

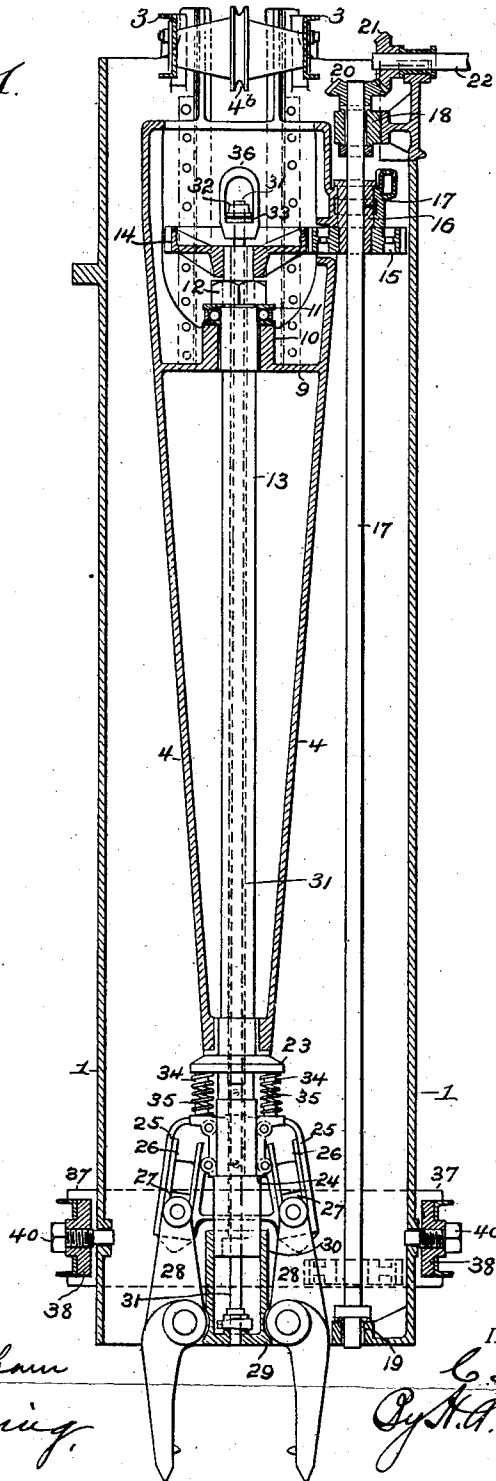
No. 858,038.

PATENTED JUNE 25, 1907.

C. L. TAYLOR.
VERTICAL CHARGING CRANE.
APPLICATION FILED MAY 25, 1906.

5 SHEETS—SHEET 1.

Fig. 1.



