

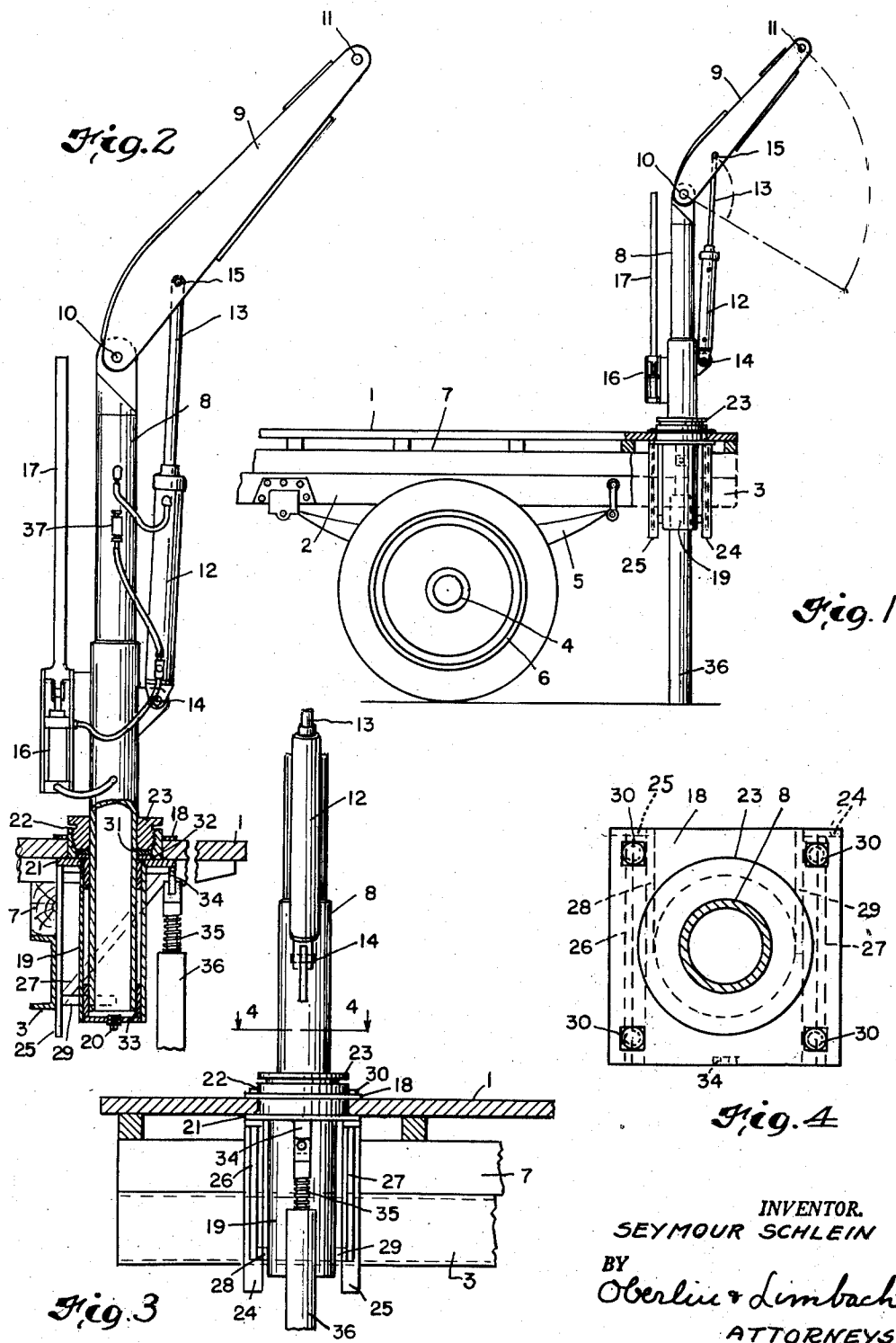
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TRUCK MOUNTED CRANE

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TRUCK MOUNTED CRANE

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This invention relates, as indicated, to truck mounted cranes and more particularly to a crane having a vertical mast mounted for pivotal movement about its axis. Mounting means are provided especially adapted for mounting such crane in the deck or platform of a vehicle such as a car or truck.

Relatively large cranes have been mounted on vehicles in the past for special purposes, including towing and wrecking cranes, and cranes for laying pipe lines and the like. In general, such cranes completely occupy or obstruct the bed of the vehicle, which is used for no other purpose. More recently, there has been an increasing demand for farm and delivery trucks to be provided with lifting mechanism which will raise and lower a relatively heavy load to and from the deck of the truck. For the most part, the lifting devices employed have either been elaborate and expensive hydraulic mechanisms or else very inadequate make-shift affairs which are clumsy and often unsafe.

