Oct. 6, 1953 S. C. MILLER 2,654,870

HIGH-VOLTAGE ELECTRODE HOUSING AND TERMINAL ASSEMBLY FOR GASEOUS DISCHARGE TUBES

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Fig. 1.

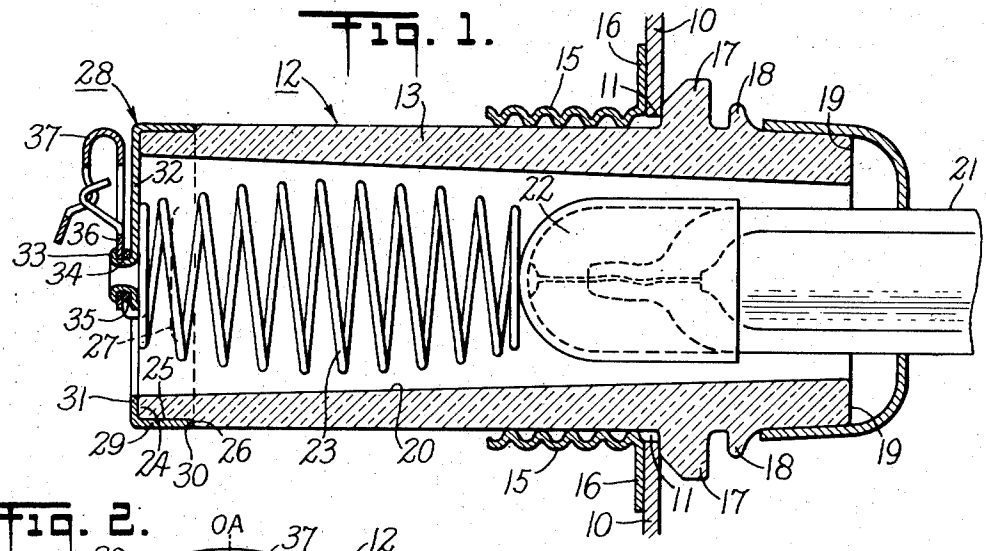


Fig. 2.

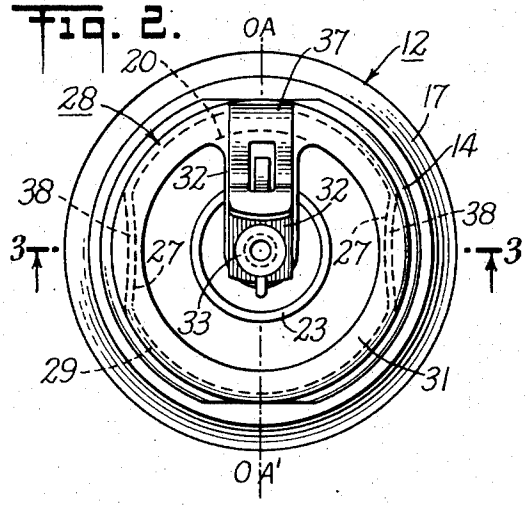


Fig. 3.

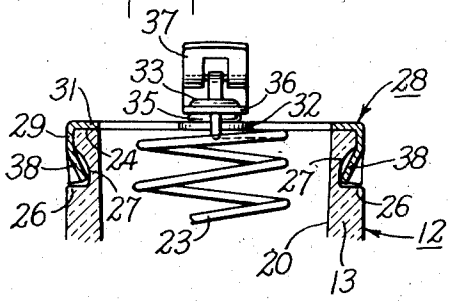


Fig. 4.

