No. 749,198. PATENTED JAN. 12, 1904.

O. & J. JOHNSON.

HOISTING AND CONVEYING APPARATUS.

APPLICATION FILED SEPT. 3, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 2.

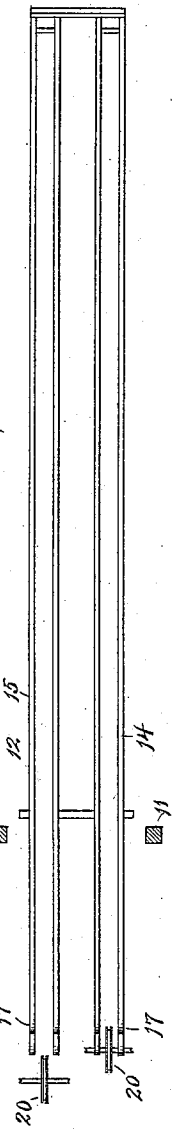


Fig. 3.

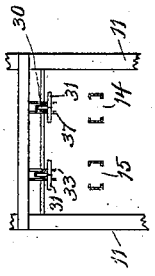


Fig. 8.

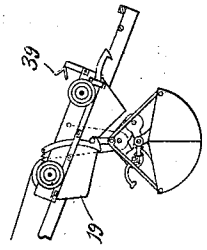


Fig. 4.

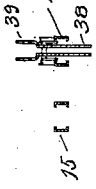


Fig. 5.



Fig. 1.

Witnesses.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 6.

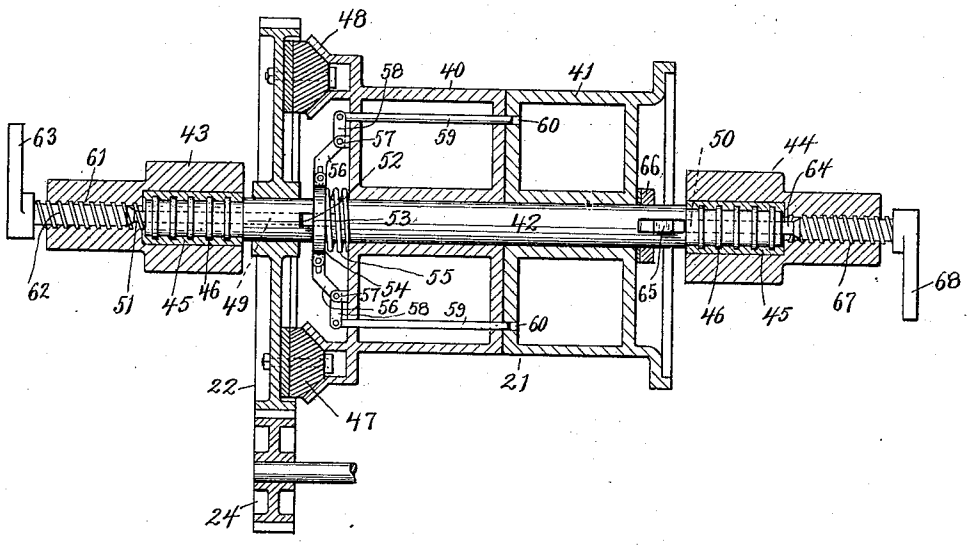
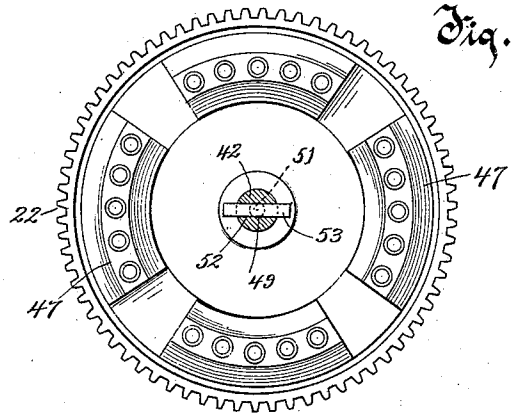


Fig. 7.



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 9.

