No. 762,352. PATENTED JUNE 14, 1904.

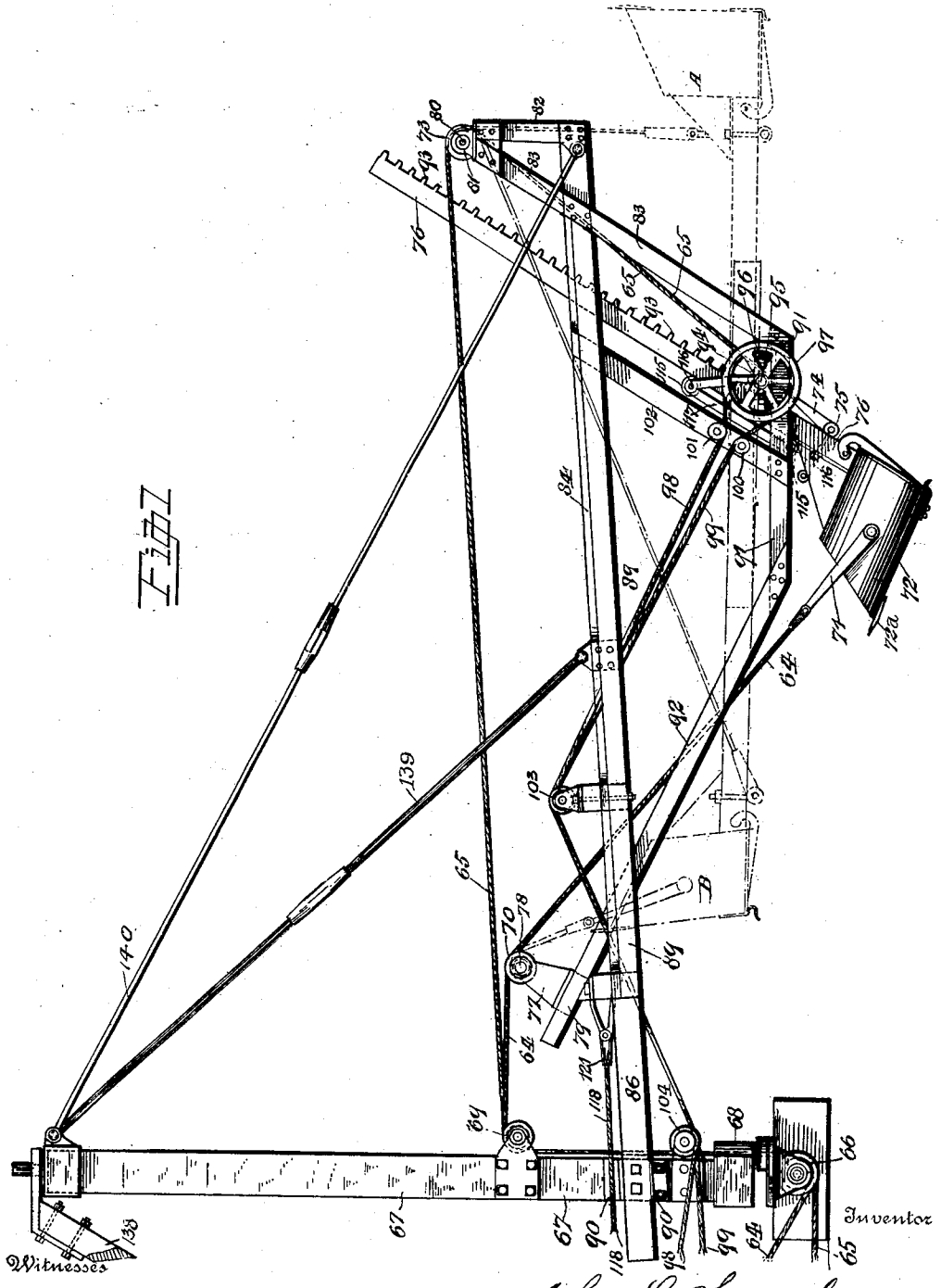
J. L. SCANLAN.

