

W. O. GOODWIN.
POST HOLE DIGGER.
APPLICATION FILED JULY 21, 1910.

1,027,199.

Patented May 21, 1912.

5 SHEETS—SHEET 1.

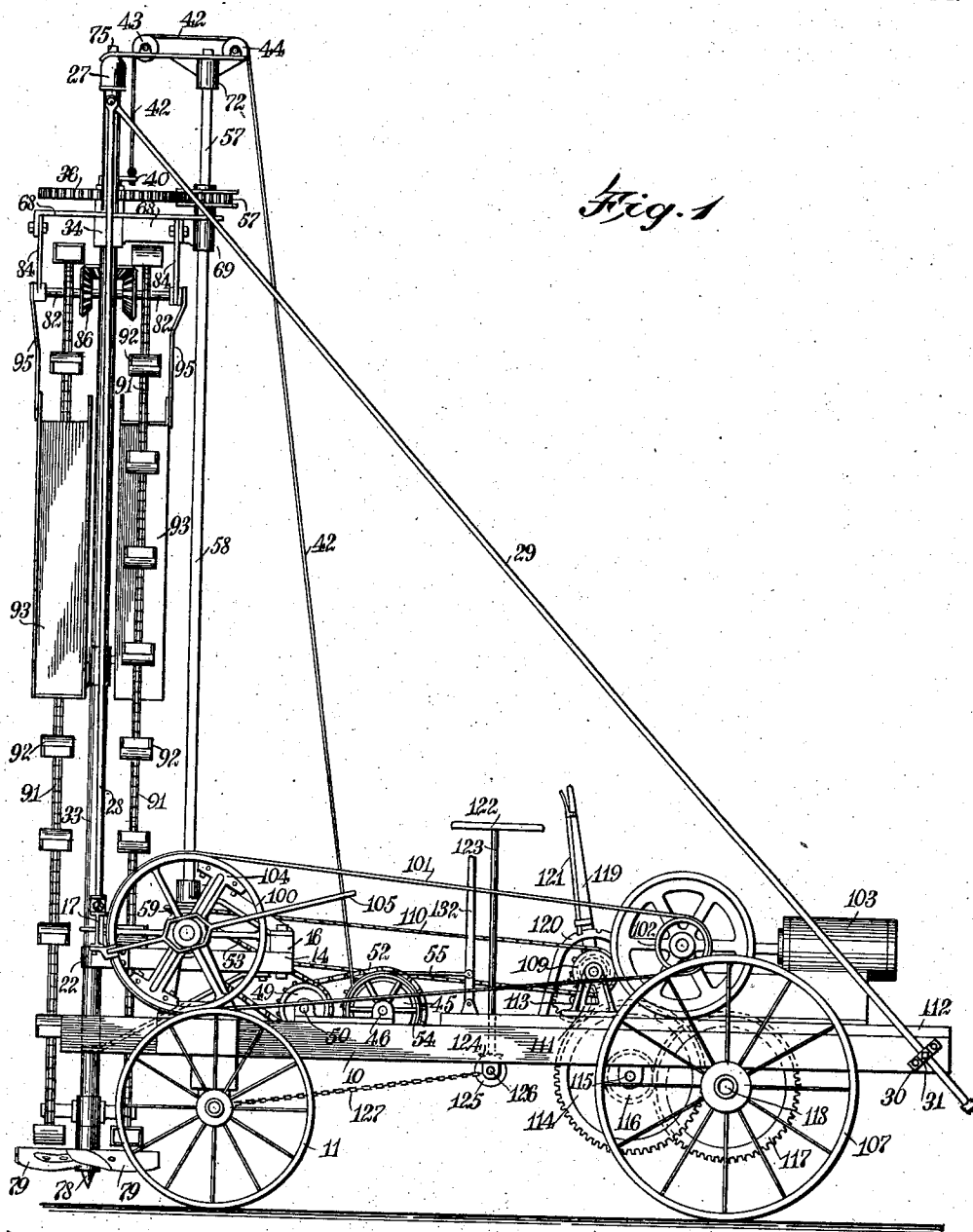


Fig. 1

WITNESSES:
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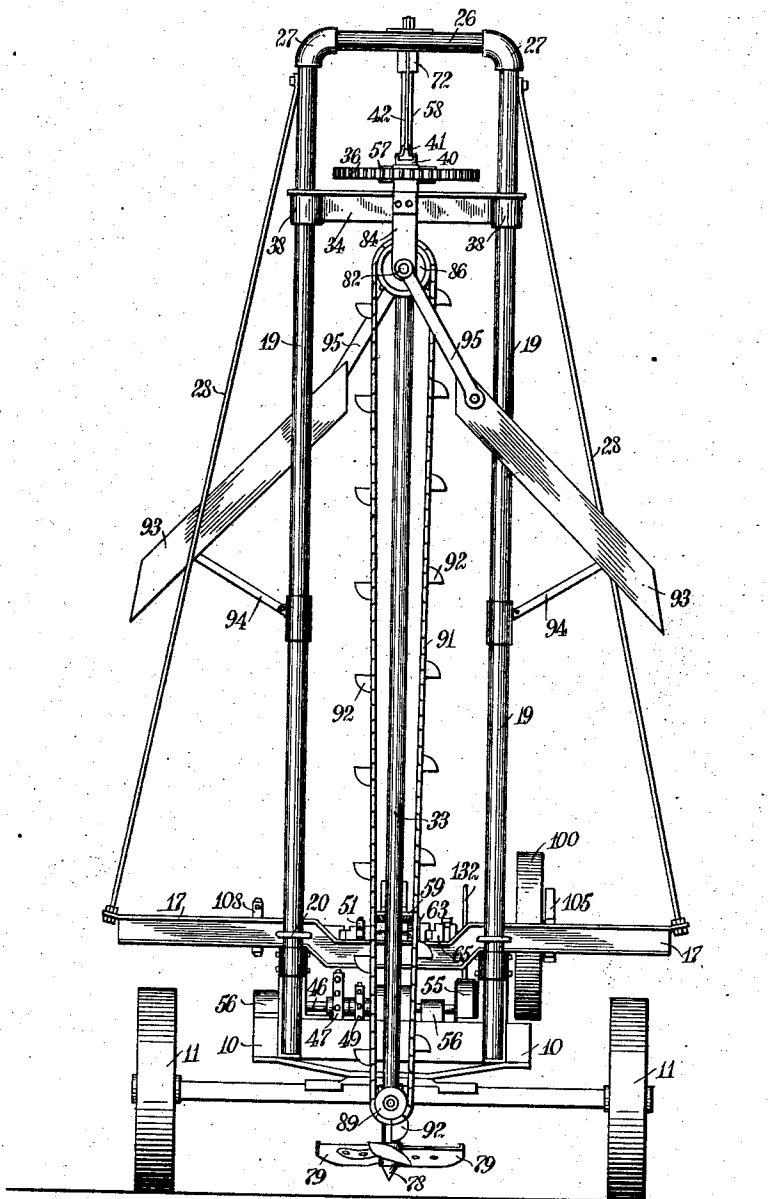
