Jan. 26, 1926. 1,571,077

F. WASHA

EARTH BORING MACHINE

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Fig. 11.

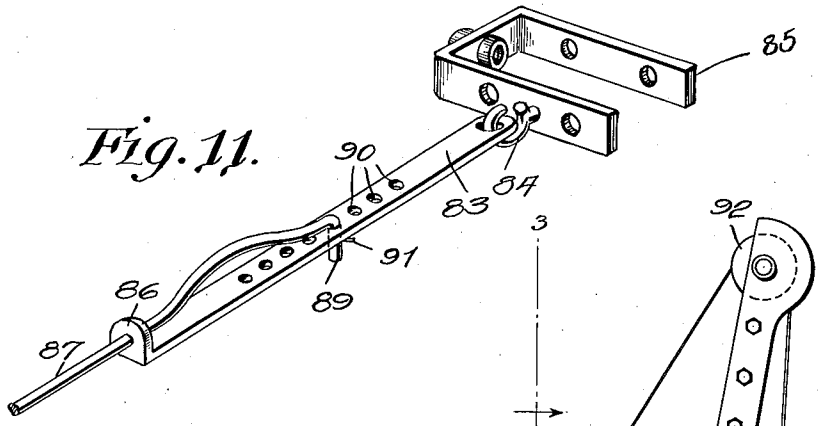



Fig. 1.




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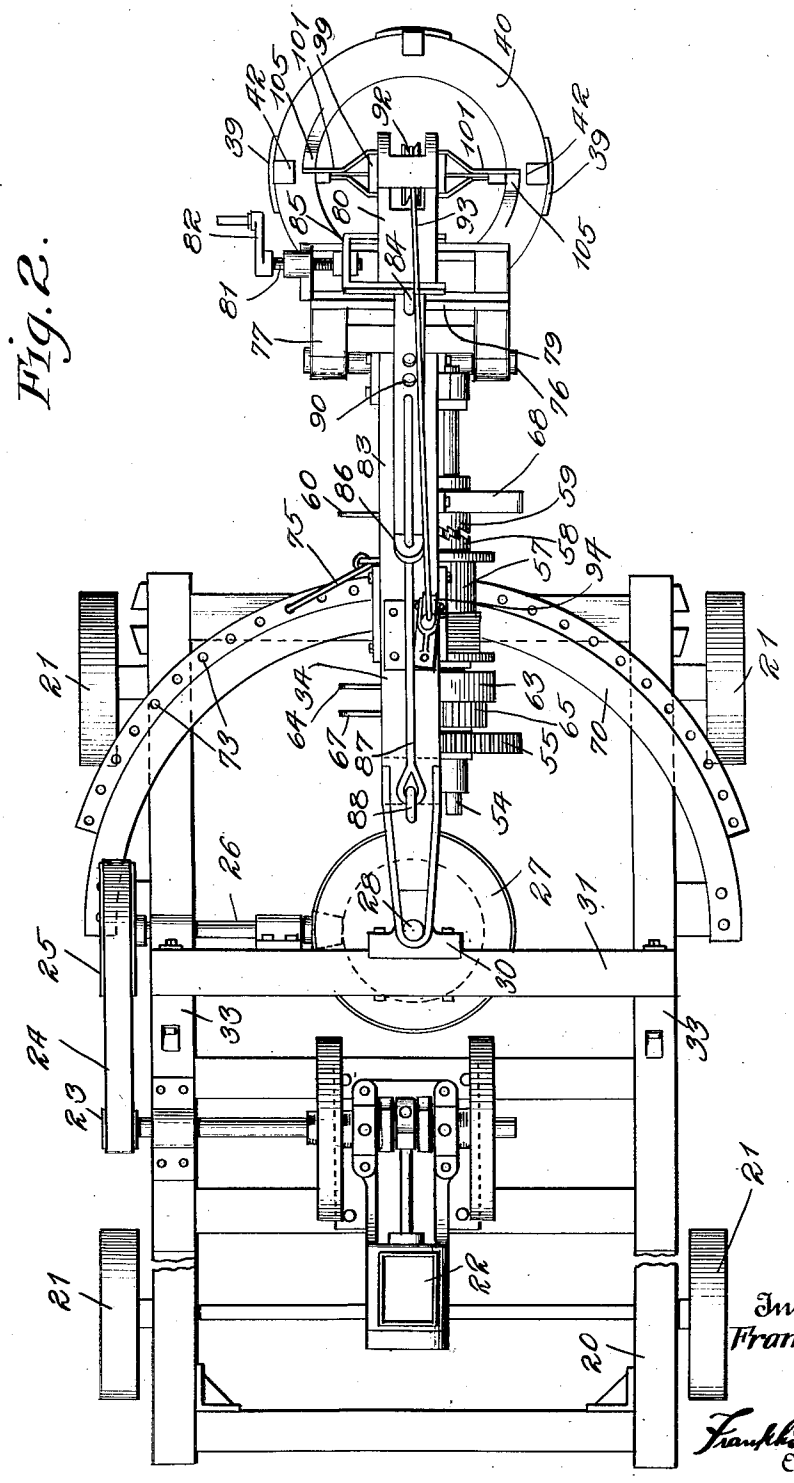
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Fig. 2.



