

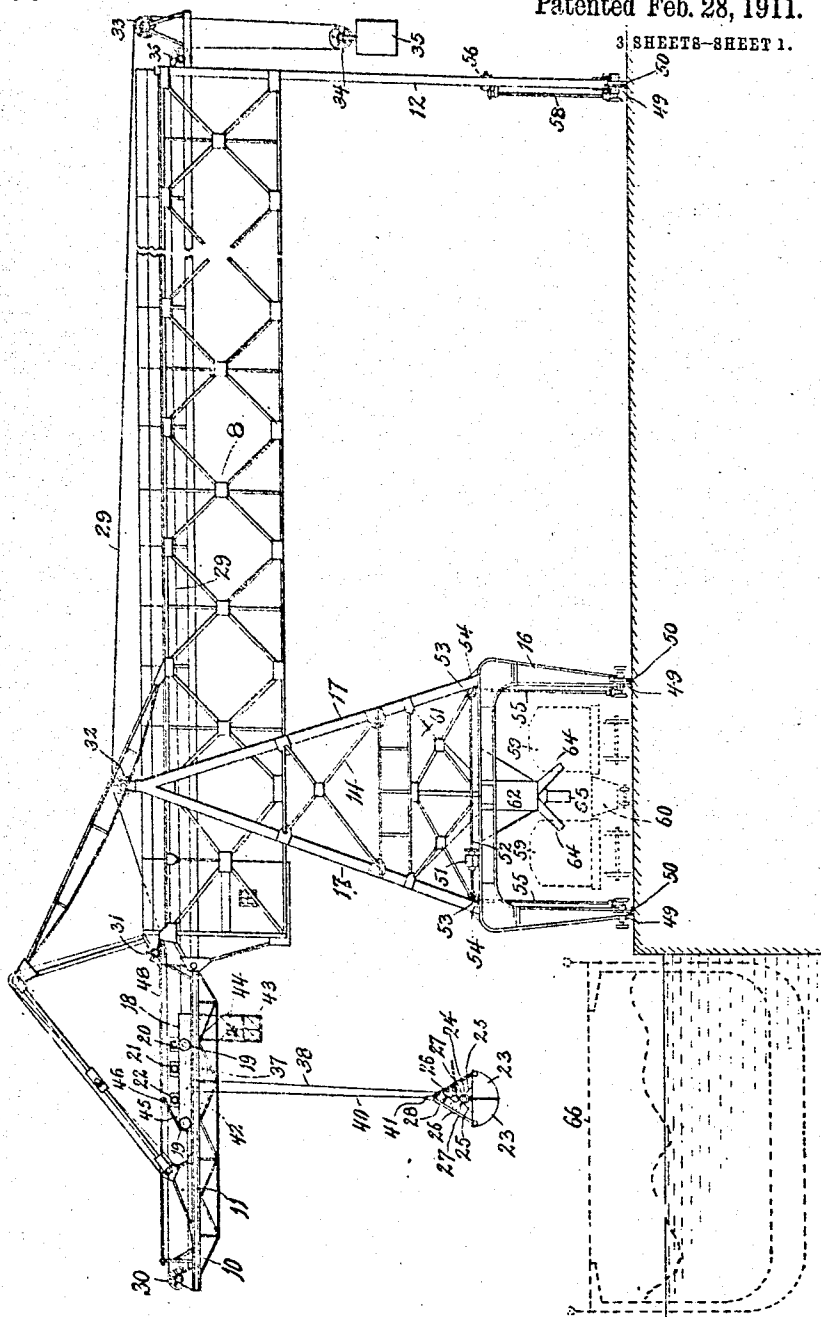
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 APPARATUS FOR ELEVATING, TRANSPORTING, AND DISCHARGING MATERIAL.
 985,417.

APPLICATION FILED APR. 27, 1906.

Patented Feb. 28, 1911.

3 SHEETS-SHEET 1.

Fig. 1.



