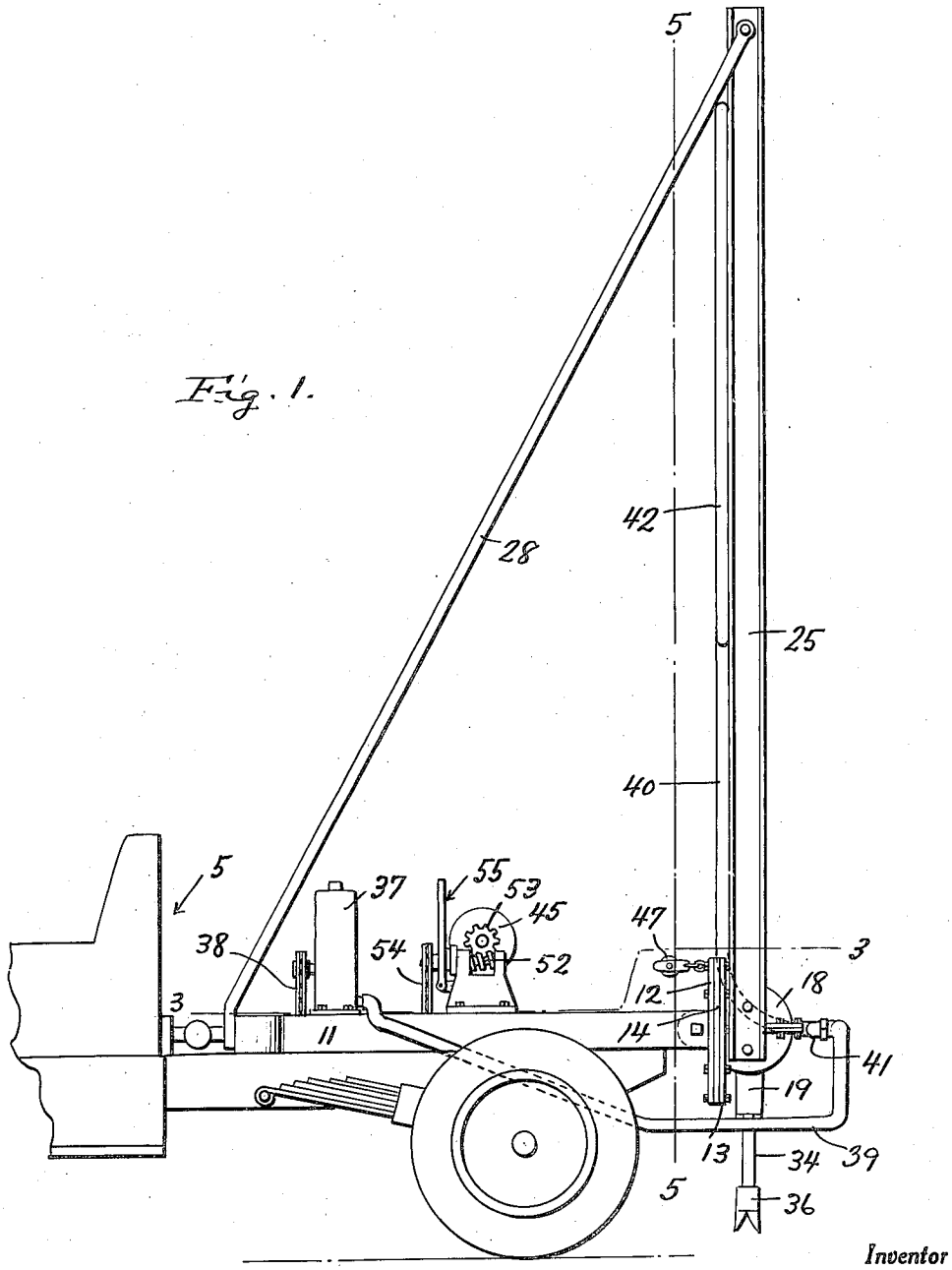
April 24, 1934. R. L. RECTOR 1,956,200

ROTARY DRILL AND CLEAN OUT MACHINE

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Fig. 1.



