

[54] **ELECTRICAL SWITCH CONSTRUCTION AND END PLUG THEREFOR OR THE LIKE**

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[52] U.S. Cl. **337/407, 337/408**
 [51] Int. Cl. **H01h 37/76**
 [58] Field of Search..... 337/108, 407, 408, 337/403, 168

[56] **References Cited**
UNITED STATES PATENTS

3,519,972	7/1970	Merrill.....	337/407
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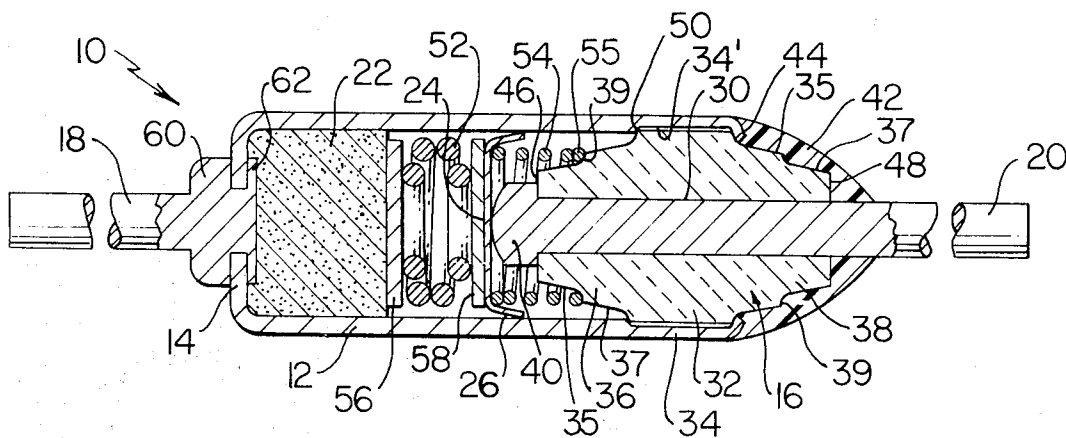
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[57] **ABSTRACT**

An end plug for a switch construction, the plug having

two identical inward and outward extensions extending from a large central portion so as to be usable in a like manner regardless of which extension is the inward or outward thereof in its assembled relation with the switch casing whereby the inward extension is adapted to provide a locating means for a spring inside the switch casing and the outward extension is adapted to provide means for spacing an exposed part of one of the switch conductors from the casing a predetermined distance. Each of the extensions of the plug has an axial length at least substantially the same as the axial length of the central portion thereof. Each of the extensions of the plug of one embodiment has a locating means intermediate its ends whereby the locating means on the inward extension is adapted to provide locating means for positioning one end of the internal spring in the switch casing and the locating means on the outward extension is adapted to provide means for mechanically locking an adhesive thereto that secures the casing to the exposed portion of the conductor. whereas in another embodiment each of the extensions of the plug has a smooth frusto-conical configuration.

