

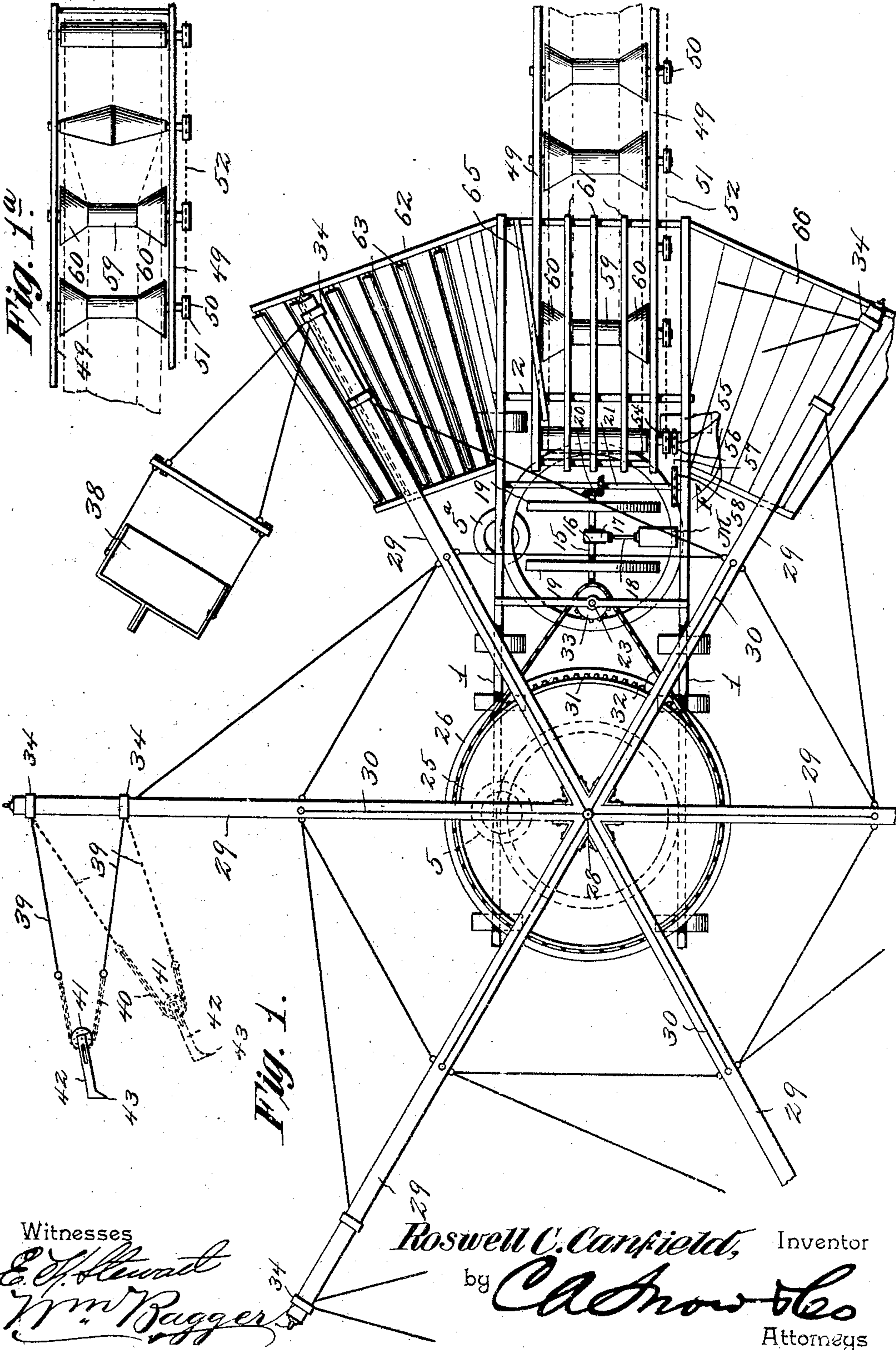
No. 774,908.

PATENTED NOV. 15, 1904.

R. C. CANFIELD.
EXCAVATING MACHINE.
APPLICATION FILED JUNE 2, 1904.

NO MODEL.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 2.

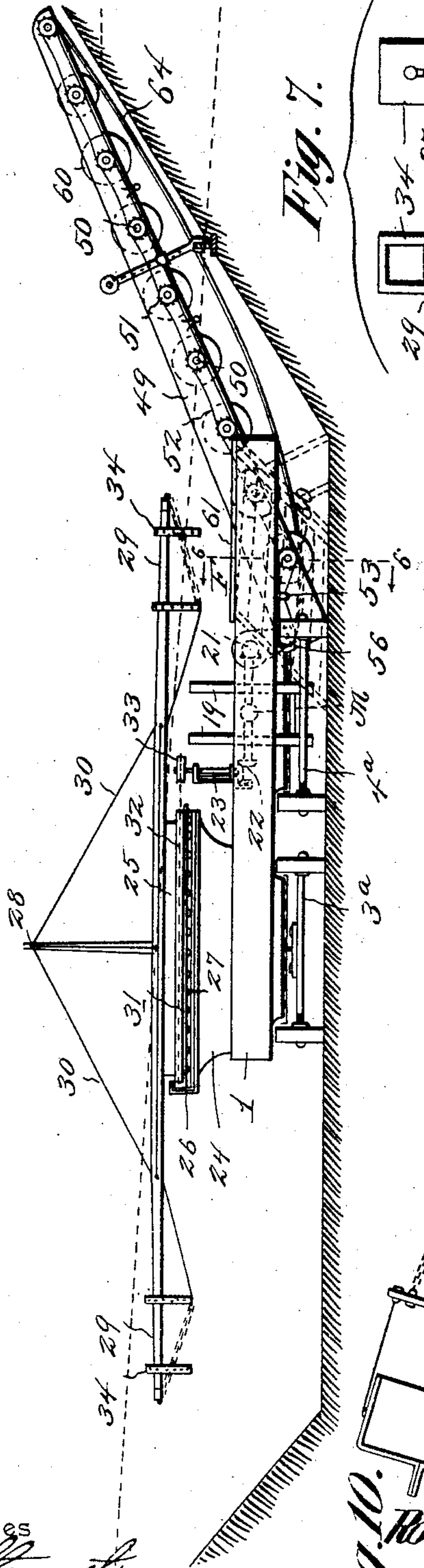


Fig. 7.

