April 30, 1968 H. A. WIDNER 3,381,118

LIGHTING UNIT

Filed Sept. 13, 1965 2 Sheets-Sheet 1

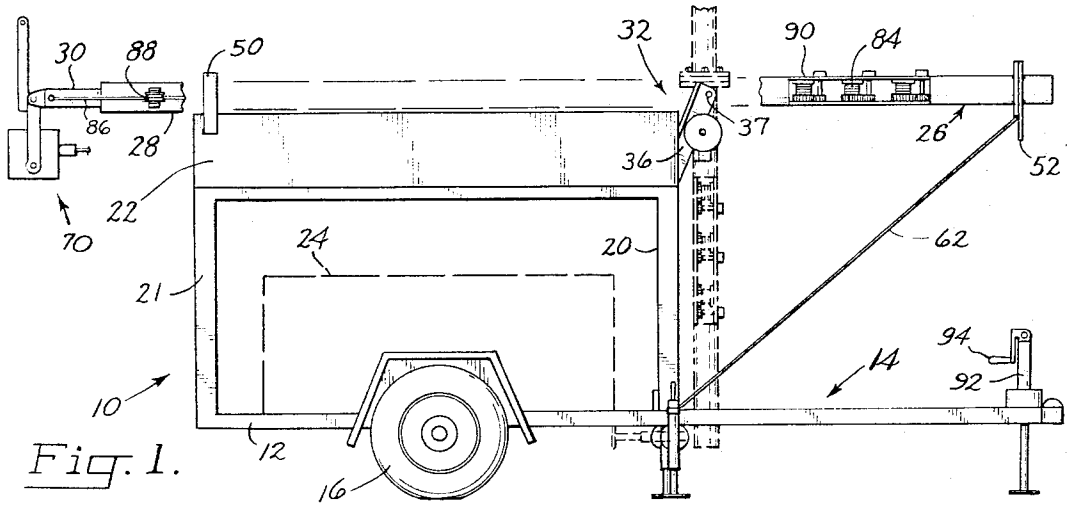

Fig. 1.

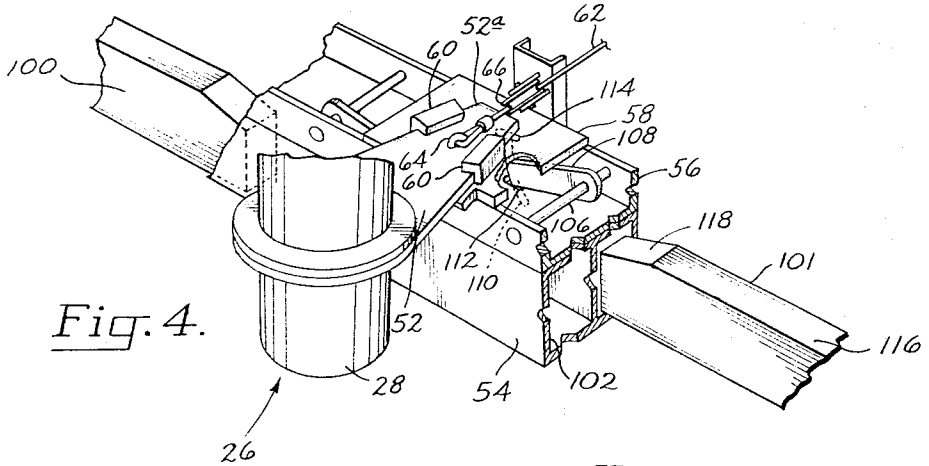

Fig. 4.

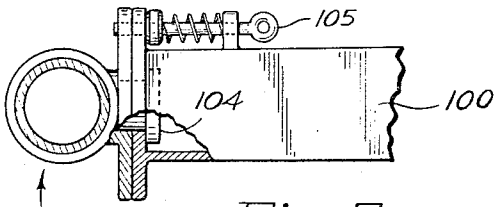

Fig. 7.

