

No. 853,985.

PATENTED MAY 21, 1907.

T. LINGA.  
DITCHING MACHINE.

APPLICATION FILED OCT. 8, 1906

3 SHEETS—SHEET 1.

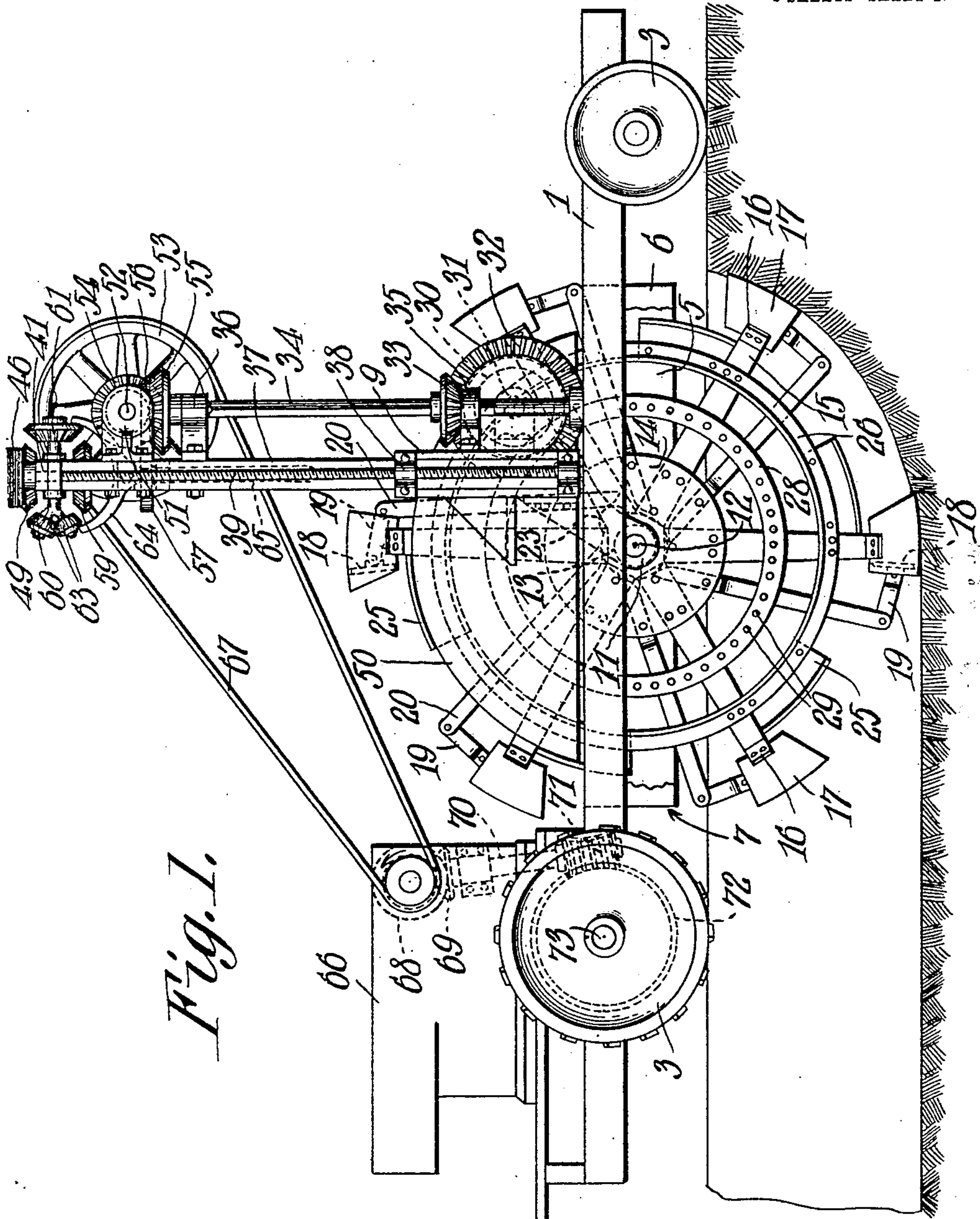


Fig. 1.

