H. J. DE VRIES.

DERRICK.

APPLICATION FILED JUNE 29, 1914.

1,175,617.

Patented Mar. 14, 1916.

4 SHEETS—SHEET 1.

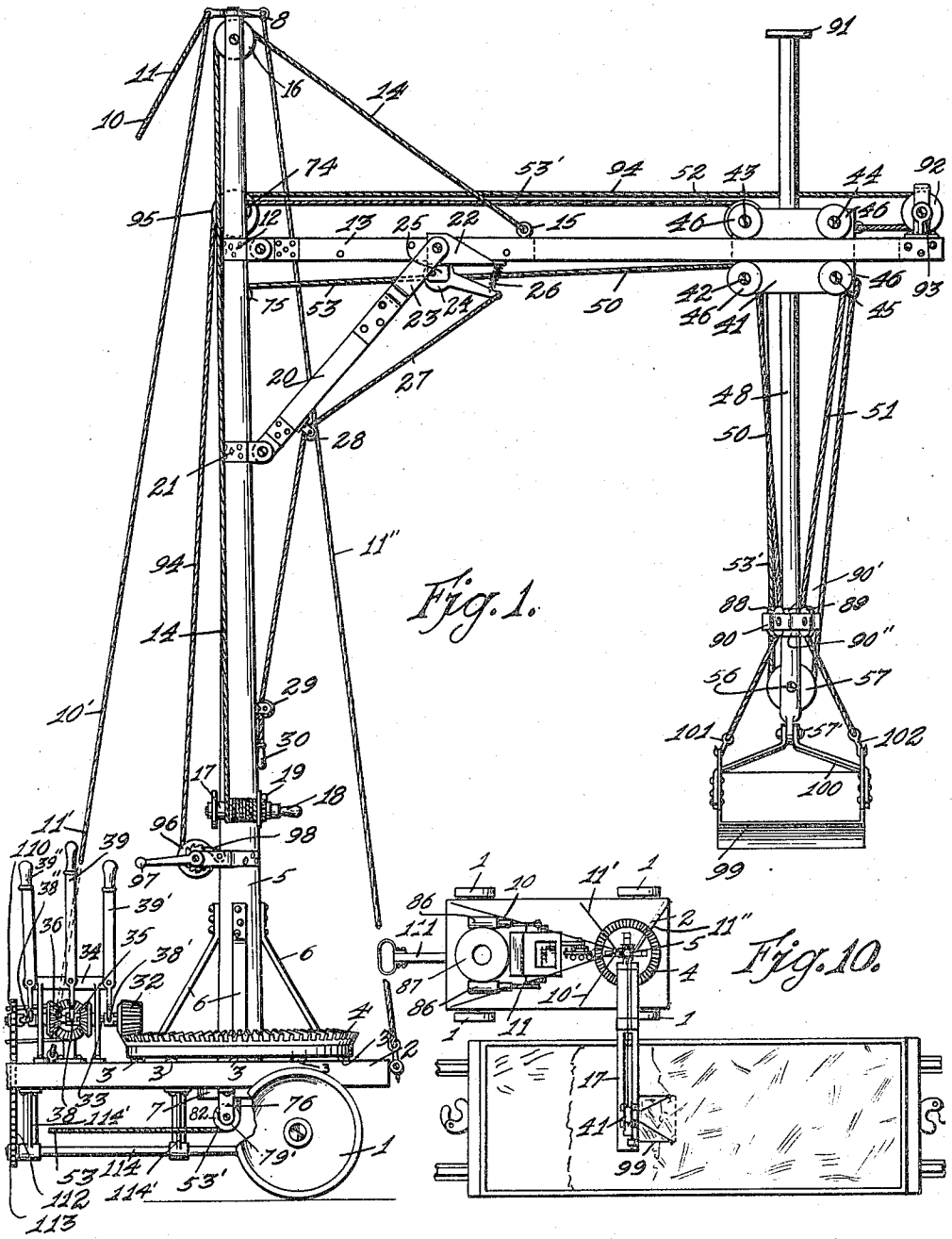


Fig. 1.

Fig. 10.