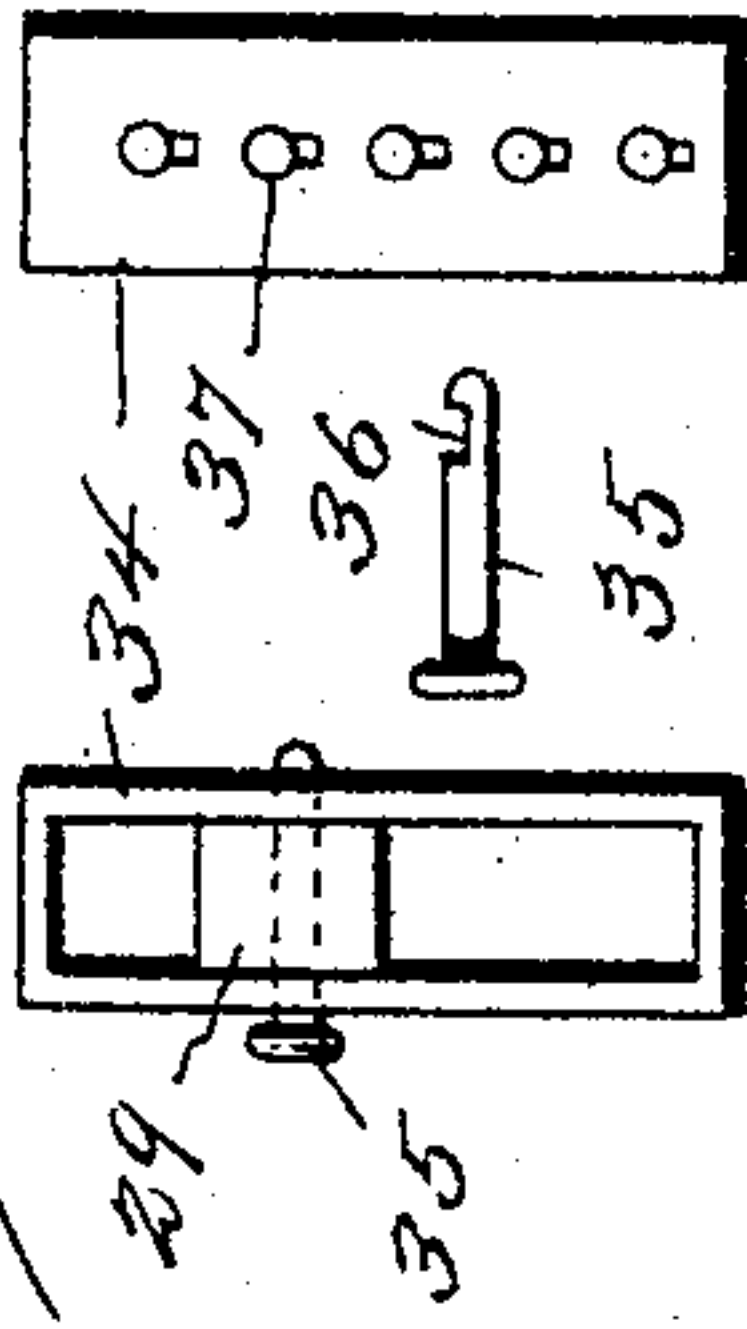


Fig. 6.

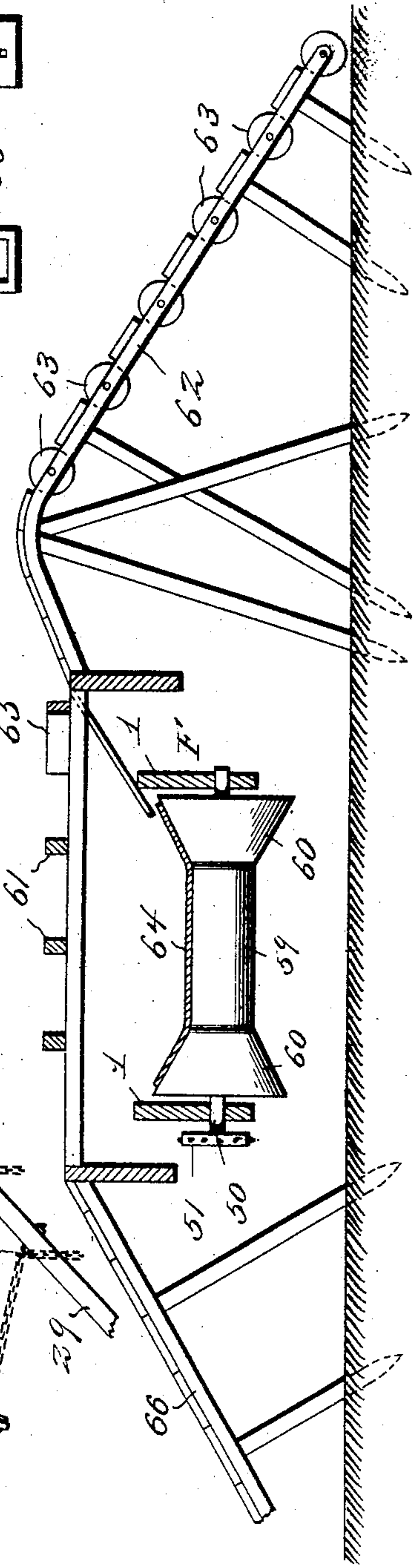


Fig. 10.