It is therefore a primary object of my invention to provide a crane which may be mounted on the deck of a truck or the like and which will be safe and efficient in operation while obstructing such deck to a minimum.

Another object is to provide special mounting means for the mast of such crane which will be extremely rigid and well braced, yet entirely out of the way.

Still another object is to provide such mounting means also adapted to serve as a reservoir for hydraulic fluid for operating such crane.

A further object is to provide stabilizing means for such vehicle arranged for maximum effectiveness when such crane is in use.

Other objects of the invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention then comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawing:

Fig. 1 is a side elevational view of the rear end portion of a vehicle having the crane of my invention mounted thereon;

Fig. 2 is an enlarged elevational view of such crane partly broken away better to show the manner of mounting the same, the view being

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from the rear of the vehicle, or right-hand side of Fig. 1;

Fig. 3 is a fragmentary elevational view taken at right angles to the view of Fig. 2 or from the far side of the Fig. 1 view; and

Fig. 4 is a sectional view taken along the line 4—4 on Fig. 3.

Referring now more particularly to said drawing, the crane of my invention is adapted to be mounted in the deck 1 of a truck or similar vehicle, the rear end portion of which is shown in Fig. 1. Such vehicle may have the usual chassis comprising two steel frame rails 2 and 3 supported on axle 4 by means of leaf springs such as 5. Wheels such as 6 are mounted for rotation on such axle. The usual wooden framing 7 carried by the chassis supports deck 1.

The crane employed for mounting on the vehicle will desirably be a hydraulic crane of the general type described in Patent No. 2,389,872 to K. A. Kruger et al. A vertical mast 8 carries a boom 9 pivotally secured thereto at 10. A hole 11 is provided at the end of the boom for mounting a pulley or, usually, merely attaching a chain. The boom is adapted to be raised and lowered through a wide arc by means of hydraulic cylinder 12 and piston 13, such cylinder being pivotally mounted on the mast at 14 and such piston being pivotally connected to such boom at 15. A double-acting hand operated hydraulic pump 16 is mounted on mast 8 and provided with a handle 17. Such pump may also desirably be provided with adjusting means of the type disclosed in my co-pending application Serial No. 16,842, filed March 24, 1948, and patented June 12, 1951, as Patent No. 2,557,056.

It is generally preferred to mount such crane at the right rear corner of the vehicle deck in order that the crane may be adapted to lift loads from either a sidewalk or loading dock with the vehicle alongside or backed against the same. The mounting means of my invention is, however, adapted to be installed at any point along the length of the deck and supporting chassis. Such mounting means must, of course, be very rigidly supported and in my construction provides for rotation of mast 8 about its vertical axis at a point below the level of deck 1. Such mounting means is also specially designed to serve as a sump for the hydraulic fluid required by pump 16, such fluid serving the additional function in this arrangement of providing lubrication for the lower mast bearing. It has been common practice in the past to mount small cranes on the deck of the vehicle with bracing extending later-

ally to support the same. This encumbers the deck and may actually be unsafe as the deck flooring deteriorates.

Referring now more particularly to Figs. 2, 3, and 4 of the drawing, my new mounting means may be best understood by describing the manner in which it is assembled. A line is first drawn on the upper surface of deck 1 corresponding to the outer side of truck frame rail 3. A deck plate 18 having a central opening is then placed on the deck at the location where it is desired to mount the crane, with the outer edge of such plate on such line. The center hole and bolt holes are marked, using the plate as a template, and drilled through the deck.

The lower mount assembly comprises a tubular well or socket 19 closed at the bottom and having a drain plug 20 therein. A circumferential laterally extending flange 21 is welded to the upper end of such well adapted to engage the underside of deck 1 as best shown in Fig. 2. Welded to such flange is a sleeve or nut 22 threaded on its inside to receive upper bearing 23. Also welded to said flange 21 are two downwardly extending legs 24 and 25 having corresponding braces 26 and 27 extending from the lower portions thereof to the opposite side of flange 21. A pair of short braces 28 and 29 also extend from such legs to the lower end of well or socket 19 to rigidly reinforce the same. It will therefore be seen that a lower mount assembly has been provided affording a substantial support for the crane mast.

Sleeve 22 of such mount is inserted through the hole in deck 1 from the underside and four long cap screws 30 are run through the upper deck plate 18 into lower flange 21 and tightened securely. This serves to position legs 24 and 25 square and tight against the outer side of the truck frame rail 3, to which they are now welded. The mast socket is thus fixedly positioned relative to deck 1 and firmly supported directly by the truck frame. The lower end of mast 8 is now inserted in such well with a laterally extending peripheral flange 31 welded to the mast as shown in Fig. 2 and resting on the upper surface of bearing 32. Such bearing therefore carries the weight of the crane proper and its inner periphery together with the inner periphery of member 23 serves as an upper bearing for the mast mounting. The upper surface of bearing 32 may be of brake-lining material while the cylindrical portion is of anti-friction material. By screwing nut 23 down on flange 31, the mast may be prevented from pivoting too freely, as when the vehicle is parked on an incline, for example. An annular sleeve 33 of anti-friction material fitting in the lower end of well 19 receives the lower open end of tubular mast 8 and together with bearings 23 and 32 holds such mast rigidly erect. The lower portion of mast 8 is filled with an oil suitable for use as hydraulic fluid and also lubricating bearing 33.

