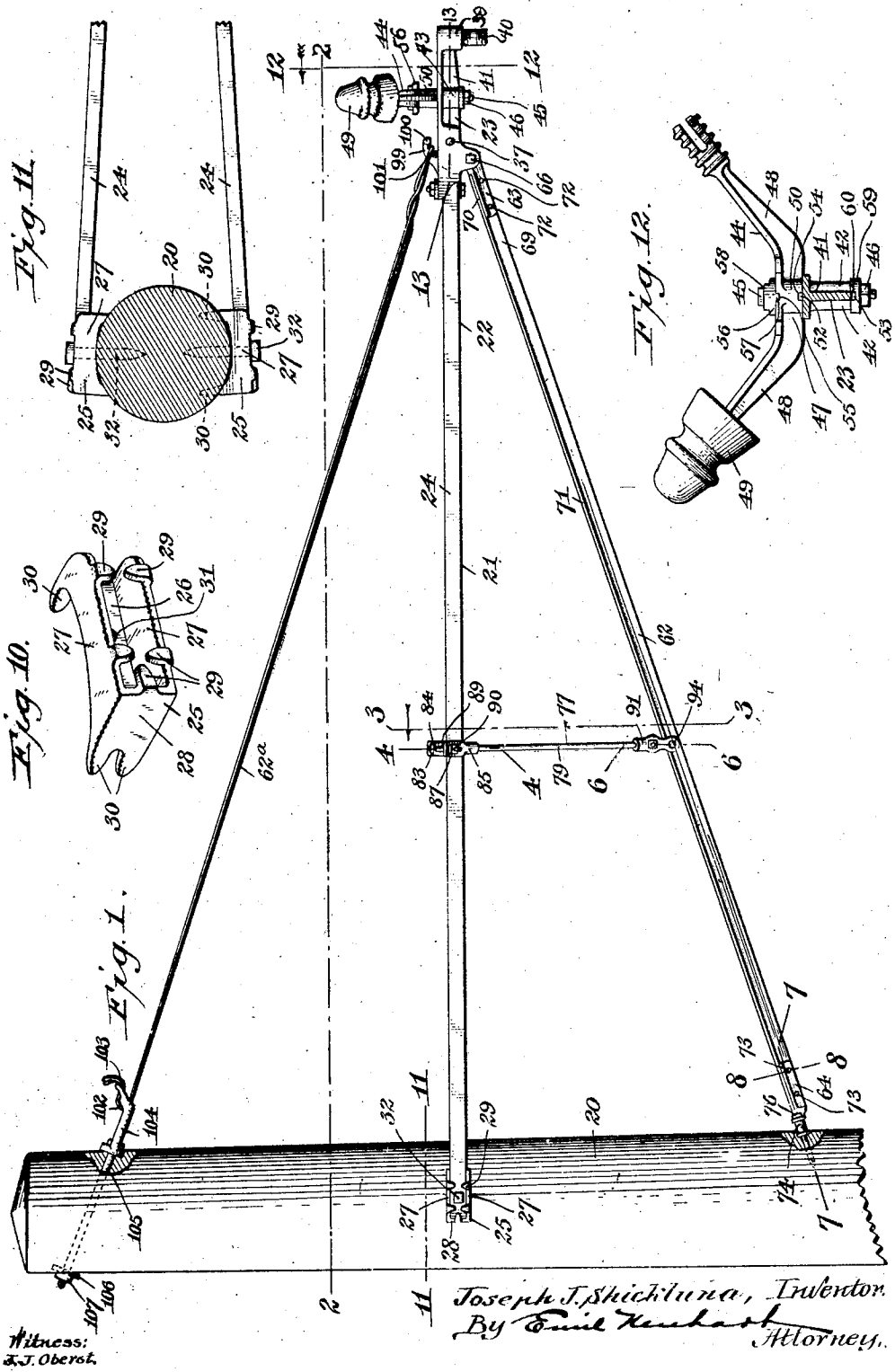
Aug. 14, 1928. 1,680,573

J. J. SHICKLUNA

MAST ARM

Filed Nov. 24, 1923 3 Sheets-Sheet 1



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Aug. 14, 1928. 1,680,573

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MAST ARM

Filed Nov. 24, 1923 3 Sheets-Sheet 2

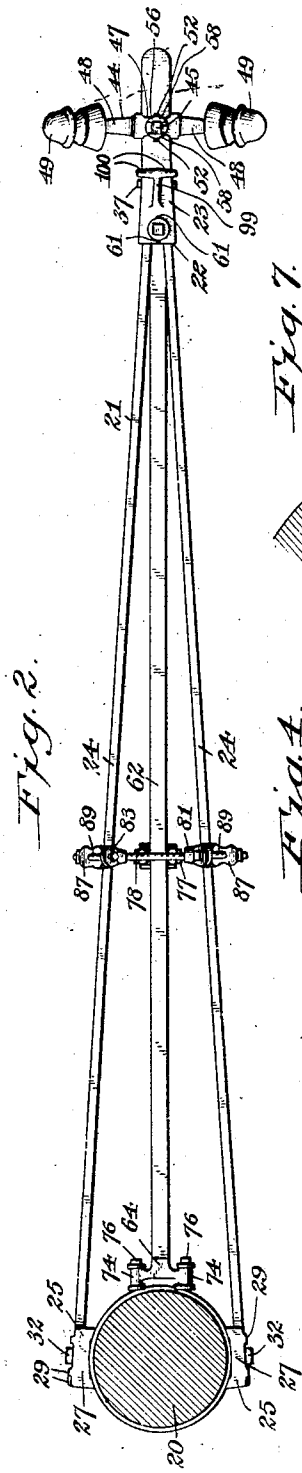


Fig. 2.

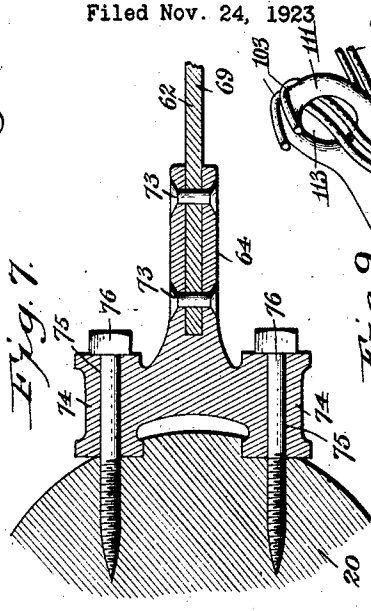


Fig. 7.

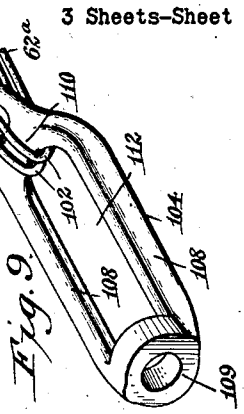


Fig. 9.

