Sept. 6, 1932. O. HIVELY 1,875,730

CRANE TROLLEY

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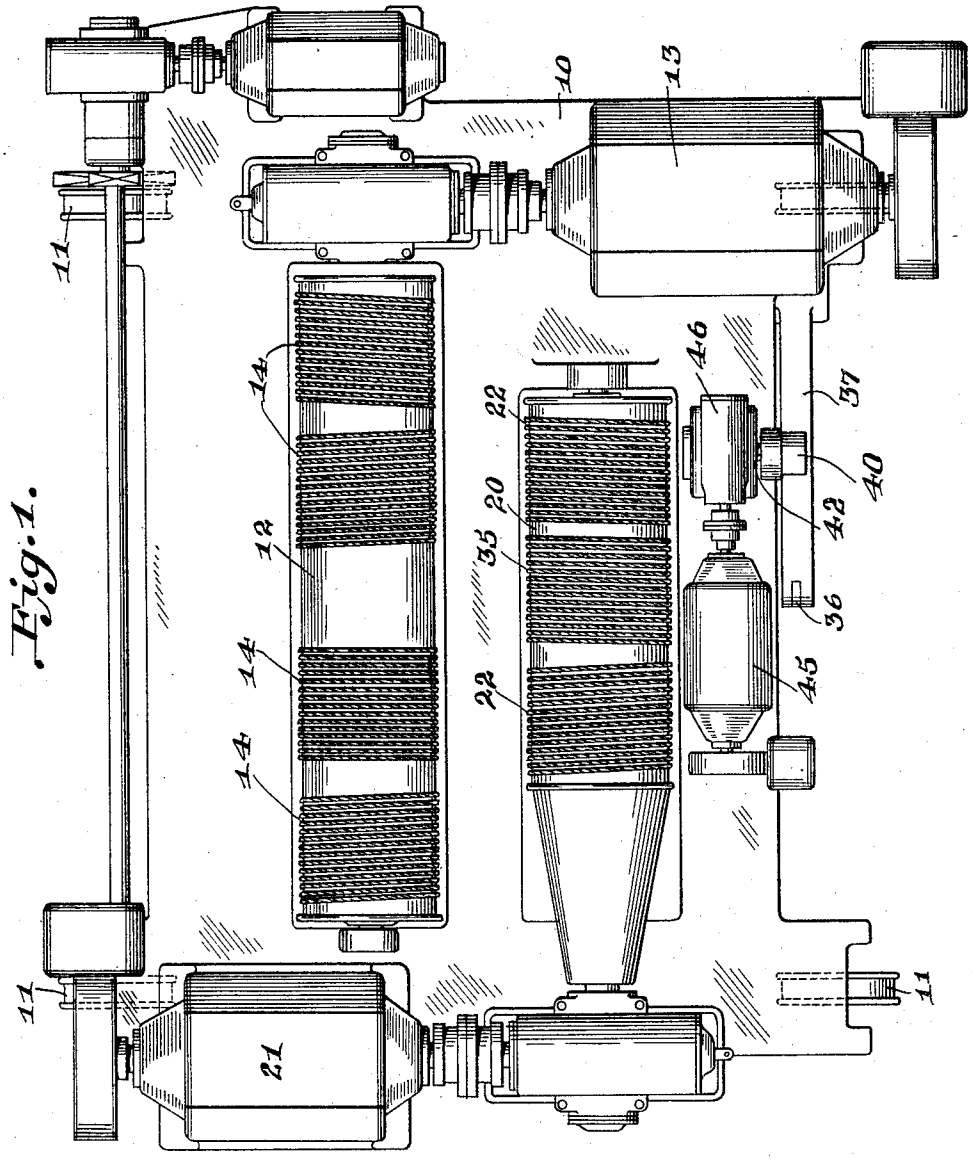


Fig. 1.

