

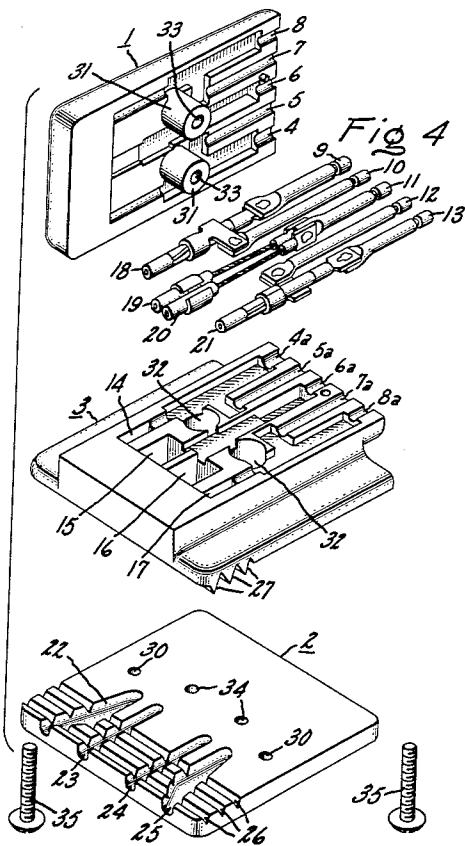
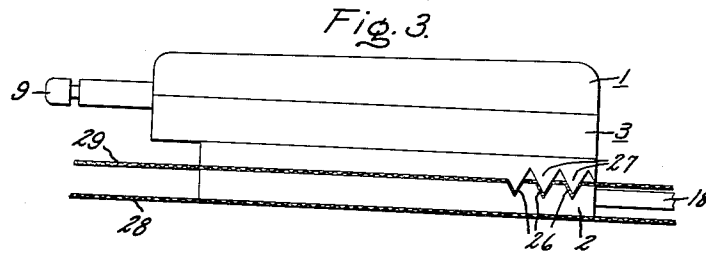
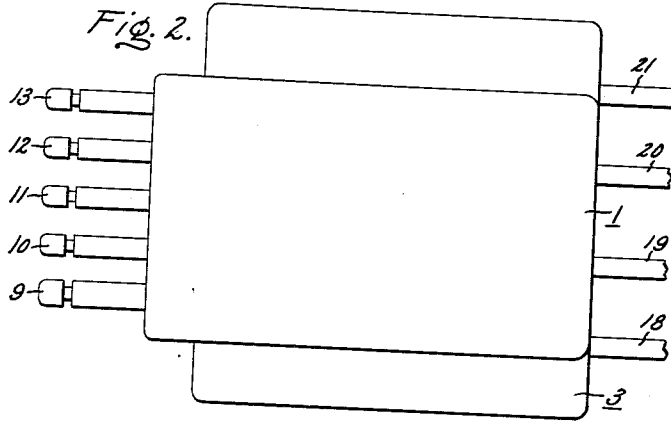
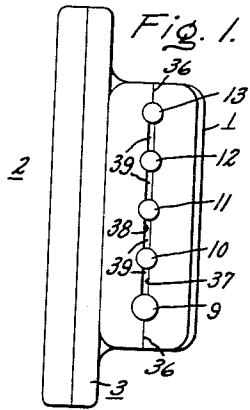
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COMBINED PLUG AND STRAIN RELIEF STRUCTURE

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COMBINED PLUG AND STRAIN RELIEF STRUCTURE

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terminals. These two parts are further arranged so as to provide gaps adjacent the projecting terminal pins so that any water collecting in the plug during the washing of the blanket drains freely therefrom. Two of the parts include cooperating hollow locating pins and recesses for assembling the two parts in proper relationship, the passage or recess in the locating pins being employed for receiving fastening devices to connect all three elements in assembling relationship.

10 For a better understanding of this invention reference may be made to the accompanying drawing in which Fig. 1 is an end view of a plug structure incorporating an embodiment of this invention.

Fig. 2 is a top view of the plug structure.