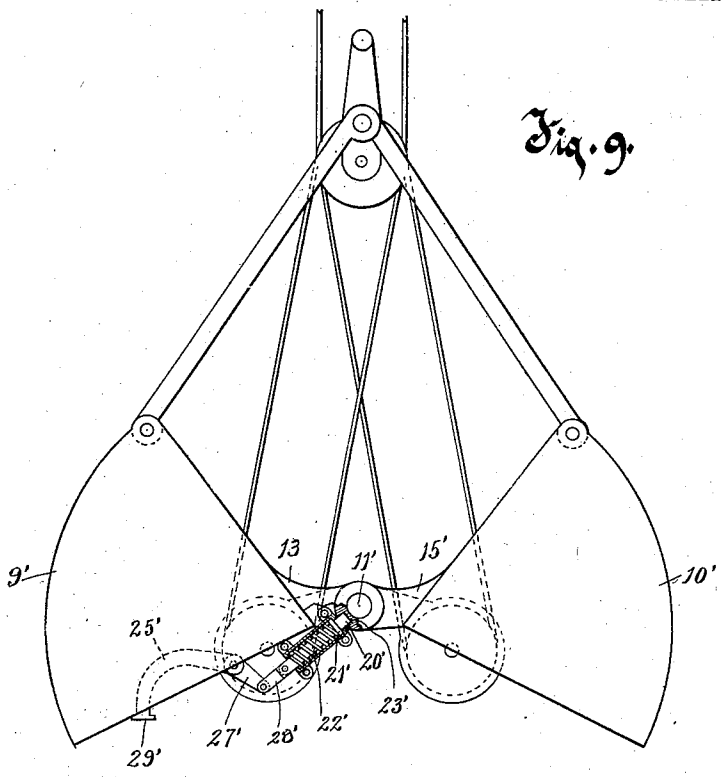
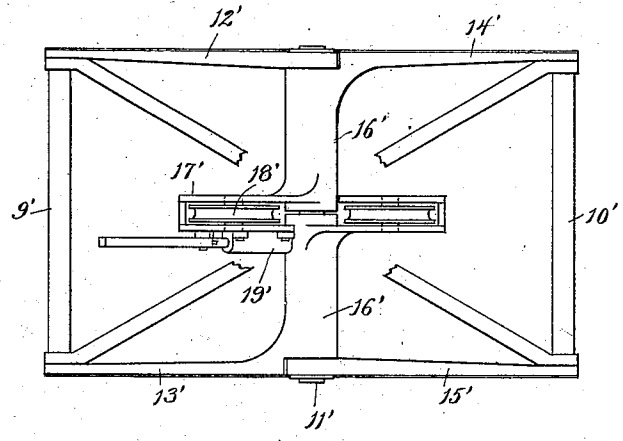


Fig. 10.



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No. 749,198. Patented January 12, 1904.

UNITED STATES PATENT OFFICE.

OLE JOHNSON AND JOHN JOHNSON, OF MILWAUKEE, WISCONSIN.

HOISTING AND CONVEYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 749,198, dated January 12, 1904.

Application filed September 3, 1902. Serial No. 121,928. (No model.)

To all whom it may concern:

Be it known that we, OLE JOHNSON and JOHN JOHNSON, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Hoisting and Conveying Apparatus, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention relates to improvements in hoisting and conveying apparatus, particularly to apparatus for hoisting and conveying material *en masse*, such as coal, and more especially to such apparatus employing buckets similar to those illustrated and described in an application for United States Letters Patent executed by us on the 30th day of May, 1902, filed in the Patent Office on June 12, 1902, and bearing Serial No. 111,276. In said application a bucket of the clam-shell variety is utilized, which is provided with a lock for automatically locking the bucket in opened position and a lock for automatically locking the bucket in closed position. In carrying out the present invention, however, only the lock is necessary which locks the bucket in open position. Therefore the other lock may be dispensed with.

It is the object of this invention to produce an apparatus employing two buckets, one partially counterbalancing the other and operated by means of a single winding apparatus or winch.