Witnesses.
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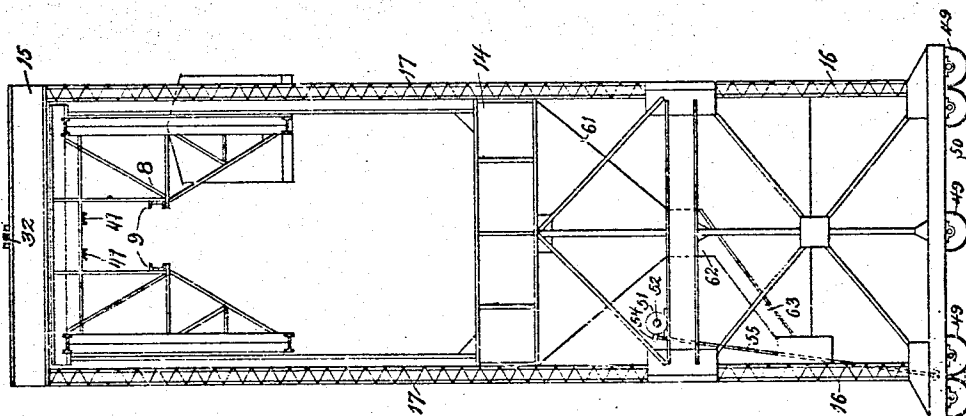
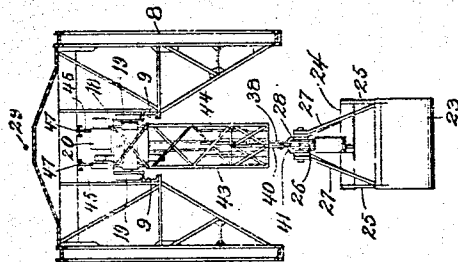
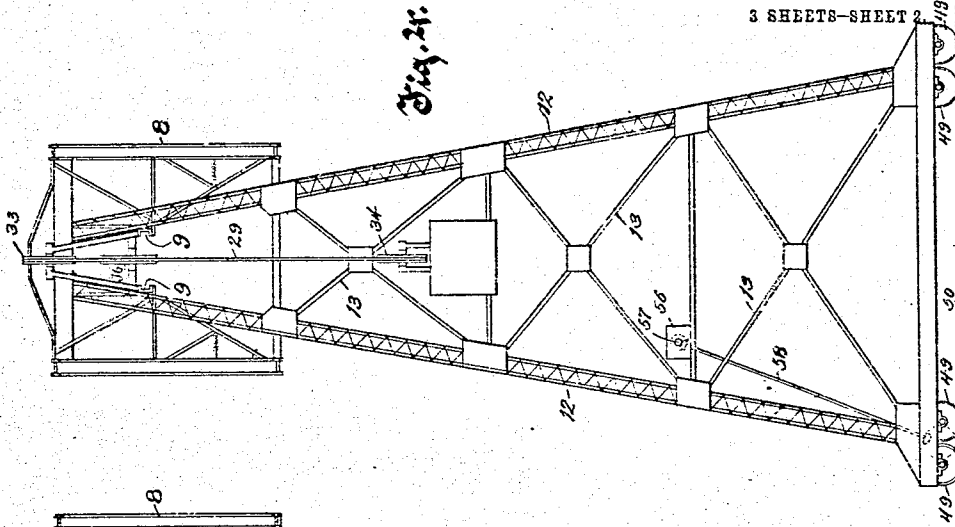
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3 SHEETS-SHEET 2



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Fig. 2.

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3 SHEETS-SHEET 3.

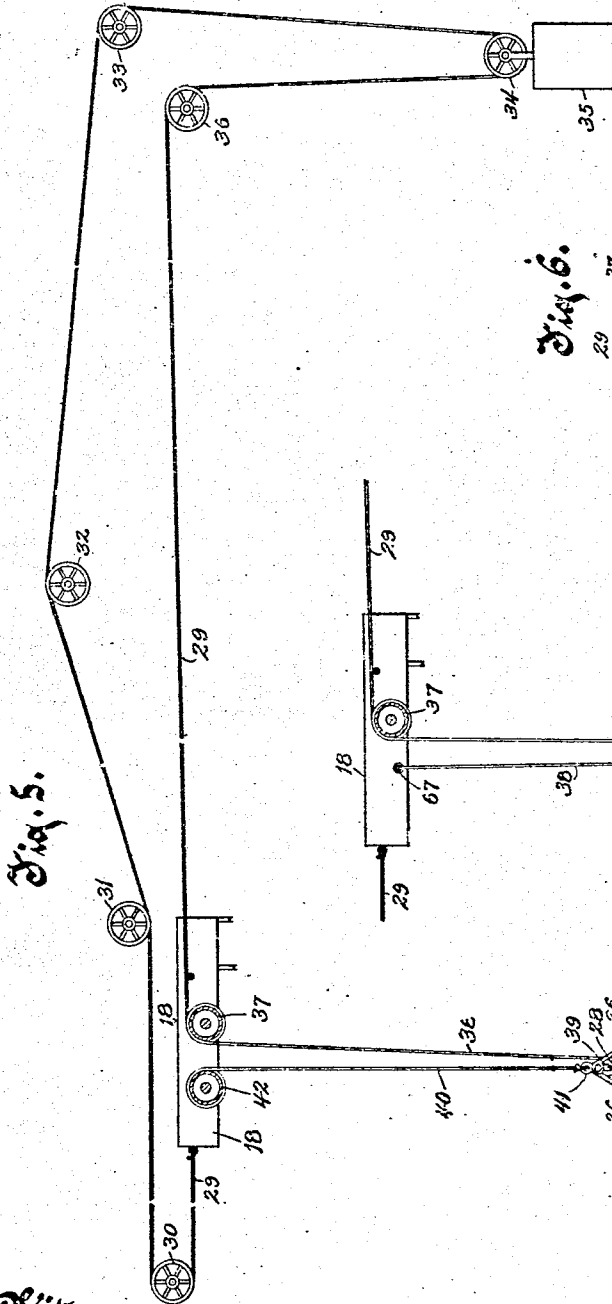


Fig. 5.

