

C. H. RUTH.
EXCAVATING MACHINE.
APPLICATION FILED FEB. 14, 1908.

910,864.

Patented Jan. 26, 1909.

4 SHEETS—SHEET 1.

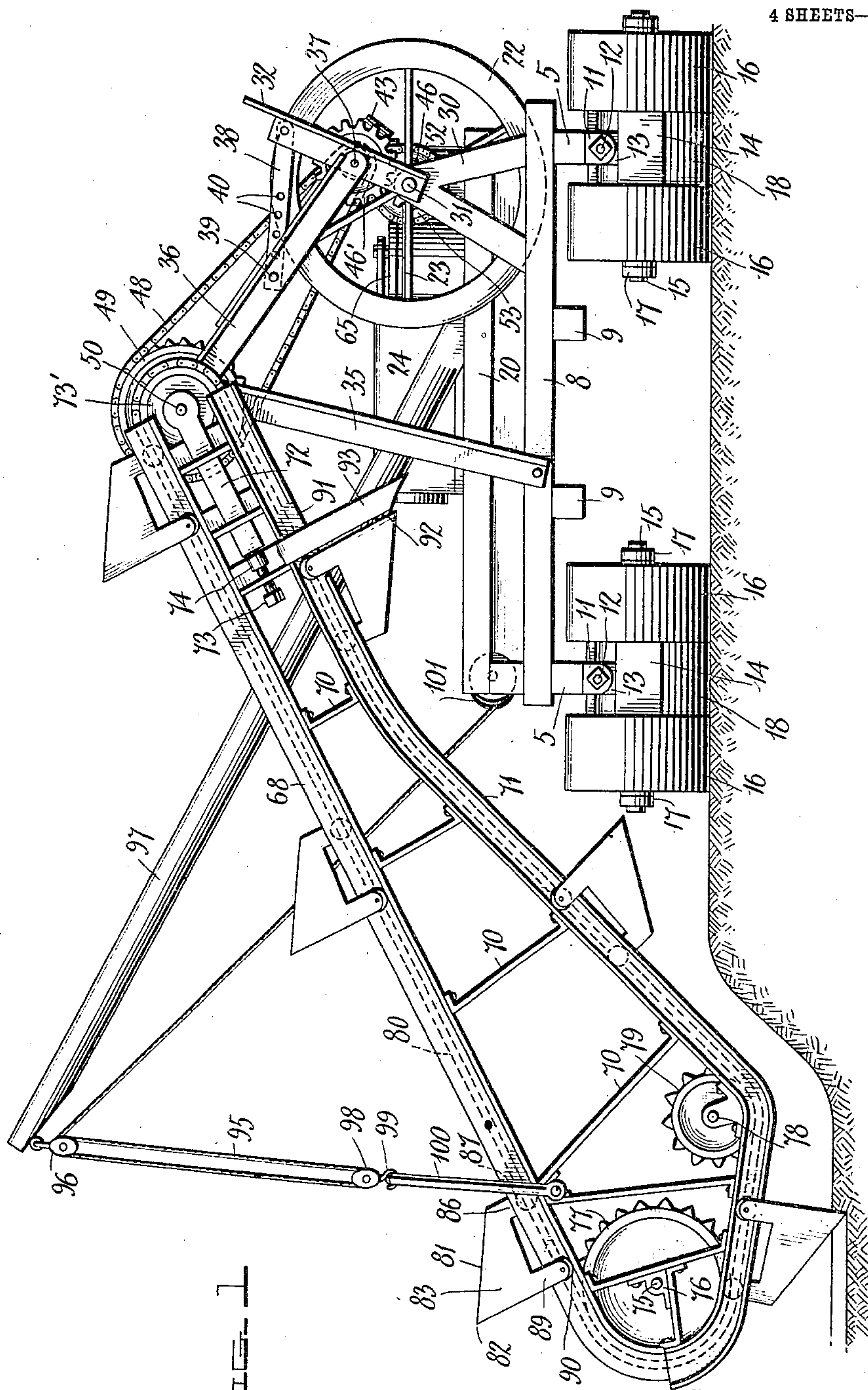


