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TUBE CONNECTOR

Filed May 11, 1959

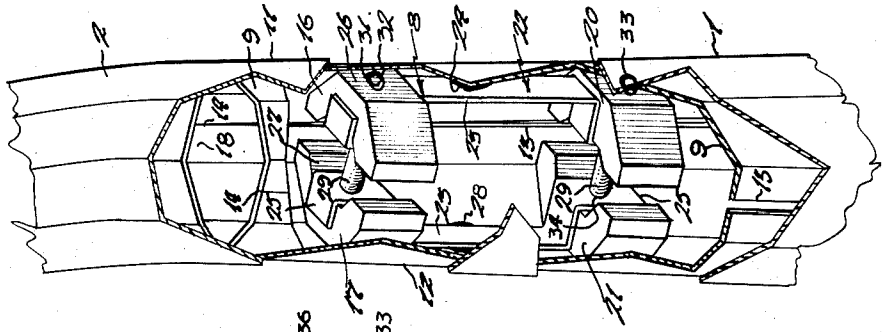


FIG 5

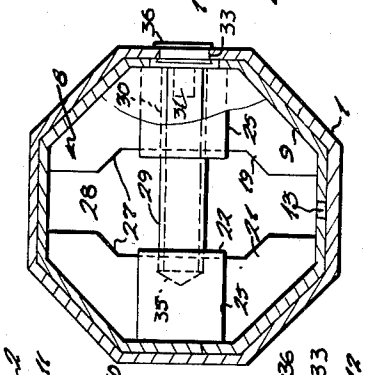


FIG 4

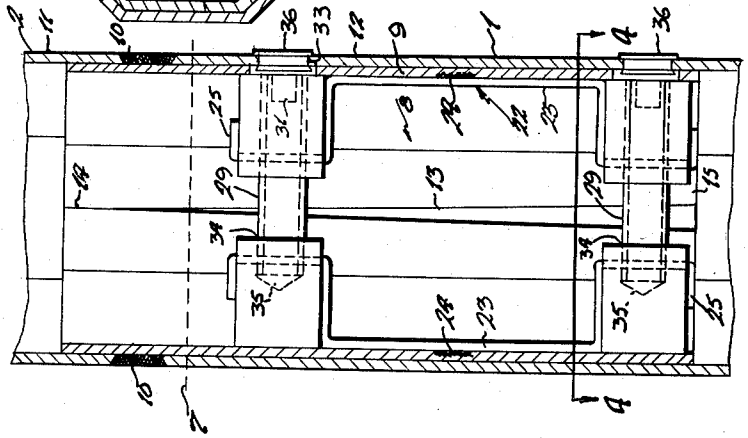


FIG 3

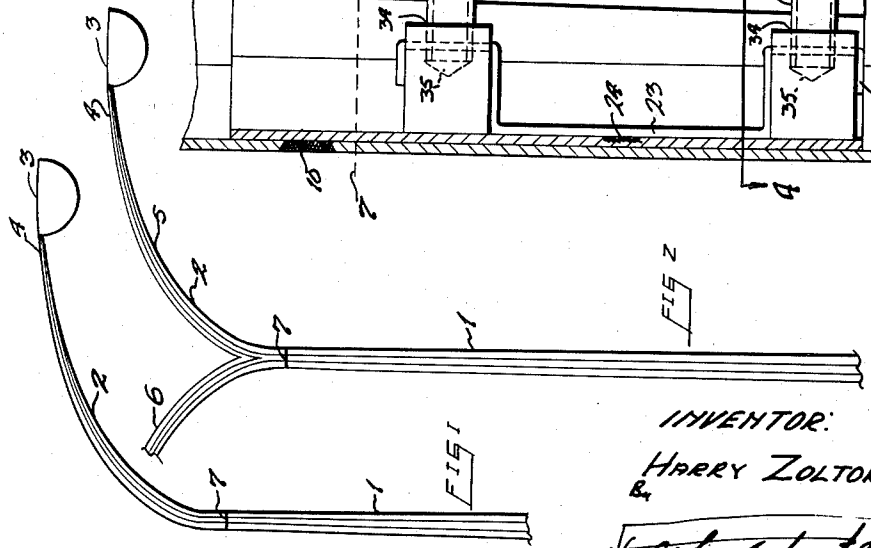


FIG 2

FIG 1

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TUBE CONNECTOR

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16 Claims. (Cl. 287—54)