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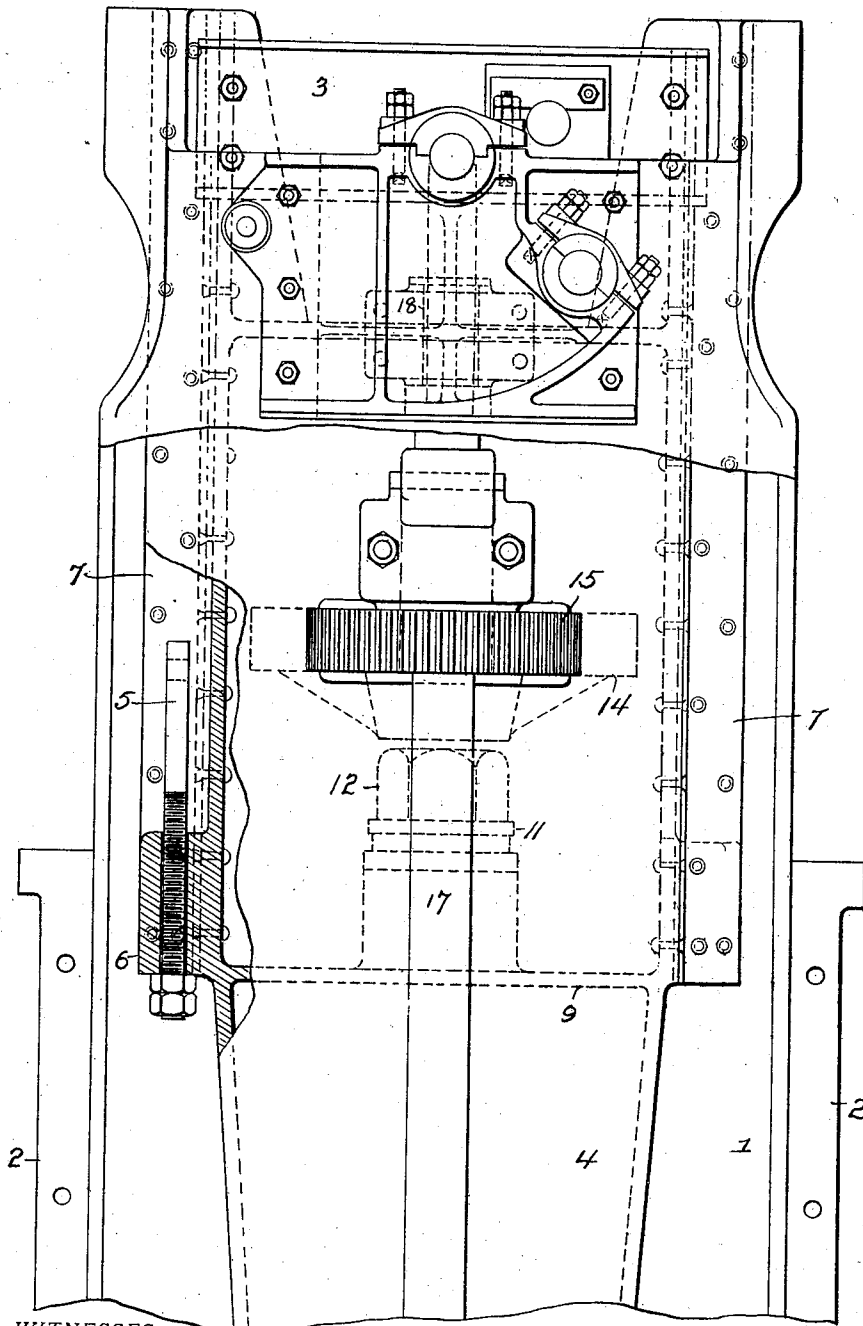
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5 SHEETS—SHEET 2.



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Fig. 2.

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5 SHEETS—SHEET 3.