EXCAVATING MACHINE.

APPLICATION FILED AUG. 17, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.



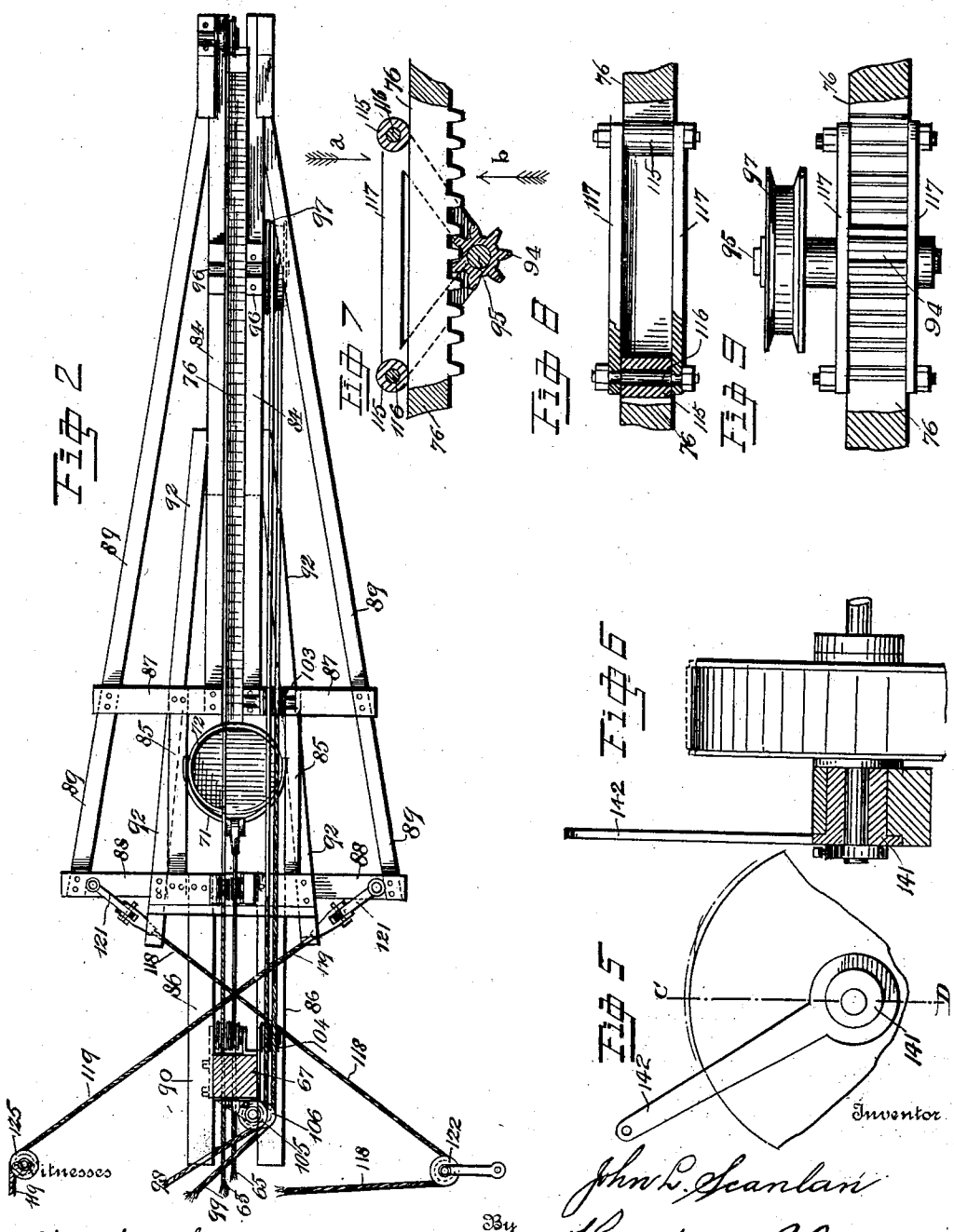
No. 762,352. PATENTED JUNE 14, 1904.

