Oct. 2, 1934. T. N. GARSON 1,975,359

CRANE

Filed Jan. 25, 1932 2 Sheets-Sheet 1

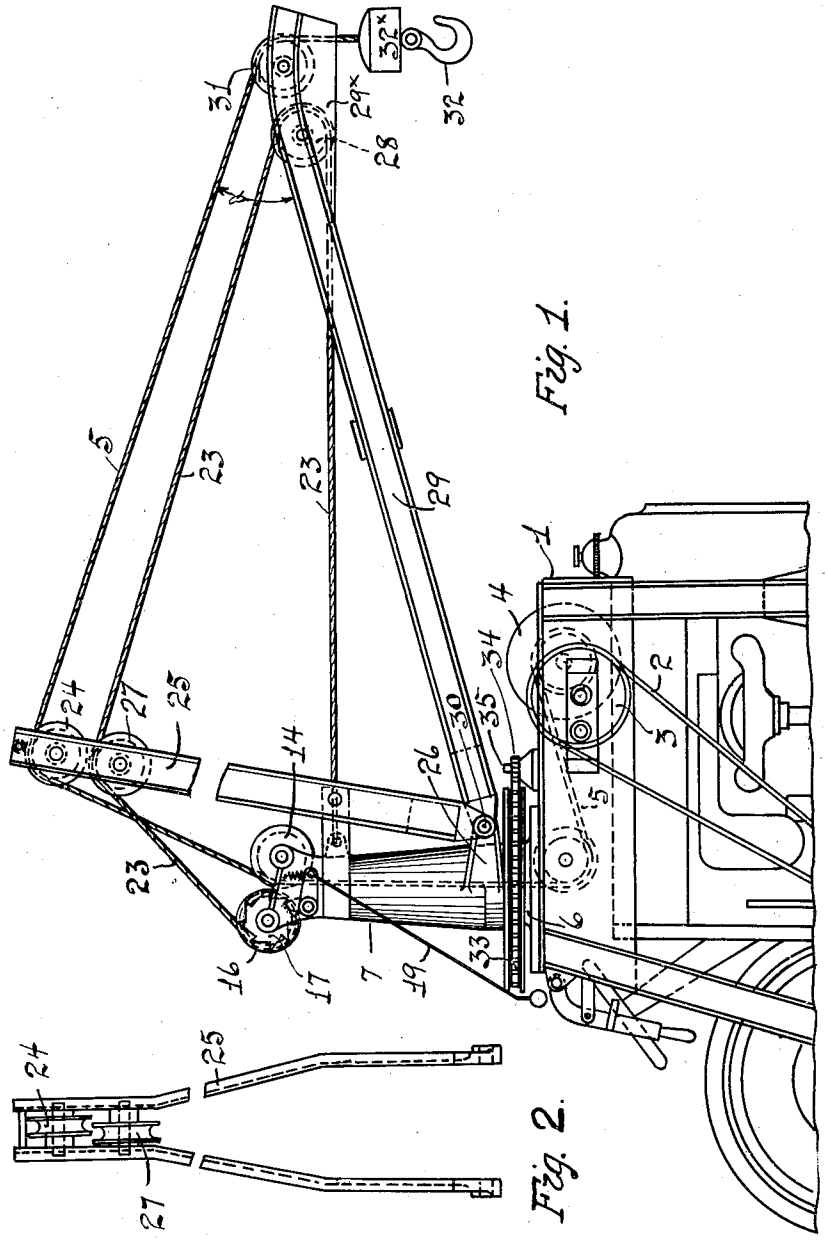


Fig. 1.

Fig. 2.

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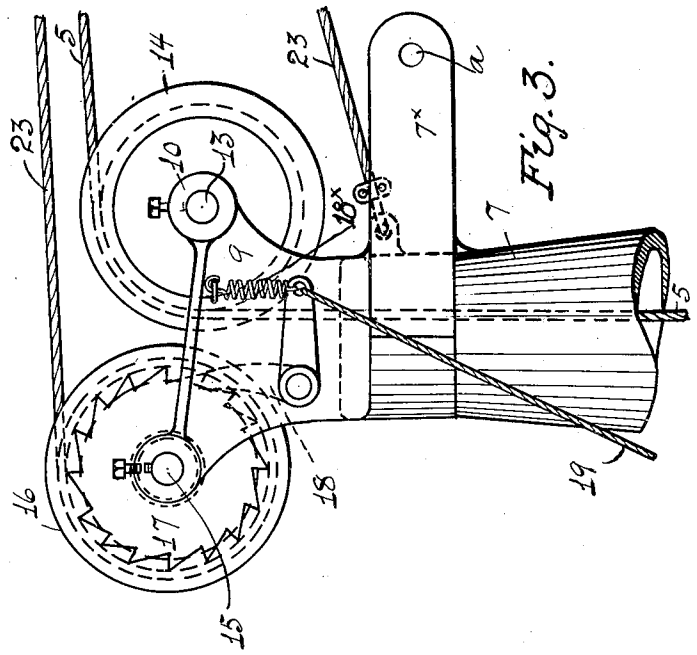


Fig. 3.

