HYDRAULIC TRAVELING CRANE CONSTRUCTION

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ABSTRACT

A hydraulically operated traveling crane includes a chassis or support constructed and arranged to permit the crane to be operated with a lattice boom or with a telescopic boom. The carrying chassis includes plates which are mounted on a base and which include an inclined front wall with a pivot bearing at the lower end for either the lattice boom or for a whipping cylinder for a telescopic boom. The upper end of the inclined front edge provides a rotatable support for a pivot journal for a backstop support for the lattice boom or for the pivotal support for the telescopic boom. The mounting plates on the carrying chassis include a rearward extension providing a rotatable support for two rotatable pulleys of the hoisting gear around which connecting cables for the telescopic boom or the lattice boom or an extension of either may be connected. The mounting platform of the chassis provides means for mounting a support plate for cable winches which are employed with the lattice boom and these may be easily removed when the telescopic boom is positioned on the chassis. The cable winches include the cable lines which are provided for raising and adjusting the lattice boom. A pump unit for the hydraulic controls is arranged below the rearward extension mounting the cable winches. Guide pulleys for the boom cables are advantageously mounted on a combining unit which includes an adjustable triangular plate member mounting the pulleys.

7 Claims, 3 Drawing Figures
HYDRAULIC TRAVELING CRANE CONSTRUCTION

BACKGROUND OF THE INVENTION

1. Field of the Invention
This invention relates in general to the construction of lifting cranes and, in particular, to a new and useful hydraulic traveling crane having a rotatable upper carrying chassis constructed to be operable with either a lattice boom or a telescopic boom which may be adjusted in length by hydraulic means.

2. Description of the Prior Art
A hydraulic traveling crane is known which includes a fulcrum for a telescopic boom and a separate fulcrum for a lattice boom which are arranged at each end of the upper carrying chassis and which may be employed for the selective attachment of one or the other boom as well as for the attachment of hydraulic cylinders on the upper carrying chassis for raising and adjusting the boom which is attached. Such a known traveling crane has a particular disadvantage that its backdrop support for the lattice boom is not designed to prevent it from toppling over. Another disadvantage is that the lattice boom is also shifted and held by hydraulic cylinders, though the use of a traveling crane equipped with lattice booms is accomplished as a rule over longer periods of time and unavoidable oil leak losses make it impossible to hold a boom for a longer period in a certain position. The varying angular velocity and shifting movements of particularly long lattice booms hardly permits fine adjustments in assembly operations. Another disadvantage of this embodiment is that the great number of levers and rods as well as the shifting cylinders for the boom greatly limit the width of the cable drums for the load hoisting gears in a traveling crane with a lattice boom, and so the cable-receiving capacity of the cable drums and thus the load lifting heights are very limited, particularly when long lattice booms and adjustable long telescopic booms are employed. A particular disadvantage of the known traveling crane construction with a telescopic boom is that the load winch is arranged in front of the boom, and is thus on the same side on which the load acts on the platform support, so that the boom and its shifting mechanism are subjected to additional loading forces by the cable line of the load winch.

SUMMARY OF THE INVENTION
In accordance with the present invention, the disadvantages of the prior art constructions are overcome by a design of a hydraulic traveling crane which includes a chassis for mounting a lattice boom or telescopic boom. The mounting arrangement for either the telescopic or the lattice boom is such that either boom may be used with the same possibilities of operation and the same safety of operation as a hydraulic traveling crane equipped specifically with only a lattice boom or with only a telescopic boom.

The inventive construction includes a rotatable mounting platform carrying an upstanding support structure which includes an inclined front wall providing a journal at its lower end for the lattice boom or the whipping cylinder for the telescopic boom. The support structure also carries a journal at its upper end which may be provided for either the backdrop support for the lattice boom or for the pivotal support of the telescopic boom. The whipping cylinder for raising and adjusting the telescopic boom is articulated to the lower pivotal support and to the associated telescopic boom. The advantages of the construction is that no special pivot or fulcrum support is required for the whipping cylinders to support the telescopic boom and the telescopic boom is not additionally loaded by the cable forces of the load winches, but is relieved. The construction includes a rearward extension of the support plates which provide a mounting for the rotatable pulleys for drums of the cable winches. A rearward extension of this part provides a means for mounting the guide pulleys for the lattice boom. The cable winches and the necessary guide rollers for operating the crane with a lattice boom are also carried on a chassis for the forward location adjacent the support for the two pivot journals. The lattice boom may be held safely in any position by self-locking brakes installed on the cable winches. The arrangement is such that very wide cable drums may be provided for the cable winches, so that even long booms and, if necessary, with extension booms, can be used on a mounting chassis. This is so, because there are no constructional elements such as cylinders, levers, etc., for actuating the boom which would limit the necessary space. By arranging the two bearings on the support in the spaced locations set forth, it is assured that no additional bearing is required for articulating either one or the other of the booms for the associated backdrop support or whipping cylinder.