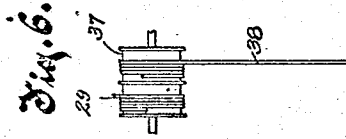


Fig. 6.

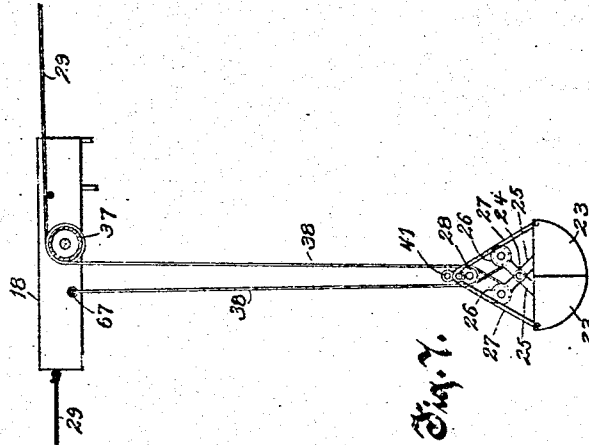


Fig. 7.

Witnesses.

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UNITED STATES PATENT OFFICE.

OLE JOHNSON, OF MILWAUKEE, WISCONSIN; NIKOLINE JOHNSON ADMINISTRATRIX
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APPARATUS FOR ELEVATING, TRANSPORTING, AND DISCHARGING MATERIAL.

985,417.

Specification of Letters Patent.

Patented Feb. 28, 1911.

Application filed April 27, 1906. Serial No. 313,904.

To all whom it may concern:

Be it known that I, OLE JOHNSON, residing in Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Apparatus for Elevating, Transporting, and Discharging Material, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention has relation to improvements in apparatus for elevating, transporting, and discharging material.

The primary object of the invention is to provide a construction wherein the power medium for causing the travel of the carriage, for raising and lowering the bucket, and for opening and closing the bucket jaws is carried directly on and travels with the carriage instead of being stationary and independent of the carriage, as has heretofore been the practice in this class of devices.

A further object resides in employing, in connection with a construction of the above character, a means for balancing the weight of the bucket.

With the above primary, and other incidental, objects in view, the invention consists of the devices and parts, or the equivalents thereof, as hereinafter more fully set forth.

In the accompanying drawing, Figure 1 is a side elevation of the complete apparatus, parts broken away. Fig. 2 is a view of the side supporting frames at the forward end of the apparatus viewing said frames at right angles to Fig. 1. Fig. 3 is a cross section of the horizontal frame, showing the carriage and bucket. Fig. 4 is a view of the rear end of Fig. 1. Fig. 5 is a diagram of the rope connections. Fig. 6 is a view of one of the winding drums; and, Fig. 7 is a diagram of a modified form of rope connections.

Referring to the drawings, the numeral 8 indicates the horizontal framework, of any desired or well known form of construction, and suitably trussed and braced. This frame is provided longitudinally thereof with rails 9—9 which form a track for the travel thereon of the carriage hereinafter referred to. Pivoted to the forward end of the horizontal frame is the usual boom 10,

the major portion of this boom being formed by beams 11—11 which constitute continuations of the rails 9.

The rear end of the frame 8 is supported by means of a trussed support, preferably consisting of legs 12—12 converging upwardly, and connected by means of diagonally crossing brace rods or trusses 13. The forward end of the frame 8 is supported by means of side frames 14—14 having a top connecting piece 15 which bridges over the upper side of frame 8. Each side frame is preferably composed of a lower inverted U-shaped portion 16, and legs 17—17 converging upwardly from said lower portions, and connected at their upper ends to the top connecting piece 15.

Adapted to travel along the track is a carriage 18 which, in the main, is of a usual and well known form of construction, being provided with wheels 19 which are adapted to travel on the rails of the track.

One of the important and novel features of the invention will now be referred to, viz., the arrangement of the power medium for driving the carriage, for raising and lowering the bucket, and for opening and closing the jaws of the bucket, the said power medium being carried directly by the carriage, and being under the control of an operator on the carriage.