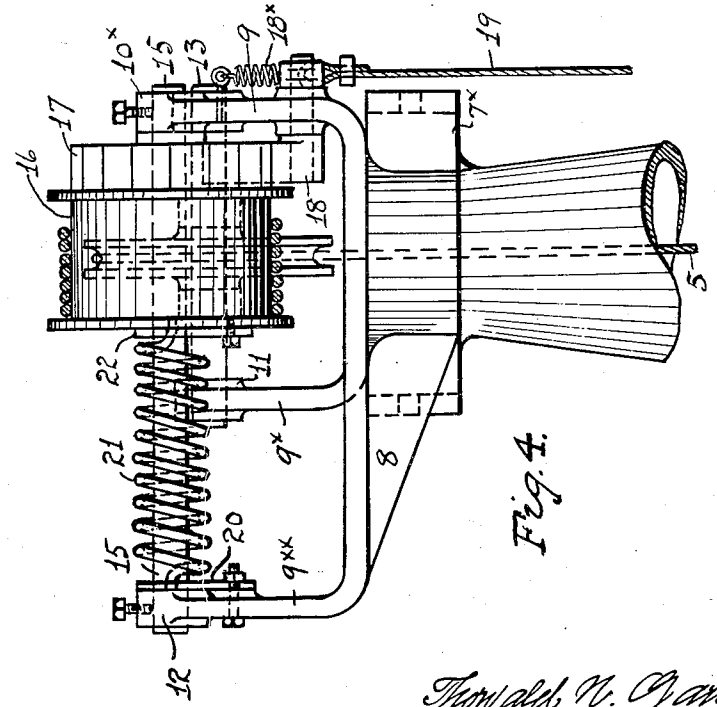


Fig. 4.

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CRANE

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2 Claims. (Cl. 212—59)

This invention has been developed with specific reference to its application to portable cranes of the type particularly adapted for mounting upon a movable structure, as, for example, a tractor. It is capable of application to stationary cranes as well as to portable cranes.

One object of the invention is to provide an auxiliary mast in addition to the primary mast for the purpose of raising the boom and the load simultaneously with ease. In other words, the invention relates particularly to means for so distributing the stresses imposed by the load upon the boom, its fulcrum and the hoisting rope, so that heavier loads may be raised by the boom than would be possible with the low primary mast construction.

Another object is to provide means for retaining the boom in its raised position.

The invention consists further in various details of construction and combinations of elements more particularly explained in connection with the accompanying drawings, which illustrate the embodiments thereof.

The invention will be described with reference to the accompanying drawings, in which

Fig. 1 is a side elevation of an embodiment of the invention.

Fig. 2 is a front elevation, partly broken away, of the auxiliary mast.

Fig. 3 is an enlarged side elevation of the turret at its upper end showing the sheave over which the hoist line is led and also showing the latching means.

Fig. 4 is a rear elevation of the structure shown in Fig. 3.

Referring to Fig. 1 of the drawings, I have shown at 1 a tractor which may be of any suitable construction. Driven by chain 2 from a power connection is a sprocket wheel 3 connected by suitable shaft and carrying connections with a drum 4 which operates the hoist rope 5. The hoist rope passes upwardly through a hollow standard, indicated at 6, which rotatably supports a mast 7, the mast, of course, being hollow and receiving the rope near its upper end as shown in Figs. 3 and 4.

Mounted upon the upper end of the mast, either integrally therewith, or bolted as a separate member, is a bracket 8, having spaced arms 9, 9x and 9xx, arm 9 having a bearing boss 10, arm 9x having a bearing boss 11 and arm 9xx having a bearing boss 12. The bearing bosses 10, 11, receive between them, a shaft 13 carrying a pulley 14 over which hoist rope 5 is led.

The bearing bosses 10x, 12, support between them a shaft 15 upon which is mounted a drum 16 carrying a ratchet wheel 17. Ratchet wheel 17 is engaged by pawl 18 operated by a pull-rope 19.

Affixed to arm 9xx by securing plate 20 and encircling shaft 15, is a coil spring 21, the opposite end of the spring being connected by plate 22 with drum 16. Wound upon drum 16 is a latching rope 23.

After leaving the upper end of mast 7 and passing over pulley 14, hoist rope 5 is led over a pulley 24 carried at the upper end of an auxiliary mast 25 which is pivoted to a bracket arm 26 projecting forwardly of the mast 7.

On the auxiliary mast below pulley 24 is a pulley 27 which receives latching rope 23, the rope being led over pulley 27 and thence over a pulley 28 carried by a boom 29, the latter being pivotally supported at 30 to bracket 26 of the mast.