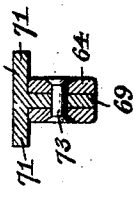


Fig. 8.

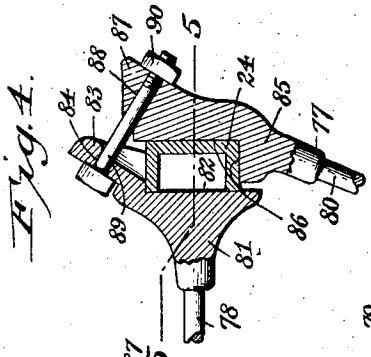


Fig. 4.

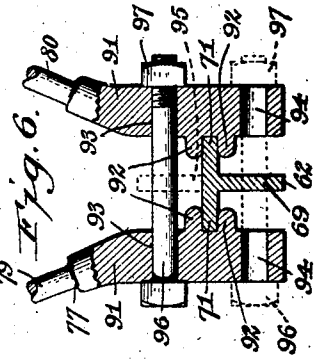


Fig. 6.

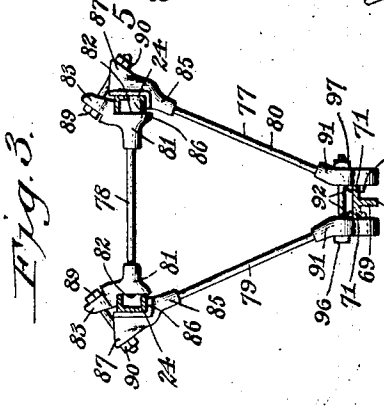


Fig. 3.

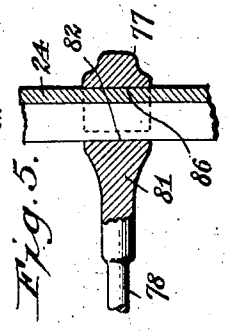


Fig. 5.

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MAST ARM

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Fig. 13.

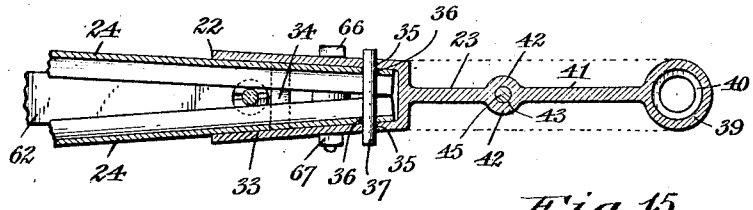


Fig. 15.

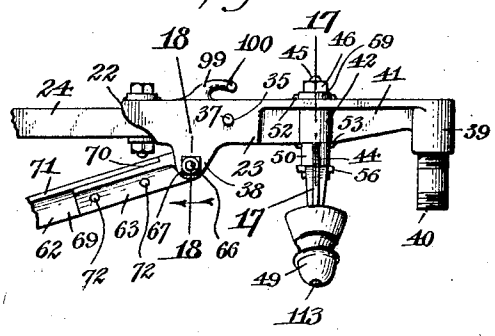


Fig. 14.