The numerals 20, 21 and 22 indicate, respectively, three motors which are mounted directly on the carriage. The motor 20, at the rear of the carriage, is for the purpose of driving the carriage, or, in other words, causing the travel of said carriage, and to this end the motor shaft is geared up to the axle of the rear wheels of the carriage, so that when said motor is started, the rotation of the motor shaft will cause the rotation of the axle, and hence the carriage will be moved either forwardly or rearwardly, in accordance with the direction of turning of the motor shaft. The two remaining motors 21 and 22 are respectively for the purpose of operating the ropes for opening and closing the bucket jaws and for raising and lowering the bucket, the operation of which will be hereinafter fully pointed out.

I employ in connection with my invention, a clam-shell bucket, the two main members of which consist of segmental jaws 23—23

which are pivotally connected to a pivot shaft 24 by means of arms 25. The arms cross each other in diagonal planes, and at their upper extremities, above the pivot shaft, carry sheaves 26—26. Links 27 are connected to the outer ends of the upper edges of the pivoted bottom segments or jaws, and converge upwardly to a point of meeting. Just below the point of convergence of the links 27 is carried a sheave 28. The rope or cable for opening and closing the jaws of the bucket is indicated by the numeral 29. This rope is connected at one end to the front end of the carriage, thence is carried forwardly around a guide sheave 20 at the front end of the boom 10, thence rearwardly and beneath a guide sheave 31, thence at a slight upward inclination over a guide sheave 32, thence continued rearwardly at a slight decline, and over a guide sheave 33 at the rear end of the frame 8, thence downwardly and around a sheave 34 connected to the top of a counter-weight 35, thence upwardly and over a guide sheave 36 at the rear end of the frame 8, thence forwardly and around a winding drum 37, and thence downwardly in engagement with the side of the bucket sheave 28. I prefer that the downward continuation of the rope 29 from the drum 37 be a separate length of rope, indicated by the numeral 38. The terminal end of rope 29, under this arrangement, is wound around drum 37 and secured thereto, and the upper end of extension rope 38 is also connected to drum 37, and then wound therearound a plurality of times, and continued downwardly to sheave 28. Extension rope 38, after leaving sheave 28, is continued around one of the sheaves 26, thence upwardly and over sheave 28, thence downwardly and around the other sheave 26, and thence upwardly and connected at its end to a stud 39.

The lifting or elevating rope is indicated by the numeral 40, and the lower end of this rope is connected to an eye 41 at the point of convergence of the two links 27. This rope is continued to and wound around and secured to another drum 42 carried by the carriage. The motor 21 controls the winding of drum 37, that is to say, the shaft of this motor is geared up to the drum shaft, so that when the motor is set in operation and its shaft rotated, the drum shaft will be rotated in a direction to either raise or lower the rope 38, in accordance with the direction of rotation of the motor shaft. Drum 42 is controlled by motor 22 in the same manner, that is to say, the motor shaft is geared up to the drum shaft, so as to rotate the drum in a direction either to raise or lower the rope 40, in accordance with the direction of turning of the motor shaft. The several motors 20, 21 and 22 are all under the control of an operator traveling with the car-

riage and seated in a depending frame 43, a series of levers 44 for controlling the different motors being arranged in said frame, in convenient position to be operated by the operator.

For supplying the power for operating the different motors, I provide trolley poles 45—45 carrying trolley wheels 46. These wheels 46 are adapted to engage electrical conductors or trolley rails 47—47 extending longitudinally along the main frame 8, extensions 48, thereof, also extending longitudinally along the boom. The current passes from one of the trolley rails, down the trolley pole to the controlling levers 44, and by suitable manipulation of these levers by the operator any one or more of the motors may be thrown into the circuit, and the motors thus operated. The other trolley pole and rail form the return for the electrical current.

If desired, the entire apparatus may be made portable, in order that it may be conveniently located with respect to a vessel from which coal is to be taken, or with respect to piles of coal at different locations. This is accomplished by providing wheels 49 at the lower ends of the lower portions 16 of the side supports 17, and similar wheels at the lower end of the legs 12 of the rear support. These wheels, if desired, may run on suitable rails 50. Mechanical means are advantageously employed for causing the entire apparatus to travel along the rails, and to this end I provide the side frames 17 with a motor 51, the shaft 52 thereof being geared to and adapted to rotate upright shafts 53 through the intermeshing of the gears 53—53 on the ends of shaft 52 with gears 54—54 on the upper ends of said upright shafts 55—55. The lower ends of these upright shafts are geared to the axles of the wheels 49 so as to cause the rotation of said axles. A motor 56 is mounted on the rear supporting frame, and the motor shaft 57 drives an upright shaft 58 through the medium of suitable gearing; and this upright shaft 58, in turn, drives the axles of the wheels 49 of this rear supporting frame through the medium of the gearing between the lower end of shaft 58 and the axles of wheels 49.

