No. 854,837. PATENTED MAY 28, 1907.

D. O. PAIGE.

CRANE.

APPLICATION FILED FEB. 24, 1906.

4 SHEETS—SHEET 1.

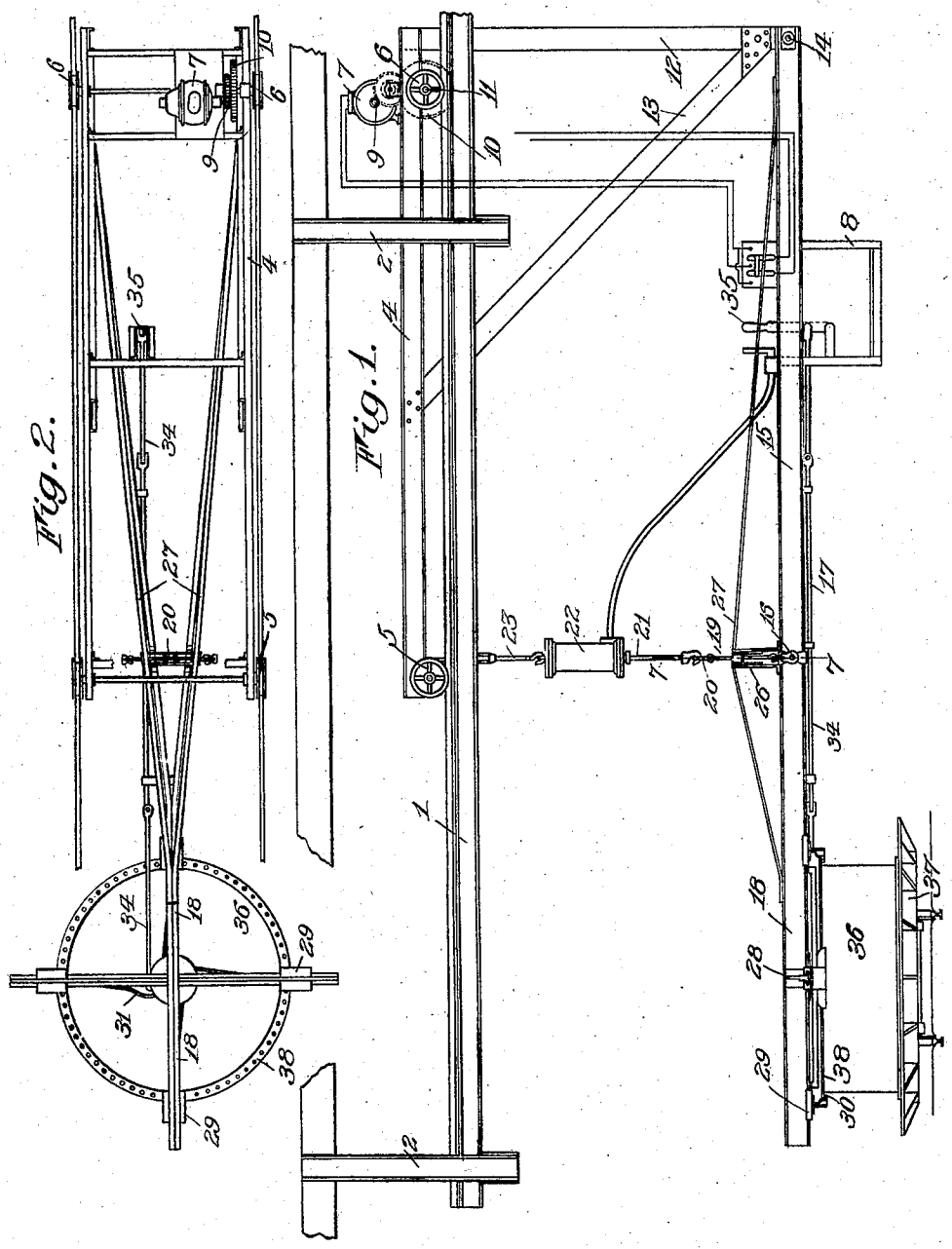


Fig. 2.

Fig. 1.

