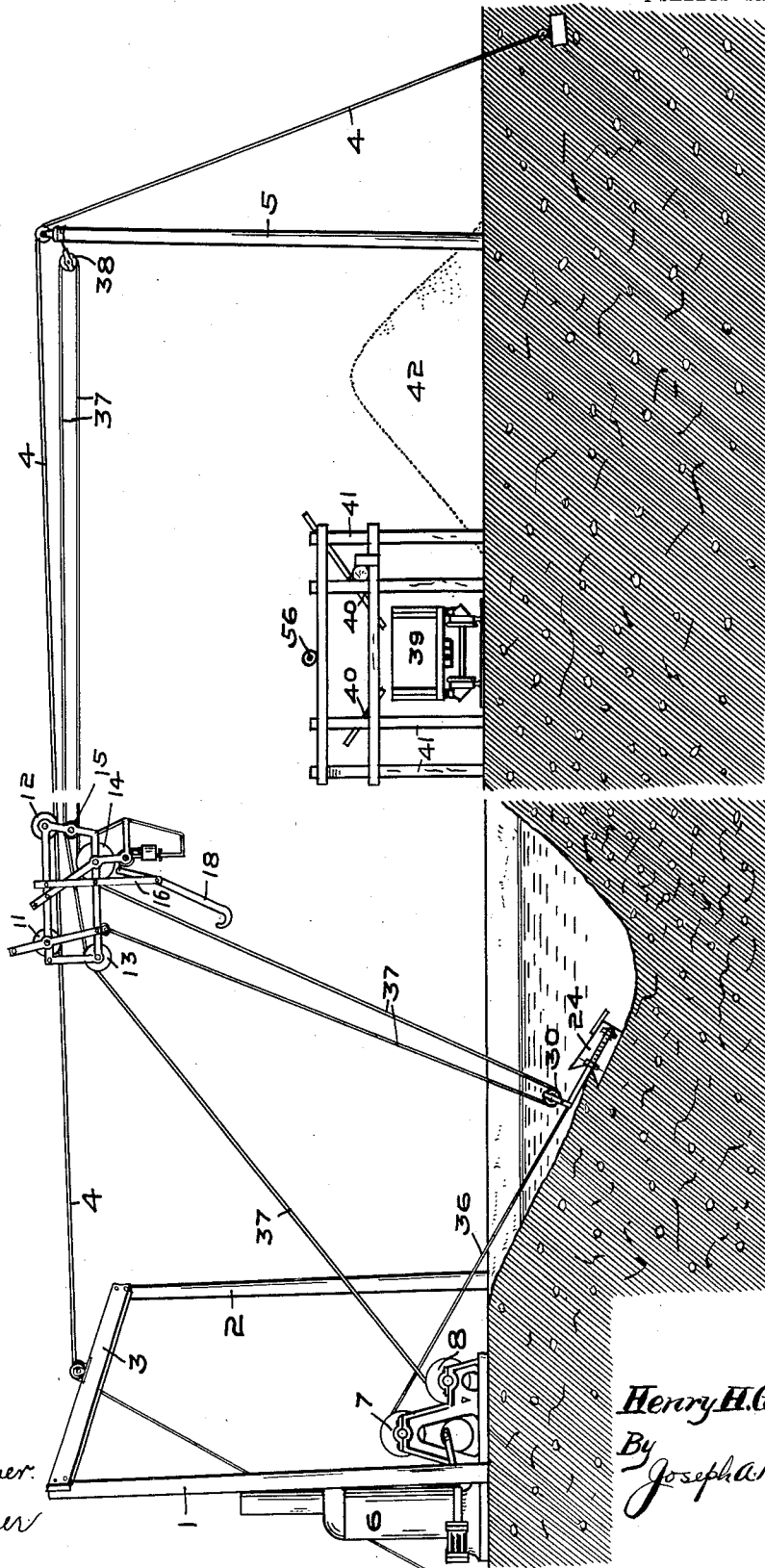


H. H. GUFFIN.
HOISTING AND CONVEYING APPARATUS.
APPLICATION FILED JUNE 27, 1904.

4 SHEETS—SHEET 1.

Fig. 1.



