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MAST ARM AND BRACE FOR LUMINAIRES

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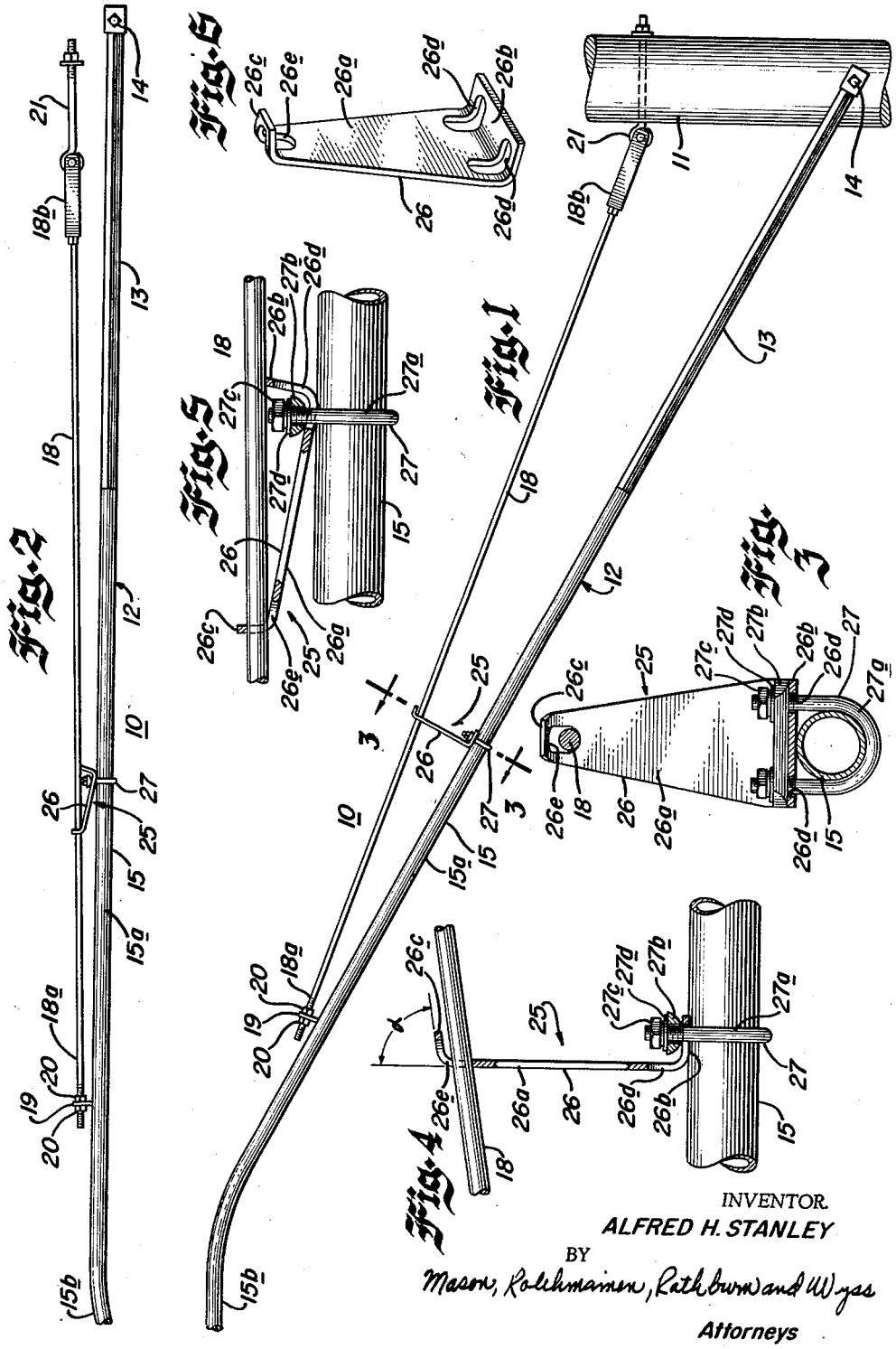

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MAST ARM AND BRACE FOR LUMINAIRES

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The present invention relates to a support and, more particularly, to a support or mast adapted to carry a luminaire or similar device in lateral spaced relation from an upright member such as a utility pole.