FIG. 1

Witnesses
J. J. Jenkins
H. G. Smith

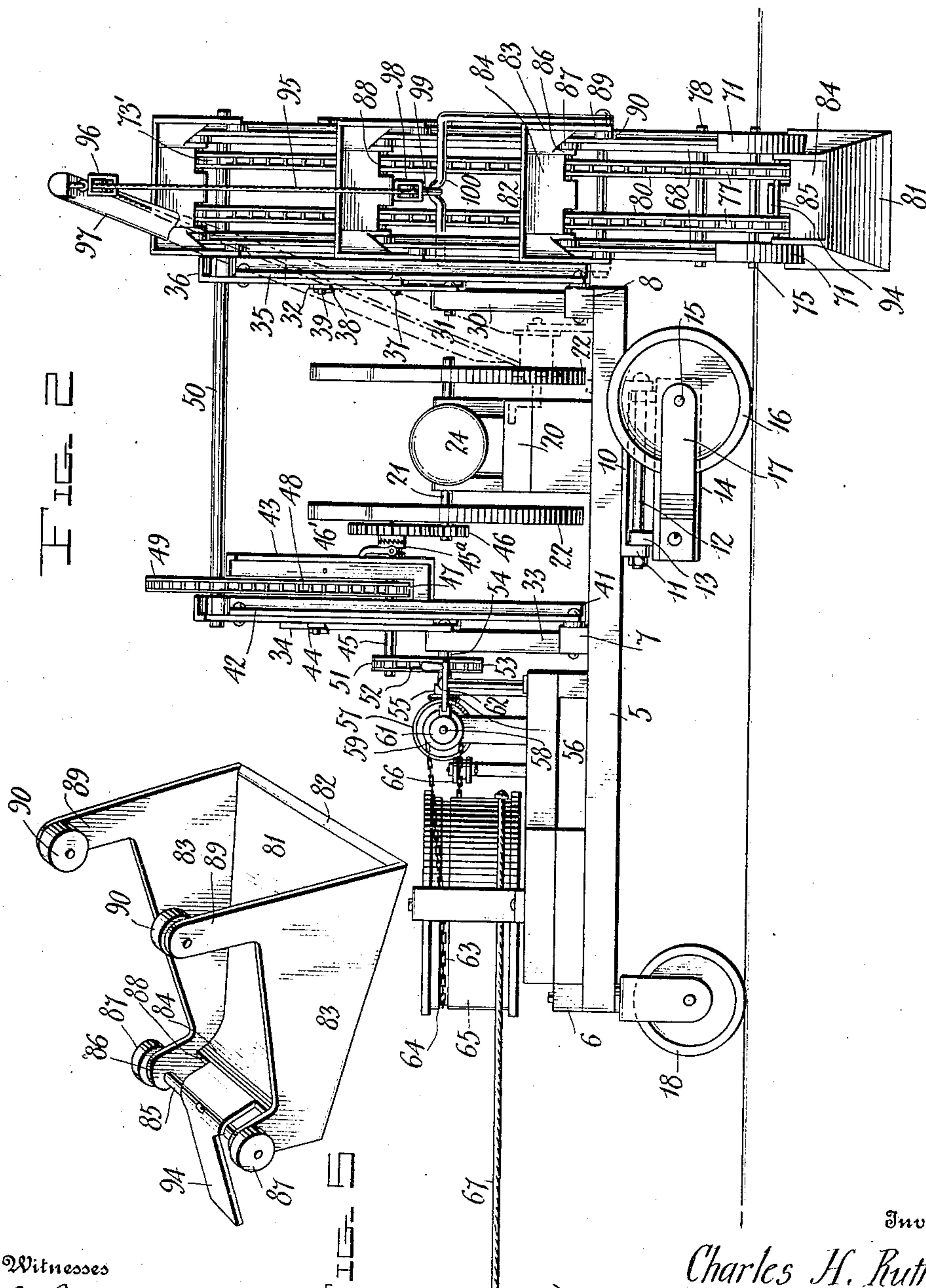
Inventor
Charles H. Ruth
By *Charles H. Ruth*
Attorneys