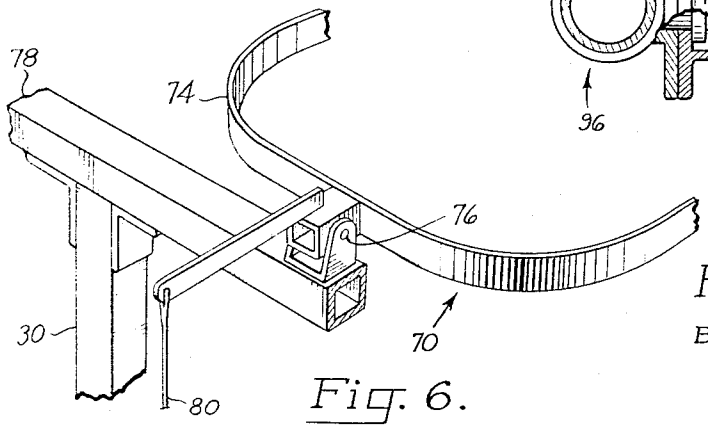

Fig. 6.

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LIGHTING UNIT

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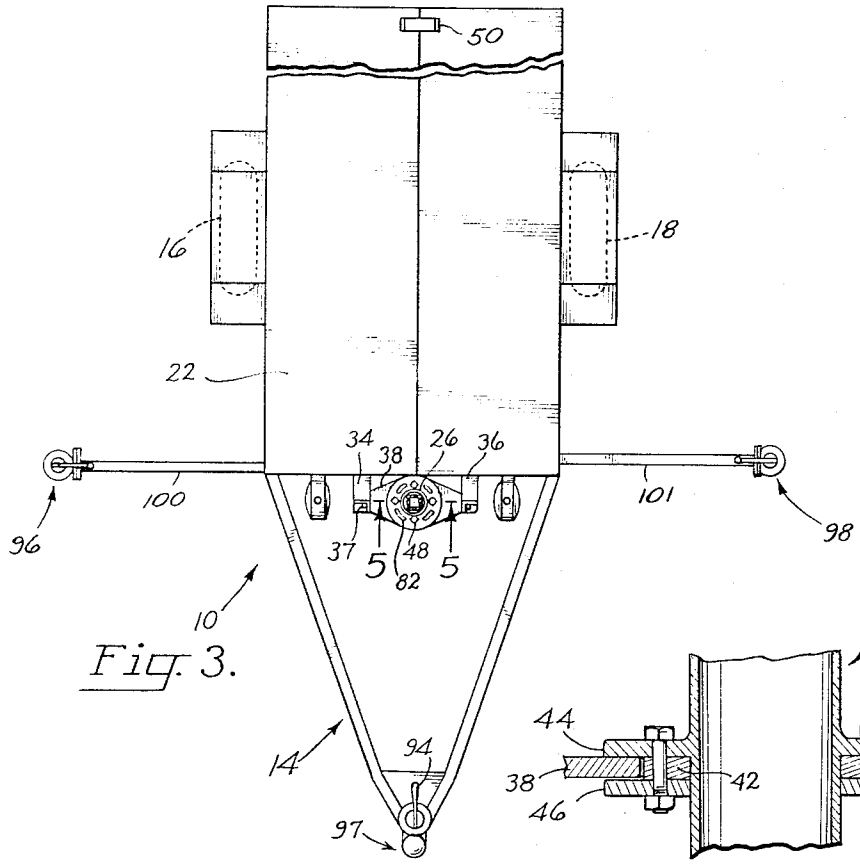

Fig. 3.

Fig. 5.