My invention relates to new and useful improvements in tube connectors, specifically for tube connectors adapted to connect adjacent lengths of tubing together and designed specifically for joining tubular lamp standards.

Contemporary decorative lamp standards consist of a relatively high vertical tube having one or more cantilever arms extending from the upper end thereof upon the ends of which the lamp fixtures are located.

Such lamp standards are normally of polygonal cross section and the davit or cantilever arms usually extend outwardly from the main standard a considerable distance.

Due to the height of conventional lamp standards and the distance of the overhang, it is extremely difficult to manufacture these in one piece as it will be realized that they are difficult to handle in the manufacturing process and also extremely difficult to transport from the place of manufacture to the site where they are to be installed. In fact, with the present day overhang required, it is impossible to transport such standards in a conventional box car.

It is, therefore, desirable to manufacture the standards, tubes or poles separate from the davit or cantilever arm assembly, and it therefore becomes necessary to provide an efficient junction between the two portions when they are installed.

Conventional spigot and clamp connection can be used but these are unsightly and detract from the finished appearance of the lamp standard which should flow in a smooth line from the base to the end of the cantilever arms and to enhance this appearance, it is conventional that the standards taper inwardly from the base to the ends of the cantilever arms to give a pleasing effect.

I have overcome these disadvantages by providing an efficient tube connector situated internally of the ends of the tubes being joined and including a junction tube having two pairs of expanding blocks freely held therewithin which, due to a split being provided inside of the junction tube, enables the blocks to be expanded against the junction tube which, in turn, is expanded against the inner walls of the tube ends being joined thus providing an extremely firm and invisible junction between the two lengths. This connection when used with tapered tube sections, takes advantage of the taper in the pole shafts to insure a positive connection.

The principal object and essence of my invention is, therefore, to provide a tube connector adapted to joint adjacent lengths of tubing, said connector being invisible when installed.

Another object of my invention is to provide a device of the character herewithin described which permits all the wiring and lamp installations to be installed within the cantilever arm sections of a lamp standard prior to erection.

Yet another object of my invention is to provide a device of the charatcer herewithin described which

permits relatively large dimensioned lamp standards to be handled easily in manufacture and transportation.

A still further object of my invention is to provide a device of the character herewithin described in which the tube connector is easily tightened by means of a simple wrench.

Another object of my invention is to provide a device of the character herewithin described which is particularly suitable for use with tapered polygonal cross section tubing.

Another object of my invention is that a single connector is utilized for attaching multiple davit arms to a single shaft.

With the foregoing objects in view, and such other objects and advantages as will become apparent to those skilled in the art to which this invention relates as this specification proceeds, my invention consists essentially in the arrangement and construction of parts all as hereinafter more particularly described, reference being had to the accompanying drawings in which:

Figure 1 is a side elevation of the upper end of a lamp standard and having a single cantilever arm secured thereto.

Figure 2 is a view similar to Figure 1 but showing a double cantilevered arm section.

Figure 3 is an enlarged cross sectional view of the lower end of the cantilever arm portion and the upper end of the vertical support portion connected together by means of my tube connector.

Figure 4 is a view substantially along the lines 4—4 of Figure 3.

Figure 5 is a fragmentary perspective view of my tube connector in situ.

In the drawings like characters of reference indicate corresponding parts in the different figures.

