June 18, 1963 D. W. HARLING 3,094,220

MAST ARM

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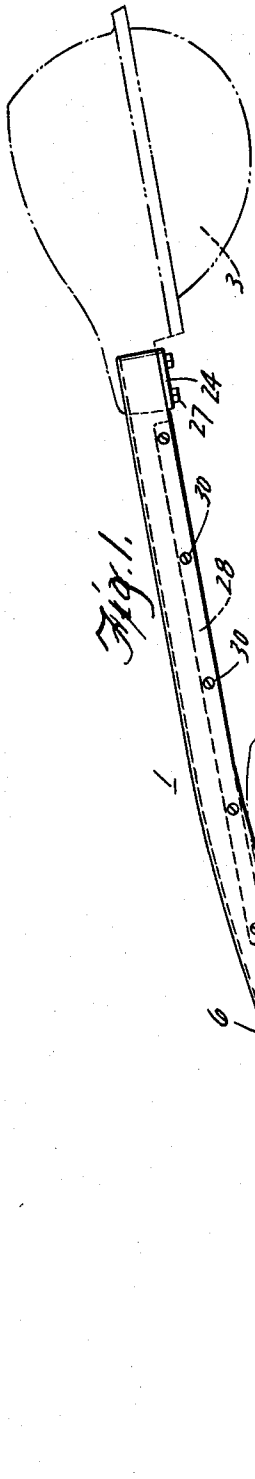


Fig. 1.

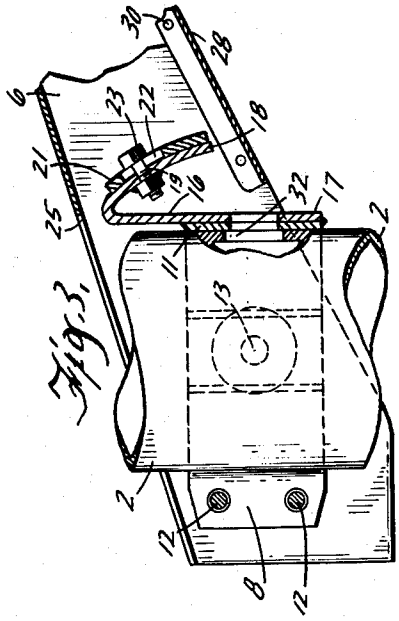


Fig. 3.

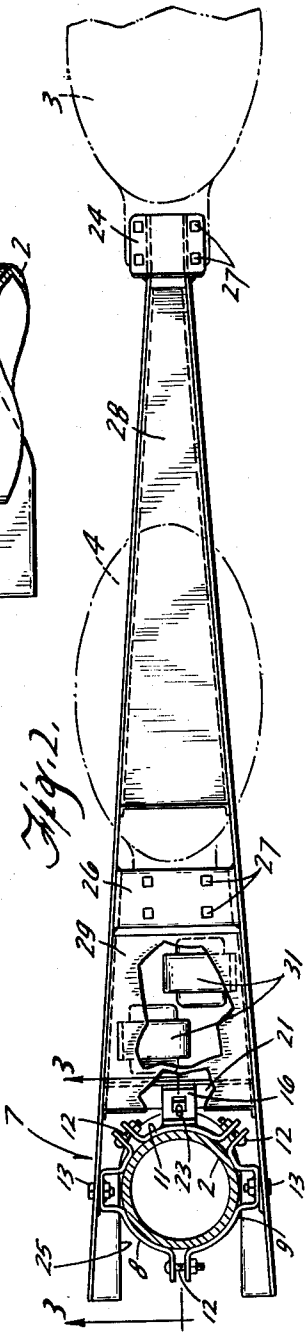


Fig. 2.

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MAST ARM

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This invention relates to street lighting installations and more particularly to mast arms for supporting street lighting luminaires.

Street lighting practices are moving towards higher and higher levels of illumination on the street. One proposal for achieving a higher level of illumination has been the development of higher lumen output lamps, but these have not proven to be an entirely adequate solution. The higher lumen output lamps are larger than standard lamps presently in wide use and require larger and more expensive luminaires and ballasts which increase the cost of a street lighting installation. In addition to the increased cost, installations incorporating higher lumen output lamps as a single light source transmit high intensity light beams which result in a luminaire having a high glare factor.

This invention contemplates the provision of a single mast arm adapted to support luminaires in tandem. With such a mast arm standard, medium sized luminaires can be used and will result in higher levels of illumination on the street, as compared to an installation incorporating a higher lumen output lamp, and at a cost substantially less than such a high lumen output installation. Further, the tandem mounting of medium intensity light sources, as opposed to one light source of high intensity, results in substantially less glare.

