July 16, 1940. M. M. KAUFFMAN 2,208,264

ELECTRIC CONNECTOR AND INSULATOR ATTACHMENT

Original Filed March 31, 1936

Fig. 1.

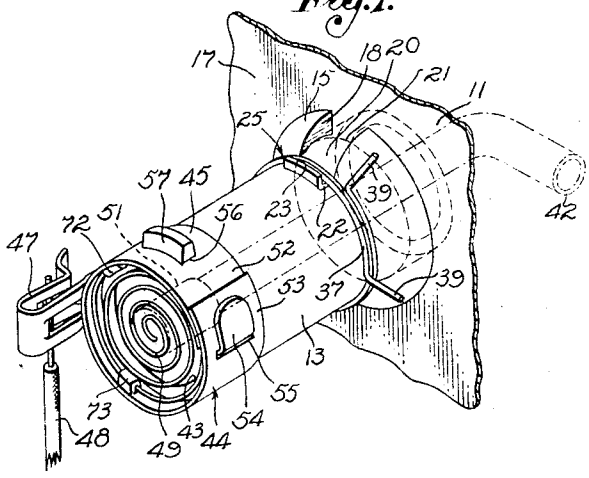


Fig. 4.

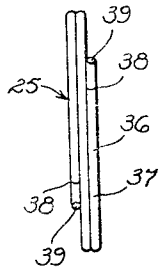


Fig. 5.

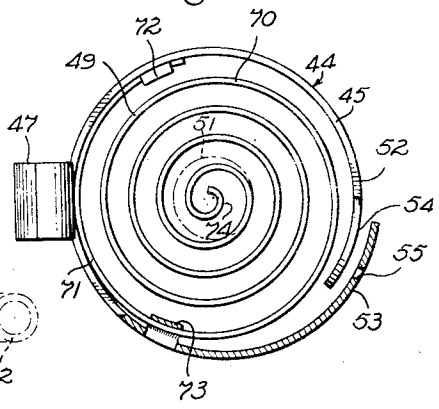


Fig. 2.

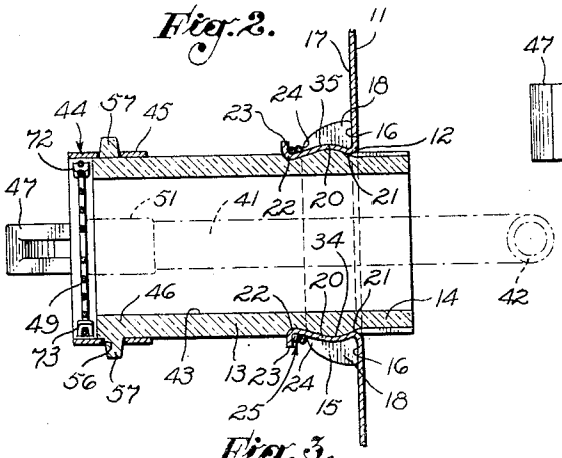


Fig. 6.

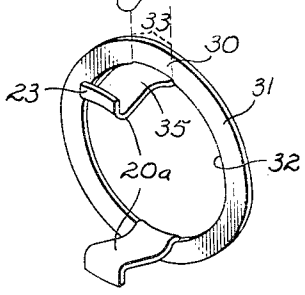
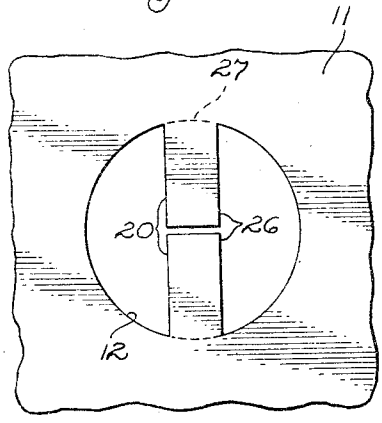


Fig. 3.