Proceeding therefore to describe my invention in detail, Figures 1 and 2 show the upper portion of a conventional lamp standard including the main vertical post **1** and the cantilever portion **2**. Figure 1 shows a single cantilever arm with a lighting fixture **3** upon the distal end **4** thereof, whereas Figure 2 shows a double cantilever arrangement with one cantilever arm **5** extending in a direction approximately 180 degrees from the second cantilever arm **6**, lighting fixtures **3** being secured to the distal ends thereof as in Figure 1.

The junction **7** between the vertical portion **1** and cantilever portion **2** is the location of my tube connector collectively designated **8** and shown in detail in the remaining views.

In the drawings, it will be noticed that the main standard **1** and the cantilever arms **2** taper gradually from the lower end toward the distal end **4** and it will be appreciated that the tube connector **8** also tapers so that it nests within the adjacent ends of the portions being connected thereby.

In detail, my tube connector consists of a junction tube **9** having a cross sectional configuration similar to the cross sectional configuration of the tube lengths being connected. In this connection the tubes being connected are octagonal when viewed in cross section, consequently the junction tube **9** is also octagonal when viewed in cross section but it will be appreciated that the connector can be adapted to join tubes having any cross sectional configuration providing the junction tube has a similar cross sectional configuration.

The relatively short junction tube **9** is plug welded as at **10** within the lower end **11** of the cantilever tube section **2** and nests within this end with the majority of the junction tube **9** extending downwardly therefrom and adapted to be nested within the upper end **12** of the vertical standard **1**. This junction tube **9** is split longitudinally as at **13**, and the upper end **14** of the split

are tack welded together to enable the ends to be inserted easily within the end **11** of the cantilever arm prior to the afore-mentioned plug welding **10**.

Because of this construction, the split **13** widens as it approaches the base **15** of the junction tube thereby permitting the junction tube to follow the taper of the main standard **1**.

A pair of upper expansion blocks **16** and **17** are located adjacent the upper end **18** of the junction tube and a lower pair of expander blocks **20** and **21** are located adjacent the lower end **15** of the junction tube.

Means collectively designated **22** are provided within the junction tube to maintain the pairs of blocks freely in axially spaced relation as shown, said means taking the form of a pair of elongated straps **23** secured by spot welding **24** medially along the length thereof, to the inner walls of the junction tube **9** and reference to Figures 4 and 5 will show that these straps **22** and **23** are located diametrically opposite one another and at 90 degrees from the aforementioned split **13**.

The ends **25** of the straps are angulated to form U-shaped clips within which nests the aforementioned blocks **16**, **17**, **20** and **21** and it will be observed from reference to Figures 4 and 5 that the outer walls **26** of the blocks are shaped to conform with the inner walls of the junction tube and to nest freely therewithin. The blocks also are recessed on their inner faces at **27** to assist the aforementioned nesting of the blocks within the clips or brackets **25** on the ends of straps **23**, this recessing also providing a vertical channel area **28** through which wiring for the lamps may pass.

Means are provided to expand the blocks against the walls of the junction tube, said means taking the form of bolts **29** which are screwthreaded upon the ends **30** thereof. These ends engage corresponding screwthreaded apertures **31** within the blocks specifically designated **16** and **20** and are also provided with recessed hexagonal wrench engaging heads **32**.

The wall of the vertical tube **1** is apertured as at **33** opposite the recessed heads **32** of the bolt to enable a wrench, commonly known as an Allen wrench, to be inserted through the walls and to engage the bolt **29** for rotating same.

The ends **34** of the bolts freely engage blind apertures **35** within the inner faces **27** of the blocks specifically designated **17** and **21**, it being observed that the straps **23** are apertured to permit free movement of the bolts therethrough.

From the foregoing it will be observed that if bolts **29** are rotated, the screwthreaded engagement of the ends **30** within the blocks **16** and **20** force the blocks apart against the walls of the junction tube **9** which in turn wedge against the inner surfaces of the end **12** of the vertical tube **1** thus clamping together securely the cantilever section **2** to the vertical section **1**.