Fig. 3 is a side view of the plug structure showing the structure mounted on a portion of a blanket fabric.

Fig. 4 is an exploded view of the plug structure.

Referring to the drawing there is shown a multi-element plug structure including a top molded plastic member 1, a bottom molded plastic member 2 and an intermediate molded plastic member 3. The upper and intermediate members 1 and 3 respectively are molded on the cooperating faces thereof to provide a plurality of registering grooves 4, 5, 6, 7 and 8 for receiving the terminals 9, 10, 11, 12 and 13 of the plug structure.

The intermediate member 3 includes a plurality of passages 14, 15, 16 and 17 through which the wires 18, 19, 20 and 21, respectively connected to the plug terminals, pass to a location between the intermediate member 3 and the lower member 2.

The lower member 2 is provided with a plurality of grooves 22, 23, 24 and 25 for receiving the wires 18, 19, 20 and 21 respectively. In order to provide a strain relief for these wires, the lower element 2 includes a plurality of serrations 26 extending transversely of the aforementioned grooves 22, 23, 24 and 25. The cooperating intermediate element 3 includes a corresponding plurality of serrations 27 extending transversely of the bottom surface of the intermediate member and adapted, in the assembled position of the plug element, to be received within corresponding serrations 26 and the lower element. In the assembled position of the plug, the lower edges of the serrations 27 on the intermediate member exert a pressure on the wires extending through the grooves 22, 23, 24 and 25 and thereby provide frictional resistance to movement of the wires so that an adequate strain relief is secured.

In the past it has frequently been the practice to sew the plug structure to the fabric of the electric blanket. This, of course, required a specific stitching operation for this purpose. Moreover, it was necessary to make the plug structure or at least a flange portion thereof of a material which could be suitably sewed. In the present invention the molded elements 1, 2 and 3 are preferably formed from an acrylonitrile copolymer or similar plastic material which in its final molded state provides a hard rigid structure not suitable for sewing. In accordance with this invention the operation of sewing is eliminated and the greater flexibility in the use of materials for the plug structure is achieved by mounting the plug in a simple manner in engagement with the blanket fabric. Specifically the lower element 2 of the plug structure is mounted between two plies of the blanket fabric 28 and 29. The upper surface of the member 2 is positioned directly adjacent the bottom surface of the blanket ply 29. The intermediate member 3 is placed directly adjacent the upper surface of this blanket ply 29. It can be seen, particularly by reference to Fig. 3 that the blanket fabric 29 is firmly gripped by the cooperating serrations 26 and 27 of the members 2 and 3 respectively when the elements of the plug structure are in their assembled relationship. The plug is thereby held firmly in

This application relates to a combined plug and strain relief structure and more particularly to such a structure adapted for use with electric blankets and the like.

Plugs for use with electric blankets and the like must fulfill a number of requirements, all of which are fully provided for in this combined plug and strain relief structure. For example, in order to minimize the pull exerted on the wires of the blanket and the terminals thereof even under the hard usage which must in some cases be contemplated, it is desirable to provide some effective form of strain relief. In order to prevent relative movement of the blanket and the plug with the possible deleterious effect on the internal wiring, it is desirable to fasten the plug structure in some manner to the blanket. This has usually been done in the past by some means such as sewing the plug directly to the blanket fabric. This, of course, necessitated making the plug of some material which could be easily sewed, and also necessitated a separate stitching operation. In the plug structure of the present invention, the blanket fabric is easily and conveniently and firmly gripped during the assembly of the component parts of the plug structure. Also it is necessary from time to time to wash electric blankets with the attendant possibility that water may seep into the internal portions of the plug structure. The plug in the present invention is so constructed that any water which may collect in the interior of the plug during the washing operation drains easily and completely therefrom.

It is an object of this invention to provide an improved plug structure.

It is another object of this invention to provide an improved plug structure including improved strain relief.

It is a further object of this invention to provide an improved structure including an improved arrangement for securing the plug to a blanket or other fabric.