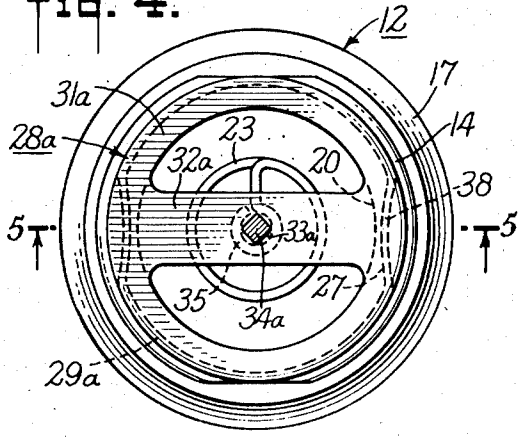
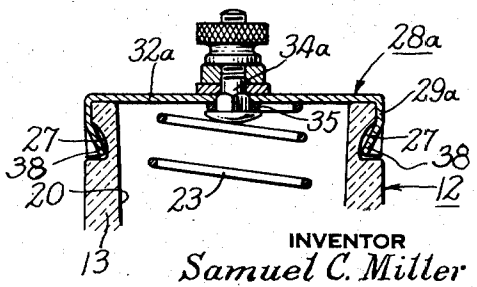


Fig. 5.



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Fig. 6.

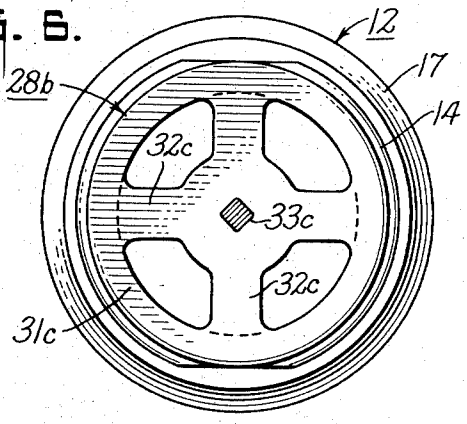


Fig. 7.

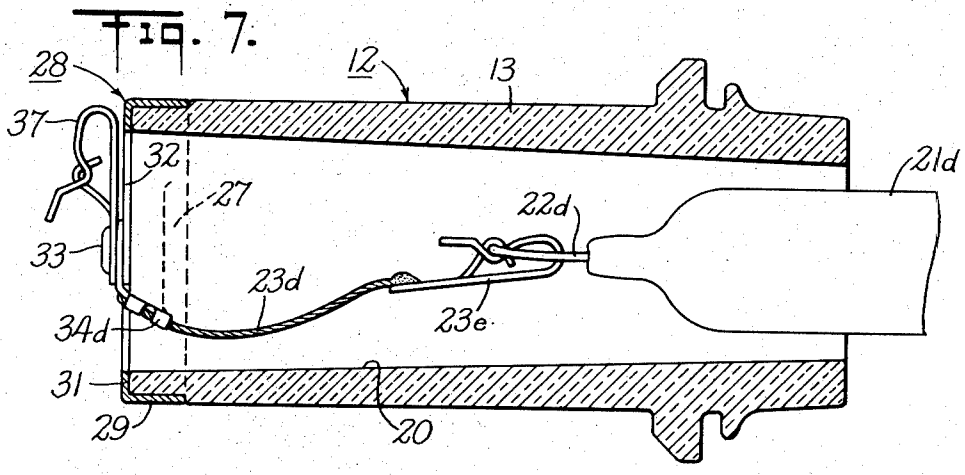
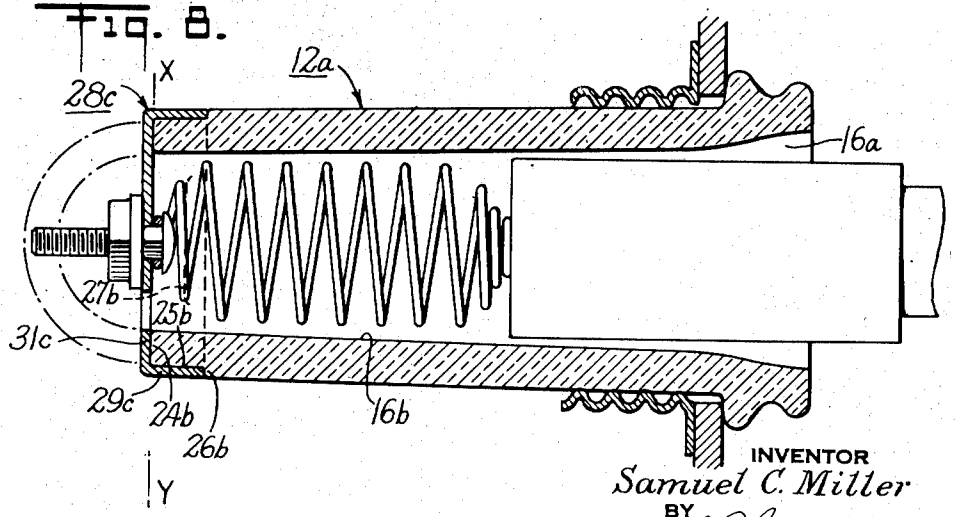


