

Nov. 22, 1960

C. H. DYKES

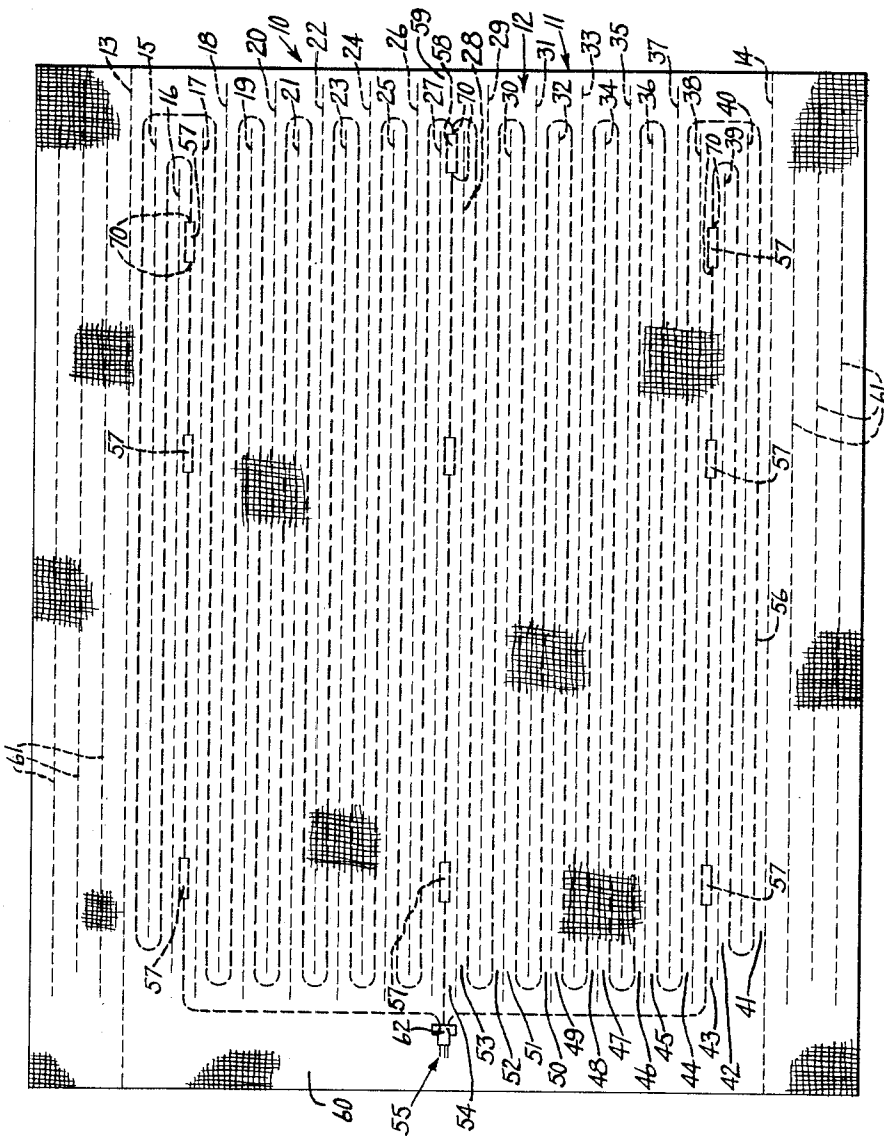
2,961,526

ELECTRIC HEATING APPLIANCE

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2 Sheets-Sheet 1

Fig. 1



Inventor
Carrel H. Dykes

Attys
Lee, Sherman, Munie, Gasser & Simpson

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2 Sheets-Sheet 2

Fig. 2

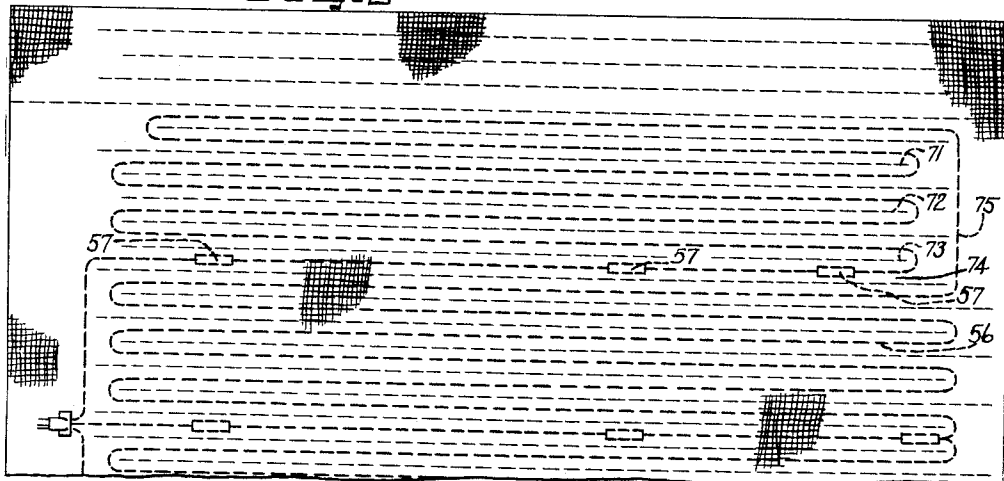


Fig. 3

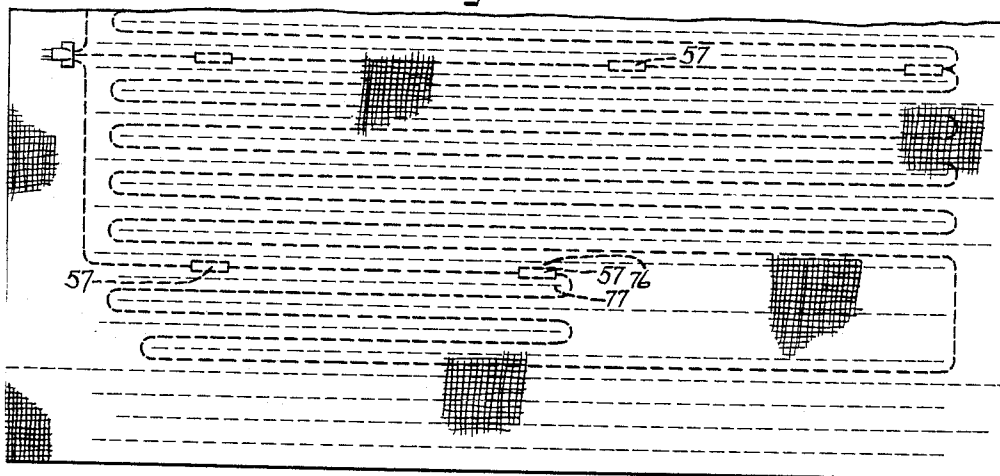


Fig. 4

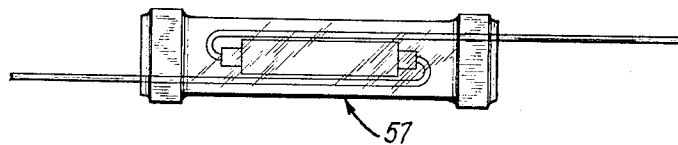
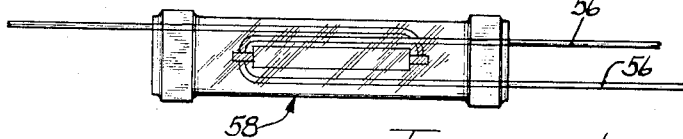


Fig. 5



Inventor

Carrel H. Dykes

By *Hill, Sherman, Morin, Chase & Hughes* Attys

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2,961,526

ELECTRIC HEATING APPLIANCE

Carrel H. Dykes, Bay Springs, Miss., assignor to Northern Electric Company, Chicago, Ill., a corporation of Delaware

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This invention relates generally to electric heating appliances, and more specifically to an improved heating appliance shell incorporated therein, including the method of wiring it.

Although the principles of the present invention may be included in various heating appliances, a particularly useful application is made in electric blankets and pads.

Typical electric blankets comprise a woven cloth shell having a series of elongated channels woven therein and defined by dividers or stitching. This type shell is well known in the art, being well illustrated and explained in the United States patent to Moberg, No. 2,203,918. In the manufacture of electric blankets, a heating wire, having temperature responsive switches located therein, is disposed in the various channels of the shell to define a heated portion. During the manufacture of the blanket the heating wire is carried on and unwound from a shuttle.

