

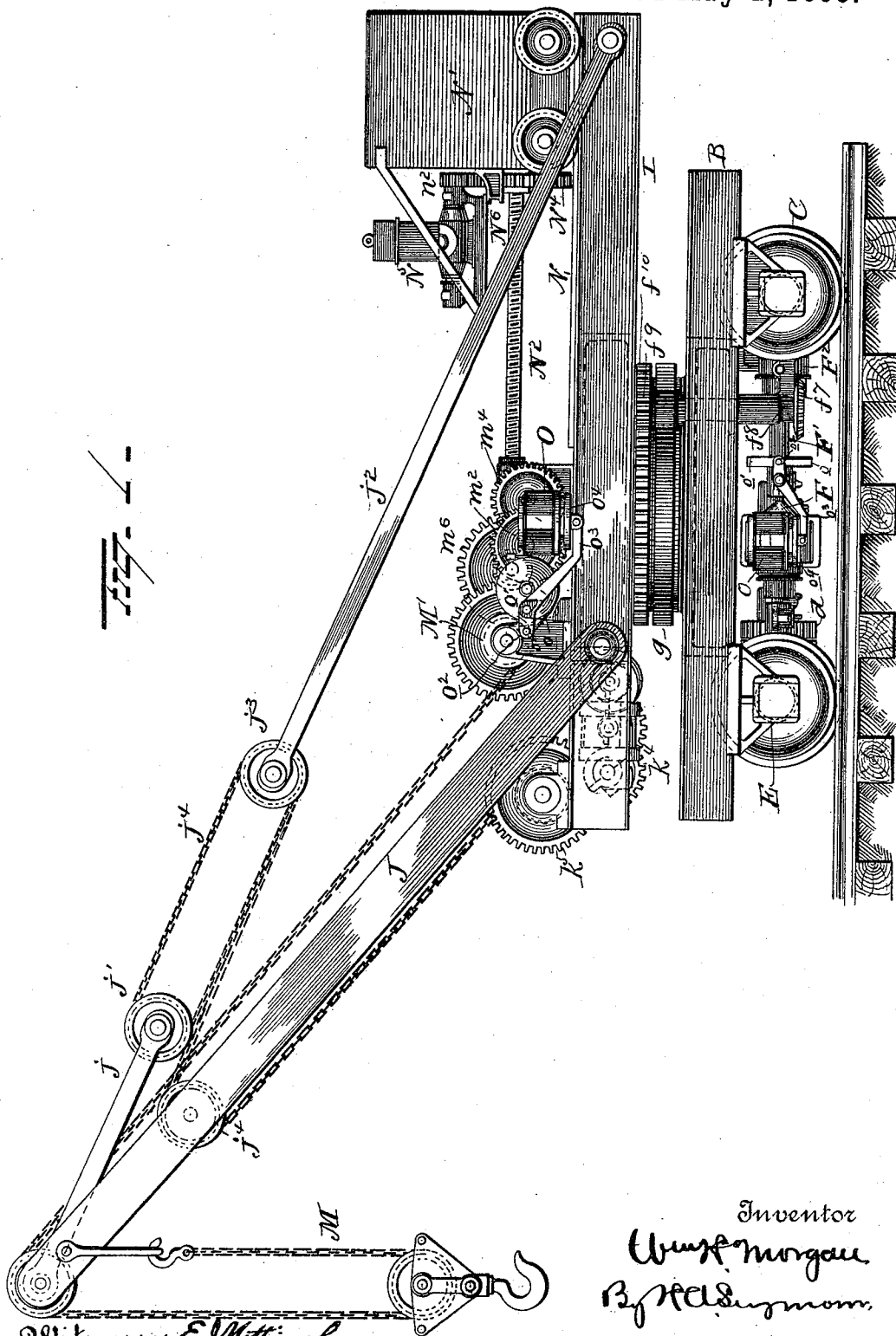
(No Model.)

5 Sheets—Sheet 1.

W. H. MORGAN.
LOCOMOTIVE CRANE.

No. 496,428.

Patented May 2, 1893.