WITNESSES:

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A. H. Kephart

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HENRY J. DE VRIES.

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4 SHEETS—SHEET 2.

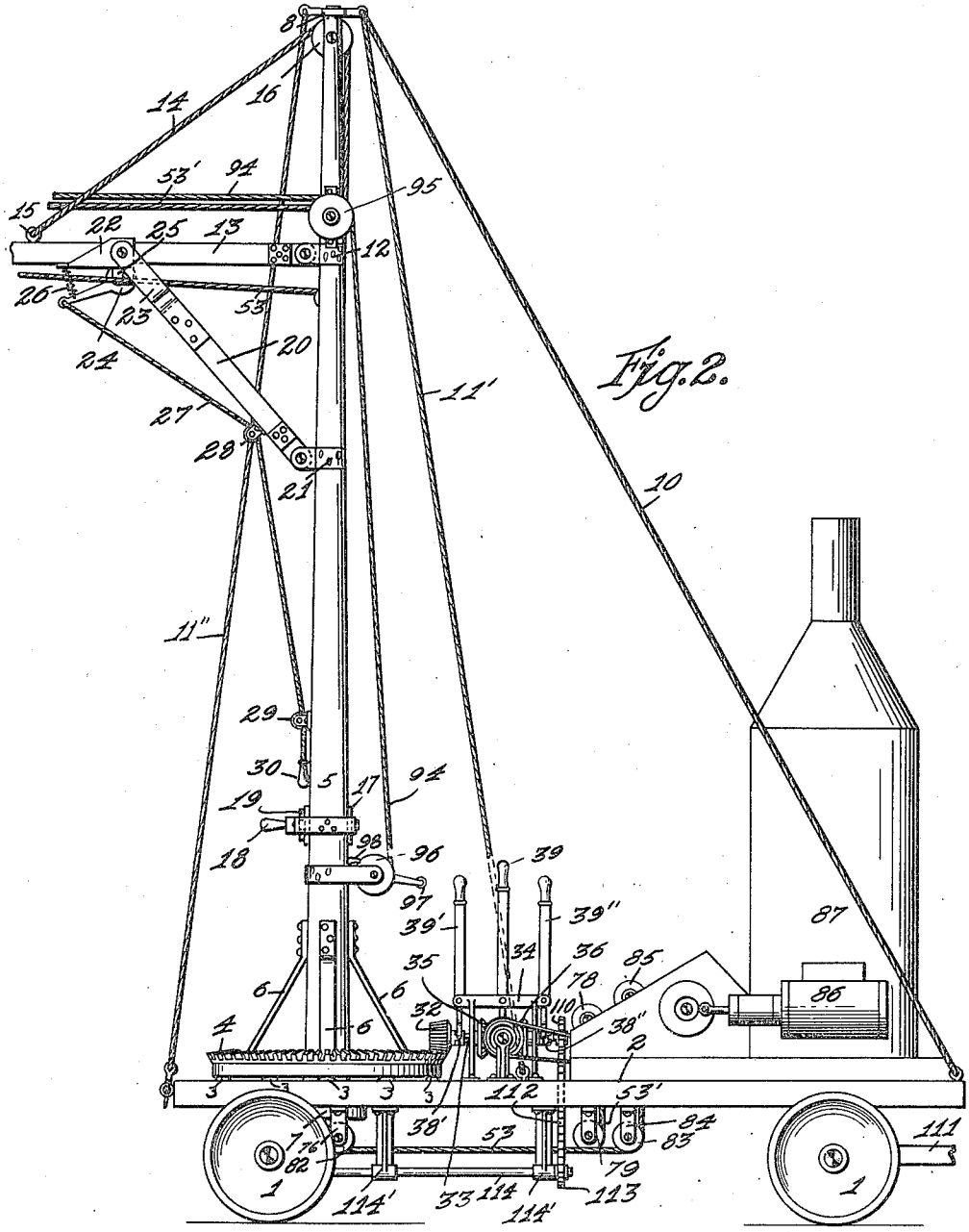


Fig. 2.

