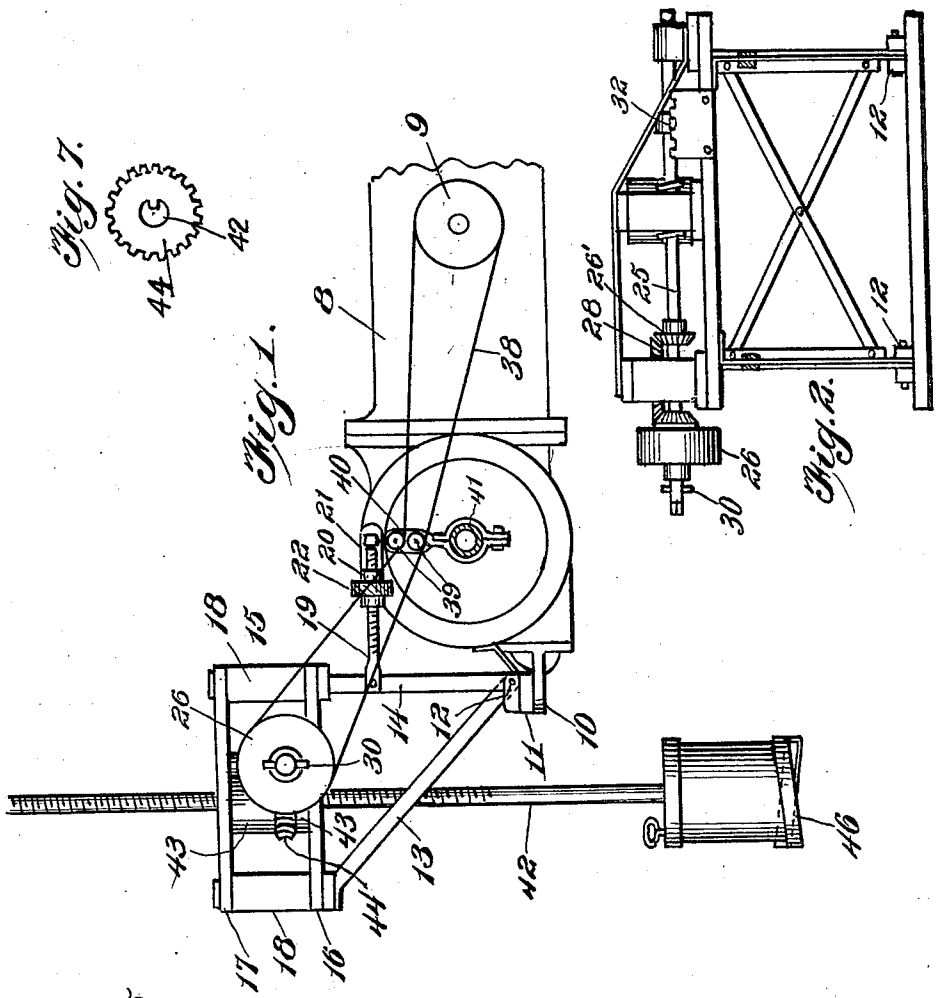
Aug. 5, 1924. 1,504,184

E. C. DE SHON

EARTH BORING MACHINE

Filed Feb. 17, 1922 2 Sheets-Sheet 1



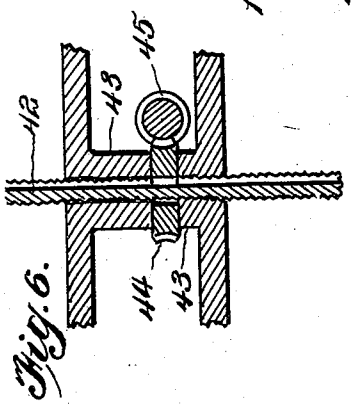


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Fig. 3.