If desired, the configuration of the expander blocks may be slightly different from the configuration of the walls of the junction tube to give a greater wedging action but in any event, due to the free floating action of the two pairs of blocks, the junction tube can be wedged securely within the end of the vertical tube with the minimum of time and effort.

Finally, flexible plugs **36** selectively engage the apertures **33** through the wall of the tube portion **1** thus sealing off the interior of the tubes from moisture and the like.

From the foregoing it will be seen that the cantilever sections can be fully wired prior to installation and the vertical tube can be set into position whereupon it is a relatively simple matter to mount the cantilever arms upon the vertical tube and to clamp same securely into position by means of the aforementioned bolts **29**.

Since various modifications can be made in my invention as hereinabove described, and many apparently widely different embodiments of same made within the spirit and scope of the claims without departing from such spirit and scope, it is intended that all matter contained in the accompanying specification shall be interpreted as illustrative only and not in a limiting sense.

What I claim as my invention is:

1. A connector for detachably securing together adjacent lengths of tubing, comprising in combination a connector assembly spanning the junction between said lengths and being situated internally thereof, said assembly including a junction tube having an external configuration similar to the internal configuration of the tube lengths being joined, said junction tube nesting within the ends of said tube lengths, said junction tube being split lengthwise on at least one side thereof whereby said junction tube is expandable, a pair of upper expander blocks freely supported in said junction tube, a pair of lower expander blocks freely supported in said junction tube, means to support said blocks in said junction tube, and means cooperating with each pair of blocks, to expand said pairs of blocks against the sides of said junction tube independently and hence expand said junction tube within said ends of said lengths of tubing.

2. A connector for detachably securing adjacent lengths of tapered tubing, comprising in combination a connector assembly spanning the junction between said lengths and being situated internally thereof, said assembly including a tapered junction tube having an external configuration similar to the internal configuration of the tube lengths being joined, said junction tube nesting within the ends of said tube lengths, said junction tube being split lengthwise on at least one side thereof whereby said junction tube is expandable, a pair of upper expander blocks freely supported in said junction tube, a pair of lower expander blocks freely supported in said junction tube, means to support said blocks in said junction tube, and means cooperating with each pair of blocks, to expand said pairs of blocks against the sides of said junction tube independently and hence expand said junction tube within said ends of said lengths of tubing.

3. A connector for detachably securing together adjacent lengths of polygonal cross sectional tubing, comprising in combination a connector assembly spanning the junction between said lengths and being situated internally thereof, said assembly including a junction tube having an external configuration similar to the internal configuration of the tube lengths being joined, said junction tube nesting within the ends of said tube lengths, said junction tube being split lengthwise on at least one side thereof whereby said junction tube is expandable, a pair of upper expander blocks freely supported in said junction tube, a pair of lower expander blocks freely supported in said junction tube, means to support said blocks in said junction tube, and means cooperating with each pair of blocks, to expand said pairs of blocks against the sides of said junction tube independently and hence expand said junction tube within said ends of said lengths of tubing.

4. A connector for detachably securing adjacent lengths of polygonal cross sectional tapered tubing, comprising in combination a connector assembly spanning the junction between said lengths and being situated internally thereof, said assembly including a tapered junction tube having an external configuration similar to the internal configuration of the tube lengths being joined, said junction tube nesting within the ends of said tube lengths, said junction tube being split lengthwise on at least one side thereof whereby said junction tube is expandable, a pair of upper expander blocks freely supported in said junction tube, a pair of lower expander blocks freely supported in said junction tube, means to support said blocks in said junction tube, and means cooperating with each pair of blocks, to expand said pairs of blocks against the sides of said junction tube independently and hence expand said junction tube within said ends of said lengths of tubing.