Present commercial luminaire supports frequently provide a support of considerable length so that the luminaire may extend over roadways and the like from a supporting utility pole or standard. Obviously, the pole may not be mounted too closely to the traveled portion of the highway. With the longer lengths of supports, it has been necessary to provide tie members extending from near the end of the free end of the mast arm to the utility pole in angularly spaced relation to the mast arm, thereby to reduce the bending load of the mast arm and to carry the luminaire load by tension in the tie member and corresponding compression in the mast arm. Bracket or other means are provided for angularly positioning the tire rods and mast arms relative to each other.

Where the lateral displacement of the luminaire from the supporting upright member is great, for example, sixteen feet, the rise of the tie rod member above the mast arm at the pole end of the support may be substantial, for example, about two feet. Moreover, it will be appreciated that such supports are generally manufactured at a plant remote from the field installation thereof. Accordingly, difficulties have been experienced in the crating, storage, shipping and handling of assembled supports wherein the tie rod member is angularly spaced from the mast arm by a bracket or other means, because of the large size of the support. Of course, it may be possible to provide a separate, detachable bracket and tie rod which may be field-assembled with the mast arm; however, such disassembly during crating, shipping and handling would result in inconvenience in the field erection of the support as well as create possibilities of losing the individual components in the field.

Accordingly, it is desirable to provide an elongated support for supporting a luminaire or the like in lateral spaced relation to a utility pole or other upright member wherein all of the components of the support are conveniently held together in a compact relation during crating, shipping, and handling of the support; and which may thereafter readily be erected in the field.

Accordingly, it is an object of the present invention to provide a new and improved support for luminaires and the like which overcomes the above-mentioned difficulties.

A further object of the present invention is to provide a new and improved support for luminaires and the like which may be folded for crating, storage, shipping and handling and which may be readily and quickly unfolded for field-erection.

Another object of the present invention is to provide a new and improved brace for use in interconnecting the tie member and mast arm of a support for a luminaire and the like.

Further objects and advantages of the present invention will become apparent as the following description proceeds and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

In accordance with these and other objects, there is provided an improved support structure for supporting a luminaire and the like in laterally spaced relation to a utility pole and including a generally tubular mast provided at one end with a bracket portion adapted to be secured to the utility pole and adapted at its other or free outer end to support a luminaire. The mast arm extends from the utility pole angularly inclined from the horizontal. A tie member is provided which has one end connected to the mast arm intermediate its length and has means at its other end for connection to the utility pole. A generally channel-shaped tie rod brace interconnects the mast arm and the tie member and is foldable between a first position extending generally perpendicularly to the mast arm and a second position substantially juxtaposed the mast arm. Pivoting or folding of the brace member is effective to move the tie member between a first position angularly disposed relative to the mast arm and a second position juxtaposed the mast arm.

For a better understanding of the present invention, reference may be had to the accompanying drawing in which:

FIG. 1 is a side elevational view of the improved support structure according to the present invention and illustrating its extension from a utility pole;

FIG. 2 is a side elevational view of the improved support structure of FIG. 1, illustrated in its folded position;

FIG. 3 is a cross-sectional view of the support structure illustrating to a larger scale the improved tie rod brace and taken along line 3—3 of FIG. 1;

FIG. 4 is a fragmentary broken-away elevational side view of the improved support structure of FIG. 1, illustrating the tie rod brace, and drawn to the same scale as FIG. 3;

FIG. 5 is a fragmentary broken-away side elevational view of the support structure, illustrating the tie rod brace in another of its positions; and

FIG. 6 is a perspective view of the improved tie rod brace.

Referring now to the drawing, there is illustrated a support structure 10 for supporting a luminaire and the like (not shown) from one end in laterally spaced relation to an upright member such as a utility pole 11. The support structure 10 is provided with a mast arm 12 for carrying and supporting the luminaire. The mast arm 12 includes an A-shaped bracket portion 13 adapted to be secured to the utility pole 11 by a pair of bolts 14, only one of which is illustrated in the drawing, and an elongated tubular member 15 having a first portion 15*a* extending from and aligned with the A-shaped bracket, and provided with an angularly disposed free outer end portion 15*b* adapted to carry the luminaire. The mast arm is adapted to extend from the utility pole angularly inclined from the horizontal, as illustrated in FIG. 1, with the outer end portion 15*b* of the tubular member 15 extending generally horizontally.