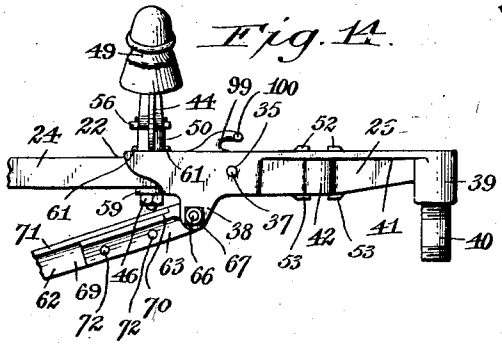


Fig. 17.

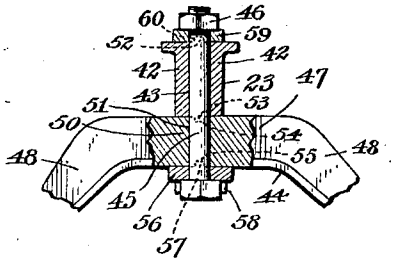


Fig. 16.

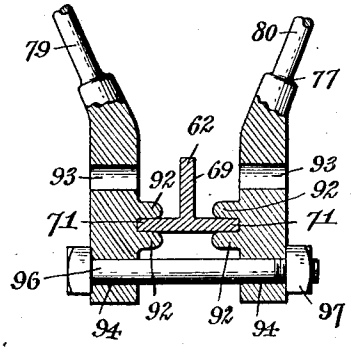
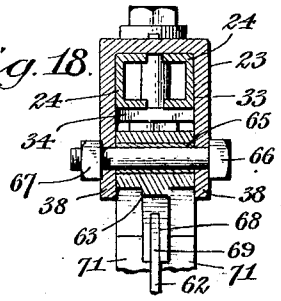


Fig. 18.



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Patented Aug. 14, 1928. 1,680,573

UNITED STATES PATENT OFFICE.

JOSEPH J. SHICKLUNA, OF BUFFALO, NEW YORK.

MAST ARM.

Application filed November 24, 1923. Serial No. 676,723.

My invention relates to an improved mast arm for supporting electric lights.

One of the primary objects of my invention is the provision of a mast arm of this type which is collapsible so that it will occupy comparatively little space when storing or shipping the same in quantities.

Another object of my invention is to provide a mast arm in which the arm proper may be braced from the bottom or supported from a higher point than its point of connection to the mast, or so that it may be both braced from the bottom and supported from a higher point.

Another object is to provide an improved overhead support for the mast arm and to provide a mast arm which is formed of slender members comprising the arm proper, a brace, and a truss or truss structure connecting the arm proper with the brace, all of which may be used with or without said overhead support.

A still further object is to provide a mast arm with a reversible brace and to connect both the inner end of the arm proper and the inner end of the brace to the mast or pole in an improved and simplified manner.

A still further object is to provide an insulation arm for the mast arm which can be positioned either above or beneath the mast arm, and which has angular or oblique end portions, preferably directed laterally and upwardly; said insulation arm being, however, reversible, and when reversed having the angular or oblique end portions directed laterally and downwardly; and to otherwise improve on mast arms of this type.

With the above and other objects in view, the invention consists in the novel features of construction and in the arrangement and combination of parts to be hereinafter described and more particularly pointed out in the subjoined claims.

In the drawings:—

Fig. 1 is a side elevation of the upper portion of a mast or pole having my improved mast arm connected thereto.

Fig. 2 is a horizontal section taken on line 2—2, Fig. 1, the overhead support or guy wire being omitted.

Fig. 3 is a transverse section taken on line 3—3, Fig. 1, looking in the direction of the arrow crossing said line.

Fig. 4 is an enlarged transverse section taken on line 4—4, Fig. 1.

Fig. 5 is a horizontal section taken on line 5—5, Fig. 4.

Fig. 6 is an enlarged transverse section taken on line 6—6, Fig. 1.

Fig. 7 is an enlarged longitudinal section taken on line 7—7, Fig. 1.

Fig. 8 is an enlarged transverse section taken on line 8—8, Fig. 1.

Fig. 9 is a detached perspective view of the securing fitting whereby the inner end of overhead support or guy wire is secured to the mast; said view showing also the manner of connecting said support or wire to said fitting.

Fig. 10 is a detached perspective view of one of the mast arm fasteners adapted to be driven into the mast or pole and secured thereto.

Fig. 11 is a horizontal section taken on line 11—11, Fig. 2.

Fig. 12 is an enlarged transverse section taken on line 12—12, Fig. 1, looking in the direction of the arrow crossing said line.

Fig. 13 is an enlarged horizontal section taken on line 13—13, Fig. 1.

