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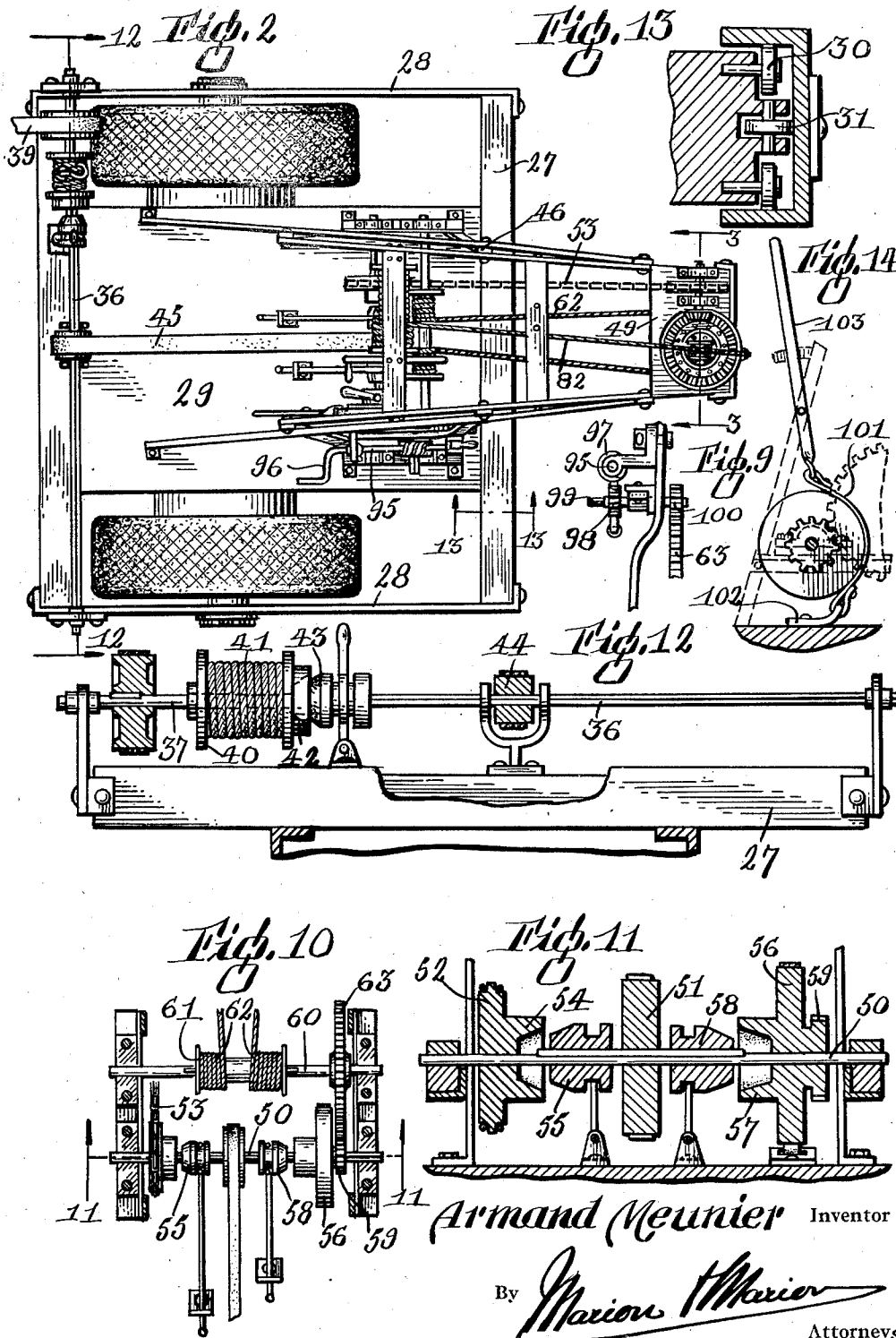
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UNITED STATES PATENT OFFICE

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EARTH BORING APPARATUS

Application filed January 30, 1930. Serial No. 424,576.

The present invention relates to improvements in earth boring apparatus adapted particularly for boring holes for fence posts, telephone poles and the like.

5 An important object of the invention is the provision of a boring apparatus in which the auger supporting shaft can be adjusted in an accurate plumb-line and having means for effectively rotating the boring auger.

10 A further object of the invention is the provision of a boring apparatus of the above character having mechanism for enabling accurate plumb-line adjustment of the auger regardless of the position of the carrier.

15 Another object of the invention is the provision of an earth boring apparatus of the above type having means for properly rotating the boring auger from the engine of the carrier vehicle or from an auxiliary engine 20 mounted thereon.

Still another object of the invention is the provision of a boring apparatus of the above character having means for transversely shifting the apparatus upon a carrier vehicle 25 and for conveniently and accurately adjusting the position of the boring auger with respect to the said vehicle.

A still further object of the invention is the provision of an apparatus of the above 30 type which will be durable and compact in construction and efficient in use.

Other objects and advantages of the invention will become apparent as the description progresses.

35 In the accompanying drawings forming a part of this specification and in which like reference characters are employed to designate corresponding parts throughout the same:

40 Figure 1 is a fragmentary side elevational view showing the apparatus mounted upon a wheeled carrier vehicle,

45 Figure 2 is a top plan view of the same, Figure 3 is an enlarged longitudinal section taken on the line 3—3 of Figure 2,

Figure 4 is a horizontal section taken on the line 4—4 of Figure 3,

50 Figure 5 is a transverse vertical section taken on the line 5—5 of Figure 1,

Figure 6 is a rear end view of the boring tool supporting mechanism,

Figure 7 is an enlarged vertical section taken on the line 7—7 of Figure 6,

Figure 8 is a fragmentary vertical section 55 taken on the line 8—8 of Figure 1,

Figure 9 is a fragmentary rear elevation taken at line 9—9 of Figure 1,

Figure 10 is a fragmentary horizontal section taken at line 10—10 of Figure 1, 60

Figure 11 is a transverse vertical section taken on the line 11—11 of Figure 10,

Figure 12 is a similar view taken on the line 12—12 of Figure 2,

Figure 13 is a similar view taken on the line 65 13—13 of Figure 2, and

Figure 14 is a side elevational view of the brake mechanism.

Referring to the drawings, wherein for the purpose of illustration is shown a preferred 70 embodiment of the invention, the numeral 25 generally designates the rear end portion of a wheeled motor truck provided with longitudinally extending frame beams 26.

Built upon the rear portion of the truck 75 is a rectangular shaped metallic frame including a pair of transverse metallic channels 27 connected by flat longitudinal bars 28 supporting therein a rectangular shaped horizontally disposed base plate 29. At the front 80 and rear end portions, the base plate 29 carries vertical rollers 30 disposed above and below a horizontal roller 31, adjacent the ends of the plate contacting with the transverse channels 27 for transverse adjustment of the 85 plate. Through the intermediate portion of the plate is rotatably extended a shaft 32 having attached to its upper end a hand crank 33 and to its lower extremity a spur pinion 34. The pinion 34 meshes with a transversely 90 extending spur rack 35 so that rotary operation of the shaft 32 will cause transverse shifting of the base plate.

Journalled transversely in an intermediate position upon the truck frame is a horizontal 85 transmission shaft 36, the major portion of which is square in cross section, while a portion at one end is of circular cross section, as indicated at 37. On the circular end of the shaft is keyed a pulley 38 having trained over 100

its periphery a drive belt 39 which is also trained over a complementary pulley connected with the engine of the vehicle for rotatably actuating the shaft 36. Adjacent the pulley 38 is mounted a drum 40 rotatable upon the circular section of the shaft and having connected therewith and wound upon the drum a pulley cable 41 adapted to be employed for pulling fence posts and the like. At one end, the drum 40 is provided with an external clutch section 42 adapted to cooperate with a cone section 43 slidably positioned upon the non-circular portion of the shaft for driving the drum when required for pole pulling purposes. On the central portion of the shaft 36 is secured a relatively small pulley 44 having trained over its periphery a drive belt 45.

On the rear portion of the base plate 29 is erected a skeleton frame 46 including a plurality of upright metallic bars 47 supporting a horizontal, rearwardly tapering frame 48. The rear end of the frame 48 projects rearwardly and overhangs the rear portion of the truck, as shown to advantage in Figures 1 and 2, and carries thereon a horizontal platform 49.

Journaled transversely in the lower portion of the frame 46 and disposed in a horizontal position on the truck is a transmission shaft 50 having keyed on its central portion a pulley 51 over which is trained the belt 45. Rotatably positioned on one end of the shaft 50 is a sprocket wheel 52 having peripheral sprocket teeth disposed to engage a continuous drive chain 53. At its inner side, the sprocket wheel 52 is provided with a hub shaped to form an external pulley section 54 disposed to cooperate with a slidable cone section 55 keyed on the shaft 50. On the opposed end of the shaft is rotatably mounted a brake drum 56 having formed on its inner side an external clutch section 57 cooperating with a slidable cone section 58 and upon an outer radially extending hub portion with a spur gear 59.

Rearwardly of the shaft 50 is disposed a companion shaft 60 arranged parallel with the former and having keyed upon its intermediate portion a drum 61 having attached thereto and wound upon the opposed end portions a pair of rope sections 62. Adjacent one end of the shaft 60 is disposed a relatively large spur gear 63 keyed on the shaft and adapted to mesh with the gear 59 upon the adjacent shaft 50.