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6 SHEETS—SHEET 2.

Fig. 2



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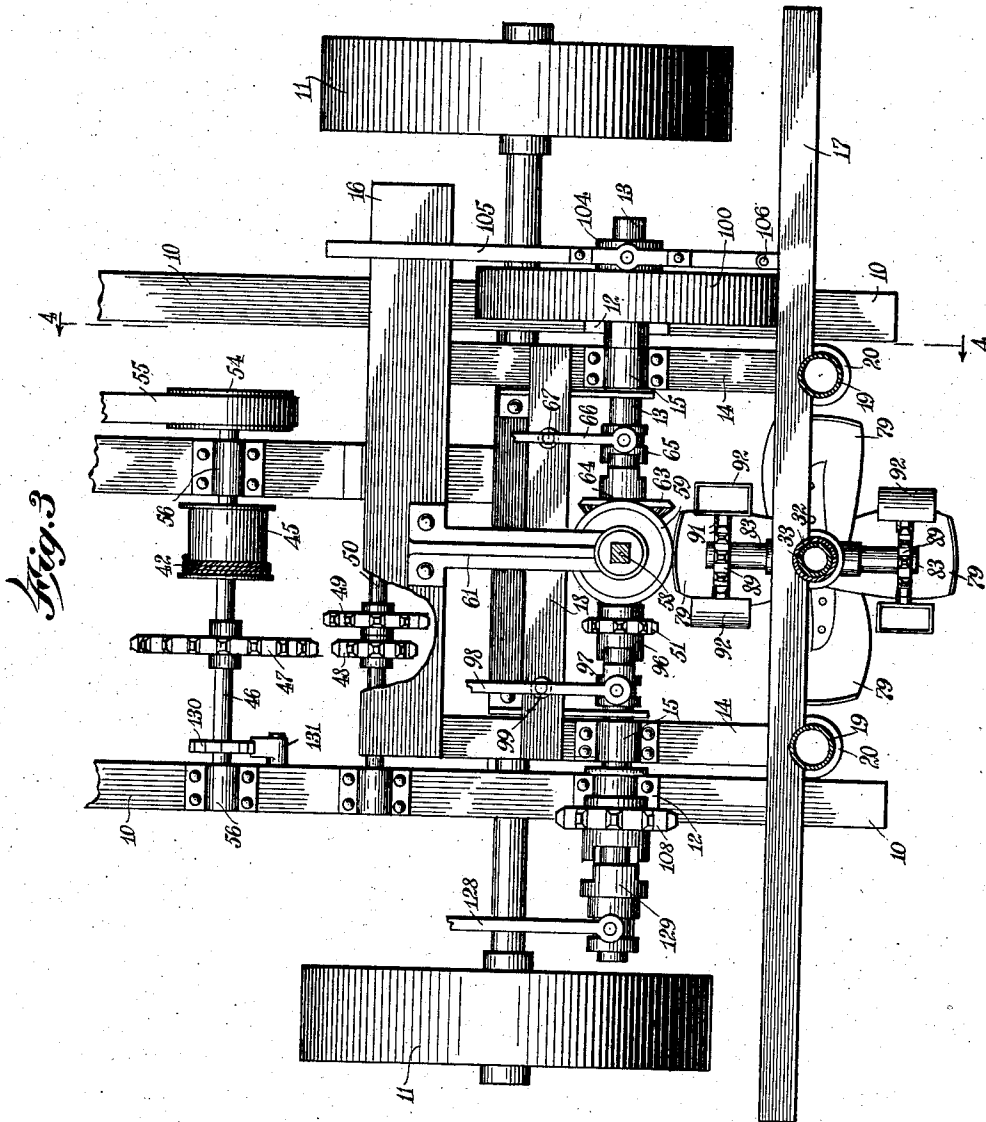
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5 SHEETS—SHEET 3.



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5 SHEETS-SHEET 4.

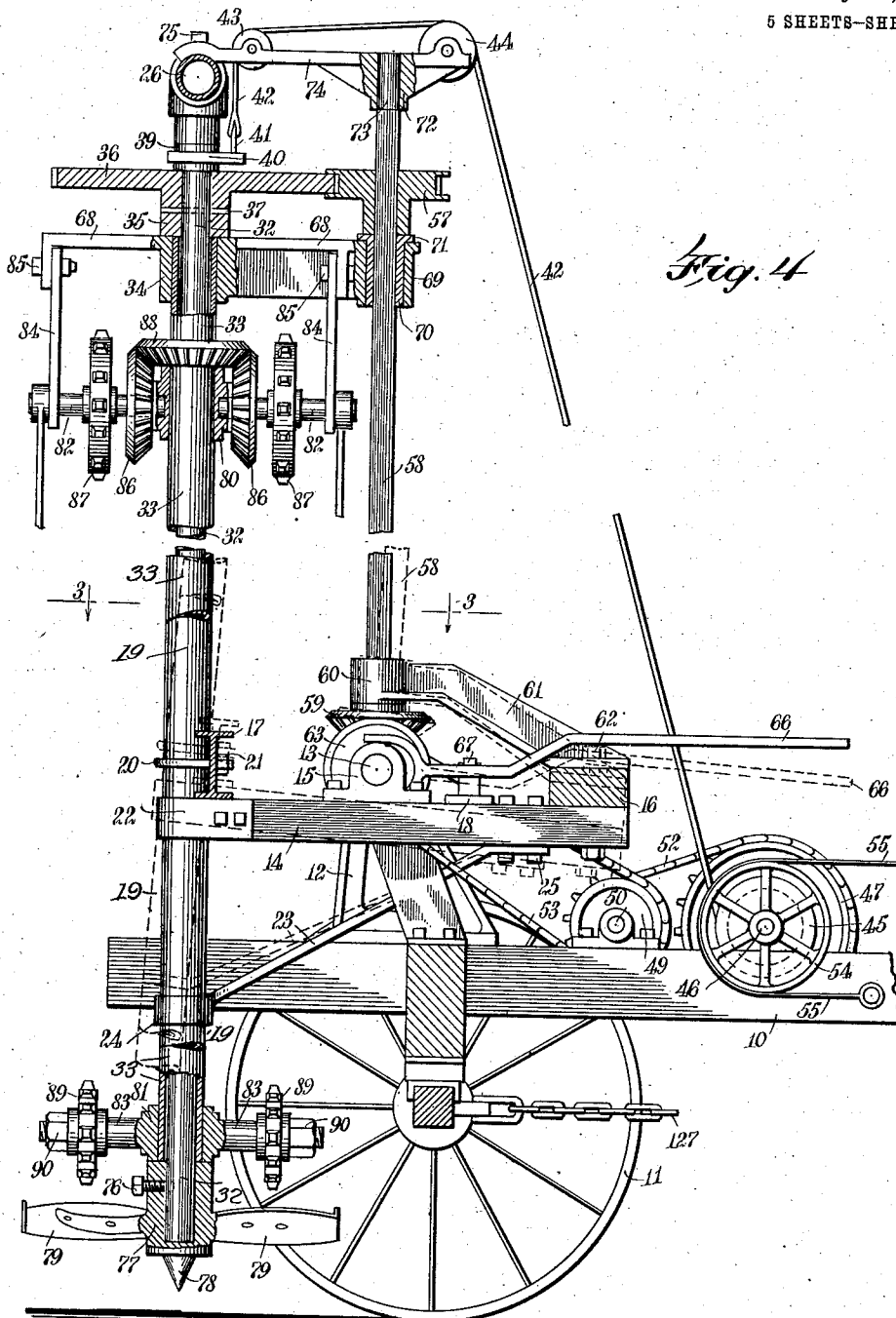


Fig. 4

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5 SHEETS—SHEET 5.

