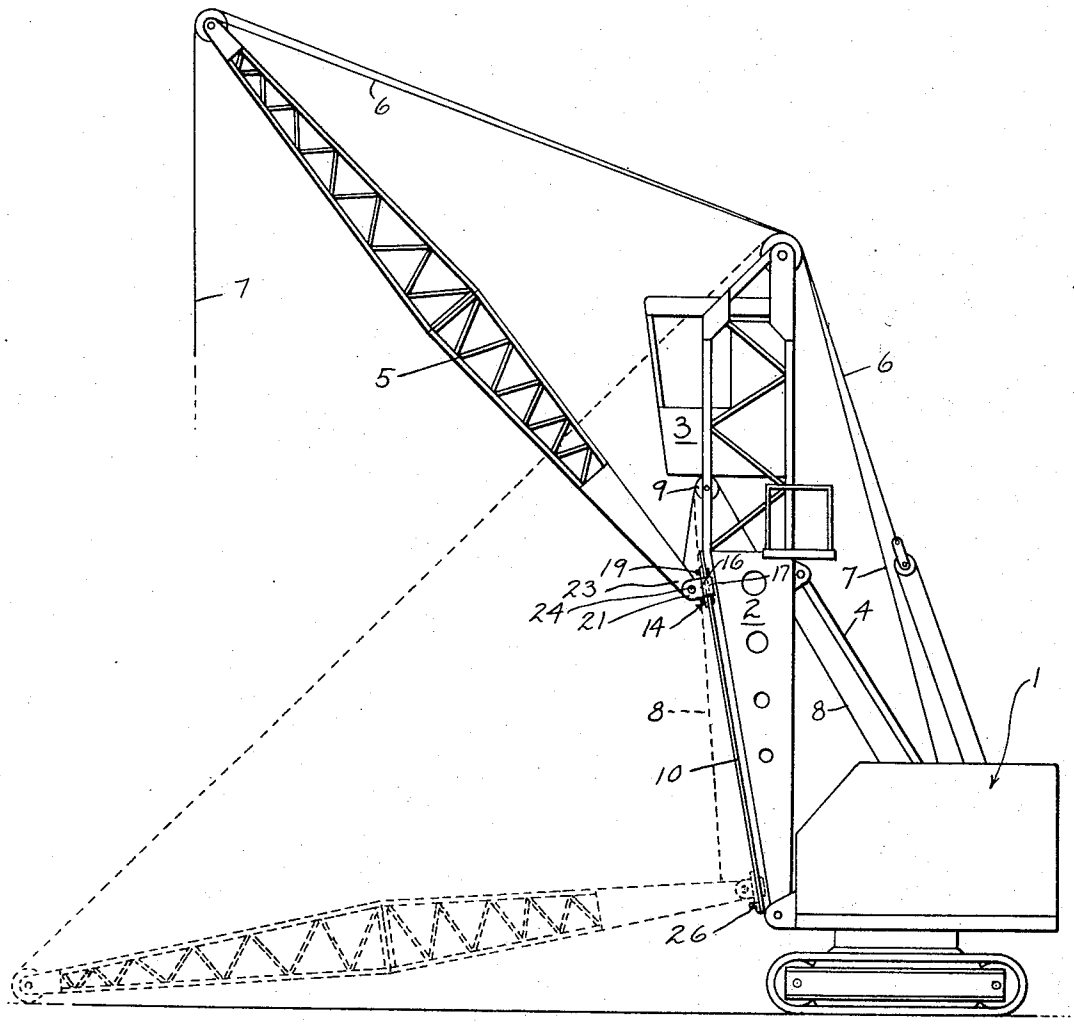
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SLIDABLE BOOM FOOT LUG FOR CRANE

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Fig. 1



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Fig. 2.