J. L. SCANLAN.

EXCAVATING MACHINE.

APPLICATION FILED AUG. 17, 1903.

NO MODEL. 3 SHEETS—SHEET 2.



Witnesses
Wm. O. Morck
Fannie F. Ayers.

Inventor
John L. Scanlan
By Thompson & Bell
Attorney

No. 762,352. PATENTED JUNE 14, 1904.

J. L. SCANLAN.

EXCAVATING MACHINE.

APPLICATION FILED AUG. 17, 1903.

NO MODEL. 3 SHEETS—SHEET 3.

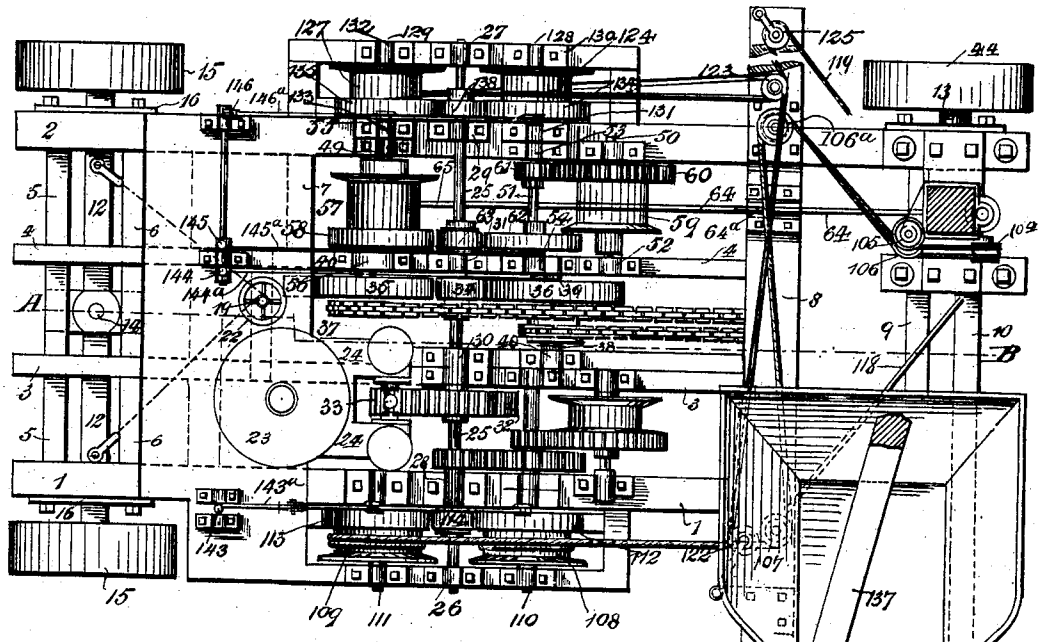


Fig 4

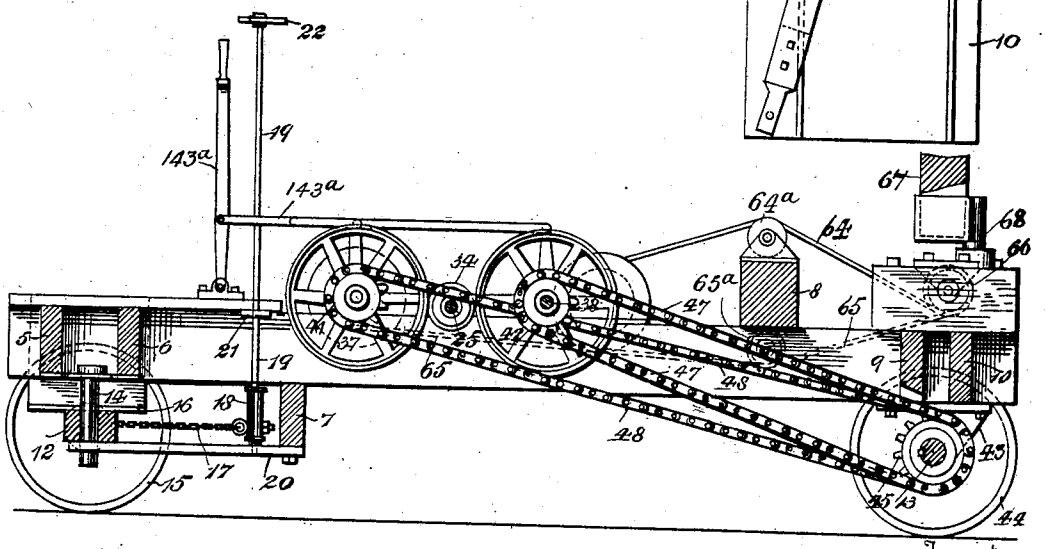


Fig 3

Witnesses
Wm. O. Morck
Fannie T. Ayers.

Inventor
John L. Scanlan
By Thompson & Bell
Attorney

No. 762,352. Patented June 14, 1904.

UNITED STATES PATENT OFFICE.

JOHN L. SCANLAN, OF INDIANAPOLIS, INDIANA.

EXCAVATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 762,352, dated June 14, 1904.

Application filed August 17, 1903. Serial No. 169,785. (No model.)

To all whom it may concern:

Be it known that I, JOHN L. SCANLAN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented new and useful Improvements in Excavating-Machines, of which the following is a specification.

My invention relates to certain new and useful improvements in excavating-machines, hereinafter more fully described, and particularly pointed out in the claims.

The object of this invention is to provide a machine which may be employed to be operated to excavate or dig from the machine for the purpose of removing the upper covering or layer of marl or viscous earth that usually covers sand-beds situated in low places and deposit such marl or viscous earth away from the working place, thereby exposing the sand or gravel, which may be removed without being contaminated with foreign substances; second, to provide a means whereby the handle of the bucket or scoop will be guided and steadied when being operated to scoop or shovel the sand at various depths of excavation; third, to provide means whereby the apparatus may be readily and quickly transported from place to place. I attain these objects by means of the apparatus illustrated in the accompanying drawings, in which similar numerals of reference designate like parts throughout the several views.

Figure 1 is a broken elevational view of the derrick and excavating-scoop. Fig. 2 is a plan of the same. Fig. 3 is a longitudinal sectional elevation of the carrying-truck and winding mechanism and showing the means of driving said truck, taken through the line A B. (See Fig. 4.) Fig. 4 is a plan view of the same. Fig. 5 is an enlarged detail view showing the eccentric bearing of the drum-shaft situated at the friction-wheel ends thereof. Fig. 6 is a sectional view of the same, taken through the line C D. Fig. 7 is a broken longitudinal sectional view of the dipper-beam side guiding roller-frame. Fig. 8 is a similar plan view of the same, and Fig. 9 is a similar inverted plan view of the same.

