

No. 619,100.

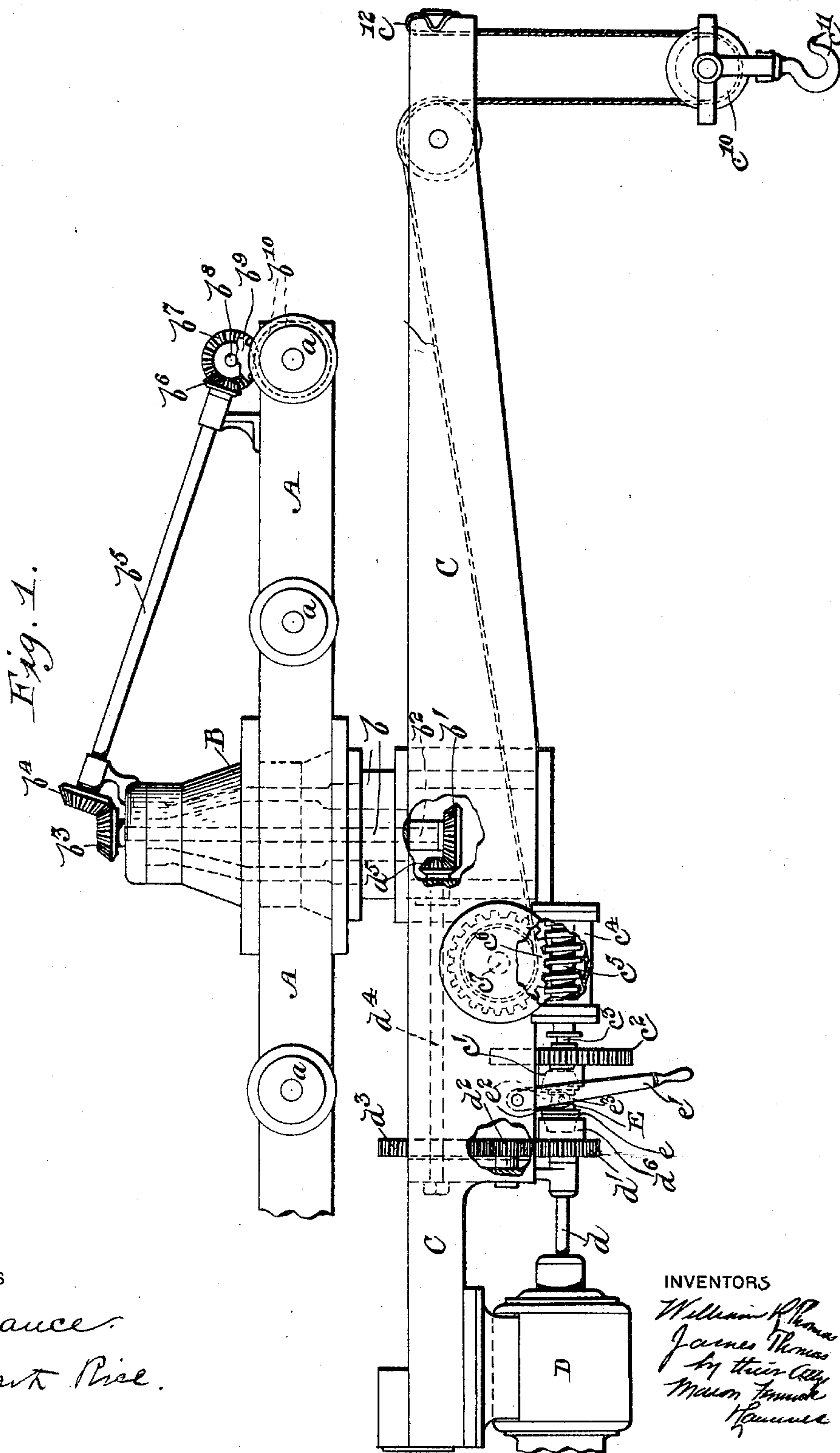
Patented Feb. 7, 1899.