12 Claims, 9 Drawing Figures



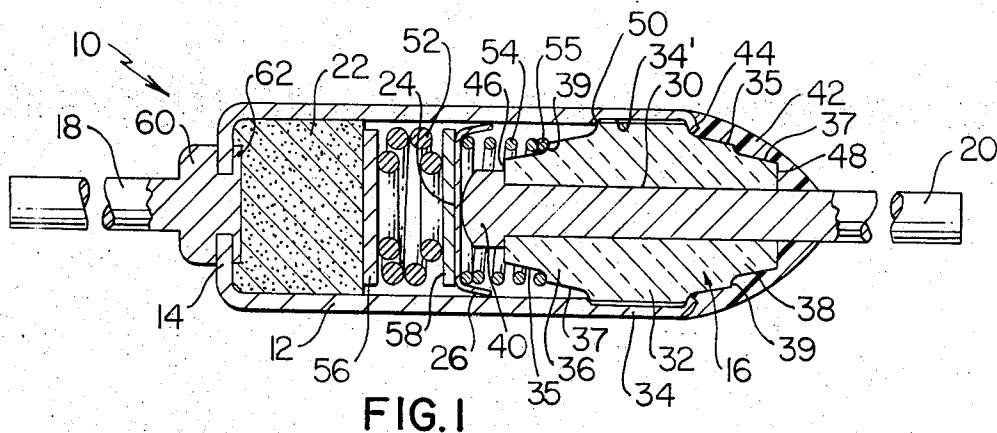


FIG. 1

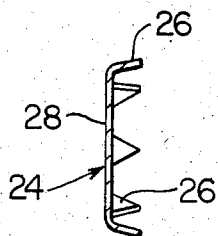


FIG. 4

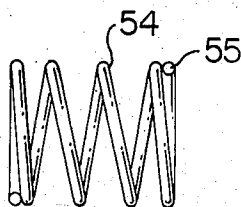


FIG. 3

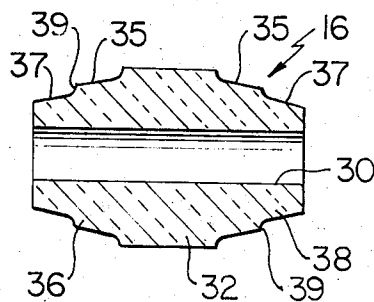


FIG. 2

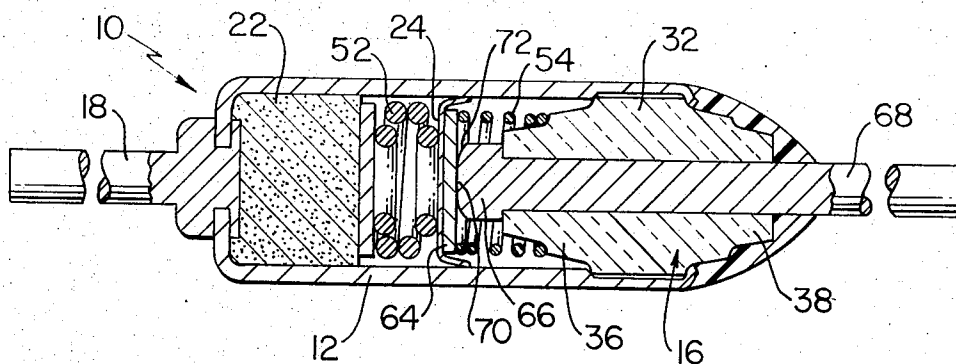


FIG. 5

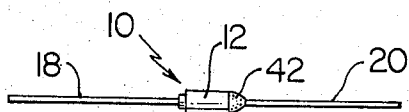
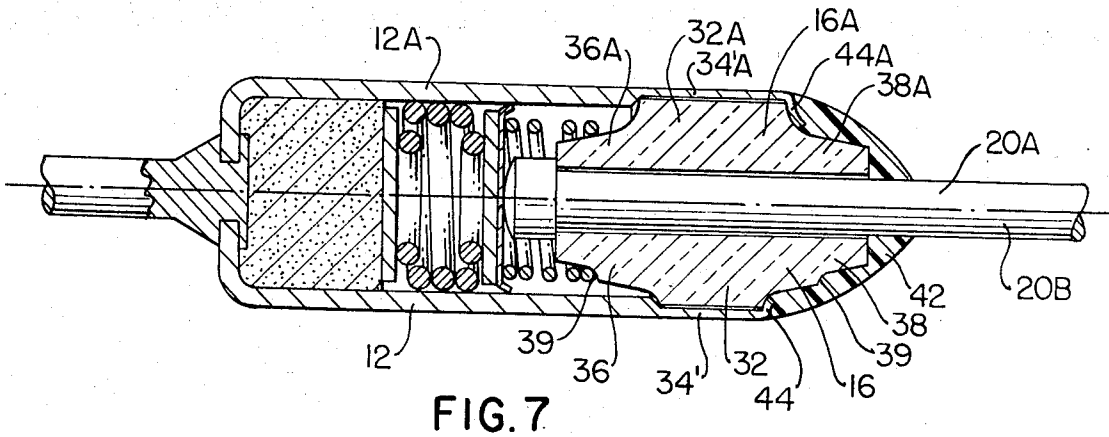
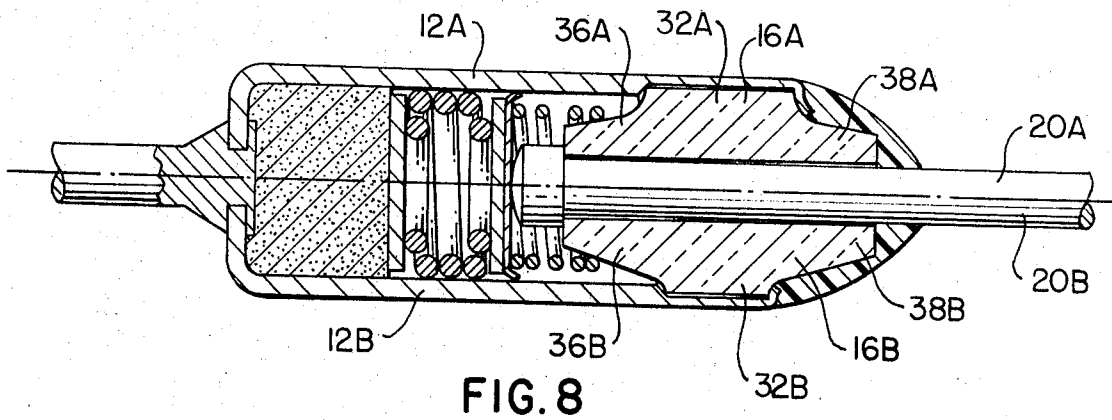
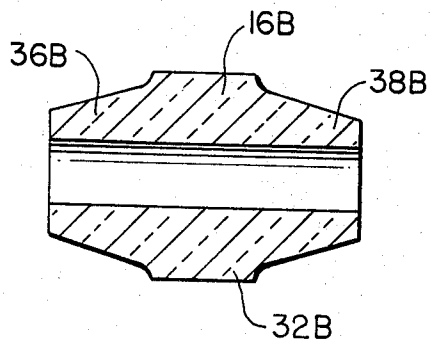