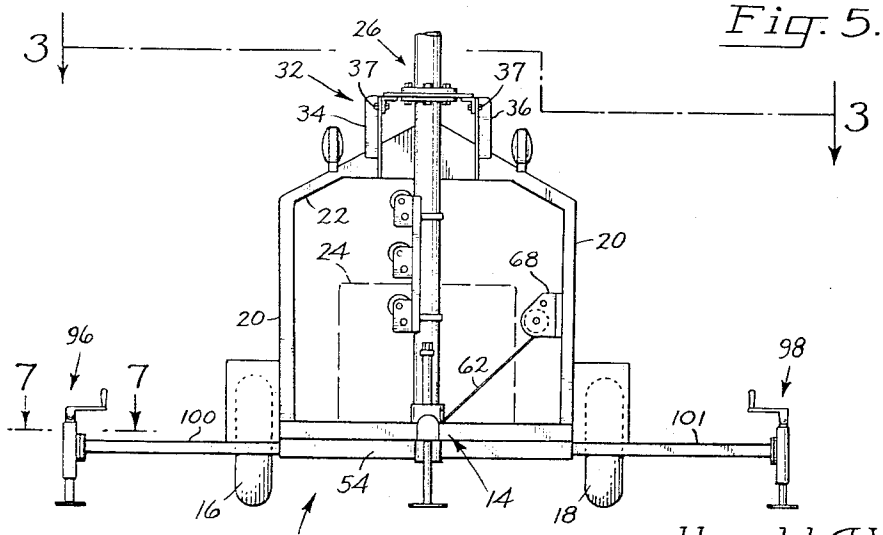

Fig. 2.

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LIGHTING UNIT

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ABSTRACT OF THE DISCLOSURE

Mobile lighting apparatus including a wheel-supported frame and an elongated telescopic mast mounted on the frame. A mounting connected to a lower mast section supports the mast for rotation about its longitudinal axis, as well as for swinging movement about a horizontal transverse axis. A positioning plate on the mast is received within a guide slot on the frame, on the mast being drawn upright by pulling in a cable. Adjustable lateral supports may be extended for stability, and means prevents the positioning plate from being received within the guide slot prior to extension of these lateral supports.

This invention relates to a lighting unit of the type that may be employed to illuminate from a high level a region adjacent the unit. Such apparatus has a number of different uses, including providing a light for conducting night construction work, providing light for making movies or still photographs, providing illumination for theatrical performances, etc.

In a preferred embodiment of the invention the lighting unit is a mobile one and includes wheels or the equivalent accommodating movement from one locality to another. In this way the unit is particularly well suited for providing light at temporary locations.

Generally, an object of this invention is to provide an improved lighting unit including means for supporting one or more light sources at a high elevation.

A more specific object of this invention is the provision of a lighting unit featuring a novel construction enabling changes readily to be made in the regions illuminated by the unit, and the direction in which light shines from light sources therein.

Another and more specific object is to provide a new and improved mobile lighting unit which is readily transported over the ground, yet which is completely stable when set up to provide illumination of a given location.

Yet another object is to provide a novel lighting unit featuring a mast for supporting one or more light assemblies, and a mounting for such mast whereby the same may be easily dropped from an upright position to a horizontal position.

A related object is to provide such a lighting unit which includes a collapsible mast having mounting lighting assemblies, where the mast has multiple telescopic sections.

A still further object is to provide lighting apparatus with unique support means which are laterally adjustable to stabilize a mast in the unit.

These and other objects and advantages are attained by the invention, and the same is described hereinbelow in conjunction with the accompanying drawings, wherein:

FIG. 1 is a side elevation of a mobile lighting unit constructed as contemplated according to one embodiment of the invention, showing a mast therein occupying a horizontal position;

FIG. 2 (second sheet of drawings) is an end elevation of the unit illustrated in FIG. 1, but showing portions of the mast in an upright position;

FIG. 3 is a top plan view of the lighting unit in FIG. 2;

FIG. 4 (first sheet of drawings) is a perspective view, on a slightly enlarged scale, illustrating portions of a mast in the apparatus, such mast having a positioning plate thereon and such plate being fitted within guide structure operable properly to center the mast when raised;

FIG. 5 (second sheet of drawings) is a cross-sectional view, also enlarged, along the line 5—5 in FIG. 3, illustrating means mounting the mast;

FIG. 6 (first sheet of drawings) is an enlarged perspective view of the top of the mast; and

FIG. 7 shows on an enlarged scale a jack, and a swivel mounting for the jack, forming part of a mast-stabilizing support in the unit.

Referring now to the drawings, and first of all more particularly to FIGS. 1, 2 and 3, 10 indicates generally a frame for the unit, which frame includes longitudinals 12 along opposite sides of the unit defining a platform, and forwardly of this platform a tongue 14. Suitably mounted adjacent opposite sides of the platform portion of the frame are opposed lateral support wheels 16, 18. These wheels support the unit for movement over the ground when the same is towed by a drawing vehicle through tongue 14.