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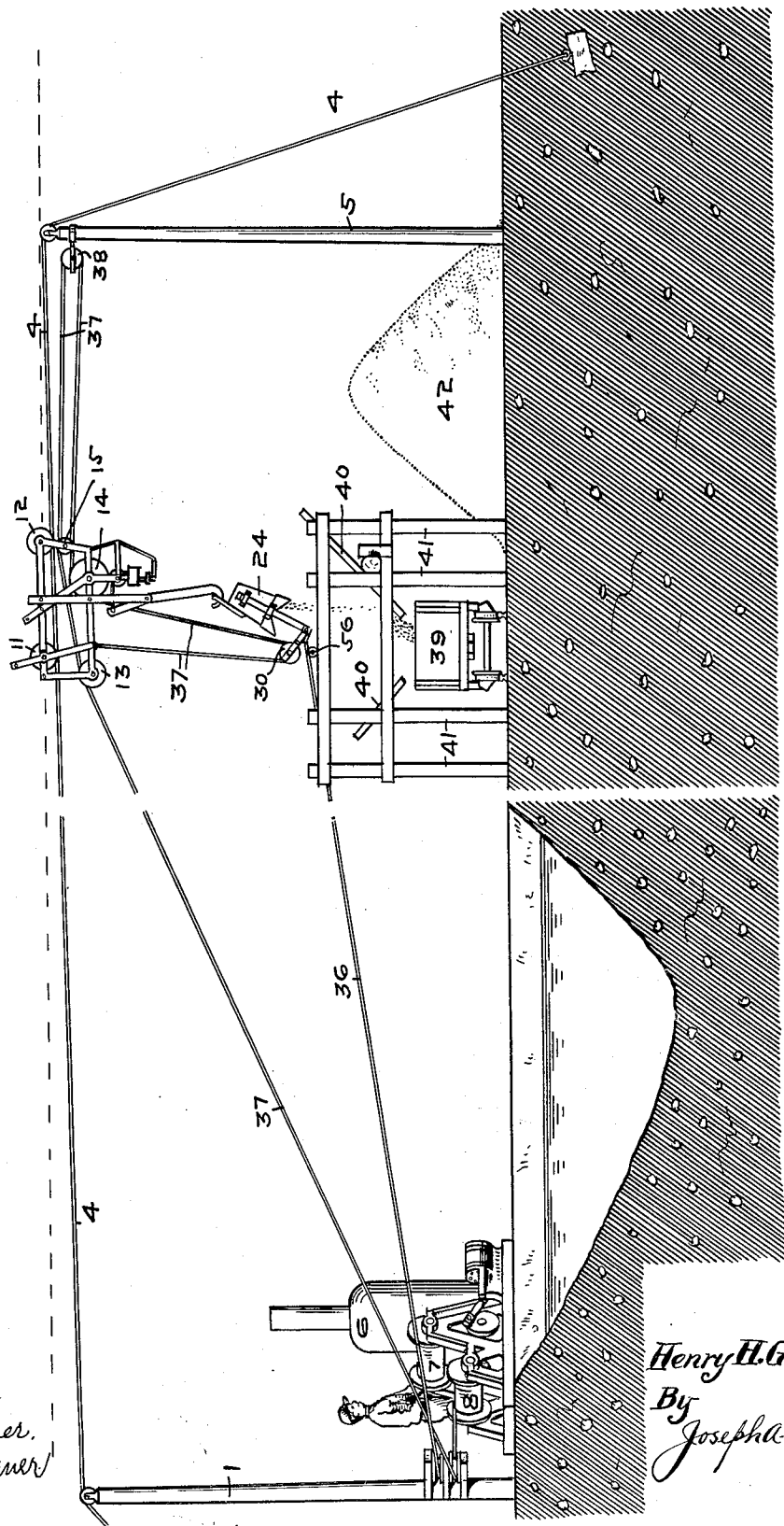
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4 SHEETS—SHEET 2.

Fig. 2.

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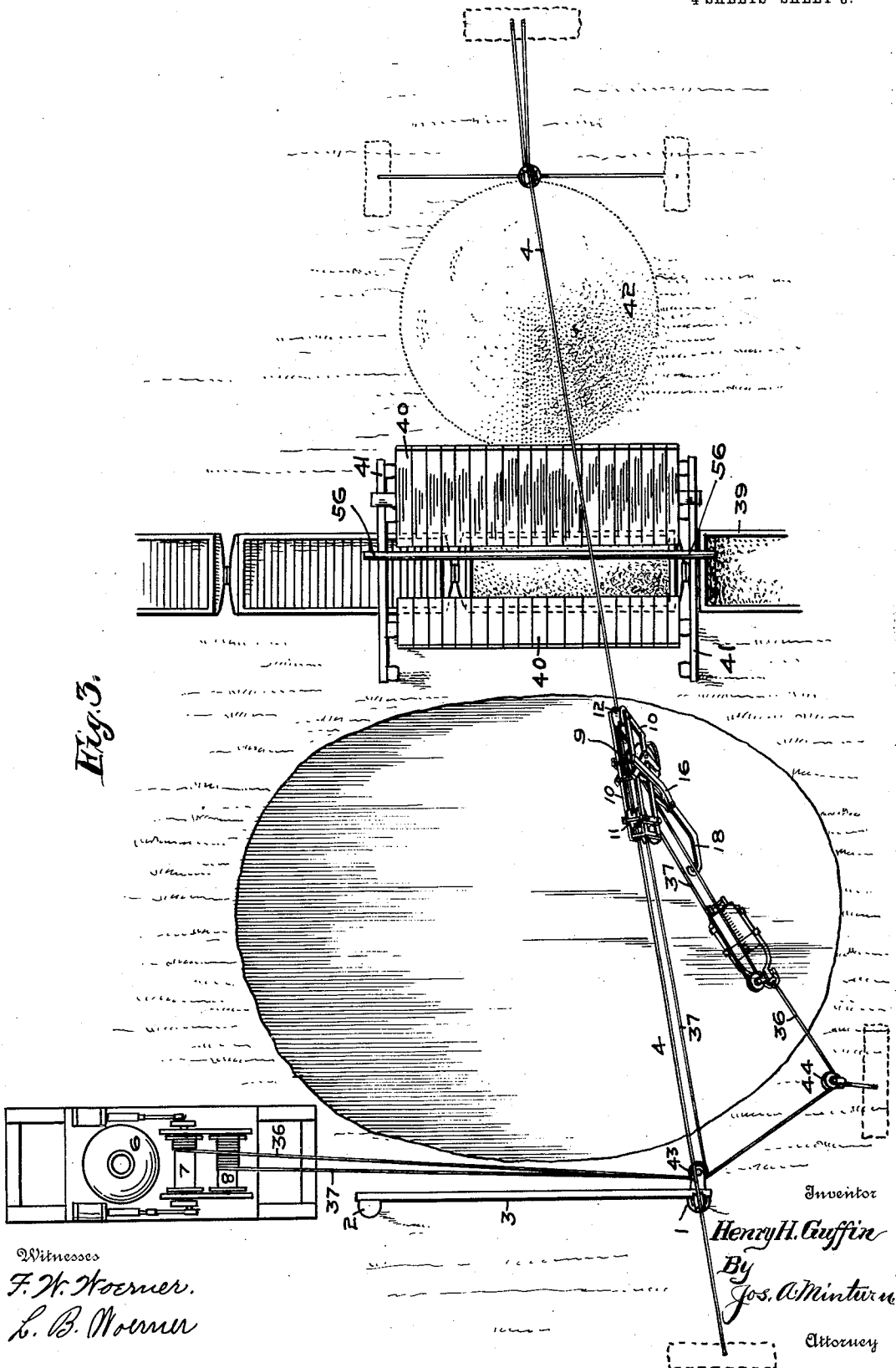
No. 868,984.

PATENTED OCT. 22, 1907.

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4 SHEETS—SHEET 3.

Fig. 3.



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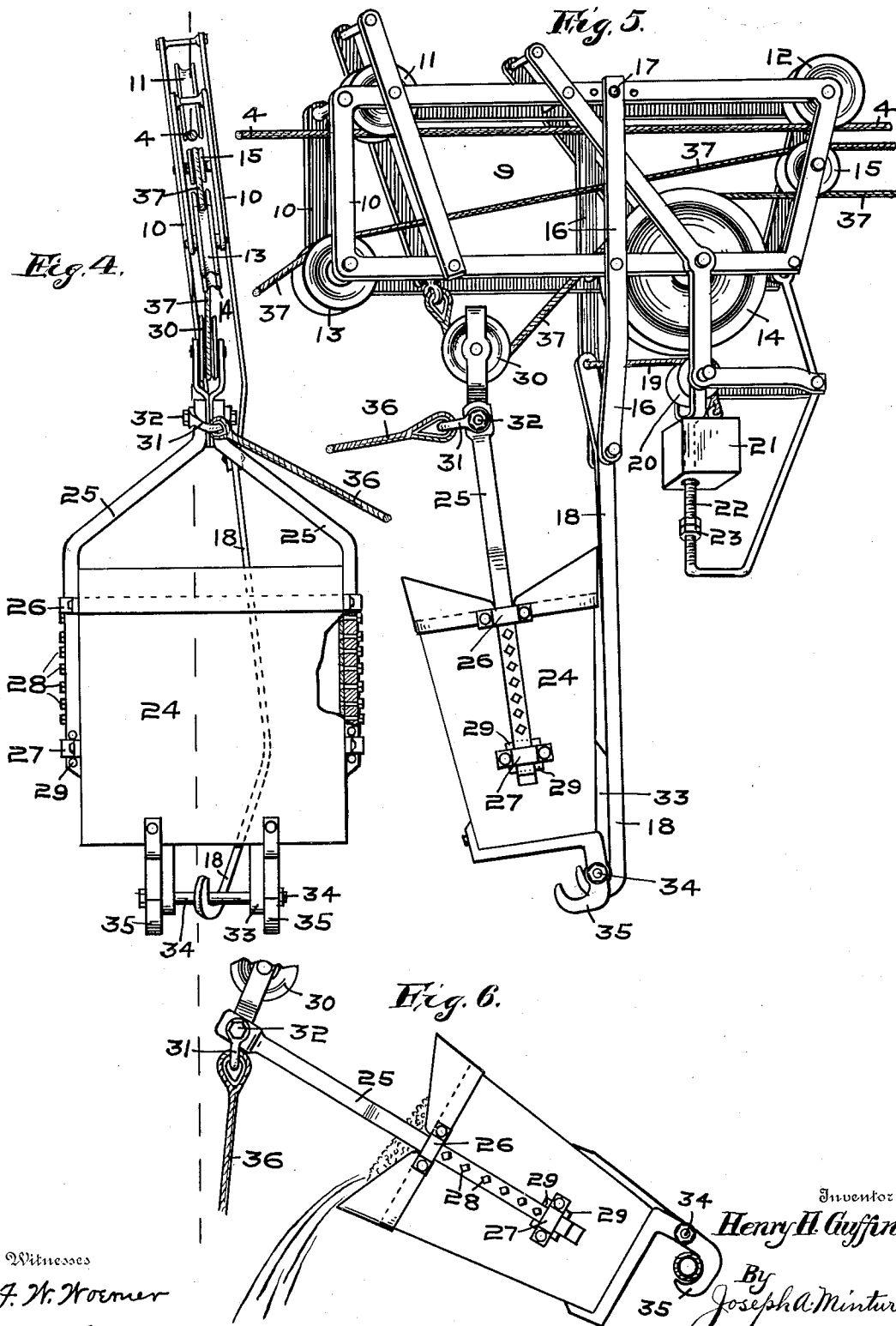
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UNITED STATES PATENT OFFICE.

HENRY H. GUFFIN, OF INDIANAPOLIS, INDIANA.

HOISTING AND CONVEYING APPARATUS.

No. 868,984.

Specification of Letters Patent.

Patented Oct. 22, 1907.

Application filed June 27, 1904. Serial No. 214,324.

To all whom it may concern:

Be it known that I, HENRY H. GUFFIN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Hoisting and Conveying Apparatus, of which the following is a specification.

This invention relates to hoisting and conveying devices in which a traveling carriage runs on a tram-rope or cable and is controlled by ropes operated from a hoisting engine.

The invention is particularly adapted for taking gravel from under water, out of a pit or from the bed of a stream, but it is well adapted for digging trenches and other excavating work.