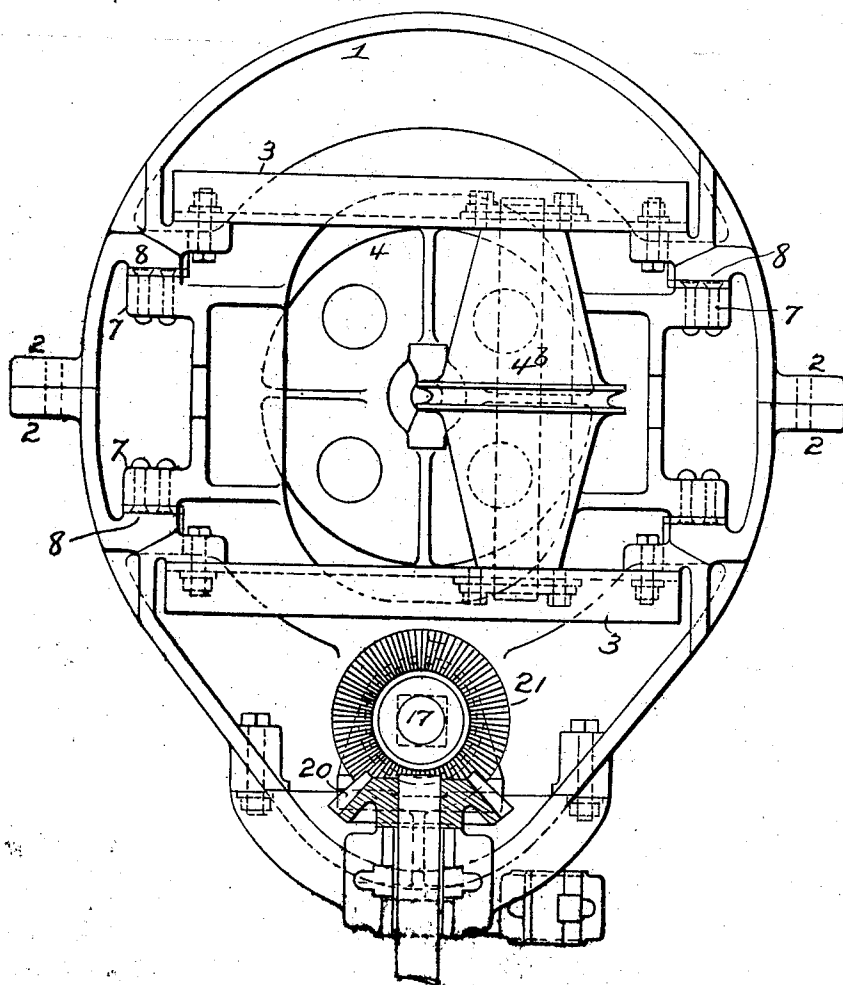


FIG. 3.

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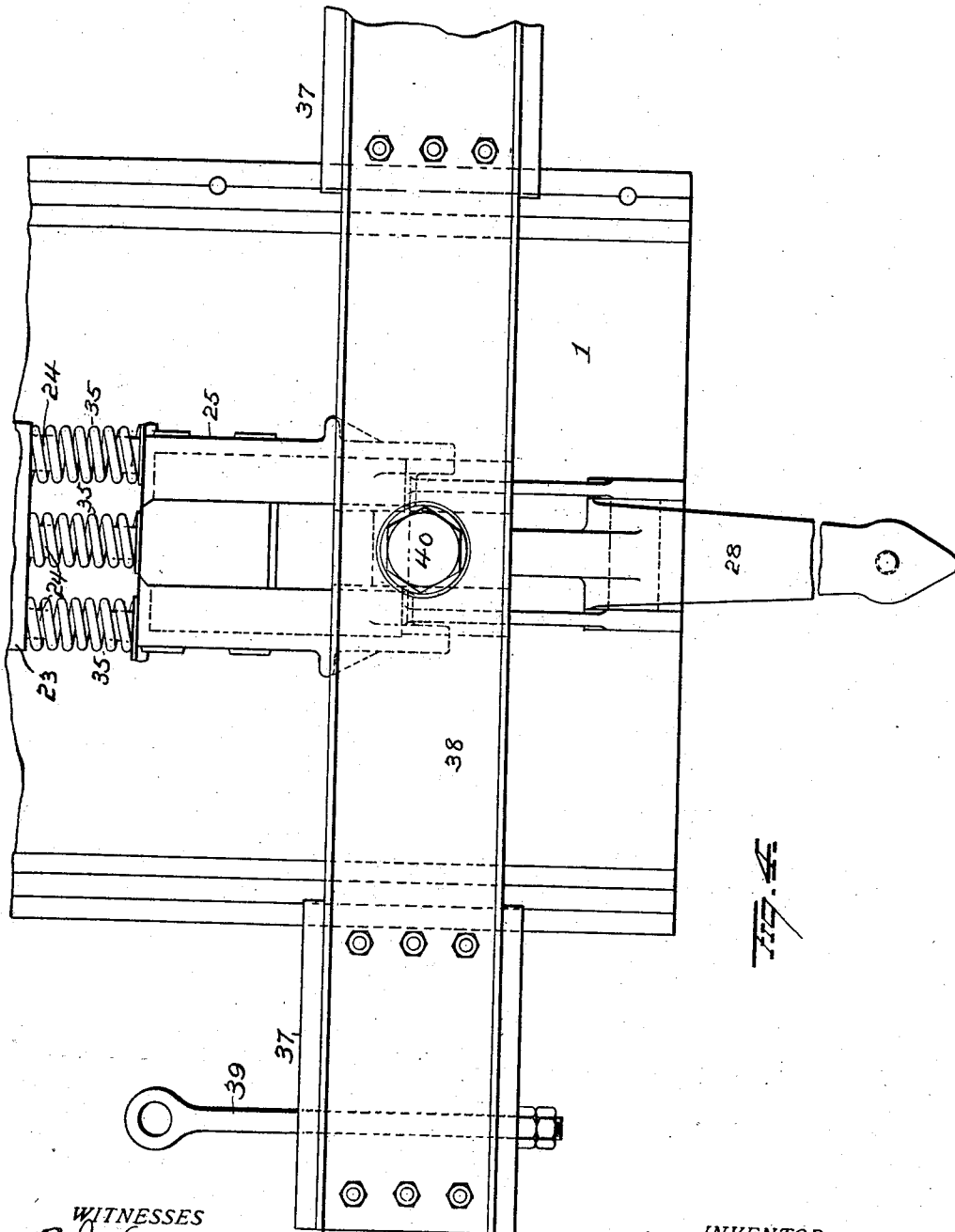
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5 SHEETS—SHEET 4.