The inverted U-shaped lower portions 16 of the side frames 17 are sufficiently high to permit of the passage of cars beneath the top member thereof. These cars are shown by dotted lines in Fig. 1, and the two outer cars are indicated by the numerals 59, 59, and the intermediate smaller car by the numeral 60. If desired, after the bucket is loaded, and raised, the carriage 18 can be moved to a position along its track so as to dump its load into a hopper 61. This hopper has leading therefrom a passage 62, and the bottom of passage 62 is formed by an

inclined screen 63. The coal which is deposited in the hopper 61 passes into the passage 62, and the large lumps of coal pass down the inclined screen, and through discharge spouts 64—64 which diverge outwardly in directions to discharge into the cars 59—59. The finer particles of coal pass through the meshes of the sieve, and enter a spout 65, which is in position to discharge these fine particles into the car 60.

For the sake of describing the operation of the apparatus, it will be assumed that the bucket shown in Fig. 1, had been first lowered into the vessel 66, with the jaws of the bucket in their open position. The motor 21, under the operation of the apparatus would then be thrown into operation, and this would cause a winding of cable 38 and a closing of the jaws of the bucket. The motor 22 is next put into operation, and both motors will then be effective in winding up cables 38 and 40, and consequently hoisting the loaded bucket up to the carriage. Motor 20 is now set into operation, and this will cause the carriage to travel in either direction, in accordance with the direction of turning of the motor shaft, and the carriage will then travel to a place where it is desired to dump the load. When this place is reached, rope 40 is held, the motor 21 reversed, and the shaft thereof thereby caused to rotate in a direction to unwind rope 38. This will cause an opening of the bucket jaws and a dumping of the contents of the bucket, and if it is desired to first lower before dumping, motor 22 is reversed, which will cause an unwinding of rope 40, and when the bucket is lowered sufficiently motor 22 can be thrown out of operation and motor 21 put into operation in a manner to open the jaws as hereinbefore described. After the bucket has discharged its contents, the motor 20 may again be set in action in such manner as to cause the carriage to travel along the track to the point of loading.

It will be seen that by the arrangement of the ropes in connection with the counterweight 35 the weight or heft of the empty bucket is always counterbalanced. While provision has heretofore been made for counterbalancing the weight of the empty buckets in this class of devices, yet I am not aware that a counterbalancing means has been provided in connection with a carriage in which the power medium for operating the carriage is carried directly on the carriage and travels therewith.

The most important object of my invention, however, is the provision broadly of the power medium carried by the carriage, and traveling with the carriage. Under the ordinary arrangements, where the power medium is located at a point distant from the carriage, it is necessary that the operator stand at this point, and it is consequently

very difficult for him to be able to see the bucket at all the different points to which it is carried in the travel of the carriage; the distance from the position of the operator being frequently very great. In fact, under the old construction it is frequently necessary for an extra man to be stationed at the point of dumping to signal the operator at the point where the power medium is controlled, so that said operator may know when to drop the bucket. Under my present improvement, wherein the operator travels with the load, and is at a point above the load, he is always in a position to view the entire operation of loading and unloading, and can thereby most advantageously control the same. My improved construction, also, renders it necessary only to employ minimum amount of rope, owing to the fact that the winding drums are carried directly on the carriage.

In Fig. 7 of the drawing I show a slightly modified rope connection wherein instead of the rope 38, after leaving the last sheave 26, being connected terminally to a stud 28, is continued up into the groove of sheave 28, at a point opposite to its first contact with said sheave and extended to and connected with a pin or stud 67 projecting laterally from the carriage 18. This Fig. 7 construction of bucket is similar to the construction of bucket covered in Letters Patent issued jointly to the present applicant and John Johnson under Patent No. 716,239, dated Dec. 16, 1902, and should be provided with the locking means fully described in said Letters Patent, the locking means referred to providing for locking the bucket in a closed position, and also locking the same in an open position.

Referring more in detail to the operation of the bucket, it is to be stated that by winding up on the rope 38, the upper ends of the arms 25 are brought together, and the jaws of the bucket are consequently also brought together and closed. On the other hand, by unwinding or slackening rope 38, and holding rope 40 taut, the bucket jaws will open by gravity.

What I claim as my invention is:—

1. In an apparatus for elevating, transporting, and discharging material, the combination of a frame provided with a track, a carriage adapted to travel along said track, a receptacle for holding material carried by the carriage, a cable connected to the carriage and the receptacle and extending in a direction in the line of travel of said carriage and returning thereto and adapted to operate the receptacle, a counterweight operatively connected with the cable, power means carried directly by the carriage and constructed to cause the travel of the carriage along its track, and means for operating and controlling said power means

to cause the carriage to travel in either direction.

