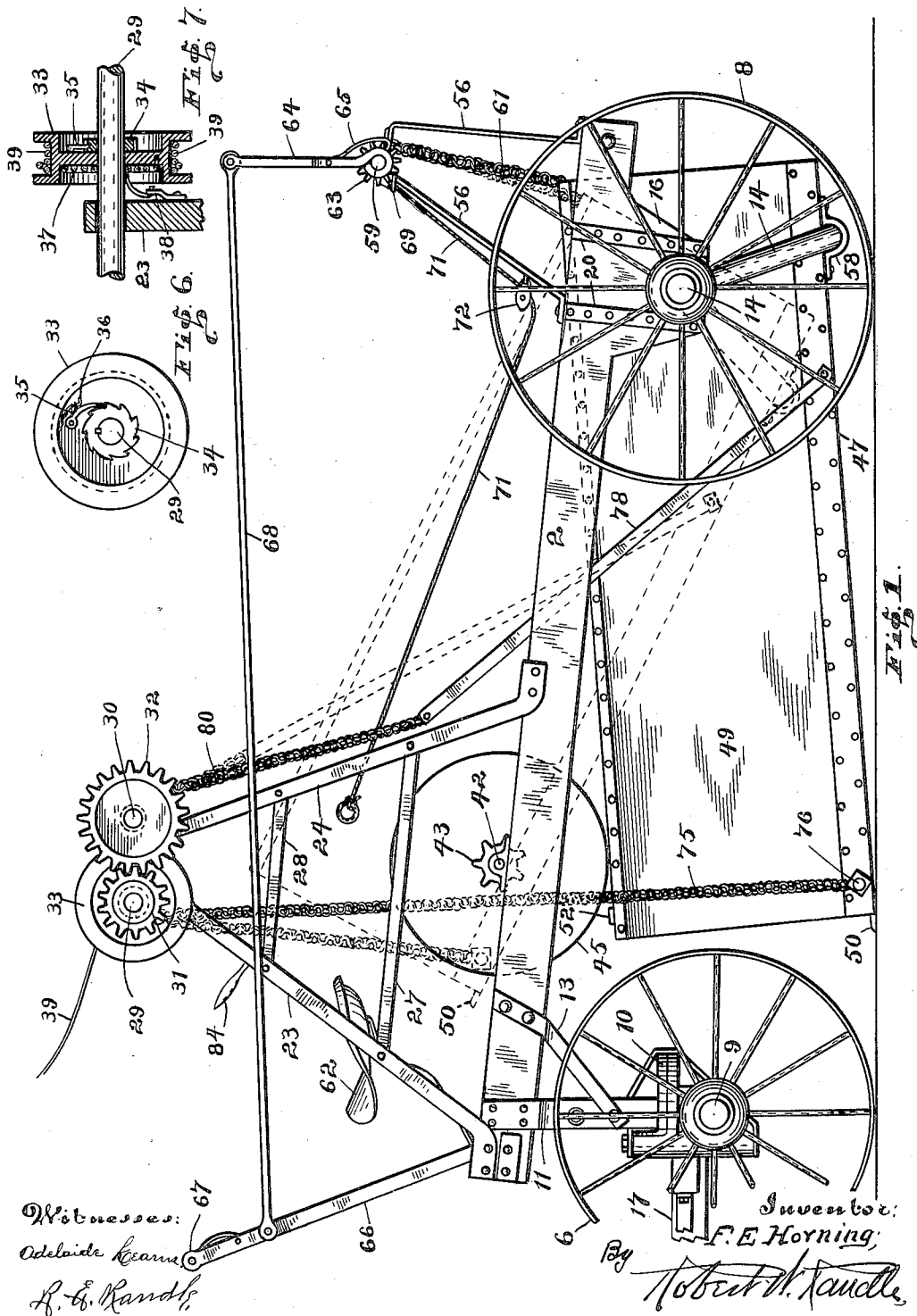


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EXCAVATING MACHINE.
APPLICATION FILED MAY 27, 1911.

1,021,777.

Patented Apr. 2, 1912.

