H. H. DAMMAN.

EXCAVATING MACHINE.

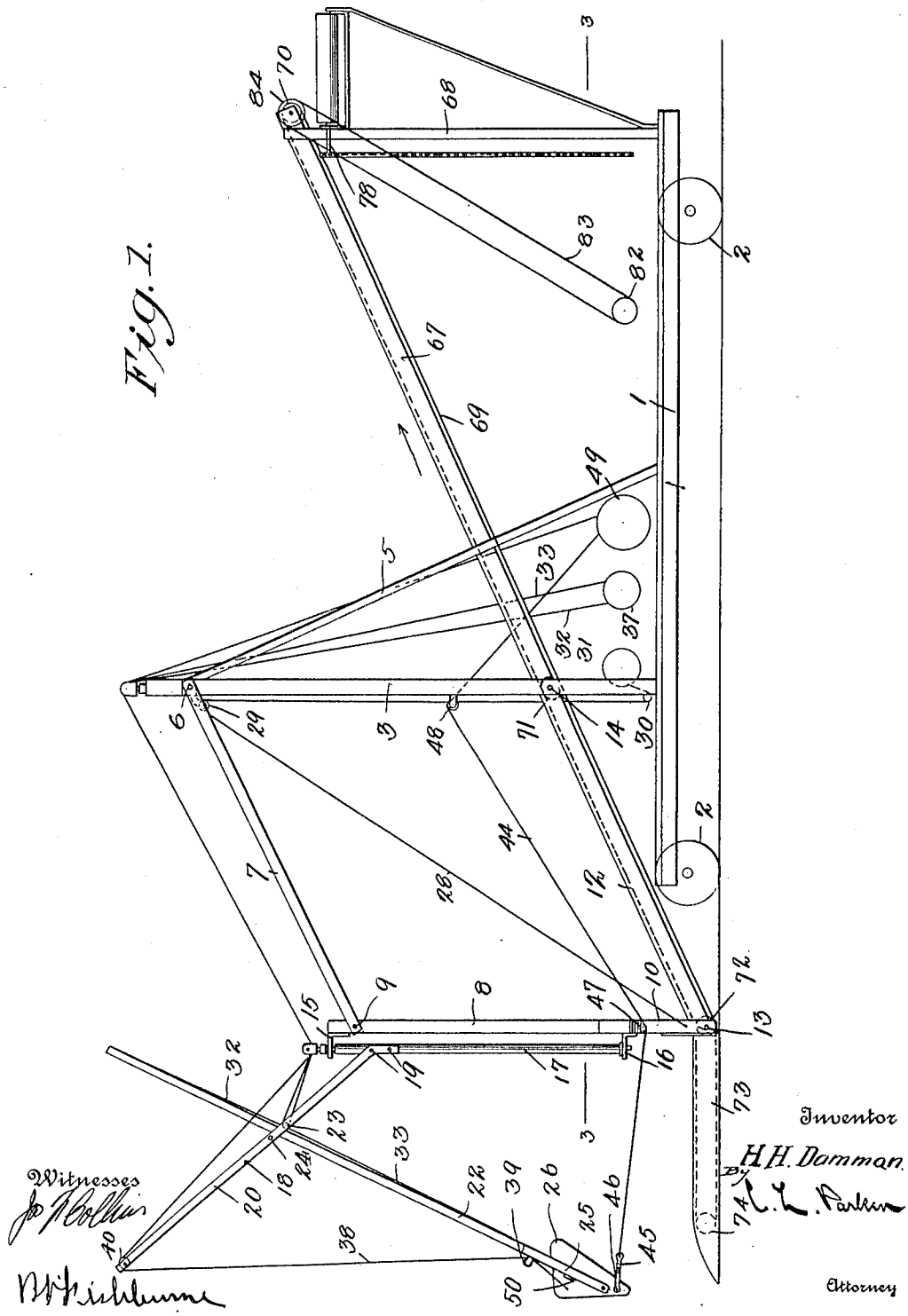
APPLICATION FILED AUG. 17, 1912.

1,082,011.