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ROTARY DRILL AND CLEAN OUT MACHINE

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Fig. 6.

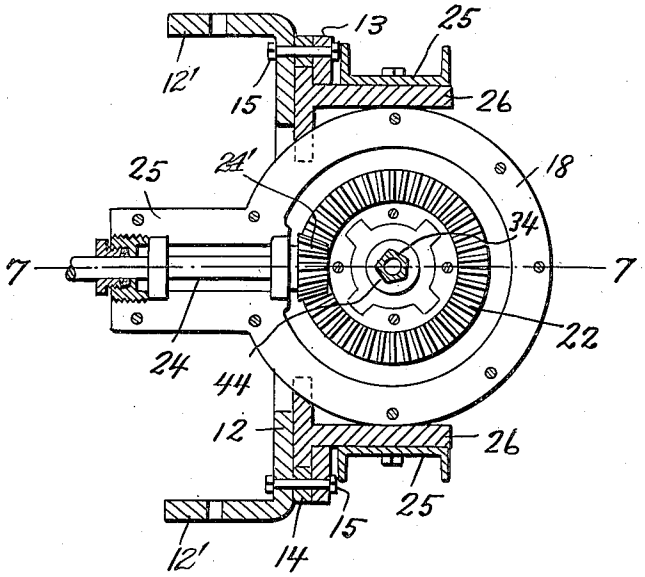


Fig. 2.

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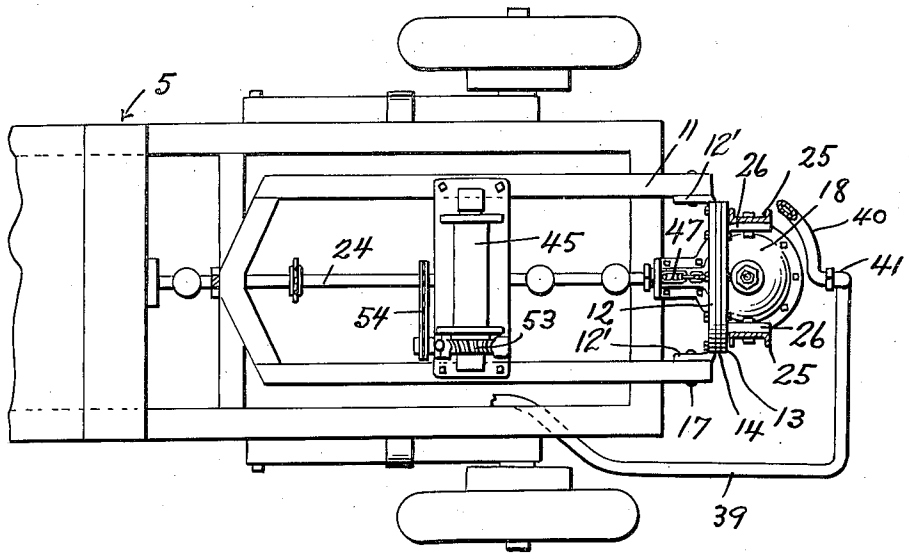
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ROTARY DRILL AND CLEAN OUT MACHINE

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Fig. 3.