Roswell C. Canfield,

Inventor

by

C. A. Snow & Co.

Attorneys

Witnesses
E. H. Stewart
Wm. Bagger

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3 SHEETS—SHEET 3.

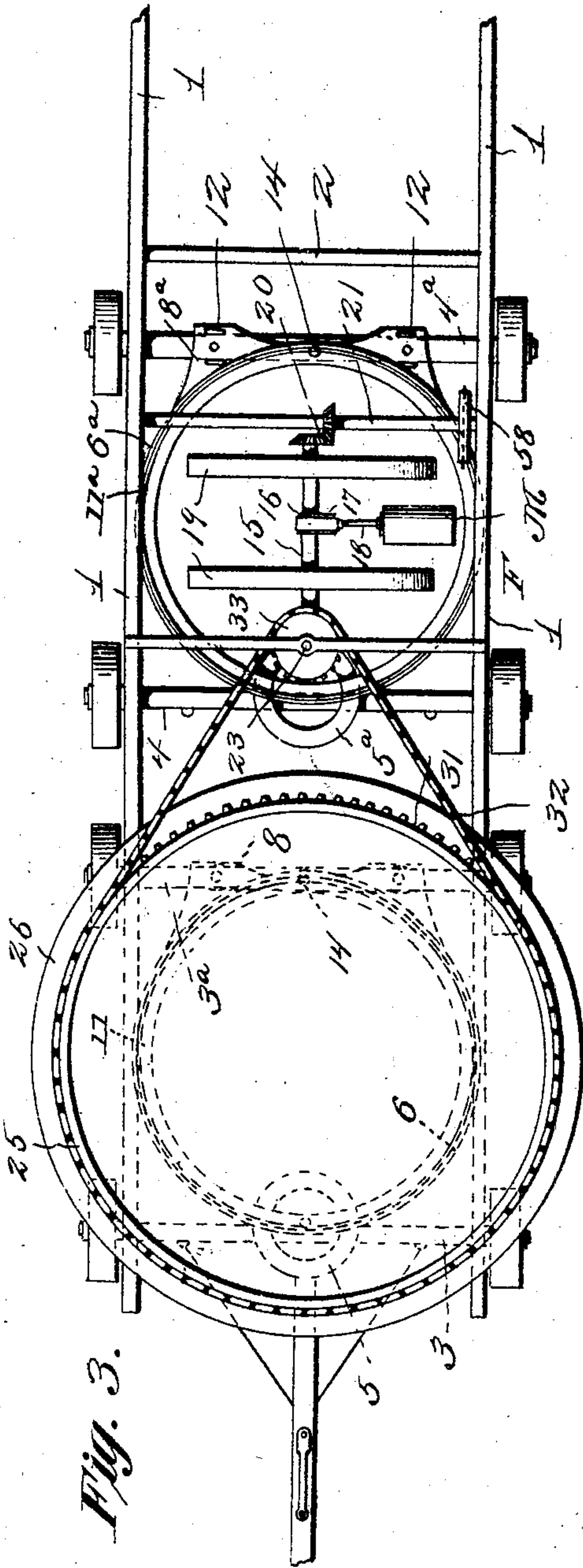


Fig. 3.

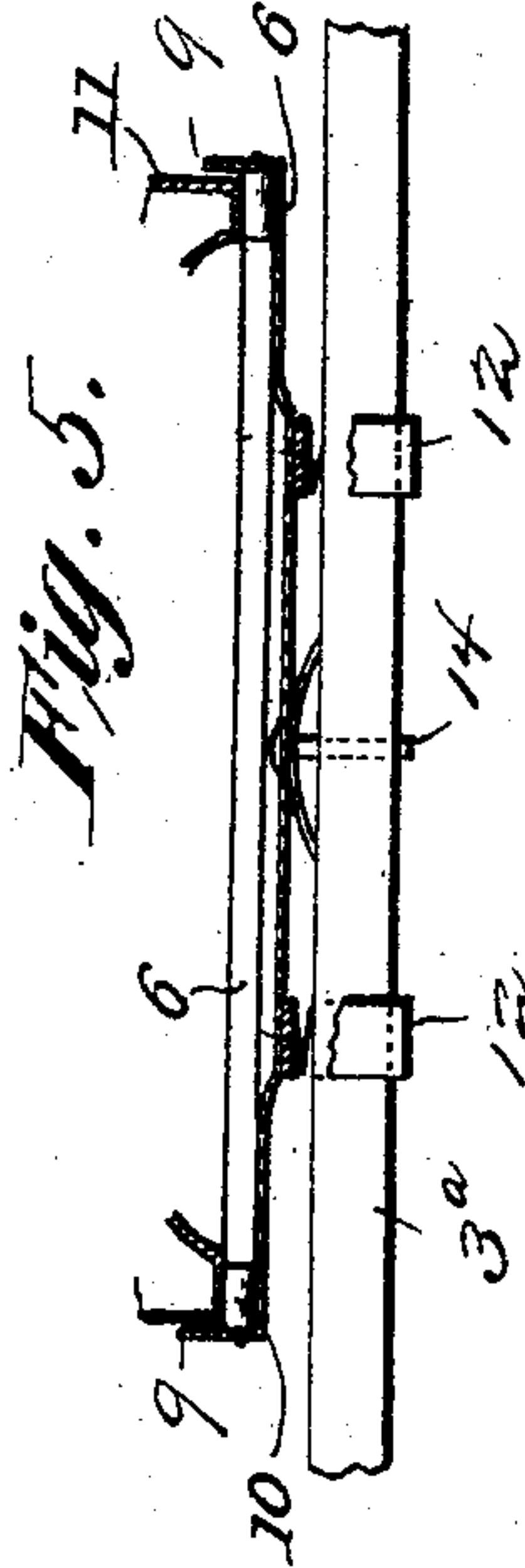


Fig. 5.

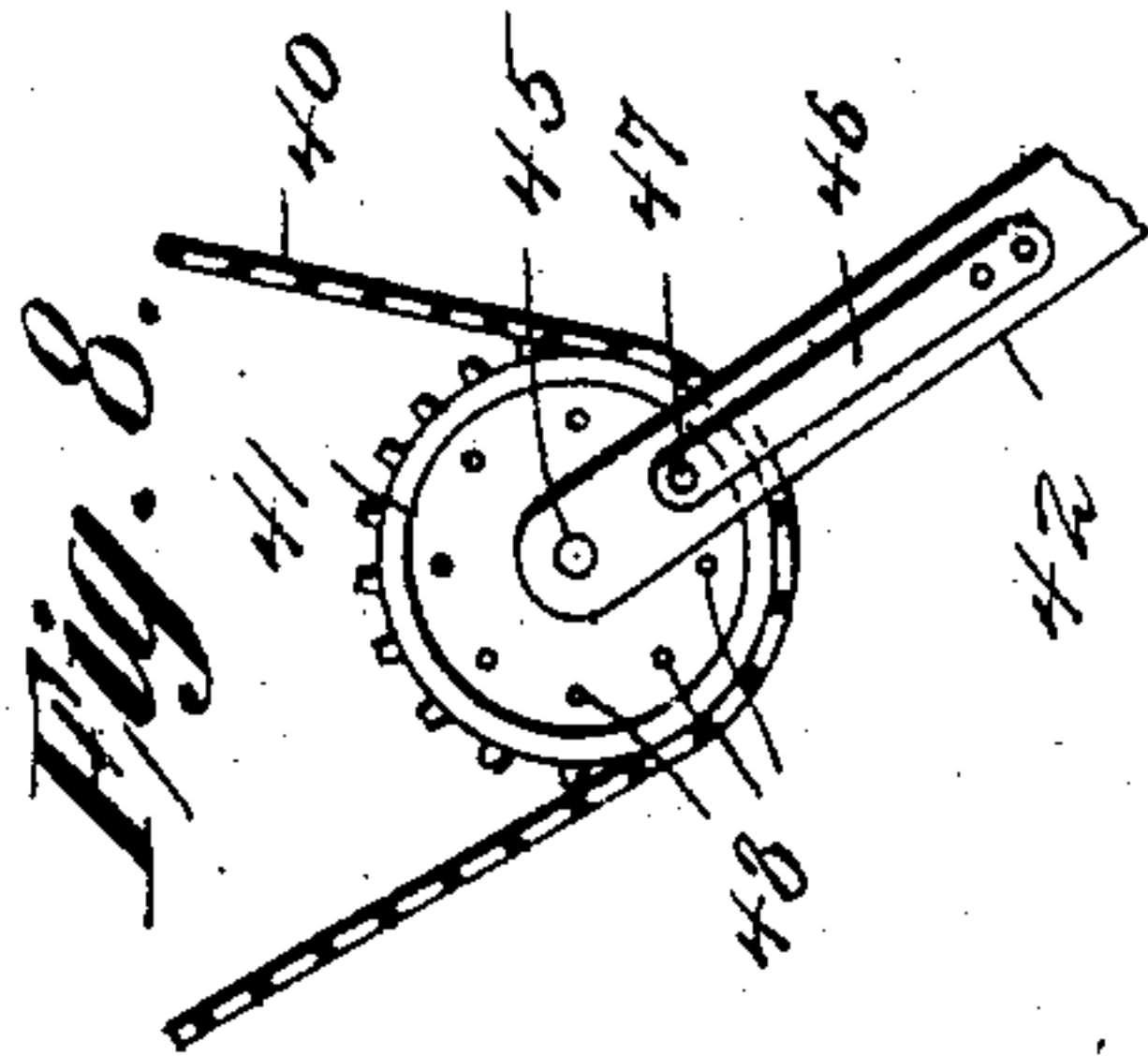


Fig. 8.