A still further object of this invention is to produce an apparatus by means of which two buckets may be operated by a common winding apparatus or winch, the direction of rotation of which will be automatically changed at the proper points in relation to the position or location of the buckets.

These and other objects we attain by means of the device illustrated in the accompanying drawings and described in the specification presented herewith.

In said drawings, Figure 1 is a side elevation of a fragment of a superstructure upon which are mounted a winding-drum, an electric motor for operating said drum, and a rheostat for controlling said motor. A portion of a boom is shown suitably suspended from the superstructure, and a trolley or carriage is shown at the dumping-point, and a bucket is shown in open position suspended from said carriage. Fig. 2 is a plan view of the boom upon which the tracks for the trolleys or carriages are mounted. Fig. 3 is a detail view of a portion of the superstructure. Fig. 4 is a detail view in cross-section of a portion of the trolley-tracks, and this view also shows a portion of one of the carriages between the tracks. Fig. 5 is a detail view of a portion of the device. Fig. 6 is a sectional plan view of the winding apparatus or winch employed in this device. Fig. 7 is a face view of a gear-wheel carrying the friction-plates by means of which the winding-drum is driven from said gear-wheel. Fig. 8 is a side elevation of one of buckets used in connection with the device mounted in a carriage which is supported on a portion of the track carried by the boom. Fig. 9 is a side elevation of said bucket in open position, and this view shows the arrangement of the line in its passage about the several sheaves used. Fig. 10 is a plan view of said bucket with the head line removed and with the links for connecting said head and bucket broken off.

Throughout the several views like elements are denoted by like characters.

In describing the apparatus and the operation of the buckets Fig. 8 will be considered in connection with Fig. 1 and as though the boom shown in Fig. 8 were a continuation of the boom shown in Fig. 1. When the bucket shown in Fig. 1 is in open position and at the point as shown in said figure, the bucket shown in Fig. 8 will be open and in the hold of the vessel or on the material to be hoisted—that is, when one bucket is dumping the other is loading. In other words, when the down bucket is closing the up bucket is opening.

The apparatus preferably consists of any suitable superstructure provided with a platform 9, upwardly-extending portions 10 and 11, and a boom 12, pivotally supported by suitable means to said upwardly-extending portion by a double-hinged joint 13, so that the same can be raised and lowered and swung around to different positions laterally. The boom is provided with two trolley-tracks 14 and 15, which from their lower ends to a point 16 are straight and stand at any desired angle from the horizontal. The tracks at their upper ends are curved up, as at 17, to form stops, and from the points 16 to the ends 17 the tracks

will stand at a less inclination from the horizontal than from the point 16 to their lower ends, and the purpose of this will be hereinafter described. Two trolleys or carriages 18 and 19 are used, one to each track. The carriages will be the same as the one described in my former application, before referred to, and by means of the locking mechanism employed on the carriage each carriage as it reaches the lower end of its track will be locked to the track and the bucket released from the carriage and allowed to fall to the loading-level.

The bucket consists of two segments 9′ and 10′, pivotally connected to a pivot-shaft 11′ by means of four arms 12′, 13′, 14′, and 15′, riveted or otherwise suitably attached to the upper parts of the side pieces. Each of the arms is provided with an upwardly-extending portion having an eye therein adapted to encompass said shaft, which lies directly above the meeting edges of the bucket when in closed position. The arms 12′ and 15′ are formed in the nature of links, while each of the arms 13′ and 14′ is provided with an offset and cylindrically-formed portion 16′ surrounding the pivot-shaft and extending toward the center to within working distance of the other. The cylindrical portion 16′ of the arm 13′ is provided with a sheave-carrier 17′, formed in the nature of a shield or housing for protecting a sheave 18′, rotatably carried on a shaft supported by its side walls from contact with the material to be hoisted. The shaft-housing projects past the pivot-shaft onto the segment 10′ side of the bucket and forms a lever, the strain of which is transmitted by its cylinder 16′ and arm 13′ to segment 9′. Arm 14′ is formed in a manner, as far as 13′ has been explained, identical with arm 13′, but the sheave-housing of arm 14′ has a housing 19′ of a locking agent riveted or otherwise secured thereto.

