

Dec. 30, 1952

R. BROWN

2,623,988

TUBE AND SUPPORT COMBINATION FOR ILLUMINATED SIGNS

Filed May 24, 1948

Fig. 1.

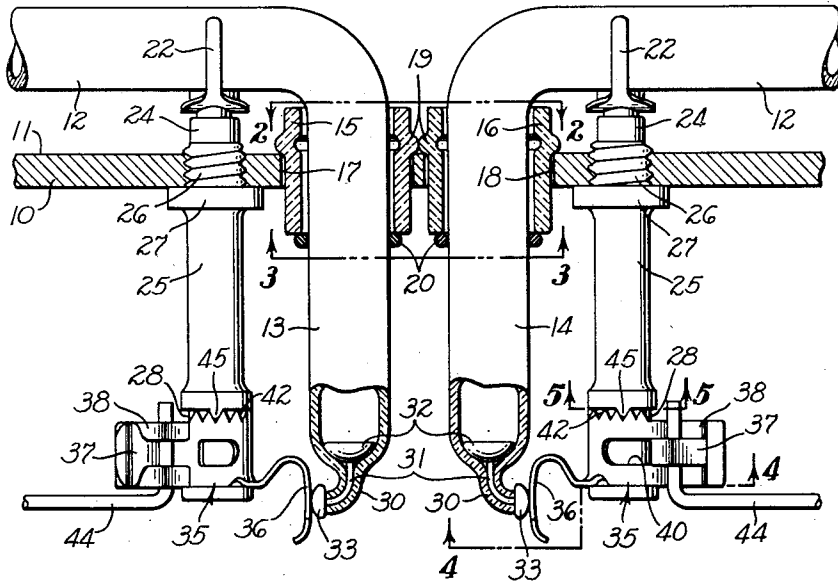


Fig. 2.

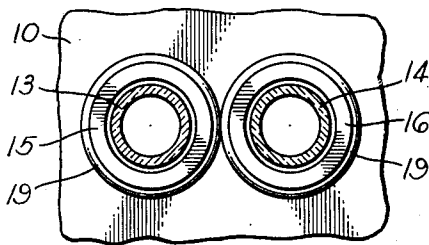


Fig. 3.

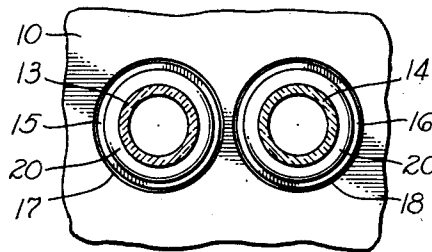


Fig. 4.

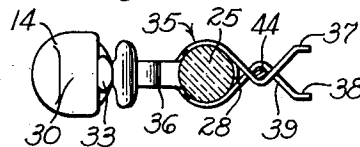


Fig. 6.

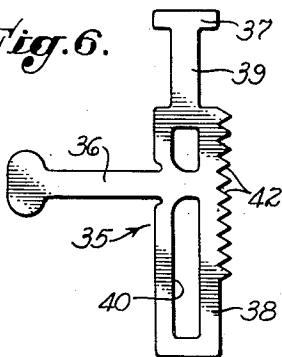
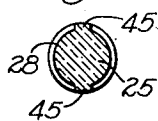


Fig. 5.



INVENTOR.
RALPH BROWN
BY HIS ATTORNEYS.
HARRIS, KIECH, FOSTER & HARRIS
By *Ward D. Foster.*

UNITED STATES PATENT OFFICE

2,623,988

TUBE AND SUPPORT COMBINATION FOR
ILLUMINATED SIGNS

Ralph Brown, Fall Brook, Calif., assignor to Elec-
trical Products Corporation, Los Angeles, Calif.,
a corporation of California

Application May 24, 1948, Serial No. 28,763

8 Claims. (Cl. 240—11.4)

1

This invention relates generally to the display or advertising sign art and more particularly to illuminated signs employing luminescent tubes for illumination purposes. Specifically, the invention pertains to a new and improved illuminating tube and means for mounting said tube on a sign or the like.