Patented Dec. 23, 1913.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

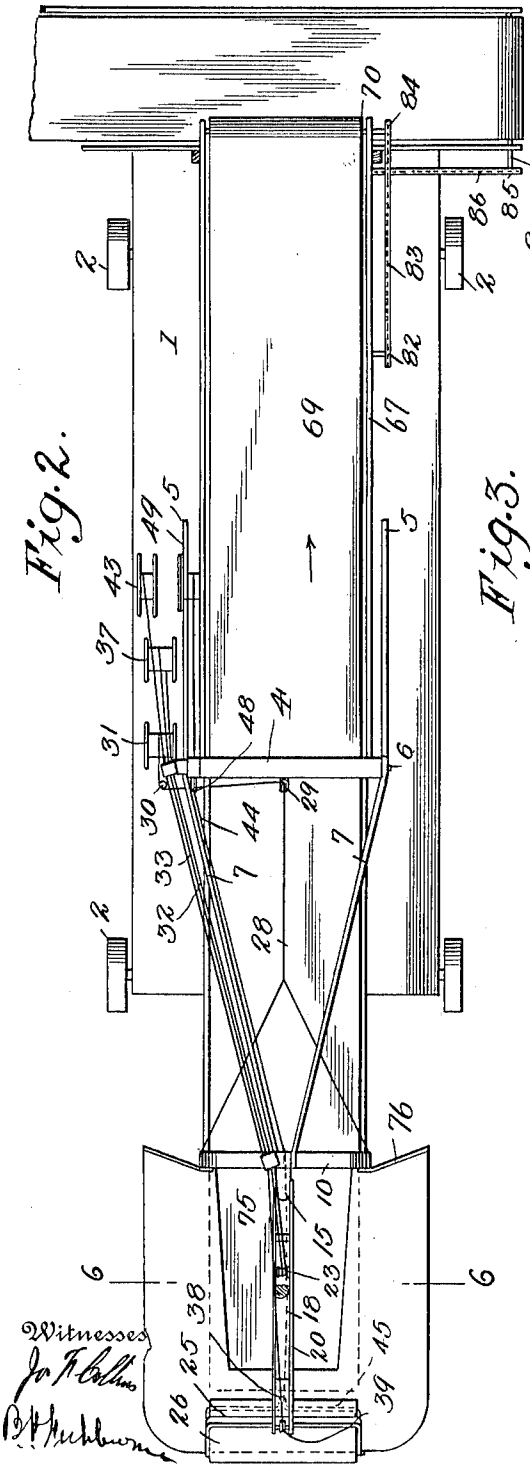
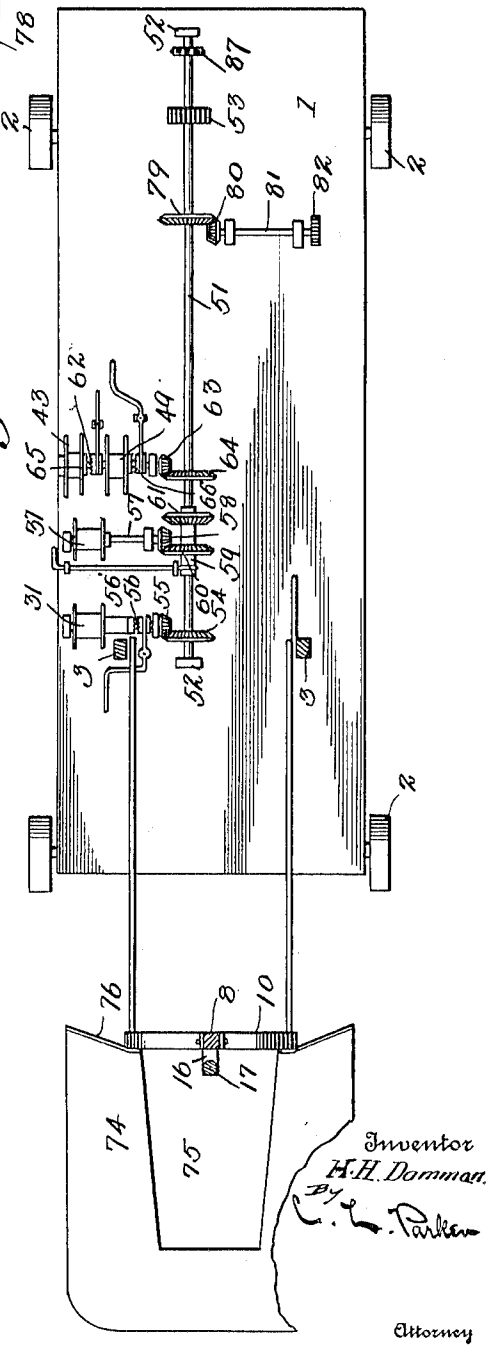


Fig. 3.



