United States Patent

Nakajo

[15] **3,662,907**

[45] **May 16, 1972**

[54] DEVICE FOR ACTUATING A SWINGABLE BOOM

[72] Inventor: **Toshihiro Nakajo,** Tokyo, Japan

[73] Assignee: **Unic Corporation,** Tokyo, Japan

[22] Filed: **Apr. 17, 1970**

[21] Appl. No.: **29,573**

[52] **U.S. Cl.** .....**214/77 R,** 212/55, 212/59

[51] **Int. Cl.**.....**B60p 1/48**

[58] **Field of Search**.....214/130, 131, 141, 77, 78, 214/80; 212/55, 59, 35

[56] **References Cited**

UNITED STATES PATENTS

3,109,541 11/1963 Matson .....214/77 UX

FOREIGN PATENTS OR APPLICATIONS

1,242,646 8/1960 France.....214/130

555,862 4/1958 Canada.....214/77

Primary Examiner—Gerald M. Forlenza

Assistant Examiner—Robert J. Spar

Attorney—Stevens, Davis, Miller & Mosher

[57] **ABSTRACT**

A device for actuating the swingable boom of a truck crane. The boom is swingably supported at the top of a hollow post secured to a crane truck. A pair of series connected hydraulic cylinders are disposed between the boom and the hollow post, while guiding the movement of the hydraulic cylinders by the hollow space of the post. Thereby, when the boom is actuated by the hydraulic cylinders, the hydraulic cylinders are prevented from moving toward a baggage frame of the crane truck and from reducing the effective floor space of the baggage frame.

