QUICK DETACHABLE BASKET FOR AERIAL TOWERS

INVENTOR

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The present invention relates in general to walled operator platforms, commonly termed "baskets," used on mobile aerial devices such as aerial towers, and more particularly to means for mounting such operator platforms or baskets on a boom member of an aerial tower device in a manner rendering the basket readily removable from or mountable on the boom member.

The aerial tower structure frequently takes the form of a lattice or box beam device having a boom member pivotally intercoupled boom members, which may be angularly adjusted to various positions or a telescopic boom assembly having a boom member which is axially movable in an angularly adjustable carrier boom, or a single boom device, in each of which an inboard end of the boom assembly is pivotally supported on a pedestal structure mounted on a truck or vehicle frame. The free or outboard end of the single boom or of the outboard boom member of the articulated or telescoping boom assembly carries the personnel basket, which is usually fixed to a bracket or flange formations on the end of the outboard boom member by a large number of bolts to stabilize the basket relative to the bracket. Many of such aerial towers have hydraulic controls mounted on the basket for controlling the movement of the boom assembly to dispose the basket at the desired elevated positions.

Such structures have come into especially wide use in the electrical utility and electrical service fields, as a convenient device to enable workmen to rapidly reach and service overhead electrical conductors, lamp installations, and the like. Because the workmen in such uses of the apparatus are often exposed to high voltage conductors or sources of electrical shock, the baskets of such aerial tower devices are usually constructed of reinforced plastic of high dielectric characteristics. This is primarily to provide a non-conducting or highly insulative platform for the workmen so as to protect them from line to ground and to protect the basket from phase to phase or line to ground conduction.

Periodic and damage determination dielectric tests must be run on a basket to insure the safety of workmen. Considerable labor is involved in removing and replacing the basket at test periods, when the basket is secured to the mounting bracket on the associated boom member in the usual manner, frequently involving five, six or more bolts, along each of two flanges of the mounting bracket. Removing all of these bolts to dismount the basket has been a time consuming job requiring two or more men and considerable labor time.

Another object of the present invention is to provide a novel personnel basket mounting construction for securing a plastic basket or walled platform to the mounting bracket of a mobile aerial tower device in a manner rendering the basket readily attachable and detachable by one-man in a few seconds.

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provided with an aligned hollow bushing 39 to receive a shaft 31 therethrough secured by welding to the other spacer channel. The rearwardly projecting end of the shaft 31 is fixed in the customary manner in a conventional cooperating facility on the free end of the outboard boom member (not shown) of an articulated or telescoping aerial tower boom assembly, or the outboard end of a single boom tower, for supporting the mounting bracket 28 and basket 11 and maintain the basket in levels during operation.

Each of the side plates 27 of the mounting bracket 28 also carry a pair of stabilizing and aligning plates 32 in the form of elongated members of Z shaped cross-section having laterally offset, parallel flanges 33, 34, extending oppositely from a narrow connecting web 35. The flange 33 of each plate 32 is welded to the adjacent side plate 27 and the web 35 is of sufficient width to define with the flange 34 a well to accommodate the aligned basket rib 18, 19 and the reinforcing plate 20 bolted thereto. Each flange 34 is provided with a circular opening 36 near the lower end thereof, bounded by a concentric reinforcing ring 37 welded to the flange 34, and the side plates 27 are similarly apertured, as indicated at 38, and interconnected by a transverse tube 39 welded at its ends to the side plates 27 and located concentric with a common axis of the openings 36, 38, to removeably receive an elongated reattaining pin 40. The slope and location of the opening 38 is so chosen as to cause the free edges of the basket ribs 18, 19, to abut the webs 35 of the plates 32 when the sockets 24 of the hook member 22 seat firmly on the trunnion pins 25, and apertures 41 corresponding to the diameter of openings 36, 38 and retaining pin 40 are positioned in the basket ribs 18, 19 to become axially aligned with openings 36, 38 when the hook members are thus firmly engaged on the pins 25 and the abutment of the webs 35 with the basket ribs occurs.

The retaining pin 40 is a solid elongated rod of sufficient length to protrude from both ends of the bore therefor defined collectively by the rings 37, openings 36, 38 and 41, and tube 39, one end of the retaining pin 40 having an enlarged head 42 of any suitable configuration, and the other end having an axial kerf 43 therein to accommodate accurate movement of an elongated toggle member 44 having a greater length than the shaft diameter coupled to the pin 40 by a pivot 45 extending diametrically of pin 40 and located eccentrically of the center of mass of the toggle member 44. In this manner, the toggle member 44 has a heavier end portion 44a which swings downwardly under gravitational forces when released to disengage and permit the basket to return to the position of the opening 37 and prevent withdrawal of the toggle end of the pin 40 through the bore. The toggle may, however, be swung to a position aligning its longitudinal axis with the axis of pin 40 wherein its cross-section lies within the cross-section of the pin 40 and permits insertion and withdrawal of the pin 40 through the bore, therefore. The toggle member 44 may be provided with a transverse opening 46 therethrough in its lighter portion to lie immediately above the surface of pin 40 when the toggle is in cross-wise position to receive a safety pin, such as a cotter pin or the like, to prevent accidental turning of the toggle member to an aligned condition relative to the retaining pin 40.