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CRANE TROLLEY

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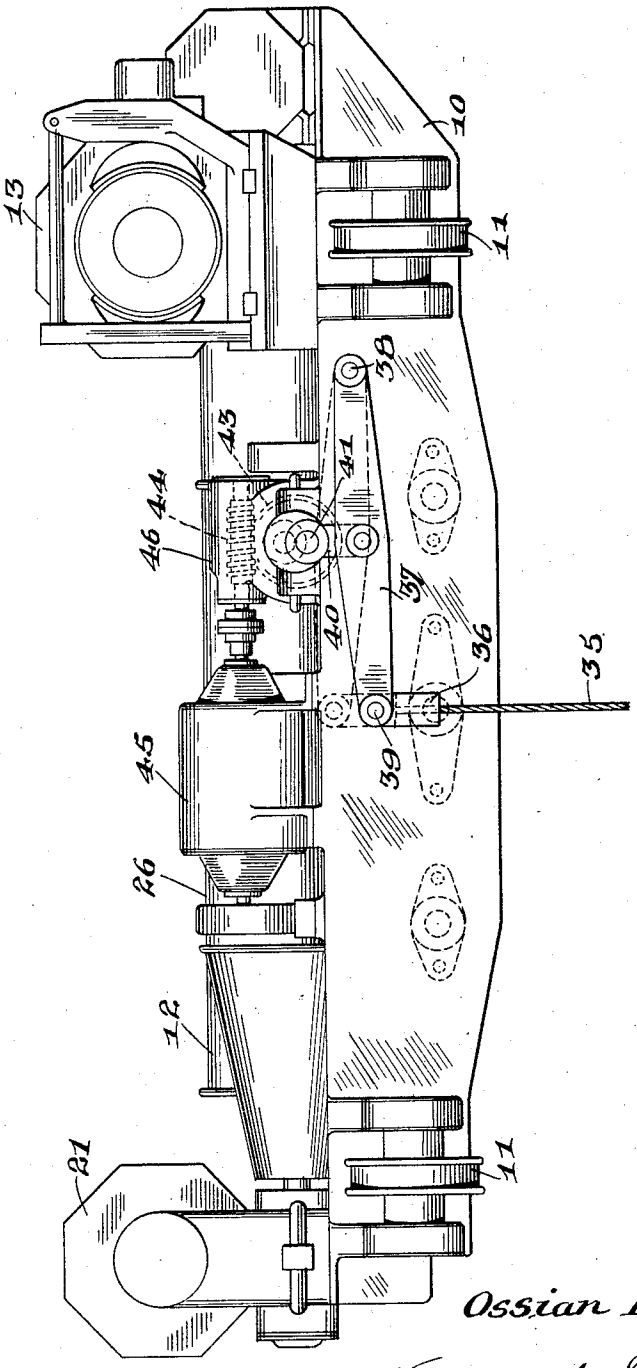


Fig. 2.

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CRANE TROLLEY

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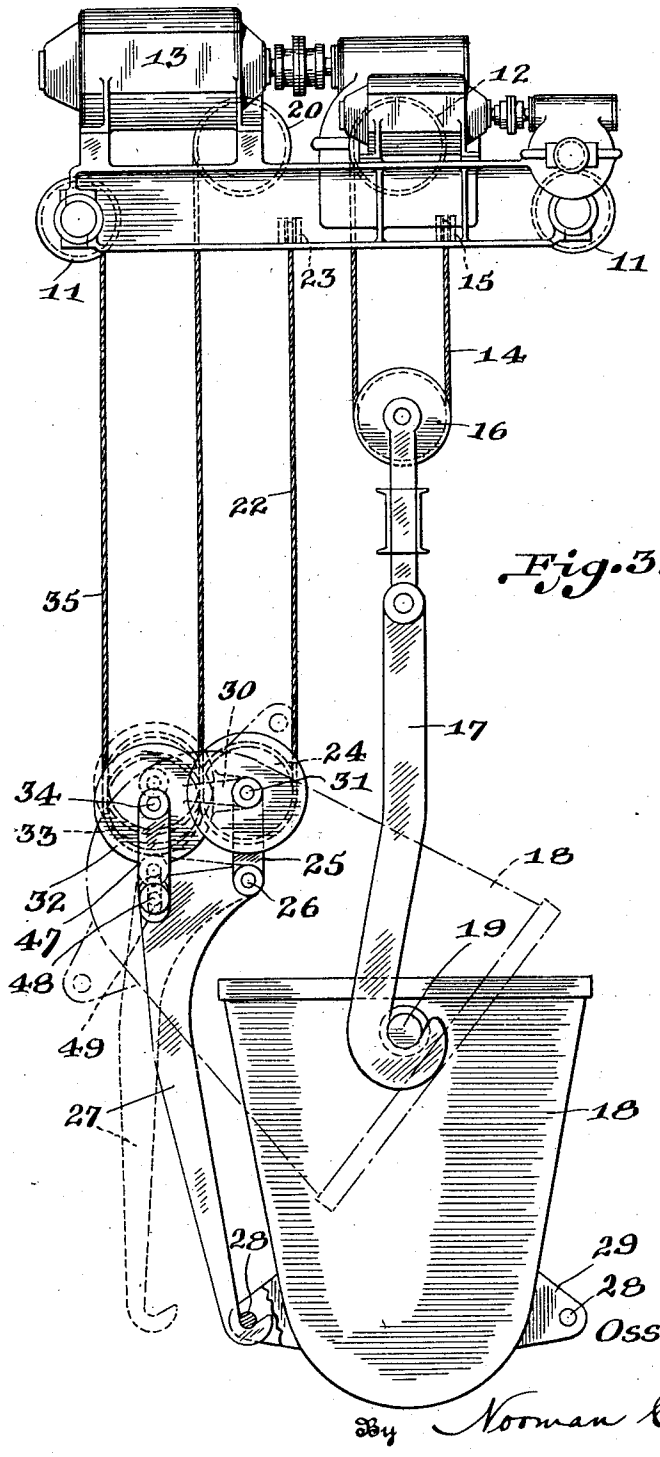