The winches for the lattice boom are advantageously secured on an upstanding bracket which is mounted on the chassis platform in a manner such that it may be easily removed when the telescopic boom is to be employed. These control winches can, of course, be left on the platform if desired, when the telescopic boom is installed instead of the lattice boom. A particularly space-saving arrangement for the load hoisting gears, and which also enhances the carrying capacity of the crane, is attained when they are arranged at the ends of bearing plates secured as brackets on the platform of the upper carrying chassis, or on adjoining winch plates which are secured by means of welds, or securing screws. In the latter case, they are carried on plates which project toward the rear and in the case of a Diesel engine pump unit for the hydraulic plant, they can be arranged underneath the projections of the winch plates, and thus underneath the load hoisting gear where they provide a counterweight for the operation of the device. The hydraulic control and driving elements which are carried on the crane are identical for use either with a telescopic boom, or with a lattice type boom.

Instead of fastening the unit in a manner with the guard rollers on the winch plates for ready detachment, a type of fastening may be of advantage which permits the turning upwardly or downwardly of the various elements. For traveling on the road, the boom is folded as usual, and the unit turns automatically downwardly, so that the height of the vehicle is reduced for transportation. The load hoisting gears or the part thereof which may be provided for an extension boom are mounted so that they may be easily removed and can be replaced by a counterweight, in order to obtain the carrying capacity of the traveling crane by use of this counterweight. In addition, it is possible to arrange on the rear end of the platform of the upper carrying chassis a fastening device for an additional counterweight for the
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use of the traveling crane with a lattice boom which is secured by means of welds, screws, etc. The unit for the boom shifting winches and/or guide rollers are advantageously carried on the bearing plates of the platform of the upper carrying chassis.

Accordingly, it is an object of the invention, to provide a traveling crane which includes means for operating with a telescopic or lattice boom, and which comprises a mounting plate carrying a first pivotal journal for suspending a lattice type boom or a whipping cylinder for a telescopic boom, and a second pivotal journal located upwardly from the first forming a pivotal mounting for the telescopic boom or for a backdrop support of a lattice boom, and which advantageously includes a rear mounting plate portion carrying the hoisting drums or associated gearing.

A further object of the invention is to provide a hoisting crane which is simple in design, rugged in construction, and economical to manufacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its uses, reference should be had to the accompanying drawing and descriptive matter in which there are illustrated preferred embodiments of the invention.

**BRIEF DESCRIPTION OF THE DRAWING**

In the Drawing:

FIG. 1 is a schematic side elevational view of a chassis of a hydraulic traveling crane having a lattice boom installed thereon and constructed in accordance with the invention;

FIG. 2 is a view similar to FIG. 1, but with a telescopic boom thereon; and

FIG. 3 is an enlarged view of a portion of the mounting chassis for the crane of another embodiment of the invention.

**GENERAL DESCRIPTION OF THE PREFERRED EMBODIMENT**

Referring to the drawings in particular, the invention provides, a hydraulic traveling crane, generally designated 50, which includes a chassis with a platform 1 at the upper portion, which is rotatable on a mounting base 52. The platform 1 carries a large gear 54 which is driven by a pinion 56 for rotational purposes.

In accordance with the invention, the platform 1 carries two spaced parallel upright mounting plates or bearing plates 6 which includes an oblique front edge 6a. A boom step bearing or mounting pin 2 is carried at the lower end of the front of each plate 6 and provides a pivotal mounting for either a lattice boom, generally designated 3, in FIG. 1, or a so-called whipping cylinder or fluid drive motor 10 for raising and lowering a telescopic boom 30.

A higher pivot or abutment bolt 5 is supported by the plate 6 at a higher elevation and rearwardly of the pivot 2 and, it provides a pivotal support for either a back drop support 4, as shown in FIG. 1, or for the telescopic boom 30, as shown in FIG. 2.

The bearing plate 6 includes a rearwardly extending upper portion which carries winch plates 7 which project rearwardly over a Diesel engine pump unit 17 for the hydraulic plant which is mounted on the platform 1. The load hoisting gears or drums 8 and 9 are journaled in the winch plates 7, 7 and form a winch unit, generally designated 24, which is secured to the bearing plate 6. The load hoisting gear 9 is provided for an extension boom which is not shown, but which can be used either with the lattice boom 3 or the telescopic boom 30.