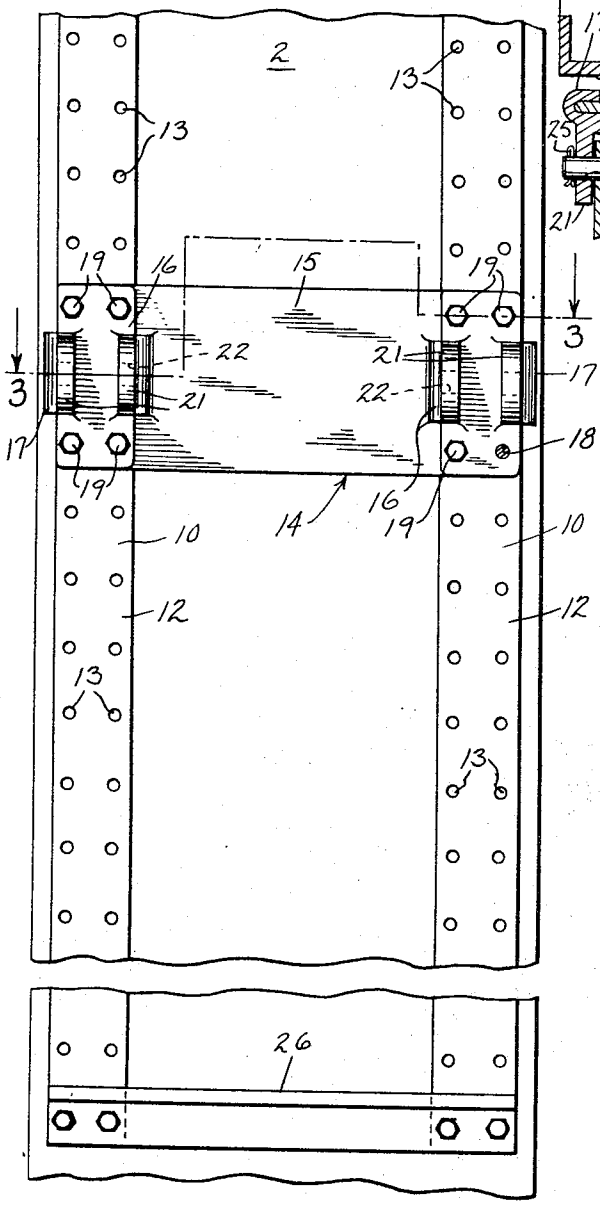


Fig. 3

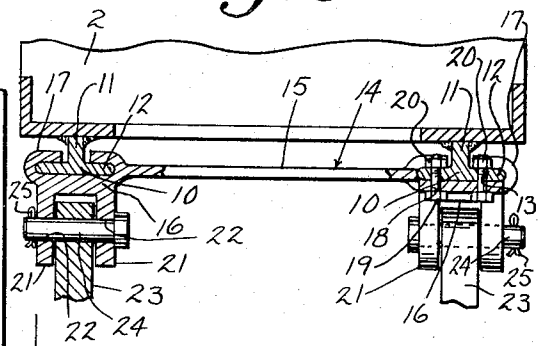
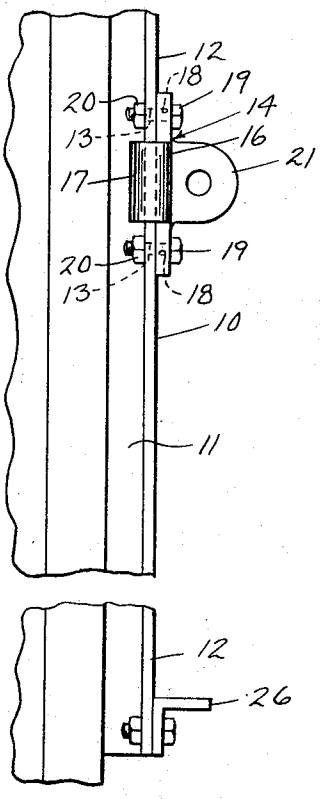


Fig. 4



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SLIDABLE BOOM FOOT LUG FOR CRANE

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Filed Dec. 10, 1965, Ser. No. 513,022
2 Claims. (Cl. 212—57)

ABSTRACT OF THE DISCLOSURE

This disclosure relates to a tower crane having a vertical tower and a boom footed on the tower, the boom foot being raisable and lowerable to change its working elevation and for easy mounting and dismounting of the boom. Spaced, parallel vertical rails which extend upwardly from points near the bottom of the tower, the rail flanges being spaced outwardly from the tower. A horizontal lug has slides at either end provided with tabs that are wrapped about the rail flanges to slidably mount the lug on the rails, there being stop means near the bottom of the rails to prevent the lug from sliding off. The slides and rail flanges are provided with holes, and bolts are used to lock the lug to the rails in any of a plurality of vertical positions. The slides are provided with spaced forwardly extending apertured ears, and the boom foot has apertured arms received between the ears, the boom foot being removably fixed to the lug by means of transverse pins passing through the apertures. A cable attached near the foot of the boom is used to raise and lower the boom foot and lug with respect to the tower.

The invention relates to cranes, such as dock cranes, of the type including a vertical tower and a boom supported thereon; and it resides more particularly in a slidable boom foot lug arrangement for such a crane comprising a vertical rail on the tower, a lug vertically slidably mounted on the rail that is adapted to removably receive the foot of the boom, and a lock to fix the lug to the rail at at least one preselected point.