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UNITED STATES PATENT OFFICE

2,208,264

ELECTRIC CONNECTOR AND INSULATOR ATTACHMENT

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Continuation of application Serial No. 71,841, March 31, 1936. This application August 3, 1938, Serial No. 222,861

4 Claims. (Cl. 173—339)

My invention relates in general to means for insulating electric devices from their supports and for connecting such electric devices into an electric circuit, and relates in particular to electric insulating and connecting means having especial utility with glow tubes of the general character employed in electric signs. The present application is a continuation of my copending application Serial No. 71,841, filed March 31, 1936, entitled Electric connector and insulator attachment.

The invention has utility in the insulation and connection of various types of electric devices, but in view of the fact that its greatest use will probably be in conjunction with electric display devices, such as neon signs, the following disclosure of the invention will be, for the purpose of simplicity, limited to the use of the invention as a means for insulating electric members of the general character of gas-filled glow tubes and connecting electric feed conductors or wires to the terminals of the tubes. In illuminated display members of this general character, a supporting structure is generally employed having a front wall which may be of sheet metal and adjacent to which the gas-filled glow tubes are secured. The tubes are supported in spaced relation to the front face of the wall by suitable brackets or posts, and to enable the connection of electric conductors to the ends of the tubes in such a manner that such connections will not be exposed, my invention provides an insulator of tubular character adapted to receive the rearwardly bent end of a glow tube, and the insulator also carries a contact member and supporting means therefor through which electric connection with the electrode at the end of the tube is made in such a manner that no stresses are applied to the tube which might tend to break the same, and in such a manner that change in relative size of the cooperating members due to temperature changes will not result in breaking the glow tube.

It is an object of the invention to provide a simple insulator and connecting device which may be readily mounted on a wall and secured in place without the use of screws or bolts, thereby avoiding all possibility of portions of bolts or other connecting means being visible on the front of the wall to which the device is secured.

It is a further object of the invention to provide an insulator which may be secured in a position coinciding with an opening in a wall member without the use of tools. Another object of my invention is to provide an insulator that may be mounted in a positive manner in an aperture in the wall, from the rear of the wall, without the workman reaching around to the front face of the wall, and without the necessity of a second workman cooperating from the front face of the wall.

It is also an object of the invention to provide this insulator with an end portion adapted to project into or through the hole or opening in the wall member, and to provide adjacent such end an interrupted annular rib forming a shoulder adapted to fit against the inner face of the wall and slots through which securing members may pass, such securing members being preferably in the form of strips or tongues which lie in the slots, have means at their forward ends for engaging or connecting to the wall, and have means at their rear ends engageable by a detachable securing means which fits around the insulator in a position adjacent the back or rear portion of the interrupted rib.

It is a further object of the invention to provide an electric connector and an insulator for supporting the same, such electric connector being of simple form and being adapted to be secured to the insulator without the use of tools, and having a terminal to which a feed wire may be connected and also having a contacting member for engaging an electric device to which electric current is to be fed.

Further objects and advantages of the invention will be made evident throughout the following part of the specification.

Referring to the drawing, which is for illustrative purposes only,

Fig. 1 is a perspective view showing a preferred form of my invention.

Fig. 2 is a longitudinal sectional view through the device shown in Fig. 1.

Fig. 3 is an enlarged fragmentary view showing a portion of a wall member with an opening having tongue blanks formed therein.

Fig. 4 is a side view of the clamping means employed in Fig. 1.

Fig. 5 is an end view, to enlarged scale, of the electric connector, this view being partly sectioned.

Fig. 6 is a perspective view showing an alternative means for forming the tongues constituting a part of the means for connecting the insulator to the wall member.