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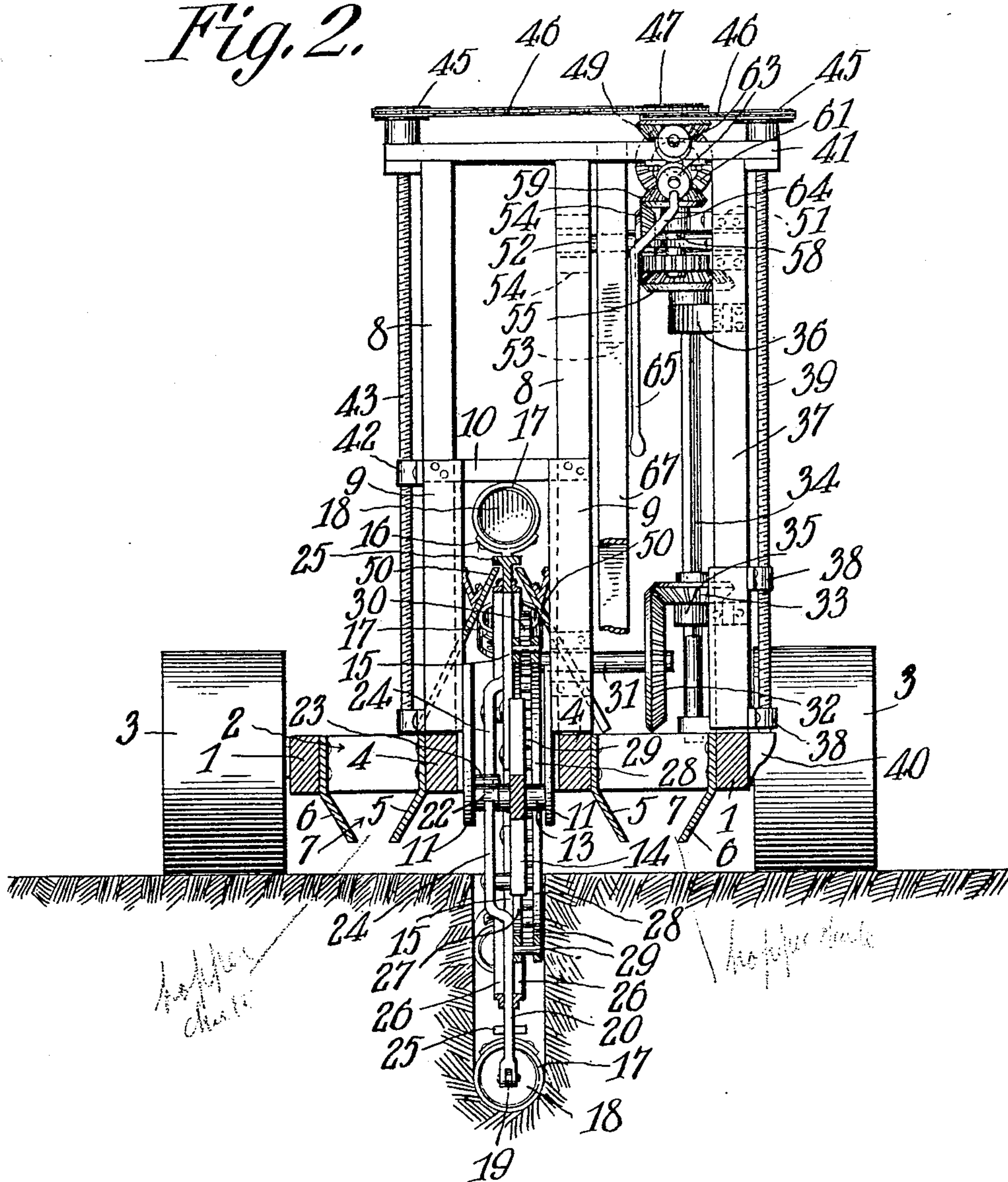
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3 SHEETS—SHEET 2.

Fig. 2.



