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3,335,876

COLLAPSIBLE TOWER CRANE

Filed Oct. 24, 1965

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FIG. 1

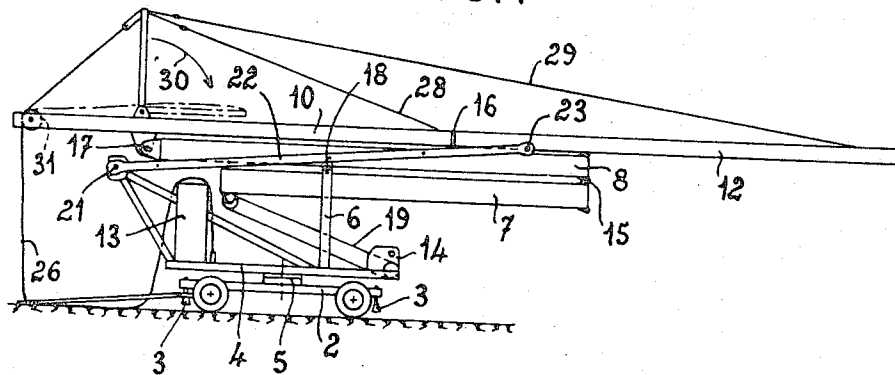


FIG. 2

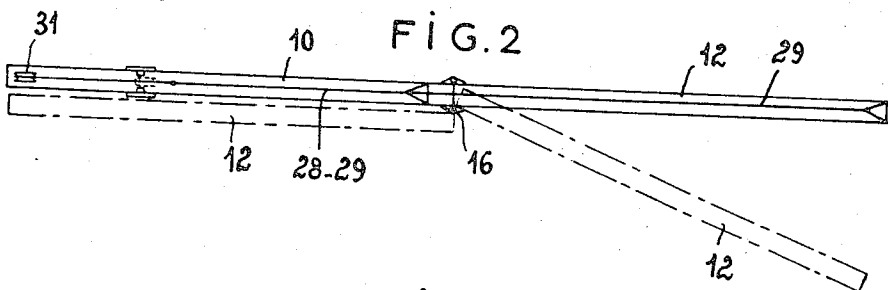
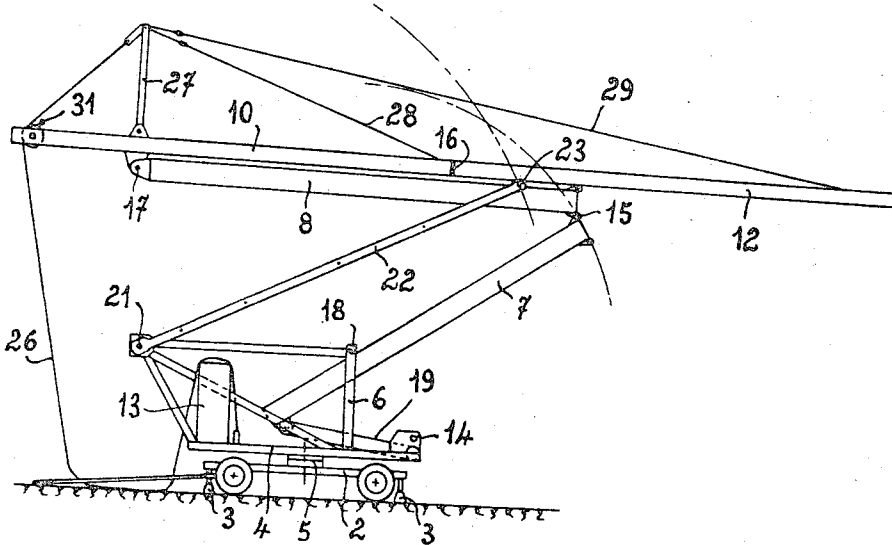


FIG. 3



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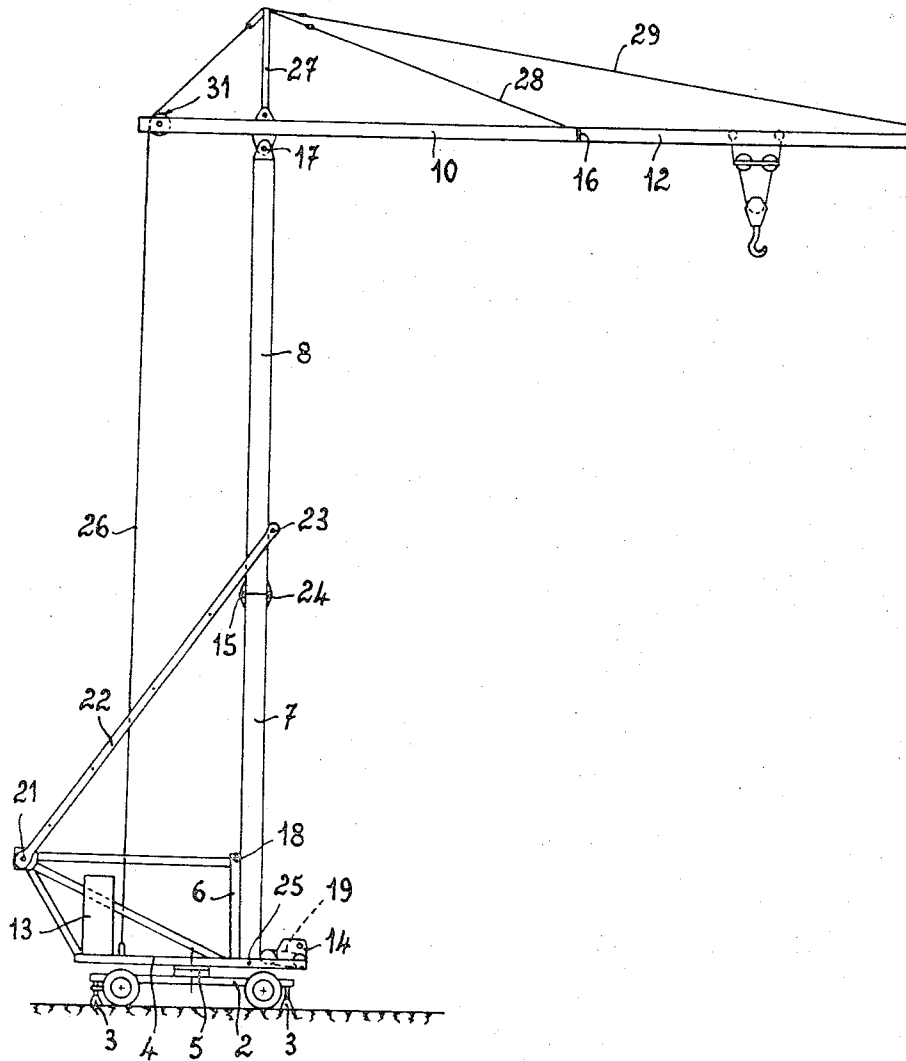
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FIG. 4



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**COLLAPSIBLE TOWER CRANE**

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 Claims priority, application France, Feb. 15, 1965, 45,628, Patent 1,436,638  
 3 Claims. (Cl. 212-46)

My invention has for its object the assembling and dismantling of cranes used for building purposes, which assembling and dismantling operations it is always desired to simplify with a view to reducing their duration and consequently to reducing as much as possible the idle periods arising whenever it is necessary to move the crane from one building yard to another. To this end, my invention comprises a mechanism which allows a speedy expansion and collapse of the parts forming the crane, to wit in particular its tower and jib without dismantling either of said parts.

The tower of the crane being, as is well known per se, constituted by two sections pivotally secured to each other about a horizontal axis while the lower section is in turn pivotally secured about a horizontal axis extending through the framework rigid with a rotary platform, my invention consists in the following steps: I set the last-mentioned pivotal axis at a predetermined height above the lower end of said section, and I connect the upper section with the framework through a connecting rod pivotally secured to said upper section and to said framework, the connecting rod and upper section may form with the lower section of the mast or of the tower a deformable four-sided pivotal system, after which the lower end of the lower section of the tower is connected through a tackle with the raising and hoisting winch in order to provide respectively for the expansion and collapse of the tower through deformation of said four-sided pivotal system. The jib is pivotally secured to the upper end of the upper section of the tower and is connected with the rotary system by means of a cable which can serve as a strut and set the jib in a horizontal position during the expansion of the tower, said cable holding thereafter the jib in said horizontal position.

In order to reduce the bulk of the crane when in its folded or collapsed position, the jib includes also two pivotally interconnected sections the pivotal axis connecting which is vertical so as to allow the folding of said two sections against each other in a horizontal plane.

My invention will be clearly understood from the following description, reference being made to the accompanying diagrammatic drawings illustrating by way of example and in a non-limiting sense a preferred embodiment of my improved mechanism. In said drawings:

FIG. 1 is an elevational side view of the crane in its folded condition while only the post and the guys of the jib are illustrated in their normal position of use;

FIG. 2 is a view of the jib from above;

FIGS. 3 and 4 are elevational side views of the crane, respectively during its expansion and in its position of use.