On the elevated rearwardly extending platform 49 are fixed a pair of spaced bearings 64 having journaled therein a transversely extending shaft 65. Rigidly secured to the shaft 65 between the bearings is a sprocket wheel 66 formed with peripheral sprocket teeth and having trained thereover the upper portion of the drive chain 53. On the inner

projecting end of the shaft 65 is keyed a bevel pinion 67.

Adjacent the bearings 64, the platform 49 is recessed and carries therein a flanged bearing ring 68 provided with a relatively large central aperture. Rotatably positioned on the horizontal surface of the ring 68 is a relatively large bevel gear 69 of annular form disposed to mesh with the pinion 67, supported upon ball bearings disposed between the gear and the ring 68. Bolted to the bevel ring gear 69 and depending from the bottom face thereof is a securing ring 70 of angular cross section having the lower flanged portion disposed to overlap the inner edge of the ring 68.

Loosely fitted within the central aperture in the gear 69 and designed to form a socket therein is an annular member 71 of channel cross section pivotally connected with the ring member 70 through the medium of a pair of diametrically opposed radially projecting pins 72. The annular socket forming member 71 is disposed to loosely support the enlarged bulbous portion 73 formed intermediate the ends of a longitudinal tube 74, the tube and ball shaped enlargement 73 being provided with a continuous through bore of non-circular cross section. Secured in recesses in diametrically opposed sides of the ball shaped enlargement 73 and extending radially therefrom to engage receiving openings in the annular socket member 71 are complementary pivot pins 75 disposed at right angles to the pins 72 to form a universal joint connecting the tube 74 with the rotary ring gear 69.

Slidably positioned through the bore in the sleeve 74 is a non-circular preferably square auger support shaft 76 carrying upon its upper extremity a cap 77 rotatable upon ball bearings 78 about a reduced upstanding stem 79 projecting upwardly from the centre of the shaft and securing the cap 77 thereon by means of a nut. On the upper surface of the cap 77 are formed a pair of diametrically opposed roller brackets 80 forming bearings for a pair of rollers 81 arranged in a co-incident plane on the cap. Trained over the rollers 81 and disposed for exerting a downward pressure on the shaft 76 is a rope 82 having one end attached to a hook 83 secured on the rearwardly extending portion of the frame and the opposed end fixed to a shaft 84 journaled in bearing brackets 85 secured to and depending from the upper portion of the frame. On one end of the shaft 84 is fixed a hand wheel 86, the rope 82 being wound on the intermediate portion thereof. Thus, by rotating the hand wheel 86 in a clockwise direction, the rope is wound upon the shaft 84 and a downward pressure exerted upon the support shaft 76.

On the lower portion of the auger support shaft 76 is rotatably fitted a transversely ex-

tending bracket 87 having upturned bearing ears formed at the ends having journaled therein the spindles of a pair of opposed grooved rollers 88.

5 Attached to the outer extremities of the rope sections 62 are a pair of pulley frames 89 having journaled therein grooved rotatable pulleys 90 disposed in substantially vertical planes at right angles to the planes of the rollers 88. A continuous rope 91 is trained
10 alternately over the pulleys 90 and rollers 88, as shown to advantage in Figure 1, thus providing a flexible support for the lower end of the auger support shaft 76 and means
15 for elevating the same.

A boring tool, in the form of a screw auger indicated at 92, is detachably connected with the lower extremity of the shaft 76, depending below the bracket 87 rotatably fitted on the shaft through the medium of a coupling sleeve 93 carrying longitudinally spaced set screws 94. In connecting the auger to the support shaft, the upper set screw 94 is
20 screwed in tightly to engage the lower portion of the shaft, while the lower set screw is initially extended for convenient insertion of the stem of the auger and subsequently tightened to securely engage the auger stem.

In order to permit manual adjustment of the auger 92 in addition to the motive power actuating means, a pivotally adjustable shaft 95 is journaled on one side of the skeleton frame having a hand crank 96 formed on one end thereof. The opposed end is mounted
35 for vertical arcuate adjustment on the frame, while the intermediate portion of the shaft carries thereon a worm gear 97. The worm gear 97 is arranged to mesh with a worm wheel 98 when adjusted to a lowered position, the wheel 98 being fixed on the inner
40 end of a transverse stub shaft 99. Upon the outer end of the shaft 99 is secured a spur pinion 100 permanently meshing with the spur gear 63 disposed therebelow.