Also, it is contemplated to include within the mast arm any operating components which might be required for operating the luminaire, e.g., the ballasts used with a mercury vapor lamp, so that a completely integrated assembly is provided.

I have discovered that such an installation, namely mounting standard, medium sized luminaires in tandem on a single mast arm, is more efficient in street side utilization of available light than luminaires incorporating the higher lumen output lamps. Specifically, luminaires incorporating the higher lumen output lamps have a street side utilization in the range of 40%, whereas an installation in accordance with my invention has a utilization on the street side in the range of 50%.

Accordingly, an object of this invention is the provision of a simple, economical street lighting installation which will provide higher levels of illumination on the street.

Another object of my invention is to provide higher levels of illumination on the street with a minimum of glare.

A further object of my invention is to provide a mast arm for supporting at least a pair of luminaires in tandem which is adjustably connected to a mounting surface to provide for adjustment of the luminaires in a vertical plane.

A more specific object of my invention is to provide a single mast arm which will support at least a pair of standard, medium sized luminaires in relative tandem relationship and which is adapted to include any operating components required for the luminaires.

These and other objects and advantages of my invention will become more apparent from a reading of the following description in connection with the drawings in which:

FIG. 1 is a side elevation of a street lighting installation in accordance with my invention;

FIG. 2 is a bottom plan view of the street lighting installation of FIG. 1; and

FIG. 3 is an enlarged cross sectional view taken along lines 3—3 of FIG. 2.

A mast arm **1** is connected to a vertical pole **2** and supports a pair of luminaires **3** and **4**. The mast arm **1** includes an upsweep substantially channel shaped bracket member **6** to which the luminaires **3** and **4** are fixedly connected, in a manner to be discussed more thoroughly hereinafter, in relative tandem relationship.

Clamping means **7** is provided adjacent the pole end of the bracket **6** and preferably takes the form of a three-piece clamp comprising a pair of side straps **8** and **9** and a third strap **11** disposed on the street side of the pole **2**. The side straps **8** and **9** and the strap **11** are suitably interconnected by nut and bolt combinations **12**. The entire clamping means **7** is releasably connected to the bracket **6** by nut and bolt combinations **13** which are disposed in a slotted hole **14** provided in both sides of the bracket **6**, and a suitable clearance hole in each of the side straps **8** and **9**. The slotted hole **14** in the bracket **6** cooperates in the adjustability of the mast arm **1** as will become more readily apparent as the description proceeds.

Attached to the forward portion of the street side strap **11** is an inverted V-shaped strap **16**. One leg **17** of the V-strap is welded to the forward portion of the strap **11**. The other leg **18** is arcuate in shape and includes a clearance hole **19**. Fixed to and extending transversely of the bracket **6** is an arcuate strap **21** which is so positioned relative to the bracket **6** and the clamping means **7** as to engage the arcuate leg **18** of the inverted V-shaped strap **16**. The arcuate strap **21** is provided with an elongated slot **22** which registers with the clearance hole **19** in the arcuate leg **18**. The arcuate leg **18** and arcuate strap **21** are releasably connected and capable of relative sliding movement and, with the slotted holes **14** in the bracket **6**, provide means for allowing adjustable movement of the mast arm **1** in a vertical plane. A nut and bolt combination **23** tightens the arcuate leg **18** against the arcuate strap **21** to fix them in any desired position.

The clamping means **7** holds the mast at any desired height, but the bracket **6** can be loosened and pivoted up or down about the clamping means and within the limits of the length of the slots **14** and **22**. An opening **25** in the bracket **6** embraces the pole **2** and is of sufficient length to provide clearance for adjustment of the bracket **6**. When the desired position of the bracket **6** is reached the nut and bolt combinations are tightened to hold the bracket **6** securely in place and provide three points of support between the clamping means **7** and the bracket **6**. Adjustability of the mast arm **1** can be better appreciated when it is kept in mind that it seldom occurs that support poles are mounted in a perfectly vertical position; the adjustability feature allows the mast arm to be moved to compensate for any deviation in the pole mounting.

The mast arm **1** also includes means for mounting at least a pair of luminaires **3** and **4** in fixed relative spaced relation on the bracket **6**. This means preferably includes a pair of mounting plates **24** and **26**. Mounting plate **24** is suitably attached to the free end of the bracket **6** and mounting plate **26** is attached to the bracket **6** intermediate the ends thereof. The luminaires **3** and **4** are connected to the mounting plates **24** and **26**, respectively, by machine bolts **27**. Therefore, the luminaires **3** and **4** are fixedly supported from the bracket **6** in tandem relationship and in alignment along the longitudinal axis of the bracket **6**. Further, the luminaires **3** and **4** are spaced a sufficient distance apart so that they will not appear, to

an approaching driver, as a single source of light with a high glare factor.