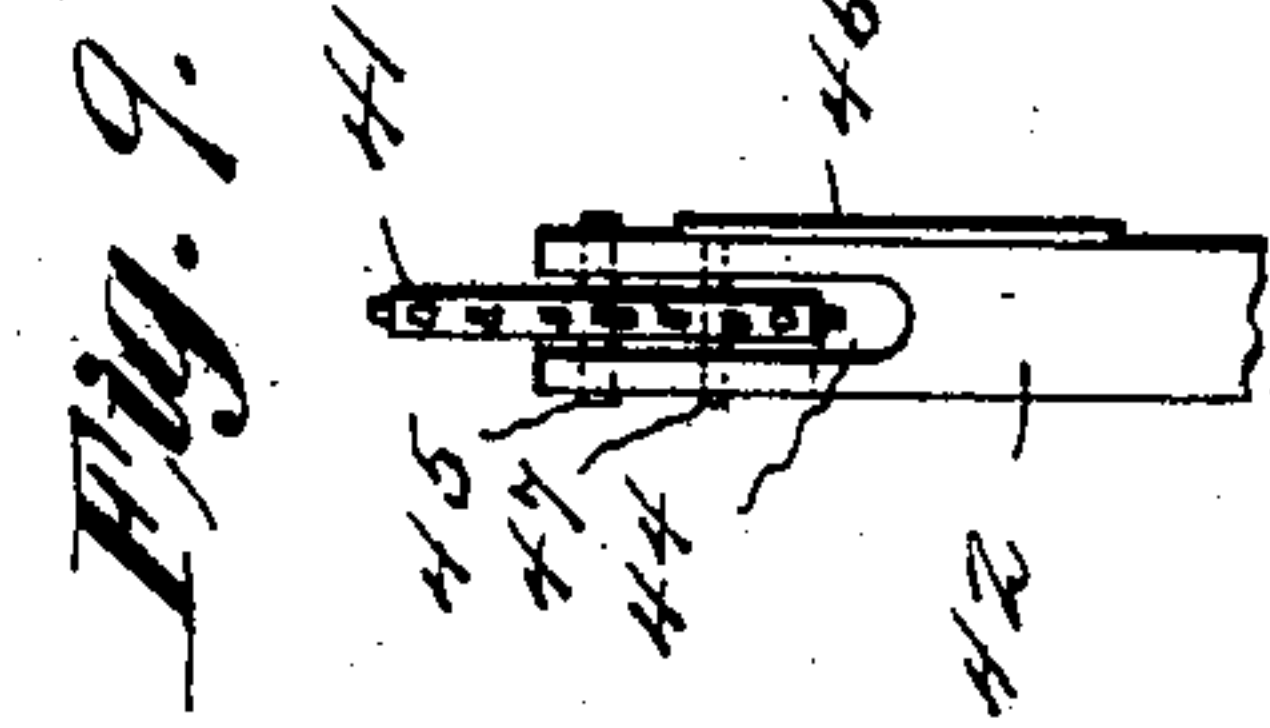


Fig. 9.

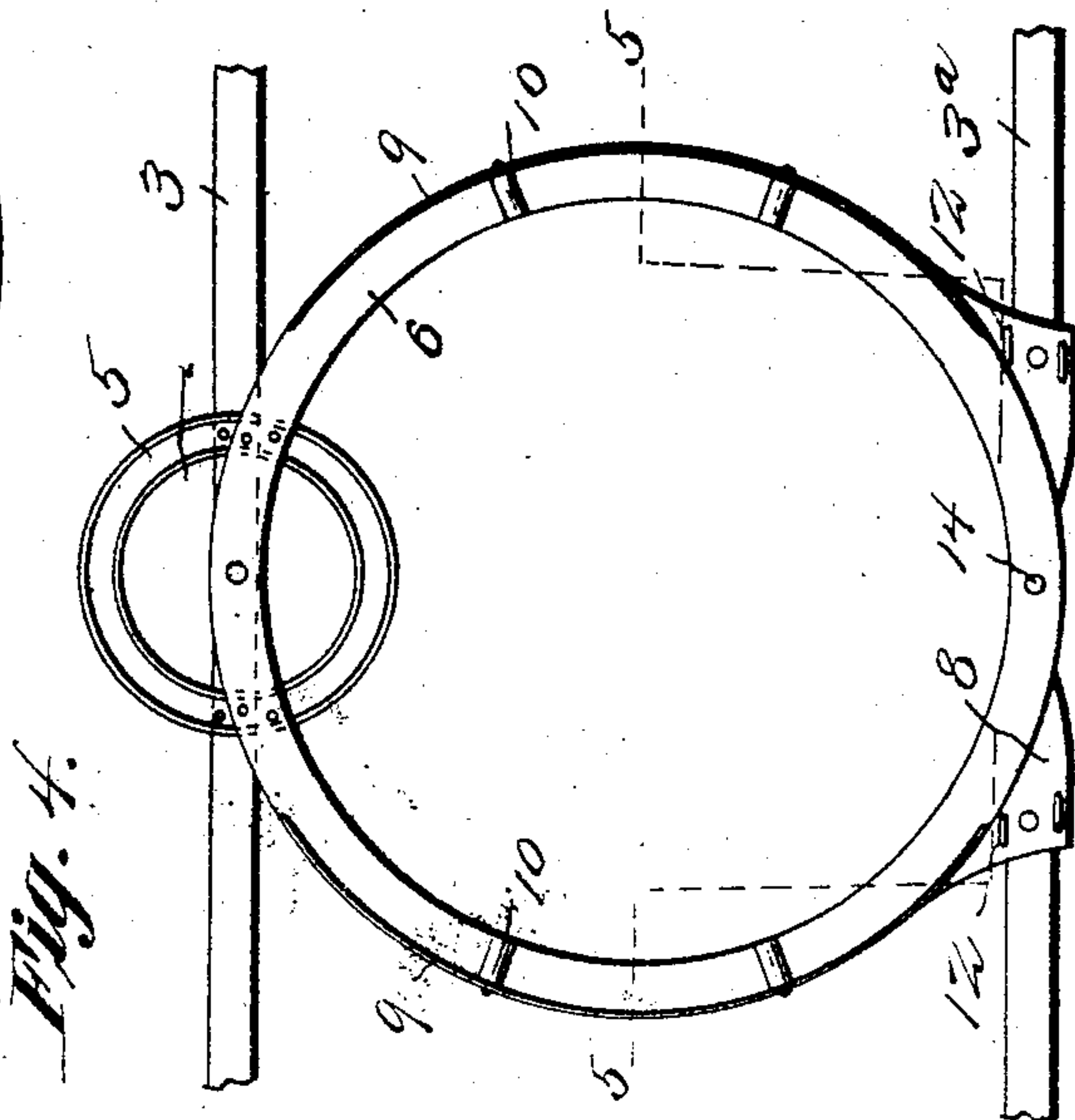


Fig. 4.