FIG. 6

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ELECTRICAL SWITCH CONSTRUCTION AND END PLUG THEREFOR OR THE LIKE

BACKGROUND OF THE INVENTION

It is well known from applicant's U. S. Pat. No. 3,519,972 that an insulating end plug can be provided for an electrical switch casing for closing the same and for carrying one of the conductors of the electrical switch, such end plug having like inward and outward extensions so as to be usable in a like manner regardless of which extension is the inward or outward thereof in its assembled relation with the switch casing whereby an orientation problem is eliminated in the automatic assembling of the end plug in the switch casing.

SUMMARY

This invention provides an improved switch construction of the above type, as well as an improved end plug for such a switch construction or the like.

It has been found, according to the teachings of this invention, that if the large central portion of the end plug for the aforementioned switch construction is reduced in axial length while the axial length of each of the extensions is increased even though the overall axial length of the plug remains the same, not only will it be easier to counterbore the switch casing to receive the end plug of this invention, but also the exposed portion of the conductor passing through the plug of this invention will be spaced a predetermined distance from the outer casing by the plug extension with greater accuracy so as to meet all electrical code requirements that were met in the past solely by extending the epoxy or adhesive means beyond the plug extension for this purpose.

It has been found, according to the teaching of this invention, that one embodiment of the end plug for such a switch construction can be utilized for providing positive locating means for an internal spring of the switch construction and that such locating means can be provided on the inward and outward extensions of the end plug in a like manner so that the end plug can be usable in any assembled relation with the switch casing. In this manner, the locating means that is provided on the outward extension of the end plug will provide means to mechanically lock the sealing adhesive utilized for securing the switch construction together in a manner hereinafter set forth.

However, in another embodiment of the plug of this invention, each of the extensions can have a smooth frustoconical configuration as the end plug of U.S. Pat. No. 3,519,972.

Thus, the unique feature of having like extensions on the end plug still remains a feature of this invention while having the additional feature of providing an improved end plug over the end plug disclosed in the aforementioned U.S. Pat. to Merrill, No. 3,519,972.

Accordingly, the switch construction of this invention has an open ended casing provided with two conductors and means for normally maintaining one electrical relationship between the conductors and for providing another electrical relationship between the conductors upon the occurrence of a certain event. The switch construction has a rigid insulating plug closing the open end of the casing and having a central opening passing therethrough and through which one of the conductors is received so as to extend outwardly from the casing and inwardly into the casing for its switching

function. The plug has two identical inward and outward extensions extending from a large central portion thereof so as to be usable in a like manner regardless of which extension is the inward or outward thereof in its assembled relation with the casing whereby the inward extension provides a locating means for a spring inside the casing and the outward extension provides means for spacing the exposed part of the one conductor from the casing a predetermined distance. Each of the extensions of the plug has an axial length at least substantially the same as the axial length of the central portion of the plug. Each of the extensions of one embodiment of the plug has a locating means intermediate its ends, the locating means of the inward extension providing positive locating means for positioning one end of the internal spring in the casing and the locating means on the outward extension providing means for mechanically locking an adhesive thereto that secures the casing to the exposed portion of the conductor extending from the plug. Each of the extensions of another embodiment of the plug has a smooth frustoconical configuration.