In the drawings, 2 designates the trailer carried by two axles and forming the chassis of the crane 1 said trailer is provided with jacks 3 adapted to engage the ground when the crane is in its operative position. Said chassis 2 carries a rotary frame 4 of which the pivotal movement is obtained by an annular system of rollers 5. The frame 2 carries in its turn a framework 6 formed by a trellis-shaped structure carrying the actual tower 7, 8, the jib 10-12, the ballast 13 and a hoisting and control winch 14. The tower includes two sections, the lower section 7 and the upper section 8, said sections being pivotally connected together about a horizontal axis 15. The jib in-

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cludes the two above mentioned sections 10 and 12 which are pivotally secured to each other about a vertical axis 16 so as to allow them to be folded against each other when the crane is in its collapsed transportation position. The section 10 of the jib is pivotally secured to the upper section 8 of the tower about the horizontal axis 17.

The connection of the tower with the rotary platform 4 is provided as follows: the lower section 7 of the tower is pivotally secured about an axis 18 located in the upper position of the framework 6, said axis 18 being located at a predetermined height above the lower end of the tower, which lower end is connected with the winch 14 by a tackle 19. The framework 6 is provided with a further horizontal axis 21 to which is rotatably fitted one of the ends of a connecting rod 22 of which the other end is pivotally secured at 23 on the upper section 8 of the tower. Thus the two sections 7 and 8 of the tower define with said connecting rod 22 and with the framework 6 a four-sided deformable pivotal system the axes of which are shown at 15, 18, 21 and 23.

When the crane is in its collapsed condition, that is in the position illustrated in FIG. 1, said four-sided pivotal system is collapsed, the upper section 8 of the tower resting directly on the lower section 7.

When it is desired to expand the crane, so as to bring it to its operative position, it is sufficient to exert, through the winch 14 and the tackle 19, a tractional action on the lower end of the lower section 7 of the tower, so as to constrain the four-sided system referred to to assume a deformed position, as illustrated in FIG. 3, and at the end of said tractional action exerted on the lower end of the lower section 7, the tower reaches through its expansion its vertical position, illustrated in FIG. 4, the connecting rod 22 playing then the part of a guy and reducing the bending moment of the tower. The two sections 7 and 8 of the tower are then held fast with reference to each other by means of a bolt 24, while a pin 25 holds fast the lower section of the tower on the platform 4.

It should be remarked that the pivotal movement of the jib 10-12 about the pivotal axis 17 connecting it with the tower, which pivotal movement makes said jib pass into a horizontal position during the expansion of the tower so as to be held in said horizontal position when the tower has reached its extended position, is obtained automatically by means of a cable 26 which is anchored on the one hand to the platform 4 and on the other hand, to the upper end of a post 27 carried by the jib, said cable passing over a pulley 31 carried by the inner section 10 of the jib. The post 27 to which are anchored the two guys 28 and 29 carrying the two sections 10 and 12 of the jib may furthermore be folded back over the jib in the direction of the arrow 30 of FIG. 1 when the crane is in its collapsed position with a view to reducing the height of the collapsed crane.

Obviously, my invention is by no means limited to the sole embodiment of the crane extending and collapsing mechanisms, disclosed hereinabove by way of example and it comprises, in contradistinction, all the modifications thereof falling within the scope of the accompanying claims, whatever may be in fact the means provided for increasing the height of the tower such as a telescopic arrangement, the addition of auxiliary sections or the like.

What I claim is:

1. A collapsible tower crane comprising a chassis, a framework carried by said chassis for rotation about an upright axis, a lower tower section pivotally mounted on the framework for vertical swinging movement about a fixed horizontal axis disposed a substantial distance above the lower end of the lower tower section, an upper tower section pivotally connected to the upper end of the lower tower section about a horizontal axis, a con-

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necting rod one end of which is pivotally secured to the framework for vertical swinging movement about a fixed horizontal axis and the other end of which is pivotally secured to the upper tower section about a horizontal axis so that the framework and the connecting rod and the two tower sections form a quadrilateral linkage having two fixed pivots carried by the framework and two vertically swinging pivots carried by the tower sections, and means acting against the lower end of the lower tower section a distance from its fixed horizontal axis to deform a quadrilateral linkage to raise and lower the tower sections.

2. A collapsible tower crane as claimed in claim 1, and a jib mounted for vertical swinging movement about a horizontal axis on the upper end of said upper tower section, and cable means connecting the jib with the framework to swing the jib vertically relative to the upper tower section and to maintain the jib in a horizontal position when the crane is erected.

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3. A collapsible tower crane as claimed in claim 1, and a jib mounted for vertical swinging movement on and relative to said upper tower section, said jib comprising two sections pivotally interconnected for horizontal swinging movement relative to each other about a vertical axis between a collapsed position in which the two jib sections are disposed side by side and an extended position in which the two jib sections are aligned.

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