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Fig. 3.

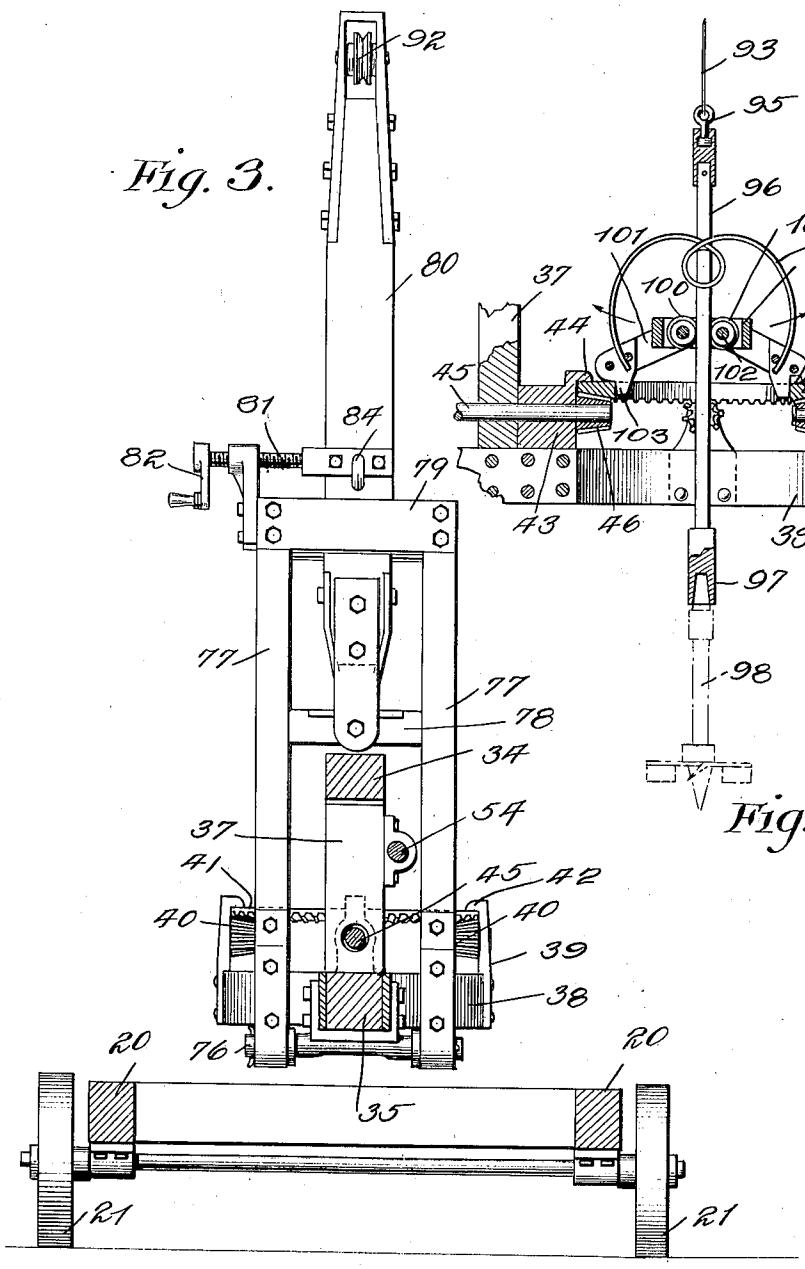



Fig. 8.




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Fig. 4.