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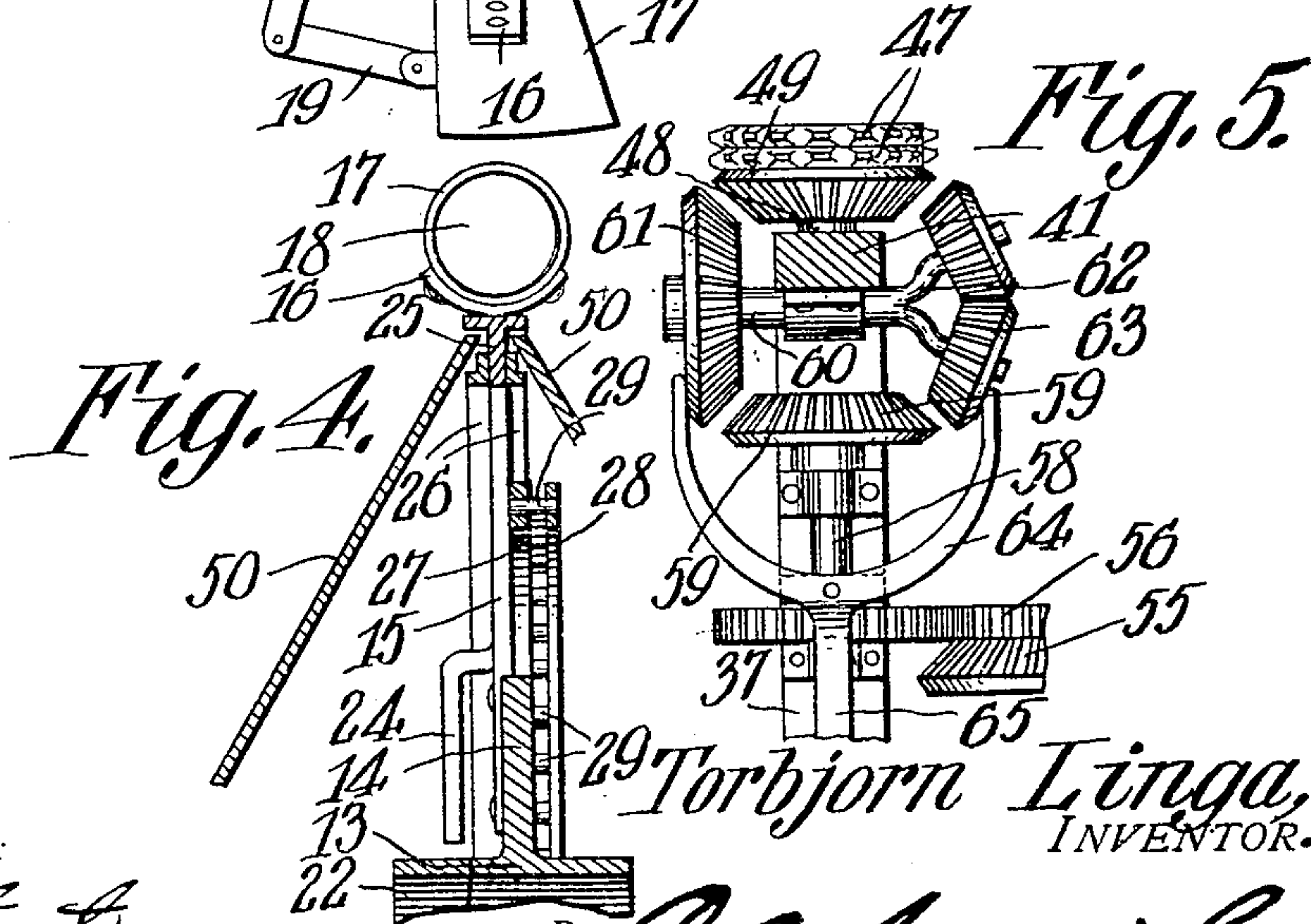
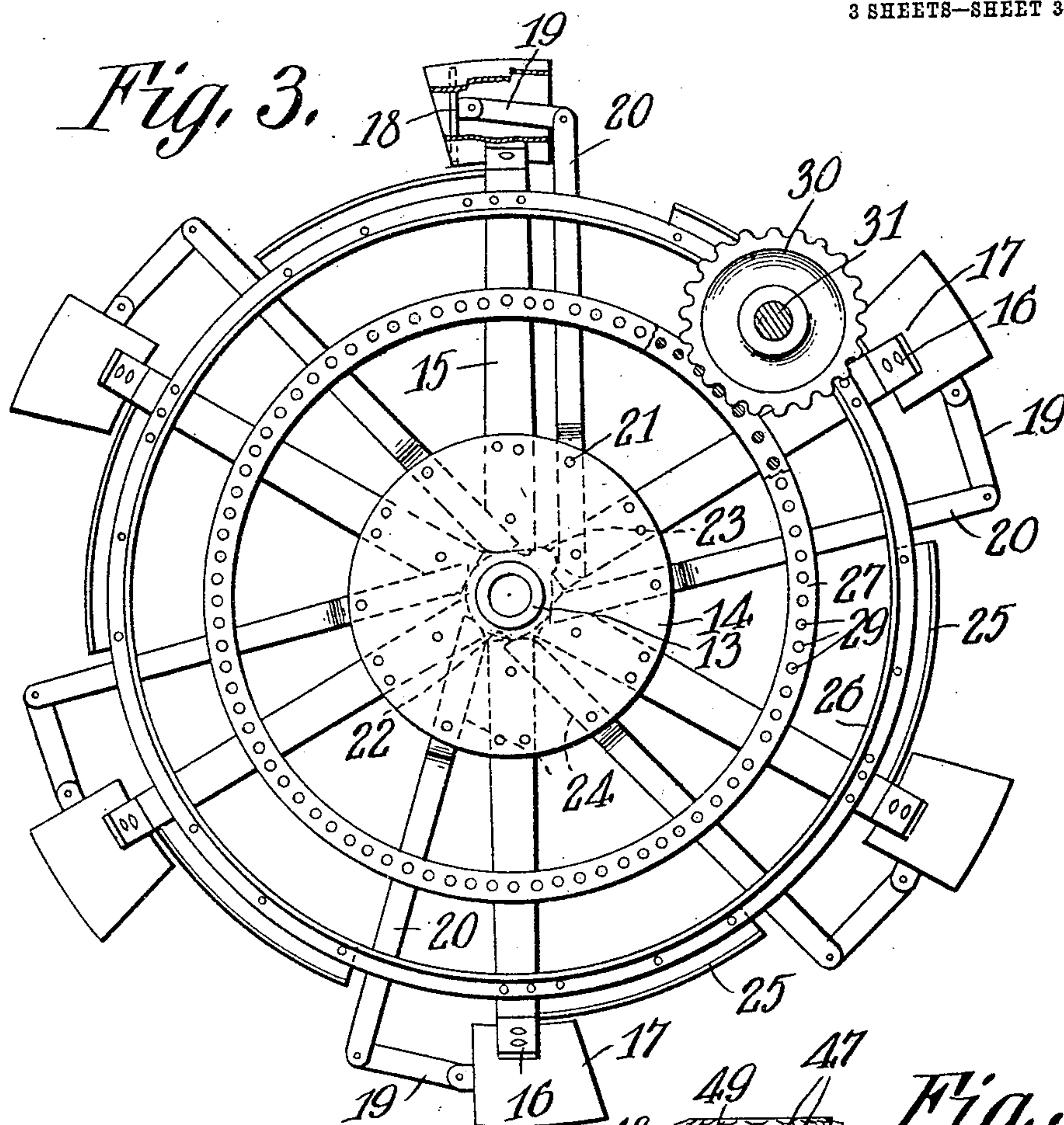
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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