Dock cranes are particularly designed for loading and unloading operations, and include a crawler or other base vehicle, a vertical tower mounted on the crawler, and a boom that has its foot supported on the tower. Such cranes are intended to be moved from place to place, and it is desirable to have the boom easily dismountable for this purpose. It is also desirable in many cases to be able to raise or lower the point at which the boom foot is mounted on the tower so that the boom can be properly positioned for loading or unloading at different elevations.

It is an object of this invention to provide for mounting and dismounting of the boom of a dock crane by means of a sliding lug arrangement in which the boom foot is removably attached to a lug which is in turn slidably mounted on a rail on the tower.

It is another object of the invention to provide such an arrangement in which the lug can be fixed to the rail at any one of a plurality of points to vary the elevation of the boom foot.

It is a further object of the invention to provide an arrangement in which the boom foot is held securely in place during operation while being readily dismountable when the crane is to be transported from place to place.

It is still another object of the invention to provide a slidable boom foot lug arrangement having the foregoing advantages that is extremely durable and easy to use, and that is formed of a minimum number of parts so that it is relatively simple and inexpensive to manufacture and use.

Other objects and advantages will appear from the

description to follow. In the description, reference is made to the accompanying drawings, which form a part hereof, in which there is shown, by way of illustration and not of limitation, a preferred embodiment of the invention.

In the drawings:

FIG. 1 is a somewhat schematic side view of a dock crane incorporating a slidable boom foot lug arrangement according to this invention, an alternative position of the boom being shown in broken lines,

FIG. 2 is an enlarged fragmentary view of the front or forward surface of the tower of the crane of FIG. 1 showing rails and a sliding lug,

FIG. 3 is a view in cross section, with parts broken away, through the plane 3—3 shown in FIG. 2, which further illustrates the rails and lug and which illustrates the manner in which the boom is attached to the lug, and

FIG. 4 is an enlarged fragmentary side view further illustrating the rails and lug.

The dock crane shown in FIG. 1 includes a mobile base, in the form of a conventional crawler designated generally by the reference numeral **1**. A vertical tower designated generally by the reference numeral **2** has its base pivotally mounted on the forward end of the crawler **1** and includes an operator's cab **3** near its top. A pair of laterally spaced struts **4**, one of which is hidden behind the other as seen in FIG. 1, extend from and are secured to the crawler **1** and are removably attached to the tower **2** to hold it securely in a vertical working position.

A boom **5** has its foot mounted on the tower **2**. A suspension cable **6** leads from a winch mechanism (not shown) on the crawler **1** about the upper end of the tower **2** and is attached to the outer end of the boom **3** so that the boom **3** may be pivoted in a vertical plane in conventional fashion. A hoist cable **7** extends from another winch mechanism (not shown) about the outer end of the boom **5** and is attached to a clam shell or other suitable implement (not shown). A boom foot cable **8** leads from a winch mechanism (not shown) about a sheave **9** on the tower **2** and is attached to the boom **5** near its foot.

A pair of parallel, generally vertical, laterally spaced rails **10** are securely fixed, as by welding, to the forward surface, the left surface as seen in FIG. 1, of the tower **2** and extend from points near its base to points representing the highest desired position for the foot of the boom **5**. The rails **10** are generally T-shaped in cross section with webs **11** normal and fixed to the front surface of the tower **2** and rail flanges **12** that are forwardly spaced from and parallel to such surface and that extend to either side of the webs **11**. The flanges **12** are provided with vertically spaced pairs of holes **13** on opposite sides of the webs **11**, the holes **13** of the two rails **10** being at corresponding elevations.

A horizontal elongated lug **14** extends between and is vertically slidably mounted on the rails **10**. The lug **14** comprises a central web **15** that extends between the rails **10** and is forwardly spaced from the tower **2**. At each end of the web **15** and integral therewith is a slide **16** which includes a pair of vertically centrally located, rearwardly extending tabs **17** which are wrapped about and slidably receive the flange **12** of the associated rail **10**. Above and below the tabs **17**, the slides **16** are provided with vertically spaced pairs of holes **18**. The holes **18** are arranged so that they will be in alignment with holes **13** at a plurality of vertical positions of the lug **14** on the rails **10**. In the preferred embodiment shown, the holes **13** are provided along substantially the entire lengths of the rails **10** so that the lug **14** can be set at almost any position between the ends thereof. Bolts **19** pass through the openings **13** and **18** and, with nuts **20**,

serve as lock means to lock the lug 14 in any desired vertical position.