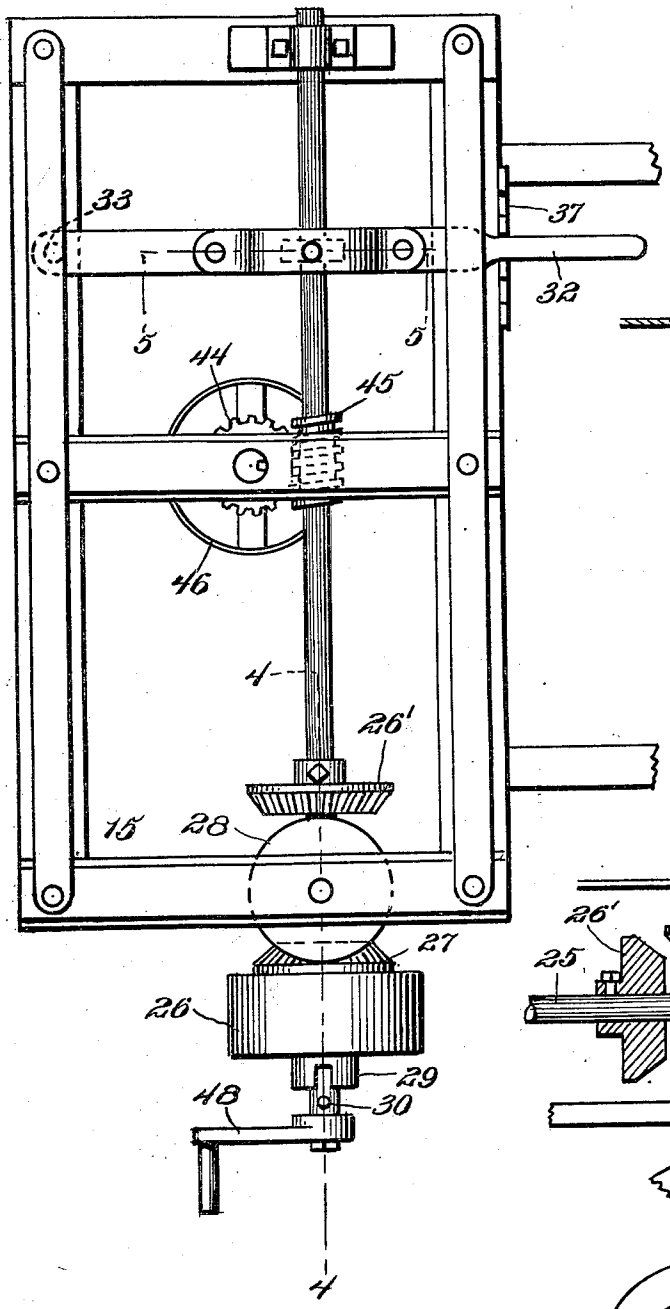


Fig. 5.

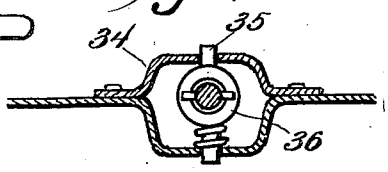
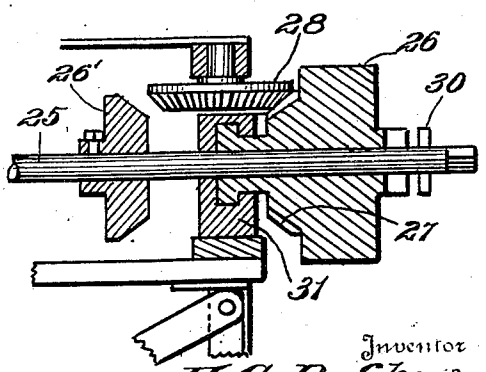


Fig. 4.



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UNITED STATES PATENT OFFICE.

EVERETTE C. DE SHON, OF CLARKSDALE, MISSOURI.

EARTH-BORING MACHINE.

Application filed February 17, 1922. Serial No. 537,278.

To all whom it may concern:

Be it known that I, EVERETTE C. DE SHON, a citizen of the United States, residing at Clarksdale, in the county of De Kalb and State of Missouri, have invented new and useful Improvements in Earth-Boring Machines, of which the following is a specification.

This invention relates to earth boring machines, having particular reference to machines for making post holes.

The primary object of the oinvention is to provide a machine for the purpose stated, by the use of which holes of a given diameter may be quickly made or drilled, and which embodies means of an improved nature for properly and accurately centering the boring tool.

A further object of the invention is to provide a machine of the character stated wherein means of an improved and novel nature are employed for governing and maintaining the angularity of the boring implement.

A still further object of the invention is to provide means in connection with an earth boring machine for quickly and easily handling the earth boring implement to be withdrawn from the ground and relieved of dirt or rock which it has accumulated in the boring operation.

A further and particular object of the invention is to provide an earth boring apparatus adaptable to power operated mechanism, and wherein the motive power of such mechanism may be utilized as the means whereby the boring implement may be driven.

A still further and particular object of the invention is to provide a boring apparatus of the character stated which is constructed in such manner as to be readily adaptable to power operated means, such as tractors, without changing or impairing the construction and operation of such tractors or power mechanism, and which may be readily and conveniently connected with the motive power source upon the tractor.