It has been common to effect this result by assembling a harness portion which includes the external wiring and all of the temperature responsive switches, inserting this portion into the shell without any shuttling, it being undesirable from a production standpoint to shuttle the temperature responsive switches. Thereafter, or prior thereto, another portion of the wiring comprising the main heater wire portion is shuttled into the other channels, the ends of the heating wire being then connected to the other portion of the harness assembly. It has also been found by experience that it is undesirable to have any portion of the wiring assembly crossing any other portion thereof. These facts taken together have heretofore made it necessary to dispose some of the temperature responsive switches in the outermost channel of the heated portion of the shell.

I have found that a better product can be provided if the temperature responsive switches are not located in the outermost channel but are located inward therefrom, closer to a point where temperature sensing is more important, such as adjacent to the body of the person covered by the blanket. However, to so locate the temperature responsive switches has required either or both of shuttling the switches, or using more than one piece of heating wire to be shuttled into the shell's heated area.

Since the various channels allow considerable freedom for the location of the heating wire, if a temperature responsive switch is carried on the shuttle to be positioned within the heated portion of the shell, it becomes difficult or impossible to properly select a length of wire which, on unwinding from the shuttle, will dispose the switch at the selected position.

The present invention contemplates the utilization of one or more shortened shell dividers which permits the use of a novel wiring method and arrangement whereby the heated portion of the blanket may be wired without any portion of the wire crossing over another portion, without using more than one main portion of heater wire, without shuttling a temperature responsive switch, and yet permitting the disposition of temperature responsive switches inward of the side edges of the shell. As is ex-

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plained more fully herein, three types of switches have been heretofore required for a double blanket. Another benefit obtained by disposing the heating switches inward from the outer edge is that only two types of switches need be provided.

Accordingly, it is an object of the present invention to provide an improved heating appliance wherein a temperature responsive switch is disposed inwardly from the edge of the heated area.

Another object of the present invention is to provide an improved heating appliance in which there are no crossed heating wires, wherein a temperature responsive switch is disposed inwardly from the edge of the heated area, and wherein the outside pattern of the heated area is not restricted due to the effecting of these results.

Yet another object of the present invention is to provide a shell for an electric heating appliance wherein the position of a temperature responsive switch may be selected as desired without sacrificing quality or productivity.

A still further object of the present invention is to provide an improved shell wherein only two types of prefabricated temperature responsive switches are required for any configuration of heated area.

Still yet another object of the present invention is to provide a method and means of disposing temperature responsive switches anywhere within the heated area of an appliance shell with both ease and accuracy.

Many other advantages, features and additional objects of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings in which preferred structural embodiments incorporating the principles of the present invention are shown by way of illustrative example.

On the drawings:

Figure 1 is a diagrammatic plan view of an electrical heating appliance provided in accordance with the principles of the present invention;

Figure 2 is a fragmentary plan view of a modified embodiment of the invention shown in Figure 1;

Figure 3 is a still further modified embodiment of the invention shown in Figure 1;

Figure 4 is a view of a temperature responsive switch;

Figure 5 is a view of another temperature responsive switch.

As shown on the drawings:

The principles of this invention are particularly useful when embodied in an electric blanket assembly such as illustrated in Figure 1, generally indicated by the numeral 10. The blanket assembly includes a shell 11, such as of woven fabric having a heated area generally indicated by the numeral 12 and defined by a pair of dividers 13 and 14. The heated area 12 is divided by other dividers 15-40 to define a plurality of channels such as 41-54 therein.

The blanket assembly 10 also includes an electric harness assembly generally indicated by the numeral 55, and which includes a main heating wire disposed in the various channels and a plurality of temperature responsive switches 57 and 58.

The shell 11 has a head edge portion 59 and a foot edge portion 60 which are ordinarily placed adjacent to the head and the foot of the bed with which the blanket assembly 10 is used. While the term "head edge portion" and the term "foot edge portion" correspond to typical usage, they are used herein as terms of reference and are not intended to be terms of limitation. Thus the edges while used as references are considered as being a straight line, it is to be understood that the actual configuration of the end of the shell may be as desired.

If desired, the shell 11 may have additional dividers 61 disposed along the sides of the heated area 12. The purpose of the dividers 61 is primarily aesthetic in that they provide a uniform appearance across the width of the blanket assembly 10.