Accordingly, it is an object of this invention to provide an improved switch construction having one or more of the novel features of this invention as set forth above or hereinafter shown or described.

Another object of this invention is to provide an improved end plug for such a switch construction or the like.

Other objects, uses and advantages of this invention are apparent from a reading of this description which proceeds with reference to the accompanying drawings showing a part thereof and wherein:

FIG. 1 is a longitudinal cross section of one embodiment of the invention.

FIG. 2 is a cross section of the insulating end plug of this invention for the switch construction of FIG. 1.

FIG. 3 is an elevation of the relatively weak spring of the switch construction of FIG. 1.

FIG. 4 is a cross section of an electrically conductive slidable member of the switch construction of FIG. 1.

FIG. 5 is a longitudinal cross section of another embodiment of the invention.

FIG. 6 is an elevation of the completed switch of all the embodiments of this invention, the switch being drawn substantially to the same scale and size as the actual switch construction.

FIG. 7 is a longitudinal cross section of the switch construction of FIG. 1 with the bottom half of such view illustrating the end plug of this invention and the upper half of the view illustrating the end plug of U.S. Pat. No. 3,519,972.

FIG. 8 is a longitudinal cross-sectional view similar to FIG. 7 except that the bottom half of such view illustrates another embodiment of the end plug of this invention.

FIG. 9 is a cross-sectional view of the end plug of the switch construction of FIG. 8.

Referring now to FIGS. 1-4, one embodiment of the switch construction of this invention is generally indicated by the reference numeral 10 and comprises a cylindrical, tubular, electrically and thermally conductive casing 12 having closures 14 and 16 at each end thereof. The closure or plug 16 is formed of electrically non-conductive material, such as ceramic or the like.

A first conductor 18 conductively contacts the casing 12 at the integral closure 14 thereof. A second conduc-

tor 20 extends into the casing 12 through the electrically non-conductive and closure or plug 16. A normally solid fuseable pellet 22 is spring-biased to exert outward pressure against the closure 14.

An electrically conductive member 24 is slidably mounted within the casing 12. The member 24 has a slidable, resilient, peripheral conductive engagement with the conductive casing 12 by the outwardly extending resilient integral teeth 26 thereof which outwardly press against the inner surface of the casing 12. The member 24 also has a conductive central portion 28 in conductive flow condition with the second electrical conductor 20 in one position of the member 24 and out of electrical flow condition with the second electrical conductor 20 in another position of the member 24.

A compression spring construction outside of the pellet 22 is held under compression between the member 24 and the casing 12 to change the electrical flow condition between the casing 12 and the electrical conductor 20 upon collapse of the pellet 22 by leftward movement of the conductor member 24 away from the electrical contact with the conductor 20.

The end closure or plug 16 has a central opening 30 passing longitudinally therethrough and surrounding the second conductor 20. The plug 16 is secured in the conductive casing 12 at the right casing end thereof by a large diameter, cylindrical, main body or central portion 32 of the plug 16 engaging the inside surface 34' of the conductive casing 12.

The plug 16 has two identical smaller diameter inward and outward plug extensions 36 and 38 extending from opposite sides of the central portion 32 thereof with the outward plug extension 38 extending out of one end of the conductive casing 12 and with the inward extension 38 extending into the conductive casing 12 and engaging a conductor arresting means, such as the conductor head means 40 at the inner end of the second conductor 20.

A sealing compound or adhesive means 42 surrounds a portion of the outward plug extension 38, a portion of the second conductor 20 adjacent the outward plug extension 38, and is sealed against the right-hand end of the casing 12 at an inward flange 44 thereof, not only to secure the conductor 20 to the casing 12 but also to provide a non-conductive spacing between the casing 12 and the exposed portion of the conductor 20 of at least a predetermined amount. Such inward flange 44 holds the main plug body 32 and the outward plug extension 38 from outward movement.

The identical plug extensions 36 and 38 have identical gradually decreasing surface diameters as shown in FIGS. 1, 2 and 5 and such extensions also have flat transverse end surfaces 46 and 48 with the flat surface 46 engaging and holding the head means 40 of the conductor 20 to prevent outward movement of the second conductor 20 out of the casing 12 and plug 16.