Witnesses

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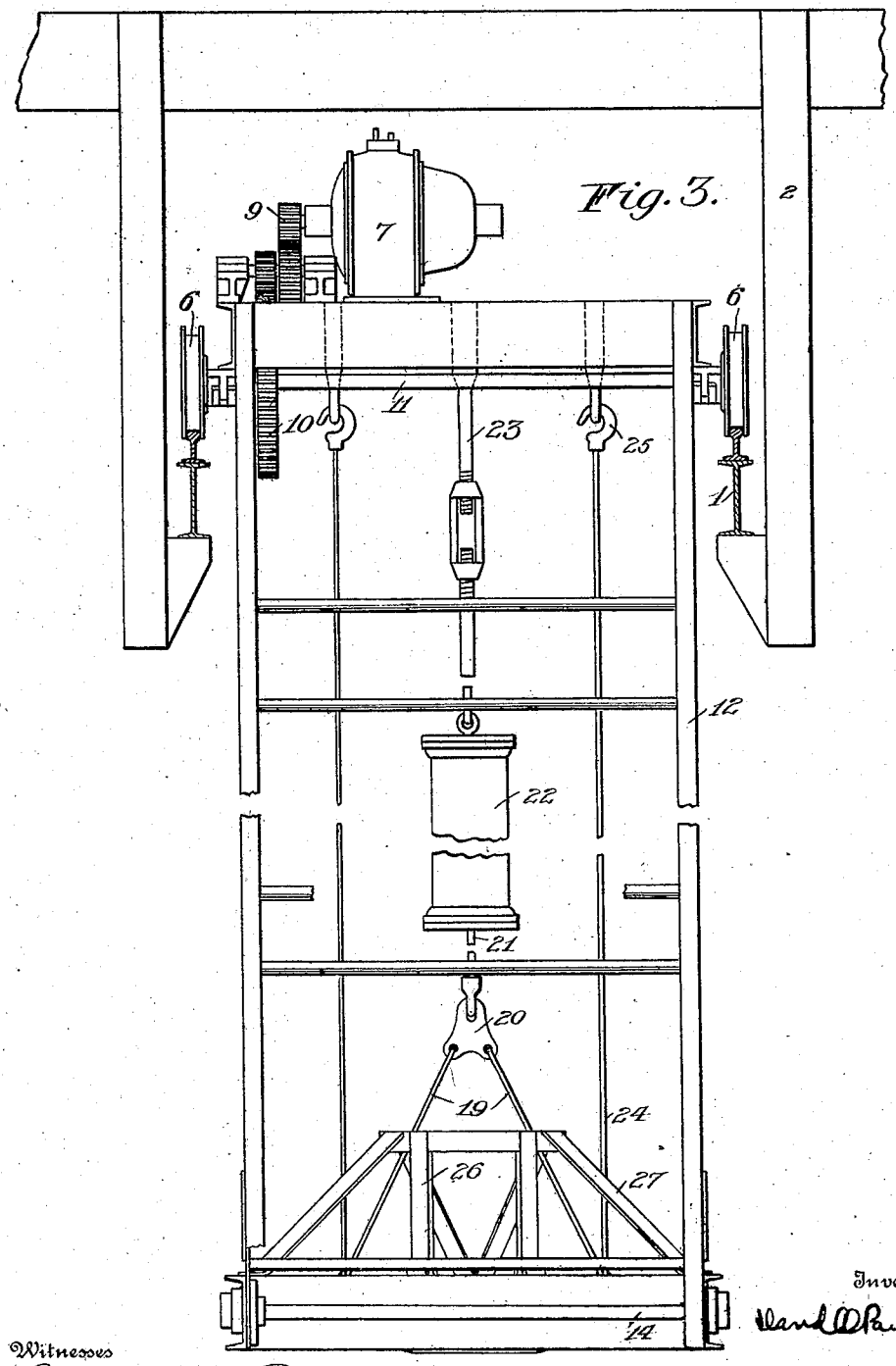
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4 SHEETS—SHEET 2.

Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 4.