TORBJÖRN LINGA, OF THOR, IOWA.

## DITCHING-MACHINE.

No. 853,985.

Specification of Letters Patent.

Patented May 21, 1907.

Application filed October 8, 1906. Serial No. 338,074.

*To all whom it may concern:*

Be it known that I, TORBJÖRN LINGA, a subject of the King of Norway, residing at Thor, in the county of Humboldt and State of Iowa, have invented a new and useful Ditching-Machine, of which the following is a specification.

This invention relates to ditching machines and its object is to provide a self-propelled machine of this character having means of novel construction for digging ditches to desired depths and for discharging the removed dirt at the sides of the ditch.

A still further object is to provide a ditching machine which is of very simple construction, which can be readily manipulated, and which has simple means for adjusting the digging mechanism vertically.

With the above and other objects in view the invention consists of certain novel features of construction and combinations of parts which will be hereinafter more fully described and pointed out in the claims.

In the accompanying drawings is shown the preferred form of the invention.

In said drawings: Figure 1 is a side elevation of the machine; Fig. 2 is a vertical transverse section; Fig. 3 is an enlarged elevation of the digging wheel one of the buckets being partly broken away; Fig. 4 is a transverse section through a portion of the wheel and the deflecting plates or guards; and Fig. 5 is a detail view showing the mechanism for raising or lowering the wheel carrying frame.