The locking agent consists of a locked bolt 20′, reciprocally contained within the housing and formed with a collar or shoulder 21′, between which and the outer end of said housing a spiral spring 22′ is confined around the stem of the bolt which projects beyond the outer end of the housing. The cylinder 16′ of arm 13′ is provided with a hole 23′, into which said bolt is adapted to be forced when in line therewith by said spring to lock the segments 9′ and 10′ against pivotal movement until the bolt is released or withdrawn. When the bolt is within hole 23′, the bucket will be locked in open position.

A lever 25′ is pivotally carried by a suitable stud-pin 26′, secured to the sheave-housing carrying the lock, and said lever has a short arm 27′, connected by means of a link 28′ to the outer end of the locking-bolt. The other end of the lever is provided with a contact-foot 29′. It will be seen that when the bucket moves to open position it will be automatically locked and will remain locked until contact-foot 29′ contacts with material to be hoisted. This contact will draw the locking-bolt and allow the bucket to move to closed position when hoisted.

A closing and hoisting line is employed for each bucket, which also serves to haul the carriage or trolley from the point of loading to the point of dumping, and said lines will pass over sheaves 20 for that purpose, carried by suitable means on the superstructure. From the sheaves the lines will pass down and around the common winding-drum 21, employed in a winding apparatus carried on platform 9 of the superstructure. The winding-drum, which will be hereinafter more fully described, is adapted by means to be secured to a gear-wheel 22, and an electric motor 23, rotatable in either direction, carries a gear-wheel 24 in mesh with gear-wheel 22. A rheostat 25 for controlling the motor 23 is in the motor-circuit and is provided with two arms 26 and 27. The rheostat can be of any of the well-known types—can either be a controller or a motor starter, employing the different steps of resistance. Connected to the outer end of arm 26 is a line 28, which passes over a sheave 29 and over a sheave 30, and at its outer end is provided with a cross piece or bar 31, Fig. 5. A suitable weight 32 is carried by line 28 a distance above arm 26, and said weight is adapted to take up the slack in the line above it and to keep cross-piece 31 normally in engagement with two **V**-shaped retainers 37. The retainers are positioned far enough apart so that the line may pass between them, and so that they will keep the cross-piece from wabbling and at right angles to the line. A line 34, provided with a weight 35 similar to line 28, passes over a sheave 36 and a sheave 30 and is provided with a terminal cross-piece 31, which is also normally engaged by **V**-shaped retainers 33.

Each carriage 18 and 19 is provided with two upwardly-extending members 38, each of which is provided with a **V**-shaped grasping member 39. These **V**-shaped grasping members are positioned far enough apart so that as the carriages move under retainers 33 and 37 the grasping members 39 will pass each side of the **V**-shaped retainers, grasp the cross-piece 31, and carry it with the carriage in its movement toward the upper end of the tracks. From this it will be seen that when the cross-piece of one of the lines is carried toward the upper end of the track the arm of the rheostat to which it is attached will be raised, and when this is done the direction of rotation of the motor will be reversed. As the carriage moves back down along the track the weight on the line will take up the slack above it and carry the cross-piece back to its **V**-shaped retainers. It will also be seen that the arm to which the line which has moved is attached will remain in its raised position until lowered by the upward movement of the other arm.

The portion of the tracks between the lower

ends and the points 16 will be at such an inclination that the strain on the hoisting and hauling line exerted by the carriage and the bucket will hold the bucket in closed position, and the inclination from the points 16 to the upper ends of the tracks will be such that when the motor is reversed, and by it the winding-drum, the tendency of the carriage to move down the track will be so slight that the bucket will have a chance to be opened by the load it contains. When the bucket is opened, the lock, described in the former application referred to, will lock the bucket in open position, and it will so remain locked in open position until it contacts with the material to be hoisted, at which time the lock will be released and the bucket will be closed by the closing and hoisting line.