W. R. & J. THOMAS.
ELECTRIC CRANE.

(Application filed June 6, 1898.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES

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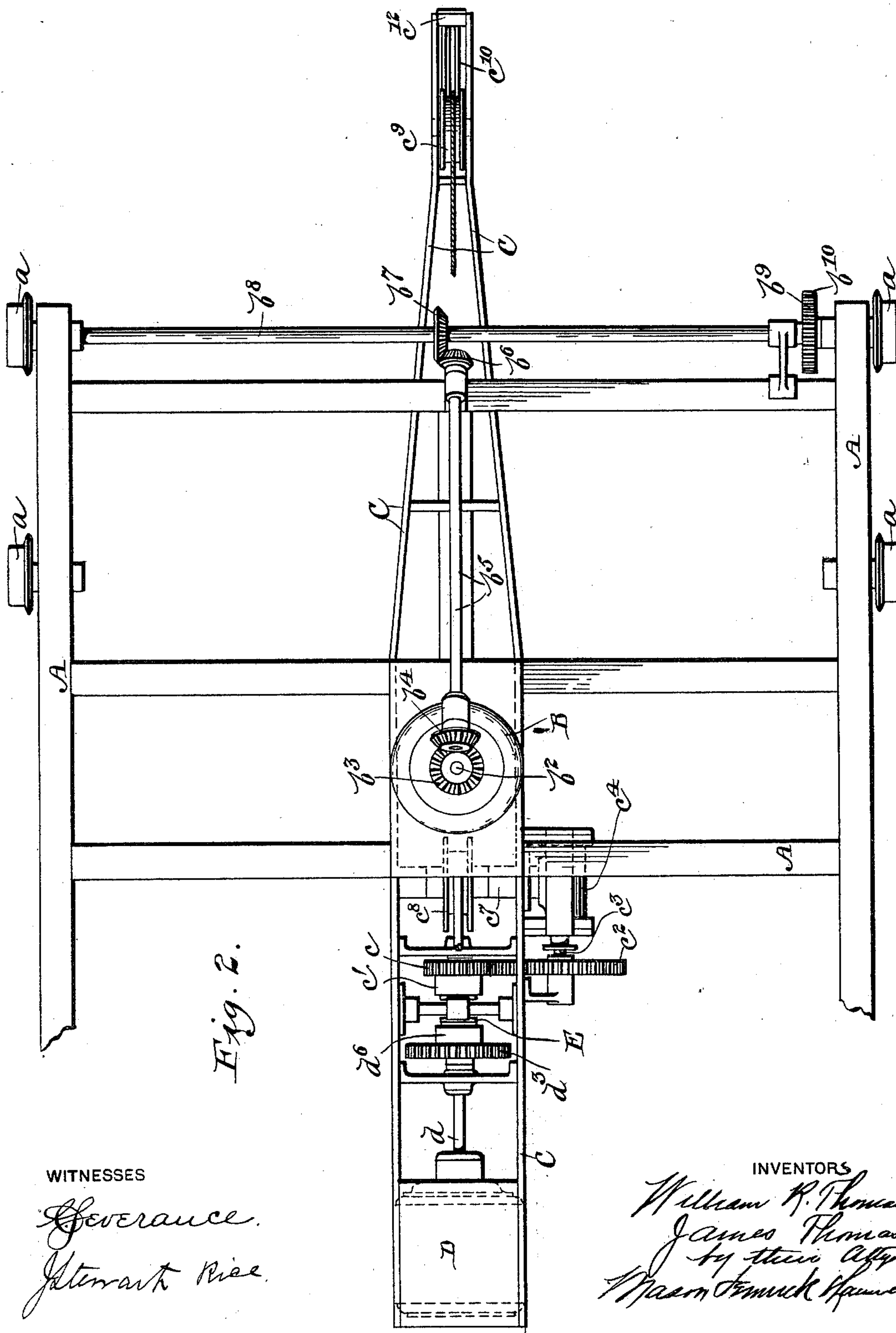
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(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

WILLIAM R. THOMAS AND JAMES THOMAS, OF CATASAUQUA,
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ELECTRIC CRANE.

SPECIFICATION forming part of Letters Patent No. 619,100, dated February 7, 1899.

Application filed June 6, 1898. Serial No. 682,736. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM R. THOMAS and JAMES THOMAS, citizens of the United States, residing at Catasauqua, in the county of Lehigh and State of Pennsylvania, have invented certain new and useful Improvements in Electric Cranes; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in traveling boom-cranes, and particularly to that class of cranes which are adapted to be operated by electric power.

It consists in mounting upon a suitable truck a boom, said boom being arranged below the truck, an electric motor carried by the said boom, and means for connecting the motor with the truck-wheels for moving it back and forth.

It also consists in providing a crane with a truck and suspending a boom upon the said truck, an electric motor mounted upon the said boom, and means for connecting the motor with a winding-drum for raising or lowering a load.