Referring to the figures by characters of reference, 1—1 are side beams connected by end beams 2 to form the main frame of the machine, said frame being supported by traction wheels 3. Parallel beams 4 are arranged longitudinally within the frame and carry inclined plates 5 which co-operate with similar plates 6 upon the beams 1 to form elongated hoppers 7 open at the bottom. Upstanding from the beams 4 are uprights 8 on which are mounted channeled side strips 9 connected at their upper ends by means of a strip 10 so as to form a frame which is slidably mounted upon the standards 8. Arms 11 extend downward from the side strips 9 and constitute supports for the stationary axle 12 of the digging wheel. This wheel comprises a hub 13 to which is secured a disk 14 and secured to the disk is a series of radiating arms 15 each of which has a yoke 16 at its upper end in which is secured a cylindrical bucket 17 the forward or advancing end of

which is preferably formed at an acute angle to the radius of the wheel. Each bucket is open at its ends and has a follower 18 slidably mounted therein and connected by a link 19 with a lever 20. All of these levers 20 are pivoted as at 21 upon the disk and are limited in their movement in one direction by a collar 22 which is fixed upon the axle.

The collar 22 has a projection 23 thereon extending into the path of ends 24 which are offset from the levers 20. Curved T-irons 25 are secured to an outer ring 26 which connects the arms 15 and these T-irons are disposed directly in front of the buckets 17 and extend to points close to the levers 20 in front thereof. A smaller concentric ring 27 is secured to the arms 15 and is connected to a similar ring 28 by means of pins 29. These pins are adapted to be engaged by a gear 30 arranged upon a shaft 31 which is journaled in one of the side strips 9 of the adjustable frame. A beveled gear 32 is secured to the shaft 31 and meshes with the gear 33 which is feathered upon a vertical rotatable shaft 34 journaled in brackets 35 and 36 extending from an upright 37. One of these brackets 35 has an ear 38 through which extends a screw 39 bearing at its lower end in the bracket 40 on one of the beams 1 and at its upper end in a cross strip 41 arranged upon the uprights 8 and 37. An ear 42 also extends laterally from the strip 10 and is engaged by a screw 43 bearing at its lower end in a bracket 44 supported by one of the beams 4 and at its upper end in the cross strip 41. The two screws are provided at their upper ends with sprockets 45 and each sprocket has a chain 46 thereon which extends around a double sprocket 47 secured upon a short shaft 48 which is journaled in the cross strip 41 and carries a beveled gear 49. Secured to the side strips 9 are inclined deflector plates 50 the upper edges of which are curved so as to be concentric with the ring 26 and these edges are overlapped by the T-irons 25. These deflector plates 50 are so disposed as to direct dirt into the hoppers 7, as clearly shown in Fig. 2. Journaled in brackets 51 extending forward from the uprights 8 and 37 is a shaft 52 carrying a pulley 53 and a beveled gear 54. This gear meshes with a gear 55 on the upper end of the vertical shaft 34 and said gear 55 carries a cog 56 which meshes with a similar gear 57 disposed upon a short shaft 58 journaled in suitable supports connected to the upright 37. This



shaft 58 has a beveled gear 59 thereon disposed directly below the gear 49. A shaft 60 is journaled upon the cross strip 41 and is provided at one end with a beveled gear 61 while its other end is forked as at 62 and carries meshing gears 63. A yoke 64 embraces gears 61 and 63 and is formed at one end of a lever 65 which is fulcrumed upon a supporting bracket extending from the upright 37. A suitable motor 66 is carried by the frame of the machine and drives a belt 67 extending around the pulley 53. A beveled gear 68 is also driven by the motor and meshes with a gear 69 upon one end of a shaft 70. This shaft has a worm 71 thereon which meshes with a worm wheel 72 on the axle 73 of one pair of wheels 3 so that the entire gear can be slowly propelled. It is of course understood that any suitable means may be employed for starting, stopping or reversing the machine and mechanism other than that shown may be used for propelling the machine it merely being necessary to provide means whereby the machine can be propelled slowly in a desired direction.