For reducing the bending load in the mast arm 12, there is provided a tie member 18 having one end 18*a* adjustably connected to a lug 19 secured to the mast arm 12 intermediate the length of the tubular member 15. The tie member 18 is connected to the lug 19 by a pair of positioning or tie nuts 20, which when slightly loosened permits limited angular movement of the tie member 18 relative to the mast arm 12. The other end 18*b* of the tie member 18 is adapted for connection to the utility pole 11 in any suitable manner, as by the illustrated eye-bolt 31. It will be appreciated that when the mast arm 12 is assembled to the utility pole 11 in the manner illustrated in FIG. 1, the load due to a luminaire hung on the end 15*b* of the tubular member is effective to provide tension in the tie member 18 and compression in the mast arm 12 between the lug 19 and the utility pole

11 thereby minimizing the bending load in the mast arm 12.

In accordance with the present invention, and in order to permit folding of the tie member 18 relative to the mast arm 12, while providing suitable means for angularly spacing the tie member 18 relative to the mast arm 12, there is provided an improved brace assembly generally illustrated at 25. The brace assembly 25 interconnects the mast arm 12 intermediate the lug 19 and the utility pole 11, with the tie member 18 intermediate its length. To this end, the brace assembly 25 includes a tie rod brace 26 and a U-bolt assembly 27 connecting the brace 26 with the mast arm 12. The U-bolt assembly 27 includes a U-bolt 27*a*, FIGS. 3, 4 and 5, a bolt strap 27*b*, and a plurality of nuts 27*c* and washers 27*d*.

Referring now to the tie rod brace 26, the brace 26 is slightly channel-shaped with an elongated bight portion 26*a*, FIGS. 3, 4, 5 and 6, dimensioned to space the tie member 18 and the mast arm 12, and additionally including a base leg 26*b* generally perpendicular to the bight portion 26*a*, and a tie rod leg 26*c* angularly disposed relative to the bight portion. In a particular embodiment of the invention, the tie rod leg 26*c* made an angle α of approximately 80 degrees with the bight portion. The bight portion 26*a* and the base leg 26*b* are provided with a pair of spaced corner slots 26*d* transversely positioned relative to the channel and extending around the corner connecting the base leg 26*b* and the bight portion 26*a*. The slots 26*d* receive the U-bolt assembly 27 to connect the brace assembly 25 to the mast arm 12. The bight portion 26*a* and the tie rod leg 26*c* are provided with a similar corner slot 26*e* transversely positioned relative to the channel and extending around the corner connecting the tie rod leg 26*c* and the bight portion 26*a*. The tie member 18 passes through the slot 26*e* to slidably and pivotally interconnect the tie rod brace 26 and the tie member 18. To facilitate pivoting of the tie rod brace 26 about the U-bolt assembly 27 when the nuts 27*c* thereof are slightly loosened, the bight portion 26*a* and the base leg 26*b* do not interconnect in a sharp corner, but rather form a curved radius at their corner. Moreover, the lower surface of the strap 27*b* which engages against the base leg 26*b* is generally spherical in shape so that the tie rod brace 26 may be more readily be pivoted about the U-bolt 27*a*. Additionally, the tie rod leg 27*c* does not form a sharp corner with the bight portion 27*a*, but the bight portion 27*a* and the tie rod leg 26*c* form a curved surface or radius with each other.

From the above detailed description, the operation of the supporting structure 10 will be apparent. However, briefly, it will be appreciated that the tie rod brace 26 is operatively associated with the mast arm 12 in such a manner that, with the nuts 27*c* of the U-bolt assembly 27 loosened, the tie rod brace 26 is foldable between a first position extending generally perpendicularly to the mast arm 12, as illustrated in FIGS. 1, 3 and 4, and a second position substantially juxtaposed to the mast arm 12, as illustrated in FIGS. 2 and 5. The U-bolt assembly 27 is both slidably and pivotally received in the slot 26*d* to provide for the rotation of the tie rod brace 26. Moreover, the tie member 18 is slidably and rotatably received in the other slot 26*e*, and when the nuts 20 are slightly loosened the tie member 18 is connected sufficiently loosely to the lug 19 to allow for limited pivotal movement relative thereto. Accordingly, rocking movement of the tie rod brace 26 as described above is effective to position the tie member 18 between a first position angularly disposed relative to the mast arm 12 as illustrated in FIGS. 1, 3 and 4, and a second position juxtaposed the mast arm 12, as illustrated in FIGS. 2 and 5.

The improved support structure according to the present invention provides a sturdy support for a luminaire and the like while providing for a minimum of crating, storing and shipping space; and at the same time field-assembly of the support structure 10 to a utility pole 11 is readily accomplished without the necessity of removing or assembling any component parts of the support structure.

