

April 8, 1941.

O. A. RIEMAN
ELECTRICAL CONNECTOR
Filed April 20, 1940

2,237,362

FIG. 1.

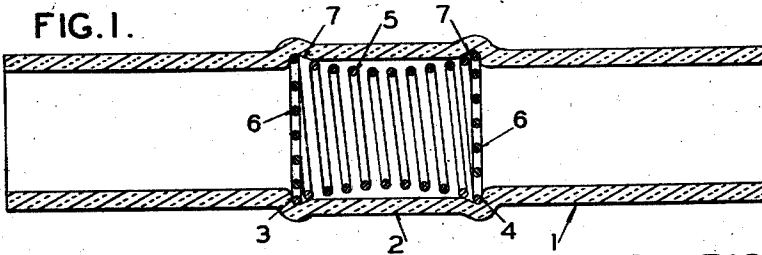


FIG. 3.

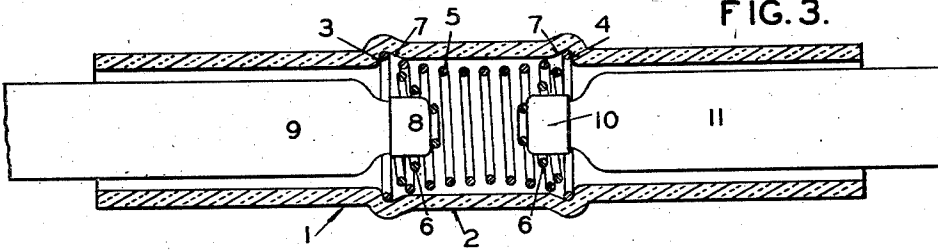


FIG. 4.

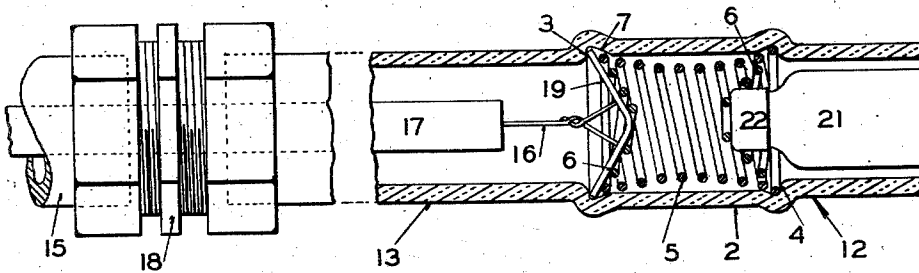


FIG. 2.

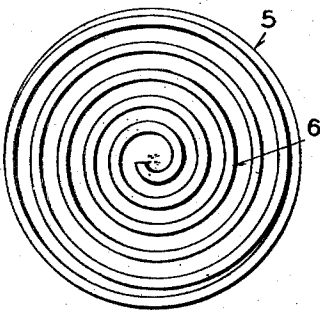


FIG. 6.

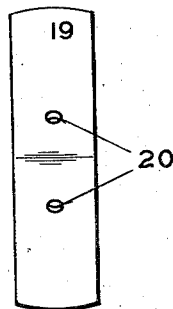
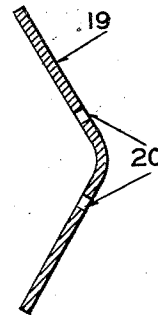


FIG. 5.



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2,237,362

ELECTRICAL CONNECTOR

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Application April 20, 1940, Serial No. 330,706

5 Claims. (Cl. 173-328)

My invention relates to connectors and more particularly to a connector for electrically connecting two conducting elements together.

One of the objects of my invention is to provide an improved connector for electrically connecting either the electrode ends of two luminous tubes or an electrical conductor and an electrode end of a luminous tube.

Another object of my invention is to produce an electrical connector of the type referred to which is capable of being readily associated with the elements to be connected and also one which is efficient in operation, provides proper insulation, and is neat in appearance since it dispenses with the necessity of taping.