The supporting and carrying truck is constructed of the longitudinally-extending side beams 1 and 2, the intermediate beams 3 and 4, and the transverse or cross beams 5, 6, 7, 8, 9, and 10, which beams may be of wood properly secured together or of iron-beam construction. The said truck-frame is provided with forward steering-axle 12 and the rear axle 13. The steering-axle 12 is pivoted at its center portion on the center pin 14, and on the ends of said axle are mounted to turn thereon the wheels 15. The side bearing or chafing irons 16 are secured to the side beams 1 and 2 of the truck-frame and are provided for the purpose of forming supporting-bearings which rest on the ends of the axles and support the weight of the frame. Guide-chains 17 extend from or near the ends of the axle 12 to a spool 18, secured on the steering-shaft 19, and the steering-shaft 19 is supported at its end in the brace-bearing 20 and the upper bearing 21, and a suitable steering-wheel 22 is secured on the top end of said shaft and by means of which the truck is guided when being propelled. A suitable boiler 23 and engine 24 is provided to supply power to drive the power-transmitting and winding mechanism. A main shaft 25 extends transversely of the truck at a point intermediate the ends thereof, and said shaft is journaled in the outer-board bearings 26 and 27, the outer bearings 28 and 29, and the inner bearings 30 and 31. On the shaft 25 is securely keyed the main drive-gear wheel 32, which gear-wheel meshes with the gear-pinion 33, which latter is secured on the shaft of the engine or any other source of power, as the case may be, and by which pinion the said shaft 25 is rotated continuously. A friction-wheel 34 is securely keyed on the shaft 25 to turn therewith, and friction-drums 35 and 36 are securely keyed on the shafts 37 and 38, which shafts are journaled in suitable bearings 39 and 40. Suitable sprocket-wheels 41 and 42 are also firmly keyed on said shafts 37 and 38, and by means of said sprockets the power is transmitted to the driving or traction axle 13 of the truck. The axle 13 of the truck is journaled in suitable side bearings 43, and on the ends of the said axle 13 are firmly secured or keyed the truck-wheels 44 to turn therewith. The sprockets 45 and 46 are also keyed or otherwise secured on the axle 13 to turn there-