In the manufacture of illuminated signs in which luminescent tubes are employed for forming the letters or other sign characters, the ends of the tubes, particularly tubes which form closed letters such as "D," "O" and "Q," and closed portions of other letters, numerals or special characters, it heretofore has been necessary to space the electrode ends of such tubes at a considerable distance in order to safeguard against arcing or short-circuiting of the electricity thereacross and in order to meet the fire underwriters' requirements and local building codes. In other words, the electrode ends of the tubes which extend through openings in and are disposed at the rear of or within the sign must be spaced apart at a distance which will avoid fire hazard. As will be apparent, when the bent ends of the tube are arranged in this manner, an opening or gap occurs between the ends and this discontinuity of the letter character detracts from the appearance of the sign since it is readily apparent to persons viewing the sign. In an effort to avoid such discontinuity, the ends of the luminescent tubes have been bent back upon themselves or, in other words, looped before being bent at right angles to extend through the openings in the sign, the loops being arranged in proximity to reduce the width of the gap. While this procedure alleviates the difficulty noted above, the length of the illuminating tube is substantially increased and the cost of producing the tube is likewise increased. Moreover, the return portions of the loops must be suitably shielded or masked to avoid double illumination of this portion of the sign character.

It is an important object of the present invention to provide an illuminated sign in which the end portions of the luminescent tube forming the letter or other character are arranged closely adjacent each other so that the gap which usually occurs between the ends of the tube is practically eliminated and a more continuous letter is produced.

Another object is to provide a sign illuminating tube having right-angular bent end portions insertable through apertures in the sign, and provided with end terminals or electrodes which are offset in opposite directions with respect to the

2

axes of the bent end portions. By this means, the ends of the electrodes of adjacent ends of a tube or tubes are spaced at a safe distance within the sign while the adjoining exterior end portions of the tubes, which are observable by persons viewing the sign, are spaced at a minimum distance to avoid gaps therebetween. In this manner, the general appearance of the sign is greatly improved without altering the spacing between the electrodes so that a safe minimum distance, corresponding with that specified by the building codes and fire underwriters, is maintained. This object is best attained by providing illuminating tubes whose extremities are formed with angular tips bent in directions away from each other so that the ends of the electrodes are offset with respect to the axes of the ends of the tube.

Another object of the invention is to provide an illuminating tube for signs in which the electrodes include wires which extend through the angular ends of the tube and which are provided with button-like tips or terminals engageable with resilient electrode contact elements which supply electric current to the electrode tips so as to effect a positive and maximum engagement therebetween.

Another object is to provide, in a sign of the character referred to, insulated posts or support members secured to the sign and providing means for supporting the illuminating tube on the sign structure and for holding the electrode terminal elements, the arrangement being such that the elements are resiliently mounted on the supporting posts and held against rotation thereon by interengaging key means on the posts and terminal elements.

Another object is to provide, in a sign of the type indicated, supporting means for releasably holding the illuminating tube in place on the sign, said means comprising resilient holders carried by the aforementioned posts, into which the tube can be snapped and from which the tube can be readily removed.

Another object is to provide an illuminated sign in which the ends of the illuminating tubes pass through bushings disposed in holes in the sign and it is a further object to provide water-proof sealing means on the ends of the tube engageable with the bushings to seal the inner electrode ends of the tubes from the atmosphere.

A further object of the invention is to provide in an illuminated sign a novel means for mounting the illuminating tubes on the sign, this means being highly efficient in holding the tubes in

place and greatly facilitating the installation of the tube on the sign and its removal therefrom.

A still further object is to provide an electrode terminal which resiliently engages the electrode tip of the tube so that a positive electrical contact is effected by the mere insertion of the end of the tube through the wall of the sign, and the use of clamps, clips or other manually operated contact elements is avoided.

Further objects of the invention will appear from the following detailed description and the drawing, which is intended for the purpose of illustration only, and in which:

Fig. 1 is a plane view of a portion of the wall of an illuminated sign, showing the means for mounting the ends of an illuminating tube on the wall and also the electrode contact means, certain parts being shown partly in section;

Fig. 2 is a cross-sectional view, taken on line 2—2 of Fig. 1;

Fig. 3 is a cross-sectional view, taken on line 3—3 of Fig. 1;

Fig. 4 is a cross-sectional view, taken on line 4—4 of Fig. 1;

Fig. 5 is a cross-sectional view, taken on line 5—5 of Fig. 1; and

Fig. 6 is a view of the contact element prior to bending to final shape.