Fig. 3.

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CRANE TROLLEY

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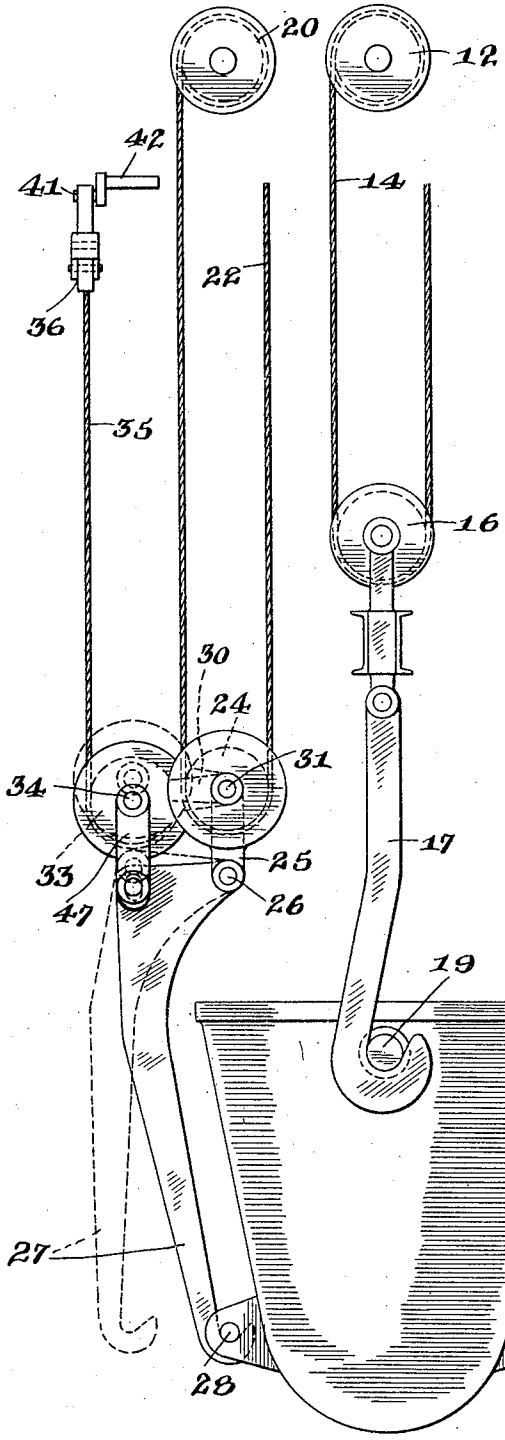


Fig. 4.

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CRANE TROLLEY

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Fig. 5.