2. In an apparatus for elevating, transporting and discharging material, the combination of a frame provided with a track, a carriage adapted to travel along said track, a receptacle for holding material carried by the carriage, power means carried directly by the carriage and constructed to cause the travel of the carriage along its track, a cable connected to the carriage and the receptacle and extending in a direction in the line of travel of said carriage and returning thereto, and a counterweight operatively connected to said cable and adapted to counterbalance the weight of the receptacle.

3. In an apparatus for elevating, transporting and discharging material, the combination of a frame provided with a track, a carriage adapted to travel along said track, a receptacle for holding material carried by the carriage, power means carried directly by the carriage and constructed to cause the travel of the carriage along its track, a cable operatively connected to the carriage and the receptacle and extending in a direction in the line of travel of said carriage and running over a sheave provided therefor and returning to said carriage, and a counterweight provided with a sheave suspended from said cable and adapted to counterbalance the weight of the receptacle.

4. In an apparatus for elevating, transporting and discharging material, the combination of a frame provided with a track, a carriage adapted to travel along said track, a receptacle for holding material carried by the carriage, power means carried directly by the carriage and constructed to cause the travel of the carriage along its track, a cable operatively connected to the carriage and the receptacle and extending in a direction in the line of travel of said carriage and running over sheaves provided therefor and returning to said carriage, and a counterweight provided with a sheave suspended from said cable between two of the sheaves and adapted to counterbalance the weight of the receptacle.

5. In an apparatus for elevating, transporting and discharging material, the combination of a frame provided with a track, a carriage adapted to travel along said track, a receptacle for holding material carried by the carriage, power means carried directly by the carriage and constructed to cause the travel of the carriage along its track, a cable operatively connected to the carriage and the receptacle and extending in a direction in the line of travel of said carriage and running over sheaves located near the end of the travel of said carriage in one direction, returning therefrom and running over a sheave located near the end of

the travel of said carriage in the opposite direction and thence to the carriage, and a counterweight provided with a sheave suspended from said cable between two of the sheaves and adapted to counterbalance the weight of the receptacle.

6. In an apparatus for elevating, transporting and discharging material, the combination of a frame provided with a track, a carriage adapted to travel along said track, a receptacle for holding material carried by the carriage, power means carried directly by the carriage and constructed to cause the travel of the carriage along its track, a cable operatively connected to the carriage and the receptacle and extending in a direction in the line of travel of said carriage and running over sheaves located near the end of the travel of the carriage in one direction, returning therefrom and running over a sheave located near the end of travel of said carriage in the opposite direction and thence to the carriage, another cable connected to said receptacle and to said carriage and adapted to raise and lower said receptacle, and a counterweight connected to the first mentioned cable and adapted to counterbalance the weight of the receptacle.

7. In an apparatus for elevating, transporting, and discharging material, the combination of a frame provided with a track, a carriage adapted to travel along said track, power means carried directly by the carriage, a receptacle for holding material carried by the carriage, and operatively connected thereto by a cable, and a counterweight connected operatively with said cable and adapted to counterbalance the weight of the receptacle.

8. In an apparatus for elevating, transporting, and discharging material, the combination of a frame provided with a track, a carriage adapted to travel along the track, power means carried by the carriage, a bucket having pivoted jaws, a rope or cable connected to the carriage and extending in one direction therefrom and around a guide sheave and thence in the opposite direction and in engagement with a series of guide sheaves, and thence back to the power means carried by the carriage, a rope extending downwardly from the power means to the bucket, a counterweight with which the first mentioned rope or cable has a loose or sliding movement, another rope or cable extending from the bucket to the carriage, and means for operating and controlling the power means.

9. In an apparatus for elevating, transporting, and discharging material, the combination of a frame provided with a track, a carriage adapted to travel along said track, power means carried by the carriage, load-carrying means carried by the carriage, and

means for counterbalancing the weight of the load-carrying means.

10. In a hoisting and conveying apparatus, the combination with traversing carriage of self-propelling means thereon, a grab, means upon said carriage for raising and lowering said grab, means upon said carriage for supporting an attendant to control the traverse of the carriage and the movements of the grab, and means for counterweighting the grab, the counterweighting means being relatively fixed with respect to the travel of the carriage, and the line to the counterweighting means extending from the carriage to said means in substantially the line of the travel of the carriage.

11. In a hoisting and conveying apparatus, the combination with a carriage of self-propelling means therefor, a grab, means for raising and lowering the same, an endless rope extending along the path of said carriage and operatively associated with said raising and lowering means, and a counterweight connected to said endless rope to assist in raising said grab.

12. In a hoisting and conveying apparatus, the combination with a traveling carriage, a counterweight located at a relatively fixed point apart from the carriage and at a distance therefrom, a motor for operating the counterweight, said motor being mounted on the carriage, and a rope leading from the counterweight to the motor.