Fig. 6

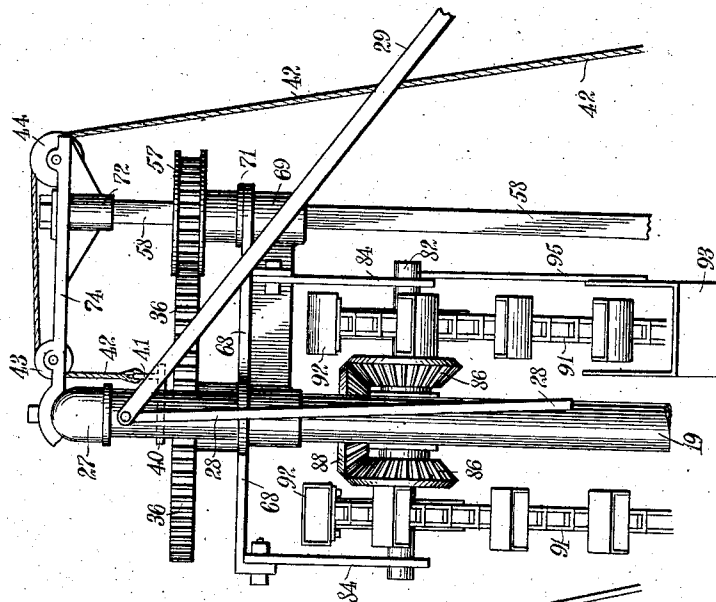
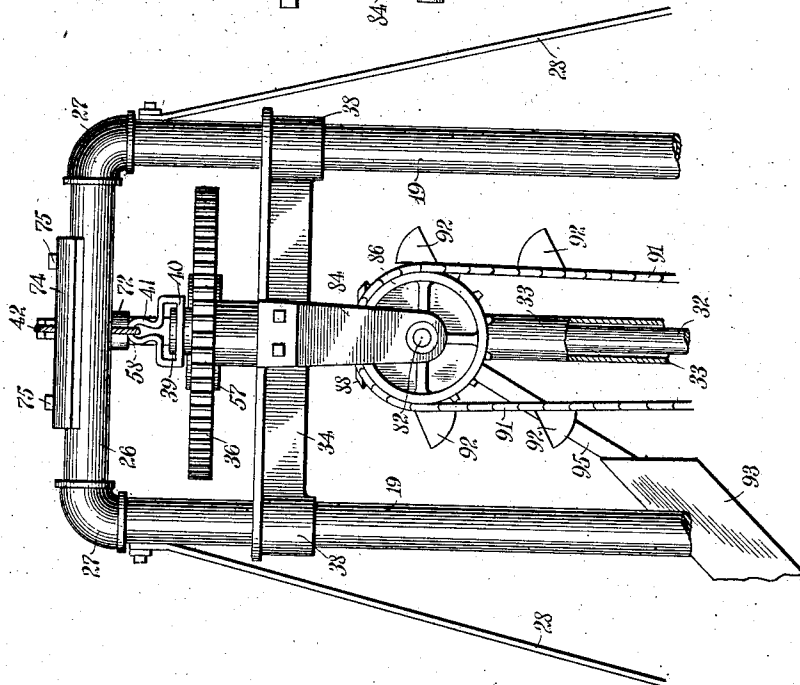


Fig. 5



WITNESSES:

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UNITED STATES PATENT OFFICE.

WALDMAR OTIS GOODWIN, OF SALINA, KANSAS.

POST-HOLE DIGGER.

1,027,199.

Specification of Letters Patent.

Patented May 21, 1912.

Application filed July 21, 1910. Serial No. 573,041.

To all whom it may concern:

Be it known that I, WALDMAR O. GOODWIN, a citizen of the United States, and a resident of Salina, in the county of Saline and State of Kansas, have invented a new and Improved Post-Hole Digger, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to provide a mechanism for earth boring, having connected therewith elevating means for removing the earth from the hole as bored and delivering the same for removal; to provide in an earth boring machine of the character described, means for guiding the boring tool and mechanism for operating the same to form holes, the extension whereof is inclined from the vertical; to provide a mechanism for controlling the operation of the boring mechanism which is simple, efficient and durable; and to provide a truck for supporting said boring mechanism, said truck being provided with a self contained motor and with a transmission mechanism connecting the said motor with the traction wheels and with the boring mechanism alternately.

One embodiment of the present invention is disclosed in the structure illustrated in the accompanying drawings, in which like characters of reference denote corresponding parts in all the views, and in which—

Figure 1 is a side elevation of a post hole digging machine constructed and arranged in accordance with the present invention; Fig. 2 is an end elevation of the same; Fig. 3 is a fragmentary view in cross section, and on an enlarged scale, the section being taken on the line 3—3 in Fig. 4; Fig. 4 is a vertical section taken on the line 4—4 in Fig. 3, the view being broken away and contracted in its vertical extension; Fig. 5 is a detail view, on an enlarged scale and in end elevation, of the top of the guide and supporting frame; and Fig. 6 is a side elevation in detail, and on an enlarged scale, of the top of the guide and supporting frame of the machine, together with the transmission gearing and shaft for operating the rotary boring shaft.

Heretofore the employment of earth augers or boring tools has been rendered undesirable by reason of the inability to remove the dirt from the hole as and when bored. A further objection has heretofore

existed in that the preliminary operation of setting up the boring tool has been such that the time required or lost about equaled the time gained over the hand operation. In the present invention these objections are overcome, in the first instance, by equipping a boring tool with earth elevating devices adapted to raise the earth from the boring head and deliver the same to suitable conveyers, or other transportation means, and in the second instance, by mounting the boring mechanism on a suitable motor driven traction vehicle.

The vehicle is provided with a suitable body structure, having longitudinally disposed sills 10, 10. The sills 10, 10 are extended beyond the steering wheels 11, 11, and are provided with standards 12, 12 to form bearing boxes for a drive shaft 13, upon which the guide frame rests, and from which the boring and elevating mechanisms are primarily driven.