Extending forwardly from each slide 16 are a pair of laterally spaced ears 21 which are provided with aligned transverse openings 22. The boom 5 terminates at its foot end in two laterally spaced apertured arms 23, seen in FIG. 3, which are received between the sets of ears 21. Pins 24 are removably inserted through the openings 22 and apertured arms 23, and serve as means to removably mount the foot of the boom 5 on the lug 14. Cotter pins 25 or any other suitable means are used to hold the pins 24 in place.

When the crane of FIG. 1 is working, the elevation of the foot of the boom 5 is set by locking the lug 14 at any desired vertical point on the rails 10. This elevation can readily be changed by releasing the bolts 19 so that the lug 14, and the foot of the boom 5 are freed to slide up or down the rails 10. The cable 8 is used for raising or lowering the foot of the boom 5, and when the desired position has been reached the bolts 19 are reinserted. The cable 8 is not under tension during working since the weight of the boom 5 is then on the bolts 19.

When the boom 5 is to be dismounted, its tip is first lowered to the ground by means of the suspension cable 6. The bolts 19 are then released and the cable 8 is used to lower the foot of the boom 5 to a point near the bottom of the rails 10, this position of the boom being shown in broken lines in FIG. 1. The pins 24 can then conveniently be removed. The crawler 1 is then moved to the right as seen in FIG. 1 and the cable 8 is used to lower the foot of the boom 5 to the ground. Finally, the cables 8 and 6, and the hoist cable 7, are disconnected from the boom 5. The lug 14 remains on the rails 10 at all times, and a stop 26 extends between the bottoms of the rails 10 to prevent the lug 14 from sliding off.

After the boom 5 has been dismounted, the suspension cables 6 can be reattached to the upper end of the tower 2. The struts 4 are then released, and the tower 2 can be pivoted downwardly to a horizontal position for transporting the machine.

Remounting is accomplished by reversing the foregoing steps. That is, the tower 2 is first returned to vertical position and locked with the struts 4, and the cables 6, 7 and 8 are then attached to the boom 5. The cable 8 is used to raise the foot of the boom 5 to a position where it can be received by the lug 14 and the crawler 1 is then propelled forward until the arms 23 are in place between the ears 21. The pins 24 are then reinserted and the foot of the boom 5 is raised to the desired working elevation where the bolts 19 are reinserted to lock the lug 14 into place.

The sliding boom foot lug arrangement shown herein provides for extremely simple mounting and dismounting of the boom 5 and for changing the elevation of its foot to fit working requirements. Providing the slidable lug 14 which always remains on the rails 10 makes it simple to mount and dismount the foot of the boom 5, and the pins 24 allow the boom 5 the required pivotal movement.

Although a preferred embodiment of the invention has been shown and described herein, it will be obvious that variations might be made without departure from the invention. It is not intended, therefore, that the invention be limited by the specific showing herein, or in any other way, except insofar as limitations appear specifically in the following claims.

I claim:

1. A crane comprising: a vertical tower having a front surface; a pair of spaced parallel vertical rails on the front surface that extend upwardly from points near the bottom of the tower, the rails including webs normal to the front surface and flanges forwardly spaced from and parallel to the front surface, the flanges being of substantial width and being provided with a plurality of vertically spaced holes therethrough; a unitary horizontally disposed boom foot lug comprising a central web portion spanning the distance between the rails and slides at the ends of the web portion that define substantial surfaces facing and against the front surfaces of the flanges, the slides being provided with tabs that are wrapped rearwardly about free edges of the flanges to vertically slidably mount the lug on the rails, the slides being provided with holes therethrough that are adapted to be in alignment with the holes in the flanges at a plurality of vertical positions of the lug on the rails, the slides also being provided with forwardly extending transversely apertured ears; lock bolt means adapted to be removably received through the holes in the slides and flanges to lock the lug to the rails at any of a plurality of vertical positions; a boom having a foot portion adjacent the front surface of the tower, the boom foot comprising a pair of laterally spaced transversely apertured arms which extend rearwardly to substantially directly in front of the webs of respective rails, the apertures of the arms being in alignment with the apertures of respective ears on the slides; and transverse pins removably received through the apertures in the arms and ears to removably fix the boom foot to the lug.

2. The combination of claim 1 wherein the rails are T-shaped in cross section to define flanges that extend to both sides of the webs; and wherein the flanges are provided with holes on both sides of the rail webs; and wherein the slides are provided with laterally spaced tabs that are wrapped around both edges of the flanges and laterally spaced holes adapted to be in alignment with the holes through the flanges.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,365,077 January 23, 1968

George W. Mork

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 32, for "to" read -- to be --.

Signed and sealed this 4th day of March 1969.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents