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REVOLVING TOWER CRANE

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Fig.1

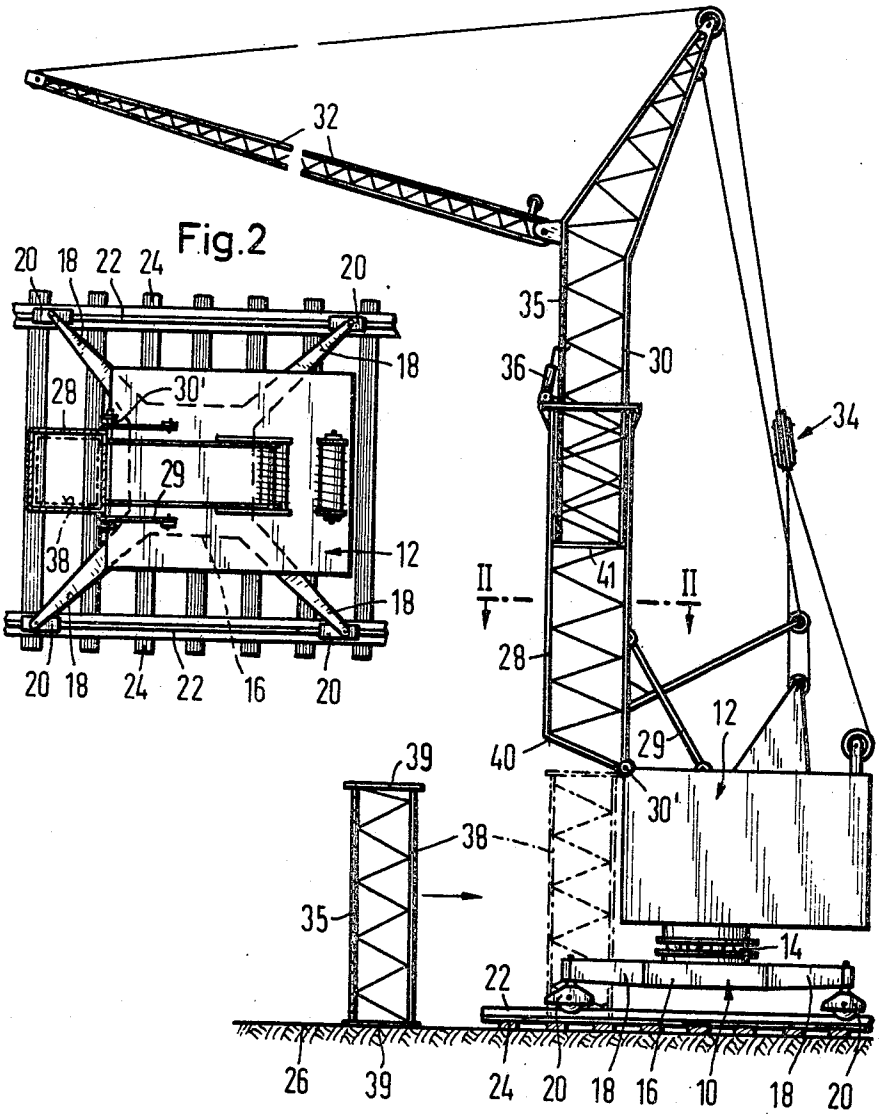


Fig.2

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REVOLVING TOWER CRANE

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ABSTRACT OF THE DISCLOSURE

A traveling, revolving tower crane whose lower tower portion forms a vertically open passage. The upper tower portion partly received in the passage can be lengthened by means of an extension introduced through the lower orifice of the passage. The base of the crane which is rotatably mounted on a supporting carriage is horizontally offset from any downward projection of the orifice. The carriage is horizontally offset from any such projection in at least one angular position of the base on the carriage. The upward spacing of the orifice from the lowermost portion of the carriage and of a supporting track should be at least equal to the length of the extension.

BACKGROUND OF THE INVENTION

The invention relates to revolving tower cranes, and particularly to traveling cranes whose tower can revolve about a vertical axis.

This type of tower crane, as known heretofore, was somewhat limited in its application because the height of the tower could not be changed, or at least, could not be changed conveniently. The known towers are mounted on the base in such a manner that the bottom end of the tower extends over some portion of the base or of the carriage on which the base is rotatably supported. If the tower consists of a lower portion in which the upper tower portion is slidably received in telescopic engagement, the lower end of the upper tower portion is not accessible.

It is the object of the invention to provide a tower crane of the general type described in which an extension can readily be attached to the lower end of the upper tower portion.

SUMMARY OF THE INVENTION

With this object and others in view as will presently become apparent, the invention provides a tower of the afore-described type with a tower extension dimensioned for longitudinal movement in the passage of the lower tower portion. The passage is downwardly open, and its lower orifice is of a size sufficient to receive the extension.

Access to the orifice is had by arranging the lower tower portion on the tower base in such a manner that the base is horizontally offset from any downward projection of the orifice, and that the support, on which the base rotates, is horizontally offset from any downward projection of the orifice in at least one angular position of the base.

Fasteners are provided at one longitudinal end of the tower extension for fastening the latter to the lower end of the upper tower portion in the passage of the lower tower portion. The vertical spacing of the passage from the ground or from the lowermost portion of the support must be sufficient to accommodate the length of the tower extension between the ground and the orifice prior to attaching the extension to the lower tower portion.

Other features, additional objects, and many of the attendant advantages of this invention will readily be appreciated as the same becomes better understood by reference to the following detailed description of a preferred

embodiment when taken in conjunction with the appended drawing.

BRIEF DESCRIPTION OF THE DRAWING

In the drawing:

FIG. 1 shows a tower crane of the invention in side-elevation; and

FIG. 2 shows the apparatus of FIG. 1 in section on the line II—II.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The illustrated crane has a supporting carriage **10** on which the base **12** of the crane is mounted by means of a turntable **14** having a normally vertical axis and ball bearings.

As is better seen in FIG. 2, the carriage **10** has a central platform **16** from which four elongated legs **18** extend in angularly offset, horizontal directions. The free end of each leg **18** carries a wheel assembly **20**. The wheels travel on a track consisting of rails **22** and wooden ties **24** directly superimposed on a bed **26** of broken rock and the like.

The base **12** encloses motors, cable winches, controls, an operator's station, and other conventional elements of a crane, not themselves relevant to this invention, and not shown in detail. The upper front edge of the base **12** is provided with a heavy hinge or pivot **50'** to which the lower end of a lower tower portion **28** is attached. The tower portion **28** is a square, vertically elongated, and vertically open tube having lattice walls, as is conventional. It is normally held in its upright position by braces **29** on the crane base **12**.

An upper tower portion **30** is slidably received in the lower tower portion and projects upwardly from the same. It carries the actual hoist equipment of the crane including only a boom **32**. The boom **32** can be raised and lowered by means of a tackle **34** and cables connected to the winches in the base **12**. Closely spaced horizontal lattice members **35** in the front wall of the upper tower portion **30** form a rack which may be engaged by two hydraulically operated pawls **36** mounted on the lower tower portion **28** to raise and lower the upper tower portion in cooperation with each other in such a manner that one pawl **36** secures the upper tower portion while the other is withdrawn. Only one pawl **36** is visible in the drawing.

The lower orifice of the passage in the lower tower portion **28** is formed by four lattice members which form a rim **40** about the orifice in a plane obliquely inclined to the horizontal. The rim **40** slopes obliquely upward in a direction away from the base **12** or in a forward direction.

The upper tower portion **30** may be lengthened by means of an extension **38** of similar lattice construction as the tower portions **28, 30**, and having fastening flanges **39** at both longitudinal ends. A similar flange **41** is provided at the lower end of the upper portion **30**.

The pivot **30'** is arranged in such a manner that any downward projection of the orifice in the rim **40** is offset horizontally from any portion of the base **12**, as is best seen in FIG. 2. As is also seen from that figure, any projection of the orifice is horizontally offset from the carriage **10** and the supporting rails **22** in the angular position of the base **12** on the carriage **10** which is shown on the drawing. As is seen in FIG. 2, two of the legs **18** flank a downward projection of the orifice in the tower portion **28**.

The distance from the rim **40** to the top of the ties **24** is somewhat greater than the length of the tower extension **38**, particularly when measured from the front member of the rim **40**. The extension **38** may therefore be brought from the position illustrated in fully drawn lines

into the position under the rim **40** indicated in broken lines, and pushed upward through the orifice in the rim **40** into the lower tower portion **28** until the flange **39** abuts against the flange **41**, and the flanges can be connected by bolts and nuts, not themselves shown.

The front wall of the tower extension **38** forms a rack **35** for cooperation with the pawl **36**. An additional tower extension may be fastened to the lower flange **39** of the extension **38** in the same manner as described above, and the overall height of the tower may thus be increased conveniently as needed.

Even when the tower is very high, its stability is good because the hoisting cables or other tension members associated with the tackle **34** are attached to a portion of the base **12** diametrically opposite to the base portion carrying the hinge or pivot **30'** relative to the vertical axis of the turntable **14**.

What is claimed is:

1. In a revolving tower crane having a support, a base mounted on said support for rotation about a vertically extending axis, an elongated lower tower portion arranged on said base for rotation with the same and extending upward from said base, said lower portion being formed with a longitudinal passage, an upper tower portion partly received in said passage and upwardly projecting therefrom, hoist means on the projecting part of said upper tower portion, and actuating means for longitudinally moving said upper tower portion in said passage, the improvement which comprises:

(a) an elongated tower extension dimensioned for longitudinal movement in said passage,

(1) said passage being downwardly open and having a lower orifice of a size sufficient to receive said extension,

(2) said base being horizontally offset from any downward projection of said orifice,

(3) said support being horizontally offset from any downward projection of said orifice in at least one angular position of said base relative to said axis; and

(b) fastening means on one longitudinal end portion of said tower extension for fastening said extension to the lower end of said upper tower portion in said passage,

(1) the vertical spacing of said orifice from the lowermost portion of said support being at least equal to the length of said extension.

2. In a crane as set forth in claim **1**, said lower tower portion having a rim about said orifice, said rim sloping obliquely upward in a direction away from said base.

3. In a crane as set forth in claim **1**, said support having a central portion carrying said base, and a plurality of elongated leg portions extending from said central portion in angularly offset horizontal directions, two of said leg portions flanking a projection of said orifice in said one angular position of said base.

4. In a crane as set forth in claim **1**, a pivot having a normally horizontal axis and securing said lower tower portion to a first portion of said base, and a tension member connecting said projecting part to a second portion of said base, said first and second portions being spaced from said axis in opposite horizontal directions.

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