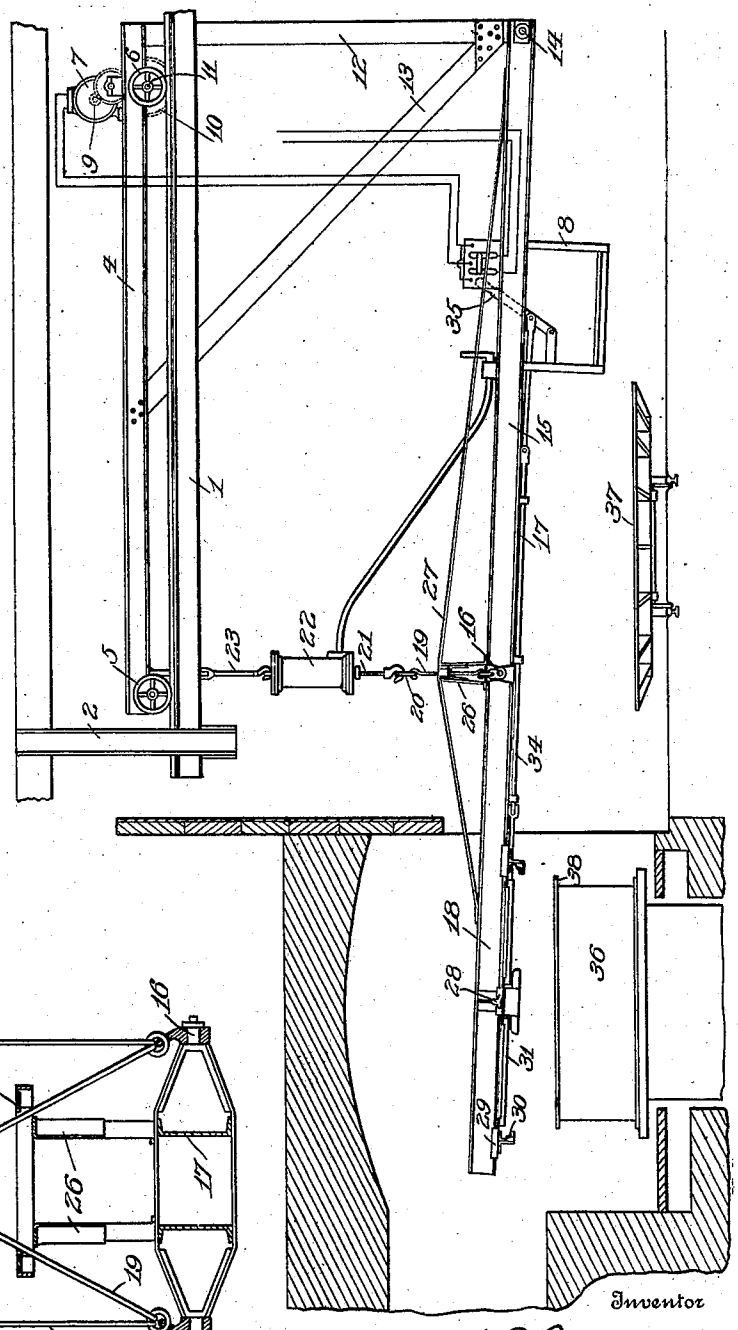
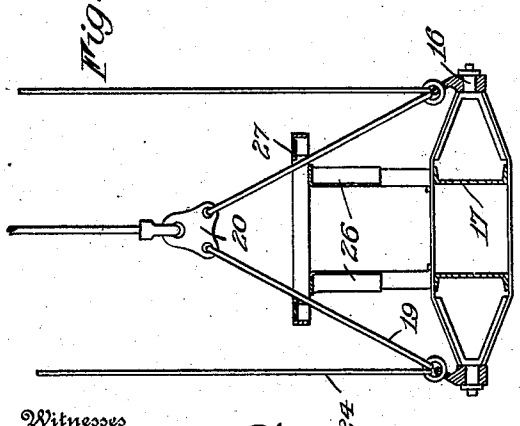


Fig. 5.



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4 SHEETS—SHEET 4.

Fig. 5.