The conventional hydraulic direction control valve unit operated by the occupant of the basket is mounted on the bracket 28, and therefore has no direct physical contact with the basket but is readily accessible to the occupant of the basket.

To assemble the basket 11 to the mounting bracket 28 on the end of the boom assembly, the workman merely lifts the basket 11 to the proper level to dispose the hook members 22 above the trunnion pins 25 on the mounting bracket 28, abuts the basket ribs against the webs defined by the flanges 34 and webs 35 of the mounting bracket aligning plates 32 with the rear edges of the basket ribs abutting the webs 35, and slides the basket downward until the hook sockets 24 fits over the pins 25, or the hook sockets 24 are first fitted over the trunnion pins 25 with the basket ribs lined up with the webs defined by the basket ribs and the weight of the basket ribs into these wells to abut the webs 35. In either case the basket is readily assembled onto the mounting bracket by one workman and assumes a position automatically lining up the openings 36, 38 and 41 for reception of the retaining pin 40. The toggle end of the retaining pin 40 is projected through the openings, with the toggle member 44 aligned with the axis of shaft 31, until the toggle end is exposed at the other end of the bore, and the toggle is manually shifted, to cross-wise position, and pinned by a safety pin in this position, to retain the pin 40 against accidental withdrawal. Even if the retaining pin 40 were not inserted, hook pressure down on the trunnion pins 25 and the weight of the basket urging the basket ribs against the webs 35 of the aligning plates 32 would tend to hold the basket in place on the mounting bracket. Thus, the retaining pin 40 serves as a simple device to insure retention of the basket in coupled or attached condition on the mounting bracket. For removal of the basket 11 from the mounting bracket 28, the above described procedure is reversed, the retaining pin 40 being removed and the basket lifted relative to the mounting bracket to raise the hook members 22 off the basket webs 35.

By this arrangement, an extremely simple yet reliable coupling between the basket and mounting bracket is provided, whereby the basket can be attached or detached quickly by one workman, the total attachment or detachment labor for such device being reduced to a one-man operation requiring a time of only a few seconds. This avoids the considerable labor involved in removing and replacing the usual type of basket mounting construction, which becomes a sizeable cost factor for fleet operators having a number of mobile aerial tower devices and conscientiously conducting the periodic electric tests with recommended frequency. With the use of spare baskets and mounting devices of the herein described type of construction, especially important time and labor savings can be made by fleet operators, as lay-up time for tests or replacement can then be substantially eliminated.

While only one form of the present invention has been particularly shown and described, it will be apparent that various modifications may be made within the spirit and scope of the invention, and it is desired, therefore, that only such limitations be placed on the invention as are imposed by the prior art and set forth in the appended claims.

What is claimed is:

1. In a mobile aerial tower device having an elongated boom which is movable for elevational adjustment of one end thereof and a personnel basket carried on said boom end for supporting a workman, said basket having upwardly extending wall means disposed adjacent said boom end; quickly detachable and attachable mounting means for supporting said basket on said boom end comprising a mounting bracket to be carried by said boom end having trunnion pins means aligned along a horizontal axis extending transversely of the axis of boom of structural members defining abutment surfaces at a selected position below said pin means, said basket having rigid coupling means projecting from said basket wall means having downwardly opening socket formations to receive and seat on said trunnion pin means upon disposition of said socket formations, said mounting pin means and relative downward movement of the bracket for supporting said basket from said trunnion pin means, surface means on said basket disposed to abut said abutment surfaces when said socket formations are seated on said pin means engaging the latter to dispose the basket in a selected upright position on the bracket, and means for releasably interlocking said basket and bracket together at a point spaced radially from
the axis of said trunnion pin means to restrain the basket and bracket against relative decoupling movement.

2. In a mobile aerial tower device, the combination recited in claim 1, wherein said mounting bracket comprises a pair of side wall members spaced transversely of the boom axis, said trunnion pin means comprising a pair of axially aligned pin members projecting outwardly from said side wall members, and said coupling means comprising a pair of laterally spaced hook members having said socket formations disposed to flank said side wall members of said bracket and engage said pin members of said socket formations.