Witnesses *E. Nottingham*
G. F. Downing

Inventor
W. H. Morgan
R. H. Symons

Attorney

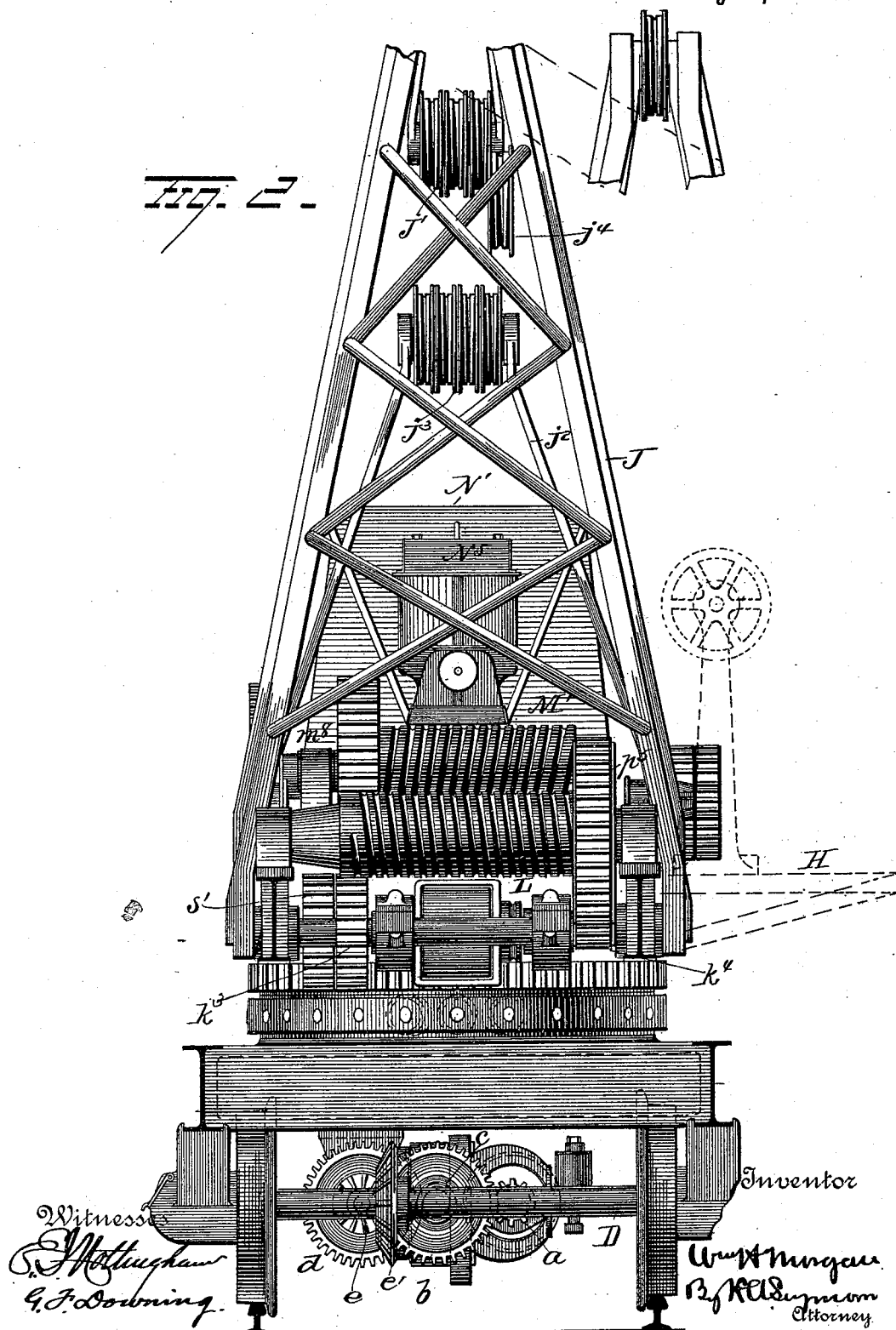
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