Fig. 14 is a side elevation of the outer end of the mast arm showing the insulator arm secured to the upper side thereof.

Fig. 15 is a similar view showing the insulator arm secured to the under side of the mast arm.

Fig. 16 is a section similar to Fig. 6, showing the brace reversed.

Fig. 17 is an enlarged transverse section taken on line 17—17, Fig. 15.

Fig. 18 is an enlarged transverse section taken on line 18—18, Fig. 15, looking in the direction of the arrow crossing said line.

Mast arms of the type to which this invention relates are usually fastened to masts or other uprights arranged at the side of a road or highway, and are adapted to extend outwardly a suitable distance from such mast or upright with sufficient rigidity to withstand storms and be properly secured to the support so that they cannot become loosened; the object being to suspend an electric lamp from the outer end thereof with a view of lighting the road or highway over the greatest possible area.

Mast arms as now constructed require

large storage facilities at the place of manufacture to properly store the finished stock, and considerable expense is incurred in shipping due to the fact they are exceedingly bulky and occupy an unusually large space when shipped in quantities. By making the mast arm collapsible or in "knock-down" form, as provided for in my invention, the various parts thereof can be disassembled and conveniently stored in a small space, and these parts can be boxed in large quantities so that when shipped they occupy comparatively little space.

Under the principle involved in this invention, I have illustrated a representative form, or what I now consider the preferred construction, of mast arm falling within the scope of my invention.

Referring to the drawings in detail, the reference numeral 20 designates a mast pole, or other upright, which is usually constructed of wood and set at the side of a road, and 21 is my improved mast arm considered as a whole and including its brace or other support and necessary adjuncts. This mast arm comprises the mast arm proper, or what may be termed the reach 22, which is formed of a head or casting 23 and inwardly-diverging bars 24, preferably of channel formation in cross section. The outer ends of these bars are fastened into said head or casting in any suitable manner, but preferably as will be hereinafter described, while the inner ends thereof are fastened to the upright at opposite sides thereof, preferably by inserting them into substantially channel-shaped fasteners 25 and constructed as best shown in Fig. 10.

Each of said fasteners 25 comprises an inner wall or web 26 and flanges 27, which give to said fastener the channel shape transversely, and at its inner end each fastener has an end wall 28. Each fastener is therefore open at its outer end and at one side. The bars 24 are adapted to be inserted between the flanges 27 of the fasteners through the open outer ends thereof, the inner ends of said bars bearing against the end walls 28. At the outer edges of the flanges 27 and end wall 28 of each fastener, retainer prongs 29 are provided which are bent at right angles to said walls and prevent displacement of the bar 24 inserted into the fastener.

The fasteners are made of suitable material, preferably malleable iron, and the retainer prongs 29 may be hammered firmly against the bars when inserted into the fasteners. At the inner side of the fasteners are driving prongs 30, which are adapted to be driven into the mast 20. Each fastener has a bolt hole 31 therethrough and each of the reach bars 24 has a bolt hole therein which registers with the bolt hole in the fastener when said bar is positioned within the latter, and driven through the registering bolt holes and into the mast are lag bolts 32, or other suitable fastening devices. By employing inwardly-diverging bars, such as 24 or the like, the mast arm is given certain laterally bracing qualities.

The head or casting 23 is elongated and the inner end thereof is channeled at the bottom, as at 33, the side walls of the channel structure so provided diverging inwardly, as best shown in Fig. 13, to conform to the trend of the bars 24. At their lower edges, the side walls of this channel formation are connected by a narrow cross bar 34 and the outer ends of the reach bars 24 are inserted into this channel formation, the upper faces thereof bearing against the top wall of such channel formation while the lower faces of said bars lie in contact with said cross bar 34. Near the outer end of this channel formation, or pocket portion as it may be termed, the side walls are provided with alined openings 35, and near the outer ends of the reach bars 24, openings 36 are provided which register with the openings 35, and through all of these openings a retainer pin 37 is inserted, thus preventing withdrawal of the reach bars from said pocket portion.

Depending from the lower edges of the side walls of said pocket portion are lugs 38, for a purpose to appear hereinafter. The head or casting 23 terminates at its outer end in a depending socket 39 which opens downwardly and is internally threaded to receive a connector nipple 40 onto which an electric lamp fitting (not shown) may be secured; said nipple receiving the lamp fitting in the event that the latter has an internal thread. However, when the lamp fitting has an external thread, the nipple 40 is dispensed with and the threaded portion of the fitting is threaded directly into the socket 39.

The head or casting 23 is of T-formation in cross section between the socket 39 and the pocket or channeled portion 33, as shown at 41; the web of said T-formation being enlarged laterally at opposite sides, as at 42, to form a vertical boss. Through this head, co-axial with said boss, is a bolt hole 43 through which an insulator arm 44 arranged transversely with respect to said head, a bolt 45 is passed, said bolt having a nut 46 threaded thereon to retain the insulator arm in position.