In the form of the invention shown in the drawing, the sign supporting structure may include as a part of the front wall thereof a metal wall 11. This metal wall 11 will, in the ordinary

practice of the invention, consist of a thin metal sheet, but, as will be evident from following parts of the specification, the wall may be of any desired thickness. The wall has a circular opening 12. An insulator member 13 is provided which is preferably of tubular form, as shown in Figs. 1 and 2, and may be molded or formed from any known insulating material selected in accordance with the dielectric characteristics required of the insulator, which of course will be determined in accordance with the voltages to be insulated against. The insulator member 13 has a front end 14 of such external shape that it will fit into the opening 12 of the wall 11. In the general use of the invention, the end 14 will project through the wall 11, but whether or not it will project through a wall in all uses of the invention will of course depend upon the wall thickness as compared with the length of the end 14. Adjacent the end 14, the insulator member 13 has an interrupted annular rib 15 formed thereon, this annular rib providing shoulders 16 adapted to engage the rear face 17 of the wall 11 around the opening 12.

The rib 15 is interrupted by slots 18, of which there are preferably two, disposed in diametrally opposed relation. These slots 18 extend parallel to the axis of the insulator member 13, or, in other words, perpendicular with respect to the inner wall surface 17. Connecting members 20, which I refer to as tongues, lie in the slots 18, the forward ends 21 of the tongues 20 being connected to the wall 11 at the edge of the opening 12, and the rear ends 22 of the tongues 20 being bent radially outwardly to provide projections or shoulders 23 which are spaced a short distance from the back 24 of the interrupted rib 15. Interposed between the shoulders or projections 23 of the tongues 20 and the back or rearward portion 24 of the annular rib 15, is a securing or clamping means 25 which passes around the end portions 22 of the tongues and also passes around the insulator member 13 adjacent the back 24 of the rib 15. This securing means 25, due to its engagement with the shoulders 23 of the tongues 20 and the back 24 of the rib 15, prevents or limits forward, or rightward, movement of the tongues 20 in the slots 18. To otherwise describe the action of the securing means 25, it may be said that such securing means engages the shoulders 23 and bears against the back 24 of the interrupted rib 15 and accordingly holds the rib 15 against the rear face 17 of the wall 11. The tongues 20 have been referred to as being attached at their forward ends 21 to the wall 11. This attachment or connection may be accomplished in several different ways. For example, as shown in Figs. 1, 2, and 3, the hole 12 may be punched in the wall 11 so as to provide inwardly extending strips 26 adapted to be bent outwardly along dotted lines 27 so as to form the tongues shown in Figs. 1 and 2. The tongues 20 may be left flat, or in the forms of the strips 26, as shown in Fig. 3, until the time for installing the insulator member 13, and at that time suitable bending pliers may be employed to bend the tongues 20 into the form in which they are shown in Figs. 1 and 2. On the other hand, the tongues 20 may be formed as separate clips, each having a projection or shoulder at its rearward end and a toe or projection at its forward end adapted to hook under the edge of the wall 11 around the opening 12. As shown in Fig. 6, tongues indicated as 20*a* may be provided with shoulders 23 at their rearward ends, and may be provided with outwardly bent toes 30 at their forward ends. These toes may be connected into or formed as part of a continuous ring 31 which has an opening 32 agreeing in size with the opening 12, but the toes 30 need not be given a width greater than the space between dotted lines 33 of Fig. 6, for the reason that when the tongues 20*a* are in place, their positions will be established by the positions of the slots 18 in which they rest.

As clearly shown in Fig. 2, the bottom walls 34 of the slots 18 are preferably arched outwardly from the front ends of such slots to the rear ends thereof, and the intermediate portions 35 of the tongues 20, or 20*a*, are preferably correspondingly arched. In the application of the securing means 25, the rear ends 22 of the tongues 20 are pressed radially inwardly, so as to cause the arched intermediate portions 35 of the tongues 20 to be clamped against the arched bottom walls of the slots 18.