It also consists in certain other novel constructions, combinations, and arrangements of parts, as will be hereinafter more fully described and claimed.

In the accompanying drawings, Figure 1 represents a side elevation of an electric traveling boom-crane constructed in accordance with our invention, parts being broken away; and Fig. 2 represents a top plan view of the same.

A in the drawings represents a truck or car adapted to support and carry the crane; B, a spindle-shell mounted thereon; C, a boom suspended in the spindle-shell, and D an electric motor mounted upon the said boom.

It is desirable in providing a traveling boom-crane to provide the same with means for moving the whole crane back and forth upon any suitable structure or track and also to provide means which shall effect the raising and lowering of the loads to be carried. In constructing such a crane we have aimed to make the parts simple and yet effective, and yet within easy control of an operator.

Our crane is particularly adapted for operation by means of electric power, although, of course, other power might be substituted in place of it without departing from the spirit of our invention.

As shown in the drawings, the truck or car A is constructed of suitable beams, preferably I-beams, bolted together and provided with wheels, as *a*, the said wheels being preferably flanged to permit of their engaging a track mounted upon any suitable structure. (Not shown.) To the central transverse beams of the truck A the spindle-shell B is secured, the said shell extending above and below the truck A. A spindle, as *b*, is mounted in the said shell and carries at its lower end the boom C. The spindle may be mounted upon any suitable bearings within the shell B, but is preferably mounted upon ball-bearings, so that the boom can very easily be swung upon its pivotal point to any desired angle. The boom C extends upon either side of the spindle *b* and upon one end carries a motor. As shown in the drawings, it is preferably an electric motor, as D, which may be of any suitable or desired construction and connected with any source of electric power. The armature of the motor D is adapted to revolve a shaft, as *d*, which extends toward the pivotal point of the boom C. The shaft *d* finds suitable bearings upon the under side of the boom C and carries a gear-wheel, as *d'*, which meshes with an intermediate pinion or gear-wheel *d''*, the said intermediate wheel meshing with and communicating motion to a larger gear-wheel *d'''*. The gear-wheels *d'*, *d''*, and *d'''* are preferably arranged with their axes in the same vertical plane. The gear-wheel *d'* is made to run loosely upon the shaft *d*. The gear-wheel *d'''* is fixed to a horizontal shaft *d''''*, which extends toward the spindle *b* and carries at its inner end a bevel-gear *d''''''*. The bevel-gear *d''''''* meshes with a corresponding bevel-gear *b'*, carried by the lower end of a vertical shaft *b''*, which extends upwardly through the spindle *b*. The upper end of the shaft *b''* carries another bevel-gear, as *b'''*, meshing with a corresponding bevel-gear *b''''*, secured to the upper end of an inclined shaft *b''''''*. The shaft *b''''''* extends toward one end of the truck or car A, where it finds a suitable bearing, and it is

also provided with a bevel-gear upon its outer end, as at b^6 . The bevel-gear b^6 meshes with a corresponding bevel-gear b^7 , mounted upon a transverse horizontal shaft b^8 . The shaft b^8 is mounted in bearings upon the truck or car A and carries a pinion, as b^9 , which meshes with a gear-wheel b^{10} , secured upon the axle of one pair of wheels a of the car A. Through this train of gearing it will be seen that motion may be imparted to the car or truck A to move it back and forth upon any suitable way or track. In order to throw this gearing into engagement with the shaft d and the motor operating the same, a friction-clutch, as E, is mounted upon the shaft d . One portion of the clutch E, as at e , is adapted to extend into and engage a corresponding clutch member, as d^6 , formed upon the gear-wheel d' . The clutch E is of course rigidly secured upon the shaft d in any suitable manner, as by means of a spline or feather, so as to turn therewith and yet is capable of longitudinal movement upon the shaft. When the clutch is brought into engagement with the clutch member d^6 of the gear-wheel d' , the motion of the motor will be communicated through the gearing just described to the wheels of the truck A, and when the motor is running in one direction it will move the car toward one end of the track; but when the motor is reversed the car of course will be moved in the opposite direction.