Specifically describing said insulator arm and its connection to said head or casting, it will be noted that it has a central horizontal portion 47 and oblique end portions 48, and the outer ends thereof are made cylindrical and provided with external screw threads, glass or other insulators 49, which are internally threaded, being applied thereto. This insulator arm, in the main, is of

T-formation in cross section, and midway between its ends the web thereof is enlarged to form a central boss 50 through which a bolt hole 51 is axially formed.

At the top of the head or casting 23, a pair of alined tongues 52 are provided which extend in the direction of the length of said head or casting adjacent the bolt hole 43 therein, while at the bottom of said head or casting a similar pair of alined tongues 53 are provided.

At one edge of the insulator arm, transverse grooves 54 are cut or otherwise formed, said grooves being in a plane bisecting the bolt hole 51 in said arm, similar grooves 55 are cut or otherwise formed in the opposite edge of said arm, said grooves also being disposed in a plane bisecting the bolt hole 51.

In preferred arrangement, the insulator arm is disposed at the top of the head or casting 23, as shown in Figs. 1, 2, and 12, and when so arranged the tongues 52 at the top of said head or casting are entered in the grooves 54 of the insulator arm, and when the bolt 45 is fastened in place, said insulator arm is firmly counted on said head or casting. By reason of the tongue and groove connection between said head or casting and said arm, rotation of said arm is prevented.

To further guard against rotation of said insulator arm on the head or casting and to prevent rotation of the bolt within said head or casting and said insulator arm, a lock washer 56 is employed at the headed end of said bolt, said washer having tenons 57 formed on one side thereof which enter the grooves 55 in the insulator arm, and at the other side, said washer is provided with spaced flanges 58 between which the head of the bolt 45 is positioned. In this manner the washer is held against rotation on the insulator arm and the bolt against rotation within the washer. A washer 59 is slipped over the threaded end of said bolt 45, and this washer has grooves 60 formed therein which receive the tenons 53 at the bottom of the head or casting 23, the nut 46 of the bolt being threaded firmly against said washer 50. In a sense, this washer 59 also serves as a lock washer, since rotation of the same is prevented by reason of its tenon and groove connection with the head or casting 23 and a fixed position of said washer will, in a measure, serve as a check against the unthreading of the nut 46 from the bolt 45.

When the insulator arm is disposed at the top of the head or casting 23, the outer portions of said arms are preferably directed upwardly, as shown in Fig. 12, but this arm, even though disposed on the top of the head or casting, may be reversed. In either case, however, a tongue and groove connection will be maintained between the insulator arm and the head or casting, and also between the washer 56 and said insulator arm. In some instances it may be found desirable to position the insulator arm underneath the head or casting, and when so positioned, a tongue and groove connection will be maintained between the head or casting and said insulator arm, and also between the insulator arm and the washer 56, which latter, in this instance, will be at the bottom instead of at the top, as clearly shown in Fig. 17, while the washer 59 will be at the top.

By providing the head or casting with the tenons at the top and bottom and providing the insulator arm with grooves at both edges, said insulator arm may be disposed in an upright position at the top of the head or casting, or at the bottom thereof, or it may be disposed in a reversed or depending position, either at the top or bottom of the head or casting. In some places where installed, authorities may, for appearance sake, choose any one of the four positions described with reference to the insulator arm; but aside from appearance it will be understood that the lead wires are directed outwardly from the upper end of the mast 20 to the insulators 49 and connected to the latter, and that usually loose or coiled wires are led from these insulators downwardly to the depending lamp. In cases where the lamp is hung low from the mast arm, it may be found more practical to so place the insulator arm that the insulators 49 are in a low position, making it unnecessary to use long lengths of wire from the insulators to the lamp; and in some cases, even where the lamp is hung comparatively high and close to the mast arm, it may be desirable to dispose the insulator arm in a depending position underneath the head or casting 23, as shown in Fig. 15, as the wires leading from the insulators to the lamp will be comparatively short, and when coiled will enable the lamp to sway without straining the wires connected thereto; and at the same time the complete device will be given a neat appearance.

In other instances it may be found desirable to position the insulator arm closer to the mast 20, and for this reason the top wall of the pocket or channel portion 33 has a bolt hole in its top wall, and on the upper side of said wall a pair of alined tongues 61 are formed, said tongues being in a plane bisecting said bolt hole and at opposite sides thereof. When the insulator arm is mounted in this inner position, the tongues 61 will be entered in the grooves 54 of the insulator arm when said arm is in upright position, or they will be entered in the grooves 55 of said insulator arm when said arm is reversed. The bolt 45 will then be shifted

rearwardly and passed through the insulator arm from the top, with the lock washer 56 resting on said arm and locking thereinto while locking the head of said bolt against rotation. This bolt passes downwardly through the pocket or channel portion of the casting and between the two reach bars 24, as clearly shown in Fig. 13, and the washer 59 is placed onto said bolt and bears against the under sides of said reach bars while the nut 46 is threaded onto the projecting end of said bolt. In this manner the insulator arm may be securely fastened at the rear end of the head or casting and be held against rotation in substantially the same manner as when secured in one of its forward positions.