3 SHEETS-SHEET 1.

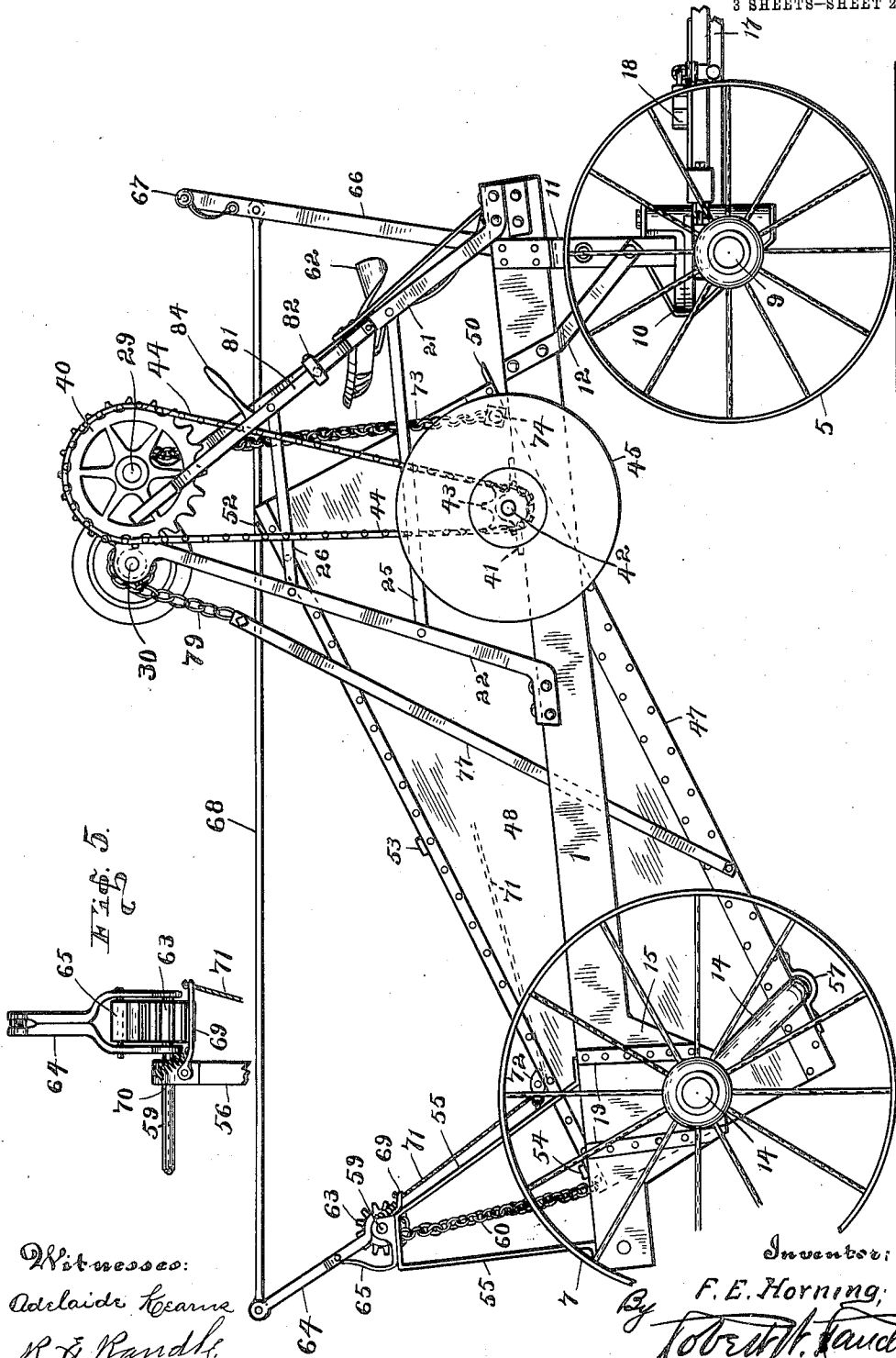


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3 SHEETS-SHEET 2.



Witnesses:
Adelaide Kearns
R. E. Randh.