with, and drive-chains 47 and 48 extend from said sprockets 41 and 42 to sprockets 45 and 46 to drive the axle 13 with either a right-hand or left-hand rotation to drive said truck either forwardly or backwardly, as the case may be.

The shafts 49 and 50 and the gear-shaft 51 are mounted in their respective bearings 52, 53, 54, 55, and 56. On the shaft 49 is firmly secured or keyed the drum 57, which is provided with the friction-wheel 58, which latter may be either keyed on the shaft 49 or formed integral with the drum 57. A drum 59 is keyed or otherwise secured on the drum-shaft 50, and a gear-wheel 60 is either formed integral with the said drum 59 or keyed on said shaft 50, and said gear-wheel is adapted to mesh with the pinion 61, secured on the shaft 51 to turn therewith. A friction-wheel 62 is keyed on the shaft 51 to turn therewith, and said friction-wheel is in the same plane as the friction-wheel 58. A friction-wheel 63 is secured on the main drive-shaft 25 to turn therewith, and said friction-wheel is situated intermediate the friction-wheels 58 and 62, so that when either wheel 58 or 62 is moved toward said friction-wheel 63 the same will contact with the latter, which shifting mechanism I will hereinafter describe.

To the drums 57 and 59 are secured the excavating-shovel or dipper ropes 64 and 65. The rope 64, being subjected to the greater strain, is connected to the more powerful gear-driven winding-drum 59. The ropes 64 and 65 pass under the sheaves 66, situated under the base of the mast 67, and passing through the hollow pivot 68, extended to and over the sheaves 69, secured to the said mast 67 intermediate the top and bottom ends thereof, the rope 64 extending over the sheaves 70 to the dipper-bail 71 of the shovel or dipper 72, to which the latter is pivoted, and the rope 65 extends over the sheave 73 to be connected to the clevis 74, which latter is hinged to the eyebolt 75, which latter is secured to the lower end of the dipper-beam 76 adjacent to the dipper 72 thereof. Sheaves 64^a and 65^a (see Figs. 3 and 4) are provided to guide said ropes to their drums 57 and 59.

