Aug. 19, 1969 E. P. CHESLOCK 3,462,110

SUPPORT ASSEMBLY

Filed June 26, 1967

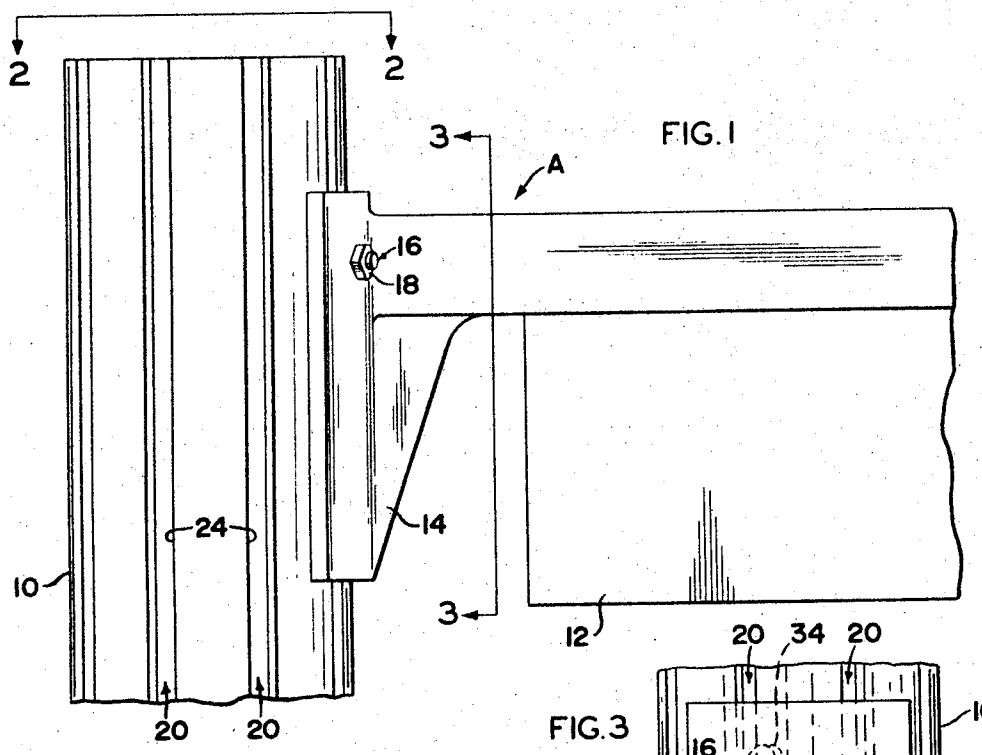


FIG. 1

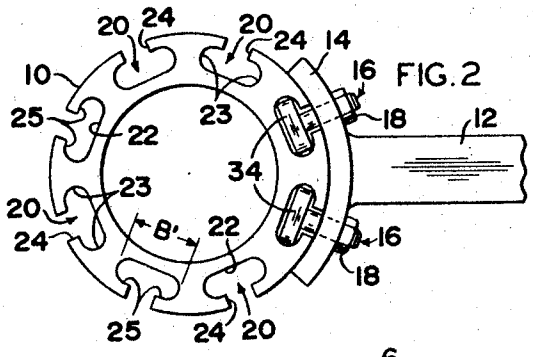


FIG. 2

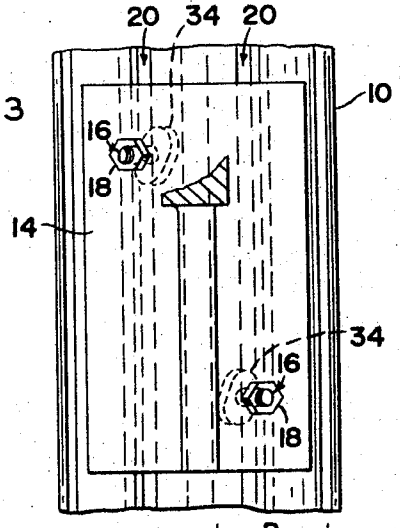


FIG. 3

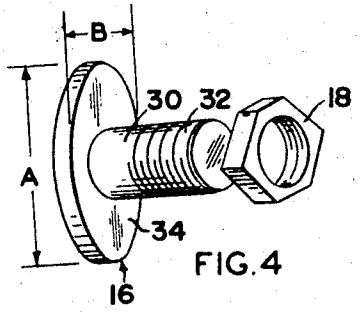


FIG. 4

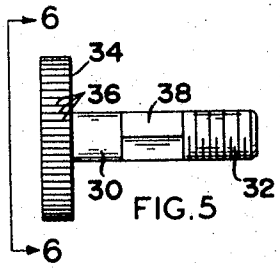


FIG. 5

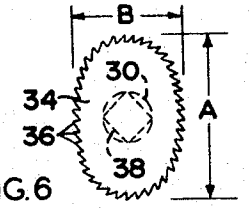


FIG. 6

INVENTOR.