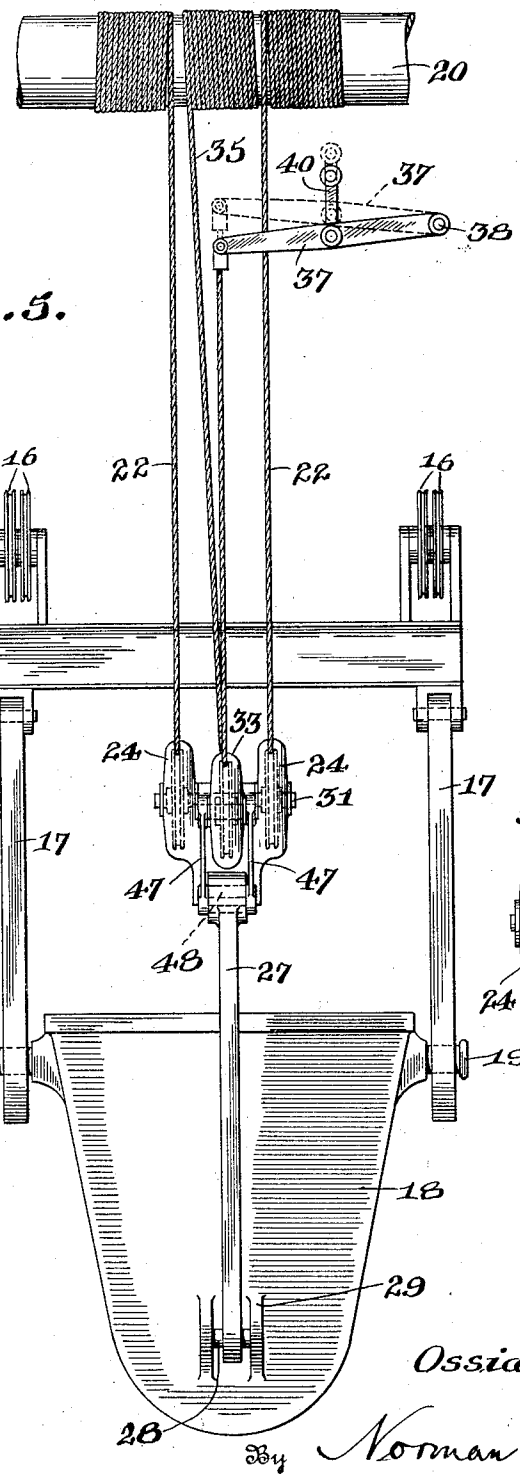


Fig. 6.

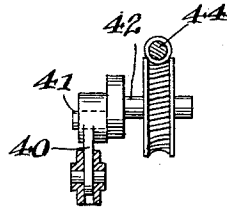
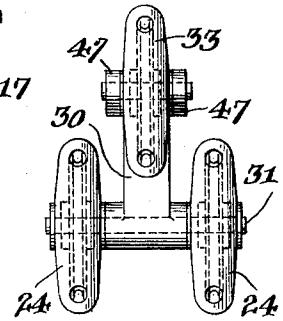


Fig. 7.



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UNITED STATES PATENT OFFICE

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CRANE TROLLEY

Application filed August 26, 1930. Serial No. 477,914.

This invention relates to improvements in crane trolleys, and more especially to such a trolley designed for the purpose of handling a hot metal ladle and tilting the ladle without help from a ground-man. While the mechanism is especially adapted for this purpose, it will be obvious from this disclosure that it might be used for other purposes, such as turning of forgings, manipulating tongs, etc.

The primary object of the invention is to provide a crane trolley mechanism including a hook actuated from the trolley, to engage the lower portion of a ladle, and means cooperating with the hook for elevating the latter to tilt the ladle and thus pour the contents of the latter.

Another object is to furnish mechanism of this character, all parts of which may be controlled by a single operator.

With the foregoing objects outlined and with other objects in view which will appear as the description proceeds, the invention consists in the novel features hereafter described in detail, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings,

Fig. 1 is a top plan view of my improved trolley.

Fig. 2 is an end elevation of the same with the hoisting ropes, ladle and tilting hook mechanism eleminated to facilitate illustration.

Fig. 3 is a side elevation, partly broken away, of the entire mechanism.

Fig. 4 is a similar view with the carriage portion of the trolley omitted and showing the crank means employed for moving the hook into and out of engagement with the ladle.

Fig. 5 is an end elevation of the ladle and portions of its elevating and tilting mechanism.

Fig. 6 is an elevation of a detail.

Fig. 7 is a top plan view of the pulley or block mechanism of the ladle tilting device.

Referring to the drawings, 10 designates the body or platform of a trolley carriage having supporting wheels 11 which travel on the usual crane tracks (not shown).