Referring to the drawing in detail, the present invention is directed to an illuminated sign having a wall 10, upon the outer face 11 of which letters, numerals or other sign characters may be provided and illuminated by electric luminescent tubes 12. The tubes 12, which follow the outline of the characters, have their end portions 13 and 14 bent inwardly at right-angles to the plane of their main portions, these ends usually extending through holes in the wall of the sign and being provided with electrodes which are engaged by electrical terminal elements through which electric current passes to the electrodes to energize the tubes. While the tube end portions 13 and 14 shown in Fig. 1 might be considered the adjacent ends of different tubes they will be herein referred to as the opposite ends of a single tube 12 by way of example. The bent ends 13 and 14 of the tube 12 extend through respective bushings 15 and 16 which are constructed from dielectric material and which are disposed in apertures 17 and 18 in the wall 10 of the sign. The bushings 15 and 16 have peripheral flanges 19 which abut the forward face 11 of the wall 10 to prevent passage of the bushings through the apertures. A resilient sealing ring 20 surrounds each end 13 and 14 of the tube 12 and engages against the inner ends of a bushing 15 and 16 to seal the opening between the bushings and the tube ends so as to prevent rain, snow and the like from entering the interior of the sign structure to interfere with the electrical connections.

The tube 12 is held in place on the sign at a predetermined distance from the face 11 thereof by means of U-shaped spring clips or holders 22 which are carried by the forwardly projecting ends 24 of posts or supporting members 25 made from glass, porcelain or other non-corrosive, dielectric material. The posts 25 may have screw-threaded portions 26 which are screwed into threaded holes in the wall 10, flanges 27 on the posts abutting the inner surface of the wall to locate the posts in proper position. As shown in Fig. 1, the major portion of each post is disposed at the rear or inner side of the wall 10 and is provided with a peripheral groove 28 adjacent its

innermost end, for the purpose to be hereinafter explained.

In the manufacture of illuminated signs employing neon or luminescent tubes, it has been necessary to separate the bent ends of the tubes in order that their tips or electrodes would be spaced at a safe distance to insure against short-circuiting thereacross. The spacing of the end portions of a tube in this manner has resulted in the occurrence of a very noticeable and objectionable gap therebetween. In the case of a single loop tube it is desirable that the ends of the tube be disposed in close proximity in order to avoid such discontinuity of the letter formed by the tube but this objective has been extremely difficult to attain since the distance between the electrodes, as established by the building codes, is the determining factor and must be maintained. As previously explained, in order to avoid such discontinuity of the letter or other sign character it has been considered necessary to loop the ends of the tube, that is, bend the tube back upon itself before forming the right-angular bent portions which carry the electrodes and which pass through the holes in the wall of the sign. By this provision, the gap between the looped ends of the illuminated letter is substantially reduced and at the same time the terminal ends or electrodes of the tube are disposed at a safe distance apart. It will be apparent that the operation of looping the adjoining ends of the tube complicates its manufacture and entails considerable expense. Moreover, since the inner portions of the loops are readily observed, they must be shielded or masked to prevent double images of these portions of the letters or characters. Furthermore, when the tubes are formed with such looped portions, they must be spaced at a considerable distance from the wall of the sign and this is objectionable for the reason that the tubes do not properly define the characters over which they are disposed and the general appearance of the sign is impaired.

In accordance with the present invention, this objectionable condition is overcome by so constructing the tube that its exposed ends can be arranged in close proximity while its electrode tips are maintained at a safe distance apart. This highly desirable condition is attained by providing the extremities of the bent end portions 13 and 14 of the tube 12 with angular tubular extensions 30 of greatly reduced diameter. The extensions enclose electrode wires 31, the inner ends of which are connected to electrodes 32 within the ends of the tube 12. The extensions 30 preferably project at right angles to the axes of the ends 13 and 14 of the tube and in opposite directions so that electrode button-like contact tips 33, formed at the outer ends of the electrode wires 31, are spaced apart at a distance which is considered safe and which meets the requirements of the underwriters and the building codes. As will be apparent, the amount of offset of the electrode contact tips 33 with respect to the axes of the end portions 13 and 14 of the tube 12 may be varied in accordance with these requirements. It is thus seen that by providing the ends of the tube with offset inner ends, the exposed portions or tips of the electrodes are adequately spaced while the outer exposed end portions of the tube are maintained in close proximity so that substantial continuity of the letter or other character formed by the tube is effected.