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Witnesses

W. B. Smith

H. G. Smith

Inventor

Charles H. Ruth

By

Charles H. Ruth

Attorneys

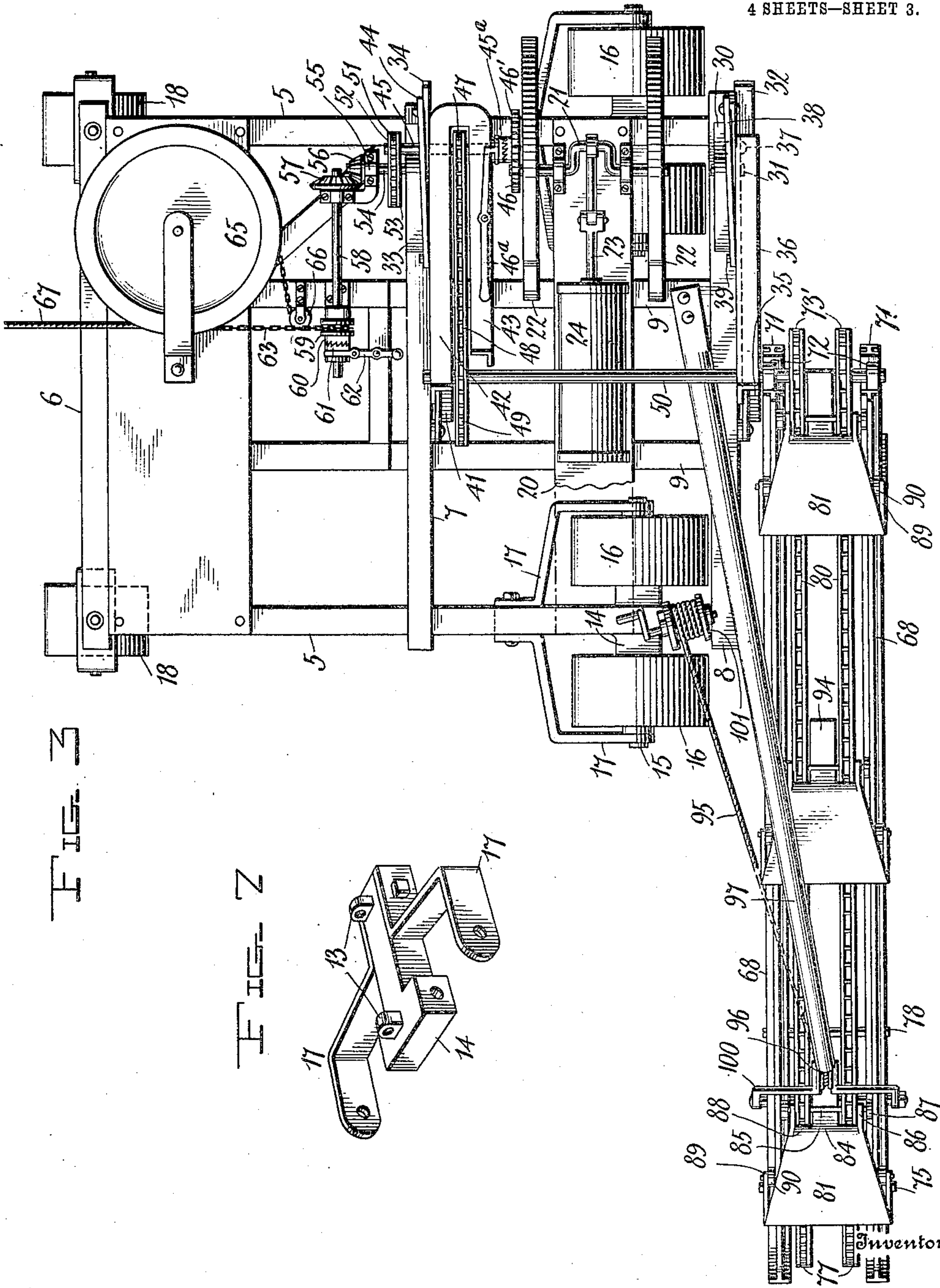
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Witnesses

J. G. Smith
F. G. Smith

Charles H. Ruth

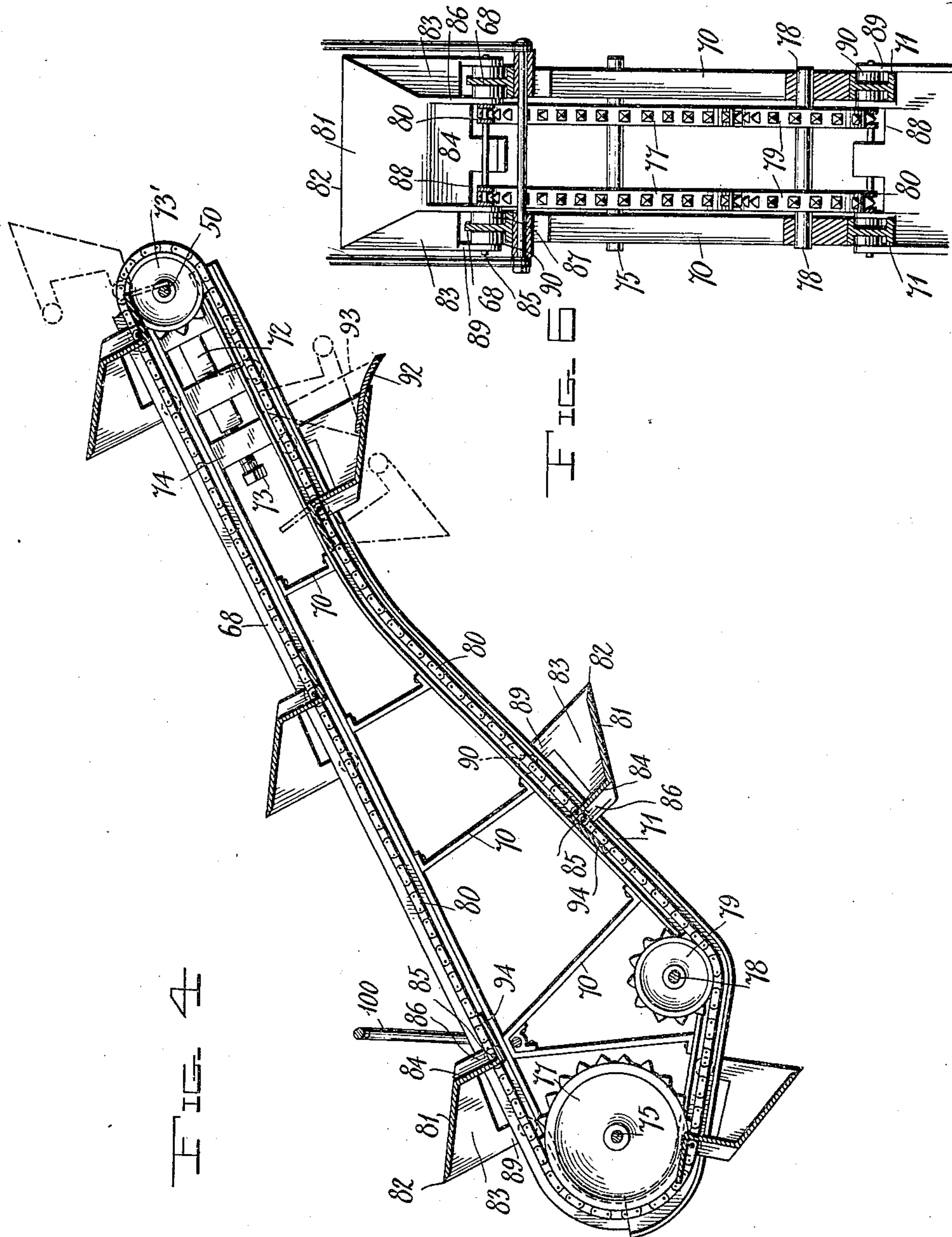
By *Donald Chandler*
Attorneys

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4 SHEETS—SHEET 4.



Witnesses
J. G. Smith.

Inventor
Charles H. Ruth
By *Charles H. Ruth*
Attorneys

UNITED STATES PATENT OFFICE.

CHARLES H. RUTH, OF BRAWLEY, CALIFORNIA.

EXCAVATING-MACHINE.

No. 910,864.

Specification of Letters Patent.

Patented Jan. 26, 1909.

Application filed February 14, 1908. Serial No. 415,970.

To all whom it may concern:

Be it known that I, CHARLES H. RUTH, a citizen of the United States, residing at Brawley, in the county of Imperial, State of California, have invented certain new and useful Improvements in Excavating-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to ditching machines and has for its object, primarily, to provide a machine which may be utilized for the purpose of deepening, widening, or dredging irrigating ditches, small streams and the like.

Broadly stated, the machine embodying my invention comprises a frame mounted for travel and a dredging or excavating conveyor which is adjustably supported upon the frame. This conveyor is of the endless type and is so constructed that its buckets will be held rigid when in excavating position and will be automatically released or dumped and scraped when elevated to a point suitable for discharge. In use, the machine is driven along the bank of the irrigating ditch to be excavated or dredged, the endless excavating conveyor being lowered into the ditch. As the machine is moved gradually forward, the endless excavating conveyor will be operated to dig soil from the sides and bottom of the ditch, this excavated material being dumped or deposited along one side of the ditch and in rear of the machine.

In addition to providing a novel form and construction of endless excavating conveyor, I have provided a novel form of running gear for the machine which is of such construction and character that the frame of the machine will at all times be substantially level regardless of inequalities in the surface of the ground.