The main hoisting drum of the trolley is shown at 12, and it is driven in the usual way by an electric motor 13. Cables 14 are wound on the drum. Each of these cables has one of its ends secured to the drum, and its other end anchored to the carriage as shown at 15. These cables have portions depending from the carriage and passing about pulleys 16 which are mounted on axles supported by a ladle elevating frame 17 which is used to raise and lower ladles containing molten metal. One of these ladles is shown at 18. It will be obvious that when the motor 13 is actuated, the drum 12 can be turned to wind or unwind cables 14, and this will result in elevating or lowering the ladle.

In accordance with my invention, the ladle may be tilted about its trunnions 19 by means of my improved mechanism. For this purpose, the carriage is provided with a second hoisting drum 20, driven by an electric motor 21. Two cables 22 are wound on this drum, and each of these cables has one of its ends secured to the drum, and its other end anchored to the carriage, as shown at 23. Depending portions of these cables pass about a pair of pulleys 24, and from the axles of these pulleys, a link 25 depends. This link partially supports, and is pivotally connected at 26 to a ladle tilting hook 27 which is adapted to engage either one of the bars 28. Each one of these bars is rigidly connected to a pair of ears 29 that are rigid with the lower end portion of the ladle. It will be clear from Fig. 3 that when the hook is in engagement with one of the bars 28, and is elevated while the frame 17 remains stationary, the ladle will be tilted on its trunnions 19 for the purpose of pouring from the ladle.

As part of my invention, I have means for moving the lower extremity of the hook 27 toward and away from the ladle for the purpose of connecting the hook to one of the bars 28. To this end, a lever 30 is pivotally mounted on the axle 31, and is rigidly connected with the casing 32 of a pulley 33 which rotates on an axle 34. The pulley 33 is sus-

pended on a cable 35, one end of which is secured to the drum 20, and the other end of which is connected to a link 36 that depends from one end of a lever 37. The other end of this lever is mounted on a fixed shaft 38 that projects from one end of the trolley carriage. For the purpose of raising or lowering the free end 39 of the lever 37, the medial portion of the latter is supported by a link 40, and the upper end of the link is mounted on a crank pin or eccentric 41, which extends from a shaft 42. The latter, as best shown in Fig. 6, is fixed to a worm gear 43, driven by a worm 44, which is operated by an electric motor 45, and is arranged in a casing 46.

At this point it will be noted that all of the motors of the trolley will be connected by a suitable wiring to a common control board, not shown, in order that a single operator may control the travel of the trolley along its tracks, the raising and lowering of the ladle, the swinging of the hook 27, and the tilting of the ladle.

In order that the raising and lowering of the pulley 33 will act to swing the hook on the pivot 26, the axle 34 is secured to the upper ends of links 47, and the lower ends of these links carry a cross pin 48 which extends through a slot 49 at the upper end of the hook 27. The slot permits of a small amount of movement of the hook 27 without moving the block or pulley 33 while tilting the ladle.

In operation, assuming that the frame 17 has elevated the ladle and carried the latter to the point of pouring, at such time, the hook 27 will be in the dotted line position shown in Fig. 4, at which time the crank pin 41 will be above the shaft 42. Now, if the motor 45 is actuated, the shaft 42 can be turned to lower the crank pin 41 so that the pulley 33 will drop downwardly, and the hook will swing about the pivot 26, so as to bring the lower extremity of the hook beneath the bar 28 at the left side of the ladle.

Now, when the motor 21 is started, the cables 22 and 35 will be wound, so that the hook 27 will be elevated to tilt the ladle about its trunnions 19, or into the dotted line position of the ladle, as shown in Fig. 3. Of course, when the parts are returned to the position shown in Fig 4, and then the motor 45 is actuated, it will cause the crank pin 41 to again move to a point above the shaft 42, with the result that the hook will be moved from the full line position of Fig. 4, to the dotted line position of that figure.

From the foregoing it is believed that the construction, operation, and advantages of the invention may be readily understood, and I am aware that changes may be made in the details disclosed, without departing from the spirit of the invention, as expressed in the claims.

What I claim and desire to secure by Letters Patent is:

1. A mechanism of the character described, including a trolley carriage, a main hoisting drum on the carriage provided with a hoisting cable, a member tilting drum on the carriage provided with hoisting cables, connected pulleys engaging the last mentioned cables, a tilting member operatively connected to the pulleys to be swung or elevated by the latter, and means coacting with one of the last mentioned cables for raising or lowering one of the pulleys so as to swing the tilting member.

