PORTABLE LIGHT TOWER
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ABSTRACT OF THE DISCLOSURE
A light tower on a portable carriage provided with a lighting generator has a superstructure with a telescoping mast pivoted thereon to turn from horizontal to vertical position about an eccentric axis. The mast may be extended and retracted by a cable winch and erected and lowered by another cable winch, the lowering motion being controlled by a hydraulic cylinder and piston mechanism. Steadying legs and various positional interlocks are provided.

My invention relates to devices which include a source of electrical energy and are mobile to carry a light source connected to the energy source to any suitable location for use in augmenting the illumination, particularly for night construction work, illumination of special areas for security and in comparable environments. A device of this general nature is disclosed in my copending application entitled “Light Tower” filed Jan. 19, 1967 with Ser. No. 610,427. In portable light towers it is customary to provide an extensible mast carrying lighting elements which can be moved to a substantial distance above the transport carriage by means of a pivotal mounting of the supporting mast, so that during transport the mast can be carried about horizontally and for use can be erected to a vertical position. The lighting elements at the free end of the mast are relatively heavy and massive. In moving the mast to its lower, generally horizontal position from its upright, erected position there is some danger that the illuminating units and even the mast itself may receive undue shocks and may be damaged.

It is therefore an object of this invention to provide a portable light tower arranged in such a way that a movable mast can be controlled in its operation so as to avoid damaging shocks.

Another object of the invention is to provide a portable light tower having a number of interlocks so that the movable portion will not readily be dislodged, but will be readily and easily retained in appropriate position subject to the operator’s control.

Another object of the invention is to provide a portable light tower in which a stable platform for the tower is provided when it is not being transported.

Another object of the invention is in general to provide an improved portable light tower.

Other objects together with the foregoing are attained in the embodiment of the invention described in the accompanying description and illustrated in the accompanying drawings, in which:

FIGURE 1 is a side elevation of a portable light tower constructed pursuant to the invention, the tower being shown at a stationary location with the mast erected;

FIGURE 2 is a side elevation similar to FIGURE 1 but to an enlarged scale and with the tower in its rest or retracted position;

FIGURE 3 is an end elevation of the structure as shown in FIGURE 2;

FIGURE 4 is a detail cross section, the plane of which is indicated by the line 4—4 of FIGURE 1;

FIGURE 5 is a detail showing in plan one of the steady legs utilized on the carriage frame, the plane of section being indicated by the line 5—5 of FIGURE 1;

FIGURE 6 is for the most part a side elevation with portions in section showing one end of the mast in transport position;

FIGURE 7 is a view similar to FIGURE 6 but showing the mast raised somewhat from transport position;

FIGURE 8 is a cross section, the plane of which is indicated by the line 8—8 of FIGURE 6;

FIGURE 9 is a plan, the plane of the view being indicated by the line 9—9 of FIGURE 7; and

FIGURE 10 is a longitudinal or axial cross section through a portion of the mast showing a detent mechanism utilized in connection therewith.

In its preferred form, my portable light tower includes a carriage 6 incorporating a frame 7 supported on the ground by ground-engaging wheels 8 and having a hitch 9 to secure the carriage to a tow vehicle. When the carriage is not being advanced, it can rest temporarily on the ground without support by the tow vehicle by reason of a support leg 11 which can be moved upwardly out of the way during transport or swung downwardly for temporary ground rest. If the carriage is to be supported on the ground with better stability, then the user may employ any one or more of a number of steady legs 12 disposed at appropriate locations on the frame 7.

A steady leg as shown, for example, in FIGURE 5 includes a swinging arm 13 connected to the frame 7 by a vertical pivot pin 14. The steady leg swings between a stowed position, represented by the dotted lines in FIGURE 5, wherein it can be retained within a clip 16 by a removable pin 17 and an active position as shown by the full lines in FIGURE 5. The horizontal arm 13 adjacent one end carries a swivel pad 18 from which a screw leg 19 can be extended so as to position a bottom pad 21 in appropriate contact with the ground. The swivel pad 18 is retained either in its ground-engaging position or in a retracted position by means of a spring-pressed pin 22 engaging the respective one of appropriate aperture 23 in the arm 13. In active position the arm 13 is held by a retaining bracket 24 against the frame by means of a retaining pin 25. In this fashion the weight on the carriage 6, if desired, can be partly or entirely transferred to and supported on the steady legs.