The casing 12 has a thinner wall portion 34 or counterbore at the right end of the conductive casing 12 with inward casing flanges 44 and 50 at each end of the thin wall portion 34. The thin wall portion 34 holds the main body 32 of the plug 16 and the inward casing flanges 44 and 50 hold the plug extensions 36 and 38 from longitudinal movement.

As illustrated in FIGS. 1, 2 and 5, the plug 16 of this invention has each of the extensions 36 and 38 thereof defined by two frusto-conical parts 35 and 37 joined together at the junction thereof by an outwardly di-

rected annular edge 39 which defines an outwardly directed locating means of this invention on the particular extension 36 and 38 for a purpose hereinafter described. It can be seen that each annular locating means 39 is arcuate in any axial cross section of the part 16.

The compression spring construction includes a relatively strong compression spring 52 between the pellet 22 and the electrically conductive member 24. Such compression spring construction also includes a relatively weak compression spring 54 between the plug 16 and the electrically conductive member 24. As long as the pellet 22 does not collapse, the strong spring 52 holds the slidable conductive member 24 against the head 40 of the conductor 20 so that there is an electrical flow condition between the second conductor 20 in the casing 12, and, thus, to the first conductor 18. However, when the pellet 22 collapses, the material of such pellet 22 substantially instantaneously becomes fluid and flows around a disc means 56 and allows the strong spring 52 to extend toward closure 14 so that its spring load becomes less than the spring load of the relatively weak spring 54. This permits such weak spring 54 to move the conductive member 24 away from the conductor head 40 so that the conductive member 24 moves out of electrical flow condition with respect to the second electrical conductor 20 and this breaks the electrical flow condition between the conductors 20 and 18 to stop the flow of current therethrough.

The disc means 56 is a spring load distributing disc, is of less diameter than the adjacent inner surface of casing 12 and is adjacent one end of the strong spring 52. The strong spring 52 may have another spring means distributing disc means 58 adjacent its other spring end. The disc means 58 is less diameter than the adjacent inner surface of casing 12. In this manner, the disc means 56 and 58 distribute the spring load of spring 52 against the pellet 22 and against the central part 28 of slidable member 24. The discs 56 and 58 may be flat-sided metal or conductive discs and thus effectively distribute the spring load.

The first electrical conductor 18 is secured to the integral conductive end wall closure 14 by the flange means 60 and 62. The pellet 22 may be adjacent or near the integral conductive end wall 14 as illustrated.

The disc means 58 is adjacent one of the spring ends of the relatively weak spring 54 but on the left side 28 of slidable member 24 and distributes the spring load of such weak spring 54 by backing up the central portion 28 of the slidable member to prevent bulging of such central portion 28 as may be seen in FIG. 1.

It can be seen that when the extension 36 of the plug 16 is disposed inside the casing 12 as illustrated in FIG. 1, the right-hand end 55 of the weak spring 54 nests against the locating means 39 of the extension 36 so as to provide a positive location for the right-hand end 55 of the spring 54. In contrast, such right-hand end of the spring 55 would tend to slide up the smooth frusto-conical plug extension of the plug of the aforementioned U.S. Pat. No. 3,519,972 and thus does not remain substantially cylindrical throughout its entire length in its assembled relation in the switch construction 10.

When the epoxy resin or other adhesive means 42 is utilized to secure the casing 12 around the plug extension 38 and to an exposed portion of the conductor 20 as illustrated in FIG. 1, such epoxy or compound 42

fills into the annular recesses defined by the locating means 39 on the outward extension 38 as illustrated to mechanically lock such compound 42 to the plug extension 38 when such compound hardens to thereby provide greater surface area and locking between the compound 42 and the plug extension 38 than when the plug extension 38 is merely a straight and smooth frusto-conical extension as provided in the aforementioned U. S. Pat. No. 3,519,972.

Thus, the locating means 39 on the extensions 36 and 38 respectively provide the dual function of locating the right-hand end 55 of the spring 54 as well as mechanically locking the compound 42 in place regardless of which extension 36 or 38 extends into the casing 12 or out of the same whereby automatic machinery can still be utilized to assemble the end plug 16 into the casing 12 during the assembling operation of the switch constriction 10 of this invention.

