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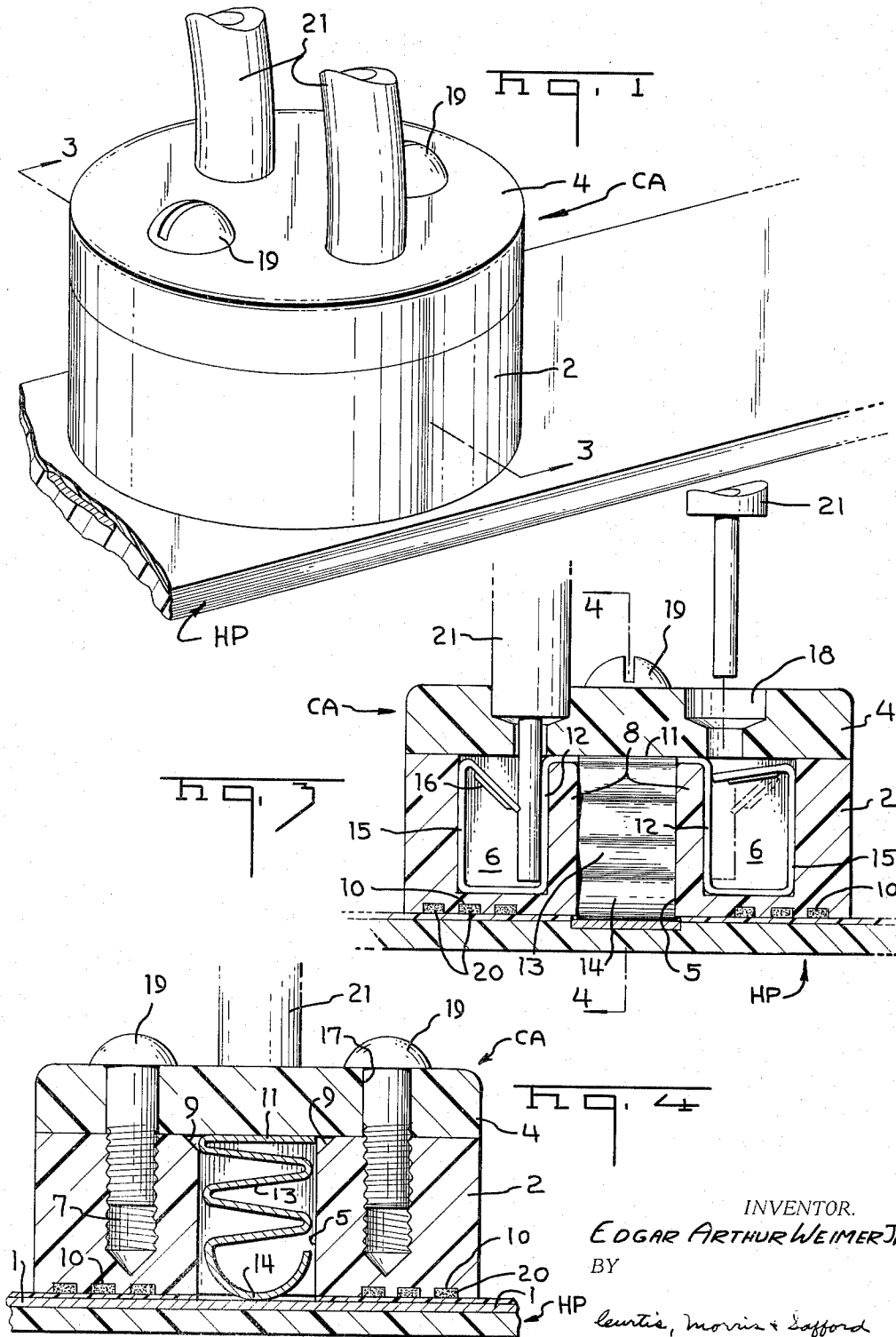
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TERMINAL ASSEMBLY FOR HEATING PANEL OR THE LIKE

