July 9, 1940. S. C. MILLER 2,206,913

NEON SIGN INSULATOR AND ATTACHING MEANS THEREFOR

Filed July 10, 1937 2 Sheets-Sheet 1

Fig. 1

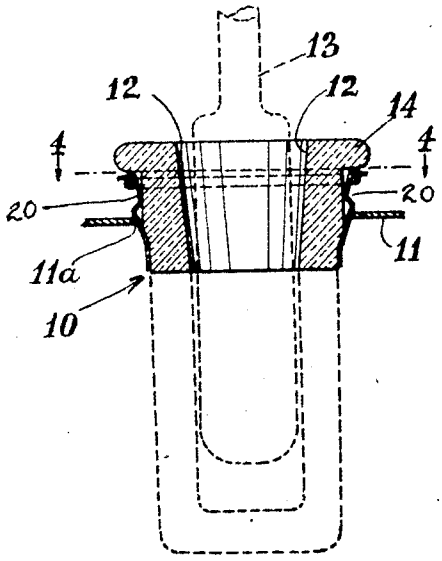


Fig. 2

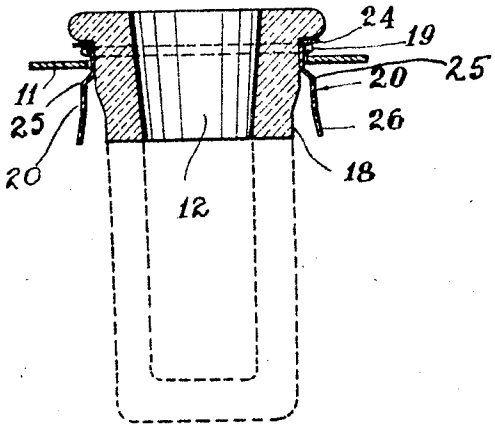


Fig. 3

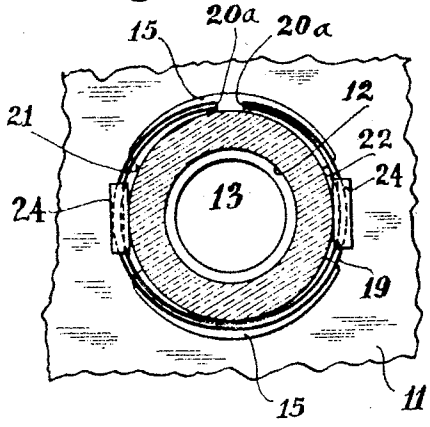


Fig. 4

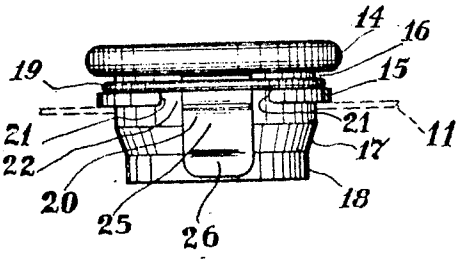
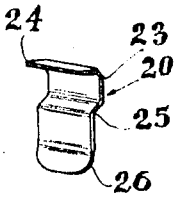