Other objects of my invention will become apparent from the following description taken in connection with the accompanying drawing in which Figure 1 is a longitudinal sectional view showing a connector embodying my invention; Figure 2 is an end view of the conductor spring of the connector; Figure 3 is a longitudinal sectional view showing the connector in operative position to connect the hooded electrodes of two luminous tubes; Figure 4 is a partial sectional view of a slightly modified connector showing the manner in which it is employed to connect an electrical conductor to a hooded electrode of a luminous tube; and Figures 5 and 6 are two views of the V-shaped spring element employed to connect the conductor wire to one end of the coiled spring of the connector.

Referring to Figures 1, 2, and 3 in detail, the connector shown comprises a sleeve 1, which may be made of a suitable insulating material such as glass. The central portion 2 of this sleeve is enlarged, as shown, in order to provide longitudinal spaced annular shoulders 3 and 4. A coiled spring 5 made of suitable conducting material, such as bronze, is positioned within the enlarged portion of the sleeve and between the two shoulders 3 and 4. The spring in its uncompressed condition is preferably slightly longer than the axial distance between the two shoulders in order that when it is inserted into the enlarged portion its end coils will have pressure engagement with the shoulders. Each end of the coil spring is formed with a spiral winding 6 (best known in Figure 2) which lies in a plane at right angles to the axis of the spring so as to present a portion which can be engaged by an element and flexed inwardly in an axial direction without the necessity of compressing the main portion of the coil spring. Also in order to assist in preventing the ends of the coil spring from being moved away

from the shoulders the enlarged portion of the sleeve is so formed as to provide beveled surfaces 7 which with the shoulders define a recess into which each end coil rests. The diameter of the central coils of the spring is slightly less than the end coils in order that each end coil may properly rest in the recess and engage the adjacent shoulder. The coiled spring 5 is placed in the enlarged portion 2 by winding it up to reduce its diameter so as it will slide through an end of the sleeve.

In Figure 3, the connector just described is shown in an operative position for connecting a hooded electrode 8 of a luminous tube 9 to a hooded electrode 10 of a luminous tube 11, these tubes being a part of a neonized lighting system.

In installing the connector one end of the sleeve is slipped over one end of a tube which is already secured in position and then the end of the other tube is slipped into the other end of the sleeve and secured in position. The hooded electrode ends of the two tubes are positioned sufficiently close together so as to engage the spiral windings 6 of the coil spring and flex these windings axially inward. Thus each hooded electrode makes a good contact with the coil spring. The electrodes of the two tubes are not brought so close together that they will cause the main body of the coil spring to be compressed whereby the ends will be moved away from the shoulders 3 and 4.

With the connector installed as shown the two electrodes will be properly electrically connected together by the coiled spring. The sleeve 1 will always be maintained in proper position on the ends of the two tubes 9 and 11 since it is held from shifting axially by the end coils of the spring engaging the shoulders 3 and 4. The sleeve insures proper insulation for the coil spring as its ends extend a substantial distance over the ends of the tubes. All taping is eliminated by the electrical connector as is also the twisting together of wires at the electrodes which is present practice. Since the sleeve is preferably made of glass it will be neat in appearance and blend in well with the glass tubes 9 and 10.

In Figure 4 there is shown a connector for connecting a conductor wire (leading from or to an electrical source) to the electrode end of a luminous tube. The glass sleeve 12 is constructed in the same manner as sleeve 1 except that one end 13 of the sleeve which connects with the conduit pipe 15 surrounding the conducting wire 16 is slightly longer to conform with certain specification of the Underwriters Laboratories. The

conduit pipe is secured to the sleeve end 13 by what is called in the trade as a "no thread" connector 18. The structure for connecting the conductor wire 16 and one end of the coil spring 5 comprises a V-shaped spring member 19 provided with holes 20 in its legs to thereby permit the end of the conductor to be looped through these holes in the manner shown. The V-shaped spring member is inserted in position by springing the ends thereof toward each other and pushing it through the end 13 of the sleeve into the enlarged portion 2 where it can again assume normal condition with its ends engaging shoulder 3. The apex part of the spring member 19 engages axially and flexes the spiral winding 6 of the spring inwardly to thereby insure a good contact with the coil spring 5. The luminous tube 21 to which the conductor wire 16 is to be connected is inserted in the other end of the sleeve 12 so that its hooded end 22 will flex the spiral winding on the other end of the coil spring inwardly to thus make a good contact.