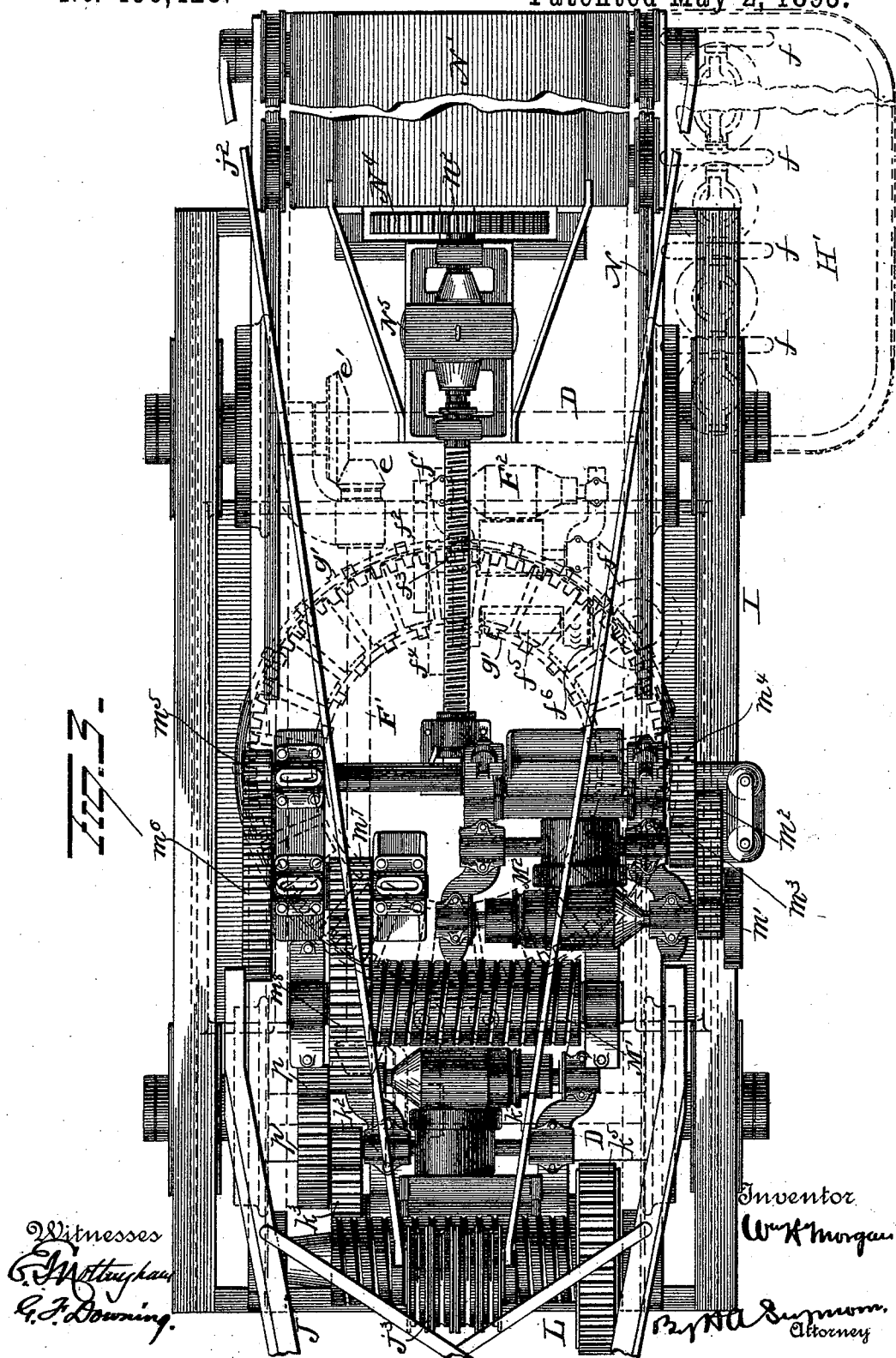
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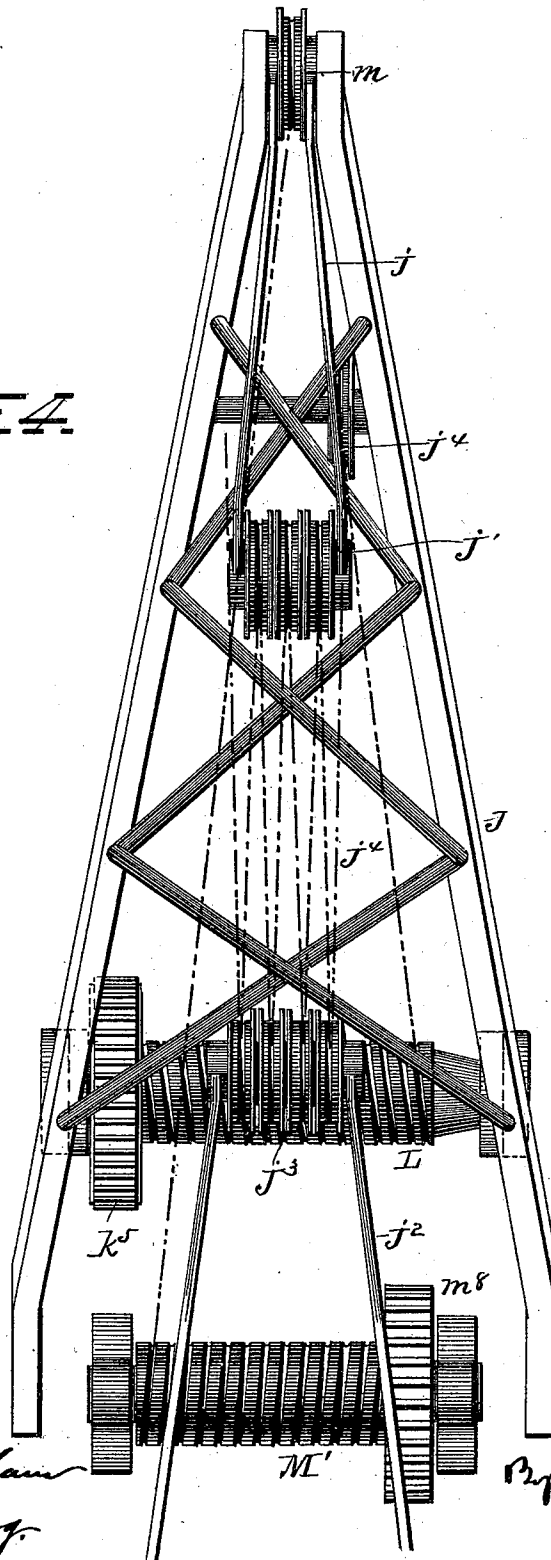
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Fig. 4.