As shown in FIG. 1, the lattice boom 3 carries guide pulleys 3a and 3b at the outer end and a hook 58 is suspended on cable 60 which extends back to the load hoisting gear 8. The back drop support 4 includes an adjustable threaded extension 4a which is pivotally connected to a pivot pin 62 carried on the lattice boom 3. The lattice boom 3 also includes a diagonal brace 64 which is pivoted at a pivot pin 66 to the lattice boom 3 and which carries a pulley 68 at its outer end.

An adjusting winch 12 is connected to cable line 22 for adjusting the lattice boom 3 and an auxiliary winch 13 is connected with cable line 23 for adjusting an extension boom which is not shown. Coaxial hydraulic motors (not shown) are arranged adjacent to winches 12 and 13 and they are combined in a compact unit, generally designated 14, which is detachably secured to the platform 1 by means of screws 15. The unit 14 can be easily removed for equipping the traveling crane with a telescopic boom, as shown in FIG. 2. The Diesel pump unit 17 for the hydraulic plant is arranged underneath the projecting winch plates 7 and thus has a favorable counterweight effect.

On the rear end of the platform 1 there is arranged a fastening device 26 with an attached counterweight 27. Guide rollers 16 for holding the lattice boom 3 are combined in a unit which includes side extension plates 72 which are secured to the bearing plate 6 by bolts 25.

An alternate arrangement of the mounting for the guide rollers 16 comprises a unit 18 which is of triangular plate-shaped configuration and which carries the guide roller set, and is pivotally mounted on a pivot 19 carried on an extension plate 72a. The plate 18 may be shifted outwardly and inwardly in respect to the extension 72a by pivoting it around the pivot 19 under the movement of a stop bolt 20 which may be adjustably threaded into a member 74 carried on the extension 72a.

When the traveling crane 50 is to be employed with a telescopic boom 30, as shown in FIG. 2, the whipping cylinder 10, which is pivoted at the pivot bolt 2, at one end is connected by an extendible piston rod 76 to a pivot bolt 11 on the telescopic boom 30. In the showing of FIG. 2, the unit 14 is shown as being removed, and the part supporting the counterweight 27 is not shown.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A hydraulic traveling crane operable with either a lattice boom having a back drop support or a telescopic boom having a whipping cylinder, comprising a chassis having a platform (1) pivotally mounted thereon, an upright bearing plate (6) carried on said platform, a first pivot journal (2) mounted adjacent the front of said bearing plate for selectively and alternatively pivotally supporting a lattice boom (3) and a whipping cylinder (10) for elevating and lowering a telescopic boom (3), a second pivot journal (5) carried on said bearing plate above and behind the first pivot journal
for selectively and alternatively pivotally supporting said telescopic boom and the backdrop support (4) for said lattice boom, a load hoisting unit (24) including load hoisting cable drums (8,9) mounted on said bearing plate adjacent the rear thereof behind said second pivot journal, cable guide line means adapted to be secured to the rear of said load hoisting unit for raising and adjusting the lattice boom, the lattice boom being adapted to be pivotally connected to said first pivot journal adjacent said lower end and being adapted to be pivotally connected to the backdrop support which is pivoted at its inner end to the second pivot journal when it is in operation, and said telescopic boom being adapted to be pivoted at its inner end to said second pivot journal and to be pivoted intermediate the length thereof to the whipping cylinder which is adapted to be pivoted at its opposite end to the first pivot journal, said cable guide line means including a cable winch unit detachably mounted on said platform adjacent said bearing plate and having guide rollers for operating the lattice boom and said bearing plate extending rearwardly at its upper portion of the rear end thereof and being connected to said load hoisting unit.

2. A hydraulic traveling crane, according to claim 1, including a motor driven pump unit located below said hoisting unit on said platform.

3. A hydraulic traveling crane, according to claim 1, including guide roller means for guiding said lattice boom upwardly and downwardly, and a guide roller mounting unit mounted adjacent the rear of said hoisting pulley unit.

4. A hydraulic traveling crane, according to claim 3, wherein said hoisting pulley unit and said guide roller unit are removably mounted on said bearing plate, and means for suspending a counterweight on said platform.

5. A hydraulic traveling crane, according to claim 1, including boom adjusting winches detachably secured on said platform adjacent said bearing plate.

6. A hydraulic traveling crane, according to claim 1, including a hydraulic control and driving unit mounted on said platform for operating selectively said lattice boom and said telescopic boom.

7. A hydraulic traveling crane, according to claim 1, including an upstanding suspension member extending upwardly from the rear of said platform and a counterweight carried on said suspension member.

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