It is thus seen from the description of the structure shown in Figure 4 that my invention may be embodied in a connector which is readily adapted to connect a conductor wire and a luminous tube electrode as well as the electrodes of two luminous tubes. The connector when in position is unable to shift axially with respect to the luminous tube or the conduit pipe 15. The "no thread" connector 18 so seals the conduit pipe and sleeve that the joint is water-tight. Thus with the unconnected end of the sleeve pointing downward there will be no possibility of water getting into the connector sleeve. The connector is very easily installed and the only special work necessary to make the connection is the looping of a conductor wire through the holes of the V-shaped spring member 19 and positioning this member in the sleeve so that it engages the shoulder 3.

Being aware of the possibility of modification in the particular structure herein described without departing from the fundamental principles of my invention I do not intend that its scope be limited except as set forth by the appended claims.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A connector for electrically connecting two elements together and comprising an imperforate sleeve of insulating material open at both ends for receiving the two elements, two spirally wound spring coils, means for electrically connecting the outer portions of said coils together and in spaced relation with the axes of the coils in alignment, and means including shoulders on the interior of the sleeve for so mounting said coils and their connecting means in the central part of the sleeve that said coils will be positioned across the sleeve and the outer portions thereof prevented from axial movement to thereby permit the cen-

tral portion of each coil when engaged by an element inserted in the end of the sleeve to be flexed inwardly of the sleeve and without relative axial movement between the outer portion and the sleeve.

2. A connector for electrically connecting two elements together and comprising an imperforate sleeve of insulating material open at both ends and provided with axially spaced shoulders on its interior surface intermediate the ends thereof, and a coil spring interposed between said shoulders and having pressure engagement therewith, said coil being provided with portions at each end positioned at right angles to the axis of the sleeve and capable of being flexed inwardly of the sleeve without movement of the portion of the coil which engages the shoulder.

3. A connector for electrically connecting two elements together and comprising an imperforate tubular sleeve of insulating material provided with axially spaced recesses in its interior surface intermediate the ends thereof, a spring having a coiled body portion positioned in the sleeve with each end coil of slightly greater diameter than the body and lying in the recess and in engagement with a wall thereof, said spring also being provided on each end with coils which are so positioned across the sleeve as to be engaged and flexed by the elements when inserted in the opposite ends of the sleeve and without movement of the coiled body of the spring relative to the sleeve.

4. A connector for electrically connecting two elements together and comprising an imperforate sleeve of insulating material open at both ends, a coiled spring positioned in the sleeve intermediate its ends, said spring having a main body portion of general cylindrical shape and inwardly coiled spiral end portions capable of being engaged by the elements and flexed inwardly when said elements are inserted in opposite ends of the sleeve, and means forming spaced apart shoulders on the sleeve for pressure engagement by the ends of the main body portion of the spring to prevent movement of the sleeve with respect to the main body of the spring and also movement of the main body of the spring with respect to the sleeve when the spiral end portions are flexed inwardly.

5. In combination with electrodes of two luminous gaseous tubes provided with exterior electrical contacts, an imperforate sleeve of insulating material provided with an enlarged central portion forming axially spaced shoulders, the open ends of said sleeves receiving the electrode ends of said tubes, and a coiled spring of electrical conducting material positioned in the enlarged portion and having its end coils in pressure engagement with said shoulders, the ends of said spring also being provided with spiral coils lying across the sleeve and each engaged and flexed axially inward by an electrode without axial movement of the corresponding end of the coil with respect to the shoulder it engages.

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