13. In a hoisting and conveying apparatus, the combination with a traversing self-propelled carriage, of a grab, a hoisting drum for said grab upon said carriage, means for counterweighting said grab, said counterweighting means being relatively fixed with respect to the travel of the carriage, and the line to the counterweighting means extending from the carriage to said means in substantially the line of the travel of the carriage and means to relieve the grab of the effect of said counterweighting means.

14. A track, a frame movably supported thereon, a hoisting drum on said frame, a motor on the frame arranged to actuate the hoisting drum, a counterweight located at a fixed point apart from the frame and at a distance therefrom, and a rope connecting the hoisting drum and the counterweight.

15. In a hoisting and conveying apparatus, the combination with a carriage, of self-propelling means therefor, a grab, means for raising and lowering the same, an endless rope extending along the path of said carriage and operatively associated with said raising and lowering means, a counterweight connected to said endless rope to assist in raising said grab, and means upon said carriage for relieving the grab of the counterweighting effect.

16. In an apparatus for elevating, transporting and discharging material, the combination of a frame provided with a track,

a carriage adapted to travel along said track, a receptacle for holding material carried by the carriage, a cable connected to the carriage and the receptacle and extending in a direction in the line of travel of said carriage and returning thereto and adapted to operate the receptacle, a counterweight operatively connected with the cable, power means carried directly by the carriage and constructed to cause the travel of the carriage along its track, means for operating and controlling said power means to cause the machine to travel in either direction, and means for positively raising the counterweight.

17. In an apparatus for elevating, transporting and discharging material, the combination of a frame provided with a track, a carriage adapted to travel along said track, a receptacle for holding material carried by the carriage, power means carried directly by the carriage and constructed to cause the travel of the carriage along its track, a cable connected to the carriage and the receptacle and extending in a direction in the line of travel of said carriage and returning thereto, a counterweight operatively connected to said cable and adapted to counterbalance the weight of the receptacle, and means for positively raising the counterweight.

18. In an apparatus for elevating, transporting and discharging material, the combination of a frame provided with a track, a carriage adapted to travel along said track, a receptacle for holding material carried by the carriage, power means carried directly by the carriage and constructed to cause the travel of the carriage along its track, a cable operatively connected to the carriage and the receptacle and extending in a direction in the line of travel of said carriage and running over a sheave provided therefor and returning to said carriage, a counterweight provided with a sheave suspended from said cable and adapted to counterbalance the weight of the receptacle, and means for positively raising the counterweight.

19. In an apparatus for elevating, transporting and discharging material, the combination of a frame provided with a track, a carriage adapted to travel along said track, a receptacle for holding material carried by the carriage, power means carried directly by the carriage and constructed to cause the travel of the carriage along its track, a cable operatively connected to the carriage and the receptacle and extending in a direction in the line of travel of said carriage and running over sheaves provided therefor and returning to said carriage, a counterweight provided with a sheave suspended from said cable between two of the sheaves and adapted to counterbalance the weight of the receptacle.

ceptacle, and means for positively raising the counterweight.

20. In an apparatus for elevating, transporting and discharging material, the combination of a frame provided with a track and carriage adapted to travel along said track, power means carried directly by the carriage, a receptacle for holding material carried by the carriage, and operatively connected thereto by a cable, a counterweight connected operatively with said cable and adapted to counterbalance the weight of the receptacle, and means for positively raising the counterweight.

21. In an apparatus for elevating, transporting and discharging material, the combination of a frame provided with a track, a carriage adapted to travel along the track, power means carried by the carriage, a bucket having pivoted jaws, a rope or cable connected to the carriage and extending in one direction therefrom and around a guide sheave and thence in the opposite direction and in engagement with a series of guide sheaves and thence back to the power means carried by the carriage, a rope extending from the power means downwardly to the bucket, a counterweight with which the first mentioned rope or cable has a loose or sliding movement, another rope or cable extending from the bucket to the carriage, means for operating and controlling the power means, and means for positively raising the counterweight.

22. In an apparatus for elevating, transporting and discharging material, the combination of a frame provided with a track, a carriage adapted to travel along said track, power means carried by the carriage, load-carrying means carried by the carriage, means for counterbalancing the weight of the load-carrying means, and means for positively raising the counterweight.

23. In a hoisting and conveying apparatus, the combination with a traversing carriage, of a hoisting device, a hoisting drum therefor upon said carriage, an endless rope controlling said drum, and means for counterweighting the hoisting device.

24. In a hoisting and conveying apparatus, the combination of a traversing carriage, a grab, means for raising and lowering said grab, a counterweight located at a relatively fixed point apart from the carriage and at a distance therefrom, a motor for operating the counterweight, said motor being mounted on the carriage, a rope leading from the counterweight to the motor, and means for controlling the motor to relieve the grab of the effect of said counterweight.

