Feb. 23, 1937. T. MARTIN 2,071,699

TUBE SOCKET

Filed Dec. 10, 1935

Fig 1

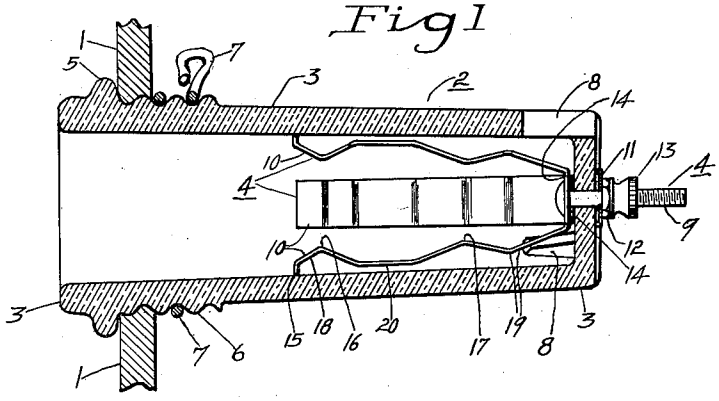


Fig 2

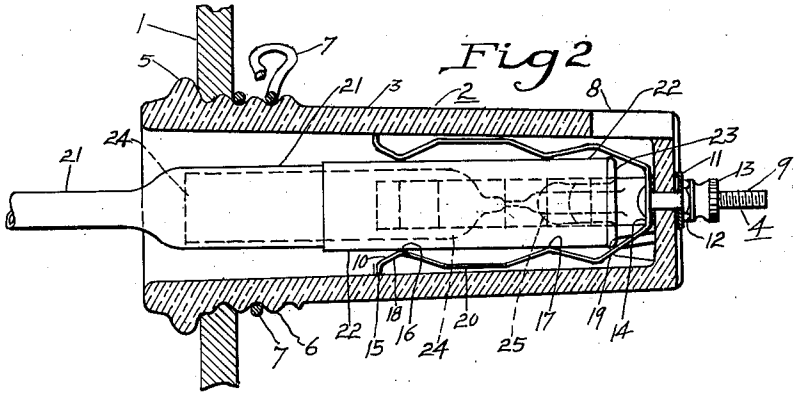


Fig 3

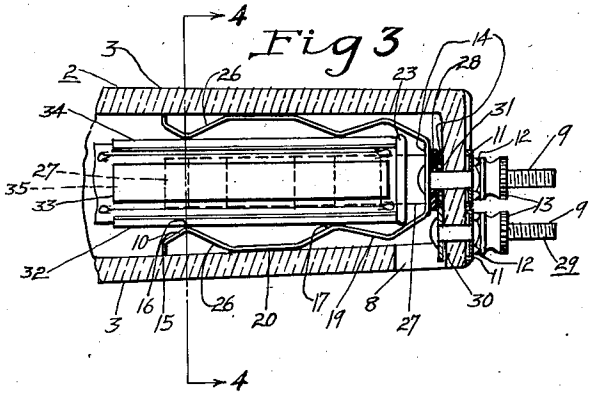
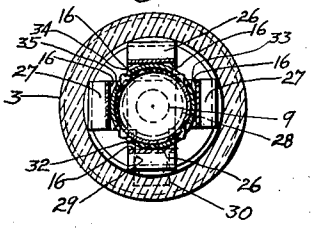


Fig 4



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2,071,699

TUBE SOCKET

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7 Claims. (Cl. 173—328)

The invention relates generally to electric conductor sockets and is directed more particularly to receptacle sockets for retaining neon tubes and the like.

The present practice of making up a neon sign requires the use of insulating anchor posts for supporting the neon tube across the face of the sign. These supporting posts or anchor members are required to carry the mechanical load of the tube which consists of its weight and the vibrations to which the tube is subjected. These posts are usually constructed from a piece of glass tubing having an open trough on the top thereof in which the neon tube rests and to which it is secured by means of tie wires. The other end of the post is usually provided with a metal base adapted to be secured to the face of the sign board. In character these posts are analogous to the insulator art wherein a transmission line is secured by tie wires to the top of a porcelain insulator mounted on a cross arm or the like. In both arts such insulators are a source of trouble and particularly in the neon art wherein the vibration of the tube strains against the rigid posts, causing the tube and/or the posts to break.

Again in changing neon sign letters one is required to remove all of these tie wires and perhaps supply new posts for new letters on the sign. This causes considerable expense in material and labor. When it is necessary to replace a broken tube or to substitute new letters in the sign such alterations also require skilled workmanship. Owing to the location of the signs it is quite frequently difficult to make such changes with the present practice of mounting the neon tube.