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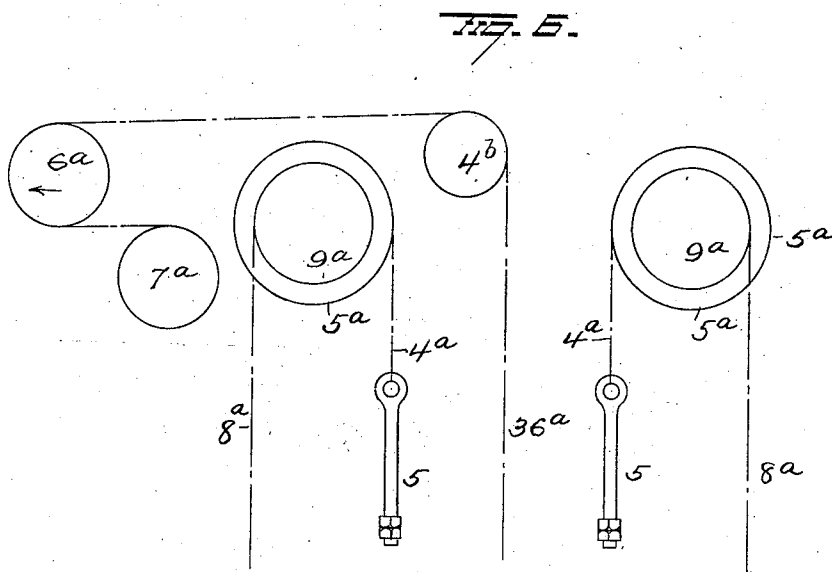
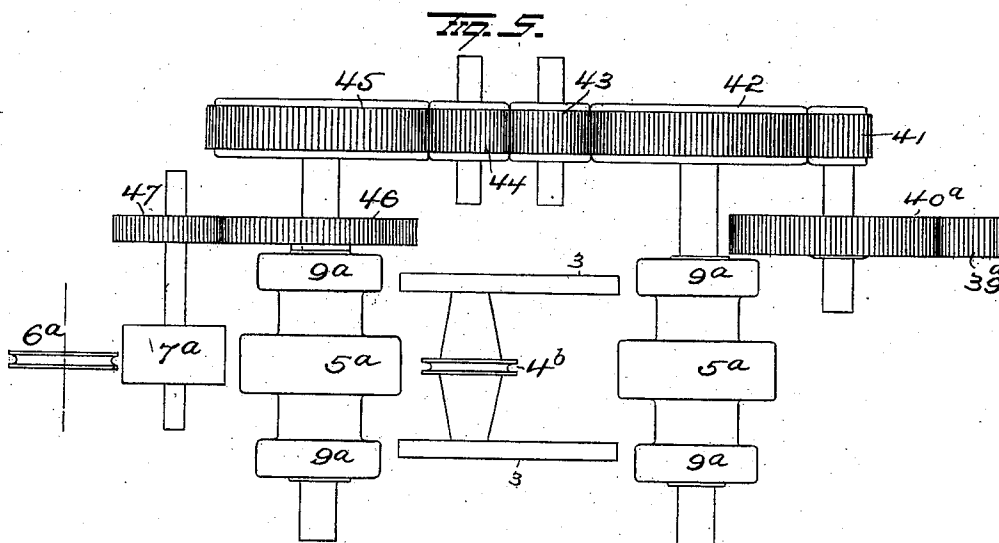
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