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2 Sheets-Sheet 1



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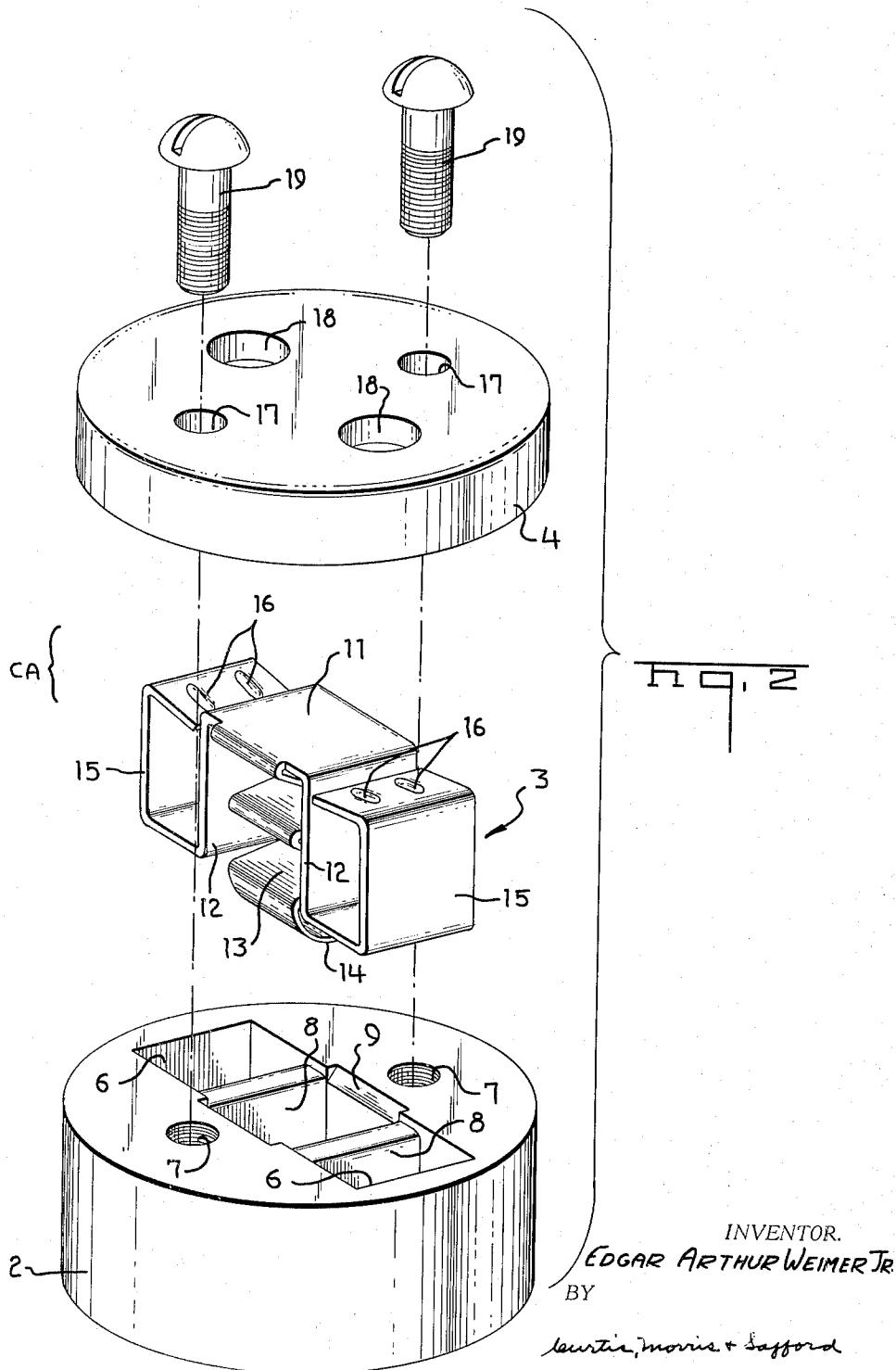
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TERMINAL ASSEMBLY FOR HEATING PANEL OR THE LIKE

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This invention relates to an electrical terminal assembly and more particularly to an electrical terminal assembly for a heating panel or the like.

In the field of electrical heating, especially with regard to the heating of buildings or compartments, heating panels are being devised which generally comprise a board of dielectric material having two copper conductors embedded along opposite and parallel edges, a resistive material is disposed in the dielectric material and connected to the copper conductors so that when current is passed through these conductors, the resistive material will radiate heat which is generally controlled by a thermostatic means. When these heating panels are installed in the walls or ceiling of a room or compartment, they will provide suitable heating means therefor.

It is, therefore, a primary object of the present invention to provide an electrical connector assembly to connect to the conductor strip means of a heating panel.

A further object of the present invention is to provide a connector assembly in which conductive leads are readily insertable and secured therein.

A still further object of the present invention is the provision of a connector assembly which includes a spring contact member which electrically engages a conductive member in the heating panel.

An additional object of the present invention is to provide a connector assembly which is capable of being mounted on a mounting member with part of or the entire housing thereof secured onto the mounting member.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there is shown and described an illustrative embodiment of the invention; it is to be understood, however, that this embodiment is not intended to be exhaustive nor limiting of the invention but is given for purposes of illustration and principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

In the drawings:

FIGURE 1 is a perspective view of the connector assembly in place on a heating panel;

FIGURE 2 is a perspective exploded view of the connector assembly;

FIGURE 3 is a cross-sectional view taken along lines 3-3 of FIGURE 1; and

FIGURE 4 is a cross-sectional view taken along lines 4-4 of FIGURE 3.