Witnesses
G. J. Nottingham
G. F. Downing

Inventor
W. H. Morgan
By *A. L. Sumner*
Attorney

(No Model.)

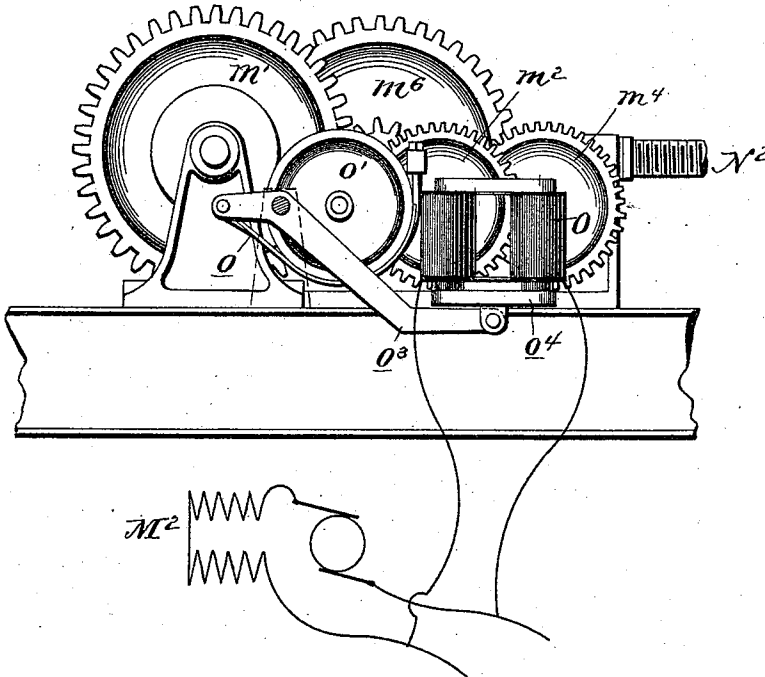
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Fig. 5.