It is often necessary to change the lengths of the hoisting-lines to accommodate different loading-levels, and in order to do this, in this apparatus, in Figs. 6 and 7 we have illustrated a means by which this may be accomplished. Winding-drum 21 is shown formed in two sections 40 and 41, and the hoisting-lines will be wound around their sections in opposite directions. The sections are loosely mounted on a shaft 42, journaled within suitable bearing-boxes 43 and 44. The boxes are preferably lined with antifriction metal 45 and the shaft within the bearings is provided with annular flanges 46 to prevent the same from moving longitudinally within the bearings. Gear-wheel 22 is keyed to shaft 42 and is provided, preferably, with friction-blocks 47, formed of paper, which are bolted to the gear-wheel. The friction-blocks 47 are formed substantially V-shaped in cross-section and are adapted to fit within a V-shaped flange 48, formed on and extending around section 40 of the drum. The ends of the shaft 42 are bored out, as shown by dotted lines at 49 and 50. A pin 51 is located within a bore 49, and connected to said pin and extending through a transverse slot 52 in the shaft 42 is a sliding block or cross-piece 53. Loosely surrounding shaft 42, between cross-piece 53 and section 40 of the drum, is a collar 54, which is yieldingly held away from section 40 of the drum by a coiled spring 55, which surrounds shaft 42 between said collar and said section 40. Pivotally connected to collar 54 by suitable means are two levers 56, each fulcrumed within a suitable projection 57, secured to section 40 of the drum. Each lever has an outwardly-extending arm 58, to which is pivoted a rod 59, which extends through the front and rear walls of section 40 of the drum and is adapted to fit within a hole or opening 60 in the forward wall of section 41 of the drum when said hole is brought into register therewith.

Section 41 of the drum is provided with a series of holes 60, in any two of which rods 59 may lie when brought in register therewith. Spring 55 tends to normally hold rods 59 in two of the holes 60 to thereby lock sections 40 and 41 of the drum together. The outer end of bearing 43 is bored and threaded, as shown at 61, and a screw 62, provided with a lever-arm 63, is adapted to be turned into the threads 61 to press against the end of pin 51 to force said pin inwardly, and with it cross-piece 53. When cross-piece 53 is forced inwardly far enough against the stress of spring 55, the rods 59 will be brought out or removed from engagement with the openings in section 41 of the drum, and section 41 may be rotated by hand or otherwise independently of section 40 to vary the length of the hoisting-lines.

Bore 50 of shaft 42 is provided with a pin 64, which carries at its inner end a cross-piece 65, projecting through a suitable transverse slot in said shaft and bearing against a collar or washer 66, loosely carried on shaft 42, between said cross-piece 65 and the rear end of section 41 of the drum. A screw 67, provided with a lever-arm 68, is adapted to bear against the end of pin 64 to force said pin against collar 66, and by means of this screw 67 the several sections 40 and 41 of the winding-drum may be forced against friction-blocks 47, carried by gear-wheel 22, and by means of this screw the friction between the friction-blocks 47 and the flange 48 may be varied. By this means when the line on section 41 of the drum has been shortened or lengthened and the two sections of the drum locked together the drum may be allowed to rotate independent of gear-wheel 22 to adjust the lines on the drum, so that they will have the proper lengths relative one to the other.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of two hoisting-buckets of the clam-shell variety each provided with means for automatically locking it in open position, of a closing and hoisting line for each bucket, a winding apparatus common to said lines, means for rotating said winding apparatus and mechanism for automatically changing the direction of rotation of said winding apparatus at the desired times in relation to the position of said buckets.

2. The combination with two clam-shell hoisting-buckets, of means on each bucket after it has opened for automatically locking it in open position until released by material to be hoisted, a movable carriage for each bucket, a line on each bucket for closing and hoisting it and moving its carriage, a winding apparatus for said lines, means for rotating said winding apparatus in either direction, and mechanism for automatically changing the direction of rotation of said winding apparatus at the proper times.