In the operation of the embodiment of FIGS. 1-4, opposite power lines are connected respectively to conductors 18 and 20 whereby the normal condition of the switch 10 is as illustrated in FIG. 1 whereby electrical conductivity is provided between such conductors 18 and 20. The parts of the switch 10 remain in conductive condition and in the position illustrated in FIG. 1 as long as the casing 12 remains at a temperature below the collapse temperature of the pellet 22. However, when the temperature adjacent the pellet 22 reaches the collapse temperature, the pellet 22 collapses and becomes fluid or otherwise movable past disc 56.

Thus, the left end of the strong spring 52 moves leftward enough to reduce its spring load below that of weak spring 54. This permits the spring 54 to move the movable member 24 leftwardly away from head 40 and thus break the electrical conductivity condition between the conductors 18 and 20.

FIG. 5 shows another embodiment somewhat similar to the embodiment of FIG. 1. However, the disc means 64 of FIG. 5 is placed adjacent the conductor head means 66 of the second conductor 68. Otherwise all of the parts of FIG. 5 are identical with the corresponding parts of FIG. 1 and therefore such parts need not again be completely described in connection with FIG. 5.

The head 66 in FIG. 5 has a substantially flat portion 70 with a rounded edge 72. This permits the flat portion 70 to provide a relatively large surface and good electrical conductivity between the second conductor 68, disc means 64, slidable member 24 and the casing 12. At the same time, the disc 64 provides substantially the same movement distributing characteristics as the disc 58 in FIG. 1 for both of the springs 52 and 54.

The head 40 of FIG. 1 may be somewhat or almost continuously rounded to provide a good conductive contact between the head 40 and the flat portion 28 of the slidable conductor member 24. The head 66 of FIG. 5 is made of good electrical conductive metal and has an extensive flat surface contact at the flat surface 70 with the flat sided good conductor disc means 64. This provides a very good conductive contact between head 66 and slidable conductor member 24 which is better than the corresponding parts in FIG. 1. The small rounded edges 72 of head 66 are sufficient to prevent arcing when the head 66 and disc 64 are separated. When the flat surfaces of head 66 and disc 64 are separated, such flat surfaces therefore have greater interruption capacity because of such flat surfaces and

small rounded edges than corresponding parts of FIG. 1.

Therefore, the embodiment of FIG. 5 has a better electrical conductivity and also has greater interruption capacity of resistive loads than the embodiment of FIG. 1.

All of the other parts of FIG. 5 may be substantially the same in structure and function as the corresponding parts of FIG. 1 and it is therefore believed unnecessary to repeat the description thereof.

As previously stated, one of the advantages of the improved end plug of this invention over the end plug set forth in applicant's U. S. Pat. No. 3,519,972, is that the large central portion 32 of the end plug 16 of this invention is reduced in axial length over the axial length of the like part thereof in the aforementioned United States patent while the axial length of each of the extensions 36 and 38 of the end plug of this invention is increased even though the overall axial length of the plug 16 remains the same not only for the purpose of making it easier to counter-bore the thin walled portion 34' of the switch casing 12 in order to receive and secure the end plug 16 of this invention in place, but also to make sure, in a more accurate manner, that the exposed portion of the conductor 20 passing through the end plug 16 of this invention will be spaced a predetermined distance from the outer casing 12 at the flange 44 thereof by electrically insulating material so as to meet all electrical code requirements for such spacing that were met in the electrical switch construction of the aforementioned patent application solely by making sure that the securing epoxy or adhesive means extended beyond the plug extension and along the conductor a certain amount for this purpose.

Thus, reference is now made to FIG. 7 wherein an axial cross-sectional view of the prior art switch construction of applicant's aforementioned U.S. patent is illustrated in the upper half thereof while the switch construction 10 of this invention as illustrated in FIG. 1 is provided in the bottom half of FIG. 7 in order to fully illustrate the aforementioned features whereby parts of the prior art switch construction similar to the parts of the switch construction 10 of this invention are indicated by like reference numerals and followed by the reference letter "A"

As illustrated in FIG. 7, it can be seen that the central part 32 of the end plug 16 of this invention has its axial length reduced from the axial length of the corresponding part 32A of the previously utilized end plug 16A while the axial length of each of the extensions 36 and 38 is increased over the axial length of the corresponding extension 36A or 38A while the over-all length of the plug 16 of this invention remains the same as the over-all length of the prior plug 16A. In the embodiment of the end plug 16 of this invention, it can be seen that the axial length of each of the extensions 36 and 38 of the end plug 16 of this invention have been increased to at least substantially the same axial length as the axial length of the central portion 32 thereof.