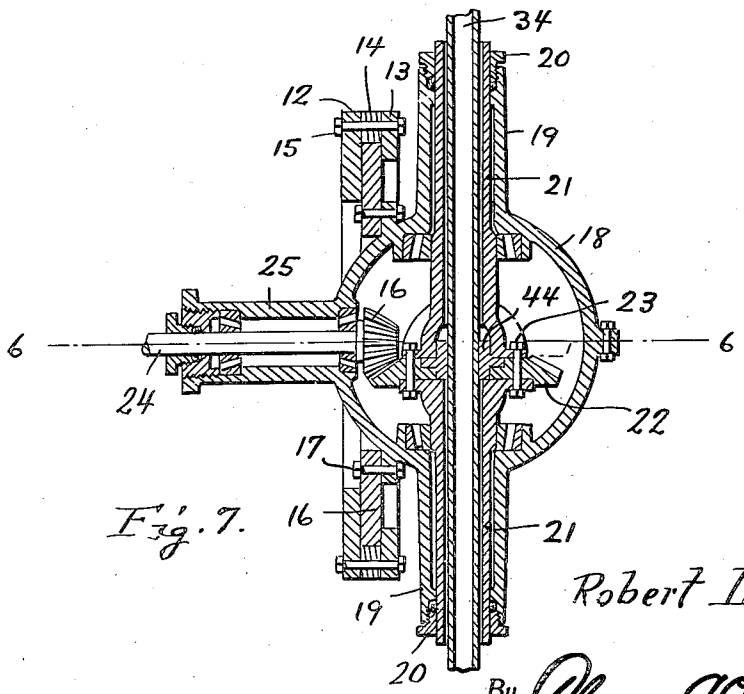


Fig. 7.

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ROTARY DRILL AND CLEAN OUT MACHINE

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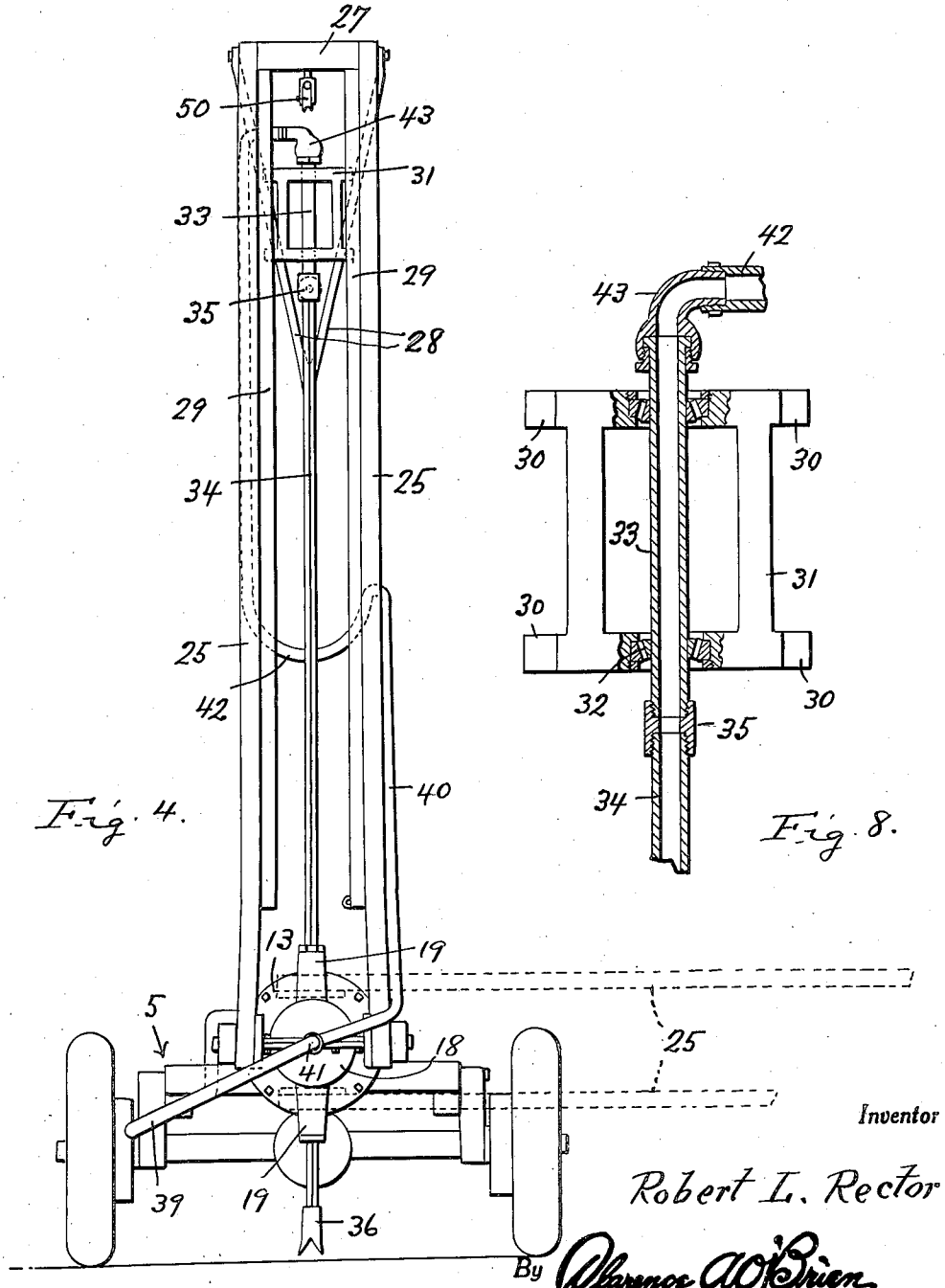


Fig. 4.

