therein parallel to said axis, a second opening into each of said compartments through another side of said block, a flexible insulated wire extending from each of said compartments through each said second opening and electrically connected to said heater within said block, said wires being bent on the outside of said block between said second openings and said bracket so as to extend through said passage in a direction generally parallel to said axis.

3. An elongated insulating terminal block for an electric heater, said block having along its longitudinal axis a plurality of compartments for receiving terminals of a heater, one side of said block having an access opening for each compartment for entry of the heater terminals, said block having adjacent a second side thereof an integral bracket for supporting lead-in wires, said bracket having a passage for said wires extending in a direction parallel to the longitudinal axis of said block, each of said compartments having a second opening through another side of said block for entry of lead-in wires extending from said bracket to the heater terminals.

4. An elongated electrically insulating terminal block for an electric heater, said block having along its longitudinal axis a plurality of compartments for receiving terminal portions of a heater, an access opening for each compartment in one side of said block for entry of the terminal portions, a plurality of openings in the opposite side of said block for entry of flexible electrical conductors into said compartments, a bracket integrally attached to a third side of said block for supporting lead-in wires and having a passage therein for said wires extending in a direction parallel to the longitudinal axis of the block.

References Cited in the file of this patent

UNITED STATES PATENTS

2,467,348 Tuttle ---------- Apr. 12, 1949

FOREIGN PATENTS

900,485 France ---------- Oct. 2, 1944