The heated area 12 in the instant embodiment comprises in fact two heated areas, one extending from the divider 13 to the center, and the other extending from the divider 14 to the center.

It will be noted that the dividers 13-40 extend transversely of the edge portions 59 and 60. It will be further noted that most of the dividers are alternately staggered in a longitudinal direction. By way of example, dividers 28, 30, 32, 34, 36, and 38 are staggered toward the foot end 60, while the dividers 29, 31, 33, 35, and 37 are staggered toward the head edge portion. Thus each of the dividers has an end portion which is staggered with respect to the end portions of the other dividers. Thus the end portions of the dividers 29, 31, 33, 35, 37 and 14 may be termed long length end portions, and are disposed closest to the head edge portion 59.

Thus also the dividers 28, 30, 32, 34, 36, 38, and 40 may be said to have end portions which are of medium length, which are recessed from the long length end portions, and which are alternately more remote from the head edge portion 59.

The divider 39 has an end portion which is still more remote from the edge portion 59 and which is relatively recessed from a pair of adjacent recessed or remote end portions of the dividers 38 and 40. Thus the divider 39 may be said to have a short length end portion which is disposed toward or adjacent to the head edge portion 59 of the shell 11.

The electric harness assembly 55 includes a plug 62 at the foot edge portion 60 of the shell 11. The harness assembly 55 also includes wiring leading from the plug 62 to the temperature responsive switches 57 and 58 disposed in the channels 43 and 54, and in a similar channel at the other side of the shell 11. Thus in this embodiment, the harness assembly 55 includes a harness having three legs in which the temperature responsive switches are disposed. This harness or sub-assembly is preassembled and is then inserted into the shell 11 from the foot edge portion 60. It will be noted that the channel 43 is the third channel from the side of the heated area 12. Thus the channel 43 receives the temperature responsive switches 57, and the channel 43 is adjacent to the short length end portion of the divider 39.

The heating wire 56 is disposed in the remaining channels of the heated area, one end of the wire 56 being fastened to the switch 58 and the other end of the wire being secured to one of the switches 57 immediately adjacent to the short end portion of the divider 39 in the channel 43. To install the wire 56 into the shell 11, the wire 56 is first wound on a shuttle which is passed through the various channels in the desired sequence, and is unwound from the shuttle as required. Of course, after the wire 56 has been secured at both ends to the leg of the harness, the connection and the switch is suitably sealed.

Referring to the head end 59 of the shell 11, it will be noted that the wire 56 has a bight which extends about or surrounds the medium length end portions of the dividers 28, 30, 32, 34, and 36. It will be further noted that a bight extends around the short end portion of the divider 39 and that an additional bight extends around the ends of the dividers 38 and 40 as well as around the bight which surrounds the divider 39.

As will be apparent later herein, the bight which surrounds the ends of the dividers 38 and 40 extends about two or more medium length end portions. This second or outwardly disposed bight has one leg which is disposed outwardly of the bight which extends about the short end portion in a separate channel. Thus the outermost leg

of the outermost bight is disposed in the outermost channel of the heated area.

Referring now to Figure 4, there is shown a view of one of the temperature responsive switches 57. It will be noted that portions of the heating wire are disposed along the switch whereby heat may be given off directly from either of two wires to the switch by radiation. The switch 57 may comprise any suitable switch element, for example, of the type taught by Porter in his U.S. Patent No. 2,627,003, disposed and sealed within a suitable water tight covering.

Referring now to Figure 5, there is shown a similar switch but this switch 58 is provided with two leads going to one of the terminals. Thus three wires pass adjacent to the switch element itself in heat transfer relationship therewith.

Referring again to Figure 1, it will be noted that each of switches 57 and 58 also receives heat from heating wire which is disposed in channels on opposite sides of the respective heat sensitive switches. Thus in each of the switches 57, heat is received from the two wires within the switch as well as from the channels lying on both sides of the switch. In the instance of the switch 58, additional heat is received from the third wire. It is now apparent that each of the switches 57 may be constructed and calibrated identically to each other, while the switch 58 must have a slightly higher setting to protect or to control to the same temperature as the switches 57, due to the fact that the third wire within the switch provides additional heat. In prior art devices, of this general type, the switches which I have shown in the channel adjacent to the short end portion have been disposed in the outermost channel. When so disposed, a still lower setting is required since no heat is received from the channel defined by the divider 61. In other words, in the prior art devices, a switch of a third setting has been necessary, while in the instant device, switches identical to switches 57 in the center channel have been used exclusively except for the one switch 58.