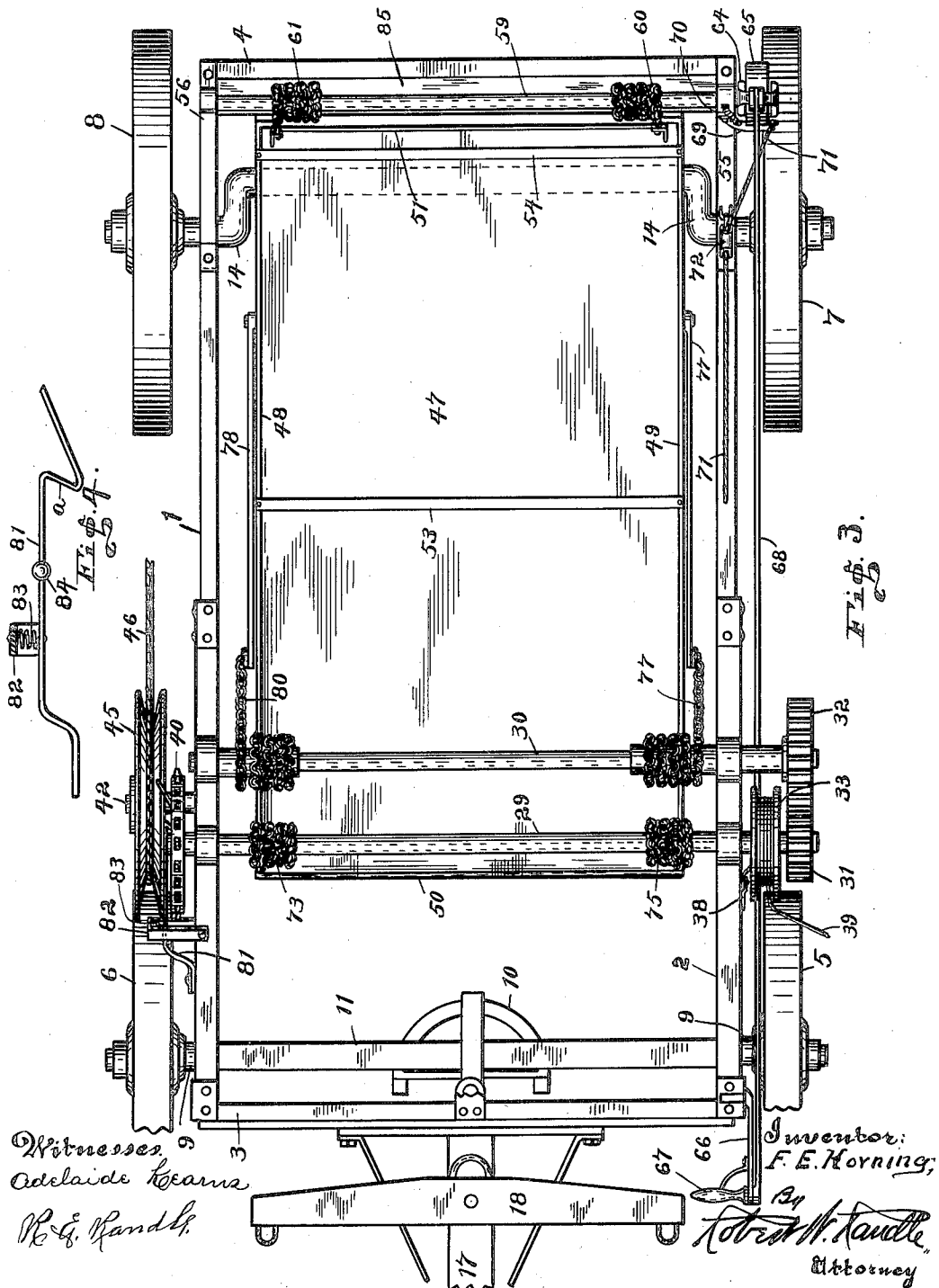
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3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

FRANK E. HORNING, OF WAYNE COUNTY, INDIANA.

EXCAVATING-MACHINE.

1,021,777.

Specification of Letters Patent.

Patented Apr. 2, 1912.

Application filed May 27, 1911. Serial No. 629,888.