It is within the concept of this invention to

provide contact elements, within the sign, engageable with the offset tip ends of the electrodes for supplying electric current thereto. In accordance with this invention, the metal contact elements are insulated from the sign structure by being mounted on the dielectric posts or supporting members 25, previously referred to, and preferably are of a resilient nature so that positive engagement of the elements with the ends of the electrodes is maintained. Each contact element 35 is preferably made as a stamping from spring metal and, as shown in Fig. 6, is T-shape, being provided with an arm 36 and clip fingers 37 and 38 projecting from one end of the arm at right-angles thereto and in opposite directions with respect to each other. The fingers 37 and 38 are bent into substantially V-shape, as shown in Fig. 4, the finger 37 having a narrowed portion 39 adapted to pass through an elongate opening 40 in the finger 38. The arm 36, which constitutes the contact, is preferably bent angularly as shown in Fig. 1 so as to provide, in effect, a leaf spring possessing maximum resiliency, the downwardly extending contact portion being adapted to make contact with one of the electrode contact tips 33 of the illuminating tube 12. An edge of the mid-portion of the contact element 35, between the fingers 37 and 38 is serrated so as to provide a series of notches 42.

Each contact element 35 is mounted on a supporting member 25 by flexing the arms 37 and 38 around the member within the peripheral groove 28 thereof. At this time, the V-shaped narrow portion 39 of the arm 37 is passed through the opening 40 of the other arm 38 so as to define a hole between the arms for receiving the bent end of an electrical conductor 44. When pressure against the arms 37 and 38 is relieved, the arms tend to spring outwardly, due to their inherent resiliency, so that they grip the end of the conductor 44 firmly therebetween as shown in Figs. 1 and 4. Each contact element 35 is held against rotation on its respective support member or post 25 by reason of the engagement of a pair of pointed lugs 45 on the post engageable in a pair of the notches 42. By this key means, the contact elements 35 can be retained in any position of rotative adjustment.

From the foregoing description, it will be seen that during the installation of the illuminative tube 12 on the sign wall 10, the end portions 13 and 14 of the tube are inserted through the respective bushings 15 and 16 and as the tube approaches a position wherein it is spaced from the surface 11 of the sign at the desired distance it engages with and snaps into place between the spring fingers of the U-shaped clips 22, which then serve to retain the tube in place on the sign.

During the installation of the tube in this manner, the tips 33 of the tube electrodes 32 encounter and depress the contact arms 36 against the inherent resiliency thereof so that a firm engagement and positive electrical connection is effected. It will be apparent that electrical current supplied through either of the conductors 44, passes through the contact elements 35 and thence into the tube 12 by way of the electrodes 33, 31, 32.

To remove the illuminative tube 12, it is only necessary to draw the same away from the sign wall 10, the fingers of the clips 22 yielding to permit this movement. As the ends 13 and 14 of the tube slide outwardly their electrode tips 33 ride off the resilient contact arms 36 to break

the electrical connection. Since the contact elements 35 are held against rotation in the parts 25, positive engagement of the electrode tips 33 with the resilient contact arms 36 when the tube 12 is re-installed, is assured.

It will be observed from the foregoing that the present invention provides an improved illuminating tube for use on advertising and display signs and a novel means for mounting the tube on the sign. By this means, the tube is positively held in place at a desired distance from the face of the sign. As an important feature of improvement, the invention provides a tube having its electrode tips offset with respect to the axes of the bent terminal portions of the tube so that the exposed ends of the tube may be brought into close association so as to avoid a space or gap therebetween which, if present, would detract greatly from the appearance of the letter or other sign character represented by the tube. By so forming the tube, the ends or tips of the electrodes are maintained at a safe distance apart so that short-circuiting of the system is entirely avoided. The invention further provides an electrical contact elements so constructed and disposed with respect to the end of the tube that it automatically engages with the offset electrode tip of the tube as the latter is mounted on the sign. The contact element is made resiliant so that a firm engagement and positive electrical connection is maintained. As a further feature of the invention, the tube-holding clip and the contact element are carried by the same supporting means so that the construction is greatly simplified.

While the improved illuminating tube, the means for holding the same and the means for effecting electrical connection with the electrode of the tube have been herein shown and described as embodied in preferred forms of construction, by way of example, it will be obvious that various modifications might be made therein without departing from the spirit of the invention. Consequently, I do not wish to be limited in this respect, but desire to be afforded the full scope of the appended claims.

I claim as my invention:

1. An illuminated sign including: a sign wall; gas-filled tube portions of insulating material disposed along the face of said wall; means supporting said tube portions on said wall, each tube portion having an end extending approximately at right angles to such portion and through an opening in said sign wall, such ends lying in closely adjacent parallel relationship; reduced extensions of said ends of said tube portions extending from said ends and approximately at right angles to the axes of said ends; electrodes carried by said extensions and projecting in opposite directions from the ends thereof and radially from said axes, said electrodes having exposed contact tips at their extremities, which tips are spaced farther apart than said axes; and contact elements carried by said sign wall and in frictional engagement with said exposed contact tips to supply electric energy to the latter, said contact tips terminating within the projected peripheral boundaries of the adjacent walls of the respective right-angularly extending ends.