Any suitable type of band or bracelet member may constitute the securing means 25. Preferably, however, as indicated in the drawings, the securing means 25 is made from a strip or wire 36 of spring metal bent to form a coil 37, preferably of several turns, as shown in Fig. 4. The length of the wire 36 is such that the ends 38 thereof overlap, and means 39 are provided at such ends whereby they may be engaged for the purpose of applying a force to move the ends 38 together, thereby increasing the diameter of the coil 37 to facilitate the installation of the securing means 25 in the position in which it is shown in Figs. 1 and 2. When the means 39 are released, after moving the securing means 25 into desired position, the coil 37 contracts around the rear ends 22 of the tongues 20 and forces them inwardly, with the result that the insulator member 13 is firmly and securely held in place. The engagement means 39 are preferably end portions of the wire 36 bent outwardly into radial positions as shown in Fig. 1. The coil 37 has the characteristics of a screw, in that it consists of a wire bent to helical form, and by rotation can be screwed on or off the rear ends 22 of the tongues 20.

Where the insulator 13 is employed in conjunction with neon signs, the end 41 of a neon tube 42 is extended rearwardly into the opening or bore 43 of the insulator 13, thereby passing through the opening 12 of the wall 11 but being insulated therefrom. In the making of electric contacts with the electrodes on the ends of neon tubes, it is customary to mount a separate terminal post on the rear face of the supporting wall. The electric lead wire of the energizing circuit is then connected to one of these posts, and another wire is carried from the post to the electrode fitting at the end of the neon tube. In my invention I provide a simple form of electric connecting means 44 which avoids the use of separate terminal posts such as just referred to. This electric connecting means, as shown in Figs. 1, 2, and 5, comprises a member 45 adapted to be clamped on the cylindrical portion or boss 46 constituting the rearward end of the insulator member 13. The member 45 carries a terminal 47 to which an electric lead wire 48 may be directly attached, as shown in Fig. 1, and also carries a contacting or connecting member 49 adapted to engage the metal electrode fitting 51 at the extremity of the neon tube end 41 in such a manner that the high voltage energizing current will be transmitted to the fitting 51 without the application of strains of a character tending

to break the neon tube 42, and in such a yieldable manner that changes in position of the cooperating parts of the entire sign structure will not produce stresses to break the neon tube.

The member 45 preferably consists of a strip of metal bendable, or bent, to circular form so that the ends 52 and 53 thereof are brought into close relation. The end 52 is provided with a tongue 54 adapted to pass through a slot 55 in the end 53 when the member 45 is closed around the boss or end 46 of the insulator member 13, whereupon the end of the tongue 54 may be bent rearwardly so as to hold the member 45 in contracted relation. The member 45 is preferably provided with openings 56 adapted to receive lugs 57 which are formed near the rear end of the insulator member 13. The lugs 57 and the openings 56 provide a means of interengagement between the boss 46 and the electric connector which will prevent removal of the electric connector from its position on the insulator 13 unless the tongue 54 is disengaged from the opening 55 and the member 45 sprung open to such diameter that the lugs 57 may be moved out of the openings 56. The contacting member 49 extends inwardly from the member 45 across the rear end of the insulator 13. This member 49 is preferably made in the form of a spiral of bronze wire 70 having its outer end 71 connected at two places to the member 45. Two small bridges 72 and 73 are punched inwardly from the wall of the member 52, and the outer end 71 of the wire 70 is passed through these bridges or loops 72 and 73 and there secured either by use of solder or by deforming the bridges 72 and 73 by pressure so that they will bear tightly against the wire 70. The spiral contacting member 49 is of resilient character, and the central portion 74 thereof is adapted to bear resiliently against the electrode fitting 51 when the end 41 of the neon tube 42 is moved rearwardly through the opening 43 of the insulator member 13. If the end 41 of the neon tube 42 is short, the contacting member 49 may be bent or deformed in the direction of the axis of the insulator member 13 so that the central portion 74 thereof will extend within the opening 43 of the insulator member 13; or, if the end 41 should be longer than shown in Figs. 1 and 2, the electrode fitting 51 will merely deflect the central portion of the member 49 rearwardly or leftwardly.