It is still another object of this invention to provide an improved multi-element plug structure including an improved arrangement for locating the several parts relative to each other and securing them in assembled relationship.

It is still a further object of this invention to provide an improved plug structure especially adapted for use with electric blankets and the like which is constructed to facilitate drainage of water from the interior thereof.

Further objects and advantages of this invention will become apparent as the following description proceeds and the features of novelty which characterize this invention will be pointed out with particularity in the claims annexed to and forming part of this specification.

In carrying out the objects of this invention in one form thereof, a plug structure is formed from three cooperating molded parts. Two of the parts are adapted to be received on opposite sides of one ply of the blanket or other fabric and include cooperating serrations for both engaging the fabric and providing strain relief for wires extending through grooves transversely of the serrations. One of these parts and the third element of the plug structure include cooperating grooves for receiving the plug

3 engagement with the blanket fabric preventing any movement of the plug relative to the wires arranged internally of the blanket fabric and this is done without the necessity of actually stitching the plug onto the blanket fabric. While in the form of invention illustrated the serrations 26 and 27 extend over only a portion of the surface of the members 2 and 3, it will be apparent that for more complete gripping of the blanket fabric these serrations could be arranged to cover a greater portion or the entire surface of the members 2 and 3.

In order to assemble the parts in proper relationship the lower element 2 includes two outer openings 30 within which are received two depending members or pins (not shown) molded integrally with the intermediate member 3. These pins and the cooperating openings 30 insure the assembling of the members 2 and 3 in proper relationship. In order to assemble the members 1 and 3 in proper relationship and further to facilitate the complete assembly of all three elements in the final plug structure, the upper member 1 is formed to include two hollow or recessed locating pins 31 and the intermediate member 3 is correspondingly formed to include two cooperating recesses or passages 32 extending therethrough. In the assembled relation of the parts 1 and 3, the pins 31 are snugly received within the recesses or openings 32 thereby fixing these two parts, and also fixing, of course, the terminals 9, 10, 11, 12 and 13 and their associated elements in proper cooperating grooves 4, 5, 6, 7 and 8 and 4a, 5a, 6a, 7a and 8a in the members 1 and 3.

For facilitating the final assembly of the members 1, 2 and 3 into the completed plug structure, the locating pins 31 are specifically made hollow, as indicated above, that is each is provided with a passage 33 extending therethrough or with a recess therein. In the form of invention illustrated, each of the locating pins 31 includes a recess extending upwardly from the bottom end thereof. Because of the fixed relationship of the members 2 and 3 by means of the pins and openings 30 previously referred to, the recesses 33 are directly in line with openings 34 provided in the bottom member 2. Thus the locating pins 31 serve not only to fix the members 1 and 3 in proper relationship but they also provide passages or recesses for receiving fastening members to complete the assembly of all three members of the plug structure.

In the form of invention shown in Fig. 4 the fastening devices are in the form of self-threading screws adapted to be received in threaded engagement with the recesses 33 in the member 1. Access to the screw heads can be easily obtained by reaching between the plies 28 and 29 of the blanket before the binding is placed on the ends of the blanket. While recesses 33 have been described above, it will be apparent that passages extending completely through the locating pins 31 could be employed. Also, other fastening devices could be utilized in place of the screws 35; for example, where passages extending completely through the pins 31 are employed, rivets extending through these passages could be used.

It will be apparent, of course, that from time to time it is desirable to wash electric blankets or other electric bed covers. The plug structure, for reasons discussed above, is firmly fixed in engagement with the blanket fabric, and it is undesirable to remove the plug, which would effect a substantial disassembly of the blanket wiring elements, for the washing operation. Accordingly the blanket, including the plug, is usually subjected to the washing operation. It is possible for water to seep into the interior of a plug under such circumstances and to be trapped therein. In order to avoid the disadvantages of such water seepage, the plug structure of the present invention is formed as best shown in Fig. 1 to provide specifically large gaps adjacent the terminals 9, 10, 11, 12 and 13 extending into the interior of the plug structure. Thus, as shown in Fig. 1 the portions of the

plug members 1 and 3 between the terminals 9 and 13 at the terminal end of the plug are made somewhat thinner than the outer portions of these plug members. The members 1 and 3 firmly engage each other along the cooperating outer surfaces or perimeters 36, but the surfaces 37 and 38 of the members 1 and 3 respectively are spaced a substantial distance from each other in the regions between adjacent terminals. This construction provides passages 39 of substantial size in these regions so that any water which may collect within the interior of the plug during the washing operation easily and automatically drains therefrom through these passages 39. Hence no water is trapped within the plug structure.