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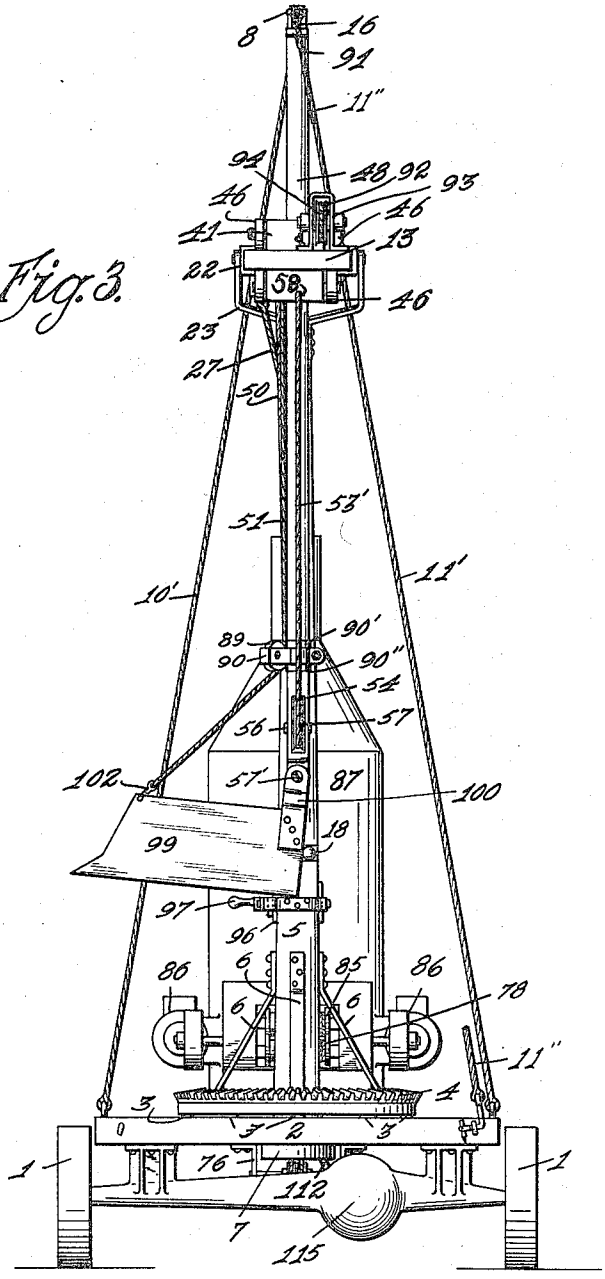
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4 SHEETS—SHEET 3.

Fig. 3.



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4 SHEETS—SHEET 4.

Fig. 4.

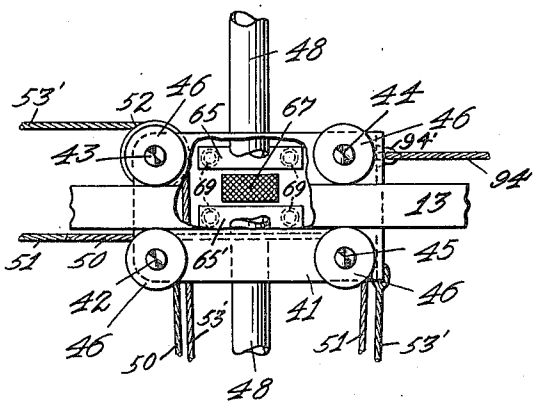


Fig. 5.

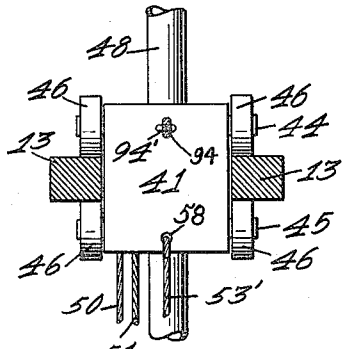


Fig. 6.

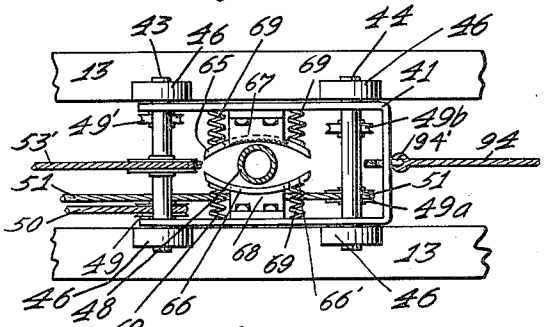


Fig. 7.