Although I employ the washer 59 at this point and said washer has the grooves 60 therein, there are no co-acting parts for said grooves when the insulator arm is applied to the inner end of the head or casting 23, and said washer is therefore used in the same manner as an ordinary ungrooved washer. Consequently, an ordinary bolt and nut may be used, with a grooved washer such as 59; and in such cases the grooves of the washer 59 receive the tenons 61.

In Fig. 15 I have shown an ordinary bolt passed through the channeled portion of the head or casting, which bolt may be used for fastening the insulator arm in position; and in such cases, the bolt 45 will be retained in the bolt hole 43, ready for use when it is desired to shift said arm to one of its forward positions.

In connection with the mast arm or, as hereinbefore referred to, the reach of the mast arm, I employ a brace 62 or an overhead support 62^a. If desired, both the brace and the overhead support may be used together, but this will, in most instances, not be found necessary and one or the other will suffice.

The brace 62 is formed of a T-shaped bar having a connector fitting 63 at its outer end and a securing fitting 64 at its inner end. The connector fitting 63 is a casting having a transverse bolt hole 65 therethrough and it is of a width to fit between the lugs 38 depending from the head or casting 23. A bolt 66 is passed through said lugs and through the bolt hole in said connector fitting and receives a nut 67 whereby the outer end of the brace is securely but detachably fastened to the head or casting 23. This connector fitting is slotted, as at 68, and receives the web 69 of said T-shaped brace bar. Said connector fitting 64 is also provided with a depression 70 along its upper face, and in this depression are fitted the flanges 71 of the T-shaped brace bar. Rivets 72 are passed through this fitting and through the web of the brace bar and serve to rigidly connect said fitting to said bar.

The securing fitting 65 is slotted and formed along a portion of its length similar to the connector fitting 64 and fitted onto the inner end of the brace bar in the same manner as the connector fitting; said securing fitting being fastened to the inner end of said brace bar by means of rivets 73. The inner end of this securing fitting is widened transversely to form lateral extensions 74, which are of spool-shape, and which are adapted to bear against the mast 20 or to be partly driven into the same, each spool having a bolt hole 75 therethrough, through which lag bolts 76 are passed that are threaded into said mast. In this manner the inner end of said brace bar is securely fastened to the mast, while the front end thereof is pivotally connected to the head or casting 23 of the reach, or mast arm proper.

The braced mast arm, thus far described, has the two reach bars 24 and the brace bar 62 arranged in triangular relation, and at a point between the ends of said mast arm, a truss structure 77 is provided, which connects the arms 24 together and connects said arms with the brace bar. This truss structure 77 comprises three rods 78, 79, 80. The rod 78 is transversely-disposed between the two reach bars 24 and the two remaining rods 79, 80 converge downwardly. The rod 78 has castings or connector fittings 81 at opposite ends, which may also be referred to as enlargements, each of which is provided with an outer flat bearing face 82 and an upward and outward extension 83 through which a bolt hole 84 is formed. Each of the rods 79, 80 has a casting, connector fitting, or enlargement 85 at its upper end, and each of these fittings is provided with an angular seat 86 and with an upward and outward extension 87 through which a bolt hole 88 is formed. The reach bars 24 fit against the angular seats 86 of the two fittings 85, while the flat bearing faces on the fittings 81 bear against the edges of the inwardly-directed flanges of said bar, each of the two fittings 81 of the transverse rod 78 co-operating with a fitting 85 at the upper end of one of the rods 79 or 80, and such co-operating fittings practically embrace the bars 24.

The bolt holes 83 and 88 in co-operating fittings are alined and trend downwardly and outwardly, and passed through these bolt holes are bolts 89 by means of which the bars 24 are securely clamped between the outer ends of the transverse rod 78 and the upper ends of the rods 79 and 80, a nut 90 being fastened to each bolt 89, as best shown in Fig. 4.

At their lower ends, the rods 78, 79 have castings or connector fittings 91 thereon, which lie against the outer edges of the opposite flanges of the T-shaped brace bar 62. Each of these fittings 91 has spaced lugs 92 on its inner side between which one

of the flanges of the T-shaped brace bar is held, said fittings having a pair of alined bolt holes 93 in a plane above the lugs 22 and a pair of alined bolt holes 94 in a plane beneath said lugs.