Frame 10 also includes uprights such as uprights 20, 21 at forward and rear portions of the platform, respectively. These uprights support roof structure 22, and housed beneath the roof structure on the platform defined by longitudinals 12 there may be provided the usual motor driven generator, switches, transformers, etc. necessary in a portable lighting system. In the drawings details of such elements have not been shown, as it is not believed that such is necessary for an understanding of the invention. The rectangular outline 24 has been provided instead to indicate the general location of such elements.

As earlier explained, the lighting unit of the invention is for lighting a region from a relatively high elevation, and supporting the lighting assemblies that function as light sources in the unit is an elongated extensible mast, indicated generally at 26. The mast includes a lower section 28 and telescopically received within this lower section, and extensible therefrom, an upper section 30. The upper section has a square or other irregular cross section, which prevents the same from rotating relative to the lower section which telescopically receives it.

Supporting the mast intermediate its ends is bracket structure 32 including a pair of arms 34, 36 joined to the frame. Journaled by journals 37 on the ends of these arms, and extending between them, is a mounting plate 38. Journals 37 enable the mounting plate to swing about a horizontal axis extending generally transversely of the mast.

As can be seen with reference to FIG. 5, plate 38 is apertured at 40 and within this aperture is a bearing 42 encircling the mast. On either side of mounting plate 38 are annular retainer members 44, 46, at least one of which is joined to the mast as by welding. Fasteners 48 extending through the retainer members and the bearing interconnect these parts. With such a construction, the mast is prevented from shifting longitudinally relative to the mounting plate, and is permitted rotation about an axis generally corresponding to its longitudinal axis. While a specific type of bearing and retainer construction has been described, it should be obvious that other constructions could be utilized to permit this limited movement of the mast relative to the pivoted mounting plate.

In FIG. 1 the mast is shown in solid outline in a substantially horizontal position. In this position, the mast is supported adjacent the forward end of the unit by the mounting plate and bracket structure just described. Support adjacent the rear of the mobile unit is provided by a U-shaped cradle member 50 suitably joined to the roof

structure. In FIG. 1, in dashed outline, the mast is shown in an upright position, and the mast is shifted to this position by swinging it about the pivot axis provided by journals 37 connecting the mounting plate and bracket structure. On raising the mast, the left end of the mast in FIG. 1 (its top end) then moves upwardly out of cradle member 50.

Referring to FIGS. 1 and 4, adjacent the base of and joined to the mast is a positioning plate 52. This plate has an end 52*a* projecting toward the rear of the unit with the mast upright. Longitudinals 12, earlier described in connection with frame 10, are interconnected adjacent the rear of tongue 14 by a transverse box beam 54 (see also FIG. 2), a broken away portion of which is shown in FIG. 4. Suitably joined to the top of this box beam is a channel member 56 which mounts a plate 58 at substantially the longitudinal midline of the unit. Angle pieces 60 joined to the top of this plate, together with the top of the plate, function as guide structure in the apparatus defining a guide slot for the reception of end 52*a* of the positioning plate with the mast upright. The positioning plate and this guide structure serve not only to position properly the base of the mast when the mast is placed in an upright position, but also function to provide stability for the base of the mast.

In the embodiment of the invention illustrated, a winch 68 and line 62 is included to facilitate swinging the mast upwardly from its horizontal position. The line extends from an anchor 64 on the positioning plate, around a pulley 66 suitably mounted on a portion of frame 10 adjacent plate 58, and thence to winch 68 which is mounted on one of the uprights 20. It should be obvious that with the mast in the horizontal position shown in FIG. 1, to raise the mast all that need be done is to wind the line about the drum of winch 68 by actuation of the winch, which serves to pull the right end of the mast downwardly in FIG. 1 with the positioning plate moving toward and thence into the guide structure described.

As best seen in FIG. 1, journals 37 connecting mounting plate 38 to bracket structure 32 provide a pivot axis for the mast which is located somewhat forwardly of the center of the mast with the mast raised. This forward position of the journals is selected to enable gravity to produce lowering of the mast merely by relaxation of tension in line 62. Thus, to lower the mast, line is payed out from the winch, and gravity pulling on the upper extremities of the mast causes the same to swing downwardly to the horizontal position shown in FIG. 1.