CLARENCE L. TAYLOR, OF ALLIANCE, OHIO, ASSIGNOR TO THE MORGAN ENGINEERING COMPANY, OF ALLIANCE, OHIO.

VERTICAL CHARGING-CRANE.

No. 858,038.

Specification of Letters Patent.

Patented June 25, 1907.

Application filed May 25, 1906. Serial No. 318,707.

To all whom it may concern:

Be it known that I, CLARENCE L. TAYLOR, of Alliance, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Vertical Charging-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 vertical charging cranes, the object being to provide an apparatus of this character in which the tongs carrying mechanism is rigidly sustained against lateral deflection, but is flexibly supported or suspended from the trolley or other support, thus obviating the danger of breaking any of the parts, or derailling the trolley due to contact of the tongs with an ingot or other object during the downward movement of the tongs.

With this object in view my invention consists in the parts and combination of parts and in the details of construction as will be more fully described and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in vertical section, the central tongs carrying stem and one half the tongs carrying frame being shown in elevation. Fig. 2 is a view partly in elevation and partly in section of the upper end of the apparatus. Fig. 3 is a plan view of the same. Fig. 4 is a view in elevation of one half of the outer casing the other half being removed so as to show the tongs, and Figs. 5 and 6 are diagrammatic views in plan and side elevation of the several drums, sheaves gearing and suspending cables.

1 represents a guide frame or casing of substantially cylindrical form and open at its lower end. This guide frame or casing is made in two sections each of which is provided with flanges 2 through which the securing bolts pass. The guide frame or casing thus constructed is designed to be rigidly secured to a trolley mounted to travel on a traveling bridge, or other elevated support, and is provided at its top with two parallel channel beams 3 in which the shaft carrying sheave 4^a is journaled.

Located normally within the guide frame or casing 1, is the tongs carrying frame 4. This frame is in the form of an inverted trun-

cated cone, and is suspended within the guide frame or casing 1 by wire ropes 4^a, attached, one at each side, to the eye bolts 5, secured to the lugs 6 integral with the tongs carrying frame 4, the said ropes passing upwardly and secured to hoist drums 5^a carried by the trolley, or by the upper end of the guide frame or casing 1. By this arrangement the tongs carrying frame may be raised so as to house the operating mechanism as shown in Fig. 1, or lowered to permit the tongs to engage an ingot within a soaking pit or elsewhere. This tongs carrying frame 4 is provided on diametrically opposite sides, as shown in Fig. 3, with the guides 7 which rest and move within the ways 8 formed on the inner surface of the guide frame or casing 1, which guides and ways hold the tongs carrying frame 4 against any lateral movement toward or away from shaft 17, but permit it to be freely raised and lowered, and by suspending the tongs carrying frame 4, by means of flexible wire ropes, the descent of the tongs carrying frame 4 and its attached tongs will be dependent upon gravity alone, hence no damage can result to the operating mechanism on the trolley, nor can the latter be derailed, by the forcible contact of the tongs with an ingot or other object while lowering the tongs carrying frame 4.