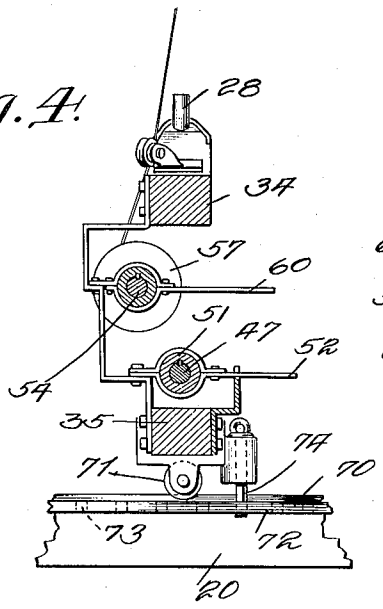



Fig. 5.

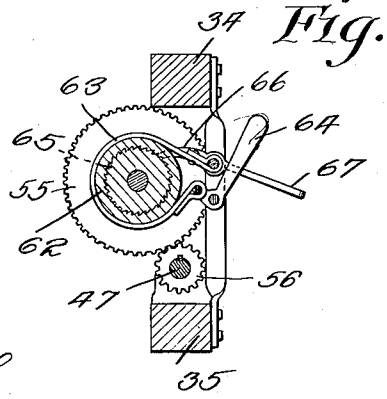
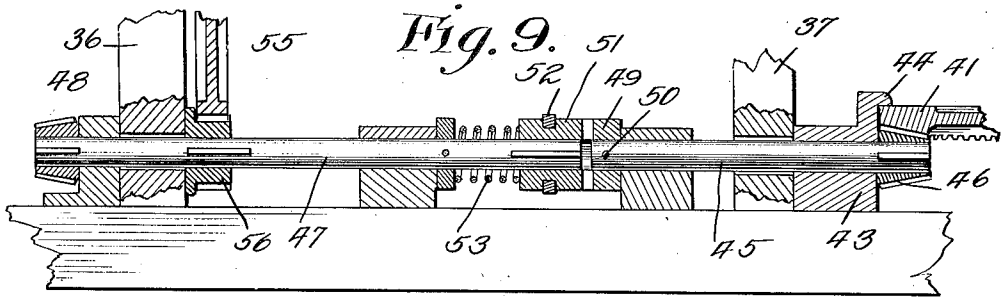



Fig. 9.