3 Claims, 2 Drawing Figures

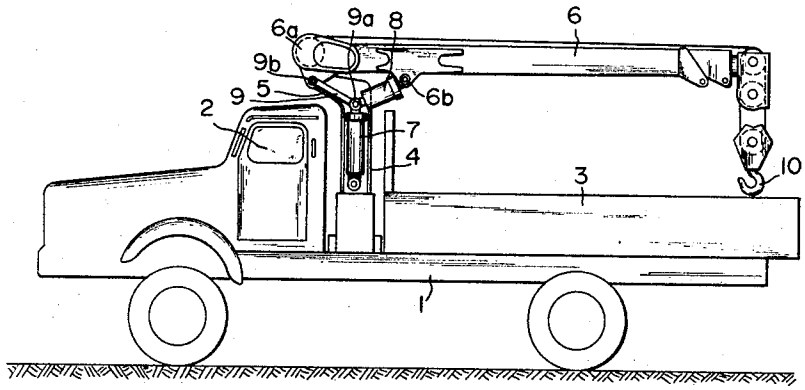


FIG. 1

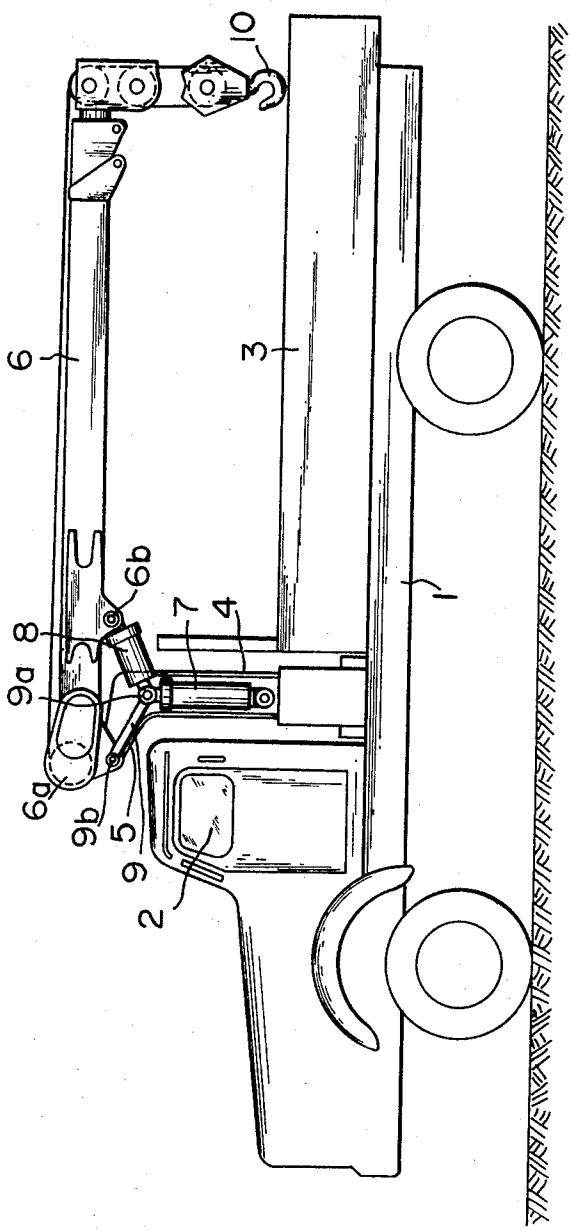
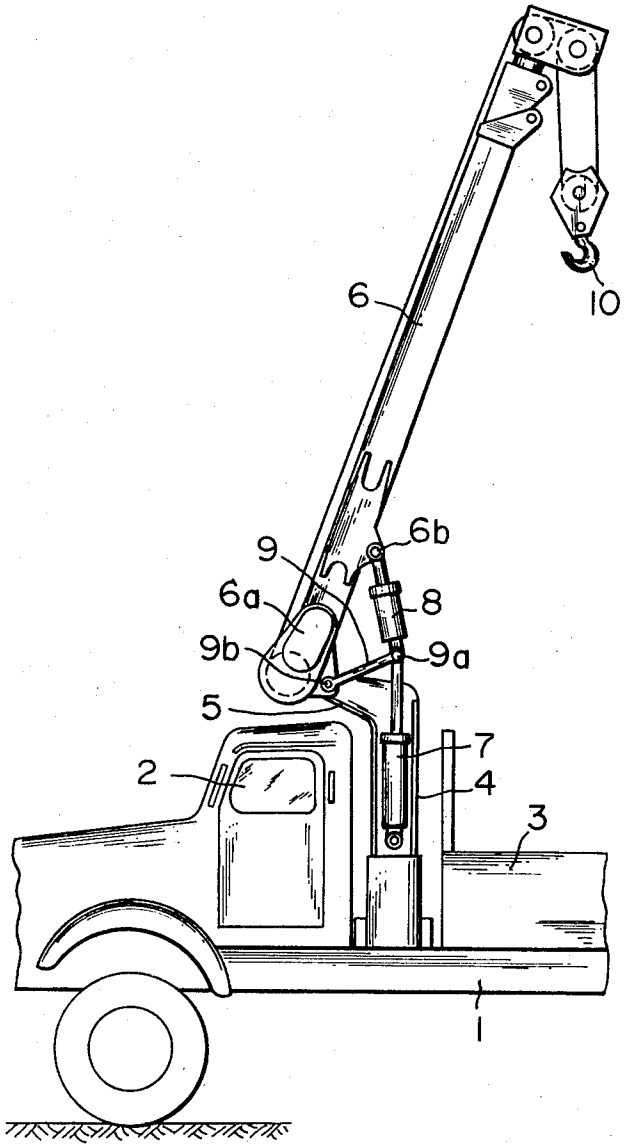


FIG. 2



DEVICE FOR ACTUATING A SWINGABLE BOOM

This invention relates to a device for actuating the swingable boom of a truck crane mounted on a truck, which device is located at a position between a driver's seat of the truck and a baggage frame thereof.

In a known device for swinging a crane boom up and down on a truck, a hydraulic cylinder is inserted between the boom and a post rotatably supporting the base portion of the boom, and the boom is swung by either feeding or discharging high-pressure fluid into and out of the hydraulic cylinder.

With most crane truck structures, as the boom is hydraulically operated, the hydraulic cylinder inevitably inclines toward the baggage frame, and the floor space available for baggage tends to be reduced.

An object of the present invention is to mitigate such difficulties of the known device for swinging the boom of a truck crane, by providing an improved device for actuating the swingable boom of a truck crane, which comprises a pair of series connected hydraulic cylinders disposed between the boom and a post, and link means linking the joint between the two hydraulic cylinders and a pivotally supported base portion of the boom, whereby, the boom swings without causing the hydraulic cylinders to move toward the baggage frame for reducing the floor space of the baggage frame.

For a better understanding of the invention, reference is made to the accompanying drawings, in which:

FIG. 1 is a side view of a truck crane having a device for actuating the swingable boom of a crane, according to the present invention; and

FIG. 2 is a partial diagrammatic illustration of the device of FIG. 1, illustrating the manner in which the device operates.