The tongs carrying frame 4 is provided near its upper end with a partition 9 having a central bearing 10 on which the anti-friction bearing 11 rests. Resting on the anti-friction bearing 11 is the nut 12 secured to and carrying the central stem 13, and secured to the stem 13 above the nut is the pinion 14. This pinion 14 and the parts last described, are located within the tongs carrying frame 4 above the partition 9, and the pinion 14 is in mesh with the pinion 15 secured to the sleeve 16 mounted in bearing 17. This bearing is integral with or secured to the tongs carrying frame 4, so that as the latter moves vertically, up or down, the pinion 15 will be carried therewith. Sleeve 16 carrying pinion 15, is provided with an angular bore that closely fits and conforms to the cross section of shaft 17, which latter is mounted at its upper end in bearing 18 carried by the guide frame or casing 1, and mounted at its lower end in the step bearing 19 carried at the lower end of said guide frame or casing. This sleeve is therefore free to slide on the shaft, and the

latter is rotated through the miter-wheels 20 and 21, the former of which is keyed to shaft 17, while the latter is keyed to shaft 22, which is connected by gearing to a suitable motor.

5 By rotating shaft 17 pinion 15 will be rotated, and as pinion 15 is carried by the tongs carrying frame 4, it follows that motion can be imparted to pinion 14 irrespective of the vertical position of the latter.

10 The central stem 13, passes downwardly through, and has bearing in the lower end of tongs carrying frame 4, and is provided at a point immediately below the lower end of said frame 4 with an enlargement or collar 15 23, which latter, together with the nut 12 near the upper end of stem 13, prevent any independent longitudinal movement of the sleeve 13 in the frame 4.

Secured on the stem below collar 23, and 20 resting on the shoulder 24 formed integral with the stem, is the tongs frame 25. This frame is made in two sections, one of which is removed in Fig. 1. These sections are clamped or bolted together on the stem, and 25 the frame as a whole, is provided with the inclined slideways 26, converging upwardly, in which the slide blocks 27 rest and move. These slide blocks are pivotally connected to the upper ends of the tongs lever 28, and the 30 latter are pivoted at points between their ends to the cross head 29. This cross head is provided centrally with an upwardly projecting sleeve open at the top and embracing the lower end of stem 13.

35 Secured to the cross head 29 within sleeve 30 is the tongs opening rod 31. This rod passes upwardly through the stem 13 and is provided at its upper end with a clevis 36, the latter being secured in place by a nut 32, 40 an anti-friction bearing 33, being interposed between the clevis and the nut as shown in Fig. 1.

Located between the top of the tongs frame 25 and collar 23 and seated at their ends on 45 lugs 34 formed integral with said parts are springs 35, shown in Fig. 4, which absorb and take up any shock due to the too rapid descent of the apparatus onto an ingot.

A wire cable 36^a is attached to clevis 36 50 and passes over sheave 4 around sheave 6^a to drum 7^a on the trolley. The upward movement of the tongs levers, by reason of the slide blocks 27 moving in converging slideways, rocks the tongs levers on their pivots 55 in directions to open the tongs, and a reverse movement of the parts causes the lower ends of the levers to approach each other.

The tongs can be rotated about a vertical axis by turning the central stem 13 through 60 the gears 14 and 15, so as to bring the tongs levers into position to engage an ingot.

The weight of the movable parts above referred to, is partially counterbalanced by the counterweight 37, which is suspended by 65 wire ropes 8^a from the same drum supporting

the tongs 28 and tongs carrying frame 4. This counterweight is in two parts, united by two channel irons 38 and is connected to the wire ropes by eye bolts 39. The counterweights and their connecting and supporting 70 channel irons embrace the guiding frame or casing 1, and is guided in a vertical direction by this frame or casing, the two sections of the counterweight, being shaped to fit closely to the curved surface of the casing 1. 75

Bolts 40 carried by the channel irons 38 can be inserted as shown, in guide frame or casing 1 thus supporting the counterweight temporarily while its supporting ropes are 80 being renewed. 85

The tongs 28 close by gravity, hence by lowering tongs carrying frame 4 and its stem 13 carrying the tongs onto an ingot, and releasing rod 31 the tongs levers will grasp the ingot and lift same out of the furnace, and 85 then by propelling the trolley the ingot can be transported and deposited at any desired point covered by the travel of the trolley.