To all whom it may concern:

Be it known that I, FRANK E. HORNING, a citizen of the United States, residing in Wayne county, in the State of Indiana, have made certain new and useful Improvements in Excavating-Machines, of which the following is a true and complete exposition and specification, being such as will enable others to make and use the same with absolute exactitude.

The object of my present invention, broadly speaking, is to provide an excavating machine which will be strong and durable in construction, easily operated and controlled, constructed to develop a maximum of efficiency with a minimum of labor and expense, and which can be manufactured and sold at a comparatively low price.

More specifically stated my object is to provide an excavating machine adapted to be employed as a self-loading wagon, by which the material operated on may be automatically loaded into the machine and then by the same machine transported any distance to the point where it is desired to have it utilized.

A further object is to provide means whereby the various parts of the machine may be easily manipulated by the operator to accomplish the greatest amount of work with a minimum of labor and with greater efficiency than has heretofore been attained.

Other specific objects and particular advantages of my machine will suggest themselves in the course of the following specification, and that which is new and useful will be pointed out in the appended claims.

The preferred manner for carrying out the objects of my invention in a practical manner is shown in the accompanying drawings, in which—

Figure 1 is a left-hand side elevation of my invention, showing the scoop or bed lowered in position to load. Fig. 2 is a right-hand side elevation of the machine, showing the scoop raised in position to transport the load, or in position to discharge the load. Fig. 3 is a top plan view of the machine, showing the scoop in the same position as in Fig. 2. Fig. 4 is a detail view of the locking-dog or cam which retains the scoop in the position shown in Fig. 2. Fig. 5 is a detail view showing a front elevation of the ratchet mechanism

for the end-gate. Fig. 6 is a detail view showing the outer face of the retrieving-pulley. And Fig. 7 is a cross-sectional view of the retrieving pulley shown in Fig. 6.

Similar indices denote like parts throughout the several views of the three sheets of drawings.

The body of my machine comprises a main-frame which is made up of the side members 1 and 2, and the end members 3 and 4. The members of said frame are rigidly secured together and the whole is mounted on suitable ground wheels: Numerals 5 and 6 denoting the front wheels, and numerals 7 and 8 denoting the rear wheels. The forward end of said main frame is elevated higher than is the rear end thereof as shown. Numeral 9 denotes the front axle, for the wheels 5 and 6. Secured in the center of axle 9 is the ordinary fifth-wheel 10 to which the forward end of the main-frame is connected by the bracket 11, which is merely a bar bent to extend from member 1 to member 2, the central portion being bent down, as in Figs. 1 and 2 and resting on the fifth-wheel 10 as in Fig. 3. A brace 12 extends from member 1 to bracket 11, as in Fig. 2; and a brace 13 extends from member 2 to bracket 11, as in Fig. 1.

The rear axle 14 is an eccentric, it having two end portions on which the rear wheels are mounted, and a central portion which is off-set for the purposes hereinafter shown. The end portions of axle 14 are rotatably mounted in suitable bearings carried by the blocks 15 and 16. Extending forward from the fifth-wheel is the ordinary tongue 17, which carries the doubletree 18 which is pivoted thereto to provide means for hitching horses to the machine. Said blocks 15 and 16 are rigidly connected to the main-frame by the bars 19 and 20, and by which the bearings for the axle are held in proper position.

Extending upward and rearward from the front end of member 1 is the standard 21 which is united at its upper end with standard 22 which extends upward and forward from the central portion of member 1, all as shown in Fig. 2. Extending upward and rearward from the front end of member 2 is the standard 23, which is united at its upper end with standard 24 which ex-

tends upward and forward from the central portion of member 2, of the main-frame, all substantially as in Fig. 1. Standards 21 and 22 are also connected by the cross-bars 25 and 26; and in like manner standards 23 and 24 are connected by the cross-bars 27 and 28.

Numeral 29 denotes a shaft extending across and mounted in suitable boxings carried by and located near the upper ends of standards 21 and 23. Numeral 30 denotes a shaft extending across and mounted in suitable boxings carried by and located near the upper ends of the standards 22 and 24, substantially as indicated.