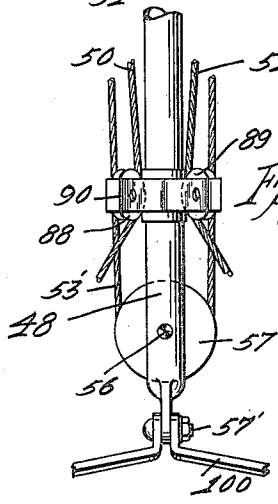


Fig. 8.

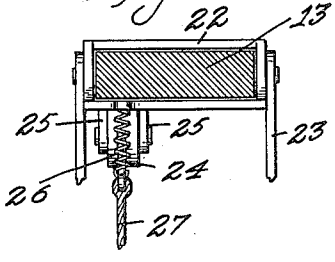
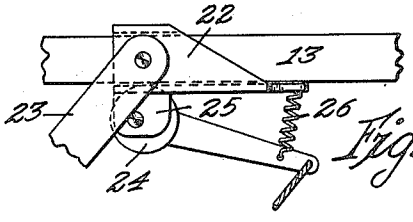


Fig. 9.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY J. DE VRIES, OF BURLINGAME, CALIFORNIA.

DERRICK.

1,175,617. Specification of Letters Patent. Patented Mar. 14, 1916.

Application filed June 29, 1914. Serial No. 847,967.

To all whom it may concern:

Be it known that I, HENRY J. DE VRIES, a citizen of the United States, residing at Burlingame, in the county of San Mateo and State of California, have invented a new and useful Derrick, of which the following is a specification in such full and clear terms as will enable those skilled in the art to construct and use the same.

This invention relates to a derrick and bucket therefor and its object is to provide means whereby the bucket may be used for scooping up sand, gravel or earth more effectively by having the weight of the derrick, boom, mast and car transferred thereto.

It will be understood that with the ordinary grabbing bucket, the bucket alone forms the means for holding the bucket down on the material when the bucket is to be closed, the closing operation necessarily partially lifting the bucket and thus decreasing its effectiveness.

This invention is for the purpose of either handling a grabbing bucket or any other form of bucket and for either loading it or closing the bucket without at the same time partially lifting the same, the weight of the boom and mast being made effective to hold the bucket down by means of a handle to which the bucket is pivoted or otherwise secured.

While one form of bucket has been shown it will be clear that several forms thereof may be used if desired.

Another object of the invention is to produce a bucket and derrick capable of propelling itself along a car to completely unload the material at each end of the car, the bucket being reversed in position when necessary to finish the unloading. The truck is also provided with means for propelling it along.

An embodiment of the invention is shown in the drawing in which the same reference numeral is applied to the same portion throughout, but I am aware that there are many modifications therefor.

Figure 1 is a side elevation of a portion of the derrick car, the mast and boom of the derrick, Fig. 2 is a side elevation of the derrick car, a portion of the mast and boom being broken away for purposes of illustration, Fig. 3 is an end elevation of the derrick looking toward the car from a position beyond the bucket, Fig. 4 is a side elevation of the derrick carrier through which the bucket handle passes, Fig. 5 is an end elevation of the carrier shown in Fig. 4, the boom being shown in section, Fig. 6 is a plan view of the carrier, Fig. 7 is a view of the lower end of the bucket handle showing the position of the bucket bail, the raising and lowering pulleys, and the cables and pulleys for loading the bucket, Fig. 8 is a view of the clamp which passes around the boom for the support thereof and the device for locking said clamp in a given position, Fig. 9 is a side elevation of the locking clamp shown in Fig. 8 and Fig. 10 is a plan view showing the relation of the truck, shovel and car.

The numeral 1 represents the truck wheels upon the axles of which is mounted the bed 2. This bed is made suitably heavy and is provided with roller bearings 3 for the bevel wheel 4 which forms the supporting base for the mast 5, said mast being suitably secured thereto and being braced with a series of braces, 6, said bearings being suitably heavy to support several tons.