2. A mechanism of the character described, including a main hoisting drum provided with a hoisting cable, a member tilting drum provided with hoisting cables, pulleys engaging the last mentioned cables, a tilting member operatively connected to the pulleys to be swung or elevated by the latter, means coacting with one of the last mentioned cables for raising or lowering one of the pulleys so as to swing the tilting member, and a lever connecting said pulleys.

3. A mechanism of the character described, comprising a trolley carriage, a main hoisting drum mounted on the carriage, a main hoisting cable actuated by said drum, elevating means supported by the cable, an auxiliary hoisting drum mounted on the carriage, cables actuated by the auxiliary drum, pulleys operatively connected with the last mentioned cables, axles associated with the pulleys, a lever connected to said axles, a tilting member supported by the axles, and means operatively connected to one of the last mentioned cables for swinging said tilting member.

4. A mechanism of the character described, comprising a trolley carriage, a main hoisting drum mounted on the carriage, a main hoisting cable actuated by said drum, elevating means supported by the cable, an auxiliary hoisting drum mounted on the carriage, cables actuated by the auxiliary drum, pulleys operatively connected with the last mentioned cables, axles associated with the pulleys, a lever connected to said axles, a tilting member supported by the axles, and means operatively connected to one of the last mentioned cables for swinging said tilting member, the last mentioned means including a lever connected to one end of one of said cables and pivotally mounted on the carriage.

5. A mechanism of the character described, comprising a trolley carriage, a main hoisting drum mounted on the carriage, a main hoisting cable actuated by said drum, elevating means supported by the cable, an auxiliary hoisting drum mounted on the carriage, cables actuated by the auxiliary drum, pulleys operatively connected with the last mentioned cables, axles associated with the pulleys, a lever connected to said axles, a tilting member supported by the axles, means operatively connected to one of the last mentioned cables for swinging said tilting mem-

ber, the last mentioned means including a crank pin operatively connected to one end of one of said cables, and an electric motor for actuating the crank pin.

6. A crane trolley comprising a carriage, a main drum mounted on the carriage, an electric motor for actuating the drum, main cables wound on the drum, each cable having one of its ends secured to the drum and its other end secured to the carriage, a hoisting element having guide pulleys suspended from said cables, motor operated auxiliary drum means mounted on the carriage, auxiliary cables wound on the auxiliary drum means, each of the auxiliary cables having one of its ends secured to the auxiliary drum means and its other end secured to the carriage, pulleys supported by the auxiliary cables, a tilting member partially supported by the last mentioned pulleys, and means for swinging the tilting member toward and away from the hoisting element.

7. A crane trolley comprising a carriage, a main drum mounted on the carriage, an electric motor for actuating the drum, main cables wound on the drum, each cable having one of its ends secured to the drum and its other end secured to the carriage, a hoisting element having guide pulleys suspended from said cables, motor operated auxiliary drum means mounted on the carriage, auxiliary cables wound on the auxiliary drum means, each of the auxiliary cables having one of its ends secured to the auxiliary drum means and its other end secured to the carriage, pulleys supported by the auxiliary cables, a tilting member partially supported by the last mentioned pulleys, means for swinging the tilting member toward and away from the hoisting element, the last mentioned means including a third auxiliary cable having one of its ends secured to the auxiliary drum means, and means connected to the other end of the third auxiliary cable for moving the last mentioned end toward or away from said carriage.

8. In mechanism of the class described, supporting pulleys, means for raising and lowering said pulleys, a hook pivotally connected to the pulleys, a third cable supported pulley, a lever pivotally connecting the third pulley to the first mentioned pulleys, means operatively connecting the third pulley to said hook, a cable supporting the third pulley, and means for elevating or lowering one end of the last mentioned cable for swinging the hook about its pivotal connection with the first mentioned pulleys.

9. In combination, a trolley carriage, main elevating means supported by the carriage, a hoisting element carried by said means, auxiliary elevating means supported by the carriage, means on the carriage for preventing the main elevating means and auxiliary elevating means from moving toward and away from each other, a tilting element pivotally connected to the auxiliary elevating means and swingable toward and away from the hoisting element, and means supported by the carriage for swinging said tiltable member.

10. In mechanism of the character described, a trolley carriage main raising and lowering means supported by the carriage, a hoisting element carried thereby, a ladle supported by the element and pivotally connected to the latter, a ladle tilting hook engageable with the ladle, means supported by the carriage for raising and lowering said hook, and means supported by the carriage for swinging the hook toward and away from the ladle.