5. The device according to claim 1 in which said means to support said blocks in said tube comprises a strap extending between each of the blocks in said upper pair to the corresponding blocks in said lower pair, said strap being secured medially along the length thereof to inner wall of said junction tube, the ends of said strap being angulated to form a clip within which said block is freely engaged and supported thereby.

6. The device according to claim 2 in which said means to support said blocks in said tube comprises a strap extending between each of the blocks in said upper pair to the corresponding blocks in said lower pair, said strap being secured medially along the length thereof to inner wall of said junction tube, the ends of said strap being angulated to form a clip within which said blocks is freely engaged and supported thereby.

7. The device according to claim 3 in which said means to support said blocks in said tube comprises a strap extending between each of the blocks in said upper pair to the corresponding blocks in said lower pair, said strap being secured medially along the length thereof to inner wall of said junction tube, the ends of said strap being angulated to form a clip within which said block is freely engaged and supported thereby.

8. The device according to claim 4 in which said means to support said blocks in said tube comprises a strap extending between each of the blocks in said upper pair to the corresponding blocks in said lower pair, said strap being secured medially along the length thereof to inner wall of said junction tube, the ends of said strap being angulated to form a clip within which said block is freely engaged and supported thereby.

9. The device according to claim 1 in which said means to expand said pairs of blocks against the sides of said junction tube comprises a bolt screwthreaded at one end and engageable within a correspondingly screwthreaded aperture within one of the blocks of each of said pairs, the other end of said bolt freely engaging a blind aperture within the other of the blocks of each of said pairs.

10. The device according to claim 2 in which said means to expand said pairs of blocks against the sides of said junction tube comprises a bolt screwthreaded at one end and engageable within a correspondingly screwthreaded aperture within one of the blocks of each of said pairs, the other end of said bolt freely engaging a blind aperture within the other of the blocks of each of said pairs.

11. The device according to claim 3 in which said means to expand said pairs of blocks against the sides of said junction tube comprises a bolt screwthreaded at one end and engageable within a correspondingly screwthreaded aperture within one of the blocks of each of said pairs, the other end of said bolt freely engaging a blind aperture within the other of each of the blocks of said pairs.

12. The device according to claim 4 in which said means to expand said pairs of blocks against the sides of said junction tube comprises a bolt screwthreaded at one end and engageable within a correspondingly screwthreaded aperture within one of the blocks of each of said pairs, the other end of said bolt freely engaging a blind aperture within the other of each of the blocks of said pairs.

13. The device according to claim 5 in which said means to expand said pairs of blocks against the sides of said junction tube include a bolt, said bolt being screwthreaded at one end and engageable within a screwthreaded aperture in one of the blocks of each of said pairs, the other end of said bolt freely engaging a blind aperture in the other of the blocks of said pairs, said bolt also passing through apertures within each of the ends of said strap.

14. The device according to claim 6 in which said means to expand said pairs of blocks against the sides of said junction tube include a bolt, said bolt being screwthreaded at one end and engageable within a screwthreaded aperture in one of the blocks of each of said pairs, the other end of said bolt freely engaging a blind aperture in the other of the blocks of said pairs, said bolt also passing through apertures within each of the ends of said strap.

15. The device according to claim 7 in which said means to expand said pairs of blocks against the sides of said junction tube include a bolt, said bolt being screwthreaded at one end and engageable within a screwthreaded aperture in one of the blocks of each of said pairs, the other end of said bolt freely engaging a blind aperture in the other of the blocks of said pairs, said bolt also passing through apertures within each of the ends of said strap.

16. The device according to claim 8 in which said means to expand said pairs of blocks against the sides of said junction tube include a bolt, said bolt being screwthreaded at one end and engageable within a screwthreaded aperture in one of the blocks of each of said pairs, the other end of said bolt freely engaging a blind aperture in the other of the blocks of said pairs, said bolt also passing through apertures within each of the ends of said strap.

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