ABSTRACT OF THE DISCLOSURE

An electrical fuse construction comprises a body member formed of a non-conductive material and includes a pair of terminals and a connector member connecting the terminals together. The body member is entirely coated with a conductive material and a rigid strut member is moulded about a portion of the body member.

BACKGROUND OF THE INVENTION

This invention relates to an improved electrical fuse construction and, more particularly, to a fuse construction which is especially suited for automotive circuits and the like.

Prior electrical circuit fuses are frequently relatively expensive to manufacture and their construction requires numerous time consuming and complex steps. Also where the fuse is to be employed in circuits which are subjected to extensive vibrational and jarring stresses, such as automobiles, electrical circuits, prior conventional fuses are frequently subjected to damage due to their fragile nature and construction. In Anthony J. Tazzominis and my copending application Ser. No. 656,111, filed July 26, 1967, we disclose an improved fuse construction which is substantially less fragile than the conventional thin strip or wire filament fuses which is simple and inexpensive to manufacture. However, the latter mentioned fuse still requires a certain degree of care in its manufacture since only a portion of such fuse is coated with a conductive metallic coating. Thus, care has to be exercised in the coating operation to insure that a portion of the body member of the fuse remains uncoated and non-conductive for handling purposes. Moreover, although such fuse construction results in a substantial improvement in durability over the prior fuse constructions, the connector member or strut of the fuse of the copending application is relatively small in diameter and is thus somewhat subject to breaking or bending and possible fracture of the strut or its metallic conductive coating when undue stresses are applied to the fuse either during the course of insertion or removal from its connector or from vibration during use. Also, since the fuses disclosed in the aforementioned copending application are small in size, little surface area is presented upon which to emboss the amperage rating or other necessary information with respect to the characteristics of the fuse.

The improved fuse construction incorporating the principles of my invention overcomes these disadvantages without sacrificing the numerous important advantages realized by the prior fuse constructions and those of the aforementioned copending application. The fuse construction of my invention may be easily and rapidly coated over its entire surface with a conductive coating material and special care need not be exercised in the course of manufacture to retain a portion of the fuse's body member in an uncoated condition. Moreover, a fuse constructed in accordance with the principles of my invention realizes substantially improved strength and durability and may be readily handled while in a current flow condition. Moreover, the fuse construction may be readily color coated and sufficient surface is provided for the presentation of necessary information regarding the characteristics or the like of the fuse. The condition of the fuse constructed according to my invention may be readily observed visually. Finally, the fuse constructed in accordance with the principles of my invention is simple and inexpensive to manufacture.

SUMMARY OF THE INVENTION

In a principal aspect, the fuse construction incorporating the principles of my invention includes a body member having at least a pair of terminals connected together by a connector member, the body member being formed of a non-conductive material. The entire body member is coated with a conductive coating, the coating on the connector member being of a predetermined cross sectional area, and a rigid member is moulded integrally about a portion of the body member.

These and other objects, features and advantages of the invention will become evident upon considering the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

In the course of the detailed description, reference will frequently be made to the drawings in which:

FIG. 1 is an elevation view of one of the preferred embodiments of fuse constructed in accordance with the principles of my invention;

FIG. 2 is a plan view of the fuse shown in FIG. 1;

FIG. 3 is a side elevation view of the fuse shown in FIG. 1; and

FIG. 4 is an elevation view of another preferred embodiment of fuse constructed in accordance with the principles of my invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. 1–3, one preferred embodiment of fuse of my invention is shown. The fuse includes a generally U-shaped body member 10 which is cast or moulded from an electrical non-conducting thermostetting or thermoplastic polymeric material. By way of example, the body member 10 may be formed of a material such as phenolic. The body member 10 includes a pair of elongated terminals 12 and 14 which are bridged and connected together by a strut or connector member 16, the terminals and connector member being integrally moulded in one piece construction. The terminals 12 and 14 and connector member 16 are preferably of a substantially cylindrical cross section and the connector member is preferably of a constant diameter.