With the central portion 32 of the end plug 16 having a smaller axial length than the axial length of the corresponding parts 32A of the end plug 16A, the length of the counterbore in the casing 12 that forms the thin wall section 34' for receiving the central portion 32 is substantially shorter than the corresponding counterbore 34'A in the prior switch casing 12A. Also, the overall length of the casing 12 is shorter than the casing

12A. Thus, the shorter counterbore 34' is easier and more economical to make than the larger counterbore 34'A, particularly when realizing the relatively small structure and parts that are being formed to produce the switch construction are represented by substantial actual sizing in FIG. 6.

Further, from FIG. 7, it can be seen that the distance that the extension 38 of the end plug 16 provides from the casing flange 44 to the exposed portion of the conductor 20 is a greater distance than the distance provided between the flange 44A of the casing 12A and the exposed portion of the conductor 20A at the extension 38A of the end plug 16A so that the greater length provided by the extension 38 of the end plug 16 of this invention ensures that the spacing between the casing 12 and the conductor 20 will meet all of the electrical code requirements, particularly when the epoxy or adhesive means 42 is disposed in place as illustrated.

While the end plug 16 of this invention as previously described has the advantage of the locating means 39 on the extensions 36 and 38 thereof for the reasons previously described, it is to be understood that the unique feature of a smaller counterbore in the casing 12 and the accuracy in the spacing of the casing 12 from the exposed portion of the conductor 20 provided by the end plug 16 of this invention can still be provided without the use of the locating means 39 on the extensions 36 and 38 if desired.

Therefore, reference is now made to FIGS. 8 and 9 for another embodiment of this invention wherein it can be seen in FIG. 8 that the upper half of the view illustrates the prior switch construction and the end plug therefor as provided by applicant's aforementioned U.S. patent and provides in the lower half thereof another end plug 16B of this invention whereby parts thereof similar to the switch construction 10 previously described are indicated by like reference numerals followed by the reference letter "B".

As illustrated in FIGS. 8 and 9, it can be seen that the extensions 36B and 38B of the end plug 16B of this invention each has a smooth frusto-conical configuration extending from the central portion 32B thereof in much the same manner as the extensions 36A and 38A of the prior end plug 16A except that the length of the extensions 36B and 38B are longer than the extensions 36A and 38A because of the reduced axial length of the central portion 32B for the purposes previously described.

Thus, while the end plug 16B of this invention does not have the locating means 39 of the end plug 16 previously described, the end plug 16B of this invention does have the improved features over the prior known end plug 16A for the reasons previously set forth in regards to the description given in connection with FIG. 7 and as fully illustrated in FIG. 8.

Thus, it can be seen that this invention not only provides an improved switch construction wherein the end closure or plug therefor can be inserted in place with either end extending into the casing and with either end projecting out of the casing, but also this invention provides an improved end closure or plug for such a switch construction or the like.

While the form of the invention now preferred has been illustrated and described as required by the patent statutes, it is to be understood that other forms thereof may be utilized all coming within the scope of the appended claims.

What is claimed is:

1. In a switch construction having an open ended casing provided with two conductors and means for normally maintaining one electrical relationship between said conductors and for providing another electrical relationship between said conductors upon the occurrence of a certain event, the switch construction having a rigid insulating plug closing the open end of said casing and having a plug opening passing therethrough and through which one of said conductors is received so as to extend outwardly from said casing and inwardly into said casing, said plug having a large central portion secured to said casing, said plug having two identical inward and outward extensions extending from said central portion so as to be useable in a like manner regardless of which extension is the inward or outward one thereof in its assembled relation with said casing whereby the inward extension provides a locating means for a spring inside said casing and the outward extension provides means for spacing the exposed part of said one conductor from said casing a predetermined distance, the improvement wherein each of said extensions of said plug has an axial length at least substantially the same as the axial length of said central portion of said plug, each of said extensions of said plug having an outer peripheral surface and a locating means extending outwardly from and substantially transversely from said outer peripheral surface of its respective extension and intermediate its ends, the locating means on the inward extension providing locating means for positioning one end of said internal spring in said casing and the locating means on the outward extension providing means for mechanically locking an adhesive thereto that secures said casing to said exposed portion of said one conductor.