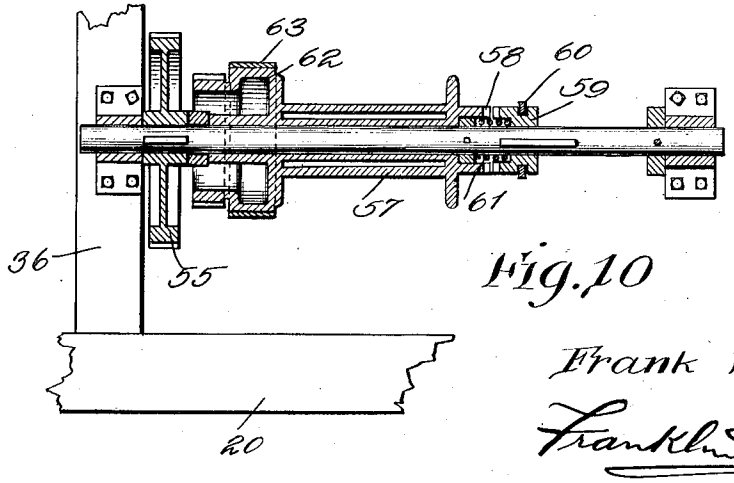




Fig. 10

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Jan. 26 , 1926. 1,571,077

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EARTH BORING MACHINE

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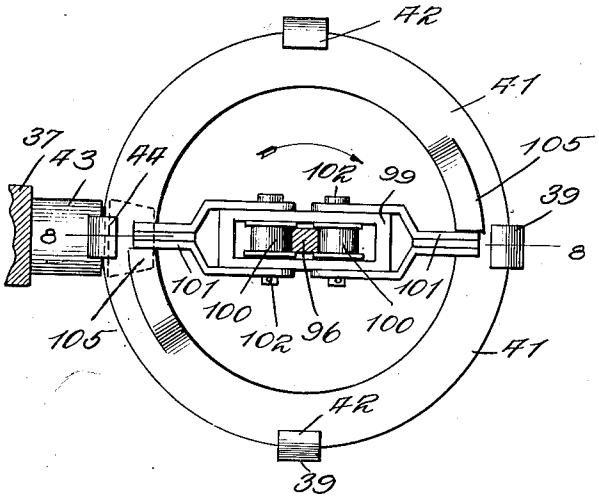



Fig. 7.

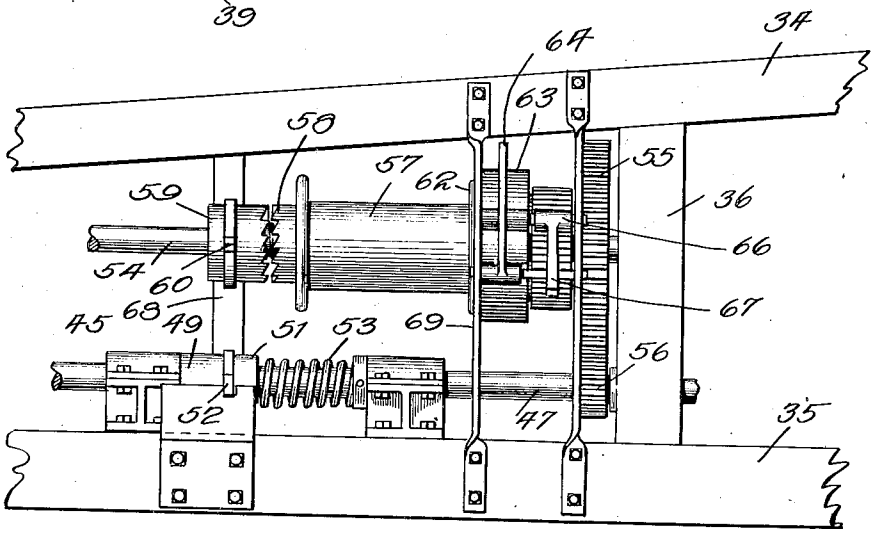



Fig. 6.

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Patented Jan. 26, 1926. 1,571,077

# UNITED STATES PATENT OFFICE.

FRANK WASHA, OF MUSCODA, WISCONSIN.

## EARTH-BORING MACHINE.

Application filed May 23, 1922. Serial No. 563,012.

*To all whom it may concern:*

Be it known that I, FRANK WASHA, a citizen of the United States, residing at Muscoda, in the county of Grant and State of Wisconsin, have invented certain new and useful Improvements in Earth-Boring Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to earth-boring machines and has especial, though not exclusive, reference to a machine adapted for boring post holes, and the like, and has for an object to provide a new and improved device for the purpose of rapidly boring holes for setting posts and other purposes.

A further object of the invention is to provide an earth-boring machine having new and improved features of adjustment for the proper positioning of the boring.

A further object of the invention is to provide an earth-boring machine having new and improved features of controlling the operation of the machine.