Witnesses

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3 SHEETS—SHEET 3.

Fig. 4.

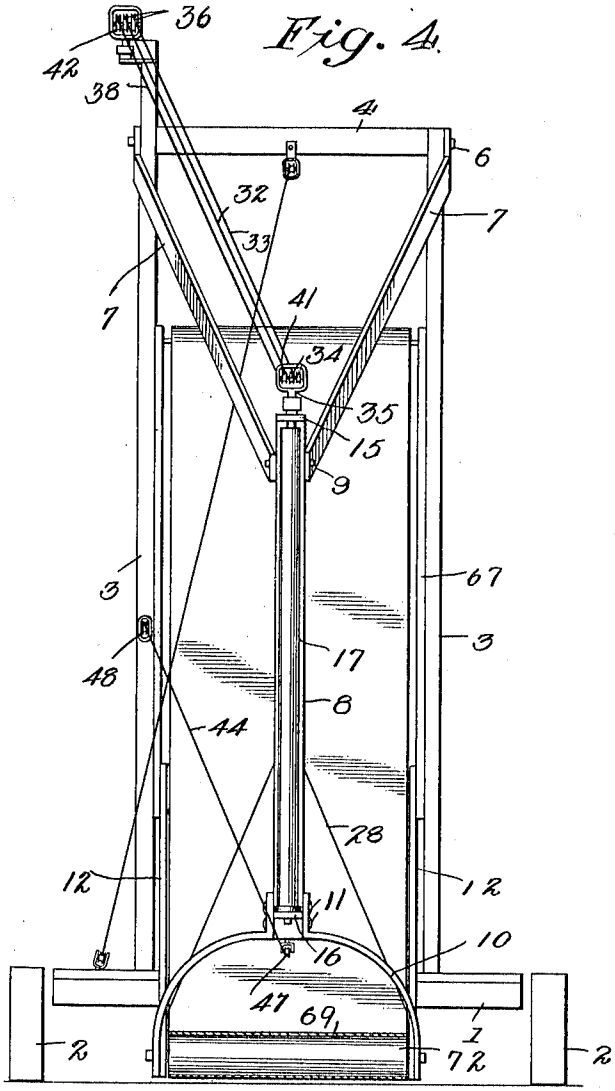


Fig. 5.

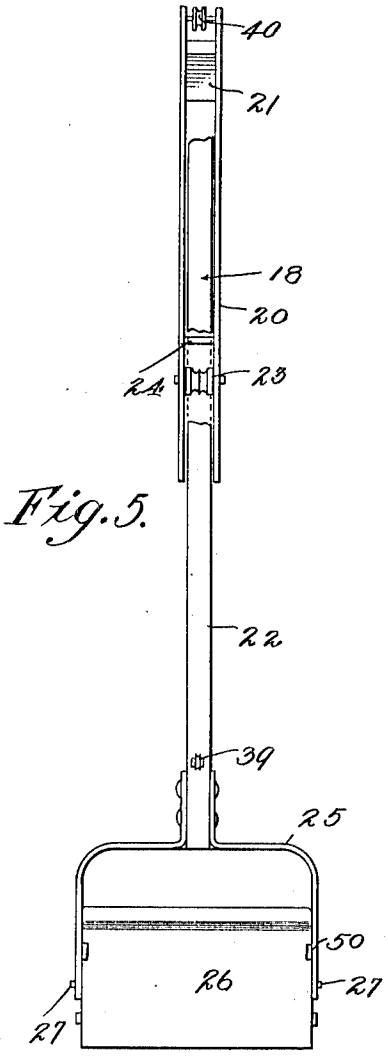
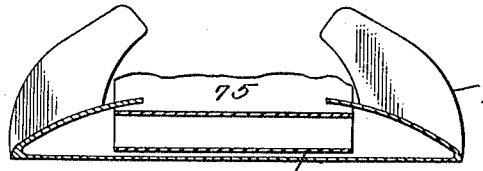


Fig. 6.



Witnesses

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EXCAVATING-MACHINE.

1,082,011. Specification of Letters Patent. Patented Dec. 23, 1913.

Application filed August 17, 1912. Serial No. 715,581.

To all whom it may concern:

Be it known that I, HAROLD H. DAMMAN, a citizen of the United States, residing at Ellensburg, in the county of Kittitas and State of Washington, have invented certain new and useful Improvements in Excavating-Machines, of which the following is a specification.