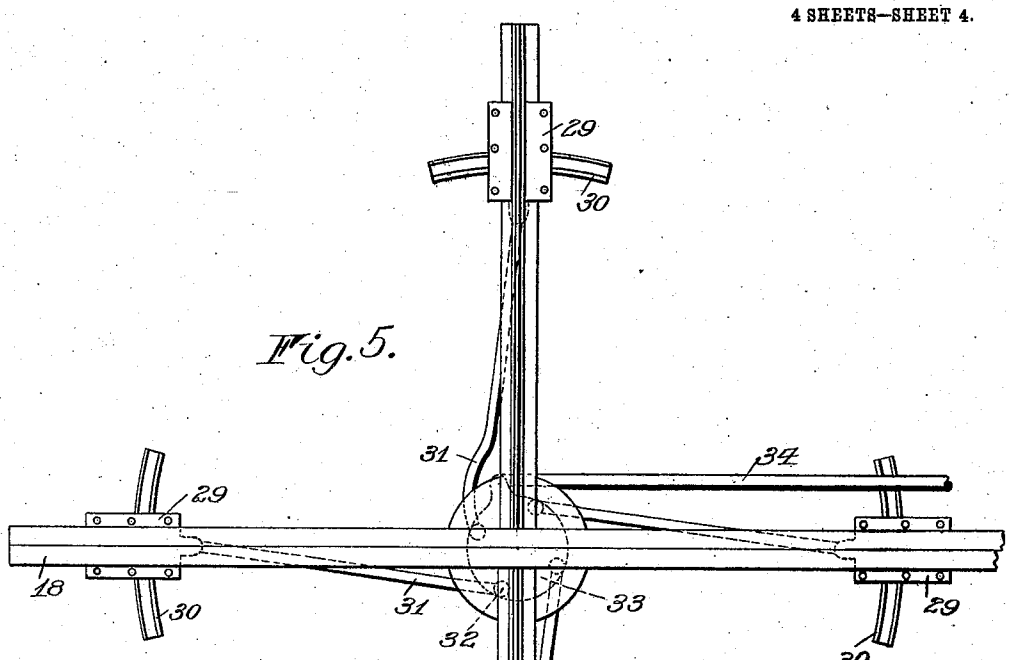
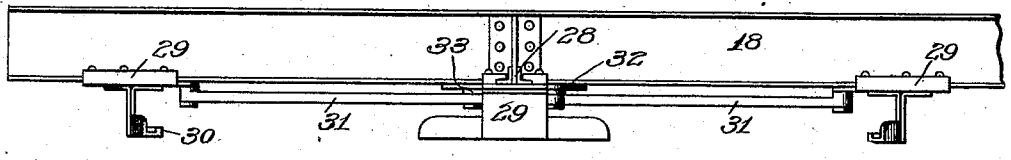


Fig. 6



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UNITED STATES PATENT OFFICE.

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CRANE.

No. 854,837. Specification of Letters Patent. Patented May 28, 1907.

Application filed February 24, 1905. Serial No. 247,120.

To all whom it may concern:

Be it known that I, DAVID O. PAIGE, of Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Cranes; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention relates to improvements in cranes, and it has for its purpose to provide a device of this kind which is particularly adapted for use in connection with an oven for enameling and similar processes whereby objects of considerable size and weight such as annular tank sections may be readily lifted from a car or other support, and introduced into the oven and deposited in proper position therein, the operations of attaching and detaching the tank section or other body being accomplished from a point removed from the oven which would otherwise be impossible should the services of an attendant for this purpose be required.

To these and other ends the invention consists in certain improvements and combinations of parts all as will be hereinafter more fully pointed out in the claims at the end of the specification.

In the drawings: Figure 1 is a side elevation of a crane constructed in accordance with my invention, the parts being shown in the position to either receive a tank section from a portable carrier or to deposit it thereon. Fig. 2 is a plan view of the device shown in Fig. 1. Fig. 3 is an end elevation on an enlarged scale looking from the right in Fig. 1. Fig. 4 is a view similar to Fig. 1, the crane having been operated to transfer the tank section from the portable car into an enameling oven. Fig. 5 is a top plan view, and Fig. 6 is a side elevation showing the attaching devices for the tank sections or other bodies on an enlarged scale, and Fig. 7 is a transverse sectional view on the line 7—7 of Fig. 1, showing the manner of connecting the hoisting device to the movable beam.

In the several views the same numerals of reference designate similar parts.

The present embodiment of my invention discloses a crane which is particularly adapted for use in transferring annular tank sections which are usually of considerable size and weight, and which are usually moved into proper position relatively to the crane, into an enameling oven which may be of any suitable form for applying an enamel lining to the interior of the sections in such a way that when these sections are assembled the interior of the tank will be provided with a practically continuous lining or coating of enamel, and when these sections have been enameled, after being subjected to the enameling process within the oven, they must be carefully removed and deposited upon a suitable carrier with extreme care in order that the frangible lining may remain intact and uninjured.

The crane comprising the present embodiment of my invention is mounted to operate longitudinally of the tracks or ways 1, the latter being suitably supported in a suitable frame 2—2 suspended from the ceiling or other suitable support, and the crane proper comprises a carriage 4, the rollers 5 and 6 thereof being arranged to run upon the tracks 1. The rollers or wheels 6 are provided in the well known way with an operating motor 7 an electric motor being preferred in the present instance as it may be readily controlled from the cab 8, and this motor in the present instance is connected by the gearing 9 and 10 to the shaft 11 which carries the wheels 6. On the carriage are secured uprights 12 which are braced by the diagonal rods 13 and it is provided at its lower end and at the rearmost point of the carriage with a pivot 14.