The shaft d extends beyond the clutch E and supports a gear-wheel, as c , which runs loosely thereon. The gear-wheel c is also provided with a clutch member, as c' , which is adapted to engage a corresponding clutch member formed upon the clutch proper, E. It will thus be seen that the clutch E is a double clutch and is adapted to throw the motive power into engagement with either the gear-wheel d' or the gear-wheel c , according as it is moved upon the shaft d . In order to impart the necessary reciprocating movement to the clutch E, a lever, as e' , is pivoted to the frame of the boom at one end and provided with an arm, as e^2 , which engages an annular groove, as e^3 , formed in the central portion of the clutch E. The outer free end of the lever e' is provided with a suitable handle, so that when the operator takes hold of the lever he may readily move the clutch back and forth, according to the part of the crane he desires to operate. The gear-wheel c meshes with a larger gear-wheel c^2 , which is mounted upon a counter-shaft, as c^3 , said shaft preferably having bearings upon one side of the boom C. The shaft c^3 extends into a suitable casing, as c^4 , in which is mounted a worm, as c^5 . The worm is adapted to engage a worm-wheel, as c^6 , which is secured upon a transverse shaft, as c^7 , mounted in the boom C. The shaft c^7 extends transversely across the boom from side to side and carries, preferably at its central point, a winding-drum, as c^8 . The frame of the boom C is preferably tapered toward its lifting end and carries a

pulley, as c^9 , over which a lifting-rope may be drawn by means of the winding-drum c^8 . One end of the rope is secured to the said drum, and the other end extends over pulleys c^9 and through the pulley or block c^{10} , which carries a lifting-hook, as c^{11} . The other end of the rope or cable is rigidly secured to the extreme end of the boom, as at c^{12} . It will be apparent that by winding or unwinding the drum c^8 the lifting-hook c^{11} and the load carried thereby will be hoisted or lowered in the usual manner. When it is desired to raise or lower a load, the clutch E is moved so as to engage the friction member c' upon the gear-wheel c , whereby the shaft d will be brought into engagement with the load-lifting mechanism just described. By causing the motor to revolve in one direction the load will of course be hoisted, and by reversing the motor it may be lowered again.

It will be apparent that the details of construction of the various parts may be varied without departing from the spirit of our invention. It will be evident from the above description that our improved crane is very simple in its parts and that it can be made of any required strength. It is also made in such a way that it can be quickly controlled by the operator either to move the car back and forth upon its track or to hoist or lower the load upon the hook c^{11} . Of course, as stated above, it will be seen that the boom is capable of a swinging movement upon the spindle b , so that the crane can be moved from side to side to reach and transfer a load from any given point to another.

It will be evident that the arrangement of the shaft and gearing for connecting the motor with the wheels of the car is such that the swinging of the boom upon its pivotal point will not interfere in the least with the said gearing, but it will accommodate itself to any movement of the boom.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a boom-crane, the combination with a supporting-car, of a boom mounted thereon, a power-shaft carried by the said boom, two counter-shafts mounted on said boom, means connecting one counter-shaft with mechanism for moving the car, means connecting the other counter-shaft with hoisting mechanism, loose gears mounted upon the said power-shaft, means connecting one loose gear with one counter-shaft, and means connecting the other loose gear with the other counter-shaft, the said loose gears having frictional cups upon their adjacent faces, a double clutch splined to the said power-shaft between the loose gears and means for reciprocating it so as to bring it into engagement with the friction-cup on one or the other loose gear according as it may be desired to actuate the car-propelling mechanism or the hoisting mechanism, substantially as described.

2. In a boom-crane, the combination with a

car having suitable wheels for carrying the same, of a spindle-shell mounted thereon, a spindle having suitable bearings in the said shell and supporting a boom beneath the said car, a main power-shaft carried by said boom, a motor attached to one end thereof, a gear-wheel connecting the said shaft with a counter-shaft upon the boom, a bevel-gearing connecting the counter-shaft with a vertical shaft extending through the spindle and bevel-gearing connecting the said vertical shaft with the wheels of the car for moving it back and forth, substantially as described.

3. In a boom-crane, the combination with a traveling car, of a boom pivotally suspended therefrom, a main power-shaft carried by said boom, a motor secured to said shaft at one

end, gearing connecting the other end of said shaft with a counter-shaft upon the boom, a worm carried by the said counter-shaft, a worm-wheel adapted to be operated thereby, the said worm-wheel operating a shaft carrying a winding-drum, the construction being such that the motor may be used to operate the winding-drum for winding or unwinding a lifting-cable secured to the boom, substantially as described.

In testimony whereof we hereunto affix our signatures in presence of two witnesses.

WILLIAM R. THOMAS.

JAMES THOMAS.

Witnesses:

R. T. DAVIES,
PATRICK McNALLY.