EDWARD P. CHESLOCK

BY

Meyer, Tilberry & Body

ATTORNEYS.

United States Patent Office 3,462,110 Patented Aug. 19, 1969

3,462,110

SUPPORT ASSEMBLY

Edward P. Cheslock, Kennett Square, Pa., assignor to E. W. Bliss Company, Canton, Ohio, a corporation of Delaware

Filed June 26, 1967, Ser. No. 648,599
Int. Cl. F16n 13/02
U.S. Cl. 248—221 6 Claims

ABSTRACT OF THE DISCLOSURE

A support assembly especially suited for supporting street lights, signs and like structures. The assembly comprises an elongated vertically extending support pole having at least one longitudinally extending groove formed therein and extending a substantial distance therealong. The groove has a first portion which opens to the outer surface of the pole and a second portion connected to the first portion and spaced inwardly from the outer surface of the pole. The second portion has side walls spaced a distance greater than the width of the first portion. Positioned within the groove is a bolt formed from a material harder than the pole and having a head portion and an elongated shank portion with a longitudinal axis and a threaded outer end. The head portion is received in the second portion of the groove and the shank portion extends radially outwardly of the pole through the second portion. The head portion of the bolt is formed so that when the bolt is rotated in the groove the periphery of the head portion engages the side walls of the groove and locks the bolt in position in the groove.

The present invention is directed toward the art of support structures, and more particularly, to a support structure arrangement wherein a supported member is connected to a support pole by a T-bolt type connection.

The invention is particularly suited for supporting street light and sign structures from vertically extending support poles and will be described with particular reference thereto; however, it is appreciated the invention is capable of broader application and could be utilized wherever it is a desire to releasably support structural members.

In the past, street lights, signs, etc. have often been supported from vertically extending support poles by the use of circumferentially extending straps, various specially designed brackets, miscellaneous hardware and plumbing-type fixtures. In general, these prior arrangements have been difficult to assemble and disassemble, as well as expensive. Additionally, the non-standardized nature of these arrangement have made their appearance relatively unsightly.

The present invention provides an arrangement which utilizes an improved T-bolt type connector to permit the supported member to be directly connected to the support pole at any location longitudinally thereof without the need of intermediate brackets or other unsightly hardware. Additionally, the invention reduces installation time, as well as simplifying disassembly and reinstallation during maintenance or repair. Further, the arrangement has pleasing appearance and offers savings in both manufacture and maintenance.

Broadly, the use of a T-bolt type connector arrangement to attach a member to a vertically extending support pole is well-known. One such arrangement is shown in U.S. Patent No. 3,086,627 to Bernard. As shown in FIGURES 1 through 3 of this patent, the support pole is provided wtih longitudinally extending grooves which open to the pole's exterior surface. Each groove is formed

with a base portion wider than the opening to the surface to define inwardly facing shoulders. A bolt is slid into the groove from one end of the pole with its head being received in the wider base portion and its shank portion extending radially outwardly of the pole through the surface opening. A supported member can then be connected to the pole by a nut threaded to the end of the bolt. The tightening of the nut causes the bolt head to engage the shoulders of the groove and, in effect, clamp the supported member to the pole.

Although this arrangement is generally satisfactory, certain problems are encountered, especially when the support poles are of substantial length. For example, when ing radially of the pole through the second portion. The at the proper location longitudinally of the slot until the support member is positioned thereon and the nut tightened. This is often difficult, especially when a plurality of bolts are to be used for connecting a single member. Further, when disconnecting the member from the pole it is difficult to prevent the bolt or bolts from sliding down the groove to the bottom of the pole.

The present invention overcomes these problems by providing an improved T-bolt type connecting arrangement which allows the T-bolt to be locked in any desired position longitudinally of the groove. This greatly facilitates installation and removal of the supported member.

