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HERMETIC SEAL FOR ELECTRIC TERMINALS AND THE LIKE

Semon H. Stupakoff, Latrobe, Pa., assignor to
Stupakoff Ceramic & Manufacturing Company,
Latrobe, Pa., a corporation of Pennsylvania

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6 Claims. (Cl. 174—152)

My invention may be more fully understood by reference to the accompanying drawings, in which:

Fig. 1 is a transverse vertical section through a typical seal completed except for application of the preformed body;

Fig. 2 is a detail view showing a vertical section through a preformed body;

Fig. 3 is a view similar to Fig. 1 of the complete seal; and

Fig. 4 is a view similar to Fig. 1 of a modification.

Referring specifically to the drawings, and especially Fig. 1, 2 designates a metal wall or casing and 2a may be regarded as the exterior of this wall or casing. Welded, brazed or soldered to the exterior of the casing is an eyelet, ferrule or like support 3 of thin metal to have flexibility and selected with reference to its coefficient of thermal expansion. It may be of nickel, cobalt alloy, of the type known commercially under the trade-mark "Kovar," having its coefficient of thermal expansion substantially matched to borosilicate glass. The conductor or terminal 4 passes through a hole in the casing and through the eyelet 3 but out of contact therewith. A body of glass, for example borosilicate glass 5 is fused to the ferrule or eyelet 3 and to the conductor 4, the conductor also having its coefficient of thermal expansion matched to that of the glass. This forms a hermetic insulated seal for the conductor so that air or moisture cannot pass from the exterior to the interior of the casing 2.

However, the shape into which the glass 4 may be formed in making the assembly is restricted. The glass does not weather satisfactorily, and as indicated above, fails rapidly under alternate hot and cold salt spray tests.

According to the present invention there is applied over the exterior of the body of glass 5 a previously formed secondary insulating body or shield 6. As shown in Fig. 2 this shield is in the form of an annulus, having a central conical opening 6a, a surrounding sleeve portion 6b, a top flange 6c and a depending peripheral skirt 6d. The contour of the piece 6 and its various components may be variously modified according to the place where it will be used and the exact form of seal with which it is employed.

This secondary insulator, as shown in Fig. 3, is placed on top of the glass seal 5. Then heat is applied sufficient to fuse or bond the glass to the secondary insulator 6. In some cases an applied bonding or fusing medium may be used. In fusing the collar or insulator 6 into place, pres-
sure is applied so as to get complete contact between the collar and the glass.

The collar may be of appropriate insulating material, including glass and preferably has its coefficient of thermal expansion matched to that of the glass. Preferably, the collar or shield is of a ceramic nature. When is hard borosilicate glass (such as that known commercially as "Corning 705") is formed of zircon porcelain. Zircon porcelain matches the thermal expansivity of the glass; it will not be adversely affected electrically by the sealing atmosphere; it will withstand weathering and the hot and cold salt spray test, and hence the combination is superior to glass alone. It is styled to give a long and devious leakage path on the surface of the seal and has suitable electric, chemical and physical qualities.

If the glass be a lead glass, the collar may, for example, be of alumina or alumina compounds of a thermal expansivity matched to the glass, the particular compounds and glasses being known in the art at the present time. In some cases, the applied insulator may be formed of plastic, as for example a phenolic plastic.

In the modification shown in Fig. 4, the overall contour of the seal is not altered, but the applied insulator is inserted in a groove which extends the leakage path on the surface of the glass. In this modification the 10 is the supporting eyelet, 11 the glass insulator, and 12 is the leading wire or terminal. In this form, the collar is applied to the glass in a soft condition interlocks with the glass, forming an annular groove 14. Also, the glass may be molded with an appropriate groove and the insulating material be applied, either as a preformed body or molded and cured in situ.

While I have shown and described one typical form of my invention and a specific embodiment it will be understood that this is illustrative, and that many variations therefrom may be made within the scope and spirit of my invention.

I claim:

1. A hermetic seal construction comprising a conductor, a body of glass fused to the conductor, a supporting eyelet to which the glass is also fused, and a preformed insulating collar encircling the glass and intimately bonded thereto and spaced away from the conductor.

2. A hermetic seal construction comprising a conductor, a body of glass fused to the conductor with the conductor passing through opposite points on the body, a supporting eyelet to which the glass is also fused, and a preformed insulating collar fused to the glass and intermediate the points of the glass body through which the conductor passes.

3. A hermetic seal construction comprising a conductor, a body of glass fused to the conductor, a supporting eyelet to which the glass is also fused, and a preformed insulating collar fused to the glass and integrally bonded thereto, the collar being of ceramic material and being a between points where the conductor emerges from the glass body, and being spaced from such points.

4. A hermetic seal construction comprising a conductor, a body of glass fused to the conductor, a supporting eyelet to which the glass is also fused, and a preformed insulating collar encircling the glass and intimately bonded thereto and spaced from the conductor and eyelet, the glass being a borosilicate glass and the collar being a zircon porcelain refractory.

5. A hermetic seal construction comprising a conductor, a body of glass fused to the conductor, a supporting eyelet to which the glass is also fused, and a preformed insulating collar encircling the glass and intimately bonded thereto and spaced from the conductor and eyelet, the glass being a lead glass, the collar being formed of a ceramic material comprised principally of alumina.

6. A hermetic seal comprising a supporting member with an opening therethrough and a conductor passing axially through the opening, a body of glass fused to the supporting member and fused to and surrounding the conductor and forming a solid insulating body between the support and the conductor, and a ceramic insulating ring surrounding the glass body and intimately bonded thereto, the ceramic insulating ring being spaced from both the supporting member and the conductor and serving to interrupt the continuity of the exposed glass surface between the supporting member and the conductor.

SEMON H. STUPAKOFF.

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