Fig. 8.



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HIGH-VOLTAGE ELECTRODE HOUSING AND TERMINAL ASSEMBLY FOR GASEOUS DISCHARGE TUBES

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Application July 13, 1949, Serial No. 104,556

4 Claims. (Cl. 339—55)

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This invention relates to insulators and more particularly to high voltage electrode housing insulators including terminal contact mounts therefor, for use in supporting neon tube sign illuminants in out-door installations of high voltage or cold cathode gaseous discharge tubes.

This invention is an improvement over my invention described and claimed in Patent No. 2,046,960, granted July 7, 1946, and continues in part some of the features of my invention described in my application for patent, Serial No. 77,015, filed February 17, 1949, entitled High Voltage Electrode Housing and Method of Making the Same, now Patent No. 2,630,469, issued March 3, 1953.

In my patents aforesaid, I have described a tubular housing, particularly a glass insulator housing contoured for plunger core die casting operation, which will form an assembly suitable for exterior insulating purposes, satisfying the requirements as to drainage of accumulated moisture or rain water, when exposed to the weather on a framework. The requirements of such insulators include the solution of the problem of supporting the terminal mount through which contact between the source of power and the electrode is completed.

The insulators of my application and patent aforesaid and the provision for attaching and assembling therewith the terminal mount are costly, requiring expensive, skilled labor properly to assemble the terminal mount to the insulator. It is accordingly an object of my invention to provide a high voltage electrode insulator housing for assembly of gaseous discharge tubes which will embody therein the features of proper drainage, support for the terminal post for clamping the contact, which may have assembled therewith a dust and insect-excluding cap, and which, while retaining all these features, involves substantial economies in the production of the insulator, especially with glass of the boro-silicate type, such as Pyrex, to be susceptible of production by plunger core die-casting operations, while making possible the attachment thereto rigidly of the mount for the terminal post.

Still more particularly, it is an object of my invention to provide a high voltage electrode housing of a contour which would make economical the production of such insulator of high fusion glass, such as boro-silicate glass of the type known as Pyrex, and including for economical combination therewith a terminal mount which will in no way interfere with the function of providing proper drainage of the insulator.

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To attain these objects and such further objects as may appear herein, or be hereinafter pointed out, I make reference to the accompanying drawing forming a part hereof, in which—

Figure 1 is a longitudinal sectional view taken on the line O—A, O—A' of Figure 2 through my electrode housing and terminal mount showing a fragment of the sign frame, to which the electrode is attached;

Figure 2 is an end elevation thereof;

Figure 3 is a fragmentary section taken on the line 3—3 of Figure 2;

Figure 4 is an end view of a housing in accordance with another embodiment of my invention;

Figure 5 is a section taken on the line 5—5 of Figure 4;

Figure 6 is an end view of a still further embodiment of my invention;

Figure 7 is a longitudinal sectional view of an insulator in accordance with Figures 1 and 2, illustrating a modified terminal connection;

Figure 8 is a longitudinal sectional view embodying some of the features of my present invention combined with another form of insulator housing.

By way of summary, my invention is characterized by the features of providing a tubular housing, particularly of high temperature resistance and low coefficient of expansion, such as is found in high temperature resistant boro-silicate glass known as Pyrex, and which is contoured for plunger core, die-casting operations, to form its interior with a drainage aperture, whereby the housing may be used as an insulator for illuminants exposed to the weather, and to include a means of supporting the terminal mount which may be attached thereto as a pre-assembled unit and which, in turn, may be attached to the insulator quickly, economically and rigidly, without interfering with the drainage and insulator functions of the assembly.