The guide frame consists of side members 14, 14, which are suspended upon the shaft 13 by bearing boxes 15, 15, and are cross braced at the ends by a heavy framing timber 16 at the rear and a metal I-beam 17 in front. The members 14, 14 are also connected by a cross brace 18, provided to furnish mounting for the pivot standards of the clutch operating mechanism. The flanges of the I-beam 17 are cut away to form pockets to receive guide tubes 19, 19. The tubes 19, 19 are fixedly bolted in position upon the I-beam 17 by loops 20, 20, the ends whereof are screw threaded and provided with set nuts 21, 21. The tubes 19, 19 are alined with the members 14, 14, the ends of the said members being partly cut away to pass the said tubes, and the tubes being secured thereto by loop straps 22, 22. The straps 22, 22 assist in maintaining the perpendicular relation between the members 14 and the tubes 19. This arrangement is further secured by bracket braces 23, 23, which are secured firmly upon the tubes 19 by collars 24, 24 provided for that purpose. The braces 23 are secured by lag bolts 25, 25 to the under sides of the members 14, and at the rear thereof. The tubes 19 are maintained in parallel relation each to the other by the I-beam 17 and a spacing tube 26 disposed at the top of the guide structure, and connected with the tubes 19, 19 by L-pipe connections 27, 27. Connecting the outer ends of the I-beam 17 and the tubes 19, 19

at the top thereof, are tie rods 28, 28. The tubes 19, 19, the I-beam 17, the spacing tube 26, and the tie rods 28, 28 form a frame having a rigidity of formation with light-

5 ness of structure.

The members 14, 14, as above stated, are pivotally mounted upon the shaft 13. The purpose in this construction is that the guide frame, and the tubes 19, 19 thereof, together
10 with the boring mechanism carried thereon, may be disposed in a vertical position in the normally vertical plane of the longitudinal axis of the vehicle. It is to adjust the angle of operation of the guide frame that I have
15 provided the adjusting tubes 29, 29. The tubes 29, 29 are small, and are threaded through eyelets 30, 30, and are secured therein by set nuts 31, 31. It is obvious that as the adjusting tubes 29, 29 are drawn upon
20 or extended the tubes 19, 19 will be inclined toward or away from the rear of the vehicle on which the guide frame is mounted. It is also obvious that in any adjusted position the tubes 29, 29 may be held by setting up
25 the nuts 31, 31.

The boring and earth elevating mechanisms with which this machine is provided are mounted in guided relation to the tubes 19, 19. A boring shaft 32 is rotatively mounted
30 in suitable bearings formed at the ends of a pipe casing 33 and upon a cross head 34, whereon it is suspended by the hub 35 of a large gear wheel 36, which is fixedly connected by means of a pin 37 to the said shaft
35 32. The cross head 34 is provided at the ends thereof with guide thimbles 38, 38, slidably mounted and movable on the tubes 19, 19.

Formed at the top of the shaft 32 is a
40 grooved head 39, in the groove whereof is mounted a supporting collar 40. The collar 40 is provided with an eyelet 41, to which a cable 42 is connected. The cable 42 is reeved over pulleys 43 and 44, and wound upon a
45 drum 45. The drum 45 is mounted on a shaft 46, to which power is applied by a fixed sprocket gear 47, which, together with a smaller sprocket gear 48 and a large sprocket gear 49, both being mounted on a
50 shaft 50, and a small sprocket gear 51 mounted on the driving shaft 13, constitute, together with suitable sprocket chains 52 and 53, a transmission mechanism for conveying the rotative movement from the shaft
55 13 to the shaft 46. The shaft 46 is mounted in suitable bearing boxes 56, 56, mounted on the carrying frame of the vehicle, as seen particularly in Fig. 3 of the drawings. It is by means of the cable 42 and drum 45 that
60 the shaft 32, casing 33, and parts connected therewith, are raised or lowered on the guide tubes 19, 19 into contact with or out of engagement with the earth wherein the post hole is to be dug.

65 The driving mechanism for the shaft 32

is connected with the gear wheel 36 by means of a shrouded gear wheel 57. The shrouded gear wheel 57 is provided with a squared central perforation provided to receive a
squared shaft 58. The shaft 58 is, at the
70 lower end, fixedly connected with a bevel gear 59. The bevel gear 59 is suitably mounted in bearings formed in the head 60 of a bracket 61. The bracket 61 is bolted by means of bolts 62 upon the framing
75 timber 16. The gear 59 is maintained in tooth engaged relation with a bevel gear 63, which is loosely mounted on the shaft 13. The gear 63 is provided with a clutch toothed hub 64, the teeth whereof are extended toward and alined with a clutch
80 65, slidably keyed on the shaft 13. The movable clutch 65 is operated by a lever 66, which is pivoted in a standard 67 mounted on the cross brace 18. By manipulating
85 the lever 66 the clutch 65 is caused to engage the gear 63, and by rotating the same, rotate the gear 59 and shaft 58 connected therewith. The shaft 58 is maintained in parallel relation with the shaft 32 by a
90 bracket extension 68, extended from the cross head 34, as shown particularly in Fig. 4 of the drawings. At the extreme end of the extension 68 is formed a socket head 69, having a bearing formed therein for the
95 bushing 70. The bushing 70 is cylindrical in shape and provided with a central squared perforation to fit the squared shaft 58, which slides within the said bushing. The bushing 70 is provided at the upper
100 end thereof with a flange 71, adapted to rest upon the extension 68 and to form thereby a seat upon which the gear 57 and the hub thereof rest. The shaft 58 is maintained in parallel relation with the tubes
105 19, 19 by being mounted in a rotary bearing formed in the boss head 72. It is in the head 72 that the upper end of the shaft 58 is pivotally mounted, the said shaft being provided with a bearing section 73 to
110 fit the bearing formed in the boss 72. The boss 72 is formed in the end of an arm 74, on which the pulleys 43 and 44 are mounted, and which is fixedly secured to the spacing tube 26 by means of bolts 75, 75.