2. The combination set forth in claim 1, in which said supporting means includes: posts of insulating material mounted on the sign wall and and provided with grooves adjacent one end for

7

receiving said contact elements; and clip means mounted directly on the other ends of said posts for receiving and supporting said tube.

3. The combination set forth in claim 1, in which said supporting means includes: posts of insulating material mounted on the sign wall and provided with grooves adjacent one end for receiving said contact elements; interengaging means on said posts and said contact elements for preventing relative rotation therebetween; and clip means carried directly by the other ends of said posts for receiving and supporting said tube.

4. In an illuminated sign having a wall provided with apertures, the combination of: a plurality of supporting members of dielectric material held in certain of said apertures and having forward ends projecting forwardly from the obverse side of said wall and rearward ends projecting rearwardly from the reverse side of said wall, said rearward ends having peripheral grooves; spring clip elements carried by the forward ends of said supporting members; a plurality of gas-filled tubes supported by said clip elements in spaced relation to the obverse side of said wall, said tubes having right-angularly bent ends projecting rearwardly through other of said apertures, adjacent ends of one or more of said tubes being arranged in close proximity and provided with electrodes having exposed tips, the electrode tips of adjacent tube ends being spaced at a distance greater than the distance between the axes of said tube ends; and resilient electrical contact elements disposed in said peripheral grooves of said supporting members and each engageable with one of said electrode tips.

5. In an illuminated sign having a wall provided with apertures, the combination of: a plurality of supporting members of dielectric material held in certain of said apertures and having forward ends projecting forwardly from the obverse side of said wall and rearward ends projecting rearwardly from the reverse side of said wall, said rearward ends having peripheral grooves; spring clip elements carried by the forward ends of said supporting members; a plurality of gas-filled tubes supported by said clip elements in spaced relation to the obverse side of said wall, said tubes having right-angularly bent ends projecting rearwardly through other of said apertures, adjacent ends of one or more of said tubes being arranged in close proximity and provided with electrodes having exposed tips, said electrode tips of adjacent tube ends being offset with respect to the axes of said tube ends in directions opposite to each other, the tips of adjacent tube ends being thus spaced at a distance greater than the distance between the axes of said tube ends; and resilient electrical contact elements releasably held in said peripheral grooves of said supporting members and each yieldingly engageable with one of said electrode tips.

8

6. A combination as in claim 4 wherein said electrode tips are located within the projected peripheral boundaries of the respective right-angular tube ends.

7. A combination as in claim 5 wherein said electrode tips are located within the projected peripheral boundaries of the respective right-angular tube ends.

8. In an illuminated sign having a wall provided with apertures, the combination of: a plurality of supporting members of dielectric material held in certain of said apertures and having forward ends projecting forwardly from the obverse side of said wall and rearward ends projecting rearwardly from the reverse side of said wall, said rearward ends having peripheral grooves; spring clip elements carried by the forward ends of said supporting members; a plurality of gas-filled tubes supported by said clip elements in spaced relation to the obverse side of said wall, said tubes having right-angularly bent ends projecting rearwardly through other of said apertures, adjacent ends of at least some of said tubes being arranged in close proximity and provided with electrodes having exposed tips, the electrode tips of adjacent tube ends being spaced at a distance at least as great as the distance between the opposed side walls of the adjacent right-angular tube ends, such tips being disposed approximately within the projected peripheral boundaries of said right-angular tube ends; and resilient electrical contact elements disposed in said peripheral grooves of said support members and engageable with at least one of said electrode tips.

RALPH BROWN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
705,597	Murray	July 29, 1902
1,907,295	Hilliard	May 2, 1933
1,913,815	Nelson	June 13, 1933
2,020,886	Hammar	Nov. 12, 1935
2,056,665	Frech	Oct. 6, 1936
2,044,464	Carey	June 16, 1936
2,147,847	Kresge	Feb. 21, 1939
2,152,319	Link	Mar. 28, 1939
2,166,951	Germer	July 25, 1939
2,235,640	Kresge	Mar. 18, 1941
2,238,589	Hensler	Apr. 15, 1941
2,296,326	Barclay	Sept. 22, 1942
2,309,676	Schmidling	Feb. 2, 1943
2,311,829	Hart	Feb. 23, 1943
2,448,937	Walter	Sept. 7, 1948

FOREIGN PATENTS

Number	Country	Date
141,097	Austria	Mar. 25, 1935