The present invention relates broadly to an excavating machine, and has particular reference to a device of this character which is well adapted to handle loose earth or material in a railway cut-out and transfer the same to dump cars or the like.

An important object of this invention is to provide a machine of the above mentioned character, which will save both time and labor in its operation.

A further object of the invention is to provide an excavating machine, the parts of which may be quickly and easily moved during the operation of the machine.

A further object of the invention is to provide a machine of the above mentioned character, which is simple in construction, strong, durable, and reliable in operation.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same, Figure 1 is a side view of the machine as a whole, Fig. 2 is a plan view of the same, Fig. 3 is a horizontal sectional view taken on line 3—3 of Fig. 1, the forward portion of the endless conveyer being omitted for the sake of clearness, Fig. 4 is a front end view of the machine, the dipper arm and associated elements being omitted and the endless conveyer shown in section, Fig. 5 is a side view of the dipper arm and bucket, and, Fig. 6 is a transverse sectional view taken on line 6—6 of Fig. 2.

In the drawings wherein for the purpose of illustration, I have shown a preferred embodiment of my invention, the numeral 1 designates a platform, which is suitably mounted upon wheels 2. Rigidly mounted upon the platform 1 is an upstanding supporting structure, including spaced vertical beams 3, connected at their upper ends by a transverse beam 4. Connected with the upper portions of the beam 3 are diagonal reinforcing bars 5, connected at their lower ends with the platform 1, as shown. Pivotally connected with the upper ends of the beams 3, as shown at 6, are forwardly converging metallic arms or bars 7, which engage upon opposite sides of and are pivotally connected with the upper end of a vertically movable mast 8, as shown at 9. Rigidly connected with the lower end of the mast 8 are outwardly extending curved brackets or arms 10, attached thereto by means of bolts 11 or the like. The lower ends of the arms 10 are pivotally connected with longitudinally extending side strips 12 by means of a shaft 13. These strips 12 form the sides of a portion of an endless conveyer to be described. The side strips 12 terminate at the vertical beams 3 and are pivotally connected with the same by a shaft 14. It is thus seen that the vertical beams 3, arms 7, mast 8 and side strips 12, form a structure which is a parallelogram. Hereinafter I will refer to this portion of the machine as a parallelogram supporting structure.

The mast 8 has upper and lower brackets 15 and 16 rigidly connected therewith, which hold a rotatable vertical mast 17. Rigidly mounted upon the rotatable mast 17 is a vertically inclined boom 18, as shown at 19. This boom is preferably formed of spaced metallic strips or bars 20, having a spacing block 21 arranged between their upper ends and held in place by any suitable means. Mounted to freely reciprocate between the strips or bars 20 is a dipper arm 22, prevented from having undue lateral movements by a pulley 23 and a transverse pin 24 spaced therefrom, as shown. Rigidly connected with the lower end of the dipper arm 22 are spaced brackets or arms 25, between which is arranged a bucket 26, pivotally connected therewith, as shown at 27.

Extending diagonally through the parallelogram supporting structure is a cable 28, having its lower end forked and attached to the curved arms 10, as shown. This cable engages an upper pulley 29 and extends downwardly for engagement with a lower pulley 30. The free end of this cable is wound about a drum 31. It is thus seen that by rotating the drum 31 the cable 28 will be wound thereon and the forward mast 8 included in the parallelogram supporting structure will be moved vertically.

The numerals 32 and 33 designate inde-

pendently movable cables, which are attached to the opposite ends of the reciprocatory dipper arm. The cables 32 and 33 engage within the grooves of the pulley 23 (see Fig. 5). The cables 32 and 33 engage pulleys 34 arranged within a frame 35, which has a swivel connection with the upper bracket 15. These cables 32 and 33 extend rearwardly and engage pulleys 36. The cables 32 and 33 are wound upon a common drum 37. It is thus seen that by rotating the drum 37 in one direction, cable 33 is wound up and cable 32 simultaneously unwound, whereby the dipper arm 22 will be moved upwardly. When the drum 31 is rotated in a reverse direction, cable 32 will be wound up and cable 33 simultaneously unwound, whereby the dipper arm 22 is lowered.