Mounted upon the pivot 14 is the substantially horizontal beam 15 which extends forwardly from its pivotal point, and intermediately of its length and approximately midway thereof are provided the trunnion bearings 16 which extend laterally from each side of the beam 15, the latter being made up of the spaced channel members 17 which converge toward their forward end, and are secured together to form the flanged extension 18. To the trunnion bearing 16 are attached the suspension bars 19, the latter being attached to the plate 20 which is connected to the piston 21 of a hoisting device 22, the latter in the present instance comprising a fluid pressure cylinder which may be controlled in its operation in any well known manner by the attendant who occupies the cab 8, this hoisting device being

suspended by the rod 23 from the top of the carriage. I also prefer to employ a device for limiting the vertical motion of the beam 15 about its pivot 14, and in the present instance I employ the rods 24 attached to the trunnions 16 and having hooks 25 at their upper ends to coöperate with the upper portion of the carriage to prevent the beam 15 from moving downwardly beyond a predetermined limit. As the hoisting device is attached at a point midway of the length of the beam 15, it is desirable to reinforce the latter so as to prevent bending or other strains, and in the present case I employ the supports 26 arranged at a point adjacent to the journal bearings 16, and over these supports are passed the tension rods 27 which are secured at their ends to the beam 15 at opposite sides of the point of attachment for the hoisting device. At the forward end of the beam 15 of the carriage I provide a cross beam 28 which extends transversely of the beam 18 which is formed by the union of the channel bearings 17, and on the lower flanges of the beams 18 and 28 are mounted the chuck members 29, the latter being movable longitudinally of these respective supports or ways 18 and 28, and provided with the segmental inwardly extending ledges 30 which are preferably formed centrally, and are adapted to engage the periphery or overhanging flange or other portion of an annular body such as a tank section, or the like. To each of these chuck members 29 are attached the pitmen or rods 31, and the inner ends of these rods 31 are in turn pivotally connected to the pins 32 of the revoluble crank plate 33, the latter being journaled at the intersection of the supporting beams 18 and 28. This attaching device for supporting or clamping the annular bodies is located forwardly beyond the point of attachment of the hoisting device and the beam 15, and the revoluble plate 33 for operating the chuck members is connected by a rod 34 to a lever 35, the latter being preferably located in the cab 8 in proximity to the controlling devices for the motor 7 and the hoisting device 22 in order to enable the attendant to operate these various parts from a central point.

A hollow annular tank section 36 is shown in the present embodiment of my invention, and in Fig. 1 I have shown this section as supported on the portable car or other carrier 37, the clamping or attaching device being secured to the section, and in Fig. 4 the tank is shown in position within the oven, but of course it will be understood that these tank sections represent only one portion of the tank, and that the heads thereof are handled in a similar manner, and that other annular bodies, other than tank sections, could be handled with equal facility.

In operating a crane constructed in accordance with my invention, when it is used for transferring annular tank sections and similar bodies from a support into an oven and vice versa, the tank section or other object 36 is brought into operative position relatively to the crane by the car 37, or by other suitable means, and while it occupies a horizontal position, the motor 7 is operated to move the carriage 4 longitudinally of the ways 1 until the attaching devices, which are located on the extreme forward end of the beam 15, are in proper position to engage the upper edge thereof, and while the rod 34 is operated to expand or spread the clamping device 30, the hoist 22 is operated to lower the beam 15 and permit the clamping device 30 to pass below the upper edge of the object, which in the present instance, is provided with an overhanging flange 38, and while these clamping devices are in this position, the lever 35 is operated to rotate the plate 33 to draw the clamping devices 30 together and thereby engage beneath the overhanging flange of the section 36, and while these clamping devices are locked in this position, the hoisting device 22 is operated to elevate the beam 15, causing the section 36 to rise above the car 35, and while the beam 15 is thus elevated, the motor 7 is again operated causing the carriage 4 to travel forwardly on the tracks 1, and this will cause the section 36 and that portion of the beam 15 which extends forwardly beyond the point of attachment between the latter and the hoisting device 22 to pass within the oven, and this is permitted by reason of the fact that there are no obstructions on the carriage which would collide with parts of the oven, as would be the case should the hoisting device 22 be located toward the forward end of the beam, and as the beam 15 occupies a relatively low position, it will be obvious that the door of the oven which is customarily supported so as to rise vertically in opening, need be opened only partially from the bottom to admit the tank section, and this is an advantage, as it enables the section to be introduced and removed while the temperature of the oven may be maintained at a relatively high degree by reason of the partial opening of the door. The section is deposited upon the table or support within the oven by operating the hoisting device 22 to lower the beam 15, and when it occupies a proper position, the lever 35 is operated to release the clamping devices 30, and when this has been accomplished, the hoisting device 22 is again operated to raise the beam 15 and finally the motor 7 is started to cause the carriage 4 to move rearwardly on the tracks 1. When the enameling or other process has been completed within the oven, the carriage 4 is operated so as to introduce the forward end of the beam 15 within the oven, and after the hoisting device 22 has been operated to lower the clamping device 30, into proper