In accordance with the present invention, an assembly is provided which includes an elongated vertically extending support pole having at least one longitudinally extending groove formed therein and extending a substantial distance therealong. The groove is formed with a first portion which opens to the outer surface of the pole and a second wider portion connected to the first portion and spaced inwardly from the pole's outer surface. A bolt member formed from a material harder than the pole and having a head and an elongated shank with a threaded outer end is positioned with its head in the second portion of the groove and its shank extending radially of the pole through the second portion. The head portion of the bolt has an outer periphery formed so as to have a maximum transverse extent greater than the width of the base portion and a minimum transverse extent less than the width of the base portion. The radial distance of the periphery from the longitudinal axis of the shank increases gradually from the points of minimum transverse extent to the points of maximum transverse extent. Consequently, tightening of a nut onto the threaded end of the shank produces rotation of the bolt and causes the outer periphery of the head portion to gradually engage and deform the side walls of the base portion of the groove to thereby lock the bolt in position.

In accordance with a more limited aspect of the present invention, the outer periphery of the head portion of the bolt is provided with serrations to increase the locking ability of the head.

Accordingly, a primary object of the present invention is the provision of an improved support arrangement for releasably and adjustably supporting a structural member or the like from a vertically extending support pole.

An additional object is the provision of T-bolt and slot type connector designed so that the T-bolt can be locked in any position longitudinally of the slot.

A further object is the provision of a support assembly which is simply constructed and of pleasing appearance.

Another object of the present invention is the provision of a connecting arrangement which is especially suited for connecting signs and like structures to vertically extending support poles.

These and other objects and advantages will become

apparent from the following description when read in conjunction with the accompanying drawings wherein:

FIGURE 1 is a partial elevational view showing the overall arrangement of a support pole and a supported element connected thereto in accordance with the present invention;

FIGURE 2 is a view taken on the line 2—2 of FIGURE 1;

FIGURE 3 is a cross-sectional view taken on line 3—3 of FIGURE 1;

FIGURE 4 is a pictorial view of a T-bolt member utilizing the present invention;

FIGURE 5 is a second modification of a T-bolt member which can be utilized in the present invention; and

FIGURE 6 is a view taken on line 6—6 of FIGURE 5.

Referring now to the drawings wherein the showings are for the purpose of illustrating the preferred embodiments of the invention only and not for the purpose of limiting same, FIGURE 1 shows the overall arrangement of a support assembly A constructed in accordance with the present invention. As shown, the assembly includes a first structural member in the form of a vertically extending support pole **10**. A supported member or second structural element shown in the form of a sign **12** provided with an integrally formed bracket **14** is connected to the pole by a bolt and nut **16** and **18**, respectively.

Pole **10** could be formed from a variety of materials and have a variety of different cross-sectional configurations; however, it is preferably extruded from aluminum and has a generally circular cross-section. As best shown in FIGURE 2, the pole is provided with a plurality of circumferentially spaced, longitudinally extending grooves **20**. The actual number and spacing of the grooves is not important to the present invention; however, the pole is preferably provided with a relatively large number of grooves circumferentially spaced to allow the supported member to be connected so as to extend in any desired direction. As shown in FIGURE 2, each of the grooves **20** includes a base portion **22** having semi-cylindrical walls **23** spaced a maximum width indicated by B'. The base portions **22** are connected with the outer surface of the pole by an outer groove or throat portion **24** which is narrower than the base portion **22**, thereby providing a pair of inwardly facing shoulders **25**.

According to the invention, bolt **16** is formed from a material harder than the pole (e.g. steel), and comprises an elongated shank **30** having a threaded outer end portion **32**. An enlarged head portion **34** is integrally formed on the shank **30** and extends transversely thereof. As seen in FIGURE 2, the bolt is arranged to be received in groove **20** with the head portion **34** received in the base portion **22** of the groove. The shank then extends transversely of the pole and permits a supported member to be simply bolted in clamped relationship to the pole.

It is apparent that this assembly provides an extremely simple and readily adjustable mounting arrangement; however, it should be noted that when the supported member is subsequently released from the pole, care must be taken to prevent thte bolt from sliding to the bottom of the pole. In an especially tall pole, such as the type generally used for supporting street signs and street lights, it is both difficult and time consuming to slide the bolt back to the proper position on the pole for reconnection of the supported member.

In order to overcome this problem, the present invention provides a novel relationship between the bolt head portion **34** and the groove base portion **22**. As shown in FIGURE 4, head portion **34** has an outer periphery which is of a non-uniform radial distance from the longitudinal center line of the bolt. The minimum transverse extent of the head portion is indicated by B and the maximum transverse extent is indicated by A. B is chosen so as to be smaller than the width B' of the base portion **22** of groove **20**. This permits the bolt to be slid into the groove from the end of the pole and moved to any desired position longitudinally thereof. Additionally, by making the width B smaller than A' the bolt can be simply inserted at any point along the groove.