After being led over pulley 28, latching rope 23 is led back to the mast and is secured to the latter as shown more particularly in Fig. 3. The hoist rope 5 is led over a sheave 31 at the end of the boom and is connected to any suitable means such as the hook 32 for engaging the load.

It will be noted from the above description that the mast 7 provides a low mast for the crane and normally the latching rope and hoist rope may be directly led from the mast to the sheaves 28, 31, at the end of the boom 29. When, however, it is desired to raise heavier loads and the boom simultaneously, the hoist and latching ropes are led as shown in Fig. 1, and the auxiliary mast 25 will be maintained in elevated position, as by means of securing the mast to a forwardly projecting arm 7x of the mast 7. For example, a bolt may be passed through a suitable aperture in the auxiliary mast 25 and then passed through aperture a in arm 7x. The auxiliary mast increases the angle b of the hoist rope 5 relatively to the fulcrum of the main boom 29.

In the movement of the tractor with the crane device mounted thereon, should low clearance be necessary, auxiliary mast 25 may be lowered to a position on top of the boom 29.

Assuming the auxiliary mast to be in the position shown in Fig. 1 with the hoist rope 5 led over pulley 24 and thence over pulley 14 and through the mast to the hoist drum 4, and a latching rope to be led over pulley 27 and wound upon drum 16, actuation of the hoist drum 4 will elevate the load carried by hook 32. When it is desired to swing the load inwardly toward the tractor, the aforesaid movement of the hoist rope

may be continued until contact block 32x above hook 32 engages member 29x of the boom 29 and raises the boom to such position that the load is suspended above the position to which it is to be lowered. To this end the hoist rope 5 is utilized both to hoist and lower the load and to control the elevated position of the boom. During such upward movement of boom 29, spring 21 will act upon latching drum 16 to rotate the same counter-clockwise while pawl 18 will ride over the teeth of the ratchet wheel 17. When the hoist drum is reversed to lower the load, pawl 18 will hold ratchet wheel 17 and drum 16 in position so that drum 16 will hold boom 29 in elevated position. Pawl 18 is normally held in engagement with ratchet 17 by a spring 18x. If, at any time it is desired to lower the boom 29, contact block 32x is held in engagement with member 29x of the boom 29, until pawl 18 is operated to release the ratchet wheel.

Spring 21 may be so related to the boom 29 that when the boom is in its maximum upward position, the spring will have the minimum effect upon the drum 16 to move the same counter-clockwise, and therefore when the boom is lowered, latching rope 23 will rotate drum 16, in clockwise rotation, to "wind" the spring with constantly increasing tortional effect. Inasmuch as spring 21 is disposed exterior of the drum in case of breakage, a new spring may be placed in position without disturbing the drum since shaft 15 may be moved endwise in a direction toward the drum, the old spring slipped off the left-hand end of the shaft (Fig. 4) and a new spring readily placed in position.

It will be noted that one end of latching rope 23 is anchored to the mast 7 through the medium of an apertured lug 7x, Fig. 3. The mast 7 is, as described above, supported by the standard 6, only the base portion of the standard being illustrated in the drawings (Fig. 1). In practice, it may be desired to rotate the mast 7 and therefore the mast in the embodiment shown is provided at its base with a sprocket wheel 33 and a sprocket wheel 34 on a shaft 35, which may be connected by any suitable means with the source of power for rotation of the mast at will, this forming no part of the present invention. When the crane is so designed that the member 7 is stationary it will, of course, constitute the "primary mast", because the member 6 will be rendered unnecessary.

Having described my invention, what I claim and desire to secure by Letters Patent, is as follows:—

1. In a crane, a primary mast, a boom pivotally mounted relatively to the primary mast, a hoist rope, a drum and operating means therefor, a guide pulley carried at the upper end of the primary mast and receiving the hoist rope, an auxiliary mast rising substantially above the primary mast having a pivotal connection to the latter, a guide pulley carried at the end of the auxiliary mast and receiving the hoist rope and means for holding the auxiliary mast in fixed position, said means being applied to the primary mast whereby the hoist rope is guided by the auxiliary mast pulley in all positions of the boom.

2. In a crane, a primary mast, a boom pivotally mounted relatively to the primary mast, a hoist rope, a drum and operating means therefor, a guide pulley carried at the upper end of the primary mast and receiving the hoist rope, an auxiliary mast rising substantially above the primary mast, a guide pulley carried at the end of the auxiliary mast and receiving the hoist rope, means for holding the auxiliary mast in fixed position whereby the hoist rope is guided by the auxiliary mast pulley in all positions of the boom, a latching rope pulley carried at the upper end of the primary mast, a latching rope pulley carried near the upper end of the auxiliary mast and a latching rope connected to the boom and led over said latching rope pulleys.

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