Fig. 5



WITNESSES:
Adalbert Hauser

INVENTOR
Samuel C. Miller,
BY
J. F. Bosselaar
HIS ATTORNEY

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NEON SIGN INSULATOR AND ATTACHING MEANS THEREFOR

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Fig. 6

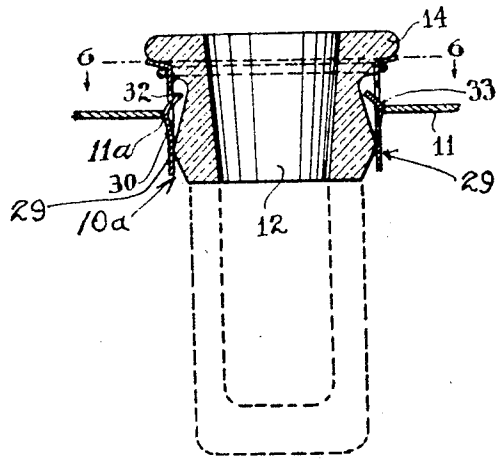


Fig. 7

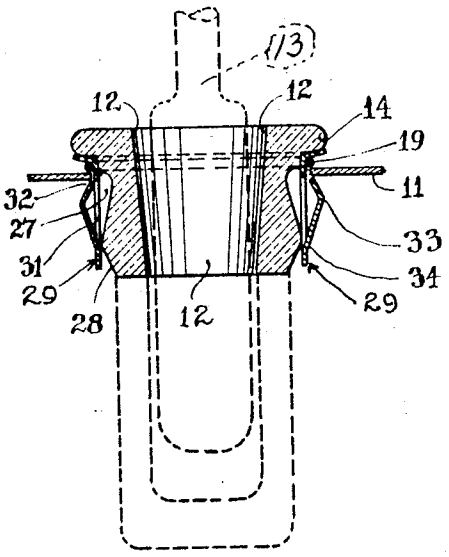


Fig. 8

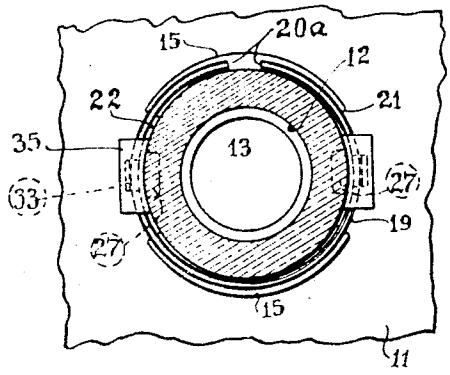


Fig. 9

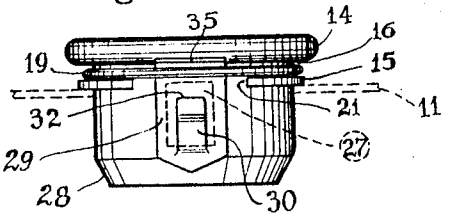


Fig. 10

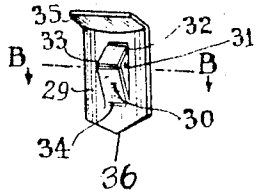


Fig. 11

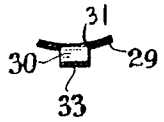
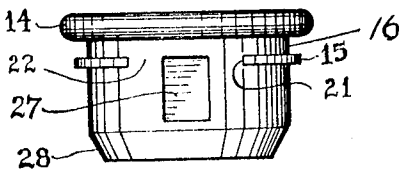


Fig. 12



INVENTOR.
Samuel C. Miller
BY J. Bassecches
his ATTORNEYS.

WITNESSES:
Adalbert Hauser

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UNITED STATES PATENT OFFICE

2,206,913

NEON SIGN INSULATOR AND ATTACHING MEANS THEREFOR

Samuel C. Miller, New York, N. Y.

Application July 10, 1937, Serial No. 152,922

11 Claims. (Cl. 173—339)

This invention relates to insulator constructions useful in connection with high tensioned illuminants such as neon tube sign assemblies and to attaching means therefor.

This application continues in part the features of my invention set forth in my application Serial No. 103,964 filed October 5, 1936 entitled High tension sign insulators and attaching means therefor.

In my application aforementioned I have described and illustrated insulator housings or collars and attaching means therefor where the insulator housings or collars are to be used in connection with the supporting plate or frame of a neon tube assembly and in which the insulating material may constitute glass such as Pyrex or boro-silicate type of glass. The contour of the insulating housing or collars have been described as illustrated of a form particularly amenable to casting operations. The attaching means therein described involve in general the provision of means to attach, replace or service the insulator from the front face of the sign frame.

The present invention carries forward the objective of my aforementioned application with additional elements of novelty combining efficiency in operation in use and mode of attachment with simplicity of construction and economy in production.