Attached to the closed portion or bottom of the bucket 26 is a cable 38, engaging a pulley 39, which is carried by the dipper arm near said bucket. The cable 38 extends upwardly and engages a pulley 40 mounted within the upper or outer end of the boom 18. The cable 38 extends rearwardly to engage pulleys 41 and 42. This cable now extends downwardly and is wound upon an independently rotatable drum 43. The lower end of the dipper arm 22 is swung upwardly by pulling on the cable 38, whereby the bucket 26 will assume the position shown in Fig. 1. When the dipper arm 22 is moved longitudinally downwardly it is thus seen that the bucket 26 will have its lower or cutting edge arranged in a position to be forced into the ground. The lower end of the dipper arm 22 is swung inwardly toward the parallelogram supporting structure by means of a cable 44, having its forward end connected with an approximately U-shaped bracket 45, which straddles the lower or cutting end of the bucket 26 and is pivotally connected with the same, as shown at 46. The cable 44 engages pulleys 47 and 48 and is wound about an independently rotatable drum 49 in an opposite direction to the winding of the cable 38 about the drum 43. When the cable 38 is released and cable 44 is being wound up, the bucket 26 is swung to a horizontal position and scrapes along the ground when traveling toward the parallelogram supporting structure. The bucket 26 is provided with stops 50 which limit the vertical swinging movement of the bucket 26 caused by the pulling upon the cable 38, said stops 50 engaging the arms or brackets 25.

Any suitable means may be employed to rotate the drums 31, 37, 43 and 49. For the sake of illustration, I have shown a longitudinal shaft 51 (see Fig. 3), journaled within end bearings 52, rigidly mounted upon the platform 1. This shaft 51 carries a pinion 53 which may be geared to a steam engine, internal combustion engine, or the like (not shown). Rigidly mounted upon the shaft 51 is a bevel gear 54, engaging a bevel gear 55, which is rigidly connected with a transverse shaft 56, upon which the drum 31 is rotatably mounted. I provide suitable clutch mechanism 56′ for locking and unlocking the drum 31 with the continuously rotating shaft 56. The drum 37 is shown as rigidly mounted upon a shaft 57 having a bevel gear 58 rigidly connected therewith. A sleeve 59 is splined upon the shaft 51 and has bevel gears 60 and 61 rigidly mounted thereon, which are adapted to be alternately moved into and out of engagement with the bevel gear 58. Suitable means are provided to move the sleeve 59 longitudinally of the shaft 51. The drums 43 and 49 are independently rotatable and for this reason I have shown them as being loosely mounted upon a transverse shaft 62, provided with a bevel gear 63, engaging a bevel gear 64 rigidly connected with the shaft 51. Clutch mechanisms 65 and 66 are employed respectively to lock and unlock drums 43 and 49 with the shaft 62. It is to be understood that I do not wish to restrict myself to this specific form of gearing for driving the drums as any other suitable means may be employed, the present form of gearing being shown simply as illustrating the way in which these drums may be advantageously operated.

The numeral 67 designates side strips which are connected at their forward ends with the vertical beams 3 and at their upper ends with rear posts 68. The side strips 12 and 67 thus have pivotal connection at 14 and form the sides of an endless conveyer. Operating within the side strips 12 and 67 is an endless belt 69, formed of any suitably flexible material. At its upper rear end this endless belt engages a driving roll 70. The shaft 14 also carries a roll 71, engaging the inner surface of the endless belt 69. The shaft 13 carries a roll 72 which also engages the endless belt 69.

The numeral 73 designates a sheet-metal apron or housing, which preferably tapers to a point at its forward end, as shown in Fig. 1. Within the forward portion of this apron or housing is mounted a roll 74, engaged by the endless belt 69. The upper surface of the apron or housing 73 is provided with an opening 75. The endless belt 69 travels in the direction indicated by the arrow in Fig. 2. It is thus seen that the bucket 26 will scrape or feed the earth or material to the opening 75 of the apron or housing 73, where the same will be taken up by the endless belt and carried away from the apron 73. The function of this apron is to prevent the bucket 26 from coming in contact with the endless belt, to prevent injury to the latter. The forward end of the

apron or housing tapering to a point, serves as guide means for the bucket 26, when the same is feeding earth or the like to the endless belt. The apron or housing 73 is provided at its rear end with upstanding wings 76, which are securely attached to the brackets or arms 10. In this way the apron or housing is connected with the mast 8 to be raised and lowered therewith.

At the upper end of the endless belt 69 and below the same is arranged a transverse endless belt 77, which is of a desired length to convey the earth or other material to the dump cars (not shown). This endless conveyer 77 is driven by a shaft 78.