It is not uncommon to provide a sprag or brace for vehicles mounted thereon adjacent the location of a lifting device and adapted to rest upon the ground and prevent undue stressing of the vehicle springs during the lifting operation. Such braces have, however, usually been clumsy affairs requiring to be separately secured to the underside of the vehicle and generally failing to provide support where most needed. It is an object of my invention to provide such support as part of the crane mounting unit, thereby greatly facilitating attachment and at the same

time ensuring that the effective bracing action will be afforded exactly where needed.

To this end I secure a bracket 34 to the underside of flange 21 adjacent the outer edge thereof (see Figs. 2 and 3) to which is pivotally attached a screw member 35. A tubular leg 36 is threaded on such screw member for axial adjustment and may be swung up under the deck of the truck when not in use, where it may be secured by any suitable catch (not shown). Since such leg or stabilizer is secured directly to the crane mount and such mount is welded to the frame of the vehicle, it is obvious that the support is provided exactly where required when such crane is in use.

The crane is operated as above indicated, through hydraulic cylinder 12 and pump 16, a control valve 37 being provided to permit the load to descend by returning hydraulic fluid from such cylinder to the interior of mast 8. The fluid supply line leading to pump 16 may descend to any desired depth into the sump in the lower end of mast 8 and well 19. If desired, a brake may be provided to control pivotal movement of such mast.

It will be seen from the foregoing that I have provided a novel crane and mounting therefor especially adapted for use on vehicles such as trucks and the like and which have many advantages over those previously known and employed. By employing my novel mounting means, it is made possible for the crane to swing a full 360 degrees and the deck is not encumbered in any way. The exceptionally rigid construction permits the handling of heavy loads in perfect safety.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In combination, a truck having a deck, steel frame rails supporting such deck, a tubular socket having its upper portion inserted in an opening through such deck near the right rear corner thereof, a laterally extending peripheral flange on said socket engaging the underside of such deck and secured thereto, brace means connecting said flange and socket to the nearest of said frame rails, a vertical mast journaled for rotation in said socket, a boom pivotally connected to the upper end of said mast, a fluid pressure operated piston-cylinder assembly pivotally connected to said mast and boom and operative to raise and lower the latter, a hand operated double-acting pump mounted on said mast to operate said piston-cylinder assembly, the lower end of said socket being closed to adapt said socket and lower portion of said mast to serve as a sump for hydraulic fluid, a stabilizer leg pivotally secured to said flange adapted directly to brace such deck and crane when said crane is in use, and means for adjusting the length of said leg.

2. In combination, a vehicle having a deck, steel frame rails supporting such deck, a tubular socket having its upper portion inserted in an opening through such deck near the right rear corner thereof and adjacent one of said rails, a laterally extending peripheral flange on said socket engaging the underside of such deck and secured thereto, brace means connecting said flange and socket to the nearest of said frame rails, a vertical mast journaled in said socket for rotation about its vertical axis, a boom pivot-

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ally mounted on said mast, a fluid pressure piston-cylinder assembly pivotally connected to said mast and boom and operative to raise and lower said boom, the lower end of said socket being closed to adapt said socket and the lower portion of said mast to serve as a sump for hydraulic fluid, and a drain plug in such lower end of said socket.

3. In combination, a vehicle having a deck, a steel frame member beneath and supporting such deck, a tubular socket having its upper portion inserted in an opening through such deck adjacent said frame member, a laterally extending flange on said socket engaging the underside of such deck and secured thereto, brace means welded to and connecting said flange and socket to said frame member, a vertical mast journaled in said socket for rotation about its vertical axis, a boom pivotally mounted on said mast, and fluid pressure means pivotally connected to said mast and boom operative to raise and lower said boom, the lower end of said socket being closed to adapt the same to serve as a sump for hydraulic fluid.

4. In combination, a vehicle having a deck, a steel frame member beneath and supporting such deck, a tubular socket having its upper portion inserted in an opening through such deck adjacent said frame member, a laterally extending flange on said socket engaging the underside of such deck, an annular plate surrounding the upper end of said socket and resting on the upper surface of such deck, means connecting said flange and plate through such deck to secure said socket therein, brace means welded to said flange, socket and frame member for rigidity and support, a vertical mast journaled in said socket for rotation about its vertical axis, a laterally extending peripheral flange on said mast supported by said flange on said socket, an annular nut sleeved on said mast and screwed into the upper end of said socket to confine said flange on said mast, and a boom carried by said mast.