11. A crane trolley comprising a carriage, main raising and lowering means supported by the carriage, a hoisting element carried by said means, a ladle supported by and pivotally connected with said element, hoisting drum means mounted on the carriage, a hoisting cable associated with the drum means, a pulley supported by said cable, a tilting hook pivotally connected to the pulley and engageable with the ladle for tilting the latter, and means supported by the carriage for swinging the hook toward and away from the ladle.

12. A crane trolley comprising a carriage, main raising and lowering means supported by the carriage, a hoisting element carried by said means, a ladle supported by and pivotally connected with said element, hoisting drum means mounted on the carriage, a hoisting cable associated with the drum, a pulley supported by said cable, a tilting hook pivotally connected to the pulley and engageable with the ladle for tilting the latter, means for swinging the hook toward and away from the ladle, the last mentioned means including a second pulley operatively connected to the hook, and a second cable engaging the last mentioned pulley and wound on said hoisting drum means.

13. A crane trolley comprising a carriage, motor driven main hoisting drum means mounted on the carriage, main hoisting cables wound on said drum means, a hoisting element suspended from the cables, a ladle pivotally connected to and supported by said element, auxiliary hoisting drum means mounted on the carriage, auxiliary cables wound on the auxiliary drum means, pulleys suspended from said cables, a link suspended from the pulleys, a hook pivotally connected to said link, a lever pivotally connected to said pulleys, a third pulley connected to the lever, a second link connected to the third pulley and pivotally connected to the hook at a point spaced from the point where the first link is connected to the latter, and means for swinging said lever and moving the sec-

ond link for swinging the hook toward and away from the ladle.

14. A crane trolley comprising a carriage, motor driven main hoisting drum means mounted on the carriage, main hoisting cables wound on said drum means, a hoisting element suspended from the cables, a ladle pivotally connected to and supported by said element, auxiliary hoisting drum means mounted on the carriage, auxiliary cables wound on the auxiliary drum means, pulleys suspended from said cables, a link suspended from the pulleys, a hook pivotally connected to said link, a lever pivotally connected to said pulleys, a third pulley connected to the lever, a second link connected to the third pulley and pivotally connected to the hook at a point spaced from the point where the first link is connected to the latter, and means for swinging said lever and moving the second link for swinging the hook toward and away from the ladle, the hook being connected to the second link by a slot and pin connection.

15. A crane trolley comprising a carriage, an electric motor actuated main drum mounted on the carriage, main cables wound on said drum, each cable having one of its ends connected to the drum and its other end connected to the carriage, a hoisting element suspended from the cables, a ladle pivotally connected to and supported by said element, a motor driven auxiliary drum mounted on the carriage, auxiliary cables wound on the auxiliary drum, each auxiliary cable having one of its ends secured to the auxiliary drum, and its other end connected to the carriage, pulleys supported by the auxiliary cables, a link suspended from said pulleys, a tilting hook pivotally connected to the link and engageable with the ladle for tilting the latter, a third auxiliary cable having one of its ends connected to the auxiliary drum, a third pulley suspended from the last mentioned cable, a lever connecting the third pulley to the first mentioned pulleys, a link suspended from the third pulley and pivotally connected to the hook, and means for moving the other end of the third auxiliary cable toward and away from the carriage.

16. A crane trolley comprising a carriage, an electric motor actuated main drum mounted on the carriage, main cables wound on said drum, each cable having one of its ends connected to the drum and its other end connected to the carriage, a hoisting element suspended from the cables, a ladle pivotally connected to and supported by said element, a motor driven auxiliary drum mounted on the carriage, auxiliary cables wound on the auxiliary drum, each auxiliary cable having one of its ends secured to the auxiliary drum, and its other end connected to the carriage, pulleys supported by the auxiliary cables, a link suspended from said pulleys, a tilting hook pivotally connected to the link and engageable with the ladle for tilting the latter, a third auxiliary cable having one of its ends connected to the auxiliary drum, a third pulley suspended from the last mentioned cable, a lever connecting the third pulley to the first mentioned pulleys, a link suspended from the third pulley and pivotally connected to the hook, and means for moving the other end of the third auxiliary cable toward and away from the carriage, the last mentioned means including an electric motor actuated element mounted on the carriage.

In testimony whereof, I have signed this specification.

OSSIAN HIVELY.