As shown in FIGURE 1, connector assembly CA is secured onto heating panel HP which is a laminated structure having the resistive material (not shown) disposed therein and connected to conductor members 1 (only one being shown). At the point where connector assembly CA is to be mounted on heating panel HP, an opening is disposed in one surface of the heating panel in order to

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bear or expose a portion of the conductor member over which the connector assembly is to be disposed.

Connector assembly CA comprises a housing member 2, a contact member 3 and a cap member 4. Housing member 2 is made of any suitable dielectric material and includes an opening 5 extending therethrough. Recesses 6 are disposed in housing member 2 on each side of opening 5 and these recesses terminate close to the bottom surface of housing member 2, as illustrated in FIGURE 3. Opening 5 and recesses 6 are preferably rectangular-shaped in accordance with the segments of contact member 3 to be disposed therein. Holes 7 are disposed in housing member 2 adjacent the sides of opening 5. The upper ends of walls 8 separating opening 5 and recesses 6 are slightly recessed from the top surface of mounting member 2. Beveled surfaces 9 are disposed in the sides of opening 5 adjacent holes 7. A series of concentric grooves 10 are disposed in the bottom surface of mounting member 2.

Contact member 3 is susceptible to mass production by automatic machinery and is conveniently formed by shaping a sheet metal blank or strip of a suitable electrically-conductive material, such as, Phosphor bronze, or the like, in successive forming steps. The metal is sufficiently hard and resilient to impart to the connection area a spring-like character. Contact member 3 comprises top and side sections 11 and 12. A serpentine-shaped or accordion-pleated spring contact element 13 is connected to one side of top section 11 and is disposed between side sections 12. Contact element 13 has a semi-circular contact-engaging section 14 at its free end, which extends below side sections 12. Each side section 12 has a U-shaped clip member 15 having one end connected thereto while the free end is disposed adjacent side section 12 slightly downward from top section 11. Side sections 12 and clip members 15 connected thereto define conductor-securing means. The legs containing the free ends of clip member 15 include ribs 16 disposed therein which increase the rigidity thereof and prevent them from being accidentally buckled.

Cap member 4 includes holes 17 which are in alignment with holes 7 of mounting member 2 and openings 18 which are in respective alignment with recesses 6. Holes 17 receive screws 19 therethrough and these holes are slightly larger in diameter than the threaded part of screws 19 so that they may pass easily through the holes. Openings 18 are counterbored, as illustrated in FIGURE 3.

In assembly, housing member 2 is secured onto heating panel HP over the opening exposing conductor member 1 by means of a suitable adhering substance 20 which extends into grooves 10 to aid in securing mounting member 2 onto the heating panel. Contact member 3 is disposed within mounting member 2 with spring contact element 13 disposed in opening 5 and the conductor-securing means are disposed into respective recesses 6 so that semi-circular engaging section 14 engages conductor member 1 and side sections 12 along with the bottom leg and connecting leg of clip members 15 snugly engage corresponding surfaces of recesses 6, as illustrated in FIGURE 3. The portions of top section 11 on each side of spring contact element 13 engage the top recessed ends of walls 8 so that top section 11 is flush with the top surface of the housing member. The portion of spring contact element 13 connected to top

section 11 extends slightly outwardly from top section 11 and is disposed adjacent one of beveled surfaces 9, as illustrated in FIGURE 4. Cap member 4 is then placed into engagement with the top surface of housing member 2 and screws 19 are extended through holes 17 into engagement with corresponding holes 7 and upon screwing same thereinto, they perform a self-threading function within respective holes 7 in order to secure cap member 4 onto housing member 2, as illustrated in FIGURES 1 and 4.

As can be discerned from FIGURE 3, the free ends of clip members 15 extending toward side sections 12 are slightly bent in a downward direction. Insulated wires 21 having part of the insulation stripped from the ends thereof to expose the wires are inserted through openings 18 and the ends of the wires coming into contact with the free legs of clip members 15 bend the same downwardly until the sharp edges of the free ends engage the side surfaces of the wires. The insulated wires are pushed into the conductor-securing means until the insulation of the insulated wires is seated within the counterbored part of openings 18, as illustrated in FIGURE 3. Thus, the free ends of the conductor-securing means resiliently grip the wires and press them against sidewalls 12 with the aid of the surfaces of the recesses opposite walls 8 thereby providing an excellent mechanical and electrical connection between the wires and the conductor-securing means so that the wires and the connector assembly can withstand a high pull-out or pull-off pressure either on the wires, the assembly or both.