With these and other objects in view the invention comprises certain novel parts, elements, units, constructions, combinations and mechanical movements, as disclosed in the drawings, together with mechanical equivalents thereof, as will be hereinafter more fully described and claimed.

In the drawings:

Figure 1 is a view of the device in side elevation, a part of the supporting frame carrying the power plant being broken away;

Figure 2 is a top plan view of the machine;

Figure 3 is a vertical sectional view taken on line 3—3 of Figure 1;

Figure 4 is a vertical sectional view taken on line 4—4 of Figure 1;

Figure 5 is a vertical sectional view taken on line 5—5 of Figure 1;

Figure 6 is an enlarged view in side elevation seen from the side opposite that of Figure 1 including that portion of the machine through which line 5—5 in Figure 1 extends;

Figure 7 is a top plan view of the turn-table and shaft of the boring tool, the latter being shown in section, as indicated by line 7—7 at Figure 1;

Figure 8 is a diametrical sectional view through the turn-table, as indicated by line 8—8 of Figure 7 showing also the drive shaft and pinion in section;

Figure 9 is a longitudinal sectional view of the main drive shaft shown in elevation with the bearings and accessories taken on a vertical plane substantially diametrical of said shaft;

Figure 10 is a view in side elevation of the winding drum shaft, the drum and associated parts being shown in vertical section substantially diametrical of the shaft, and

Figure 11 is a perspective view of the means for adjusting the inclination of the boom.

Like characters of reference indicate corresponding parts throughout the several views.

The earth-boring machine which forms the subject matter of this application comprises a base frame or carriage 20 mounted upon wheels 21 which may or may not be connected with the power plant 22 mounted upon said carriage as said connection for locomotion forms no part of the present invention.

The power plant 22 is shown conventionally at Figure 2 and is intended to comprise any type of prime mover ordinarily employed for such purposes or which may be found convenient to employ under the conditions. The prime mover 22 is provided with a pulley 23 from which a belt 24 passes over a pulley 25 upon the counter shaft 26. This counter shaft 26 inter-gears with a beveled gear 27 carried upon a vertically journaled shaft 28, the lower end of which is seated in a journal box 29 on the frame 20 and adjacent its upper end in a second journal box 30, rigidly secured to a cross-bar 31 supported by uprights 32 and braces 33.

About this shaft 28 as a center a frame is mounted to swing, comprising a top bar 34 and a bottom bar 35 with appropriate bracing and spacing uprights 36 and 37.

To this swinging frame a collar 38 is rigidly secured, the plane of said collar being normally substantially horizontal and extending as a continuation of said swinging frame. Upstanding from this collar 38 are a plurality of brackets 39 upon which are journaled a plurality of idle pinions 40. Upon the idle pinions 40 a bull ring 41 is placed and the brackets 39 are provided with inturned fingers 42 to maintain the bull ring 41 in position upon said idlers. At some point, preferably at the point of attachment of the collar 38 with

the swinging frame, a bearing block 43 is located having a finger 44 similar to the fingers 42 and for a like purpose. Journaled in this bearing block 43 is a shaft 45 having a pinion 46 inter-geared with the bull ring 41. In alinement with the shaft 45 is a shaft 47 having a pinion 48 inter-geared with the beveled gear 27. The shafts 45 and 47 are connected at times by means of a clutch, one member 49 of which is rigidly secured to the shaft 45 in any approved manner, as by the pin 50, and the other member 51 feathered to slide upon the shaft 47 controlled by the lever 52 extending laterally of the swinging frame. A spring 53 tends to hold the clutch in engaging relation so that when the clutch is so inter-engaged the two shafts 45 and 47 rotate as an entity.

Above and in parallelism with the shafts 45 and 47 is journaled a shaft 54 having a gear 55 intergeared with a pinion 56 carried upon the drive shaft 47. Loosely mounted upon the shaft 54 is a winding drum 57 with a clutch face 58 for inter-engagement with a clutch member 59 feathered upon the shaft 54 and controlled by a lever 60, a spring 61 being interposed between the clutch members, as shown more particularly at Figure 10.