Witnesses
E. Nottingham
G. F. Downing

Inventor
W. H. Morgan
By *H. A. Seymour*
Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM HENRY MORGAN, OF ALLIANCE, OHIO, ASSIGNOR OF THREE-FOURTHS TO THOMAS R. MORGAN, SR., THOMAS R. MORGAN, JR., AND JOHN R. MORGAN, OF SAME PLACE.

LOCOMOTIVE-CRANE.

SPECIFICATION forming part of Letters Patent No. 496,428, dated May 2, 1893.

Application filed November 25, 1891. Serial No. 413,048. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY MORGAN, of Alliance, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Locomotive-Cranes; and I 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.

My invention relates to an improvement in cranes, the object being to provide a portable locomotive crane in which all the movable parts are actuated by electricity.

A further object is to provide the crane with a movable counterpoise and mechanism for moving the same, whereby the counterpoise can be moved to a position to balance the load carried by the jib, thereby requiring less material in the parts connecting the body of crane with the truck and overcoming all possibility of upsetting.

With these ends in view my invention consists in the parts and combinations of parts as will be more fully described and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation of a crane embodying my invention. Fig. 2 is an end view. Fig. 3 is a plan view, and Fig. 4 a view of the jib, and Fig. 5 is a view showing one of the brakes thereon, and also showing a diagrammatic view of the motor.

A represents a trackway on which the truck B, moves. While a trackway is not essential it is desirable, and hence in the several illustrations I have shown the truck mounted on four flanged wheels C, which latter are secured to the axles D and the latter mounted at their ends in boxes E.

Located under the body of the truck is an electric motor F, the armature shaft of which carries a small pinion *a* which latter meshes with a larger pinion *b* (see Fig. 2) having a smaller pinion *c* (shown in dotted lines in Fig. 2) fast therewith. This pinion *c* meshes with a pinion *d* fast on the shaft F' running lengthwise the truck, and the said shaft is provided at its ends with bevel pinions *e* which latter engage the larger bevel pinions

e' fast on the axles of the truck. This motor is for actuating the travel of the crane and it, and the other motors to be hereinafter referred to, are controlled by an attendant located on the platform or cage H (see dotted lines Fig. 3) within easy reach of the hand wheels *f* which latter actuate the switches and rheostats not shown.

Located under the truck, is a second motor F² shown in full lines in Fig. 1 and in dotted lines in Fig. 3. This motor is provided on its armatureshaft with a small pinion *f'* which latter actuates the larger pinion *f*² carrying the smaller pinion *f*³. The latter pinion gears with large pinion *f*⁴ on end of shaft *f*⁵ and the latter is provided on its opposite end with a bevel pinion *f*⁶ meshing with the bevel pinion *f*⁷ on the lower end of vertical shaft *f*⁸. This shaft *f*⁸ is mounted in bearings carried by the truck, and is provided at its upper end with a pinion *f*⁹ which latter engages the toothed ring *f*¹⁰ carried by the platform I, for turning said platform in any direction. The platform I is supported near its center of gravity on a turn table consisting of a series of conical rollers journaled at their ends to concentric bands *g g'*, (see dotted lines Fig. 3) the rollers resting on a suitable bed plate carried by the truck and supporting the platform. The platform I is preferably made of angle iron, with a flooring or not as desired, and provided at one end with a jib J which latter as shown in Fig. 4 is preferably V shaped and as shown in Fig. 1 is pivoted at its lower end to the side girders of the platform I. The lower ends of the jib are set well back toward the turn table, and the jib is provided at its upper end with a link *j* carrying pulleys *j'*, while the platform I is provided with longer links *j*² secured near the extreme ends of the side girders, the said longer links carrying the pulleys *j*³. A chain *j*⁴ is attached at one end to a yoke or link or other device carried by the links *j*² and passes from thence around one pulley *j'* thence around a pulley *j*³ and then back and around a second pulley *j'* and down to another pulley *j*³ and so on around all the pulleys *j'* and *j*³. The chain is then passed over a pulley *j*⁴ carried by the jib and from thence down to winding drum