The sharp edges of the free ends of the clip members exert via the clip members and the surfaces of the recesses in engagement therewith sufficient pressure on the wires to secure them within the conductor-securing means. With the insulation of wires 21 seated within the counter-bores of openings 18 and with cap member 4 secured onto mounting member 2 via screws 19, the connector assembly is splashproof, shockproof and maintainable. Maintenance of the above-described assembly after wires 21 are secured therein is accomplished by removing screws 19, then wires 21, cap member 4 and contact member 3 are removed from housing member 2 whereupon wires 21 can be readily removed from the conductor-securing means of the contact member. The housing member and cap member are easily moldable by standard molding techniques.

Holes 7 may extend about half the distance of housing member 2 and other holes can be disposed in the bottom surface of mounting member 2 in alignment with holes 7 to receive screws disposed in heating panel HP. Another arrangement could be the extension of holes 7 through housing member 2 in order to have screws 19 extend through the heating panel HP. These alternative arrangements could be used instead of gluing or bonding the housing member onto the heating panel. In the first alternative arrangement, the housing member could be secured onto the heating panel and the contact member may be replaced without disturbing the housing member. If the contact member is to be removed from the housing member, the blade of a screw driver or similar tool member may be inserted along beveled surface 9 and top section 11 of the contact member in order to aid in the removal of the contact member from housing member 2. Strain means may be mounted on cap member 4 adjacent openings 18 for engagement with the insulation of wires 21 to assist in securing wires 21 within the connector assembly. It is to be noted that only one conductor-securing means may be connected to top section 11. Also, while both conductor-securing means have been disclosed as receiving the wires, only one wire may be disposed within the connector assembly.

While the present invention has been disclosed in connection with a heating panel, it is to be understood

that the connector assembly may be used in conjunction with electrical termination of a conductor member disposed on any suitable mounting member which comes within the purview of the principles of the present invention.

Thus, as can be discerned, there has been disclosed a unique connector assembly for use on heating panels, or the like, in order to provide electrical termination to the conductive members thereof.

It will, therefore, be appreciated that the aforementioned and other desirable objects have been achieved; however, it should be emphasized that the particular embodiment of the invention, which is shown and described herein, is intended as merely illustrative and not as restrictive of the invention.

What is claimed is:

1. An electrical connector comprising a housing member of dielectric material having an opening extending therethrough and recess means disposed adjacent said opening, contact means for disposition in said housing member and having a spring contact element to be disposed in said opening and conductor-securing means to be disposed in said recess means; said spring contact element having a contact section for extending outwardly from said opening for resilient engagement with a conductive member on a panel member; means for securing said housing member on said panel member; said conductor-securing means having a side section extending along a wall of said recess means, a clip member connected to said side section and having a portion extending along another wall of said recess means opposite said first-mentioned wall and a free end adjacent said side section; and a cap member adapted to be secured on said housing member over said contact means, said cap member having opening means for communication with said recess means through which wire means can pass and extend into said conductor-securing means with said free end via said portion and other wall resiliently gripping said wire means to secure same in said conductor-securing means.

2. An electrical connector according to claim 1 wherein said spring contact element is accordion pleated.

3. An electrical connector according to claim 1 wherein said opening means in said cap member is counterbored for reception of insulation on said wire means.

4. An electrical connector according to claim 1 wherein said free end has ribs to increase the rigidity thereof.

5. An electrical connector assembly comprising dielectric housing means unitable on a panel member juxtaposed a conductive member thereon, said housing means having an opening extending therethrough in alignment with said conductive member and recesses on each side of said opening, contact means in said housing means and having a spring contact element disposed in said opening and conductor-securing means in respective recesses, said spring contact element having a contact-engaging section extending outwardly from said opening for resilient electrical engagement with said conductive member, said conductor-securing means being juxtaposed with respect to said spring contact element, each conductor-securing means having a side section and a clip member engaging corresponding surfaces of the recess, said clip member having a free end directed toward said side section and terminating adjacent thereto, and cap means secured on said housing means and having openings in communication with respective recesses for receiving therethrough wire means for disposition in said conductor-securing means between the side sections and free ends thereof to secure said wire means therein.

6. An electrical connector assembly according to claim 5 wherein said openings are counterbored to receive insulation of said wire means therein.

7. An electrical connector assembly according to claim 5 wherein said spring contact element is accordion-pleated and is disposed substantially parallel to said conductor-securing means.

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8. An electrical connector comprising a housing member having an opening therethrough and a recess adjacent said opening, a contact member having a spring contact element in said opening including a contact-engaging section extending outwardly beyond said opening and a conductor-securing means in said recess including a side section and clip member having a free end terminating adjacent said side section, and a cap member secured on said housing member and having a hole in communication with said recess.

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9. An electrical connector as claimed in claim 8 wherein said spring contact element is accordion-pleated and said contact-engaging section is semi-circular.

References Cited by the Examiner**UNITED STATES PATENTS**

3,018,461	1/62	Smith	-----	339—95
3,093,433	6/63	Ege	-----	339—95

10 JOSEPH D. SEERS, *Primary Examiner*.