Although the present invention has been described by reference to only a single embodiment thereof, it will be apparent that numerous other modifications and embodiments may be devised by those skilled in the art and it is intended by the appended claims to cover all such modifications and embodiments which fall within the true spirit and scope of the present invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A support structure for supporting a luminaire and the like in laterally spaced relation to an upright member and comprising a mast arm including a bracket portion adapted to be secured to the upright member and a tubular member having a first portion extending from and aligned with the first-mentioned portion, the above-mentioned portions adapted to extend from the upright member angularly inclined from the horizontal, said tubular member including a free outer generally horizontally extending end portion adapted to support a luminaire and the like; a lug connected to said first portion of said mast arm; a brace assembly intermediate said lug and said bracket portion including a tie rod brace and a U-bolt connecting said brace and said mast arm, said tie rod brace being channel shaped with an elongated bight portion dimensioned to space said tie rod and said mast arm and including a base leg generally perpendicular to said bight portion, said bight portion and said base leg being provided with a pair of spaced corner slots transversely positioned relative to said channel and extending around the corner connecting said base leg and said bight portion and receiving said U-bolt, said brace including a tie rod leg angularly disposed relative to said bight portion, said bight portion and said tie rod leg being provided with a corner slot transversely positioned relative to said channel and extending around the corner connecting said tie rod leg and bight portion; and a tie member passing through the last-mentioned slot and having one end connected to said lug and having its other end adapted for connection to the upright member to support said tie member in an angularly disposed relation above said mast arm.

2. A supporting structure for supporting a luminaire and the like in laterally spaced relation to an upright member, said structure comprising a mast arm having one end adapted for attachment to said upright member and extending outwardly therefrom with a free end adapted to support a luminaire, a tie rod with its outer end connected to said mast arm and normally disposed to extend angularly away from said mast arm from the point of connection thereto, said rod having an inner end adapted for attachment to said upright member at a position spaced vertically above said one end of said mast arm, and bracket means extending between said mast arm and tie rod intermediate their ends for maintaining a selected angular spaced relation between said mast arm and said tie rod when said bracket means is disposed in an upstanding position generally normal to said mast arm, hinged clamping means interconnecting said bracket means and said mast arm for pivoting said mast arm between an upstanding position to a folded position substantially juxtaposed said arm, said bracket means including a channel shaped member having a central spacing web with end flanges integrally formed at upper and lower ends thereof and having slot means defined in said upper flange extending into said web portion receiving said tie rod and permitting said bracket means to pivot downwardly from said upstanding position toward said bracket means while said tie rod is extended through said slot means substantially juxtaposed said arm.

3. Bracing means for interconnecting and normally maintaining a mast arm and tie rod of a luminaire supporting structure in angular spaced apart relation, said means including a channel shaped bracket having an

elongated web and first and second end flanges integrally formed at opposite ends of said web, clamping means for attaching said bracket to said mast arm, first slot means defined in said first end flange and extending into an adjacent portion of said web for receiving the tie rod extended therethrough and second slot means formed in said second end flange and extending into an adjacent portion of said web, said clamping means extending through said second slot means, said first and second slot means being disposed in opposed relation to each other to permit pivotal movement of said bracket from an upstanding spacing position with the web generally normal to said mast arm to a folded position juxtaposed said arm wherein the angular relation between said arm and tie rod is decreased and said tie rod extends through only the portion of said first slot means that is formed in said first end flange.

4. A support structure for supporting a luminaire and the like in laterally spaced relation to an upright member, said structure comprising a mast arm having one end adapted for attachment to said upright member and extending outwardly therefrom with a free end adapted to support a luminaire, a tie rod with its outer end connected to said mast arm and normally disposed to extend angularly away from said mast arm from the point of connection thereto, said rod having an inner end adapted for attachment to said upright member at a position spaced vertically above said one end of said mast arm, and bracket means extending between said mast arm and tie

rod intermediate their ends for maintaining a selected angular spaced relation between said mast arm and said tie rod when said bracket means is disposed in an upstanding position generally normal to said mast arm, said bracket means including a channel shaped member having a central spacing web with end flanges integrally formed at upper and lower ends thereof and having first slot means defined in said upper flange extending into said web portion receiving said tie rod and having second slot means defined in said lower end flange extending into said web, clamping means on said mast arm extending through said second slot means for securing said bracket means to said arm in said upstanding position, said second slot means being disposed to permit pivotal movement of said bracket means from said upstanding position towards said arm to a folded position substantially juxtaposed to said arm permitting said tie rod to lie substantially juxtaposed said arm while said clamping means are extending through said second slot means upon loosening of said clamping means.

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