In preferred form the T-shaped brace bar 62 is so positioned that the flanges extend along the upper edges thereof, this being the position of said bar shown in Fig. 6; therefore, the web of said bar extends downwardly. When, however, this bar is reversed, the web thereof will extend upwardly, as shown in Fig. 16, and with dotted lines at 95, Fig. 6. When the brace bar is arranged with its web extending downwardly, a bolt 96 is passed through the upper pair of bolt holes 93 in the fittings 91 and a nut 97 applied thereto to draw these fittings firmly against the edges of the opposite flanges of said T-shaped bar. When, however, said brace bar is reversed, as shown in Fig. 16, the web thereof would prevent the bolt 96 being passed through the upper pair of bolt holes 93 in said fittings 91. Consequently, the bolt 96 will be passed through the lower pair of bolt holes 94 of said fitting. In either case the brace bar will be firmly clamped between the lower ends of the rods 79, 80 by said bolt 96, and flexing of said bar will be prevented by reason of its flanges being held between two pairs of lugs 92 formed on the inner faces of the fittings 91. It will be clear therefore that the rods 78, 79, 80, which may be termed truss members, are detachably connected together and serve, at each of the three corners of the triangular truss so formed, to clamp the three main members of the braced mast arm between adjacent ends of such truss members. In this manner the three main members of said braced mast arm are rigidly tied together.

By the construction thus far set forth, a rigid and durable, yet exceedingly light, mast arm is provided, and when it is desired to disassemble the parts, it is only necessary to remove the fastening devices employed to fasten the device to the mast 20, then remove the retainer pin 37 from the head or casting and the bolt 66, after which the bolts 89 and 96 of the truss structure may be removed, permitting the head or casting to be separated from the other parts of the device and the two arms of the reach or mast arm proper to be separated, and after removing the insulator arm from the casting by withdrawing the bolt 45 therefrom, all parts may be grouped together in parallel arrangement so as to occupy comparatively little space.

Formed on the head or casting 23 is a forwardly opening hook 99, the front end of which has lateral extensions 100, thus forming what may be termed a T-shaped hook. The overhead support 62^a is formed of a length of wire doubled upon itself and at its doubled-up end being passed over the T-shaped hook, as at 101. This wire is twisted in rear of said hook and the two strands or stretches thereof are directed inwardly and upwardly. The wire therefore has an eye at its front end, which is hooked over the T-shaped hook 99 and is prevented from becoming loosened by reason of the lateral extensions 100 on said hook. At its inner end, each strand or stretch of this wire is doubled upon itself, as at 102, to form an outwardly-opening hook; it is thence recurved, as at 103, to form an inwardly opening hook both hooks forming a substantially S-shaped terminal on each strand or stretch of wire.

104 designates a securing fitting fastened to the mast by means of a bolt 105, said bolt being preferably passed through said mast and held in place by a washer 106 and a nut 107. This securing fitting, as best shown in Fig. 9, is in the form of an elongated casting having two spaced side members 108 connected together at their inner ends by a perforated disk or eye 109 through which said bolt 105 is passed, and said spaced side members are connected together at their outer ends by a transverse portion 110 forming part of an upwardly and outwardly-directed eye 111. This fitting therefore has an elongated opening 112, and a circular opening 113 formed in said eye. The inwardly opening hooks 103 formed at the extremities of the two strands or stretches of wire forming the overhead support 62^a are passed through the opening 112 between the side members 108 of said securing fitting and thence through the opening 113 in the eye 111, while the outwardly opening hooks 102 are passed through the opening 112 only. In this manner the inner ends of the two strands or stretches of wire forming the overhead support are securely fastened to the securing fitting 104. If desired, the inner ends of the overhead support may be fastened to the mast in any other suitable manner.

It will be apparent from the foregoing that I have provided a collapsible or knockdown mast arm of simple construction, neat appearance and few parts, and one which is comparatively light in weight and capable of being stored or shipped in large quantities while occupying minimum space.

It also has the advantage of permitting its being assembled to readily change its appearance, since the flanges of the reach bars 24 may be directed outwardly, the brace arm reversed, and the overhead support and brace arm used together, or either without the other. The insulator arm may also be positioned in a forward or rearward position on the head or casting and reversed in either position, or it may be hung from the head or casting in a forward position

or positioned underneath the head or casting in an upright manner, all of which will, to a certain extent, change the appearance of the mast arm and permit the user to assemble the parts therof to suit his particular fancy.

When the insulator arm is reversed, the insulators 49 are preferably provided at their outer ends with openings, such as shown at 113, Fig. 15, to prevent rain lodging therein and possibly creating a short circuit.

It will further be apparent that long or short reach or brace bars may be employed with the remaining parts of the structure, since mast arms of this kind vary in length, depending on the width of the road and other conditions.

Moreover, instead of using the mast arm in conjunction with an electric lamp, it may be employed as a support for overhead trolley wires, and for various other purposes, and in such instances the insulator arm may be changed in construction, or its use may be found unnecessary.

Having thus described my invention, what I claim:—

1. In combination with a mast, a mast arm including a reach having a hook at its upper side, an overhead support formed of wire detachably connected to said hook and extending upwardly and inwardly therefrom, said overhead support having a hook at its inner end, a securing fitting having an opening therein through which the hook of said overhead support is passed, and means for securing said securing fitting to said mast.