On the frame 7 adjacent forward end thereof is an upright superstructure 26 comprised of appropriate shapes provided with braces 27 and formed to support a pair of journals 28 and 29 carrying a cross shaft 31 designed for pivotal movement about a transverse, horizontal axis. Adapted to engage the shaft 31 is a yoke 32 arranged to be secured to and encompass the lower tube 33 of an extendible mast 34. The longitudinal axis 36 of the mast...
is eccentric to or displaced from one side of the axis of the shaft 31. At its lower end the tube 33 carries a platform 37 having an extension 38. A retaining pin 39 engages the extension of the winch 46 to keep the mast in an upright position. When the pin 39 is temporarily withdrawn against the urging of its spring, the eccentric mast is free to swing about the axis of the shaft 31.

Also connected to the platform 37 is a cable 41 extending to a hand operated winch 42 mounted on the frame 7. Operation of the winch 42 is effective to move the mast from a generally horizontal, rest position to a substantially vertical, active position. As the mast is disposed eccentrically with respect to the pivot shaft 31, it can readily be erected by tension on the cable 41 and can be restored to rest position by paying out the cable 41. The motion of the mast is preferably moved very carefully, particularly during the latter part of its travel toward rest position, by special means for controlling the lowering movement. For that reason, the yoke 32 has an extended arm 44 on the opposite side of the shaft 31 from the mast and engaging the upper end of a hydraulically expandable chamber 46 by means of an upper pivot connection 47. The lower end of the hydraulic chamber is connected by a pivot 48 to the superstructure.

The hydraulic mechanism includes an outer cylinder 51 and an interior piston (not shown) connected to a piston rod 52. The opposite ends of the chamber are interconnected by the following free hydraulic duct 53 extending from one end of the cylinder to the other except for the interposition of an adjustable check arrangement 54. This permits ready flow from one end to the other of the cylinder during the upward or erecting movement of the mast but shuts off and throttles to any adjusted extent the flow in the other direction when the mast is being moved from its upright toward its rest position. If the load on the mast is in moving is at any time let go by the cable 41, the hydraulic mechanism is effective to retard the return movement of the mast to any speed well within any selected value.

The mast includes not only the lower tube 33 but likewise includes a number of intermediate tubes 61, 62 and 63, for example, interrelated for telescoping movement under the influence of a winch 64 mounted on the platform 37 and manually operated to lift the various mast sections with respect to each other, all as disclosed in my above-identified, copending application. When the tubular sections are extended with regard to each other, they are held in position by the winch 64. They may also be held by a friction detent 66 (FIGURE 10). This is an eccentric rotor 67 pivotally mounted between ears 68 on the tube 61 and is normally urged by a spring 69 into engagement with an inner tube so that axial movement of the inner tube toward lower position causes a frictional snubbing action. This prevents the downward movement of the inner tube. A manually controlled chain 71 for releasing the detent 67 from engagement with the tube to allow free sliding movement thereof.

At the upper end the inner tube 63 merges with a sleeve 72 arranged with a generally horizontal axis. Since the inner tube is rotateable about its longitudinal axis, the sleeve 72 can be rotated about the mast axis to any extent desired. Relative rotation may be held or limited, however, by a set screw 73 mounted in a collar 74 on the non-rotatable tube 62 and encompassing the upper end of the inner tube 63, the set screw being turned by a handle 76 so as to move from clamping position to releasing position and vice versa. The sleeve 72 is designed in its rest position to lie within an arcuate trough 77 disposed adjacent the upper end of said spring 52 and is adjacent the rearward end thereof. The trough is extended to provide a tangent lock plate 79 through an opening in which a plunger 81 is movable under control of a spring 82 and of a yoke lever 83 connected by a pivot 84 to the plate 79. A handle 86 projects from the yoke to rock the yoke about the pivot 84. A latch lever 87 is connected by a pivot 88 to the yoke and can be engaged with a mounting bracket 89 extending from the plate 79 to upright or to the spring 52.