5. In combination, a vehicle having a deck, a tubular socket having its upper portion inserted in an opening through such deck, a laterally extending flange on said socket engaging the underside of such deck, an annular plate surrounding the upper end of said socket and resting upon the upper surface of such deck, means connecting said flange and plate through such deck to secure said socket therein, a mast journaled in said socket for rotation about its vertical axis, a laterally extending peripheral flange on said mast supported by said socket, and an annular nut sleeved on said mast and screwed into the upper end of said socket to confine said last-named flange.

6. In combination, a vehicle having a deck, a steel frame member beneath and supporting such deck, a tubular socket having its upper portion inserted in an opening through such deck adjacent said frame member, a laterally extending flange on said socket engaging the underside of such deck, an annular plate surrounding the upper end of said socket and resting on such deck, means connecting said flange and plate through such deck, and brace means welded to said socket and frame member.

7. In combination, a vehicle having a deck, a tubular socket having its upper portion inserted in an opening through such deck, a laterally extending flange on said socket engaging the underside of such deck, an annular plate surrounding the upper end of said socket and resting upon the upper surface of such deck, means connecting said flange and plate through such deck to secure

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said socket therein, a mast journaled in said socket for rotation about its vertical axis, a laterally extending peripheral flange on said mast supported by said socket, friction material interposed between said flange on said mast and said socket, and means adjustably bearing on the upper surface of said flange on said mast to regulate the pressure on said friction material.

8. In combination, a vehicle having a deck, a tubular socket having its upper portion inserted in an opening through such deck, a laterally extending flange on said socket engaging the underside of such deck, an annular plate surrounding the upper end of said socket and resting upon the upper surface of such deck, means connecting said flange and plate through such deck to secure said socket therein, a mast journaled in said socket for rotation about its vertical axis, a boom pivotally mounted on said mast, and fluid pressure means pivotally connected to said mast and boom operative to raise and lower said boom, the lower end of said socket being closed to adapt the same to serve as a sump for hydraulic fluid.

9. In combination, a vehicle having a deck, a tubular socket having its upper portion inserted in an opening through such deck and secured thereto, a tubular mast journaled in said socket for rotation about its vertical axis, said tubular mast being open at its lower end, a boom pivotally mounted on said mast, fluid pressure means pivotally connected to said mast and boom operative to raise and lower said boom, the lower end of said socket being closed to adapt said socket and the lower portion of said mast to serve as a sump for hydraulic fluid, and a drain plug in such lower end of said socket.

10. In combination, a vehicle having a deck, a tubular socket having its upper portion inserted in an opening through such deck, a laterally extending flange on said socket engaging the underside of such deck, an annular plate surrounding the upper end of said socket and resting upon the upper surface of such deck, means connecting said flange and plate through such deck to secure said socket therein, a mast journaled in said socket for rotation about its vertical axis, a laterally extending peripheral flange on said mast supported by said socket, and means adjustably bearing on the upper surface of said flange on said mast to regulate the pressure on said socket.

11. In a crane adapted to be mounted in an opening in the deck of a vehicle, for example, a tubular socket, a mast journaled in said socket for rotation about its vertical axis, a laterally extending peripheral flange on said mast supported by said socket, friction material interposed between said flange and said socket, and means adjustably bearing on the upper surface of said flange to regulate the pressure on said friction material.

12. In a hydraulic-operated crane adapted to be mounted in an opening in the deck of a vehicle, for example, a tubular socket, a tubular mast journaled in said socket for rotation therein about its longitudinal axis, said tubular mast being open at its end thus inserted within said socket, a boom pivotally mounted on said mast, and extensible hydraulic pressure means pivotally connected to said mast and boom operative to raise and lower the latter, the lower end of said socket being closed to adapt said socket and the lower portion of said tubular mast to serve as a sump for hydraulic fluid for said hydraulic pressure means.

13. In a hydraulic-operated crane adapted to

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be mounted in an opening in the deck of a vehicle, for example, a tubular socket having longitudinally spaced journals therein, a tubular mast journaled in said socket for rotation therein about its longitudinal axis, said tubular mast being open at its end thus inserted within said socket, a boom pivotally mounted on said mast, extensible hydraulic pressure means pivotally connected to said mast and boom operative to raise and lower the latter, the lower end of said socket being closed to adapt said socket and the lower portion of said tubular mast to serve as a sump for hydraulic fluid for said hydraulic pressure means, brace means on said socket adjacent such closed end adapted rigidly to support the latter, and means adapted to secure the upper end portion of said socket in such deck.

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