For the attainment of the general objectives set forth herein and more specifically enumerated in my aforementioned application and such further objects as may appear herein or be hereinafter pointed out, I make reference to the accompanying drawings forming a part hereof, in which

Figure 1 is a sectional view of one embodiment of my invention in the form of an insulator and attaching means;

Figure 2 is a corresponding view with the insulator affixed in position;

Figure 3 is a section taken on the line 4—4 of Figure 1;

Figure 4 is a side elevation of the assembly;

Figure 5 is a perspective view of a detail in the form of the attaching clips;

Figure 6 is a longitudinal sectional view of another embodiment of my invention shown in the partial position for location;

Figure 7 is a view corresponding to Figure 6 with the insulator affixed in position on the frame;

Figure 8 is a section taken on the line 6—6 of Figure 6;

Figure 9 is a side elevation of the insulator and its attaching assembly;

Figure 10 is a perspective view of a detail in the form of an attaching clip shown in the general assembly of Figures 6 to 9;

Figure 11 is a section taken on the line B—B of Figure 10;

Figure 12 is a side elevation of the insulator collar stripped of the attaching mechanism.

Making reference to the drawings, my invention contemplates the provision of insulator collar 10 to be used in high tension illuminating signs such as neon tube assemblies, which is arranged to be affixed to a frame plate 11 through an orifice 11*a* formed therein. While I have illustrated in the drawings as the preferred embodiment of my invention, a collar, it will be understood that the length of this member may be extended into a form of a housing, more particularly described in my Patent No. 2,046,960, July 7, 1936. The dotted line representations extending from the base of the collar in Figures 1, 2, 6 and 7 are intended to outline a cup-shaped housing, it being understood that the full lines represent the essential novelty with which the present invention is concerned.

The collar 10 (or in the case of a cup-shaped housing defined by the dotted lines) has a central boring 12 arranged to receive an electrode terminal of a high tension illuminant such as that found at the ends of a neon tube sign illuminant. This electrode outline appears in Figure 1 at 13.

The exterior portions of the collar 10 is provided with a flange or apron 14. Spaced from the flange or apron 14 is an abutment flange 15, providing a groove 16 along the neck of the collar between the flange or apron 14 and the abutment flange 15. The neck of the collar is extended to provide a clearance tapered portion 17, terminating into a substantially cylindrical portion 18, for purposes which will appear more clearly as this description proceeds.

The groove 16 is arranged to receive an annular ring 19 serving to hold a pair of clips 20 longitudinally disposed along the neck of the collar. The detail of the clips mentioned is more clearly illustrated in Figure 5. For purposes of disposing the clips 20 longitudinally along the neck of the collar 10, the abutment flange 15 includes terminating shoulders 21, forming a cut-out slot 22.

For positioning the clips 20 in the assembly, the annular ring 19 is made of spring wire split at the terminal portions 20*a*. Thereby the annular ring serves to encircle the neck of the collar with a resilient contact.

The clips 20 are each formed by metal stamping operations from springy sheet metal such as

phosphor-bronze to provide a groove 23 adapted to receive the annular ring. The groove is defined by the flange 24, and the offset 25. The offset 25 is bent to a contour to serve as a latching portion, as will more clearly appear as this description proceeds. The body of the clip 20 is then extended and terminates into a camming portion 26. The configuration of the camming portion 26 is planned to conform in part to the clearance portion 17 and neck 18 heretofore mentioned, as will clearly appear by reference to Figure 1.

With the assembly as provided, as will more clearly appear from an inspection of Figure 4, that is, first disposing one clip in each of the grooves 20 between the terminal portions 21 of the abutment flange 15, the annular ring is slipped into position in the groove 16 to hold the clips 20 adjacent two sides or neck of the collar, and riding in the groove 23 of the clips. With such an assembly, the collar may be positioned on the frame 11 by compressing the clips so that the terminal or camming portions 26 lie flat and nested against the neck portions 17 and 18 of the collar. Such form will be permitted against the resilient action of the annular ring 19, which spreads during this operation, as is more clearly shown in Figure 1, without distorting the configuration of the clips 20. The collar and clips will then pass freely through the orifice 11*a* up to the point where the insertion of the assembly reaches the latching portion 25 of the clips, whereupon by slight pressure the latching portions will clear the orifice 11*a* as movement of the assembly continues through the orifice 11*a*. Thereupon, the resilient pressure of the annular ring 19 against the clips will draw the upper ends of the clips against the body of the collar and spread out the latching portion 25 and camming portion 26, so that they may flare outwardly, as is clearly illustrated in Figure 2. In this position, the collar will be held securely in the frame 11, as the abutment flange 15 will ride against the outer face of the frame 11 and the latching portion 25 will engage the inner face of the frame 11 through the orifice 11*a*.