The principal object of this invention is the provision of a conductor socket or receptacle that is capable of supporting a neon tube without the aid of the insulating posts and tie wires or other additional supports and thereby overcome these difficulties.

Another object of my invention is the provision of a conductor socket that will insure low resistance contact between the lead wires and the tube.

Another object is the provision of a conductor socket wherein a tube may be readily removed therefrom or inserted therein by an unskilled person.

A further object is the provision of a socket wherein two circuits may be transmitted to a single tube.

Other objects, advantages and means to effect the same will appear from the following description.

In the accompanying drawing wherein I have illustrated a practical embodiment of the principles of my invention,

Fig. 1 is a sectional view showing a conductor socket without a tube inserted therein.

Fig. 2 is a view similar to Fig. 1 showing the tube in place.

Fig. 3 is a view similar to Fig. 2 showing a conductor socket having two polarimeters.

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 3.

Referring to the drawing, 1 represents the panel of a signboard or the like on which is mounted the tubular neon socket 2. This socket comprises the receptacle 3, preferably made of porcelain or like material, and the conductor assembly 4.

The receptacle is provided with the flange 5 and the external threaded portion 6 which is arranged to be screwed through a hole in the panel 1 and secured in place as by the spring nut 7. The inner edges of the receptacle are generally provided with the apertures 8 to permit the escape of dirt and water that may seek its way into the socket.

The center of the inner end of the receptacle is also provided with a hole to receive the threaded bolt 9, the head of which holds the socket fingers 10 in their proper position within the receptacle. The outer end of the bolt 9 is provided with the lock washer 11 and the nut 12 which secures the conductor assembly to the receptacle. 13 represents a terminal nut for securing a lead wire from a transformer or other source to the conductor assembly.

The socket fingers 10 are preferably made of bronze or similar material that will resist corrosion, provide proper spring pressure and have the desired electrical characteristics. As shown herein, I provide four fingers made up from two strips. However, for extraordinary long and heavy neon tubes additional fingers may be added. In assembling these fingers I prefer to weld or solder these strips together so that they will maintain their proper spaced relation. If on the other hand more than one circuit is to be electrically connected to a single tube, then these fingers must be insulated from one another, as will be later explained.

Referring specifically to the fingers 10, shown in the drawing, it will be noted that they are provided with the abutments 14 and 15. The abutment 14 is made fast by the bolt 9, whereas the

abutment 15 is arranged to contact the inner surface of the tubular receptacle 3 and is also preferably free to slide longitudinally thereof.

16 and 17 represent tube contact or suspension points of the fingers which are between the abutments and connected therewith by the span sections 18 and 19. 20 represents the intermediate span section between the contact points 16 and 17.

The opposing contact points of the several fingers when inactive are spaced apart a distance somewhat less than the diameter of the object to be grasped to enable the fingers to firmly hold the object as illustrated in Fig. 2.

The span sections 18, 19 and 20 are so constructed as to redirect the forces transmitted from the abutments 14 and 15 and the contact points 16 and 17 to provide increased radial pressure on the tube when the fingers are expanded by its insertion. When assembled the fingers are provided with initial spring tension tending to expand them outwardly, thereby forcing the abutment 14 tighter against the wall of the tubular receptacle.

The tube 21 may be provided with the metallic adapter shell or base 22 to aid in withstanding the pressure exerted by the fingers and also serve to conduct the electric current to the elements in the tube. This base may be corrugated or threaded as in the case of a light bulb. However, if the base is cylindrical it is preferable to provide the flange portion 23 on the end which by its engagement with the contact points prevent accidental dismounting of the tube.

The proximity of the base 22 to the electrode 24 and the pinch seal 25 within the tube is not per se a part of this invention and is therefore not described in detail.

When the base 22 of the tube 21 is inserted in the socket and past the contact points 16 and 17, as shown in Fig. 2, the span sections 18, 19 and 20 are under compression and the angular parts thereof expand, causing the free abutment 15 to creep along the inner wall of the receptacle. By properly forming the span sections with respect to the inner wall of the receptacle, which may or may not be tapered, the desired gripping characteristics of the fingers may be produced. By providing two tube contacting points on each finger the tube is not permitted to rock within its socket, which frequently results in breakage. Again owing to the fact that the two tube contacting points 16 and 17 are suspended between the abutments 14 and 15 the tube in effect is resiliently mounted. The fingers furnish the proper cushion effect and absorb or substantially prevent the transmission of vibrations between the sign panel and the tube.