3. The combination with tracks having two inclines, of two hoisting-buckets of the clam-shell variety, a movable carriage for each

bucket, means on each bucket, after it has moved to open position and until it contacts with material to be hoisted, for holding said bucket in open position, a line for each bucket for closing it, hoisting it and moving its carriage, a winding apparatus common to said lines, means for imparting rotation to said winding apparatus, a governor for determining the direction of rotation of said means and a member in the path of travel of each carriage through the agency of which said governor is actuated.

4. The combination with tracks having two inclinations, of two movable carriages, a hoisting-bucket for each carriage, a line on each bucket for closing and hoisting it and moving its carriage from a point of loading to a point of dumping, a winding apparatus common to said lines, means for varying the operative length of said lines on said winding apparatus, a motor for said winding apparatus, and means actuated by said carriages in their travel for governing the operation of said motor.

5. The combination with tracks leading from the point of loading to the point of dumping, of two movable carriages, two buckets of the clam-shell variety, a lock on each bucket for holding each bucket in open position after it has opened at the point of dumping and until it contacts with material to be hoisted, a line for each bucket for closing and hoisting it and moving its carriage from the point of loading to the point of dumping, an agent for winding said lines and means for automatically reversing the direction of rotation of said agent when each bucket reaches the point of dumping.

6. The combination with tracks, of two movable carriages, a hoisting-bucket for each carriage, a line for closing and hoisting each bucket and moving its carriage, a winding apparatus common to said lines, an electric motor for operating said winding apparatus, a rheostat for governing the operations of said motor, and means for automatically actuating said rheostat to reverse the direction of rotation of said motor.

7. The combination of two hoisting-buckets, of a closing and hoisting line for each bucket, a winding apparatus common to said lines, means for rotating said winding apparatus, and mechanism for automatically changing the direction of rotation of said winding apparatus at the desired times in relation to the position of said buckets.

8. The combination with two hoisting-buckets, of a hoisting-line for each bucket, a winding apparatus common to said lines, means for rotating said winding apparatus and mechanism for automatically changing the direction of rotation of said apparatus at the desired times in relation to the position of said buckets.

9. The combination with two hoisting-buckets, of a movable carriage for each bucket, a line on each bucket for hoisting it and moving its carriage, a winding apparatus for said lines, means for rotating said winding apparatus in either direction, and mechanism for automatically changing the direction of rotation of said winding apparatus.

10. The combination with tracks, of two hoisting-buckets, a movable carriage for each bucket, a line for each bucket for hoisting it and moving its carriage, a winding apparatus common to said lines, means for imparting rotation to said winding apparatus, a governor for determining the direction of rotation of said means and a member in the path of travel of each carriage through the agency of which said governor is actuated.

11. The combination with tracks, of two movable carriages, a hoisting-bucket for each carriage, a line on each bucket for hoisting it and moving its carriage from a point of loading to a point of dumping, a winding apparatus common to said lines, means for varying the operative length of each of said lines on said winding apparatus, a motor for operating said winding apparatus and means actuated by said carriages in their travel for governing the operation of said motor.

12. The combination with tracks leading from the point of dumping to the point of loading, of two movable carriages, two buckets, a line for each bucket for hoisting it and moving its carriage from the point of loading to the point of dumping, an agent for winding said lines, and means for automatically reversing the direction of rotation of said agent when each of said buckets reaches the point of dumping.

13. The combination with tracks, of two movable carriages, a hoisting-bucket for each carriage, a line for hoisting each bucket and moving its carriage, a winding apparatus common to said lines, an electric motor for operating said winding apparatus, a rheostat for governing the operations of said motor, and means for automatically actuating said rheostat to reverse the direction of rotation of said motor.

14. The combination with two clam-shell hoisting-buckets, of means on each bucket after it is opened for automatically locking it in open position until released by material to be hoisted, a movable carriage for each bucket, a line on each bucket for closing and hoisting it and moving its carriage, a winding apparatus for said lines and means for rotating said winding apparatus in either direction.

15. The combination with tracks having two inclines, of two hoisting apparatuses of the clam-shell variety, a movable carriage for each bucket, means on each bucket, after it has been moved to open position and until it contacts with material to be hoisted, for holding said bucket in open position, a line for each bucket for closing it, hoisting it and moving its car-

riage, a winding apparatus common to said lines, and means for imparting rotation to said winding apparatus.