By means of the construction and arrangement of the boring tools and driving mechanism therefor, it will be seen that as the pipe casing 33 and shaft 32 are raised
120 and lowered by the manipulation of the cable 42, the transmission shrouded gear 57 slides on the driving shaft 58, maintaining, however, in all positions its non-rotative relation with the said shaft, whereby the rotation of the shaft is at all times transmitted to the gear wheel 36, and through
125 it to the boring shaft 32.

At the lower end of the boring shaft 32 there is fixedly bolted, by means of a pin
130 bolt 76, a boring head 77. The boring head

77 is provided with a centering bit 78, and radially extended upwardly inclined scoop blades 79, 79. In the operation of the invention the centering bit 78 maintains the grip of the tool upon the earth in which the post hole is being bored.

Fixedly mounted upon, or integrally formed with, the casing 33, are collars 80 and 81, provided to form bearings for short shafts 82, 82 and supports for bearing studs 83, 83. The shafts 82, 82 are supported at the outer ends by depended bearing plates 84, 84, which plates are fixedly bolted at 85, 85 upon the bracket extension 68. The shafts 82, 82 have fixedly mounted thereon bevel gears 86, 86 and sprocket wheels 87, 87. The bevel gears 86, 86 are each tooth engaged with a bevel gear 88, which is fixedly mounted upon the shaft 32, the casing 33 being parted to permit the said gear to pass through the said casing to the said shaft. The sprocket wheels 87, 87 are suspended above and in line with the sprocket wheels 89, 89 mounted rotatively on the bearings formed on the studs 83. The sprocket wheels 89 are locked in position by nuts 90, 90. The sprocket wheels 87, 87 and 89, 89 are connected by endless chains 91, 91, upon which, at suitable intervals, are mounted carrying buckets 92, 92. The chains 91 and buckets 92, together with the sprocket wheels above mentioned, constitute the conveyer for lifting the earth from the bottom of the hole when the blades 79, 79 are cutting in the bottom of the said hole.

By reason of the opposite lateral disposition of the gears 86, 86 with reference to the driving gear 88 on the shaft 32, it will be seen that the shafts 82, 82 on opposite sides of the shaft 32 are rotated in opposite rotary directions. The result of this is that the buckets 92, 92 on the opposite sides of the shaft 32 are moved, at the bottom of the hole, in directions opposed to the rotary movement of the blades 79, 79. By thus operating the buckets 92, 92 it will be observed that the earth is lifted by the blades 79, 79 and conveyed toward the buckets 92 while the said buckets are advancing toward the blades and extracting the earth therefrom. At the upper end of the elevator chain the buckets 92, 92 deposit their load into delivery chutes 93, 93. The chutes 93, 93 are extended from opposite sides of the guide frame, and are supported on the tubes by means of brace rods 94, 94. The said chutes are suspended at the upper end from the shafts 82, 82 by means of straps 95, 95. The connections of the straps 95, 95 with the chutes 93, 93 and the shafts 82, 82 are all pivotal, so that the angle of inclination of the said shafts may be adjusted to suit the needs of the operation or desires of the operator.

The crosshead 34, shaft 32, casing 33, and

parts connected therewith, as stated, are lifted by the cable 42 when the drum 45 is rotated. To rotate the drum 45 the gear 51 is provided with a clutch toothed hub 96, with the teeth of which a sliding clutch 97 is adapted to engage. The clutch 97 is operated by a lever 98, which is pivotally mounted on a standard 99 on the cross brace 18.

The driving shaft 13 is operated from a driven pulley 100, which a belt 101 connects with a driving pulley 102 of the motor 103. A heavy friction clutch 104 is keyed on the shaft 13, and is operated by a lever 105. The lever 105 is pivoted at 106, and is adapted to expand the arms of the friction clutch 104 to grip the inner surface of the pulley 100 and thereby rotate the shaft 13.

The shaft 13 has provided thereon a sprocket wheel 108, which is loosely mounted on the said shaft 13, and is connected with a gear wheel 109 by a sprocket chain 110. The gear 109 is supported in a bracket 111, which is mounted on the platform 112 of the vehicle, which platform 112 supports the motor 103. The wheel 109 is tooth engaged with a transmission wheel 113, which is tooth engaged with a large gear wheel 114. The large gear wheel 114 is fixedly mounted on a shaft 115, on which is likewise fixedly mounted a small gear wheel 116. The small gear wheel 116 is tooth engaged with a large gear wheel 117, fixedly mounted on the axle 118 on which are fixedly mounted the traction wheels 107. Suitably mounted on the gear wheel 114 is a band brake of the usual type, but not shown, which is operated by a hand lever 119. The lever 119 may be set in position on a quadrant 120 by means of a detent lever and connecting rod 121.

When used as a vehicle, the same is guided by a hand wheel 122, which is fixedly mounted on a wheel post 123. At the lower end of the post 123 is fixedly mounted a bevel gear 124, which is tooth engaged with a bevel gear 125, fixedly mounted on a winding shaft 126. The shaft 126 is arranged to turn the axle upon which the wheels 11, 11 are mounted, by means of chains 127. With a vehicle thus constructed, the mechanism may be moved rapidly from point to point by manipulating a lever 128 to throw into and out of engagement the clutch 129. When the clutch 129 is thus thrown into engagement the wheel 108 is rotated with the shaft 13. In order that the boring shaft 32, and members connected therewith, shall remain raised out of contact with the ground when the wheel 51 is thus released, I have provided the shaft 46 with a ratchet wheel 130, with the teeth whereof a pawl 131 is engaged. When the pawl 131 thus engages the ratchet wheel 130 the shaft 46 is held to prevent the unwinding of the cable 42

from the drum 45. Having arrived at the point desired for the formation of a post hole, the shaft 32 is lowered. For this purpose I have provided the pulley 54 and the band brake 55. The band 55 is suitably connected with a hand lever 132, whereby the said brake may be manipulated to drop the bit 78 and the shaft 32 connected therewith gently upon the earth.