In using the machine the wheel carrying frame made up of strips 9 and 10 and arms 11 is adjusted to a desired elevation by swinging the lever 65 so as to bring either the gear 61 or the gears 63 in mesh with gears 49 or 59. The motor will of course drive the shaft 34 by means of the bolt 67, shaft 52 and gears 54 and 55 and rotary motion will in turn be transmitted from the shaft 34 through gears 56 and 57 to shaft 58. By manipulating the gears 61 and 63 the gear 49 can be caused to rotate in a desired direction so that the screws 39 and 43 will be rotated to raise or lower the wheel carrying frame and the bracket 35 on which the gear 33 is mounted. When the wheel has been elevated to a desired point it will be supported by the screws 43 and 39 and rotary motion will be transmitted thereto from shaft 34 through gears 33, 32 and 30. The gears are so proportioned as to cause the wheel to rotate slowly, preferably about three times a minute and the forward ends of the buckets will be brought successively into contact with the ground and the pressure of the dirt entering the buckets will press the follower 18 backward until the levers 20 are stopped by the arms 15. As the buckets move upward carrying the dirt therewith the ends 24 of the levers 20 will be brought successively into contact with the projection 23 and will be tripped thereby so as to force the follower 18 forward and discharge the dirt from the buckets. The discharged dirt will fall upon the T-irons directly in front of the bucket and will then be directed to opposite sides of the machine and into the hoppers 7 by the plates or guards 50. The T-iron 25 of course prevents the dirt from falling between these guards. The machine travels forward

slowly as the wheel rotates and therefore the length of the ditch will be gradually increased and the dirt removed therefrom will be deposited along the sides thereof at points where it can be conveniently reached for the purpose of refilling the ditch. It will of course be understood that any suitable means may be employed for raising the gear 33 out of mesh with gear 32 when it is desired to stop the rotation of the digging wheel and I do not deem it necessary to illustrate any particular means for shifting said gear. Also instead of the particular means for transmitting motion to the guards from the shaft 34 any other desired mechanism may be employed provided the same is capable of being manipulated to reverse the rotation of the guards whenever desired.

The preferred form of the invention has been set forth in the foregoing description but I do not limit myself thereto as I am aware that modifications may be made therein without departing from the spirit or sacrificing the advantages thereof, and I therefore reserve the right to make such changes as fairly fall within the scope of the claims.

What is claimed is:

1. In a machine of the character described the combination with a portable frame; of a rotatable series of tubular buckets carried by said frame, means for actuating said series, and means movably mounted within the buckets for successively discharging the contents of the buckets upon reaching a predetermined point.

2. In a machine of the character described the combination with a portable frame; of a bucket carried by the frame and mounted to travel within a circle, means for actuating the bucket, a discharge device within the bucket, and means for automatically actuating said device at a predetermined point during the rotation of the bucket.

3. In a machine of the character described the combination with a portable frame; of a bucket carried by the frame and adapted to travel within a circle, a follower within the bucket, means for actuating the bucket, and means for actuating the follower when the bucket reaches a predetermined point in its movement.

4. In a machine of the character described the combination with a portable frame; of a bucket carried thereby and mounted to travel in a circle, means for rotating the bucket, a follower slidably mounted within and movable with the bucket, and mechanism for automatically sliding the follower within the bucket when said bucket reaches a predetermined point.

5. In a machine of the character described the combination with a portable frame; of an arm carried by the frame and mounted to travel in a circle, a tubular bucket movable with the arm, a follower mounted to slide



within the bucket, a lever for actuating the follower, a tripping device for actuating the lever at a predetermined point during the rotation of the arm and bucket.

5 6. In a machine of the character described the combination with a portable frame; of a wheel rotatably mounted within and supported by the frame, arms radiating therefrom, a tubular bucket carried by each arm,  
10 a follower in each bucket, means for successively actuating the follower at a predetermined point during the rotation of the wheel, and means for rotating the wheel.

15 7. In a machine of the character described the combination with a portable frame; of a wheel rotatably mounted thereon, a plurality of tubular buckets carried by the wheel, a follower within each bucket, levers fulcrumed upon the wheel for actuating the followers, a stationary tripping device for automatically actuating said levers successively  
2 at a predetermined point during the rotation of the wheel, and means for rotating the wheel.

25 8. In a machine of the character described the combination with a portable frame; of a rotatable series of buckets carried by the frame, means for automatically discharging the contents of the buckets successively at a  
30 predetermined point, and deflecting means for directing the discharged contents of the buckets toward the sides of the frame.