Referring to FIG. 1, lighting assemblies such as assembly 70 are provided at the top of the mast. An assembly is mounted on the mast through a bracket 74 which is pivotally mounted at 76 on one end of a cross arm 78, such cross arm being secured to the top of upper mast section 30. The pivot connection enables a bracket to swing about a horizontal axis extending transversely of the mast. The bracket for a light assembly is connected to a line or cable 80, removed from all the drawings except for the portion shown in FIG. 6, which line extends downwardly from the bracket through an aperture 82 in the retainer members and bearing and thence is wound about a drum in a winch such as the one shown at 84 mounted on the lower mast section. The winch and line constitute adjustable means for changing the angular position of a bracket, and the lighting assembly mounted on a bracket.

To enable an operator standing on the ground to extend upper mast section 30 from lower one 28, a line or cable is provided partially illustrated at 86 which is joined to the upper mast section. This line extends about a pulley 88 and terminates in windings extending about the drum of a winch 90 mounted on the lower mast section. By manipulation of the winch, the upper section may be fully extended or extended partially from the lower section, to place the lighting assemblies on the brackets at various elevations.

The wheels earlier described enable the unit to be moved readily over the ground utilizing tongue 14. When set up for use, it is desirable to stabilize the unit against movement, and this is particularly important when the mast is fully extended and the lighting assemblies are carried at a considerable height. To produce stabilizing of the frame 10, jacks are provided including one shown at 92 mounted on the forward end of the tongue. Jack 92 may be adjusted (utilizing handle 94) to extend its pedestal whereby the tongue becomes supported on the ground through the jack. To produce lateral stability, lateral supports or jacks 96, 98 are provided on outrigger arms 100, 101. Each of these jacks is mounted on an outrigger arm through a swivel 104 enabling the jack to be swung about a horizontal axis on the end of an outrigger arm. A spring-biased pin 105 is provided to lock the jack either in a vertical position (where the jack extends downwardly from the outrigger arm to engage the ground) or a horizontal position (where the jack is out of the way of the ground) as shown in dashed outline in FIG. 1.

The outrigger arms are guided for lateral movement by mounting them in passageways 102 defined within box beam 54. Mechanism is provided wherein the mast cannot be drawn to a fully upright position, with the positioning plate within the slot defined over plate 58, until the outrigger arms are fully extended. Thus, and referring to FIG. 4, in connection with outrigger arm 101, journaled in the opposed upright flanges of channel member 56 is a pin 106. Fastened to this pin is an arm 108 which carries on its end an elongated arcuately-shaped pin 110. Arm 108 and its pin 106 mount pin 110 for rocking movement up and down. Beneath the lower end of pin 110 is an aperture 112 through which the lower end passes, and in plate 58 is an aperture 114 receiving the upper end of the pin. With the outrigger arm which is underneath pin 106 contracted, upper surface 116 of the arm engages the lower end of pin 110 to raise it, thus to place the upper end of this pin through aperture 114 and above the top of plate 58. This positioning of the pin prevents the positioning plate from being fully received between angle pieces 60. On the outrigger arm being extended laterally, surface 118 moves under pin 110, enabling the pin to drop whereby its upper end drops below the top of plate 58. This clears the top of plate 58 to permit complete insertion of the positioning plate between pieces 60.

A similar mechanism is provided for outrigger arm 100, which operates in substantially the same way as the pin mechanism just described.

It should be obvious from the above that the unit contemplated has a number of advantages over prior-known constructions. With the unit, it is possible to place the lighting assemblies at substantially any elevation, with complete extension of the mast producing a relatively high elevation in the lighting assemblies. Varied adjustments are afforded, with the lighting assemblies being swingable about the axis of the mast by rotating the mast in its mounting, and swingable up and down about a horizontal axis by moving the bracket structures described. The unit contemplates a relatively easily operated means for swinging the mast to an upright position, and for lowering it, to ready the unit for transport. At a given location the unit is completely stable with extension of the outrigger arms described. The pins constitute interlocking structure preventing final vertical positioning of the mast until the outrigger arms are in a position to give adequate support.