It has also been found preferable to dispose the luminaires at an angle relative to each other. With such an arrangement greater lighting coverage of the street or roadway is obtained. I have discovered that it is more advantageous to mount the inboard luminaire **4** substantially in a horizontal plane while mounting the outer luminaire **3** at an angle to the horizontal. Thus the portion of the street immediately adjacent the pole **2** is well lighted, as is the opposite side of the street. The mounting plate **24** is set at an angle to the horizontal and mounting plate **26** is set substantially in a horizontal plane so that the luminaires will be disposed as discussed above.

The luminaires **3** and **4** are fixed in a desired relative relationship on the mast arm **1**. Although the mast arm **1** is adjustable in a vertical plane so that deviations in the pole mounting can be compensated for, the relative position of the luminaires will not change during adjustment so that the desired spread of light from the luminaires is maintained.

The under side of the bracket **6** is substantially closed by a pair of plates **28** and **29** which are formed to fit within the bracket **6** and are connected thereto by machine screws **30**. The plates **28** and **29** in addition to closing the bottom of the bracket **6** also add strength and rigidity thereto.

Disposed near the pole and within the mast arm **1** are two core and coil ballasts **31**, one for each luminaire. These ballasts could, if desired, be replaced by a single two lamp core and coil type ballast. Electrical leads (not shown) for the luminaires are contained within the pole **2** and extend through an aperture **32** for connection to the ballasts **31**. Thus, an integrated street lighting installation is provided. The luminaires **3** and **4** are attached to the bracket **6**, and the bracket **6** contains the ballasts **31** for operating the luminaires **3** and **4**. In practice, the luminaires and ballasts can be connected to the bracket **6** and electrically wired. The mast arm can then be raised to a desired height and fixed in place, only one connection need be made with the mast arm in position, i.e., the connection of the supply leads to the ballasts.

Another advantage of using two standard, medium sized luminaires, as opposed to a single larger higher lumen output luminaire, is that such an installation is particularly well suited for half-night operation. That is, late at night when a high level of illumination is not necessary one of the luminaires can be turned off and only one left burning. This results in a saving by reducing the cost of operation of this installation and increases the operating life thereof as the lights which are turned off can be alternated from night to night and thus lengthen the useful life of the lamps and the entire installation.

Although I have discussed my invention in relation to a particular preferred embodiment thereof it is to be understood that such discussion is for illustrative purposes only and it is not intended that my invention be limited thereto. On the contrary, it is intended, in the appended claims, to cover all modifications and embodiments of my invention as fall within the true spirit and scope thereof.

I claim:

1. A support assembly for mounting a pair of luminaires in tandem relation from a vertically extending pole, the combination of, an upsweep substantially channel-shaped arm, said arm being opened at one end for receiving said pole, bracket means adapted for embracingly engaging said pole, said one end of said arm being releasably connected to said bracket means at the opposite sides of said pole to define a pivotal axis substantially normal to the longitudinal axis of said arm, said bracket means having a vertically extending support member releasably engaging said arm along its longitudinal axis to secure said arm in a fixed angular position relative to said pole, a first mounting member fixedly connected adjacent the other end of said arm and disposed at an angle to the horizontal and constructed and arranged to receive and mount a first luminaire along the longitudinal axis of said arm, a second mounting member fixedly connected to said arm intermediate the ends thereof and constructed and arranged to receive and mount a second luminaire in alignment with said first luminaire and in a substantially horizontal position, and electrical circuitry support means mounted on said arm between said bracket means and said second member.

2. A support assembly for mounting a pair of luminaires in tandem relation from a vertically extending pole, the combination of, an upsweep arm constructed and arranged to be connected at one end to said pole, bracket means embracingly engaging said pole, said one end of said arm being pivotally and releasably connected to said bracket means at substantially the opposite sides of said pole to define a pivotal axis substantially normal to the longitudinal axis of said arm, said bracket means having a vertically extending support member releasably engaging said arm along its longitudinal axis to secure said arm in a fixed angular position relative to said pole, a first mounting member fixedly connected adjacent the other end of said arm and constructed and arranged to mount a first luminaire along the longitudinal axis of said arm and at a first horizontal angle, and a second mounting member fixedly connected to said arm intermediate the ends thereof and constructed and arranged to mount a second luminaire along the longitudinal axis of said arm and at a second horizontal angle relative to said first mounting member and, electrical circuitry support means mounted on said arm between said bracket means and said second mounting member.

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