Making reference to the drawing, Figure 1 represents, as in my inventions aforesaid, a fragment of a neon sign frame 10 having a boring 11, through which the insulator housing 12 projects. A cylindrical body portion 13 is formed with a screw threaded section 14, to receive the threaded collar 15 to press the flange 16 thereof against the rear face of the frame 10. (The screw-threaded portions are not visible since the parting line, as apparent from Figure 2, is flat.) A flange 17 provides the abutment for the outer face of the frame 10, which may optionally cooperate with another peripheral flange 18, spaced from the rim 19 to attenuate the surface and in-

crease the path of the stray discharges in the event of failure. The boring or central aperture 20 may receive axially thereof the gaseous discharge tube 21 so as to project its electrode terminal thimble 22 with the spring contact 23.

In accordance with my invention the flared rim end 24 of the insulator 12 is formed with a finished end by the plunger core die-casting operation referred to in my prior application, to provide a smooth finished edge conforming to the mold, and requiring no finishing operation. Exteriorly an annular cylindrical offset constricted neck or seat portion 25 is formed, having a shoulder rim 26. Along the line of the shoulder I may provide diametrically opposed undercut slots 27, which are extended medially of the parting line O—A, O—A', as explained in my prior application. With this construction, I provide a terminal mounting assembly 28 comprising a ferrule portion 29 whose edge 30 may abut the annular shoulder 26 and whose flange portion 31 may abut the finished edge 24 of the insulator. The flange 28 is of a depth primarily to cover the rim 24, leaving it unobstructed except for a portion comprising the extension tongue 32, which is radially directed toward the center of the insulator housing. The end of the tongue 32 may be struck up with an eyelet 33 to provide a neck 34 for anchoring the loop 35 of the contact spring 23. The shank 34 may likewise be passed through the apertured portion of the web 36 of the Fahnstock clip 37 before upsetting the eyelet portion 33.

The terminal mount assembly 28 as a unit comprising the ferrule 29 to which is preliminarily attached the contact spring 23 and the Fahnstock clip 37 may be sleeved over the offset portion 25 of the housing and by spinning, crimping or otherwise distorting the rim portion 29, driving the offset lugs 38 into the slots 27, to engage the undercut sections thereof. The effect is to draw the flange 31 in contact with the rim 24 without in any way obscuring the drainage aperture along the walls of the boring 20, it being understood that the housing 12 may be adjusted upon the frame 10 to position the tongue 32 at the uppermost level prior to locking the collar 15 into position.

The ferrule 28 with the covering flange 31 makes possible the application of the terminal assembly to the housings in accordance with my Patent No. 2,046,960.

In the embodiment illustrated in Figures 4 and 5, I show a terminal mount assembly 28*a* in which the flange 31*a* thereof has integrally formed therewith the cross bar 32*a* diametrically of the annular flange. The rim 29*a* may be applied as in the embodiment illustrated in Figures 1, 2 and 3. In this construction, I may form the cross bar 32*a* with a square aperture 33*a* to receive the terminal bolt 34*a*, having the usual squared shank as the means of clamping the lip 35 of the contact spring 23.

In assembling a ferrule in accordance with the embodiment illustrated in Figures 4 and 5, it will be understood that the cross bar 32*a* is arranged on the housing to lie horizontally, the rim portion 31*a* terminating with the wall 20 of the housing in no way to interfere with the drainage.

In Figure 6 I show an end view of another form of ferrule 28*b* in which the flange portion 31*c* is extended to provide radial cross bars 32*c*. The common web or overlap of these cross bars is formed with a square aperture 33*c* to receive a square shank of the terminal bolt as in the embodiment illustrated in Figures 4 and 5. Here the rim 31*c* is co-terminous with the wall of the boring 20 of the housing as in the prior embodiment, the narrow dimensions of the cross bars 32*c* affording little obstruction to the drainage of the boring when exposed to the weather.