The mast is prevented from being dislodged from the body of the drum by means of the large washer 7 properly secured thereto on its lower end. In order to further brace the mast, a plate 8 is pivoted on the upper end of the mast so that it can turn in a horizontal plane. This plate has cables 10, 10′, 11 and 11′ connected thereto, which cables are in turn connected with the rear end and side of the car. A shiftable cable 11″ connects the mast with either corner of the car.

On the upper portion of the mast there is a heavy strap 12, said strap having the boom 13 pivoted thereto for movement in a vertical plane. The boom is raised and lowered by means of the cable 14, which cable is connected with the bail 15 and passes over a pulley 16 at the top of the mast, the cable finally passing over the drum 17 within convenient reach of the operator, said drum having a crank handle 18 to wind and unwind said cable, a pawl 19 being used to hold the cable in any desired position.

Inasmuch as it is desired to transfer some of the weight of the mast and car to the bucket, it is necessary to prevent the boom from rising when the bucket is being loaded, and this is accomplished by providing a brace 20. This brace is pivoted at one end on the strap 21, which passes

around the mast and is pivoted at its upper end to the sliding clamp 22. Two side plates 23 are bolted to the upper end of the brace 20 and are long enough to permit the hoisting cable to pass between the end of the brace and the boom in whatever position the boom may occupy.

In order to prevent the clamp 22 from sliding along the boom when the shovel is being operated, an eccentric 24 is pivoted thereto through depending ears 25. This eccentric is so pivoted that the spring 26 will lock it on the boom in any desired position, while the cable 27 passing over pulleys 28 and 29 has a handle 30 within convenient reach of the operator to enable him to release the clamp when it is desired to shift the boom to a higher or lower position.

The mast is rotated by means of the pinion 32 loose on the shaft 33. This shaft has a double clutch member 38 operated to engage either gear 35 or 36 by means of the handle 39 pivoted to the stand 34, a clutch member 38′ to engage the pinion 32 and a clutch member 38″ to engage the sprocket wheel 110. The clutches 38′ and 38″ are operated by the handles 39′ and 39″ respectively. It is thus possible to drive either of the gears 32 or 110 in either direction independently.

The boom is slotted at its forward end for the purpose of supporting the carriage 41. This carriage has four transverse shafts 42, 43, 44 and 45, each of which has two wheels 46 thereon to contact with the upper and lower sides of the boom to hold the carriage in the proper place to enable it to be moved back and forward with the least friction.

The shaft 42 is further provided with two pulley wheels 49 and 49′, over one of which the cable 50 passes, while the shaft 45 has two pulley wheels 49^a and 49^b, over one of which the cable 51 passes, said cables being joined to the cable 53 at such a distance from the pulleys 49 as will enable the bucket to be properly raised or lowered for loading and unloading. The shaft 43 is provided with a cable pulley 53 over which the hoisting cable 53′ passes, said pulley having the necessary clearance between the bucket handle and its periphery to allow the cable to pass through.

The lower end of the bucket handle is slotted as indicated in Fig. 3 at 54 and the pulley 57 is revoluble therein on the pin 56, around which pulley the hoisting cable passes. The bucket handle extends below the pulley 57 and is pivoted to the bucket bail by means of the bolt 57′. The end of the hoisting cable passes up to and is connected with a hole 58 in the end of the carriage.

The carriage has fixed serrated jaws 67 and 68 for gripping the shovel handle 48, and four movable jaws 65, 65′, 66 and 66′, each of which is held in place by means of two heavy spiral springs 69. The object of this is to hold the handle central while permitting it to be gripped and held from rising when moved off at an angle to the vertical.

The mast is supported in a well known manner to be capable of withstanding a load of several tons and for the convenient handling of the power cables 53 and 53′ it is hollow, and the cable 11″ may be shifted to the opposite corner of the car from that side on which the boom is to be used.