Ready removal of the collar from the frame may be effected by sharply pulling the entire assembly from the face, or by first drawing the annular ring 19 from its seated position by engaging some instrument with the terminal portions 20*a*. This operation will not distort the latching portion 25 of the clips 20, so that removal for replacement of the collar may be effected while preserving the efficiency of the attaching assembly described.

In Figures 6 to 12, I have illustrated another embodiment of my invention in the form of a collar 10*a* which has a central boring 12 adapted to receive an electrode 13 shown in dotted lines in Figure 7.

As in the previous embodiment, the exterior upper end of the collar is provided with an annular flange or apron 14. Spaced from the flange or apron 14, there is provided along the neck of the collar an abutment flange 15 forming a groove 16 between same and the flange or apron 14. In this groove an annular ring 19 may be disposed by spreading the terminal ends thereof, 20*a*, to ride over either one of the flanges 14 or 15. As in the previous embodiment, the abutment flange 15 is set off with shoulders 21, providing therebetween a longitudinal slot 22 arranged to receive a clip. Within the confines of the faced portion of the collar, between shoulders 21 and outlined by the groove 22, there is formed in the collar a clearance groove 27 for purposes which will appear more clearly as this description proceeds.

The neck of the collar disposed near the lower end thereof is formed with a generally tapered section 28 affording ready insertion of this end of the collar through the frame 11 and the orifice 11*a* thereof.

There is then provided clips 29, more clearly illustrated in detail in Figure 10. These members may be formed from sheet metal such as phosphor-bronze, or similar resilient metal sheeting by a metal stamping operation.

From the body of the clip 29, there is stamped out a tongue 30, leaving an orifice 31. The tongue is shaped with a terminal portion 32, a latching portion 33 along the bend 34 connecting the tongue 32 to the body of the clip. The upper edge of the clip is preferably formed with an outwardly directed flange 35, leaving a grooved portion between the same and the latching portion 33 for reception of the annular ring 19.

The lower end of the clip is preferably tapered or pointed at 36 to facilitate insertion of these members within the orifice 11*a*, as will more clearly appear hereinafter.

With clips of the character herein described, and employing a collar such as shown in Figure 11, one clip is disposed diametrically on the sides of the collar between the shoulders 21 in the groove 22, so as to abut the flange 35 against the apron or flange 14 of the collar. The clips are so positioned that the tongue 30 is superimposed over the clearance groove 27 formed in the collar. With the clips thus positioned, the annu'ar ring is then slipped over the same to have the annular ring ride in the groove 16 and over the clips in the space between the latching portion 33 and the flange 35 thereof.

With the assembly thus provided, the collar may be affixed on the frame 11 by inserting the same through the orifice 11*a* thereof, first inserting the ends 36 through the orifice. As the tongues 30 are distended and flare outwardly in their normal position, the insertion of the assembly through the orifice will encounter frictional resistance as the assembly is forced through the orifice. This movement will then compress the tongues hinging the same along the connecting portions 34. The tongue 30 will then be compressed substantially in the plane of the body of the clips 29, and be received by the clearance slot 27 as the tongue end 32 passes through the orifice 31. It will be observed that by the clearance slot 27 provided in the body of the collar a hinging action of the tongue 30 results against the inherent resiliency of the metal from which the tongue and the body of the clip is formed, without in any way distorting the latching portion 33 formed in the tongue 30.