It is to be noted as a feature and advantage of my invention that if the metal wall 11 is provided with integral tongues or strips as shown in Figs. 2 and 3, my device may be mounted entirely from the rear side of the wall. It is necessary neither for a workman to reach around to the front face of the wall, nor for a second workman to cooperate from the front side of the wall. On the other hand, if the tongues 20 are not integral with the wall, but, as shown at 20*a* in Fig. 6, are provided by separate rings, the workman may initially slip the rings into all of the apertures from the front face of the wall before applying the insulators, and thereafter work from the rear side of the wall in completing the installation.

Although I have herein shown and described my invention in simple and practical form, it is recognized that certain parts or elements thereof are representative of other parts, elements, or mechanisms which may be used in substantially the same manner to accomplish substantially the same results; therefore it is to be understood that the invention is not to be limited to the details disclosed herein but is to be accorded the full scope of the following claims.

I claim as my invention:

1. An insulator for use with a wall having an opening therein, comprising: a body having an end formed so as to project into said opening; an interrupted annular rib formed on said body adjacent said end and providing shoulders which will engage said wall around said opening, said rib being interrupted by slots which extend from said shoulders to the back of said interrupted rib, the bottoms of said slots being arched from the front ends to the back ends thereof; resilient tongues extending through said slots and formed to snap over said arched bottom walls of said slots in grasping relation, the forward ends of said tongues being connected to said wall, and the rearward ends of said tongues having radially projecting shoulders thereon; and annular means passing around said rearward ends of said tongues and around said body in a position between said shoulders of said tongues and the back of said interrupted rib, said means engaging said shoulders and said back of said rib in such a manner as to restrict longitudinal movement of said tongues in said slots.

2. An insulator for use with a wall having an opening therein, comprising: a body having an end formed so as to project into said opening; an interrupted annular rib formed on said body adjacent said end and providing shoulders which will engage said wall around said opening, said rib being interrupted by slots which extend from said shoulders to the back of said interrupted rib; tongues extending through said slots, the forward ends of said tongues being connected to said wall, and the rearward ends of said tongues having radially projecting shoulders thereon; and a radially expansible ring means adapted to be passed around said rearward ends of said tongues and around said body in a position between said shoulders of said tongues and the back of said interrupted rib, said means resiliently engaging said shoulders and said back of said rib in such a manner as to restrict longitudinal movement of said tongues in said slots.

3. An insulator for use with a wall having an opening therein, comprising: a body having an end formed so as to project into said opening; an interrupted annular rib formed on said body adjacent said end and providing shoulders which will engage said wall around said opening, said rib being interrupted by slots which extend from said shoulders to the back of said interrupted rib; tongues extending through said slots, the forward ends of said tongues being connected to said wall, and the rearward ends of said tongues having radially projecting shoulders thereon; and an expansible ring means comprising a coil of at least one turn of spring metal having its ends equipped with means adapted for the application of manual force to expand said ring means, said ring means being adapted to be passed around said rearward ends of said tongues and around said body in a position between said shoulders of said tongues and the back of said interrupted rib, said means engaging said shoulders and said back of said rib in such a manner as to restrict longitudinal movement of said tongues in said slot.

4. An insulator for use with a wall having an opening therein, comprising: a body having an end formed so as to project into said opening; an interrupted annular rib formed on said body adjacent said end and providing shoulders which

will engage said wall around said opening, said rib being interrupted by slots which extend from said shoulders to the back of said interrupted rib; tongues extending through said slots, the forward ends of said tongues being connected to said wall, and the rearward ends of said tongues having radially projecting shoulders thereon; and an expansible ring means comprising a coil of several turns of spring metal having the ends thereof overlapped and bent outwardly so as to provide means for manual engagement to move said ends to expand said ring so that it may be passed around said rearward ends of said tongues and around said body in a position between said shoulders of said tongues and the back of said interrupted rib, said means engaging said shoulders and said back of said rib in such a manner as to restrict longitudinal movement of said tongues in said slot.

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