This apparatus comprises a wire tram-rope erected upon two supports placed on opposite sides of the proposed gravel pit, and mounted on said tram-rope is a carriage adapted to travel thereon and to support and move a receptacle for scooping gravel from a deposit on each side of which the said supports are placed, and for moving said filled receptacle to a desired point at one side of the proposed excavation where its contents is discharged. The receptacle is manipulated by means of two ropes worked by a like number of winding drums located near one of the said terminal supports, said drums being driven by a steam engine.

In operations contemplated by my invention where the procuring of gravel for construction work is generally the sole purpose, it is obviously desirable to take out the greatest possible amount of gravel without changing the tram-rope supports or the drums or other machinery, and one of the objects of my invention is to enable the operations to be carried on over a large area on each side of the line of the tram-rope without material change of apparatus.

Another object is to reduce the excavating work so as to economize in the power required to perform it, and to place the manipulation of the receptacle more completely within the control of the operator or engineer, so he can lower the receptacle at any point along the line of the tram-rope, hoist it at any point, and discharge the receptacle in whole or in part at any point or points desired.

The object of the invention also is to improve on the carriage construction, particularly as to the dumping mechanism and on the receptacle or bucket and other devices for facilitating the work of excavation, to which reference will be more fully and explicitly made hereinafter.

In the accompanying drawings in which like characters of reference indicate like parts, Figure 1 is a side elevation of a hoisting and conveying apparatus embodying my improvements, in which is shown the receptacle at the bottom of the pit in the process of load-

ing preparatory to being hoisted and conveyed; Fig. 2, a like view showing the traveling carriage advanced and the receptacle inverted in dumping position. This view shows two single supporting masts, one at each side of the pit while in Fig. 1 a double mast on the side next to the engine is shown. Fig. 3, is a top plan view of the same apparatus illustrated in Fig. 1, that is with the double mast, and shows the side hitch to excavate laterally of the tram-rope; Fig. 4 is a detail showing the traveling carriage in end view with the receptacle or bucket drawn up to it and hooked ready for dumping; Fig. 5, is a side elevation of the carriage and bucket in same position shown in Fig. 4, and Fig. 6, is a side view of the bucket hooked to a stationary dumping bar and partially dumped.

In Figs. 1 and 3 of the drawing, 1 and 2 represent poles or masts planted firmly in the ground on one side of the ground to be excavated and they are connected at their top ends by the horizontal beam 3 which gives support to the tram rope or cable 4, at one side of the proposed excavation. At the opposite side of the place to be excavated and sufficiently remote therefrom to afford ample room for receiving, piling or handling the excavated material is the support 5, called the "dump-mast" which gives support at that side to said cable 4.

6 is a hoisting-engine of any suitable and well-known construction, having two winding-drums 7 and 8, provided with the ordinary brakes and levers, not shown, for operating them separately or together.

9 is the carriage, having the side frames 10 10, the construction of which is clearly illustrated in Figs. 4 and 5. This frame has two grooved wheels 11, 12, which rest upon the cable and on which the carriage travels on said cable. The frame also has the sheaves 13 and 14 and the idler 15, and on each side, pivotally attached by means of bolts to the lower members of said frame are the straps 16, 16. These straps are bolted to the top members of the frame by means of the bolts 17 and a series of holes are provided for said bolts as shown in Fig. 5, to permit of a swinging adjustment of said straps for purposes hereinafter described. The lower ends of the straps 16, 16, are bent inwardly toward each other and form hangers for the support of the bar 18. The lower end of this bar is provided with a hook as shown and the lower end of the bar having said hook is bent laterally as clearly shown in Fig. 4. The filled receptacle is caught on this hooked bar for the purpose of dumping it, and inasmuch as the handling of the receptacle is attended by considerable oscillatory or swinging movement of the latter it is important, to prevent injury to the dump-bar and carriage, to flexibly connect said bar to the carriage; hence the bar 18 is pivotally secured to said straps 16 and the hooked end of the bar is swung in the direction to meet

the receptacle by chain 19 which is attached to the upper end of bar 18 and thence passing over sheave 20 is attached to the weight 21. The latter has vertical adjustment on the rod 22, depending from the carriage and regulated in extent by the adjustable stop 23, here shown as threaded nuts which are screwed up or down upon said rod which is threaded.