In Figs. 5 and 6 I have shown diagrammatically the drums and suspending cables 90 and gearing for actuating the drum. Ropes 4^a support the tongs carrying frame to which they are attached by the eye bolts 5. These ropes pass up to drums 5^a which are driven in unison through gearing 45 and 42, 43 and 44, and 41—40^a and 39^a. Ropes 8^a support 95 the counterweight for the tongs carrying frame and suspend from the parts 9^a of the drums 5^a. Rope 36^a is connected to the upper end of tongs operating rod and passes 100 over sheaves 4 and 6^a to drum 7^a, the drum 7^a being operated by the main hoisting train to which it is connected by the gears 46 and 47. Sheave 6^a is arranged to be moved horizontally by the tongs operating motor through 105 an arrangement of levers, hence it will be seen that when sheave 6^a is moved in the direction of the arrow, rope 36^a will be hoisted and the tongs will be opened, and an opposite movement of sheave 6^a will close 110 the tongs.

It is evident that many slight changes might be resorted to in the relative arrangement of parts shown and described without departing from the spirit and scope of my 115 invention hence I would have it understood that I do not wish to restrict myself to the exact construction and arrangement of parts shown and described, but,

Having fully described my invention what 120 I claim as new and desire to secure by Letters-Patent, is:—

1. In a vertical charging crane the combination with a depending guiding frame or casing, of a vertically movable frame within 125 said guiding frame, flexible means suspending said vertically movable frame, a vertical stem mounted to rotate in said vertically movable frame and ingot tongs carried on the lower end of said vertically movable stem. 130

2. In a vertical charging crane, the combination with a vertically movable frame, guiding means therefor, and flexible means for raising and lowering said movable frame, of a vertical stem mounted in said frame, means for rotating said stem, and ingot tongs carried by the stem, the said tongs having a limited sliding movement on said stem.

3. In a vertical charging crane, the combination with a vertically movable frame, guiding means therefor, and flexible means for raising and lowering said movable frame, of a vertical stem mounted in said vertically movable frame, ingot tongs carried by said stem below the movable frame, means for rotating said stem, and means for opening and closing the tongs.

4. In a vertical charging crane, the combination with a vertically movable frame, guiding means and flexible supporting means for said frame, of a vertical stem carried by the vertically movable frame, means for rotating said stem, ingot tongs carried by the stem below the movable frame, and means for counterbalancing the movable frame and parts carried thereby.

5. In a vertical charging crane, the combination with a fixed guiding frame or casing, of a frame mounted to move vertically within said frame or casing, means on the vertically movable frame engaging ways on the fixed frame or casing for guiding the former in its movements, flexible suspension means for said movable frame, a stem mounted to rotate in said movable frame, ingot tongs carried by the lower end of the stem and means for opening and closing the tongs.

6. In a vertical charging crane, the combination with a vertically movable frame, means for supporting same against lateral movement, and flexible suspension means

for said frame, of a stem mounted to rotate in said frame, a two part tongs frame secured to the lower end of said stem and provided with inclined guide ways, tongs levers having sliding connection with said inclined guide ways, a cross head to which the tongs levers are pivotally connected and a tongs opening rod connected with said cross head and passing up through the stem.

7. In a vertical charging crane, the combination with a vertically movable frame, and a vertical stem mounted to rotate therein, of tongs frame secured to the stem and having a limited sliding movement thereon, springs interposed between said tongs frame and a collar on the stem, tongs levers having sliding connection with inclined ways in said tongs frame, a cross head to which the tongs levers are pivoted and a rod connected to said cross head and passing up through the stem.

8. In a vertical charging crane the combination with a depending frame, an angular shaft mounted therein and means for rotating said shaft, of a frame flexibly suspended within said depending frame, connections between the two frames for guiding the movable frame, a vertical stem carried by the movable frame, tongs carried by said stem, means for opening and closing the tongs, a pinion on the upper end of said stem and pinion slidingly mounted on the angular shaft and meshing with the pinion on the stem.

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

CLARENCE L. TAYLOR.

Witnesses:

A. L. ROBERTS,
N. C. FETTERS.