Secured on the extreme left-hand end of shaft 29 is the small gear-wheel 31, and meshing therewith and secured on shaft 30 is the large gear-wheel 32, by which shafts 29 and 30 are revolved together, but one operating at a faster rate of speed than the other.

Numeral 33 denotes a spool-pulley which is freely revoluble on shaft 29, being located between gear 31 and the standard 23, as shown in Fig. 3. Said spool-pulley is provided with a single central web, and with a comparatively large channel in its periphery, as shown.

Secured on shaft 29 adjoining the web of pulley 33 is a ratchet-wheel 34. Pivoted to the web of pulley 33 is a dog 35 which engages the ratchet 34, the dog being retained resiliently in engagement with the ratchet by the spring 36. Contacting with the other (inner) face of the web of pulley 33 is the coil-spring 37. The outer end of spring 37 is secured to the pulley 33 while the inner end of said spring is secured to the finger 38 which latter extends from the standard 23, as shown in Figs. 3 and 7. Numeral 39 denotes a single length of wire-cable, or the like, a portion of which is adapted to be wound on the pulley 33.

Secured on the right-hand end of shaft 29 is the large sprocket-wheel 40. Mounted on the upper edge of side member 1, immediately below shafts 29 and 30, is a boxing 41 in which is mounted the stub-shaft 42.

Secured on shaft 42, and in alinement with sprocket wheel 40, is the small sprocket wheel 43. Connecting sprocket-wheels 40 and 43 is the sprocket-chain 44. Also secured on shaft 42 is the grooved rope-pulley 45 which is adapted to carry the removable endless-rope 46, which is for the purposes hereinafter set forth.

I will now describe the scoop, or the bed, which includes the bottom 47 having a smooth and unobstructed inside face; and it is provided with the right and the left-hand sides 48 and 49 respectively.

The front end of the scoop is not closed, being open at all times. Extending forward along the front edge of the bottom 47

is the blade 50. The upper edges of the sides 48 and 49 are tied together by a plurality of cross-bars 52, 53 and 54. The rear end of the scoop is adapted to be opened and closed by the end-gate 51, which is mounted to slide up and down in suitable guide-ways located at the rear end of the scoop. The horizontal dimensions of the scoop are less than the inside dimensions of the main frame, in order that the scoop may operate between, below and above the members thereof as indicated.

The rear portion of the scoop rests on the central portion of the axle 14, the offset in said axle being of such extent as to allow the bottom of the scoop to be near the ground at all times. The scoop is pivotally secured to the central portion of axle 14 by the boxings 57 and 58, substantially as indicated.

Extending up from the rear end of member 1 is the bracket 55, and a similar bracket, 56, extends up from the rear end of member 2. Mounted across and carried on the upper ends of the brackets 55 and 56 is a shaft 59. Numerals 60 and 61 denote two chains which have their upper ends secured to the shaft 59 and their lower ends are secured to the upper corners of the end-gate, whereby the end-gate may be raised and lowered by turning shaft 59. Said shaft 59 is adapted to be turned by the driver, who may be located on the seat 62, as follows: Secured on the left-hand end of shaft 59 is the ratchet-wheel 63. Loosely mounted on shaft 59 and striding said ratchet 63 is the ratchet-arm 64, in which is pivotally mounted the downwardly extending ratchet-dog 65 whose free end engages the teeth of the ratchet-wheel 63 as the arm 64 is operated as hereinafter set forth, and for the purpose specified. Pivoted at its lower end to the front portion of member 2 is the arm 66 which is provided at its upper end with a handle 67 which is within reach of the operator on the seat 62. Connecting the upper end of the arm 64 with the upper portion of arm 66 is a rod 68. Pivoted to the upper portion of bracket 56 is a latch 69 which is normally retained in engagement with the ratchet-wheel 63 by a spring 70. The latch 69 is adapted to be freed from the ratchet-wheel 63 by the operator who may be on the seat 62. Secured in the free end of latch 69 is a cord 71 which extends downward through pulley 72 and then forward where it may be secured within reach of the operator on the seat 62.