The sheaves 70 are mounted in their supporting-uprights 77 to turn on their bearing-pin 78. The said upright 77 is securely bolted to the cross piece or beam 79. The sheaves 73 are mounted on the pins 80 to turn thereon, and said pin is secured to a supporting-piece 81, securely bolted to the upright pieces 82 and the upper portion of the brace 83, which upright pieces 82 and brace 83 are securely bolted to the side of one of the outer end portions 84 of the outer or end guide members of the boom. The boom is composed of the outer end portions or upper guides 84, the intermediate portions 85, the inner or securing portions 86, the cross-beams 87 and 88, and the outer stiffening-braces 89, all of which are securely bolted together to form a rigid structure. The pieces or inner portions 86 of the boom are securely bolted to the sides of the mast 67 between the stiffening or angle piece 90, and the lower guide portions 91 of the boom (see Fig. 1) are held in their horizontal positions in parallel relation to each other and at a distance apart to loosely receive the dipper-beam 76 by the upwardly-inclined side braces 83 and 92. The braces 92 are secured at or near their upper ends to the intermediate beams 85 by suitable securing-bolts. The inner faces of the lower guides 91 are arranged in vertical alinement with the inner faces of the outer end portions 84 of the main boom. A rack 93 is secured to the dipper-beam 76 and is adapted to engage the rack-pinion 94, secured on the shaft 95. The shaft 95 is journaled in suitable bearings 96, secured to the lower guide-beams 91, and a pulley 97 is secured on the end of said shaft 95. The dipper raising and lowering ropes 98 and 99 surround the pulley 97 and have a sufficient number of turns to secure close frictional contact, and the said rope ends 98 and 99 pass over and under the guide-sheaves 100 and 101, which sheaves are mounted on the brace 102, secured at its bottom end to the guide-beam 91 and at its top end to the boom-beam 84 on one side thereof. The said rope ends 98 and 99 extend from said sheave-pulleys 100 and 101 to and over the sheaves 103, to and under the sheaves 104, and around the sheaves 105 and 106, secured to the mast, (see Fig. 4,) and said ropes 98 and 99 extend to and around the sheave-pulley 106^a to and around suitable sheave-pulley 107, secured on the beam 8, which latter is secured on the top of the truck-beams 1 and 2, as shown particularly in Figs. 3 and 4, and thence from said sheave 107 said rope 98 extends to and around the drum 108 and its companion rope 99 to its drum 109. The drums 108 and 109 are mounted on their shafts 110 and 111, respectively, to turn therewith, and each of said drums is provided with the friction-wheels 112 and 113, which latter are adapted to be caused to engage or contact alternately with their driving friction-wheel 114 by the means hereinafter described and used in connection with the other friction-gears of this mechanism, and thus the ropes 98 and 99 are alternately wound and unwound on their drums 108 and 109 to cause a rotation of the pulley 97 to cause the dipper or scoop 72 to be raised or lowered. The rack 93 of the dipper-beam 76 is held in gear with its pinion 94 by the friction-rollers 115, which latter are mounted on bearing-pins 116, secured at their ends to the triangular side frames 117. The side triangular frames 117 are pivotally mounted on the shaft 95, and thus when it is necessary to swing the beam 76 forwardly or backwardly the same can be readily accomplished by means of the drag-ropes 64 and 65.

The operation of swinging the boom so that the scoop or dipper 72 be brought over in position over the hopper 120, secured unto the prolonged ends of the truck-beams 10 and 8, to dump the contents of the said dipper or scoop therein is accomplished as follows: The swinging or turning ropes 118 and 119 are provided, and the rope 118 and 119 are connected to the clevis 121, pivotally mounted to or near the ends of the cross-beam 88, and the said ropes 118 and 119 cross in front of the mast 67 for the purpose of increasing the range of the swing of the boom. The rope 118 is passed around the sheave 122 and from thence to a sheave-wheel 123 to and around the drum 127. The said rope 119 is passed around the sheave 125 and thence around the lower sheave 123, situated under the upper sheave 123, to and around the drum 124. The drums 124 and 127 are keyed or otherwise firmly secured on the shafts 128 and 129, respectively, and the said shafts 128 and 129 are mounted to turn in their bearings 130, 131, 132, and 133, respectively. Integral on the drums 124 and 127, formed or keyed or otherwise secured on the shafts 128 and 129 to turn therewith, are the friction-pulleys 134 and 135, which pulleys are adapted to be alternately moved in contact with the friction-wheel 136 to turn the said drums to alternately wind and unwind the ropes 118 and 119 to swing the boom in either the right-hand or left-hand direction—that is, out of working position or into working position, as desired.