The hoisting cable 53′ passes over a pulley 74 which pulley is journaled within the mast to enable the cable to pass therethrough in such a position as not to be disturbed by the rotation thereof, and from thence to the hoisting drum 78 from the pulleys 79 and 79′. The cable 53 passes under a pulley 82 journaled in depending brackets 76 below the bottom of the mast. The cable 53′ passes over a pulley 75 similarly journaled at the upper portion of the mast and down through the mast and under a pulley 79′ journaled in depending brackets 76 and to a pulley 83 journaled in brackets 84 and thence to the hoisting drum 85.

The hoisting engine 86 is supplied with power from the boiler 87 and is constructed in a well known manner to provide means whereby the drums 78 and 85 may be driven while separated or at the necessary speed with respect to each other as may be required for an object which will be later explained, but which engine and hoisting apparatus form no part of the present invention and is therefore merely diagrammatically indicated.

The cables 50 and 51 pass over pulleys 88 and 89 journaled on a strap 90 surrounding the shovel handle and at such a distance from the lower end thereof as to enable the bucket to be raised to the position indicated in Fig. 7. In order to prevent the shovel handle from dropping down too low and passing out from between the guides therefor, a plate 91 is bolted to the top thereof.

In order that the carriage may be shifted back and forth along the boom a pulley 92 is pivoted to the end of the boom at the top thereof in the bracket 93, a cable 94 passing thereover and having one end connected to the carriage 41. This cable passes over a pulley 95 on the mast and down to the hand drum 96, said hand drum having a crank 97 for operating the same and being held in a given position by means of the pawl 98.

It will be observed that the boom may be raised and lowered by means of the cable 14 and the carriage moved inwardly and downwardly thereon comparatively easily by resting the shovel on the ground so that the cables 14 and 94 may be hand operated, while of course the cables 53 and 53′ are

power operated for the loading of the shovel and for the hoisting thereof.

The shovel comprises a skip-like scoop 99 having a rigid bail 100 at one end and having holes for the hooks 101 and 102 at its open end. It will be observed that this shovel may be reversed by simply changing its position and shifting the cables 50 and 51 from one side to the other side of the carriage pulleys over which they pass, the strap 90 enabling the pulleys 88 and 89 to be shifted from one side to the other side of the the shovel handle when necessary. It is also to be observed that the size of the shovel handle with respect to the space through which it passes through the carriage must be such as to enable it to have considerable movement without injury to itself, so that the jaws 67 and 68 are spaced far enough from the shovel handle to enable it to have a considerable amount of movement in angle.

The strap 90 is held in place by means of the collars 90′ and 90″ on the shovel handle, but it may be rotated thereon. The object of this is to enable the bucket to be reversed in position so that the material in each end of the car may be expeditiously removed therefrom. This reversal is accomplished by merely removing the bolt 57′ swinging the pulleys in the strap 90 around to the opposite side of the bucket handle and changing the cables running to the front corners of the buckets to the pulleys 49′ and 49ᵇ, whereupon the bucket will be hoisted on the reverse side of the bucket handle.

The truck may be hauled from place to place and directed by attaching a wagon to the pole 111, but when in use unloading cars it may be moved under its own power from the sprocket wheel 110, the pole 111 being used merely to guide it. The wheel 110 has a chain 112 passing thereover and under a wheel 113, below the truck. This wheel 113 is on a shaft 114 journaled in a bearing 114′ and in a casing 115 on the rear axle within which is suitable gearing to enable the rear wheels to be turned to drive the machine forward or back.

The operation of the apparatus is as follows: The boom is raised and lowered by hand when the latch therefor is opened at a time when the bucket and handle therefor is resting upon the ground or upon the top of the material in the car, whereupon the boom may be raised by pulling upon the cable 14. The position of the carriage 41 may at the same time be adjusted outwardly on the boom by pulling on the cable 94 which passes over the winding drum 96, the hoisting cable 53′ tending to draw the carriage inwardly so as to keep the cable 94 taut.