In the accompanying drawings, Figure 1 is a rear end view of the machine, Fig. 2 is a side elevation thereof, Fig. 3 is a top plan view, Fig. 4 is a detail vertical longitudinal sectional view through the excavating conveyor, Fig. 5 is a detail perspective view of one of the buckets, Fig. 6 is a vertical sectional view taken transversely through the conveyor, and, Fig. 7 is a detail perspective view of one of the mountings for one pair of

wheels for supporting the rear end of the frame.

As shown in the drawings, the frame of the machine comprises, generally speaking, side sills 5, a front end cross sill 6, an intermediate cross sill 7, and a rear end cross sill 8 all of which cross sills connect the side sills. The frame also includes longitudinally extending intermediate sills 9 which connect the intermediate transverse sill 7 and the front end sill 6. The frame, thus constituted, is supported for travel by a novel form of running gear which will now be specifically described, the object of this specific construction of running gear being to accommodate for travel over uneven ground.

Brackets 10 are secured to the under sides of the side sills 5 adjacent the rear ends of the said sills and are formed each with a pair of depending ears 11 through which the ends of a rod 12 are passed. These rods 12 are passed also, loosely, through ears 13 upon the upper faces of blocks 14, the blocks being in this manner connected for rocking or swinging movement to the said side sills. A shaft 15 is journaled transversely in a bearing in the rear end of each block and carries upon each side of said block a ground wheel 16, there being a clip 17 secured at its forward end to each side of these blocks and extended rearwardly and laterally to the ends of the corresponding shaft 15 to hold the wheels against displacement. Caster wheels 18 are mounted at the forward corner of the frame of the machine and serve to support the forward end of the said frame.