As the pressure is continued against the assembly to the point where the latching portions 33 pass the walls of the orifice 11*a*, the tongues will again distend or flare outwardly as will more clearly appear in Figure 7. It will thus be observed that the collar may be affixed in position with the abutment flange 15 riding against the outer face of frame 11, and that the tongues 30 upon flaring or distending outwardly will hold the collar affixed in position by the resistance offered by the latching portions 33 and the terminal portions 32 to the inner face of the frame 11.

As in the previous embodiment, removal for replacement may be similarly effected.

While I have illustrated in the drawings particularly in connection with Figures 6 to 12, the latching portions of such form and resilient mounting to flare outwardly upon passing through the orifice through which the insulator is to pass, it is understood that positive connection against displacement may be effected by bending the latching tongues **30** in the case of the embodiment illustrated in Figures 6 to 12, and the clip **20** in the embodiment illustrated in Figures 1 to 5 so as to make withdrawal of the assembly as a whole impossible. The bending operation must be accomplished from the rear of the frame plate. It will be observed however that removal may then be accomplished by first removing the ring **19** in each embodiment whereupon the insulator may be removed leaving the clips in position for independent removal.

It will also be observed that a change in thickness of the frame plate **11** or an extension of the tongues **30** at the ends **32** will serve to prevent free play of the mounted assembly as conditions may find desirable.

It will thus be observed that I have provided a simple and economical collar or housing attaching assembly in which simple drillings in the frame may be used and in which affixation may be effected from the front face of the sign assembly cooperating with an insulator contour readily amenable to casting operations at which heat resisting glass, such as Pyrex glass, is workable. It will further be observed that I have provided a front face attaching device for insulators of the character described in which high operating efficiency for insulation is not impaired by the form of the attaching means provided, and further having elements of novelty in the rapidity of attachment or removal for replacement while maintaining the efficiency of the attaching means after repeated operations for attachment or removal as may be found necessary in the servicing of the illuminants to which the device is particularly applicable.

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

1. A high voltage electrode insulator assembly for combination with a sign frame of the character described and insertable and attachable solely from the front face thereof through an orifice in said frame, comprising in combination an insulator orificed to receive an electrode envelope and including a flange or apron, a frame-abutting flange spaced therefrom, and defining an annular groove therebetween, longitudinally disposed clips having a portion thereof abutting a part of said insulator in an endwise relationship and extending transversely across said groove, an annular ring fitted in said groove holding said clips in the longitudinal position, said clips being formed with latching offsets serving to engage the inner face of said frame.

2. A high voltage electrode insulator assembly for combination with a sign frame of the character described and insertable and attachable solely from the front face thereof through an orifice in said frame, comprising in combination an insulator orificed to receive an electrode envelope and including a flange or apron, a frame-abutting flange spaced therefrom, and defining an annular groove therebetween, longitudinally disposed clips having a portion thereof abutting one of said flanges and extending transversely across said groove, an annular ring fitted in said groove holding said clips in the longitudinal position, said clips being formed with latching offsets serving to engage the inner face of said frame.

3. A high voltage electrode insulator assembly for combination with a sign frame of the character described and insertable and attachable solely from the front face thereof through an orifice in said frame, comprising in combination an insulator orificed to receive an electrode envelope and including a flange or apron, a frame-abutting flange spaced therefrom, and defining an annular groove therebetween, longitudinally disposed clips having a portion thereof abutting one of said flanges and extending transversely across said groove, an annular ring fitted in said groove holding said clips in the longitudinal position, said clips being formed with latching offsets serving to engage the inner face of said frame, said latching offsets being resiliently mounted, whereupon passage through said orifice may not distort the same.

4. A high voltage electrode insulator assembly for combination with a sign frame and insertable and attachable solely from the front face thereof through an orifice in said frame, comprising in combination an insulator orificed centrally thereof to receive an electrode envelope and including exteriorly thereof a flange or apron, a frame-abutting flange spaced therefrom, and defining an annular groove between said flanges, cut-outs formed on said second flange defining longitudinal grooves, a clip disposed in each of said second mentioned grooves and lying transversely across said first groove, an annular ring fitted in said first groove, holding said clips in the longitudinal position, said clips being formed with latching offsets distendable to engage on the inner face of said frame adjacent the orifice formed therein.