25. In an apparatus of the class described, the combination with a self-propelling traversing carriage, a hoisting device suspended thereon, an operating rope, a hoisting rope,

a counterweight associated with said hoisting rope, said counterweight located at a relatively fixed point apart from the carriage and at a distance therefrom, and means for causing a like movement of said ropes, and means also for causing differential movement thereof while positively relieving the hoisting device of the effect of said counterweight.

26. A track, a frame movably supported thereon, a hoisting drum on said frame, a motor on the frame arranged to actuate the hoisting drum, a counterweight near one end of the track, and a rope connecting the hoisting drum and the counterweight.

27. The combination of a traveling carriage, drums carried thereon, a rope extending from the carriage in one direction and in the line of travel of said carriage and over sheaves, and back to the carriage in the line of the travel of the carriage in the opposite direction, said rope connected to one of said drums, a bucket, a rope connected to the last referred to drum and to the bucket, and another rope connected to the other drum of the carriage and extended to and connecting with the bucket.

28. A track, a frame movably supported thereon, a hoisting drum on said frame, a motor on the frame arranged to actuate the hoisting drum, a counterweight near one end of the track, and a rope connecting the hoisting drum and the counterweight.

29. A track, a frame movably supported thereon, a hoisting drum on said frame, a motor on the frame arranged to actuate the hoisting drum, another motor on the frame arranged to move said frame along the track, a counterweight near one end of the track, and a rope connecting the hoisting drum and the counterweight.

30. A track, a frame movably supported thereon, a hoisting drum on said frame, a motor on the frame arranged to accommodate the hoisting drum, another motor on the frame arranged to move said frame along the track, a counterweight located at a relatively fixed point apart from the frame and at a distance therefrom, and a rope connecting said hoisting drum and the counterweight.

31. A track, a frame movably supported thereon, a hoisting drum on said frame, a motor on the frame arranged to actuate the hoisting drum, a counterweight near one end of the track for assisting said hoisting mechanism in lifting a load, and a rope connecting the hoisting drum and the counterweight.

32. A track, a hoisting mechanism movably supported thereon, said mechanism comprising a hoisting drum and means for actuating said drum, a counterweight near one end of the track for assisting said hoisting mechanism in lifting a load, and a rope

connecting the hoisting drum and the counterweight.

33. A track, a hoisting mechanism movably supported thereon, said mechanism 5 comprising a hoisting drum and means for actuating said drum, a counterweight near one end of the track for assisting said hoisting mechanism in lifting a load, and a rope system connecting the hoisting drum and the 10 counterweight, said rope system being so arranged that the lateral movement of the hoisting mechanism does not affect the position of the counterweight.

34. A track, a hoisting mechanism movably supported thereon, said mechanism 15 comprising a hoisting drum and means for actuating said drum, a counterweight near the end of the track for assisting said hoisting mechanism in lifting a load, a rope connecting the hoisting drum and the counterweight, and means for moving the hoisting 20 mechanism along the track.

35. A track, a frame movably supported thereon, a hoisting drum on said frame, a 25 motor on the frame arranged to actuate the hoisting drum, another motor on the frame arranged to move said frame along the track, a counterweight near one end of the track, and a rope connecting the hoisting drum and 30 the counterweight.

36. A track, a frame movably supported thereon, a hoisting drum on said frame, a 35 motor on the frame arranged to actuate the hoisting drum, a counterweight near one end of the track for assisting said hoisting mechanism in lifting a load, and a rope con-

necting the hoisting drum and the counterweight.

37. A track, a hoisting mechanism movably supported thereon, said mechanism 40 comprising a hoisting drum and means for actuating said drum, a counterweight near one end of the track for assisting said hoisting mechanism in lifting a load, and a rope connecting the hoisting drum and the 45 counterweight.

38. A track, a hoisting mechanism movably supported thereon, said mechanism 50 comprising a hoisting drum and means for actuating said drum, a counterweight near one end of the track for assisting said hoisting mechanism in lifting a load, and a rope system connecting the hoisting drum and the counterweight, said rope system being so 55 arranged that the lateral movement of the hoisting mechanism does not affect the position of the counterweight.

39. A track, a hoisting mechanism movably supported thereon, said mechanism 60 comprising a hoisting drum and means for actuating said drum, a counterweight near one end of the track for assisting said hoisting mechanism in lifting a load, a rope connecting the hoisting drum and the counterweight, and means for moving the hoisting 65 mechanism along the track.

In testimony whereof, I affix my signature, in presence of two witnesses.

OLE JOHNSON.

Witnesses:

A. L. MORSELL,

ANNA F. SCHMIDTBAUER.