L. This drum is mounted on platform I and is actuated by the motor K, through the pinions k , k' , k^2 , k^3 , k^4 and k^5 ; the pinions k' and k^2 being rigidly secured together and the pinions k^3 and k^4 being fast to the opposite ends of a shaft while the large pinion k^5 is fast to the winding drum L. By means of the motor K, the chain and winding drum, the jib can be elevated or lowered as necessity demands. It is evident that the jib can be fixed or stationary, and with such a construction the motor K and the chain for elevating and lowering same would be dispensed with. The jib is provided on its extreme end with a pulley m over which the hoisting chain M passes. This chain is secured at its lower end to the drum M' which latter is actuated by the electric motor M² through the pinions m' , m^2 , m^3 , m^4 , m^5 , m^6 , m^7 and m^8 . The pinion m' is fast on the armature shaft and meshes with the larger pinion m^2 , carrying a pinion m^3 ; the pinion m^3 drives a larger pinion m^4 fast on one end of shaft m^9 and in turn drives the smaller pinion m^5 fast on the opposite end of said shaft and the latter pinion m^5 meshing with larger pinion m^6 actuates the shaft carrying pinion m^7 and the latter in turn drives the large pinion m^8 fast on the winding drum M'.

The platform I is provided at its rear end with parallel rails N on which the weight N' is movably mounted, the said weight being preferably provided with grooved or flanged wheels as shown for preventing lateral displacement of the weight.

N² is a screw secured at its forward end against rotation, and extending rearwardly toward the weight N' the latter having an opening therein for the entrance of the screw. N⁴ is a pinion secured to a nut, the latter being swiveled to the weight and threaded internally to correspond with the threads on the screw N². When the pinion N⁴ is turned it follows that the nut carried thereby is also turned and necessarily moves lengthwise the screw, carrying with it the weight N'. The pinion N⁴ is actuated by the pinion n^2 on the armature shaft of the electric motor N⁵ the latter being seated on a shelf N⁶ carried by the weight N'. Thus it will be seen, that by passing a current through the motor N⁵, the revolving armature imparts motion to the pinion N⁴ and the latter in turn to the nut thereby causing the weight to be moved toward or away from the rear end of the platform I. By employing a movable counter poise or weight, and providing means whereby the position of the weight can be readily and quickly changed, the crane can at all times be kept nicely balanced, so that it can be swung easily, and is protected against any chances of upsetting. Again, by connecting the weight to the screw, so that the weight is held against movement either toward or away from the jib, except when the pinion N⁴ is turned, there is no chance of the weight sliding or changing its

position should the crane accidentally tilt so as to give the rails a slight inclination.

While the movable weight and the mechanism for moving same is desirable, and probably preferable, yet I do not limit the application of the other features of the device to a crane having a movable counterpoise, as it may be desirable in some cases where the objects to be lifted are practically uniform in weight, to have the weight fixed to the platform.

In connection with the motor for actuating the longitudinal travel of the crane, and the motor for hoisting the load, I have provided gravity brakes held out of operation when the motors driving the said parts are in operation, by electro magnets included in said motor circuits, and energized by the current flowing through same; the construction is such that as soon as the current is broken by accident or design, the magnets becoming de-energized immediately release their respective brakes so that the latter acting by gravity clutches and hold the rotating parts against movement and thereby stops the travel of the crane, or if it be the brake on the hoisting mechanism, prevents any load then sustained by said hoisting mechanism from falling.

The brakes for sustaining the load and stopping the travel of the crane are both shown in Fig. 1, and as they are both constructed and operate alike, a description of the one for braking the hoisting drum will suffice for both. The same reference letters however are employed on the corresponding parts of both brakes. This brake consists of a flexible strap o fastened at one end to a bracket or other fixed structure and passes under the disk or brake wheel o' fast on the longitudinal shaft which drives both axles, the other end of said strap being secured to the short arm o^2 of lever o^3 pivoted to the motor frame or other fixed part of the structure.