Witnesses
E. J. Stewart
Wm. Bagger

Roswell C. Canfield, Inventor
by *C. A. Snow & Co.*
Attorneys

UNITED STATES PATENT OFFICE.

ROSWELL C. CANFIELD, OF COLFAX, WASHINGTON.

EXCAVATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 774,908, dated November 15, 1904.

Application filed June 2, 1904. Serial No. 210,868. (No model.)

To all whom it may concern:

Be it known that I, ROSWELL C. CANFIELD, a citizen of the United States, residing at Colfax, in the county of Whitman and State of Washington, have invented a new and useful Excavating-Machine, of which the following is a specification.

This invention relates to ditching and excavating machines; and it has among its objects generally to provide a machine of this class which shall possess superior advantages in point of simplicity, durability, and general efficiency.

Other objects of the invention are to provide a machine including a turn-table and means for driving the same, sweeps connected with and extending from the turn-table and adapted for the attachment of plows and scrapers, which by said sweeps, shall be caused to operate upon the ground within a certain distance from the center of rotation.

Another object is to provide means for adjusting the draft vertically, so as to cause the earth-engaging implements to dig into the soil to any required depth.

Another object is to provide means for the radial adjustment of the earth-engaging implements.

Further objects of my invention are to provide for the disposal of the dirt excavated by means of elevating or carrying means provided with improved means whereby the soil or dirt excavated may be dumped at any desired point.

The invention further consists in the improved construction of the supporting-truck, whereby the latter may be conveniently arranged for transportation and also for travel longitudinally in the ditch which is being dug.

With these and other ends in view, which will readily appear as the nature of the invention is better understood, the same consists in the improved construction and novel arrangement and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of an excavating-machine constructed in accordance with the principles of

the invention, showing the same in operative position. Fig. 1^a is a detail plan view showing the upper end of the elevator. Fig. 2 is a side elevation showing the machine disposed in operative position in a ditch or excavation. Fig. 3 is a plan view showing the trucks and the frame of the machine arranged for transportation. Fig. 4 is a plan view of one of the trucks with the upper member of the turn-table removed. Fig. 5 is a vertical sectional view taken on the plane indicated by the line 5 5 in Fig. 4 and indicating the upper member of the turn-table in position. Fig. 6 is a sectional detail view, enlarged, taken on the plane indicated by the line 6 6 in Fig. 2. Fig. 7 represents in detail the means whereby earth-engaging elements are connected adjustably with the sweeps. Figs. 8 and 9 are detail views of the front end of the plow-beam used in connection with the invention. Fig. 10 is a detail view showing how earth-engaging implements may be attached directly to the sweeps of the machine.

Corresponding parts in the several figures are indicated by similar characters of reference.

In the construction of this improved excavating-machine I avail myself of a frame (generally designated F) which may be described as being composed of side pieces 1 1, connected at intervals by suitable braces 2, of which any desired number may be used, said braces being generally arranged in such position as to be available to support the bearings for the various shafts included in the makeup of the machine. This frame is supported upon two pairs of axles 3 3^a and 4 4^a, the axles 3 3^a constituting the front truck and the axles 3 4 being the front axles of each truck. The front axle of each truck supports the fifth-wheel member 5 5^a, and the two axles of each truck cooperate to support an annular supporting member 6 6^a, to the under sides of which are firmly bolted fifth-wheel members 7 7^a, cooperating with the members 5 5^a. The annular supporting members 6 6^a are provided with flanges 8 8^a, firmly connected with the rear axles of the trucks. The annular supporting members 6 6^a are also provided

with upstanding flanges 9, said flanges being provided with rollers 10, journaled upon pins connected with said flanges, the said supporting members serving to support bearing-rings 11 and 11^a, the frame F being superimposed and directly supported upon said bearing-rings 11 and 11^a.

It will be seen from the foregoing that the supporting-trucks may be disposed in alignment with each other when the device is to be arranged for transportation, or the two trucks may be swung around at right angles to their normal position, as will be the case when the machine is disposed for operation in a ditch or excavation, when, the trucks being arranged transversely to the frame, draft may be applied to the trucks independently of each other, and the entire machine may thus be moved in the direction of the work which is to be performed.

It will be preferred to interpose between the rear axles 3^a 4^a and the flange members 8 8^a connecting-clips 12 and springs 13, which will assist in supporting the weight of the rear parts of the annular supporting members and also to compensate for the space occupied by the fifth-wheel members interposed between the annular supporting members and the front axles. A centrally-arranged bolt 14 also serves to connect each of the annular supporting members with the rear axle of the respective trucks.

Suitably connected with and supported by the frame of the machine above the rear truck of the latter is a motor, (designated M,) which may be an ordinary gasoline-motor, sufficiently powerful to perform the work to be accomplished by the machine.

15 designates a shaft having an eccentric 16 encircled by a band 17, which is suitably connected with the piston-rod 18 of the motor. Said shaft also carries fly-wheels 19, one near each end. The shaft 15 is carried by means of bevel-gearing 20 to a horizontally-disposed shaft 21 at its rear end and by bevel-gearing 22 to a vertically-disposed shaft 23 at its front end.