While some of the features of this invention have been described by particular reference to bed covers, it will be apparent that the invention in these respects is equally applicable to other devices in which wiring and a plug is used in association with some fabric.

While a specific embodiment of this invention has been shown and described, it is not desired that the invention be limited to the particular construction shown and described and it is intended by the appended claims to cover all modifications within the spirit and scope of this invention.

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

1. A multi-element plug comprising a top molded plastic member, a bottom molded plastic member and an intermediate molded plastic member, said top and intermediate members having cooperating recesses for receiving terminals of the plug, said intermediate member including passages therethrough for receiving wires extending to said terminals, two of said members including cooperating locating pins and recesses respectively for holding said members in proper assembled relationship, said pins including recesses therein, the third of said members including openings adapted to register with said pin recesses, and fastening means extending through said openings and into said pin recesses for holding all three members in assembled relationship.

2. A multi-element plug comprising a top molded plastic member, a bottom molded plastic member and an intermediate molded plastic member, said top and intermediate members having cooperating recesses for receiving terminals of the plug, said intermediate member including passages therethrough for receiving wires extending to said terminals, said top member including a plurality of depending locating pins, said intermediate member including corresponding recesses for receiving said pins to hold said members in proper assembled relationship, said pins including recesses therein, said bottom member including openings adapted to register with said pin recesses, and fastening means extending through said openings and into said pin recesses for holding all three members in assembled relationship.

3. The combination of claim 1 wherein said bottom member includes passages on the interior surface for receiving said wires and wherein said intermediate member and said bottom member include cooperating serrations extending transversely of said passages whereby when said intermediate member and said bottom member are in assembled relationship, said serrations on said intermediate member engage said wires to provide strain relief.

4. A plug structure adapted for use with a fabric and associated wiring comprising a top molded plastic member, a bottom molded plastic member, and an intermediate molded plastic member, said bottom and said intermediate member including serrations extending transversely along the cooperating surfaces thereof, at least one ply of said blanket being received between said bottom member and said intermediate member and being engaged by said cooperating serrations, and means for fastening said members in assembled relationship whereby said blanket ply is firmly gripped by said cooperating serrations.

5. A plug structure adapted for use with a fabric and

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associated wiring comprising a top molded plastic member, a bottom molded plastic member, and an intermediate molded plastic member, said top and intermediate members having cooperating recesses for receiving terminals of the plug, said intermediate member including passages therethrough for receiving wires extending to said terminals, said bottom member including passages on the interior surface thereof for receiving said wires, said bottom member and said intermediate member including cooperating serrations extending transversely of said passages, at least one ply of said blanket being received between said bottom member and said intermediate member, said cooperating serrations gripping said blanket ply therebetween, said serrations on said intermediate member further engaging said wires to provide strain relief, and means for fastening said members in assembled relationship whereby said blanket is gripped by said cooperating serrations and said serrations on said intermediate member are held in firm engagement with said wires.

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6. A plug structure adapted for use with a washable fabric comprising a top molded plastic member, a bottom molded plastic member, and an intermediate molded plastic member, said top member and said intermediate member including cooperating recesses for receiving plug terminals, means for holding said members in assembled relationship, said top member and said intermediate member engaging each other along a surface extending along the perimeter thereof, the facing surfaces of said top member and said intermediate member at the end adjacent said plug terminals being spaced from each other in the regions between adjacent terminals to provide gaps for drainage therethrough of any water collecting in the interior of the plug when the fabric is washed.

No references cited.