O is an electro magnet consisting of two solenoids yoked together and provided with movable cores joined by a yoke or armature o^4 which necessarily moves with the said cores. The lever o^3 has its long arm jointed to the center of the armature by a sliding pivotal connection. The solenoids are included in the circuit of the motor actuating the axles, so that when said motor is in operation, the whole or part of the current passes through the solenoids and energizing them, causes them to draw up the armature, thereby moving the lever on its pivot and causing the brake strap to fall away from the brake wheel and offer no resistance to the rotation of the latter. When the circuit through the motor is broken, purposely or otherwise, the solenoids will be de-energized and allow the armature to drop away from them by its own weight; this movement of the armature elevates the short arm of the lever and forces the strap solidly against the brake wheel. The weight of the cores, armatures and long arm of the lever are suffi-

cient to apply the brake strap with a force sufficient to prevent any rotation of the shaft which actuates the axle, or sufficient to sustain any load that can be hoisted by the crane, so that when the current is cut-off the crane is immediately stopped, or the descent of the load checked as the case may be. In the brake for sustaining the load, the brake strap passes over a brake wheel fast on the armature shaft and in this respect differs from the arrangement of parts above described. These brakes can be applied to the other motors of the crane if so desired.

The operator's platform is as shown in dotted lines in Fig. 3 located near the rear end and to one side of the platform H, and within easy reach of the platform, are located several standards (one for each motor) carrying mechanism for actuating the switches and rheostats. The current can be supplied from an overhead wire or wires by any of the well known forms of trolleys now in use, or it can be taken from rails or underground conduits. The wiring, rheostats and manner of collecting the current form no part of my present invention and are not shown or described.

Instead of having the screw stationary as above described the screw can be movable and be actuated by a pinion fast on same.

It is evident that many slight changes might be resorted to in the relative arrangement of parts without departing from the spirit and scope of my invention and hence I would have it understood that I do not confine myself strictly to the exact construction of parts herein described, but,

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

1. In a jib crane, the combination with a truck mounted on wheels, a movable platform on the truck, a jib, and hoisting mechanism, of a movable counterpoise on the platform and a motor carried by said counterpoise for moving the latter, substantially as set forth.

2. In a jib crane the combination with a truck mounted on wheels, and a pivoted platform on said truck, of a pivoted jib, an electric motor for changing the inclination of the jib, a counterpoise adapted to be moved toward and away from the jib and an electric motor carried by said counterpoise for moving same.

3. In a jib crane, the combination with a truck mounted on wheels, a horizontally swinging platform on said truck and hoisting devices carried by said platform, of a trackway on said platform, a movable counterpoise thereon, and a motor carried by said counterpoise for moving same.

4. The combination with a truck mounted on wheels, a platform pivotally mounted on said truck, and hoisting mechanism on the platform, of a stationary screw, a movable

counterpoise, a nut carried by the counterpoise and engaging the screw and means for turning said nut to move the counterpoise, substantially as set forth.

5. The combination with a truck mounted on wheels, a platform loosely supported on the truck and adapted to turn thereon and hoisting mechanism, of a stationary screw a movable counterpoise, a device connecting said screw and counterpoise, and an electric motor for moving said device, substantially as set forth.

6. In a locomotive crane, the combination with a truck an electric motor and gearing for driving same, a platform mounted to turn horizontally on said truck, and an electric motor and gearing for turning said platform, of a gravity brake for the driving mechanism of the truck and an electro magnet in the circuit of said truck driving motor adapted to act on said brake and hold it out of operation when the motor circuit is closed, substantially as set forth.

7. In a locomotive crane, the combination with a truck mounted on wheels, of a platform pivoted to the truck and provided with a jib and hoisting mechanism, an electric motor for actuating the hoisting mechanism, a gravity brake for the hoisting mechanism an electro magnet in the motor circuit acting on the brake to hold it out of operation when the motor circuit is closed, and an electric motor and gearing carried by the truck for turning the platform.

8. In a locomotive crane the combination with a truck, a platform loosely mounted so as to turn thereon, a jib hoisting mechanism, an electric motor for driving the truck and an independent electric motor for actuating the hoisting mechanism, of independent gravity brakes for the truck and hoisting mechanism, and an electro magnet for each brake, the said magnets being in circuit with their respective motors and acting on the brakes to hold them out of operation when their respective motor circuits are closed.

9. The combination with a truck, a turn table, a platform on the turn table, an adjustable jib hoisting mechanism, and a movable counterpoise, of an electric motor for driving the truck, an electric motor for changing the position of the jib, an electric motor for actuating the hoisting mechanism and an electric motor mounted on the counterpoise for shifting the same, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM HENRY MORGAN.

Witnesses:

F. E. DUSSEL,
H. W. HARRIS.