16. The combination with tracks having two inclinations, of two movable carriages, a hoisting-bucket for each carriage, a line on each bucket for closing it, hoisting it and moving its carriage from a loading-point to a dumping-point, a winding apparatus common to said lines, means for varying the operative length of said lines in relation to said winding apparatus, and a motor for operating said winding apparatus.

17. The combination with tracks leading from the point of loading to the point of dumping, of two movable carriages, two buckets of the clam-shell variety, a lock on each bucket for holding said bucket in open position after it has been opened at the point of dumping and until it contacts with material to be hoisted, a line for each bucket, for closing it, hoisting it and moving its carriage from the point of loading to the point of dumping, an agent for winding said line, and means for operating said agent.

18. The combination of a track having two inclinations, a clam-shell hoisting-bucket provided with means for automatically locking it in open position after it has opened and until it contacts with material to be hoisted, a carriage for said hoisting-bucket movable on said track, a line for closing said bucket, hoisting it and moving its carriage and mechanism for winding said line.

19. The combination with an inclined track of a hoisting-bucket of the clam-shell variety provided with means for automatically locking it after it is opened, and until it contacts with material to be hoisted, in open position, a carriage for said bucket movable on said track, a line for said bucket for closing it, hoisting it and moving its carriage, and means for automatically releasing said lock at the desired time.

20. The combination of two hoisting-buckets having movable sections, means for automatically locking said buckets in open position, of a closing and hoisting line for each bucket, a winding apparatus common to said lines and means for rotating said winding apparatus.

21. The combination with two hoisting-buckets each provided with means for automatically locking it in open position, of a closing and hoisting line for each bucket, a winding apparatus common to said lines, means for rotating said winding apparatus and mechanism for automatically changing the direction of rotation of said winding apparatus at the desired times in relation to the position of said buckets.

22. The combination with two hoisting-buckets, of means on each bucket after it has opened for automatically locking it in open position until released by material to be hoisted, a movable carriage for each bucket, a line on each bucket for closing it, hoisting it and moving its carriage, a winding apparatus for said lines, means for rotating said winding apparatus and mechanism for automatically changing the direction of rotation of said apparatus.

23. The combination with a hoisting-bucket of the clam-shell variety provided with means for automatically locking it in open position, of a closing and hoisting line for said bucket, a winding apparatus for said line, means for rotating said apparatus and means for counterbalancing said bucket.

24. The combination with a clam-shell hoisting-bucket, of means after said bucket has opened for automatically locking it in open position until released by material to be hoisted, a movable carriage for said bucket, a line on said bucket for closing and hoisting it and moving its carriage, a winding apparatus for said lines, means for rotating said winding apparatus and means for counterbalancing said bucket.

25. The combination with a hoisting-bucket of the clam-shell variety provided with means for automatically locking it in open position, of a closing and hoisting line for said bucket, a winding apparatus for said line, means for rotating said winding apparatus, mechanism for changing the direction of rotation of said winding apparatus, and an agent for counterbalancing said bucket.

26. The combination with a clam-shell bucket, of means on said bucket after it has opened for automatically locking it in open position until released by material to be hoisted, a movable carriage for said bucket, a line on said bucket for closing and hoisting it and moving its carriage, a winding apparatus for said line, means for rotating said winding apparatus in either direction and an agent for counterbalancing said bucket.

27. The combination with a track having two inclines, of a hoisting-bucket of the clam-shell variety, a movable carriage for said bucket, means on said bucket after it has moved to open position and until it contacts with material to be hoisted, for holding said bucket in open position, a line for said bucket for closing it, hoisting it and moving its carriage, a winding apparatus for said line, means for imparting rotation to said winding apparatus and an agent for partially counterbalancing said bucket.

In testimony whereof we affix our signatures in presence of two witnesses.

OLE JOHNSON.
JOHN JOHNSON.

Witnesses:
ANNA V. FAUST,
A. L. MORSELL.