With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a side elevation, partly in section, of a portion of a conventional type of tractor and illustrating as applied thereto a boring machine embodying the invention,

Figure 2 is a rear elevation of the improved boring device,

Figure 3 is a slightly enlarged plan view of the boring apparatus,

Figure 4 is a sectional view on line 4—4 of Figure 3,

Figure 5 is a similar view taken upon line 5—5 of Figure 3,

Figure 6 is a fragmentary sectional view illustrating the manner in which power is imparted to the drilling tool, and

Figure 7 is a detail view of the power transmitting gear.

Referring now more particularly to the drawings, 8 indicates generally a portion of a tractor body of familiar type, having a fly or power wheel 9 thereon, and this tractor body is provided at its rear end with the usual draw bar 10.

The mechanism embodying my invention rests upon a foot 11, bolted or in any other preferred manner secured upon the draw bar 10, and this foot carries spaced upstanding lugs or ears 12 near its ends and between which the lower ends of legs 13 and 14 are pivotally secured. The legs 13 and 14 are arranged in pairs near each end of the foot, and are pivoted jointly to the lugs as shown.

A supporting frame indicated generally at 15 is carried at the upper ends of the pairs of legs 13 and 14, being rigidly attached to the said legs. This frame includes spaced parallel sections 16 and 17, maintained in spaced relation by the members 18. The rear leg 14 of one of the pairs has pivoted thereto the forward end of a threaded bar 19, the said bar passing through the spaced lugs 20 of a bracket 21 secured to a part of the body or casing of the tractor 8, and a threaded nut or hand wheel 22 positioned between the spaced members 20 threadedly receives the bar 19. This particular construction enables the frame 15 to be moved toward or away from the body 8 of the tractor, and it will be understood that this adjustment may be made by manipulation of the hand wheel 22. Obviously, such adjustment necessarily varies the angularity at which the frame 15 will be disposed with respect to the ground.

Arranged transversely of the frame 15 and in suitable bearings between the upper and lower sections thereof is a power shaft

25, and this shaft is capable of sliding longitudinally within its bearings. This shaft has rotatably mounted thereon near one end a band or belt pulley 26, to one face of which is attached a bevel gear 27 at all times in mesh with an idler bevel gear 28 rotatably mounted upon frame 15. The outer face of the belt pulley is equipped with a clutch head 29 adapted to engage with a pin or other obstruction 30 carried by the shaft 25. To maintain the belt pulley 26 against sliding movement, the inner end of the same is rotatably embedded in a block 31 carried by the frame 15.

The shaft 25 has rigidly secured thereto a bevel gear 26′, adapted when the shaft 25 is slid to its limit in one direction to engage with the teeth of idler bevel gear 28, and may be disengaged from the said gear when required by withdrawing the said shaft. This longitudinal adjustment of the shaft may be carried out by the lever 32, the latter being pivoted as at 33 to frame 15 and having a yoke portion 34 carrying pins 35 to engage within the kerf of a yoke pulley 36 carried by the said shaft. The outer end of lever 32 travels over a sector indicated at 37, and is thus held in its several positions of adjustment.

The pulley 26 is impelled by a belt 38 passing over the same and over the drive pulley 9 of the tractor. The stretches of this belt pass over idlers or guide rollers 39 mounted upon a bracket 40 secured to a shaft or bar 41 constituting a part of the tractor construction, and by arranging these idlers in this manner it is apparent that the various adjustments of the frame relative to the tractor body will be compensated for and the belt 38 will at all times be maintained in a proper degree of tension.

Depending from the central portion of frame 15 and movable longitudinally therein is a drill shaft 42. This shaft is threaded throughout the greater part of its length and passes through suitable bearings 43 carried by the frame 15. Between the bearings 43 is positioned a worm gear 44 splined to the said shaft, and this worm gear is at all times in mesh with a worm 45 carried by the shaft 25. The lower end of this drill shaft carries a drill or cutting tool 46, preferably of the type to take up drilled earth or ground rock and to retain the same. The drill, however, may be of any approved or desired type.