It will be observed that the mouth of the bucket stands at right angles to the boom so that when the car is to be loaded the truck is placed along side of the car and the boom turned over the car, whereupon the hoisting cable is manipulated to bring the mouth of the bucket down on the material in a desired angle, the cables 50 and 51 being at that time slacked over to permit the bucket to hang down. When the bucket is dropped down on the material in the car the cable 53 may be slacked over and the cables 50 and 51 are then drawn up so as to bring the bucket to a position to hold its load, while at the same time the bucket may be slightly dragged across the car by rotating the mast and its turntable.

When the bucket is loaded the mast and boom will be turned so that the bucket may be discharged into a waiting wagon or bin as may be desired. When the car has been partially unloaded and one end thereof is free of sand or gravel the bucket may be reversed in position, so that all of the material up to the end of the car may be removed therefrom. When the bucket is reversed the cables 50 and 51 are changed to the pulleys 48′—49ᵇ on the opposite side of the carriage 41 from that shown in Fig. 1, while the pulley support 90 is simply rotated 180 degrees and the cables again attached to the mouth of the bucket.

It will be observed that the hoisting cable 53′ must be hauled in about twice as fast as the cable 53 so that the hoisting engine must be suitably geared for this purpose, but that forms no part of the present invention.

When it is desired to move the apparatus in one direction or the other, the clutch member 38′ is engaged with the sprocket wheel 110, whereupon the lever 39 may be shifted to engage the forward or backing bevel gear, thus driving the truck to the front or rear as may be required. It will be observed that one advantage of this bucket lies in the fact that it can be loaded and unloaded by the man in charge of the engine without having anyone touching it in any way.

It is of course understood that the mast is properly and securely stepped and stayed into place to prevent it from overturning.

It is to be observed that while the grips 66, 67 prevent the bucket handle 48 from rising when the bucket handle is pulled off to one side or the other of the boom that as soon as the bucket handle becomes vertical they no longer prevent it from rising and only act to assist in loading the bucket when the bucket handle is working to one side or the other of the vertical.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States, is as follows, modifications within the scope of the claims being expressly reserved:

1. In a derrick, a drum, a revoluble mast

supported thereby, a boom, means to adjust the position of said boom, means to lock said boom in any given adjustment, a carriage slidable on said boom, a bucket, a handle to which said bucket is pivoted, said handle extending through said carriage, a cable for moving said carriage along the boom, a cable for raising and lowering the bucket, and bucket handle, and a double cable for loading the bucket.

2. In a derrick, a drum, a mast revoluble thereon, means whereby said mast may be rotated in either direction, a boom supported by the mast, a carriage slidable on said boom, means to change the position of said carriage on said boom at will, a bucket, a handle pivoted to said bucket and extending through the carriage, means on said carriage to grip said handle, and cables for hoisting the bucket and for loading the same.

3. In a derrick, a drum, a mast revoluble thereon, a boom supported by said mast, a carriage slidable on the boom, a reversible bucket, a handle to which said bucket is pivoted and extending through said carriage, a cable for raising and lowering said handle and bucket, other cables for loading the bucket, and means whereby the loading cables may be operated from either side of the carriage to enable the bucket to be loaded from either side of the handle.

4. In a derrick, a drum, a mast revolubly supported thereon, a boom carried by said mast, and adjustable with respect thereto, means to lock said boom in any given adjustment, a carriage, a cable, to adjust the position of said carriage in said boom, a bucket, a handle pivoted to said bucket, a pulley carried by said handle adjacent said bucket, a hoisting cable passing under said pulley to raise and lower the handle and bucket, and other cables connected with the forward end of the bucket to enable the bucket to be loaded.

5. In a derrick, a drum, a revoluble mast thereon, means to rotate said mast in either direction, a boom carried by the mast, means to adjust the position of said boom with respect to the mast, means to lock said boom in any given adjustment, a carriage slidable along said boom, a cable to hold said carriage in any given position on said boom, a bucket, a handle pivoted thereto and extending through said carriage, a cable for hoisting said handle and bucket, means on the carriage to grip the bucket handle when it is moved out of the vertical, and means extending to the front end of the bucket for loading the same.

In testimony whereof I have hereunto set my hand this 4″ day of November, A. D. 1913, in the presence of the two subscribed witnesses.

HENRY J. DE VRIES.

Witnesses:
HARRY SINGLETON,
WILLIAM FOSTMAN.