The frame of the machine supports above the front truck a circular casing 24, which affords a track or turn-table 25, which is preferably retained in position upon said track by means of flanges 26. Supporting-rollers, ball-bearings, or other suitable means (conventionally indicated at 27) are to be employed for the purpose of reducing friction between the turn-table 25 and the track 24. The turn-table is provided with an axial mast or upright 28 and with a plurality of radially-extending sweeps 29, of which latter in the accompanying drawings six have been shown, this being the number which will probably be preferred in a full-sized machine. Guys or braces (shown at 30) connect the upper end of the mast with each of the sweeps for the purpose of reducing strain upon the latter.

These sweeps serve as operating means for the earth-engaging implements, as will be hereinafter described.

The turn-table 25 is provided with a circumferential series of teeth or cogs 31, and a chain 32 passes over said cogs and over a spur-wheel 33 at the upper end of the shaft 23, which, as previously described, is connected with and driven by the motor, from which a rotary motion is thus imparted to the turn-table 25.

Adjustably connected with each of the sweeps is a link 34, which is vertically-adjustable upon the sweeps by means of a key 35, having at its outer end a notch 36, cooperating with a keyhole-slot 37 in one of the side walls of the link to hold it securely against withdrawal. These vertically-adjustable links serve as means for the attachment of the scrapers 38, one of which will usually be attached to or connected with each of five of the sweeps, the sixth sweep being reserved for the attachment of a plow. The sweep to which the plow is attached is provided with two of the vertically-adjustable links 34, and to the lower end of each of said links is connected a link-rod 39. The ends of the link-rods 39 are connected by a chain 40, passing over a sprocket-wheel 41, which is journaled in suitable bearings at the front end of the plow-beam 42, which carries a plow 43 of suitable construction. The bearings for the sprocket-wheel are in the nature of a slot or recess 44, formed horizontally at the front end of the plow-beam, the sprocket-wheel being journaled upon a pin 45, extending vertically through the recessed part of the beam. To the upper side of the latter is attached a spring 46, carrying a locking-pin 47, adapted to extend through a perforation in the upper side of the plow-beam and into any one of a plurality of perforations 48 formed radially in the sprocket-wheel, which latter may thus be adjusted and locked in any desired position. It will readily be seen by reference to the drawings that by the rotation of the sprocket-wheel the position of the plow with relation to the sweep may be considerably changed and that the plow may be adjusted to work at various distances from the center of rotation of the turn-table.

The casing 24 and the turn-table 25 support the sweeps at an elevation which will enable them to easily clear the motor, the fly-wheels, and other operative parts of the machine, which are mounted above the rear truck. The side pieces of the frame F are extended in rear of said rear truck and serve to support the elevator or endless carrier, whereby the dirt and excavated material are elevated to the side of the ditch and there dumped. The elevator consists of an ordinary casing including side pieces 49, suitably braced and spaced apart and affording bearings for a plurality of shafts 50, equipped with gear-wheels 51 for an endless chain 52, which is guided over

an idler 53 and a driving-sprocket 54. The latter is mounted upon a shaft 55, having an additional sprocket 56, connected by a chain 57 with a sprocket 58 upon the horizontally-disposed shaft 21, which is driven from the motor, as hereinbefore described.

The shafts 50 carry between the sides of the casing a plurality of supporting-rollers 59, which are in the nature of spools provided at their ends with conical flanges 60, so that the endless carrier passing over said rollers or spools and which is composed of flexible material shall form a pocket whereby the spilling of dirt to either side will be prevented.

Suitably supported between the extended ends of the frame F between which the elevator is mounted is a grating 61, and adjacent to one side of this grating upon suitable trestle-work is supported an inclined plane 62, between the sides of which are journaled a plurality of rollers 63, which project somewhat above the upper side of said inclined plane. The extreme upper end of the latter is disposed at a short distance from the adjacent frame member 1, and from this point it is downwardly inclined over the frame member and in the direction of the carrier-belt 64. A trip 65 is disposed in alinement with the grate-bars 61. A suitably-supported downward incline 66 extends from the opposite frame member 1 to a point near the ground.

In the operation of this device motion is imparted to the turn-table 25 and to the endless carrier 64 from the motor M. The earth-engaging implements connected with the sweeps may be handled by an attendant, who will set the scrapers, as well as the plow, so as to properly engage the soil. The latter being loosened by the plow will be readily scooped up by the scrapers, which when they reach the incline 62 will readily travel up said incline and encountering the trip 65 will be tilted so as to discharge their contents between the grate-bars 61 and into the pocket formed by the lower part of the endless carrier. By the continued rotation of the turn-table the sweeps will drag the scrapers over the grate and down the incline at the opposite side, where they will be subsequently righted by an attendant. The plow will in like manner pass over the inclines and the grate and will be subsequently righted and caused to engage the ground properly by the attendant. The dirt deposited upon the endless carrier will be elevated until it reaches the desired point of delivery. At this point is disposed a special roller, which is fusiform or tapered from its central portion to the ends thereof. The flexible belt on coming into engagement with this roller will be twisted, its central portion being moved in an upward direction, so that the load will slide off the belt at each side of the elevator-frame. By this simple arrangement the load may be discharged at any desired distance from the edge of the

ditch within the limits of the length of the elevator, since the fusiform roller may be readily shifted from one place to another.