The receptacle or bucket 24, which is used to excavate and transport the sand and gravel from the pit, is made preferably of iron or steel and of a rectangular form in horizontal section, and is provided with a two-part rigid bail. The two parts 25, 25, are secured to the narrow walls or "ends" of the bucket by first passing them under the holding plates 26 and 27 and then bolting the sections to the said walls by means of the bolts 28, placed between the upper and lower plates. Transverse pins 29 through the bail sections on each side of the lower plate 27 prevent longitudinal movement of the bail in said loops and facilitate the attachment. Between the upper ends of the bail sections is the frame of sheave 30, and the ends of the clevis 31 receive the bail-ends between them, and all of the said parts are united by the bolt 32. Bolted to the back of the bucket are the hangers 33, 33, which support the horizontal bar 34. When the bucket is to be inverted in the process of dumping its contents this bar 34 is engaged by the hooked end of bar 18, as shown in Fig. 2, and the bucket is made to turn as on a hinge. Hooks 35, 35 are also secured to the bottom of the bucket to engage a stationary bar 56 for inverting the bucket in case of accident to the bar 18. The means for attaching the hooks 35 is clearly illustrated in the drawings and require no further explanation.

In practice the bar 18 will be bent at the height of the bucket to correspond with the taper of the latter and facilitate the hooking process.

The upper edges of the longer sides of the receptacle are preferably formed of steel plates drawn to a sharp edge to facilitate the scooping operations in filling the buckets, both sides being thus provided so that when the cutting edge is worn off of one side the bucket can be turned and the other side used. The hangers 33 and hooks 35 are taken off and fastened to the other side when this turn is made. Fastened to the clevis 31 of the receptacle bail is the rope 36 called the "load-line" or "inhaul-line", which passes thence to the drum 7 of the engine and is wound upon said drum.

The rope 37, called the "hoist-line" or "outhaul-line" has one end made fast to the carriage. The line is then carried down and around the sheave 30 and thence up and over the sheave 14, thence around a sheave in a block 38 near the top of the dump-mast 5, thence back and over the idler 15 and sheave 13 of the carriage, and from there down to the drum 8, on which it is wound and unwound by the rotation of the drum.

39 represent cars into which the gravel is emptied from the bucket as the latter is successively filled from the gravel pit and carried back thereto. To direct the gravel into said cars with more certainty and in a large measure to protect the cars against injury from the impact of the gravel if directly dumped from the elevated bucket into the car, I provide the hopper-like inclines 40, 40, arranged on each side of the car-track and adapted to discharge into the car as the latter is presented under said hopper. The inclines

are supported by a suitable frame 41, as clearly shown in the drawings, and said frame also forms the support for the stationary bar 56 on which the bucket hooks are caught when the bucket is to be dumped independently of the hooked dump-bar carried by the carriage.

The dump-mast will preferably be set far enough away from the gravel pit to provide room between it and the pit for the car-tracks and hopper, and room between the hopper and mast for a gravel pile made from gravel discharged from buckets delivered at such times as when cars are not provided fast enough to receive the entire output of the apparatus. If cars are not used all of the gravel may be dumped upon the ground in said pile 42.

The operation of my invention is as follows: Taking the apparatus in position shown in Fig. 1, the receptacle at the bottom of the pit is filled by being drawn toward the engine by the winding of rope 36 on drum 7, and when it is loaded it will be drawn to the surface of the water in the pit by applying the brake to drum 7 and winding up the hoist line 37 on the drum 8. The bucket at the top of the water but still submerged in it is partially floated or buoyed up by it and by releasing the load line or rope 36 and winding up still more on line 37 the carriage will be moved toward the dump mast and the receptacle or bucket drawn and partially floated to the dump-mast side of the pit. By thus utilizing the sustaining power of the water the work can be done with much less steam energy and with less expense for fuel and engine equipment. When the filled bucket has reached the far side of the pit the brake is again applied to hold the load line drum, whereupon the continued winding in of the hoist line 37 will hoist the bucket. The latter is raised above the hooked end of the dump-bar 18 and then lowered upon said hook; then by releasing the load line 36 and winding in the hoist line 37 the carriage and its bucket will be moved toward the dump-mast to the position where the bucket is to be dumped. When the bucket is being emptied, its position is close to the carriage, and the carriage and therefore the bucket, may be prevented from retreating toward the dump mast by applying the brake to the drum of the load line, which line is attached to the bucket and holds the carriage. When the bucket is slowly inverted its weight will draw the rope 37 over the lower back sheave 14 which has a tendency to draw the carriage toward the dump-mast unless held by the load-line. But by the proper management of the winding drums 7 and 8, which the operator soon learns, the bucket can be moved to any point along the line of the tram-rope 4 and there held and partially or wholly inverted, rapidly or slowly, as circumstances dictate. Thus before the final dumping place has been reached I am able in practice to tilt the bucket enough to pour off the water contained in it, and then continue the travel to wagon or cars and pour the gravel slowly into them, or in a pile on the ground if no other receptacle is provided.