9. In a machine of the character described the combination with a portable frame, hoppers carried thereby; of a rotatable series of  
35 buckets carried by the frame, means for automatically discharging the contents of the buckets successively at a predetermined point, and means for directing the discharged contents into the hoppers.  
40

10. In a machine of the character described the combination with a portable frame, hoppers carried thereby; of a rotatable series of buckets carried by the frame,  
45 means for automatically discharging the contents of the buckets successively at a predetermined point, and oppositely inclined deflectors for directing the discharged contents into the hoppers, and means movable with  
50 the buckets for preventing the admission of any of said contents between the deflectors.

11. In a machine of the character described the combination with a portable frame; of a wheel rotatably mounted upon  
55 the frame, a series of buckets carried by the wheel, means for automatically discharging the contents of the buckets successively at a predetermined point during the rotation of the wheel, deflecting devices disposed at opposite sides of the wheel, and means movable  
60 with the wheel for preventing the discharged material from falling between the deflectors.

12. In a machine of the character described the combination with a portable  
65 frame; of a wheel rotatably mounted upon

the frame, a series of buckets carried by the wheel, means for automatically discharging the contents of the buckets successively at a predetermined point during the rotation of the wheel, deflecting devices disposed at opposite sides of the wheel, and means movable with the wheel for preventing the discharged material from falling between the deflectors, and means for vertically adjusting the wheel and deflectors. 70

13. In a machine of the character described the combination with a portable frame; of a wheel rotatably mounted upon the frame, a series of buckets carried by the wheel, means for automatically discharging  
80 the contents of the buckets successively at a predetermined point during the rotation of the wheel, deflecting devices disposed at opposite sides of the wheel, means movable with the wheel for preventing the discharged material from falling between the deflectors, mechanism for rotating the wheel, and means for adjusting the wheel and deflectors vertically independently of the rotation of the wheel. 85  
90

14. In a machine of the character described the combination with a portable frame; of a vertically adjustable frame carried thereby, mechanism for actuating the adjustable frame, a wheel carried by said adjustable frame, buckets rotatable with the wheel, deflectors at opposite sides of the wheel and movable with the adjustable frame, means for automatically discharging the contents of the buckets successively at a  
95 predetermined point, and means for rotating the wheel independently of the adjustment thereof. 100

15. In a machine of the character described the combination with a portable  
105 frame; of a vertically adjustable frame carried thereby, a wheel rotatably mounted within the adjustable frame, a series of buckets carried thereby, a follower within each bucket, levers fulcrumed upon the wheel and connected to the followers, rigid means for successively tripping the levers to actuate the followers, angle irons carried by the wheel and between the buckets, oppositely inclined deflectors movable with the adjustable frame and at opposite sides of the wheel, said deflectors being adapted to be overlapped by the angle irons, and means for rotating the wheel independently of its adjustment. 110  
115  
120

16. In a machine of the character described the combination with a portable frame; of a vertically adjustable frame carried thereby, a wheel rotatably mounted within the adjustable frame, a series of  
125 buckets carried thereby, a follower within each bucket, levers fulcrumed upon the wheel and connected to the followers, rigid means for successively tripping the levers to actuate the followers, angle irons carried by  
130



the wheel and between the buckets, oppositely inclined deflectors movable with the adjustable frame and at opposite sides of the wheel, said deflectors being adapted to be  
5 overlapped by the angle irons, parallel rings carried by the wheel, pins connecting said rings, a gear meshing with the pins to rotate the wheel, and means for rotating said gear independently of the adjustment of the wheel.  
10 17. In a machine of the character described, the combination with a portable frame and a motor for propelling the frame; of a vertically adjustable frame, means operated by the motor for adjusting said frame,  
15 manually operated means for throwing the adjusting mechanism into or out of contact

with the motor, a wheel rotatably mounted within the adjustable frame, buckets carried thereby, means for automatically discharging the contents of the buckets successively  
20 during the rotation of the wheel, and mechanism actuated by the motor for rotating the wheel independently of the adjustment of the frame.

In testimony that I claim the foregoing as  
25 my own I have hereto affixed my signature in the presence of two witnesses.

TORBJÖRN LINGA.

Witnesses:

F. B. JACOBSON,  
G. S. GARFIELD.