While an embodiment of the invention has been described, it should be obvious that variations and modifications are possible without departing from the invention. It is desired to cover all such organizations of the invention as would be apparent to one skilled in the art, and that come within the scope of the appended claims.

It is claimed and desired to secure by Letters Patent:

1. A lighting unit comprising:

a frame,

an elongated, substantially upright mast,

a mounting for the mast mounting the mast on said

frame and receiving the mast at a point intermediate its ends with the mast rotatable about its longitudinal axis, said mounting including means positively holding said mast from movement relative to the mounting in an axial direction,

pivot means supporting the mounting accommodating pivoting of the mounting, and swinging of the mast, about a substantially horizontal axis extending transversely of the mast, and

a lighting assembly mounted on the mast adjacent its top.

2. The lighting unit of claim 1, wherein the mast is extensible, and includes a lower mast section and an upper section extensible from the lower section, and said mounting is connected to the lower mast section.

3. Mobile lighting apparatus comprising:

a frame and ground-traveling means supporting the frame for movement over the ground,

an elongated mast having a lighting assembly thereon,

means mounting the mast on said frame accommodating swinging of the mast about a substantially horizontal axis extending transversely thereof whereby the mast may be swung from a substantially horizontal to an upright position,

mast positioning means adjacent the base of the mast with the mast upright, and guide structure on the frame which, with the mast upright, receives the mast positioning means,

adjustable lateral support means, shiftable laterally of the mast to an extended position to provide lateral support therefor, and

means preventing said mast positioning means from being received in said guide structure prior to adjustment of said lateral support means to its extended position.

4. In a mobile lighting unit including a frame and ground-traveling means supporting the frame for movement over the ground,

an elongated mast having a lighting assembly mounted thereon,

means mounting the mast on the frame accommodating swinging of the mast about a substantially horizontal axis extending transversely thereof, whereby the mast is shiftable from a substantially horizontal to an upright position,

a positioning plate joined to and extending laterally of the mast adjacent the base thereof with the mast upright,

guide means on said frame defining a guide slot for receiving said positioning plate with the mast upright,

means interposed between the frame and the mast for shifting the mast from its horizontal to its upright position, whereby said positioning plate may be moved into said guide slot,

adjustable lateral support means having a retracted position adjacent the mast and a stabilizing position spaced laterally outwardly from said retracted position, and

means released by said lateral support means on its movement toward its stabilizing position freeing said guide means to receive said positioning plate.

5. Lighting apparatus comprising:

a frame,

an elongated telescopic mast including an upper section and a lower section, with the uper section extensible from the lower section and nonrotatable relative to the lower section,

means mounting the lower section of the mast on said frame accommodating rotation of the lower mast section and upper mast section as a unit about the longitudinal axis of the mast, and swinging of the mast about a substantially horizontal axis extending transversely thereof, whereby the mast is shiftable from a substantially horizontal to an upright position,

a lighting assembly carried on the mast adjacent the top thereof with the mast upright, and

means connected to the lower mast section for detachably holding the mast in an upright position and against swinging movement about its said transverse axis.

6. The lighting apparatus of claim 5, which further includes means mounting the lighting assembly on the mast accommodating swinging of the lighting assembly about an axis extending transversely of the mast, said lighting assembly being movable in an arc about the longitudinal axis of the mast by rotation of the mast in its said mounting.

7. The apparatus of claim 6, which further comprises means operatively connected to the lighting assembly extending from adjacent the top of the mast and to adjacent the base of the mast enabling an operator positioned adjacent the base of the mast to swing the lighting assembly to various positions.

8. The apparatus of claim 7, which further comprises a positioning plate joined to the base of the mast extending laterally therefrom, means on the frame defining a guide slot for receiving said positioning plate with the mast in an upright position, and means interposed between the mast and the frame actuatable to draw the mast from a horizontal to an upright position and to place said positioning plate in said means defining a guide slot.

9. The apparatus of claim 8, which further comprises support means mounted on the frame adjustable from a retracted position adjacent the mast to an extended position spaced laterally outwardly therefrom.

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