The greatest power is required during the scooping operation or filling of the bucket, and to make the carriage follow along without consuming any of the power that could be better utilized in the work of filling, I make the tram-rope support next to the

engine lower than that at the dump-mast which causes the carriage to follow the bucket by gravity as the latter is being filled.

In the modification shown in Fig. 3, the engine and drums are located at approximately right angles to the tram-rope and the load line after leaving the drum passes around sheave 43 supported by a bracket from the mast at the engine side of the pit and thence around the sheave 44 anchored at one side of the pit in suitable position to give the desired side pull to the bucket. It is in case of a side pull like this that the laterally bent dump-bar is required. The hoist-line in this modification passes from its winding drum, around a sheave supported by the same bracket as sheave 43 and goes thence to the carriage and down to the bucket, in the manner as previously described. The purpose of the two masts 1 and 2 with the beam 3 connecting them is to provide a support for the tram-rope at various positions longitudinally of said beam without the inconvenience of planting a new mast for each change, and it is obvious that a still greater number of masts similarly connected may be used.

Having thus fully described my invention what I claim as new and wish to secure by Letters Patent of the United States, is—

1. In a hoisting and conveying apparatus, a way highest at its dump end, a carriage adapted to travel on said way, a receptacle, a sheave attached to said receptacle, a rope attached to said carriage and passing thence under the sheave attached to said receptacle, thence over a sheave in said carriage, thence around a sheave located at a point outside of the line of said way near the highest end of the latter, thence back over a second sheave in said carriage, means for operating said rope and means for dumping said receptacle.

2. In a hoisting and conveying apparatus, a way highest at its dump end, a carriage adapted to travel on said way, a receptacle, a sheave attached to said receptacle, a rope attached to said carriage and passing thence under the sheave attached to said receptacle, thence over a sheave in said carriage, thence around a sheave located at a point outside of the line of said way near the highest end of the latter, thence back over a second sheave in said carriage, a rope attached to the receptacle, means for operating said ropes and means for dumping said receptacle.

3. In a hoisting and conveying apparatus, a way, a carriage adapted to travel on said way, a receptacle having a two-part rigid bail jointed at the top of said bail, a sheave having its block or frame pivotally secured at said joint between the parts of the bail, a rope attached to said carriage and passing thence under the sheave attached to said receptacle-bail, thence over a sheave in said carriage, thence around a sheave located at a point outside of the line of said way, thence back and over a second sheave in said carriage, means for operating said rope and means for dumping said receptacle.

4. In a hoisting and conveying apparatus, a way, a carriage adapted to travel on said way, a receptacle having a two-part rigid bail jointed at its top, a sheave having its frame pivotally secured at the joint between the parts of the bail, a clevis embracing the ends of said bail, a pin or bolt passing through the clevis, bail ends and sheave frame and uniting said parts, a rope attached to said carriage and passing thence under the sheave attached to said bail, thence over a sheave in said carriage, thence around a sheave located at a point outside of the line of said way, a rope attached to said clevis, means for operating both of said ropes and means for dumping said receptacle.

5. In a hoisting and conveying apparatus, a horizontal member supported at the top of a plurality of masts, a second support, a way supported above the level of the ground on said supports, a carriage adapted to travel on said way, a receptacle, a rope attached to the carriage and passing thence under a sheave attached to said receptacle,

thence over a sheave located in the carriage, thence around a sheave located at a point outside of the line of said way as to one of the above supports, thence back and over an idler in said carriage and thence over a second sheave in said carriage, means for operating said rope and means for dumping said receptacle.