As shown, the maximum transverse extent of the head is greater than the width B' of the base portion **22** of groove **20**. Preferably, the radial distance from the center of the head to its outer periphery increases gradually from the points of minimum transverse extent to the points of maximum transverse extent. Consequently, the act of tightening nut **18** onto the threaded end of shank **30** will cause the bolt and head portion **34** to rotate in the groove thereby causing the gradually increasing radial extent of the head's periphery to engage the side walls of the base portion of the groove. Because the bolt is formed from a material harder than the pole, the final tightening of the nut causes the head portion to dig into the side walls of the groove **20** and, effectively, lock therein. This locking effect is further enhanced by the semi-cylindrical shape of the side walls **23** of base portion **22**. As can be seen from FIGURE 2, the original engagement between the head's periphery and the side walls **23** takes place as line contact between the periphery and side wall. This line contact produces high force concentration causing more deformation of the side walls and, consequently, better locking of the bolt in the groove.

After the nut has been finally tightened to clamp the supported member to the pole, subsequent release of the nut to remove the supported member will not normally release the bolt. Hence, the bolt remains in the desired location, thus, greatly facilitating the reinstallation of the supproted member.

Although the outer periphery of the head portion **34** could have a variety of configurations, the particular oval shape shown in FIGURE 4 is preferred. As described above, the gradual increase between the minimum transverse extent and the maximum transverse extent permits a relatively uniform engagement between the side walls of the groove and the bolt head.

FIGURES 5 and 6 show a modified form of the bolt member. According to this modification, the outer periphery of head portion **34** is provided with knurling or serrations **36** which function to increase the locking power of the bolt head. Additionally, the bolt shank **30** is provided with wrench receiving flats **38** which are positioned so that when the bolt is slid into the groove the wrench receiving flats are beyond the outer surface of the pole. Thus, by the use of a wrench, the bolts can be locked in the desired position on the pole prior to the original installation of the support member **12**. This eliminates the necessity of manually holding the bolts in position during original installation of the supported member.

The invention has been described in great detail sufficient to enable one of ordinary skill in connect art to make and use the same. Obviously, modifications and alterations of the preferred embodiment will occur to others upon the reading and understanding of the specification and it is my intention to include all such modifications and alterations as part of my invention.

I claim:

1. A support assembly including; an elongated vertically extending support pole having at least one longitudinally extending groove formed therein and extending a substantial distance therealong, said groove having a first portion which opens to the outer surface of the pole and a second portion connected to the first portion and spaced inwardly from the outer surface of the pole, said second portion having side walls spaced a distance greater than the width of said first portion; a bolt member formed from a material harder than the pole and having a head portion and an elongated shank having a longitudinal axis and terminating in a threaded outer end, said head positioned in said second portion of said groove and said shank extending radially outwardly of the pole through said second portion, said head portion having an outer periphery formed so as to have a maxi-

mum transverse extent greater than the distance between the side walls of said base portion and a minimum transverse extent less than the distance between the side walls of said base portion, the radial distance of said periphery from said longitudinal axis of said shank increasing gradually from the points of minimum transverse extent to the points of maximum transverse extent and a nut member threaded on said outer end of said bolt member for cooperating with the outer surface of said pole to clamp a supported member thereto, whereby rotation of said nut member to clamp a supported member produces rotation of said bolt about said axis to cause said outer periphery to engage and deform said side walls thereby locking said bolt in position in said groove.

2. A support assembly as defined in claim 1 wherein said side walls are of semi-cylindrical configuration.

3. A support assembly as defined in claim 1 wherein said periphery of said head portion is of oval configuration.

4. A support assembly as defined in claim 1 wherein said periphery is serrated.

5. A support assembly as defined in claim 1 wherein said shank is provided with tool receiving surfaces spaced from said head portion.

6. A support assembly as defined in claim 1 wherein said pole is formed from aluminum and said bolts are formed from steel.

References Cited

UNITED STATES PATENTS

1,557,972	10/1925	Bostwick.	
2,002,339	5/1935	Copeman.	
2,955,690	10/1960	Bedford	151—37 X
3,053,355	9/1962	Attwood	151—37 X
3,086,627	4/1963	Bernard	52—738 X

ROY D. FRAZIER, Primary Examiner

J. F. FOSS, Assistant Examiner

U.S. Cl. X.R.

52—474, 738; 248—125, 245