In operating the device, the frame is attached to the body of the tractor upon the draw bar thereof in the manner above-described, and the belt 38 is passed over pulleys 9 and 26. The stretches of the belt will be positioned upon the guide or idler rollers 39 so that proper tension of these plies will at all times be maintained. The proper drill tool 46 will be secured upon the drill shaft 42 and the latter will be lowered so as to bring the drill point in close proximity to the ground. The tractor is positioned so that the drill point will penetrate the ground at the desired place, and the angularity at which the hole will be bored will be governed by adjustment of the frame 15 by operating the adjusting wheel 22. When the drilling apparatus has thus been adjusted, power may be imparted to the drive pulley 9, whereupon the pulley 26 will proceed to rotate. When it is desired to commence the drilling operation, the lever 32 is moved so as to draw shaft 25 longitudinally and to establish a positive driving connection between the said pulley and shaft by engaging the pin 30 in the clutch face 29 of the said pulley. In adjusting the shaft 25 longitudinally to bring about this result, the gear 26′ will have been moved out of engagement with the idler gear 28. With a positive driving connection between the pulley and shaft thus established, it is apparent that the power developed in the shaft 25 will be transmitted to the worm wheel 44 and the latter will, in turn, cause the drill shaft 42 to rotate in its threaded bearings 43. This will cause the drill shaft to rotate in an earth boring direction, and this operation continues until a hole of the desired depth has been made, or until the drill point has become so encumbered with earth or other material as to be ineffective in further operation. When such a situation arises, the shaft 25 is slid longitudinally so as to disengage pin 30 from clutch face 29, thus severing the positive driving connection between the said clutch and the shaft. Further longitudinal sliding movement of the shaft 25 causes gear 26′ to enmesh with idler gear 28, whereupon the shaft 25 will be caused to rotate in a direction opposite to the direction of rotation of the said shaft in the drilling operation. This retrograde rotation of the shaft 25 is imparted to the drill shaft 42, whereupon the bit or point 46 is caused to be withdrawn from the bore and raised above the surface of the ground. When raised above the surface of the ground, this bit or bucket 46 may be relieved of its contents and the said bit may again be caused to enter the ground and the boring operation resumed. These operations are continued until a hole of the desired depth has been made.

Should it be desired to operate the boring machine independently of the power source, that is manually, the belt 38 may be removed from the pulley 26 and a handle 48 may be applied to the squared end of shaft 25. The operations of feeding and retracting the drill shaft will remain the same in the manual operations of the machine.

The drilling machine has been described as preferably being associated with a self-

impelled vehicle, such as a tractor, however, it will be understood that the mechanism may with equal facility and efficiency be embodied in other types of machines or supporting frames, and may be impelled by a suitable motor or engine, or may be manually driven as above-described.

Having thus fully described my invention, I claim:—

1. In a device of the class described, a frame, a power shaft carried by said frame, a normally idle power wheel upon said shaft, means governed by movements of said shaft longitudinally for causing the shaft to be coupled to and rotated in either direction from said power wheel, means for sliding said shaft, and drill mechanism including a drill shaft having threaded engagement with the frame and rotatable in one direction or the other according to the direction of rotation of said power shaft.

2. In a device of the character described, a frame, a power shaft slidably carried by said frame, drill mechanism including a drill shaft having threaded engagement with the frame and adapted to be driven in opposite directions from said power shaft, a pulley loosely carried by said shaft, an idle gear at all times driven by said pulley, a gear on said shaft adapted when the latter is slidably moved in one direction to engage with said idle gear for driving the power shaft in one direction and driving the drill shaft in one direction thereof, clutch mechanism for coupling said power shaft with said pulley when said power shaft is slidably moved in the reverse direction to rotate said power shaft and drill shaft, and means for sliding said shaft.

3. In a device of the class described, a frame, a power shaft carried by said frame, a drill shaft threadedly engaged in said frame, a power connection between said drive and drill shafts, and means for causing said drive shaft to rotate in opposite directions.

4. In a device of the class described, a power machine, a frame carried by said power machine and adjustable at various angles with relation thereto, drill mechanism carried by said frame, means for imparting power from said power machine to said drill mechanism, and means for adjusting said frame.

5. In a device of the class described, a power machine, a frame, a pivotal connection between said frame and said power machine, feed mechanism interposed between said frame and said power machine whereby the said frame may be caused to swing upon its pivots, drill mechanism carried by said frame, and means for transmitting power from said power machine to said drill mechanism.

6. In a device of the class described, the combination with a tractor, of a foot secured to said tractor, legs pivoted to said foot and extending upwardly therefrom, a frame carried at the upper ends of said legs, drill mechanism carried by said frame, a threaded bar secured to one of said legs, a bracket on said tractor receiving said threaded bar, an adjusting wheel threaded upon said bar and cooperating with said bracket to move the bar longitudinally, and means for transmitting power from said tractor to said drill mechanism.

In testimony whereof I affix my signature.

EVERETTE C. DE SHON.