6. In a hoisting and conveying apparatus, a way supported above the level of the ground, a carriage adapted to travel upon said way, a receptacle having a horizontal bar below its bottom, a rope and tackle for connecting the carriage and receptacle and for actuating the carriage on the way, a rope attached to the receptacle, a sheave located laterally of the vertical plane of said way around which said rope is passed, means for operating said ropes and a laterally bent dump-bar having a hooked lower end to engage the bar under the receptacle and assist in dumping the latter.

7. In a hoisting and conveying apparatus, a way supported above the level of the ground, a carriage adapted to travel upon said way, a receptacle having a horizontal bar or eye below its bottom, a rope and tackle for connecting the carriage and receptacle and for actuating the carriage on said way, a rope attached to said receptacle, a sheave located laterally of the vertical plane of said way around which said rope is passed, means for operating said ropes and a laterally bent dump-bar having a hooked lower end to engage the bar under the receptacle and assist in dumping the latter, said bar being pivotally supported and yieldingly held in the path of the receptacle.

8. In a hoisting and conveying apparatus, a way, a carriage adapted to travel thereon, a receptacle having an under side eye to engage a hook, a rope and tackle to connect the carriage and receptacle and to operate both, straps secured to the carriage, a dump-bar pivoted under the carriage to said straps said bar having a hook at its lower end and yielding means for pressing the hooked end of the bar into engagement with the eye of the receptacle when the receptacle is elevated into a position close under the carriage.

9. In a hoisting and conveying apparatus, a way, a carriage adapted to travel thereon, a receptacle having an under side eye to engage a hook, a rope and tackle to connect the carriage and receptacle and to operate both, straps secured to the carriage in an adjustable manner and having ends depending from said carriage, a vertical bar depending from the carriage, a weight having a perforation through which said last bar passes, adjustable means for determining the downward movement of said weight on said bar, an idler mounted adjacent to said bar, a flexible connection as a chain, connecting said weight with the top end of a dump-bar, a dump-bar pivotally secured below said chain attachment, to said depending straps, said dump-bar having a terminal hook to engage the eye of the receptacle.

10. In a hoisting and conveying apparatus, a way, a carriage, a receptacle, a dump-bar pivotally secured to the carriage said bar having a lower terminal hook to engage the receptacle and means for yieldingly presenting the hooked end of the bar in the path of the receptacle.

11. In a hoisting and conveying apparatus, a receptacle of oblong form in horizontal section having sharp edges at the tops of its wider sides and having a rigid bail and a horizontal bar at the middle of one of its wider lower edges, in combination with a rope and tackle for raising and lowering the receptacle, a second rope attached to the receptacle bail and a hooked bar supported independently of the receptacle to engage the bar under the receptacle and assist in dumping it.

12. In a hoisting and conveying apparatus, a receptacle having a rigid bail, a horizontal bar at the middle of one of its wider lower edges and hooks adjacent to said bar opening toward the front of the receptacle.

13. In a hoisting and conveying apparatus, a receptacle of oblong form in horizontal section having sharp edges at the tops of its wider sides, a rigid two-part bail bolted to the narrow ends of the receptacle intermediate of the cutting edges, a pair of loops at each end through which the bail sections respectively pass and transverse pins in said sections above and below one of said loops at each end of the receptacle.

14. In a hoisting and conveying apparatus, a way, a carriage, a receptacle having a rigid bail and under side extensions, ropes and tackle to operate said carriage and receptacle, a hopper at the place for discharging the contents of the receptacle and means independent of the receptacle for engaging its under side extensions to invert the receptacle.
- 5
15. In a hoisting and conveying apparatus, a receptacle having a rigid two-part bail, the separation between the two parts being at its top and middle, the ends at said separation being bent outwardly and parallel and a sheave frame pivotally secured between said ends.
- 10

16. In a hoisting and conveying apparatus, a receptacle having a rigid two-part bail, the separation between the two parts being at its top and middle, and a sheave-frame secured to the ends formed by said separation.
- 15

In witness whereof, I, have hereunto set my hand and seal at Indianapolis, Indiana, this, 30th day of May, A. D. one thousand nine hundred and four.

HENRY H. GUFFIN. [L. S.]

Witnesses:

JOSEPH A. MIXTUN,
F. W. WOERNER.