The operation of a machine constructed and arranged as above described, and as shown in the accompanying drawings, is as follows: When the shaft 32, and members connected therewith, are raised, as shown in Fig. 1 of the drawings, with the bit 78 raised from contact with the ground, the vehicle is moved to any point where it is desired to operate the post hole digger. The vehicle is shifted until the bit 78 is disposed in the proper position, when, by throwing out of gear the clutch 129, the vehicle is brought to a stand, operating for this purpose the lever 119. The shaft 32 is then lowered by releasing the shaft 46 and pawl 130 mounted thereon, and by manipulating the lever 132 to ease the brake 55 to permit the said shaft to drop quietly into operative position. The shaft having been centered, the tubes 29, 29 are adjusted to place the tubes 19, 19, and the guided shaft 32, in a vertical position. This having been accomplished, the tubes 29, 29 are locked in adjusted position by the set nuts 31. The shaft 13 is now operatively engaged by the pulley 100 by manipulating the lever 105 to seat the clutch 104. The shaft 13 having attained its speed, the clutch 65 is thrown in to engage the bevel gear 63, and through the said gear 63 and the gear 59 to rotate the square shaft 58. The shaft 58 rotating, rotates the shrouded gear 57, and by it the large gear wheel 36 and the shaft 32. With the rotating of the shaft 32 the full weight of the said shaft 32, casing 33, and members connected therewith, is permitted to rest on the bit 78, which immediately sinks into the earth. As soon as the blades 79, 79 are brought into contact with the earth, the same is cut and delivered upward over the face of the said blades. With the operation of the shaft 32 it will be remembered the conveyer buckets 92, 92 are moved to extract the earth from the bottom of the post hole as formed, and to deliver the same upward therefrom and into the chutes 93, 93. The chutes 93, 93 are given suitable lateral extension, which may be increased or decreased sufficiently to deliver the earth thus elevated to one side of the hole being dug, or into a truck or other suitable transporting conveyance. The operation of boring the hole is now continuous, the shaft 32 and parts connected therewith, including the elevator chains 91 and buckets connected thereto, being gradually sunk un-

til the limit to which it is desired to dig the hole is reached. The limit having been thus reached, the boring mechanism may be arrested by manipulating the lever 66 to remove the clutch 65 from the wheel 63. When the clutch is thus removed, the clutch 97 may be engaged with the wheel 51, through which, and the wheels 49, 48 and 47, the drum 45 is rotated to wind up the cable 42. The winding of the cable 42 results in the lifting of the shaft 32 and the parts connected therewith until the lower end of the said shaft, with the blades 79 and the bit 78, is lifted above the level of the ground. If, when the proper depth of the hole is reached, it be desired to continue the operation of the elevator buckets 92 therein without deepening the hole, this is accomplished by manipulating the lever 132 to hold the drum 45 to prevent the lowering of the shaft 32.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A post hole digger, comprising an earth auger having a head embodying a plurality of cutting blades and an elongated shaft; a plurality of endless chain bucket elevators; a driving mechanism for said auger embodying a driving shaft disposed in parallel relation with said auger shaft; a transmission connection between said auger shaft and driving shaft embodying a gear wheel slidably mounted on said driving shaft; a flexible lifting cable connected with said auger shaft; a drum adapted to wind said cable to lift said auger shaft; guide pulleys for said cable; a bevel gear wheel fixedly attached to said auger shaft; a plurality of short shafts disposed in lateral extension adjacent to said auger shaft; a plurality of bevel gears mounted on said laterally disposed shafts in toothed engagement with the first mentioned bevel gear; and pulleys mounted on said laterally disposed shafts for driving said elevators.

2. A post hole digger, comprising an earth auger having a head embodying a plurality of cutting blades and an elongated shaft; a plurality of endless chain bucket elevators; a supporting guide frame for said auger and elevators pivotally mounted to swing in a vertical plane; a wheel carried vehicle having pivotal bearings for said frame formed thereon; a transmission shaft vertically supported on said frame in parallel disposition to said auger shaft; a driving mechanism embodying a shaft forming the pivot of said frame and operatively connected with said transmission shaft; and transmission gearing connecting said auger and transmission shafts, one of said gears being slidably mounted on said transmission shaft.