It will be seen that owing to the peculiar construction of the supporting-trucks upon which the frame is mounted the latter may be readily arranged for transportation over roads and may as readily be disposed in operative position, in which it may travel in the direction of the work that is to be performed. It is obvious that during operation the position of the machine is to be shifted from time to time, and this may be readily effected either by the use of draft-animals or, if preferred, by providing suitable gearing, whereby motion shall be transmitted to the supporting-wheels from the motor.

While I have in the foregoing shown a simple and preferred form of embodiment of my invention, I desire it to be understood that I do not necessarily limit myself to the precise structural details therein exhibited, but that I reserve the right to any changes, alterations, and modifications which may be resorted to within the scope of the invention and without departing from the spirit or sacrificing the efficiency of the same.

An obvious modification (illustrated in detail in Fig. 10 of the drawings) consists merely in the omission of the links or frames 34, whereby the earth-engaging implements or the draft-chains of the same have been illustrated as being connected with the sweeps. As illustrated in Fig. 10, the draft-chains may be directly connected with the sweeps, which latter may be provided with hooks H, with which the chains may be connected in such a manner as to admit of the convenient lengthening and shortening of the same.

Having thus described the invention, what is claimed is—

1. In a ditching and excavating machine, a turn-table having sweeps and earth-engaging implements connected with said sweeps.

2. A turn-table having radially-extending sweeps and a central mast, braces connecting said masts with the sweeps, a dirt-loosening implement connected with one of said sweeps, and scrapers connected with the other sweeps.

3. A casing forming an elevated track, a turn-table supported upon said track, sweeps extending radially from said turn-table, and earth-engaging implements connected with said sweeps.

4. A turn-table having radially-extending sweeps, vertically-adjustable links connected with said sweeps, and earth-engaging implements connected with said adjustable links.

5. A turn-table having radially-extending sweeps, approximately rectangular link-frames having keyhole-slots in the walls thereof, keys connecting said link-frames adjustably with the sweeps, and earth-engaging implements connected with the lower ends of said link-frames.

6. A turn-table, a sweep radiating therefrom, link-rods connected with said sweeps, a chain connecting said link-rods, and an earth-engaging implement having a sprocket-wheel engaging said chain.

7. A turn-table, a sweep radiating from the same, link-rods connected with said sweep, an earth-engaging implement having a sprocket-wheel connected therewith, means for retaining said sprocket-wheel against rotation, and a chain passing over said sprocket-wheel and connecting the ends of the link-rods.

8. A turn-table, a sweep extending radially from the same, a pair of link-rods connected adjustably with said sweep a short distance apart, an earth-engaging implement having a sprocket-wheel, means for retaining said sprocket-wheel against rotation, and a chain passing over said sprocket-wheels and connecting the ends of the link-rod.

9. A turn-table, a sweep extending radially from the same, link-rods connected adjustably with said sweep, an earth-engaging implement having a recessed beam, a sprocket-wheel journaled in the recess of said beam and having a plurality of perforations, a key engaging the beam and extending through one of the perforations of the sprocket-wheel, a spring to retain said key in position, and a chain passing over said sprocket-wheel and connecting the ends of the link-rods.

10. A turn-table, sweeps radiating from the same, an earth-loosening element connected with one of said sweeps, scrapers connected with other sweeps, an endless carrier, and means for elevating and tilting the scrapers to deposit their contents upon the lower end of said endless carrier.

11. An endless carrier, scrapers arranged to move transversely across the lower end of the same, an inclined plane having rollers to carry said scrapers in an upward direction, a downward incline from the upper end of said inclined plane in the direction of the endless carrier, and a trip disposed to tilt the carrier.

12. An endless carrier, scrapers disposed to travel transversely across the lower ends of the same, and a grating disposed above the lower end of the carrier to support the scrapers while in transit.

13. An endless carrier, scrapers disposed to travel transversely across the lower end of said carrier, elevating means for said scrapers at the approaching side, a grating disposed above the lower end of the carrier, and tripping means to tilt the scrapers.

14. An endless carrier, scrapers disposed to travel transversely across the lower end of said

carrier, a grating disposed above the latter, an inclined plane for the ascent of the scrapers on the approaching side, an inclined plane for the descent of the scrapers on the departing side, a downward incline from the upper side of the inclined ascending plane in the direction of the grate, and tripping means to tilt the scrapers over said grate.

15. An endless carrier, a grating disposed above the lower end of the same, ascending and descending means adjacent to the opposite sides of the carrier, a grating, a turn-table, sweeps extending radially from the same, and earth-engaging implements connected with said sweeps and adapted to be thereby carried transversely across the grate above the carrier.

16. A frame, a pair of rotary supporting-trucks for said frame, a turn-table supported above one truck and having radially-extending sweeps, earth-engaging implements connected with said sweeps, a motor and gearing supported above the other truck, an endless carrier, means for transmitting motion from the motor to the turn-table and to the endless carrier, a grating supported above the lower end of the endless carrier, and means for conveying the earth-engaging implements in an upward direction, across the grating, and in a downward direction at the opposite side of the latter.

17. In a ditching and excavating machine, a frame, a pair of trucks independently supporting said frame, and annular engaging means upon the upper sides of the trucks and the under side of the frame, whereby the said trucks may be independently turned with relation to said frame.

18. A pair of trucks, a fifth-wheel member upon the front axle of each truck, annular supporting members having fifth-wheel members secured to their under sides and engaging the fifth-wheel members upon the front axles, means for supporting said annular supporting members upon the rear axles of the trucks, supporting-rings rotatively engaging the annular supporting members of the trucks, a frame mounted upon said supporting-rings, and excavating and elevating means supported by the frame.

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

ROSWELL C. CANFIELD.

Witnesses:

HENRY W. CANFIELD,
ROBERT L. McCROSKEY.