The stiffening-legs 137 and 138 are provided for the purpose of holding the mast 67 in its vertical position, and guy-rods 139 and 140 extend from the end of the boom to the top of the mast 67 to support and stiffen the said boom. The means by which the friction-pulleys are moved into contact with their driving friction-wheels is simple and well known, and the various shafts of the drums 57, 59, 108, 109, 127, and 129 and the gear-shaft 51 have those ends that are removable—that is, the ends of side shafts on which their friction-wheels are situated—journaled in suitable eccentric bearings 141, all of which are alike and are fitted to turn in their bearing-boxes. The eccentric bearings 141 are provided with levers 142, which are connected by suitable connecting-rods 143^a 144^a 145^a 146^a to the operating-levers 143, 144, 145, and 146, (see Figs. 3 and 4,) by which means each of the series of drums (three series) are independently moved into or out of engagement with their friction drive-wheels to be operated each independently of the other or simultaneously, as the case may require.

The method of applying and using this invention for the purpose required I will now proceed to describe.

The truck or derrick having been placed in position, so the boom and the scoop 72 will be situated directly over the gravel-bed to be operated upon, the said dipper or scoop 72 and the dipper-beam 76 are removed from their position as shown in full lines in Fig. 1 and changed to the position A shown in dotted lines in said figure. The scoop or dipper 72 is now in position to be worked or swung to work and excavate the viscous upper layer of dirt or marl to expose the gravel and to remove said layer of dirt in a direction far away from the main truck. The scoop or dipper 72, with its beam 76, is swung into position in contact with the upper layer or strata of viscous earth, uncovering the gravel nearer to the truck, and the said scoop or dipper 72 is dragged along forward from said truck with its scraper 72^a embedded in said layer of viscous earth or marl and dragged along such layer until said dipper 72 is filled. The depth of immersion of said dipper in the strata or layer of viscous earth is regulated by means of the rack 93 and its pinion 94, operated by the ropes 98 and 99, which ropes are wound and unwound by the operator who manipulates the winding-drums to which said ropes are connected. The dipper having received its full complement of matter to be removed is raised forwardly to the position A, (shown in dotted lines in Fig. 1,) and the boom is swung around to move said scoop or dipper 72 to a place where said layer of viscous material is to be dumped out of the way of the gravel-bed or that portion thereof to be worked. The operator now releases the drop-bottom of the dipper or scoop 72 and its contents is dumped by gravity. The operator now returns the dipper or scoop 72 into position adjacent to the truck and the same operation is repeated, and thus the sand and gravel is laid bare to be removed readily without contaminating the same by admixture of foreign substances. The rack-beam 76 is now withdrawn from between its friction-rollers 115 and rack-pinion 94 and inserted between said friction-rollers 115 and rack-pinion 94 in the reverse position, as shown in full lines. (See particularly Fig. 1.) The scoop or dipper 72 is now in position to excavate the sand or gravel, which operation is performed by a movement reverse to that by which the strata of viscous matter or marl was removed—that is, by a movement of the dipper or scoop toward the truck. The scoop or dipper 72 is moved forwardly or from the top to its full extent by the drum 59, upon which the rope is wound to draw the said dipper 72 forwardly, and the dipper-beam 76 is also extended by means of the drum 108, which is operated to wind the rope 98 to extend the scoop or dipper 72 its full extent away from the truck. This position of the scoop having been reached, the drum is next operated to wind the rope 64 upon it to draw the dipper or scoop 72 toward the truck, and the depth of the excavation or the amount the scoop 72 is

to be embedded in the gravel or sand is regulated by means of the drums 108 and 109, which are operated to either extend the dipper-beam 76 or withdraw it, as the circumstances may require. The dipper 72 having received its full complement of sand or gravel is elevated to the position B (see Fig. 1 in dotted lines) and by means of the rope 64 being wound on the drum 57, in which position said scoop is retained while the boom 84 is being swung around into position to bring the scoop or dipper 72 directly over the chute 120. The boom 84 and its mast is swung on its pivotal point 68 by means of the drums 127 and 124, and the operator, when he requires the boom to be swung around to bring the said scoop 72 into position over the hopper 120, causes the friction-pulley 135 to engage the friction-wheel 136 to wind the rope 119 around its pulley 127, thereby drawing the said boom around as required. The scoop having been brought in position over the chute 120, the operator disengages the spring-catch 72^a to permit the drop-bottom 72^b to open and discharge the gravel into the chute 120, which gravel or sand falls therefrom to the ground, or a conveying means is put to a suitable place to be stored for future use. The boom is now returned to its former working position by means of the rope 118, by which said boom is swung in the opposite direction, which rope is wound on its drum 124 by causing the friction-pulley 134 to engage the friction-wheel 136. This operation having been performed, the scoop is ready for use as before, and thus the operation is continued.