Numeral 73 denotes a chain secured at its lower end to the lower forward right-hand corner of the scoop by the bolt 74, the upper end of said chain being secured to shaft 29 and adapted to be wound thereon. In like manner numeral 75 denotes a chain secured at its lower end to the lower forward left-hand corner of the scoop by the bolt 76,

the upper end of chain 75 being secured to shaft 29, same as chain 73. The length of said chains 73 and 75 are such as to allow the scoop to be lowered as low, or lower, as that shown in Fig. 1.

Pivoted at their lower ends to the respective right and left-hand sides of the scoop, near the lower edges thereof, and in the rear of the center thereof, are the respective bars 77 and 78. Secured to the upper end of bar 77 is the chain 79, and secured to the upper end of bar 78 is the chain 80. The upper ends of said chains 79 and 80 are secured to shaft 30 on which they are adapted to be wound.

In Figs. 2 and 4 is shown a ratchet, whose function will hereinafter be made apparent, and it consists of an arm 81 which is loosely pivoted at its lower end to the outer face of the standard 21, from which it extends parallel therewith but turned outward in order to have its upper end located near the outer face of sprocket-wheel 40, and adapted to be moved toward and away from said wheel. The upper end of said arm 81 is provided with a hooked portion forming a shoulder *a* which may engage the spokes of the sprocket-wheel 40 in order to prevent wheel 40 from revolving in one direction; yet always allowing it to revolve in the other direction.

Numeral 82 denotes a guard secured to the sides of standard 21, forming a loop through which the arm 81 extends, and forming a guide therefor. A spring 83 is adapted to normally retain the arm 81 toward the standard 21, that is with the shoulder *a* in engagement with one of the spokes of the wheel 40.

Numeral 84 denotes a handle by means of which the driver may press the arm 81 outward in order to release shoulder *a* from the wheel 40.

Disposed across between members 1 and 2 and adjoining member 4 is the butting-sill 85 which is adapted to receive the rear end of the scoop thereagainst as the scoop is being loaded.

Modus operandi: Ordinarily my machine is adapted to be drawn by a team, however it may be propelled with a motor if desired. In practice the machine is to be taken to the point to be loaded (which for convenience of description we will designate a gravel-pit), after which the forward end of the scoop is lowered, as in Fig. 1 in order that the blade 50 may engage the gravel. The machine is then propelled forward, which may be by an engine located outside the pit with a cable for that purpose extending from the engine and attached to the forward end of the tongue 17. As the machine is drawn forward the gravel will be forced into the scoop until the scoop is full, or until the desired amount of gravel is

loaded into the scoop, after which the forward end of the scoop should be raised to the position shown in Fig. 2, which may be accomplished by attaching the cable 39 to an engine or other power located in front of but not otherwise attached to the machine. As the cable 39, which at this time is wound on the spool-pulley 33, is drawn forward the spool-pulley 33 is revolved in the direction which will cause the dog 35 to engage the ratchet 34, thereby causing the shaft 29 to be turned which will wind the chains 73 and 75 thereon, thereby lifting the forward end of the scoop. Now as shaft 29 is turned it will, of course, turn the shaft 30, by means of the gear-wheels 31 and 32, thereby winding the chains 79 and 80 on the shaft 30, resulting in drawing forward on the scoop and swinging the entire scoop forward as it is being raised. After the scoop has been raised to the point desired the cable 39 may be released which by reason of the coil spring 39 will be automatically retrieved or wound back on the spool 33, as the spool 33 will revolve back free, the dog operating back on the ratchet 34 without engagement therewith, and therefore without turning the shaft 29. During the time of raising the scoop, as above set forth, the shoulder *a* of the arm 81 will be acting as a ratchet whereby when the cable 39 is released the said shoulder *a* of arm 81 will engage one of the spokes of wheel 40 which will hold the scoop and its load in the position shown in Fig. 2. After the machine is loaded, as set forth, it may be propelled any distance to the point where it is desired to dispose of the load. The unloading may be quickly accomplished by the operator on the seat 62 first operating the arm 66, by means of the handle 67, forward and backward which, manifestly, will cause the shaft 59 to be turned by the dog 65 engaging the ratchet-wheel 63 and thereby turning the shaft 59 with each forward movement of the arm 66, and the latch 69 preventing the shaft 59 from turning back as the dog is being moved back for a new hold. As the shaft 59 is turned, as stated, the chains 60 and 61 will be wound thereon; thereby raising the end gate 51 step-by-step. As the end gate is raised to the desired sufficiency it is evident that by reason of the slant of the scoop that the gravel, or other material therein, will slide by gravity out under the end-gate, after which the operator on the seat may pull on the cord 71 which will move the latch 69 away from the ratchet-wheel 63 and thereby allow the end-gate to fall by gravity to its closed position. After the load is discharged then the machine may be returned to be again loaded as before. The lowering of the scoop to position to be filled may be accomplished by gravity, the operator having only to press outward on