2. In combination with a mast, a mast arm having a reach, an overhead support formed of wire and connected at one end to said reach and having its other end doubled upon itself and thence recurved to form a substantially S-shaped terminal, a securing fitting having two separated openings therein through one of which the doubled-up and recurved portion of said wire is passed and through the other of which the recurved portion only of said wire is passed, and means for securing said securing fitting to said mast.

3. A mast arm comprising a reach having a head secured to the outer end thereof, means on said head for connecting a lamp thereto, and an insulator arm connected to said head.

4. A mast arm comprising two inwardly-diverging bars and a head connected to the outer ends of said bars, a brace detachably connected to said head and extending inwardly and downwardly therefrom, an insulator arm detachably applied to said head, and means on said head for attaching a lamp thereto.

5. A mast arm having a reach provided with a bolt hole and a tongue adjacent said bolt hole at the top and bottom of said reach, an insulator arm provided with a groove at one of its edges, said groove being adapted to receive the tongue at the top or the other tongue at the bottom of said mast arm under changed positions of said insulator arm on said mast arm, and a bolt extending through said mast arm and insulator arm to fasten the latter to said mast arm.

6. A mast arm having a bolt hole therethrough and a pair of aligned tongues at the top and bottom in a plane intersecting said bolt hole, an insulator arm having oblique end portions and a bolt hole and having also grooves in opposite edges arranged in pairs in planes to intersect the bolt hole in said insulator arm, said insulator arm being reversible and either pair of grooves therein receiving the tongues at the top or bottom of said mast arm according to the connection of said insulator arm to said mast arm, and a bolt passing through said bolt holes and securing said insulator arm to said mast arm.

7. A mast arm having a bolt hole therethrough and a tongue at one side adjacent said bolt hole, a reversible insulator arm having a bolt hole and a groove at each edge thereof adjacent said last-mentioned bolt hole, either of said grooves being adapted to receive said tongue, depending on the position of said insulator arm on said mast arm.

8. In combination with a mast, a mast arm having two inwardly-diverging bars, channel-shaped fasteners receiving the inner ends of said bars and having retainer prongs bent over the outer sides of said bars, and means passed through said bars and fasteners and adapted for connection to said mast.

9. A mast arm comprising a reach having inwardly-diverging bars, a brace for said reach, said brace and bars being disposed in triangular relation, and a truss structure connecting said bars and brace comprising a transverse rod disposed between said bars and having fittings at opposite ends lying against said bars, and a rod disposed between each of said bars and said brace and having fittings at opposite ends thereof, the fitting at one end of each of said last-mentioned rods co-operating with the fittings at opposite ends of said transverse rod and lying in contact with one of said bars, and the fittings at the opposite ends thereof lying at opposite sides of said brace, and bolts passing through adjacent fittings to clamp the bars and brace therebetween.

10. A mast arm comprising a reach having inwardly-diverging bars, a brace for said reach, said bars and brace being disposed in triangular relation, and a truss structure connecting said bars and brace

and comprising three rods and disconnectable fittings at opposite ends of each of said rods, each of said bars and said brace being reversibly retained between adjacent fittings, and bolts passed through adjacent fittings to securely fasten said bars and brace within said truss and tie them together.

11. A mast arm comprising a reach having inwardly-diverging bars and a T-shaped brace detachably and reversibly connected to said reach, a truss structure connecting said bars and brace comprising a truss element disposed between said bars and a truss element disposed between each of said bars and said brace, each of said last-mentioned truss elements having a fitting at its lower end provided with spaced lugs adapted to receive one of the flanges of said brace therebetween when said brace is in either of its two positions, said fittings having two pairs of alined openings, one pair being in a plane above said lugs and the other in a plane beneath the same, and a bolt passed through either pair of said bolt holes, depending on the position of said brace.

12. A mast arm comprising a reach having two inwardly-diverging bars, a brace for said reach, said bars and brace being arranged in triangular relation, a truss structure connecting said bars and brace and comprising a transverse rod having enlargements at opposite ends provided with upward and outward extensions, two downwardly-converging rods connected to said brace and having enlargements at their upper ends with upward and outward extensions, and bolts passed through the upward and outward extensions of the castings of said last-mentioned rods and the castings of said transverse rod for clamping said bars between said castings.

13. A mast arm comprising two inwardly-diverging bars and a head connected to the outer ends of said bars, a brace detachably connected to said head and extending inwardly and downwardly therefrom, an insulator arm, means provided in the construction of said head to permit the insulator arm to be detachably applied to the upper side of said head in different positions lengthwise thereof, or to the under side of said head in reversed position, and means on said head for attaching a lamp thereto.

In testimony whereof I affix my signature.

JOSEPH J. SHICKLUNA.