Like parts are designated by like numerals throughout the drawings.

In FIGS. 1 and 2, a device of the present invention may be applied to a truck 1 having a driver's seat 2 and a baggage frame 3. A hollow post 4 is disposed between the driver's seat 2 and the baggage frame 3, and the upper end 5 of the hollow post 4 is bent toward a top cover of the driver's seat.

The base portion 6*a* of an extensible boom 6 is rotatably pivoted to the upper end 5 of the post 4. A main hydraulic cylinder 7 is disposed in the hollow post 4, and an auxiliary hydraulic cylinder 8 is connected in series to the main hydraulic cylinder 7 at one end thereof. The opposite end of the auxiliary hydraulic cylinder 8 is pivotally connected to the boom 6 at a position 6*b*, which is suitably spaced from the pivoted part of the base portion 6*a* of the boom. The joint 9*a* between the main hydraulic cylinder 7 and the auxiliary hydraulic cylinder 8 is pivotally connected to one end of a link 9, and the opposite end 9*b* of the link 9 is swingably connected to the pivoted part of the base portion 6*a* of the boom. The boom 6 has a hook 10 depending from the free end thereof.

The operation of the boom actuation device of the aforesaid construction, according to the present invention, will now be described in detail. In order to raise the boom 6 from the position, as shown in FIG. 1, high-pressure fluid is delivered to the hydraulic cylinders 7 and 8, so as to extend both of the cylinders 7 and 8. As a result, the extensible boom 6 can be forced to a raised position, as shown in FIG. 2. During the aforesaid

extending operation of the hydraulic cylinders 7 and 8, the movement or the locus of the joint 9*a* between the two hydraulic cylinders is limited by the link 9. Since the link rotates about the pivot point 9*b*, the locus of the joint 9*a*, which is affixed to the free end of the link 9, apparently becomes a circle about the pivot point 9*b*. Accordingly, the upper end of the main hydraulic cylinder 7 sways only very little during its operation. In other words, the main hydraulic cylinder 7 can complete its full stroke of extension and contraction in the premises of the hollow post 4. More particularly, with the device of the present invention, the main hydraulic cylinder 7 disposed in the hollow post 4 can operate the boom 6 between its lowered position and fully raised position, during which the main hydraulic cylinder 7 remains in the premises of the hollow post 4, whereby, the hydraulic cylinder never moves out of the hollow post 4. As a result, the floor space of the baggage frame 3 of the truck 1 is never affected by the operation of the hydraulic cylinder 7.

As shown in the foregoing disclosure, according to the present invention, there is provided an improved device for actuating the swingable boom of a truck crane, in which series connected hydraulic cylinders 7 and 8 are provided between a hollow post 4 and a boom 6, while connecting the joint 9*a* between the two hydraulic cylinders to a pivot point 9*b* at the base potion 6*a* of the boom 6 by means of a link 9. Whereby, during the swinging operation of the boom 6, the hydraulic cylinders 7 and 8 never move into the baggage frame 3 of the truck 1. In other words, the operation of the hydraulic cylinders 7 and 8 never acts to reduce the floor space of the baggage frame 3. Thus, the present invention ensures fully efficient use of the baggage frame of a crank truck, and contributes greatly to the industry.

What is claimed is:

1. A device for actuating the swingable boom of a truck crane mounted on a truck, comprising

a hollow vertical post secured to a stationary portion of the truck for pivotally supporting the boom, the hollow post having a top end being bent away from the longitudinal vertical axis of the post and supporting a base portion of the boom in a manner swingable about an axis located in the bent top end,

a first hydraulic cylinder being secured to the stationary portion of the truck at one end thereof and extending substantially vertically through the hollow post,

a second hydraulic cylinder having one end pivotally secured to the opposite end of the first hydraulic cylinder while having the opposite end thereof connected to the base portion of the swingable boom, and

a link rotatably connecting the joint between the first and second hydraulic cylinders to said axis of the swing of the boom in the bent top end of the vertical post, whereby the first hydraulic cylinder is held substantially vertical throughout the swinging operation of the boom.

2. A device according to claim 1, wherein said hollow post is disposed between a driver's seat and a baggage frame of the crane truck.

3. A device according to claim 2, wherein the top portion of the hollow post pivotally supporting the base portion of the boom is bent away from the baggage frame.

* * * * *