the handle 84 which will release the wheel 40 and allow the scoop to assume the position shown in Fig. 1.

In place of raising the forward end of the scoop as above set forth I have provided another means which may be practiced. This second means presupposes an engine (which should be located to the rear of the machine) having a rope-pulley, corresponding to the rope-pulley 46 herein shown. Now suppose that an endless rope-belt 46 be placed over the groove of said pulley of the engine and over pulley 45 of the machine. It is evident that if the engine be operated that the turning of pulley 45 will, through the sprocket 43, and the sprocket chain 44, cause the sprocket-wheel 40 to be turned, thereby causing it to turn the shafts 29 and 30 and thereby elevating the scoop as previously stated.

I desire to call attention to the fact that when the scoop is lowered to filling position and as soon as it engages the material to be loaded it will be forced back against the sill or bumper 35, thereby causing it to be forced positively forward as the machine advances.

I desire that it be understood that various changes may be made in the details of construction from that herein shown and described without departing from the spirit of my invention or sacrificing any of the advantages thereof.

Having now fully shown and described my invention and its operation what I claim and desire to secure by Letters Patent of the United States, is—

1. An excavating machine comprising a main-frame mounted on four ground wheels, the central portion of the rear axle being bent to extend across near the ground line and parallel therewith, a scoop having its rear end pivotally connected on said axle and extending forward therefrom to near the front wheels, means whereby the forward end of the scoop may be raised and lowered by power, means whereby the scoop swings forward as the front end is being raised, and a bumper for the rear end of the scoop.

2. In an excavating machine, a main-frame having its forward end located higher than the rear, an eccentric rear axle having its central portion located near the ground-line, ground-wheels mounted on the outer ends of said axle, a pair of front wheels

adapted to turn under the frame, means whereby the machine may be propelled by animals, a driver's seat located on the front of the said frame, a scoop having its rear portion pivoted on the central portion of the rear axle, standards extending up from each side of the main frame, a pair of shafts extending across the machine and supported by said standards, chains adapted to wind on one of said shafts and extending down and secured to the forward corners of the scoop, and means for connecting the other shaft to the scoop in the rear of the center thereof, and means whereby said shafts may be operated together but at different rates of speed from each other.

3. An excavating machine comprising a main-frame, an eccentric rear-axle having its central portion located near the ground and adapted to swing forward and backward, ground-wheels mounted on the ends of said axle, a front axle having ground wheels adapted to turn under the frame, means whereby the machine may be propelled by animal power, a driver's seat located on the front of the main-frame, a scoop having its rear portion pivotally mounted on the central portion of said rear axle and extending forward therefrom, standards extending up from the sides of the main-frame and toward the forward end thereof, a shaft carried by said standards, chains adapted to be wound on said shaft, the lower ends of said chains being secured to the lower forward corners of the scoop, means for revolving said shaft independent of the means for propelling the machine, said means including a sprocket wheel secured to one end of said shaft, a smaller sprocket wheel mounted below the first named sprocket wheel, a stub-shaft on which the smaller sprocket wheel is secured, a sprocket chain connecting said sprocket wheels, a channel wheel secured to said stub-shaft, and a belt adapted to operate on said channel wheel and over a similar channel carried by an engine located in the rear thereof, all substantially as shown and described.

In testimony whereof I have hereunto subscribed my name to this specification in the presence of two subscribing witnesses.

FRANK E. HORNING.

Witnesses:

R. W. RANDLE,
R. E. RANDLE.