Journaled in suitable bearings 19 upon a platform 20 supported by the side sills 5, at the rear end of the frame, is a crank shaft 21 carrying, outwardly of the bearings, fly wheels 22, this shaft being rotated by reason of the operative connection therewith of the piston rod 23 of a suitable engine 24 also mounted upon the platform 20. The up-rights for supporting the conveyor frame and the drive shaft therefor are arranged one rearwardly of the crank shaft 21 and the other forwardly thereof.

The rear one of the pair of uprights mentioned above is constructed and is supported in the following manner. An upstanding bracket 30 is fixedly supported upon the rear end sill 8 of the frame of the machine and is formed at its upper end with a stub shaft or stud 31 which projects rearwardly

therefrom in a line with the axis of the crank shaft 21 and pivoted at its lower end to this stud and extending upwardly therefrom at an angle is an arm 32, formed preferably of angle iron. A similar upstanding bracket 33 is supported upon the intermediate sill 7 with its stud also extending in a line with the axis of the crank shaft and to the latter bracket is pivoted the lower end of an arm 34 which is identical with the arm 32. Pivoted at its lower end to the rear face of the rear end sill 8, about the middle thereof, is an upstanding angle iron support 35 and this support is pivoted at its upper end to an angle iron beam 36 adjacent the upper outer end thereof, this beam being pivoted at its lower end as at 37 to the arm 32 above the pivot for the said arm. From the foregoing it will be understood that these several elements, 32, 35 and 36, by reason of their pivotal connection one with the other, may assume positions at various angles with respect to each other and in order that, when so adjusted as regards their relative position, they may be held at such adjustment, a bar 38 is pivoted to the arm 32 at the upper end thereof and to the beam 36 intermediate its ends, this latter pivotal connection being had by means of a bolt 39 engaged through an opening in the said beam 36 and interchangeably through openings 40 in the said bar 38. An upstanding angle iron support 41 is pivoted to the intermediate cross sill 7 of the frame at a point in front-to-rear alinement with the corresponding pivot for the corresponding support 35 but the arm 34 and the support 41 are connected by means of a frame which, while it serves the same function as the beam 36, differs radically in construction therefrom. The same frame is formed of angle iron which is bent substantially into U-form, one of the spaced members of the U frame being indicated by the numeral 42 and the other by the numeral 43, the member 42 being in advance of the member 43. The upper end of the arm 41 is pivoted to the vertical wing of the member 42 at a point corresponding, in front to rear alinement, with the point of pivotal connection of the support 35 with the beam 36. The arm 34 is pivotally connected to the member 42 of the frame above described in a manner identical with that in which the arm 32 and beam 36 are connected and a bar 44 is pivotally connected to the upper end of the arm 34 and to the said member 42 of the frame in a manner corresponding to the similar connection had between the bar 38 and the beam 36.

A shaft 45 is journaled in bearings upon the members 42 and 43 of the frame and this shaft carries at its rear end a pinion 46' with which meshes a pinion 46 fixed upon the crank shaft 21 at the forward end thereof. The pinion 46' is loose upon the shaft 45 and