With this mechanism, the plunger 81 can be retracted and latched by manipulation of the handle 86 and engagement of the latch lever 87 with the frame 89. When the latch 87 is raised, the spring 82 is effective to project the plunger 81 and restore the handle 86. When the latch 87 is released, the spring 82 is effective to move the sleeve 72 from the plate 79 and is thus effective to hold the sleeve and the mast in rest position partly supported in the cradle 77.

Extending rotatably through the sleeve 72 is a cross bar 91 symmetrically mounted and having a cylindrical central portion journaled within the sleeve 72. Relative rotation, however, is limited by a holding pin 92 radially movable by a spring 93 and a T handle 94. When the detent pin 92 is projected, as shown in FIGURE 7, it interengages the sleeve 72 and the cross bar 91 and precludes rotation thereof about a longitudinal axis. When the handle 94 is withdrawn, the cross bar may be rotated within the sleeve. The limit of rotation is particularly established by a central projection 96 extending from the sleeve 72 in the path of rotation of lugs 97 and 98 projecting from the opposite sides of the cross bar, thus limiting the rotational motion to approximately 180 degrees.

The cross bar can be provided with any part of several different instrumentatilities. In this instance it carries a plurality of lighting sources 101 of a standard kind. These have movable mountings 102 connecting them to the cross bar. The lighting units 101 are supplied by conductors 103 connected through cables 104 to a suitable lighting motor-generator set 106 on the frame 7. When the tower or mast is erected, the various light units can be turned on and can be oriented in virtually any desired manner to illuminate a selected zone.

In the operation of this structure, the hitch 9 is secured to a draft vehicle. The various support or steering legs are in a withdrawn position and the mast is collapsed and is anchored in its rest position. The mechanism is then transported to any desired site. The draft vehicle can then be unhitched, at least temporarily, and the support 11 can be utilized. If the location is to be occupied for a protracted time or if special leveling is required, the various steady legs are disclosed, retracted and locked and cranked into position. The winch 42 is actuated after release of the latch pin 81 and the mast is erected and locked in its upright position. Then the winch 64 is actuated to project the various mast sections. These are held in extended position. Prior to erecting the mast fully or shortly after it has left its cradle, as shown in FIGURE 7, the lighting elements can be oriented as desired. This may involve appropriate rotation of the cross bar 91 and of the sleeve 72. The lights in their upright position can then be utilized as desired.

When the structure is to be put out of use, the detent 66 is released and the various mast tubes telescope by gravity into each other. The winch 64 can assist in regulating the lowering movement. Then the locking pin 39 is withdrawn and the mast, since it is eccentric, is permitted to swing downwardly by its own weight. Excessive speed is precluded by the hydraulic mechanism 46 so that the mast is cushioned into its cradle or trough 77. It is then latched in position for transport. After the draft vehicle is connected, the steady legs and other supports are withdrawn and the device is drawn to a new location.

What is claimed is:

1. A portable light tower comprising a carriage, a superstructure, a socketed carriage, a traversing shaft journaled on said superstructure, a mast on one side of said shaft, a yoke connected to said mast and to said shaft, an arm secured to said shaft and projecting therefrom on the side away from said yoke, means interconnecting said mast and said carriage for moving said mast about the
axis of said shaft and relative to said superstructure between a rest position and an active position, a hydraulic cylinder at one end pivoted to said arm, a hydraulic piston reciprocable in said cylinder and at one end pivoted to said superstructure, a by-pass duct extending from one end of said cylinder to the other end thereof, and means in said duct for regulating hydraulic flow therethrough.

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