Formed rigid and preferably integral with the winding drum 57 is a brake drum 62 having thereabout a band brake 63 controlled by a lever 64 by which the unwinding of the drum 57 may be manually controlled. Also rigid with the winding drum 57 and brake drum 63 and also preferably integral, is a ratchet wheel 65 with a pawl 66 positioned to engage said ratchet 65 and controlled by a manual lever 67. Appropriate frame and brace pieces 68 and 69 are provided for supporting the several levers 52, 60, 64 and 67.

The supporting frame 20 is provided with a segmental track 70 and the swinging frame is provided with a roller 71 traveling upon said track and supporting the forward end of the frame in its oscillation about the shaft 28 as its center. Means is provided for maintaining this swinging frame in an attained angular position. This may be in any approved manner, as by providing a segment 72 with perforations 73 with a sliding pin 74 for engaging said perforations, as shown at Figure 4, or a hook 75, as shown at Figure 2, one being considered the full equivalent of the other. As the pinion 48 engages the gear 27 it is obvious that the shaft 47 and other parts carried by the swinging frame will be actuated from said gear no matter what the angular position of said frame may be relative to the supporting frame 20.

At the forward or outer end of the swinging frame a pivot 76 is provided upon which is fulcrumed a swinging frame composed of the side bars 77 spaced to swing over the outer end of the swinging frame and the supporting bar 37 and provided with a cross-bar 78 and spaced guide plates 79.

Pivoted to the cross-bar 78 is a boom 80 mounted to swing between the guide plates 79 and controlled by means of a manual screw 81 and crank 82, so that the said boom may swing at an inclination laterally relative to the swinging frame 77.

For supporting the swinging frame 77 and boom 80 at an inclination relative to the vertical an adjusting member is provided comprising a perforated plate 83 pivoted at one end to the eye-bolt 84, which serves as a pivot for the shackle 85 to which the manual screw 81 connects. At its opposite end the perforated member 83 has an offset 86 perforated to receive a rod 87 which is connected to the eye-bolt 88 in the frame member 34. The rod 87 has a right-angular hook 89 which may be inserted through any one of the perforations 90 of the strip 83 and provided with a cotter pin 91 for maintaining the parts in adjustment.

At its upper end the boom 80 is provided with a sheave 92 over which a cable 93 extends from the winding drum 57 passing en route through the guide pulley 94.

The cable 93 connects by means of a swivel 95 with the shaft 96 of the boring tool. This shaft 96 is preferably squared and is provided with a chuck 97 at its lower end, for receiving the boring tool indicated in dotted lines at 98 in Figure 8, it being understood that no attempt has been made in said figure to show a boring tool of any type but only something connected with the chuck 97.

For actuating the boring shaft 96, which is accomplished by rotating the same, a clutch member is provided comprising a frame 99 with flanged rollers 100 engaging the squared drive shaft 96, so that the drive shaft is free to be raised and lowered by means of the cable 93 in operation. This frame 99 is carried by arms 101 which are preferably bifurcated and pivoted to the frame 99 by the bolts 102 which also serve as shafts for journaling the grooved rollers 100. These arms 101 are provided with noses 103 forming shoulders 104 for engaging upon and within the inner peripheral edge of the bull ring 41, as shown more particularly at Figure 8. The bull ring is provided with upstanding lugs 105 which in rotating engage against the arms 101 to rotate the frame 99 therewith and consequently the boring shaft 96. A spring 106 is provided for holding the said arms 101 normally converging at a minimum angle so that when the device is lowered onto

the bull ring the weight of the parts will extend the arms 101 against the tension of the spring until the noses 103 come into engagement with the interior of said ring and the lugs 105 engage against said arms to rotate the device.