Referring to the modification shown in Figs. 3 and 4, the strips which form the two pairs of fingers 26 and 27 are insulated from one another by means of the interposed member 28 which may be an integral part of the receptacle 3 or a separate disk. The bolt 9 thus mechanically holds the fingers in place and serves as a terminal for the fingers 26, whereas the bolt 29 serves as the terminal to electrically connect the fingers 27 through the bus strap 30. Where the bolt 9 passes through the central portion of the strip which forms the finger 27 I provide the insulating washer 31.

The center portion of the span section 20 may be designed to rest against the wall of the receptacle as shown in Fig. 3, thus providing an additional abutment to support the contact points 16 and 17. This arrangement provides additional gripping qualities but is not as resilient as the form shown in Fig. 2.

With this design it is necessary to provide a shell or base made up in four sections 32, 33, 34 and 35, wherein the opposite sections which are of like polarity may be connected to one another across the base of the tube but insulated from each other and connected to their respective elements within the tube. The tube may be grooved longitudinally to receive these base sections and they may be held in place as by cementing.

This type of socket would be advantageous for mercury tubes and the like where a starting electrode of filament is used.

I claim:—

1. In a socket, the combination of an open ended housing made of insulating material and having a smooth continuous inner wall, a gripping finger extending longitudinally within the housing and secured to the closed end thereof, abutments on said finger adjacent the ends thereof and in direct engagement with the wall of the housing for supporting said finger, and a pair of contact points spaced longitudinally on said finger intermediate of said abutments for engaging and gripping an inserted object, said outer abutment being in sliding engagement with the inner wall of the housing.

2. In a socket, the combination of an open ended housing made of insulating material and having a smooth continuous inner wall, a gripping finger extending longitudinally within the housing and secured to the closed end thereof, abutments on said finger adjacent the ends thereof and in direct engagement with the wall of the housing for supporting said finger, and a pair of contact points spaced longitudinally on said finger intermediate of said abutments for engaging and gripping an inserted object, the inner abutment being fixed relative to the housing and the outer abutment being slidable longitudinally of the housing as the object engages said contact points.

3. In a socket, the combination of an open ended housing made of insulating material and having a smooth continuous inner wall, a plurality of gripping fingers extending longitudinally within the housing and secured to the closed end thereof, abutments on said fingers adjacent the ends thereof and in direct engagement with the wall of the housing for supporting said fingers, and a plurality of contact points spaced longitudinally on said fingers intermediate of said abutments for engaging and gripping an inserted object, said outer abutment being in sliding engagement with the inner wall of the housing.

4. In a socket, the combination of an open ended housing made of insulating material and having a smooth continuous inner wall, gripping means extending longitudinally within the housing and secured to the closed end of the latter, said means having alternate abutments, longitudinally spaced apart and engaging the wall of the housing, and contact portions for gripping an inserted object, and the innermost abutment being fixed while the remaining abutments are in sliding engagement with the wall of the housing.

5. In a socket, the combination of an open ended housing made of insulating material and provided with a smooth bore, gripping means extending longitudinally therein, the inner end of said gripping means being secured to the inner closed end of the housing, and said gripping

means being also provided with a plurality of longitudinally spaced abutments in sliding engagement with the bore of the housing, and contact portions on said gripping means intermediate of said abutments and spaced longitudinally thereof for engaging an inserted object.

6. An electric socket for use with a plug member having a plurality of contact surfaces mounted on the perimeter thereof, the combination of an open ended housing made of insulating material and having a smooth bore, a plurality of gripping fingers insulated from each other and extending longitudinally within the housing, said fingers being secured to the closed end of the housing, abutments on said fingers adjacent their ends and in direct engagement with the wall of the housing, and a plurality of longitudinally spaced contact points on each finger intermediate of said abutments for engaging and gripping the respective contact surfaces on a plug.

7. An electric socket for use with a plug member having a plurality of contact surfaces mounted on the perimeter, thereof, the combination of an open ended housing made of insulating material and having a smooth bore, a plurality of gripping fingers extending longitudinally within the housing and insulated from one another, said fingers being secured to the closed end of the housing, a plurality of abutments in longitudinal spaced relation on said fingers and in sliding engagement with the wall of the housing, and a plurality of contact points on said fingers, each contact point being disposed between adjacent abutments and arranged to engage and grip the respective contact surfaces on a plug.

THOMAS MARTIN.