It will be noted that one of the essential features of my invention that makes this possible is the short end portion on the divider 39. It will be noted that each of the medium end portions of the dividers extends between the legs of a bight. In addition, the medium end portions of the dividers 38 and 40 not only extend between the legs of a bight, but serve to space the one bight which extends about the other from the other. Of course, the long end portions positively space various other bights from each other.

It is also now apparent that another principal feature of this invention is the method by which the shell 11 is wired. The harness legs with the switches are inserted into the shell channels from the foot edge portion of the shell, the channel receiving the outermost legs having an odd number greater than one counting from one side of the heated shell area. Thereafter or prior thereto the heater wire is shuttled into the other channels of the area to be heated, the shuttling beginning or ending at the other shell edge in the next lower numbered channel and continuing to said one side, and thence around the wired channels at the other shell edge into the next higher numbered channel and continuing toward the other side of the shell. Thereafter, the wire ends are secured to the harness leg and the switch covering is sealed to the wire at the points indicated by numeral 70.

Referring now to Figure 2, a structure generally similar to that shown in Figure 1 is presented. Only a portion of the blanket is shown, the omitted portions being either symmetrical or identical to Figure 1. In this structure, it will be noted that three dividers 71, 72, and 73 have been provided with short end portions and that the switches 57 along with the harness leg have been disposed in the seventh channel 74 from the side of the heated area. As before, a bight 75 of the wiring 56 is disposed in surrounding relationship to the short end portions of

the dividers 71-73 and to the bights surrounding the individual short end portions of such dividers.

Referring now to Figure 3, a further modification of the instant invention is illustrated wherein the switches 57 are disposed in the fifth channel 76 counting from the side of the heated area. As before, the switches 57 are disposed immediately inward of the divider 77 having a shortened end portion. The number of dividers which are provided with the shortened end may be varied to dispose the switches 57 any desired distance from the side of the heated area, and the degree of shortening is optional provided that the amount of recess or shortening is such that will permit the second bight to surround the shortened end, and which gives the desired shape of heated area.

I have thus provided a heating appliance shell which permits rapid fabrication and at the same time permits the positioning of temperature responsive switches in the areas which are picked for functional conditions rather than for the convenience of manufacture. In addition, a further convenience of manufacture is thereby produced in that only two types, instead of three types, of switch settings are required. At the same time, the continued use of continuous shuttling of the heater wire and avoiding crossing of the heater wires is present. This wiring arrangement also enables an increase in versatility in varying the outside pattern of the heated area. Further the production advantages accruing from prefabrication of the portion of the harness assembly have been retained. Further even though the blanket shell can be readily stretched or pulled out of form, the comparatively non-resilient blanket wire and harness can be disposed therein with the thermally responsive switch's position remaining within relatively narrow fixed dimensions. With this construction, the variations in blanket shells and also the variations in the amount of tension a given operator will put on the wire while it is being threaded or shuttled through the blanket will have negligible effect on the switch position. Except for the connections indicated by the numeral 70, all connections are made apart from the bulky shell, the structure of the invention thereby providing considerable added ease and resulting improved workmanship in the manufacture thereof.

Numerous configurations, heretofore impossible under the standard outlined herein, are now possible to be provided.

Although various minor modifications might be suggested by those versed in the art, it should be understood that I wish to embody within the scope of the patent warranted hereon all such embodiments as reasonably and properly come within the scope of my contribution to the art.

I claim as my invention:

1. In an electric heating appliance having a shell, said shell having a series of laterally spaced dividers defining a plurality of channels, said dividers having ends disposed at one edge of the shell, alternate ends of the dividers being more remote from said edge than other ends, and a heating wire connected to a temperature responsive switch and both disposed in one of the channels, the wire having bights extending about said more remote alternate ends and spaced from each other by said other ends, the improvement of: one of said dividers, disposed immediately intermediate a pair of the dividers having said more remote ends, having an end still more remote from said edge, said last-named end having a bight of said wire extending thereabout and into the channel having the temperature responsive switch, and an additional bight extending about said pair of dividers and said last-named bight.