In operation the device will be moved from place to place as the boring may require until the vertical position of the boring shaft 96 is approximately over the required locus of the boring. The exact location is then acquired by swinging the swinging frame about the pivot 28 and by adjusting the boom until the exact spot will be touched by the boring tool 98 as the boring shaft 96 descends. The boring tool is now set in rotation by throwing in the clutch composed of the members 49 and 51 so that the shaft 45 is rotated to rotate the pinion 46 and therewith the bull ring 41. This rotation of the bull ring by means of the lugs 105 engaging against the arms 101 will rotate the frame 99 and the boring shaft 96. The boring shaft and tool is now lowered by releasing the ratchet 66 and controlling the unwinding of the drum 57 by means of the band brake 63. The boring tool is then lowered into position and being rotated by the bull ring is caused to penetrate the earth the desired distance. The desired distance for the completion of a post hole or the required load upon the boring tool having been obtained, the tool is raised from the ground by throwing in the clutch consisting of the members 58 and 59, thereby winding the cable 93 upon the winding drum 57. The tool having been raised from the ground, the clutch is disconnected and the tool held above ground by means of the ratchet and pawl above referred to.

What I claim to be new is:

1. An earth boring machine comprising a frame, a shaft journaled vertically upon the frame, a prime mover mounted upon the frame and connected to drive the shaft, an auxiliary frame mounted to oscillate upon said first mentioned frame with the said shaft as a center, earth-boring apparatus carried by the auxiliary frame, mechanism transmitting power from said shaft to said earth-boring mechanism, a hoisting drum, a cable from the drum to the earth-boring apparatus, and means to control the action of the drum from the transmitting mechanism.

2. An earth boring machine comprising a main frame, a shaft journaled vertically upon said frame, a prime mover mounted upon the frame and connected to drive the shaft, a gear carried by said shaft, an auxiliary frame mounted to oscillate upon the main frame with the shaft as a center, rotating earth boring mechanism carried by the auxiliary frame, a gear for driving said earth boring mechanism, a shaft journaled upon the auxiliary frame intergeared at one end with the gear of the vertical shaft and its opposite end with the earth boring mechanism, a hoisting drum, a cable from the drum to the earth-boring apparatus, and means to control the action of the drum from the transmitting mechanism.

3. An earth boring machine comprising a main frame, a shaft journaled vertically upon the frame, a prime mover carried by the frame connected to drive the shaft, a gear carried by said shaft, an auxiliary frame mounted to oscillate upon the main frame with the shaft as a center, a ring carried at the outer end of the auxiliary frame, a bull wheel mounted to rotate relative to and substantially concentric with said ring, idlers carired by said ring supporting said bull wheel, an earth-boring shaft extending concentrically through the bull wheel and ring, means carried by the bull wheel for boring engagement with the shaft, a shaft journaled upon the auxiliary frame intergeared at one end with the gear of the vertical shaft and its opposite end with the bull wheel, and manually controlled means intermediate the ends of said shaft for connecting and disconnecting the same.

4. An earth-boring machine comprising a main frame, a shaft journaled vertically upon the frame, a prime mover carried upon the frame connected to drive the shaft, a gear carried by the shaft, an auxiliary frame mounted upon the main frame adapted to oscillate laterally with the vertical shaft as a center, a ring carried at the end of the auxiliary frame opposite the vertical shaft, idler gears carried by the ring, a shaft extending from the gear of the vertical shaft along the auxiliary frame and provided with a gear related to the ring similar to the idlers, a bull wheel mounted upon the idlers and said last mentioned gear, a clutch mechanism carried by the bull wheel, a boring shaft extending through the clutch, the bull wheel and the ring, a drum journaled upon the auxiliary frame, a cable extending from said drum to the boring shaft, and manual means for connecting and disconnecting the drum with its gear.

5. An earth-boring machine comprising a frame, an auxiliary frame mounted to oscillate relative to the main frame, a ring carried at the outer end of the auxiliary frame, idlers carried by the ring, a bull wheel mounted to rotate upon the idlers, said bull wheel being provided with shoulders, a boring shaft extending through the bull wheel and ring, and a spring-controlled clutch slidable upon said shaft and having diametrically extending arms positioned for engagement by the shoulders of the bull wheel.

In testimony whereof I hereunto affix my signature.

FRANK WASHA.