The entire non-conductive body member 10 is plated with an electrically conductive material to render the terminals and connector member conductive. The plating may be accomplished by dipping or spraying. A suitable plating material is provided by a composition of 63% tin and 37% lead by weight. The thickness of the plating on the strut or connector member 16 determines the amperage rating of the fuse. For example, a fuse having a 0.032 inch constant diameter connector member and coated with the above noted composition to a thickness of 0.001 inch will have a 3 amp rating. An increase in plating thickness to 0.002 inch results in a 3 amp fuse, a 0.004 inch coating thickness results in a 7.5 amp fuse. The greater the coating thickness for a given connector member diameter, the greater is the cross-sectional area available for the conduction of current. Consequently, the fuse amperage rating increases as the thickness of the coating on the connector member increases. Since the entire body member 10 may be coated in one step by dipping or spraying, nearly its entire surface, the coating thickness of the terminals will generally be substantially that of the con-
nector member 16. So the connector member 16 will set the maximum amperage rating of the fuse, the diameter of the connector member 16 should be somewhat less than the diameter of the terminals 12 and 14 to provide a coating on the connector member which will have a smaller cross-sectional area than the conductive area provided by the terminals. When the cross-sectional area of the coating of the connector member coating has such relationship to the coating area of the terminal, the connector member 16 coating will act as the limiting conductor, the coating on the connector member 16 melting before the coating on the terminals 12 and 14 when an amperage overload is passed through the fuse. The length of the connector member 16 is not critical and may be varied without appreciable effect on the fuse amperage rating.

After the body member 10 has been entirely coated, a solid rigid non-conductive member 18 is moulded about the connector member 16 and the upper portion of the terminals 12 and 14. The rigid member 18 operates to provide a solid non-conductive handling surface for manipulation of the fuse and to strengthen the connector member and terminals against vibrational stresses encountered during use or twisting or other stresses encountered during handling of the fuse. The rigid member 18 is notched in its center at 20 to expose a major portion of the connector member 16. The notch enables visual inspection of the connector member coating to determine the condition of the fuse. The rigid member 18 is formed of a suitable polymeric material, such as polyvinyl chloride, and may be appropriately color coded and contain suitable fuse characteristics information 22 of the like moulded or printed thereon.

Referring to FIG. 4, a second embodiment of fuse construction is shown. Like the previously described embodiment, the body member 24 is formed of a non-conductive polymeric material and includes a pair of terminals 26 and 28 interconnected by a connector member or strut 30. The entire body member is coated, as earlier described, with a suitable conductive coating. The body member 24 of the embodiment shown in FIG. 4, is generally H-shaped, the connector member 30 connecting the elongated terminals 26 and 28 intermediate their distal ends. The upper end of the terminals is grooved at 32 to provide an irregular surface which firmly engages and holds the rigid member 34 which is moulded thereabout. The rigid member 34, in the embodiment of FIG. 4, is moulded about the upper end of the terminals 26 and 28 and the connector member 30 remains uncovered. Such construction avoids any possibility of damage to the connector member's coating and simplifies the moulding operation while exposing the connector member to visual inspection. The fuse described herein may also be utilized as a connector to hold various connector housing blocks together, as described in the aforementioned copending application, Ser. No. 656,111.

It is to be understood that the embodiments of the invention which have been described are merely illustrative of a few applications of the principles of the invention.

Numerous modifications may be made by those skilled in the art without departing from the true spirit and scope of the invention.

What is claimed is:

1. An electrical fuse comprising in combination; a body member formed of a non-conductive material including at least a pair of terminals and a connector member connecting said terminals to each other, a conductive material coating substantially the entire surface area of said terminals and said connector member, the coating on said connector member having a predetermined cross-sectional area such that at least a portion of the coating on said connector member melts when the current conducted thereby exceeds a predetermined amount, and a rigid strut member moulded integrally about a portion of said body member.

2. The fuse of claim 1 wherein said rigid member is moulded integrally about a portion of said terminals.

3. The fuse of claim 1 wherein said rigid member is constructed and arranged to expose at least a portion of said connector member to visibility.

4. The fuse of claim 3 wherein said member includes a recess exposing said connector member to visibility.

5. The fuse of claim 1 wherein said rigid member is moulded integrally about at least a portion of said connector member.

6. The fuse of claim 1 wherein said terminals are elongated and said connector member connects said terminals intermediate their distal ends to form a generally H-shaped body member, and said rigid member is formed integrally about the upper extended portions of the terminals of the H-shaped body member.

7. The fuse of claim 6 wherein the upper extended portions of the terminals of said H-shaped body member include an irregular surface firmly engaging the rigid member.

8. A method of making an electrical fuse comprising the steps of:

(a) forming by moulding a non-conductive body member having a pair of substantially parallel terminals interconnected by a connector member;
(b) coating the entire body member with a conductive material such that said connector member is of a predetermined cross-sectional area, and
(c) moulding a non-conductive rigid strut member about at least a portion of said body member.

References Cited

UNITED STATES PATENTS

2,934,627 4/1960 Bristol et al. .......... 337—293
3,361,884 1/1968 Parke .......... 337—297

H. B. GILSON, Primary Examiner

U.S. Cl. X.R.,

337—187, 198, 293