2. A plug for a switch construction having an open ended casing provided with two conductors and means for normally maintaining one electrical relationship between said conductors and for providing another electrical relationship between said conductors upon the occurrence of a certain event, said plug comprising a rigid insulating member for closing the open end of said casing and having a plug opening passing therethrough and through which one of said conductors is adapted to be received so as to extend outwardly from said casing and inwardly into said casing, said plug having a large central portion adapted to be secured to said casing, said plug having two identical inward and outward extensions extending from said central portion so as to be useable in a like manner regardless of which extension is the inward or outward one thereof in its associated relation with said casing whereby the inward extension is adapted to provide a locating means for a spring inside said casing and the outward extension is adapted to provide means for spacing the exposed part of said one conductor from said casing a predetermined distance, each of said extensions of said plug having an axial length at least substantially the same as the length of said central portion of said plug, each of said extensions of said plug having an outer peripheral surface and a locating means extending outwardly from and substantially transversely from said outer peripheral surface of its respective extension and intermediate its ends, the locating means on the inward extension being adapted to provide locating means for positioning one end of said internal spring in said casing and the locating means on the outward extension being adapted to pro-

vide means for mechanically locking an adhesive thereto that would secure said casing to said exposed portion of said one conductor.

3. In a switch construction having an open ended casing provided with two conductors and means for normally maintaining one electrical relationship between said conductors and for providing another electrical relationship between said conductors upon the occurrence of a certain event, the switch construction having a rigid insulating plug closing the open end of said casing and having a plug opening passing therethrough and through which one of said conductors is received so as to extend outwardly from said casing and inwardly into said casing, said plug having two identical inward and outward extensions so as to be useable in a like manner regardless of which extension is the inward or outward one thereof in its assembled relation with said casing whereby the inward extension provides a locating means for a spring inside said casing and the outward extension provides means for spacing the exposed part of said one conductor from said casing a predetermined distance, the improvement wherein each of said extensions of said plug has an outer peripheral surface and a locating means extending outwardly from and substantially transversely from said outer peripheral surface of its respective extension and intermediate its ends, the locating means on the inward extension providing locating means for positioning one end of said internal spring in said casing and the locating means on the outward extension providing means for mechanically locking an adhesive thereto that secures said casing to said exposed portion of said one conductor.

4. In a switch construction as set forth in claim 3, the further improvement wherein said locating means on said plug are annular.

5. In a switch construction as set forth in claim 4, the further improvement wherein each extension of said plug is substantially frusto-conical with the smaller end thereof being the free end of said plug.

6. In a switch construction as set forth in claim 5, the further improvement wherein each extension of said plug has an inner part that is substantially frusto-conical and an outer part that is substantially frusto-conical in a downwardly stepped manner from the inner part thereof, said locating means of the respective extension comprising the juncture between said inner and outer parts thereof.

7. In a switch construction as set forth in claim 6, the further improvement wherein the juncture of each ex-

tension has an arcuate configuration in any axial cross section thereof.

8. A plug for a switch construction having an open ended casing provided with two conductors and means for normally maintaining one electrical relationship between said conductors and for providing another electrical relationship between said conductors upon the occurrence of a certain event, said plug comprising a rigid insulating member for closing the open end of said casing and having a plug opening passing therethrough and through which one of said conductors is adapted to be received so as to extend outwardly from said casing and inwardly into said casing, said plug having two identical inward and outward extensions so as to be useable in a like manner regardless of which extension is the inward or outward one thereof in its associated relation with said casing whereby the inward extension is adapted to provide a locating means for a spring inside said casing and the outward extension is adapted to provide means for spacing the exposed part of said one conductor from said casing a predetermined distance, each of said extensions of said plug having an outer peripheral surface and a locating means extending outwardly from and substantially transversely from said outer peripheral surface of its respective extension and intermediate its ends, the locating means on the inward extension being adapted to provide locating means for positioning one end of an internal spring in said casing and the locating means on the outward extension being adapted to provide means for mechanically locking an adhesive thereto that would secure said casing to said exposed portion of said one conductor.

9. A plug as set forth in claim 8 wherein said locating means on said plug are annular.

10. A plug as set forth in claim 9 wherein each extension of said plug is substantially frusto-conical with the smaller end thereof being the free end of said plug.

11. A plug as set forth in claim 10 wherein each extension of said plug has an inner part that is substantially frusto-conical and an outer part that is substantially frusto-conical in a downwardly stepped manner from the inner part thereof, said locating means of the respective extension comprising the juncture between said inner and outer parts thereof.

12. A plug as set forth in claim 11 wherein the juncture of each extension has an arcuate configuration in any axial cross section thereof.

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