is formed with one member of a clutch, the other member 45^a of the clutch being splined upon the shaft and being engaged by and movable through the instrumentality of a lever 46^a pivoted upon the arm 43 of the U-frame, into and out of engagement with the clutch member first mentioned. The shaft 45 also carries a small sprocket gear 47 and trained around this gear is a sprocket chain 48 the chain being passed also over a similar gear 49 which is carried by a shaft 50 journaled in suitable bearings at the upper ends of the bar 36 and the member 42 of the said frame, it being understood of course that this chain travels in a plane intermediate the members 42 and 43 of the frame. A sprocket 51 is fixed upon the shaft 45 and trained over this sprocket is a sprocket chain 52. This chain is passed also over a sprocket gear 53 upon a shaft 54 which is journaled in a suitable bearing 55 in a horizontal plane with the sill 7. This shaft 54 carries also a beveled gear 56 which meshes with a similar gear 57 carried at the outer end of a shaft 58. This shaft 58 has loose upon it a chain pulley 59 with which is formed one member 60 of a clutch, the other member 61 of the clutch being slidable upon the shaft but keyed thereto and being movable into engagement with the member 60 by means of a suitable lever 62. A chain 63 is engaged around this pulley 59 and in the chain groove 64 of a winding drum 65 which is rotatably mounted at the forward end of the frame, one stretch of the chain being passed around an idler 66. A cable 67 is permanently connected to the winding drum 65 and is adapted to be wound thereon, the other end of the cable being connected to any suitable anchor (not shown) which is fixed in advance of the machine, it being understood of course that rotation of the drum to wind the cable thereon will result in the machine being drawn bodily forward.

The excavating conveyer will now be described. The frame of the conveyer is comprised of a pair of T beam tracks 68 which extend in parallel relation with their odd or major flanges presented upwardly and supported from these tracks beneath the same by means of suitable braces 70 are tracks 71 which are formed from eye beams and which extend downwardly in parallel relation to the tracks for a portion of their length, thence obliquely downwardly at an angle with respect to the said tracks and finally at an angle to the lower end of the tracks. Bearings 72 are shiftably mounted upon the braces 70 at the upper end of the frame at each side thereof and are adjustable by means of adjusting screws 73 which are threaded through suitable bearings 74 and swiveled in the bearings 72. The shaft 50 is extended rearwardly and is journaled in the bearings 72 and this shaft carries between

the bearings sprocket gears 73' which rotate between the upper ends of the tracks 68 and 71. A shaft 75 is journaled in suitable bearings 76 and fixed upon this shaft for rotation therewith are sprocket gears 77 which rotate between the lower ends of the tracks. A shaft 78 is journaled for rotation in suitable bearings fixed upon the tracks in the angle of their lower bend and this shaft carries sprocket gears 79. Sprocket chains 80 are trained over the gears 73', 77 and 79, and travel, with their lower stretches between the two tracks 71 and their upper stretches between the two tracks 68. The excavating buckets of the machine are connected between these chains at suitable intervals and travel with the chains as will be readily understood and these buckets will now be specifically described. Each bucket comprises a bottom 81 having a sharp front edge 82 and having formed integral with its side edges sides 83. The bottom of each bucket is curved upwardly adjacent its rear edge as at 84 and around a shaft 85 which is passed also through ears 86 formed integral with the upper edges of the sides 83. Rollers 87 are journaled upon this shaft at the ends thereof and directly outwardly of the said sides. The overturned rear end portion of each bucket is cut away adjacent each side 83 as at 88 so as to expose portions of the shaft 85, these portions being passed through suitable links of the sprocket chains 80. The buckets are narrowed in the direction of their rear ends and formed with the upper edges of the sides 83 at the forward ends thereof are upstanding ears 89 to the upper ends of which and upon stub shafts formed therewith are journaled rollers 90. The rollers 90 are so located with respect to the rollers 87 that when the buckets are in motion the rollers 87 travel between the inner flanges of the eye beam tracks 71 and the rollers 90 between the outer flanges of the said tracks, the tracks of course bracing the buckets so that they will dig into the bed of the ditch or stream and remove quantities of soil therefrom.