5. A high voltage electrode insulator assembly for combination with a sign frame insertable and attachable solely from the front face thereof through an orifice in said frame, an inner orifice in said insulator arranged to receive an electrode envelope, the exterior portions of said insulator being formed with spaced flanges defining an annular groove, therebetween, one of which flanges serves to hold said insulator in frame-abutting position on the exterior face of said frame, a clearance slot formed in said last mentioned flange seating a longitudinally disposed clip, means seated in said groove holding said clip in the seated position thereof aforesaid, a latching offset formed in said clip resiliently mounted in respect of said insulator, and normally distended and flaring outwardly to engage the inner face of said frame adjacent the orifice.

6. A high voltage electrode insulator assembly for combination with a sign frame insertable and attachable solely from the front face thereof through an orifice in said frame, comprising in combination an insulator centrally orificed to receive an electrode envelope and including exteriorly thereof spaced flanges forming an annular groove therebetween, said flanges being materially larger than the orifice in the frame, a neck portion on said insulator readily insertable through said orifice of said frame, seats formed on one of said flanges, clips provided with latching portions arranged transversely of said groove in said seats, an annular ring for holding said clips in the seated position engaging said groove, said latching portions normally lying outwardly flared to engage the inner face of the frame,

said latching portions being resiliently mounted and capable of being compressed without deformation of the said latching portion.

7. A high voltage electrode insulator having a collar and neck portion insertable through an orifice in a sign frame and comprising a central orifice to receive an electrode envelope and including exteriorly thereof spaced flanges forming an annular groove therebetween, one of said flanges serving as a frame-abutment member, said flange forming the abutment member being formed with longitudinal seats, each one of which being arranged for receiving a longitudinally disposed attaching clip, said seats being positioned adjacent said annular groove.

8. A high voltage electrode insulator having a collar and neck portion insertable through an orifice in a sign frame and comprising a central orifice to receive an electrode envelope and including exteriorly thereof spaced flanges forming an annular groove therebetween, one of said flanges serving as a frame-abutment member, said flange forming the abutment member being formed with longitudinal seats, each one of which being arranged for receiving a longitudinally disposed attaching clip, and clearance portions formed on the neck of said insulator adjacent each of said seats for receiving a compressed portion of the clip for said seat.

9. A high voltage electrode insulator having a collar and neck portion insertable through an orifice in a sign frame and comprising a central orifice to receive an electrode envelope and including exteriorly thereof spaced flanges forming an annular groove therebetween, one of said flanges serving as a frame-abutment member, said flange forming the abutment member being formed with longitudinal seats for receiving longitudinally disposed attaching clips, and clearance portions formed on the neck of said insulator adjacent each of said seats for receiving a compressed portion of the clip for said seat, said clearance portion comprising a recess formed in the neck of said insulator underlying the seat for said clip.

10. In a high voltage electrode insulator assembly comprising a tubular insulator formed exteriorly thereof with a flange or apron, an abutment flange spaced therefrom defining an annular groove having terminating portions defining a seat for one of several attaching clips, each of said clips comprising a flange and a latching portion defining a groove arranged to be aligned with said annular groove for receiving an annular ring, said flange of said clip serving to abut the flange or apron of said insulator.

11. In a high voltage electrode insulator assembly for combination with a sign frame, and including an insulator formed with spaced flanges, the space therebetween defining an annular groove on the exterior thereof, and in which one of said flanges serves as a sign frame face-abutting member and in which said face abutting member is formed with clip defining seats, clips therefor comprising sheet metal stampings having an outwardly disposed flange and a latching member defining a groove for receiving an annular attaching member disposed in said annular groove and cooperating together to form the seat for the annular attaching member, said latching member being formed of a tongue struck up from the body of said clip and resiliently disposed in relation to the body of said clip.

SAMUEL C. MILLER.