In this and in the prior embodiments of the tongue or cross bar stiffening may be effected by stiffening ridges where reduction in dimensions are desired, to thereby increase the remaining aperture.

In the embodiment shown in Figure 7, I illustrate the terminal mounting assembly 28 having extended from the tongue 32 a clip 34*d*, held by the eyelet 33. This clip, through a flexible cable 23*d*, supports a Fahnstock clip 23*e* for quick connection to the pigtail 22*d* of the electrode end of the tube 21*d*. A terminal mount assembly as here described illustrates the facility of assembly of the housing with a Fahnstock clip connection.

In Figure 8 I illustrate a housing 12*a* following the construction generally illustrated in my Patent No. 2,046,960, as previously mentioned, in which the central boring 16*a* has its walls 16*b* gradually constricted toward the rim 24*b* defining the opening. Drainage in this particular case may be toward the mouth of the housing. However, a smooth walled bearing is provided whose rim may be ground down or fractured by a clean-break operation along the line X—Y, as described in my prior application, forming the neck 25*b*, the shoulder 26*b* and the undercut slots 27*b* by the plunger core molding operation.

A terminal mount assembly 28*c* may be capped upon a neck 25*b* in accordance with any of the embodiments shown in Figures 1 to 7. The rim 24*b*, under these circumstances, where formed by the clean-break operation to leave a sharp rim of somewhat irregular contour, is protected by the covering afforded by the ferrule and flange 29*c* and 31*c*, respectively.

It will thus be observed that I have provided a housing which may be moulded particularly of the glass as described by a die-casting plunger core operation, permitting the use of a type of glass which would ordinarily be unavailable for the production of high voltage electrode housings, and likewise permitting resort to a "clean-break" operation for severing one end of the housing so produced, with little or no finishing operations by grinding required, as found necessary in the production of a housing in accordance with my issued patent aforementioned, since the terminal mount assembly is anchored primarily upon a smooth molded finish exteriorly of the housing and where a clean-break is resorted to, is covered by either the dust cap shown in the embodiment illustrated in Figures 1 to 7 or by the terminal mount assembly illustrated in Figure 8. Substantial economies are effected in the labor of making the insulator and assembling the terminal mount with the insulator.

While the features of my invention with regard to the housing have primary utility with the glass of the character described, it will be understood that the terminal mount assembly may have utility with insulators similarly contoured with the seat or neck for the terminal mount, such as for example, where the insulator is so molded or cast from ceramics, plastics or porcelain.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is:

1. In a high voltage tubular electrode housing of insulating material, for supporting an electrode tube on a frame, the housing having a substantially cylindrically contoured exterior body portion, a mouth at one end through which an electrode tube may pass, and a rim at the other end with flange means between said ends adjacent said mouth for mounting the housing to the frame, the interior of said housing being outlined by a wall continuously extended toward the rim end forming a drainage passage extended to the rim end and said rim end having indentations exteriorly positioned forming seat portions, the combination therewith of a supporting terminal mounting made of electrical conducting material adjacent said rim end having finger portions extending into said seat portions holding said mounting means against displacement relatively to said housing, the mounting means carrying a contact terminal extending inwardly toward the center of the tubular housing and said mounting means also having other portions integral therewith and substantially covering said rim end solely, leaving a substantially clear passage for drainage.

2. A housing assembly in accordance with

claim 1 wherein said terminal mounting means includes a ferrule portion from which the finger portions are extended into said seat portions, said mounting means also including a flange extended from said ferrule portion covering said rim substantially coterminously with said rim end adjacent said passage, and said mounting means also including a radial arm for said terminal directed over said passage and extended from said ferrule.

3. A housing assembly in accordance with claim 1 wherein the rim end having the seat portions comprises an annular reduced portion and the mounting comprises a ferrule member sleeved over said reduced portion.

4. A housing in accordance with claim 1 wherein said terminal mounting means includes an arm directed radially over said passage and having integrally formed therefrom eyelet means engaging a terminal connecting clamp member.

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