Having thus fully described this my invention, what I claim as new and useful, and desire to cover by Letters Patent of the United States therefor, is—

1. In an excavating-machine, the combination with a scoop or dipper, and a dipper-beam, of a revoluble mast inclined upwardly, a boom extending from said mast, said boom comprising two side guide members, horizontally-extending guides situated beneath and in vertical alinement with said upper guide members and between which said dipper-beam is adapted to work, a shaft mounted on said lower guides, a beam-guide pivoted on said shaft, a pinion and a rack on said dipper-beam whereby said dipper-beam is traversed in said beam-guide to elevate or lower said scoop, drag-ropes for dragging said scoop either forwardly from or rearwardly toward said revoluble mast.

2. In an excavating-machine, the combination with a scoop or dipper and a beam to the depending end of which said scoop is rigidly secured, of a supporting-truck, a mast revolubly mounted on said truck, a boom extending from said mast and inclined upwardly, said boom comprising two side guide members, inner supporting members, and intermediate connecting members, horizontally-extending guides situated beneath and in vertical alinement with said upper guide members, and between which upper and lower guides said dipper-beam is adapted to work, a shaft situated transversely on said lower guides, a dipper-beam guide pivotally mounted on said shaft, a pinion on said shaft and a rack on said dipper-beam, a rope-pulley on said shaft, ropes extending from said pulley whereby said pulley-shaft and pinion are rotated in either direction to extend or withdraw said dipper, and ropes extending from the dipper end of said dipper-beam whereby the said dipper may be dragged forwardly from or rearwardly toward said supporting-truck.

3. In an excavating-machine, the combination with a power-driven truck, a side chute fixed to said truck, and a revoluble mast carried by said truck, of a dipper-beam, and dipper secured rigidly to the lower end of said beam, a boom extending from said mast and inclined upwardly, said boom comprising two side guide members, inner supporting members, intermediate separating members connecting said supporting and said guiding members, horizontally-extending parallel guides situated beneath said boom-guide members and in vertical alinement therewith, and between which said upper and lower guide members said dipper-beam is adapted to work, a shaft situated transversely of and over said lower guides, a dipper-beam guide-frame pivotally mounted on said shaft, guide-rollers carried by said guide-frame, a pinion secured on said shaft, and a rack on said dipper-beam, a rope-pulley on said pinion-shaft, and a power-rope surrounding said pulley, hauling-ropes connected to the dipper end of said dipper-beam whereby the said dipper is traversed forwardly and backwardly, and means whereby said boom may be swung to move said dipper in position over said chute.

4. In an excavating-machine, the combination with a power-driven traction-truck, and a revoluble mast, of a dipper-beam, a dipper rigidly secured to the lower end of said beam, a boom extending from and inclined upwardly, said boom comprising the following elements, outer guide members, inner supporting members, intermediate distance members, cross-beams situated at the forward and rear ends of said distance members and connecting the latter to said forward boom-guide members, boom-supporting members, side boom-braces extending from or near the forward ends of said boom-guide members backwardly and outwardly to connect the projecting outer ends of said cross-beams, lower horizontally-extending guide members situated vertically under and having their guiding-faces in vertical alinement with said boom-guide members, boom-swinging ropes connected to the projecting ends of one of said boom cross-

beams and crossed in front of said mast, dragging-ropes connected to the lower dipper end of said dipper-beam, as described, power-transmitting ropes encircling said dipper-rack shaft-pulley, and suitable independently-operated power-driven winding-drums to which each of said ropes is connected to be operated independently.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN L. SCANLAN.

Witnesses:
THOMPSON R. BELL,
NINA WINTERBERG.