position to engage the section 36, the lever 35 which is controlled within the cab 8 at a point removed from the oven, may now be operated to close the clamping devices about the section. The hoisting device 22 may now be operated to elevate the beam 15 and the motor 7 is operated to cause the carriage 4 to travel rearwardly on the ways 1, and thereby withdraw the section from the oven, the hoisting device 22 being operated to lower the section upon the car 37 and the lever 35 operated to release the clamping devices 30. Thus it will be understood that the complete operation of inserting the section within the oven and withdrawing it therefrom and placing it upon a portable carrier is accomplished without rendering the section liable to damage or other injury, and the operations described are all controlled by an attendant who may be located in the cab 8, or at any other convenient point which is at a distance from the attaching devices, and therefore the extreme heat of the oven and of the parts removed therefrom, does not hinder the handling of the sections.

A crane of the kind described constructed in accordance with my invention, as before stated, is particularly useful in handling bodies such as tank sections which are to be enameled, or otherwise treated so as to render them liable to damage in subsequent handling, as the various operations of transferring the sections between the oven and the portable carrier are accomplished with certainty, and by locating the pivotal point of the beam 15 at the rearmost point of the carriage and attaching the hoisting device 22 at a point rearwardly from the forward end of the beam, the operations of positioning the sections within the oven which require more or less care, is materially facilitated, and by trussing or re-inforcing this beam in a manner such as I have described, sufficient strength is insured without unnecessarily increasing the weight of the parts.

I claim as my invention:

1. In a crane, the combination with a suitable carriage having an upright extending downwardly from its rear end, of a beam having its rear end pivotally attached to said upright to insure movement of the beam in a vertical plane only and provided with suitable devices at its forward end for engaging the objects to be handled, trunnion bearings rigidly attached to, and projecting laterally from the opposite sides of the beam at points intermediate its length, a pair of suspension bars each coöperating with one of said trunnion bearings, a member connecting the upper ends of the suspension bars, and a hoisting device supported on the carriage and cooperating with said member for adjusting the beam on its pivots.

2. In a crane, the combination with the tracks or ways, of a carriage mounted to travel on said ways, a substantially horizontal beam pivoted at one end to the carriage and provided with attaching devices at its opposite end, a hoisting device mounted on the carriage for operating the beam, and cables connecting the carriage and beam for limiting the downward motion of the latter during its operation by the hoisting device.

3. In a crane, the combination with the tracks or ways, of a carriage mounted to operate on said tracks, a beam suspended from the carriage having one end pivotally connected to the carriage and provided at its opposite end with attaching devices, a hoisting device attached to the beam intermediately of the attaching devices and its pivotal point for operating the beam, and a truss for reinforcing the free extended portion of the beam.

4. In a crane, the combination with a carriage having the uprights at one end, and a hoisting device supported at the opposite end of the carriage, of a horizontal beam composed of a pair of spaced channel members pivoted at their rear ends to the uprights of the carriage, connected at an intermediate point to said hoisting device, and united at their forward ends to form an extension having flanges extending from opposite sides to form guides, and chuck members mounted to operate on said guides.

5. In a crane, the combination with a carriage, of a beam pivoted at one end to a part of the carriage, and having chuck members arranged on its opposite end, trunnions projecting laterally from the opposite sides of the beam at a point intermediate of its pivotal center and the chuck members, a hoisting device supported by the carriage, suspension bars connecting the trunnions with the hoisting device, supports arranged on the beam adjacent to the trunnions, and tension rods resting on the supports and having their ends attached to the beam at each side of the trunnions.

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