Rigidly mounted upon the longitudinal shaft 51 (see Fig. 3) is a bevel gear 79, which engages a bevel gear 80, rigidly connected with a shaft 81. A sprocket wheel 82 is rigidly connected with the shaft 81, and is engaged by a sprocket chain 83, extending upwardly to engage a sprocket wheel 84, which is rigidly connected with the driving roll 70. The shaft 78 carries a sprocket wheel 85, engaged by a sprocket chain 86, which engages a sprocket wheel 87 rigidly mounted upon the shaft 51.

The boom 18 and associated elements being supported by the rotatable mast 17 are free to be swung horizontally in either direction, which may be accomplished by cables (not shown) attached to the boom 18. These cables may be operated to move the boom to a desired position, subsequently to which they are tied to fixed elements. Of course any other suitable means may be employed to swing the boom 18 horizontally and retain the same in a desired position.

The operation of the machine is as follows:—The cable 28 is wound up or released to raise or lower the forward mast 8 included in the parallelogram supporting structure, to raise or lower the apron or housing 73, depending upon the depth of the cut within which the machine is operating. The cable 38 is wound up to swing the bucket 26 to the position shown in Fig. 1, it being understood of course that the cable 44 is released. The dipper arm 22 has its lower end swung outwardly or upwardly by the pull upon the cable 38. The dipper arm 22 may now be moved longitudinally downwardly by proper manipulation of the cables 32 and 33, and the dipper arm 22 may be swung downwardly by gradually unwinding or releasing the cable 38. In this manner the bucket has its cutting edge forced into engagement with the ground or the like. The cable 38 is gradually released while the cable 44 is being wound up. This cable 44 swings the bucket 26 to its horizontal scraping position and causes it to travel toward the apron or housing 73. When the bucket 26 filled with the earth or the like, assumes a position above and adjacent the apron 73, the cable 44 is released and cable 38 is again wound up to swing the bucket to its vertical position, whereby the earth will be dumped upon the endless belt 69. This endless belt conveys the earth to the endless belt 77, which in turn carries the same to the dump cars (not shown).

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that certain changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:—

1. In apparatus of the character described, the combination with a horizontal wheeled frame, of an endless conveyer extending longitudinally of the horizontal wheeled frame and beyond the forward end thereof to be disposed therebelow, a horizontally swinging mast disposed near the forward end of the wheeled frame, a vertically inclined boom connected with the upper end of the mast, a swinging and reciprocating dipper arm connected with the vertically inclined boom, a bucket pivotally connected with the lower end of the dipper arm, means to reciprocate the dipper arm in opposite directions to move the same toward and away from the ground, means to swing the bucket to a normally horizontal scraping position and draw the same toward the forward horizontal portion of the endless conveyer, and means to swing the bucket to a vertical position whereby the contents thereof is dumped upon the forward horizontal portion of the endless conveyer.

2. In a machine of the character described, a wheeled support, spaced upstanding posts connected at their upper ends, upper arms pivotally connected with the posts and converging toward their forward ends, a mast disposed between the forward ends of the pivoted arms and pivotally connected therewith, outwardly extending arms connected with the lower end of the mast, side strips pivotally connected with the outwardly extending arms and with said posts, an endless conveyer operating between the side strips, excavating means mounted upon the mast, means to operate said excavating means, and a cable connected with the lower portions of the mast and extending upwardly, whereby a pull upon the cable will serve to raise the mast.

3. The combination with a wheeled support, of an upstanding parallelogram supporting structure having one side thereof rigidly connected with the wheeled support and the opposite side vertically movable, means to move the vertically movable side, an apron connected with said vertically mov-

able side and extending forwardly beyond the same, an endless conveyer having a portion thereof operating within the apron and extending rearwardly beyond the parallelogram supporting structure, excavating means to deliver material to the endless conveyer, and means to operate the excavating means.

4. In a machine of the character described, the combination with an upstanding parallelogram supporting structure including a vertically movable side, a vertically swinging boom pivotally connected with the vertically movable side, a dipper arm carried by the boom, means to reciprocate said dipper arm, a bucket pivotally connected with the free end of the dipper arm, means to swing the bucket with relation to the dipper arm, means to move the vertically movable side of the parallelogram supporting structure, and a conveyer to receive material from the bucket.

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

HAROLD H. DAMMAN.

Witnesses:
E. D. DOYLE,
F. M. BLANCHARD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."