3. A post hole digger, comprising an earth

auger having a head embodying a plurality of cutting blades and an elongated shaft; a plurality of endless chain bucket elevators; a supporting guide frame for said
 5 auger and elevators pivotally mounted to swing in a vertical plane; a wheel carried vehicle having pivotal bearings for said frame formed thereon; a transmission shaft polygonal in cross section; a driving mechanism embodying a shaft forming the pivot
 10 of said frame and operatively connected with said transmission shaft; and transmission gearing connecting said auger and transmission shafts, one of said gears being slidably mounted on said transmission shaft.
 15

4. A post hole digger, comprising an earth auger having a head embodying a plurality of cutting blades and an elongated shaft; a plurality of endless chain bucket elevators;
 20 a supporting guide frame for said auger and elevators pivotally mounted to swing in a vertical plane; a wheel carried vehicle having pivotal bearings for said frame formed thereon; a transmission shaft vertically supported on said frame in parallel disposition
 25 to said auger shaft; a driving mechanism operatively connected with said shaft to rotate the same; and transmission gearing connecting said auger and transmission shafts, one of said gears being slidably mounted on said transmission shaft.
 30

5. A post hole digger, comprising an earth auger having a head embodying a plurality of cutting blades and an elongated shaft; a plurality of endless chain bucket elevators;
 35 a supporting guide frame for said auger and elevators pivotally mounted to swing in a vertical plane; a wheel carried vehicle having pivotal bearings for said frame formed thereon; a transmission shaft vertically supported on said frame in parallel disposition
 40 to said auger shaft; a driving mechanism embodying a shaft forming the pivot of said frame and operatively connected with said transmission shaft; transmission gearing connecting said auger and transmission shafts, one of said gears being slidably mounted on said transmission shaft; a self-propelled power driven vehicle to support
 45 said frame and auger, the driving mechanism whereof is adapted to operate said auger and elevators; and manually operated means for interchanging the traction mechanism of said vehicle and the driving mechanism of said auger with the driving mechanism of said vehicle.
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 55

6. A post hole digger, comprising an earth auger having a head embodying a plurality of cutting blades and an elongated shaft; a plurality of endless chain bucket elevators;
 60 a supporting guide frame for said auger and elevators pivotally mounted to swing in a vertical plane; a wheel carried vehicle having pivotal bearings for said frame formed thereon; a transmission shaft polygonal in
 65

cross section; a driving mechanism embodying a shaft forming the pivot of said frame and operatively connected with said transmission shaft; transmission gearing connecting said auger and transmission shafts, one
 70 of said gears being slidably mounted on said transmission shaft; a self-propelled power driven vehicle to support said frame and auger, the driving mechanism whereof is adapted to operate said auger and elevators;
 75 and manually operated means for interchanging the traction mechanism of said vehicle and the driving mechanism of said auger with the driving mechanism of said vehicle.
 80

7. A post hole digger, comprising an earth auger having a head embodying a plurality of cutting blades and an elongated shaft; a plurality of endless chain bucket elevators;
 85 a supporting guide frame for said auger and elevators pivotally mounted to swing in a vertical plane; a wheel carried vehicle having pivotal bearings for said frame formed thereon; a transmission shaft vertically supported on said frame in parallel disposition
 90 to said auger shaft; a driving mechanism operatively connected with said shaft to rotate the same; transmission gearing connecting said auger and transmission shafts, one of said gears being slidably mounted on said transmission shaft; a self-propelled power driven vehicle to support said frame and
 95 auger, the driving mechanism whereof is adapted to operate said auger and elevators; and manually operated means for interchanging the traction mechanism of said vehicle and the driving mechanism of said auger with the driving mechanism of said vehicle.
 100

8. A post hole digger, comprising an earth
 105 auger having an elongated driving shaft and a plurality of radially disposed cutting blades; a plurality of endless belt bucket elevators mounted in parallel disposition adjacent to said shaft and extended within the rotary path of said cutting blades; a guide frame for said auger and elevators; a transmission shaft, gear-connected with said
 110 auger shaft and disposed in parallel relation therewith, the gear mounted on said transmission shaft being slidably mounted thereon; a hoisting mechanism embodying a cable and drum for winding the same thereon and a brake for controlling the feed therefrom; a traction vehicle provided with pivot supports for said frame; a motor-propelled
 115 driving mechanism mounted on said vehicle; and a plurality of manually actuated connecting mechanisms for operatively and alternately connecting the said transmission mechanism, hoisting mechanism and traction mechanism.
 120
 125

9. An earth auger comprising a drill shaft, an elevator mechanism adapted for following the drill shaft, and having two conveyer
 130

belts and means for actuating the drill shaft and for driving the belts simultaneously in opposite directions.

10. An earth auger comprising a drill shaft having a suitable bit, means on said shaft adjacent to said bit for carrying an elevator mechanism, an elevator mechanism adapted for travel on said carrying means, and having two conveyer belts and means for actuating the drill shaft and for driving the belts simultaneously in opposite directions.

11. In an earth auger, a drill shaft, a frame mounted near the free end of said shaft, two sprockets carried by said frame, driving mechanism connected with said shaft, two sprockets suitably mounted adjacent to the connection between the shaft and driving mechanism and two conveyer belts respectively connecting the two sets of sprockets, the driving mechanism having means for simultaneously rotating the second named two sprockets in opposite directions.

12. In an earth auger, a revoluble drill

shaft, a non-rotatable member at the upper end of said shaft, a tube attached to said non-rotatable member and projecting over said shaft, a frame carried by the tube, two pairs of sprockets respectively supported by the non-rotatable member and said frame, two conveyer belts respectively connecting said two pairs of sprockets, and means for simultaneously rotating the sprockets on the non-rotatable member in opposite directions.

13. An earth auger comprising a guide frame, a head adapted for longitudinal travel in the guide frame, a drill shaft journaled in said head, transverse conveyer shafts journaled in said head, and means for actuating the drill shaft and for rotating in opposite directions said conveyer shafts.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WALDMAR OTIS GOODWIN.

Witnesses:

GEO. A. PERRILL,
G. M. ARNOLDY.

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