3. In a mobile aerial tower device, the combination recited in claim 2, wherein said basket wall means comprises an upwardly projecting wall and a pair of vertical rib members integral with said wall and projecting therefrom toward said bracket along laterally spaced parallel planes flanking the side wall members of said bracket to lap portions of the same, a rigid metallic reinforcing plate conforming generally to the lateral profile of said rib members in the portion thereof adjacent said bracket secured against each of said rib members at plural points to relieve point stresses in the associate rib member, and said hook members being securely fixed to said reinforcing plates.

4. In a mobile aerial tower device, the combination recited in claim 3, wherein said rib members terminate in vertically elongated rectilinear flat surfaces at their free edges inclined at an angle to the vertical when said basket occupies said selected upright position and define said surface means, and said structural members defining said abutment surfaces comprise a vertically elongated plate member of substantially Z-shaped cross-section on the outer surface of each of said side wall members, each having a first flange fixed against the adjacent side wall member, a web projecting outwardly therefrom, and a second flange extending toward the basket from the adjacent side wall member along a plane offset outwardly therefrom a distance corresponding generally to the thickness of one of said rib members and its associated reinforcing plate to receive the same therebetween, said web defining a vertically elongated surface conforming to the inclination of said free edges of said rib members to abut the same when said basket occupies said selected upright position.

5. In a mobile aerial tower device, the combination recited in claim 4, wherein said means for releasably interlocking said basket and bracket includes an elongate retaining pin of greater axial length than the distance between said second flanges of said structural members on said pair of side wall members, said side wall members and said second flanges and said rib members having registering apertures therein aligned along a common horizontal axis spaced radially from the axis of said trunnion pin means when said hook members are seated on the latter and said basket occupies said selected upright position to define a bore for receiving said retaining pin, said retaining pin being removably disposed in said bore through each of said apertures to restrain said basket and bracket against accidental detachment from each other.

6. In a mobile aerial tower device, the combination recited in claim 5, wherein said retaining pin has an enlarged formation at one end to abut one of said second flanges and a toggle mechanism on the other end of said retaining pin, said toggle mechanism including an elongated toggle, of greater length and smaller cross-section than the width of said apertures pivoted on the retaining pin for movement from a first position disposed cross-wise of the retaining pin to prevent passage of the toggle through said apertures to a second position aligned longitudinally with the axis of said retaining pin to pass through said apertures.

7. In a mobile aerial tower device, the combination recited in claim 6, wherein the portion of said toggle extending from its pivot toward one longitudinal end thereof has greater weight than the portion from said pivot to the other end thereof to gravitationally urge the toggle to said first position.

8. In a mobile aerial tower device, the combination recited in claim 2, wherein said basket wall means comprises an upwardly projecting wall and a pair of vertical rib members integral with said wall and projecting therefrom toward said bracket along laterally spaced parallel planes flanking the side wall members of said bracket to lap portions of the same, said rib members terminating in vertically elongated rectilinear flat surfaces at their free edges inclined at an angle to the vertical when said basket occupies said selected upright position and define said surface means, and said structural members defining said abutment surfaces comprise a vertically elongated plate member of substantially Z-shaped cross-section on the outer surface of each of said side wall members, each having a first flange fixed against the adjacent side wall member, a web projecting outwardly therefrom, and a second flange extending toward the basket from the adjacent side wall member along a plane offset outwardly therefrom a distance corresponding generally to the thickness of one of said rib members to receive the same therebetween, said web defining a vertically elongated surface conforming to the inclination of said free edges of said rib members to abut the same when said basket occupies said selected upright position.

9. In a mobile aerial tower device, the combination recited in claim 2, wherein said basket wall means includes a pair of laterally spaced ribs projecting toward the bracket in flanking relation to said side wall members, said means for releasably interlocking said basket and bracket including an elongated retaining pin of greater axial length than the distance between said structural members on said pair of side wall members, said side wall members and said ribs having registering apertures therein aligned along a common horizontal axis spaced radially from the axis of said trunnion pin means when said hook members are seated on the latter and said basket occupies said selected upright position to define a bore for receiving said retaining pin, said retaining pin being removably disposed in said bore through each of said apertures to restrain said basket and bracket against accidental detachment from each other.

10. In a mobile aerial tower device, the combination recited in claim 9, wherein said retaining pin has an enlarged formation at one end thereof to prevent passage through said apertures and a toggle mechanism on the other end of said retaining pin, said toggle mechanism including an elongated toggle, of greater length and smaller cross-section than the width of said apertures pivoted on the retaining pin for movement from a first position disposed cross-wise of the retaining pin to prevent passage of the toggle through said apertures to a second position aligned longitudinally with the axis of said retaining pin to pass through said apertures, the portion of said toggle extending from its pivot toward one longitudinal end thereof having greater weight than the portion from said pivot to the other end thereof to gravitationally urge the toggle to said first position.

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