45 Brake mechanism for controlling the rotation of the auger elevating and rotating gear is also provided, embodying a semi-circular brake band 101 having its lower end attached to a fixed bracket 102 and its opposed end
50 pivotally connected with a hand brake lever 103 pivoted intermediate its ends upon the frame work so that by swinging the lever in a rearward direction the band 101 will be frictionally pressed against the periphery of
55 the drum to break the rotary motion of the shafts 50 and 60.

The apparatus operates as follows: The carrier truck is driven to the position at which it is desired to bore the post hole.
60 During transportation, the auger is disposed in an elevated position or entirely removed from the apparatus.

When the truck is arranged in a proper position, the screw auger 92 is connected to the support shaft 76 by the coupling 93 and

set screws 94 carried thereby. The aligned auger and support shaft 76 are then disposed in a plumb-line, regardless of the inclination of the truck and base plate 29 from the horizontal, through the medium of the universal
70 connections on the elevated platform 49. The auger and support shaft are then lowered by manually rotating the hand wheel 86 so as to wind a portion of the rope 82 upon the shaft 84 and by manually rotating the
75 crank 96 so as to actuate the gear 63 through the worm gearing so as to extend the rope sections 62 until the auger is in contact with the ground surface. The clutch cone 55 is then brought into engagement with the clutch
80 section formed on the sprocket 52 so as to connect the motor drive for rotating the auger shaft 76 through the medium of the bevel pinion 67 and bevel gear 69. The auger is then driven into the ground by manually
85 rotating the hand wheel 86 and forcing the upper end of the shaft 76 downwardly through the medium of the rope 82.

When the hole of sufficient depth has been formed, the clutch connecting the motive
90 drive power with the shaft rotating means is disconnected and the cone 58 adjusted to engage the clutch section formed on the brake drum 56 and pinion gear 59 so as to rotate the gear 63 and shaft 60, thereby causing the rope sections 62 to be wound upon the shaft
95 and to elevate the auger and auger supporting shaft.

It is to be understood that the form of my invention herein shown and described is to
100 be taken as a preferred example of the same, and that various changes as to the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.
105 Having thus described my invention, I claim:

1. An earth boring apparatus comprising the combination with a wheeled carrier, of a base plate mounted for transverse adjustment on the carrier, earth boring mechanism supported upon the said base a gimbal joint for supporting said mechanism, and a driving gear secured to said joint. 110

2. An earth boring apparatus comprising the combination with a wheeled carrier, of a base plate mounted on the carrier, mechanism for transversely adjusting the position of the base plate on the carrier, a support frame built upon the base plate, an earth boring
120 auger mounted on the said frame and a gimbal joint to support said auger.

3. In an earth boring apparatus, the combination of a base, a skeleton frame secured on the base, an auger support shaft extending through a portion of the frame and having a universal connection therewith, means for rotating the said shaft through a gimbal joint and an annular gear from a source of motive power, manually actuated mechanism for ex-
125 130

erting downward pressure on the auger shaft, means for elevating the said auger shaft, gearing associated with the elevating means whereby the shaft may be elevated by motive
5 power or by manual operation, and brake mechanism operative to control the shaft rotating and elevating means.

4. In an earth boring apparatus, the combination with a support frame having an elevated platform, of an annular gear mounted
10 to rotate parallel with the platform, an auger supporting shaft extending through the said gear having a universal connection therewith, a drive pinion meshing with the said annular gear, and means for rotatably operating the
15 said drive pinion from a source of motive power.

5. In an earth boring apparatus, an elevated support frame, an auger support shaft
20 extending through the frame, a gimbal joint to support said shaft on the frame, an annular gear secured to the joint, a pinion meshing with said gear, a rotary shaft, rope members secured to the rotary shaft and to the auger
25 supporting shaft for elevating the latter, gearing associated with the rotary shaft adapted to afford connection with a motive drive member, chain driving means to actuate the pinion from the drive member, and manually actuated gearing associated with said
30 rotary shaft for manual elevation of the auger shaft.

6. In an earth boring apparatus, the combination of a carrier motor truck, a base
35 plate mounted for transverse adjustable movement on the truck, a frame secured on the base plate having an elevated overhanging platform, an auger supporting shaft extending through the platform, a gimbal joint
40 to support the shaft thereon, gearing comprising an annular gear secured to the joint disposed to rotate the auger support shaft, a positive driving connection between the said rotatable gearing and the truck motor, a rope
45 trained over the upper portion of the auger shaft connected with hand gear for forcing the said shaft downwardly, mechanism for elevating the auger shaft, gearing connecting the said shaft elevating mechanism with the
50 vehicle motor, and means for detachably connecting a boring auger with the lower end of the auger support shaft.

In witness whereof I have hereunto set my hand.

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ARMAND MEUNIER.