2. An electric heating appliance including in combination: a shell having a head edge portion and a foot edge portion; said shell having a series of laterally spaced dividers extending transversely of said edge portions and defining a plurality of channels in the shell; said dividers

having staggered long, medium, and short length end portions disposed toward one of said edge portions of the shell; an electrical harness including a heating wire extending through said channels and connected to a temperature responsive switch and both disposed in one of the channels, said harness extending through the other end of said shell directly into said one channel; said wire having bights extending about said medium length end portions and said short length end portion; one of said medium length end portions extending between the legs of the bight which surrounds it and separating said bight from said bight which surrounds said short end portion, one leg of said last-named bight extending into said one channel from said one edge of said shell.

3. An electric heating appliance including in combination: a shell having a head edge portion and a foot edge portion; said shell having a series of laterally spaced dividers extending transversely of said edge portions and defining a heated shell area having a plurality of channels; said dividers having staggered long, medium, and short length end portions disposed toward one of said edge portions of the shell; an electrical harness including a heating wire extending through said channels and connected to a temperature responsive switch and both disposed in one of the channels, said harness extending through the other end of said shell directly into said one channel; said wire having bights extending about said medium length end portions and said short length end portion; and an additional bight extending about at least two of said medium length end portions and said short length end portion, said last-named bight having a leg extending from said one end of said shell toward said other end of said shell and disposed in the outermost channel of said heated shell area.

4. An electric heating appliance including in combination: a shell having a head edge portion and a foot edge portion; said shell having a series of laterally spaced dividers extending transversely of said edge portions and defining a heated shell area having a plurality of channels; said dividers having staggered long, medium, and short length end portions disposed toward one of said edge portions of the shell; an electrical harness including a heating wire extending through said channels and connected to a temperature responsive switch and both disposed in one of the channels, said harness extending through the other end of said shell directly into said one channel; said short end portion having a bight of said wire extending thereabout, one leg of said bight extending into said one channel to said switch, said one channel being similar in width to the other channels and being an odd numbered channel greater than one counting inward from the side of said heated shell area.

5. A method of wiring a channelled shell of an electric heating appliance comprising the steps of: inserting a harness leg having a temperature responsive switch, from one edge portion of the shell, into an odd numbered shell channel, greater than one, counting from one side of the heated-area shell-channels to be wired; shuttling a heater wire into the remaining channels of the area to be heated, said shuttling beginning at the other shell edge in the next lower numbered channel and continuing to said one side, thence around the wired channels at said other shell edge into the next higher numbered channel and continuing toward the other side of the shell; and securing the wire ends to the harness.

6. A method of wiring a channelled shell of an electric heating appliance comprising the steps of: inserting a harness leg having a temperature responsive switch, from one edge portion of the shell, into an odd numbered shell channel, greater than one, counting from one side of the heated-area shell-channels to be wired; shuttling a heater wire into the remaining channels of the area to be heated, said shuttling being in either direction along a path extending from the other shell edge through the next lower numbered channel, thence in series through

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each lower numbered channel, thence around the above-identified channels at said other shell edge and through the next higher numbered channel adjacent to said odd numbered channel, and thence through each higher numbered channel; and securing the wire to the harness.

7. A shell for an electric heating appliance, said shell having a series of laterally-spaced means defining a series of heating-wire-and-thermostat-receiving channels, said channel defining means having staggered long, medium, and short length end portions directed toward one of the edges of the shell, there being at least one of said medium end portions disposed intermediate each adjacent pair of said long end portions, and a pair of said medium end portions disposed on opposite sides of each of said short length end portions which jointly define a pair of said channels inwardly spaced from the outermost of said series of channels.

8. A shell for an electric heating appliance, said shell having a series of laterally-spaced dividers defining a series of heating-wire-and-thermostat-receiving channels, said dividers having staggered long, medium, and short length end portions directed toward one of the edges of the shell, there being at least one of said medium end portions dis-

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posed intermediate each adjacent pair of said long end portions, and a pair of said medium end portions disposed on opposite sides of each of said short length end portions which jointly define a pair of said channels inwardly spaced from the outermost of said series of channels.

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