In order that the forward ends of the bucket may be permitted to drop when they have reached a predetermined height, the lower outer flanges of the eye beam tracks 71 are cut away for a short distance as to 91 so that when the buckets reach this point in their travel the rollers 90 will no longer have a support upon which to travel. In order that all of the excavated soil may be removed from the buckets when they are dumped, I have provided a scraper which comprises a blade 92 supported by means of integral arms 93 which are secured at their upper ends to certain of the braces 70 and this blade 92 is projected rearwardly and upwardly and after the buckets drop and con-

tinue their upward travel their bottoms sweep over the upper edge of the blade, any soil adhering to the bottom being in this manner scraped off. In order that the buckets may be automatically righted when they reach the upper end of the conveyer, a lip 94 is formed at the rear end edge of the bottom of each bucket and projects rearwardly therefrom and, as the buckets are carried over the upper end of the conveyer frame, these lips ride over the shaft and produce the result stated. The lower end of the conveyer frame is supported by means of a cable 95 which is passed through a block 96 supported at the upper end of a boom 97 which projects upwardly and laterally from the rear end of the frame of the machine, the cable being also passed around a second block 98 which is provided with a hook 99 engaged with a yoke 100 attached to the frame.

From the foregoing description of my invention it will be seen that the conveyer frame may be raised and lowered by means of the cable 95, it being wound upon a suitable windlass 101 and that the buckets will be automatically dumped, scraped, and righted to operative position. The frame can also be adjusted to extend to a greater or less degree in a lateral direction from the machine by adjusting its supports heretofore described.

What is claimed, is:—

1. A machine of the class described comprising a frame arranged for travel, an excavating conveyer supported from said frame, said conveyer comprising an endless chain of buckets, means for holding said buckets in operative position throughout a portion of the length of their upward travel, said buckets being arranged to tilt automatically after passing such means, a trip arm carried by each bucket, and an element arranged in the path of said arm for returning the buckets successively to normal position.

2. In an excavating machine, a conveyer comprised of an endless flight of buckets, means for normally maintaining said buckets in upright position, said means being constructed to release said buckets to permit of dropping to discharge position, and a fixed scraper arranged in the path of travel of said buckets.

3. In an excavating machine, a conveyer comprised of an endless flight of buckets, means for normally maintaining said buckets in upright position, said means being constructed to release said buckets when they reach a certain point in their path of travel to permit of dropping of the buckets to discharge position, and a fixed scraper arranged in the path of travel of said buckets and to scrape along the bottom walls of the buckets from rear to front as they pass thereover.

4. In an excavating machine, a conveyer comprised of an endless flight of buckets,

means for normally maintaining said buckets in upright position, said means being constructed to release said buckets to permit of dropping of their forward ends, said buckets
5 when dropped being free to swing and a fixed scraper arranged in the path of travel of said buckets and to scrape over their bottom walls from rear to front as the buckets are carried thereover.

10 5. In an excavating machine, a conveyer comprised of an endless flight of buckets, means for normally maintaining said buckets in upright position, said means being constructed to release said buckets to permit of
15 dropping to discharge position, and a fixed scraper arranged in the path of travel of said buckets, said scraper being arranged to cause the inversion of said buckets as they pass thereover and to scrape their bottom walls
20 from rear to front.

6. In an excavating machine, a conveyer comprised of T-beam tracks, an endless chain of buckets traveling between the tracks, each of the buckets being provided at each side
25 with a pair of rollers, one roller traveling to

each side of the web of the track, a portion of the outer flange of each track being broken away to permit dropping of the forward end of the bucket to discharge position, and a fixed scraper arranged in the path of travel 30 of the buckets.

7. In an excavating machine, a conveyer comprised of an endless flight of buckets, chains carrying the buckets, a shaft, gears upon the shaft over which the chains are 35 trained, means for normally supporting the buckets in upright position, said means being constructed to release the buckets to permit of their dropping to discharge position at a certain point in their path of travel, each of 40 the said buckets being provided with a tongue constructed and arranged to ride over one of the shafts to right the respective bucket.

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

CHARLES H. RUTH.

Witnesses:

ROULEN MALAN,
GEO. J. HALLEWAY.