Fig. 8.

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ROTARY DRILL AND CLEAN OUT MACHINE

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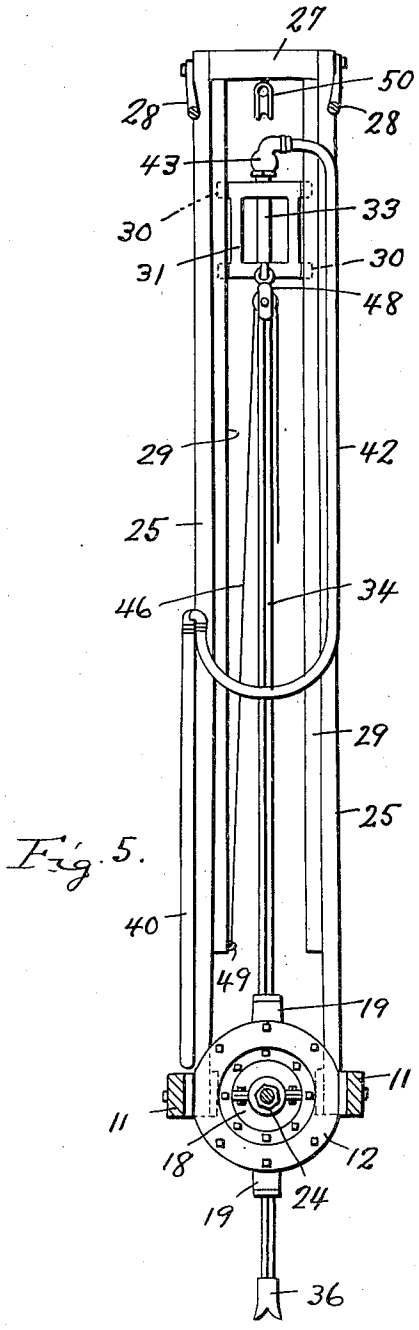


Fig. 5.

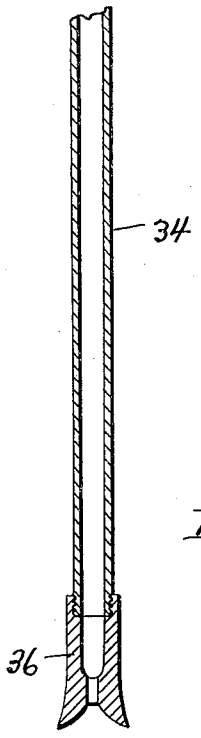


Fig. 9.

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UNITED STATES PATENT OFFICE

1,956,200

ROTARY DRILL AND CLEAN OUT MACHINE

Robert L. Rector, Alvord, Tex.

Application April 25, 1933, Serial No. 667,874

1 Claim. (Cl. 255—19)

This invention relates to rotary drills, and has more particular reference to drills of the type especially adapted for boring into rock formation.

In acordance with the present invention a rock drilling machine is provided wherein a column of air is kept flowing downwardly through the drill stem and upwardly through the hole being drilled, between the walls of the hole and the drill pipe or stem, and by thus circulating the air the cuttings are removed from the hole in advance of the drill bit.

Another feature resides in the portability of the machine by which it may be readily and quickly transported from one location to another.

Still another feature of the invention is the adaptability of the machine for either vertical or horizontal boring purposes.

The invention together with its numerous objects and advantages will be best understood from a study of the following description, taken in connection with the accompanying drawings wherein is illustrated the preferred embodiment of the invention.

It is to be understood at the outset that it is in no wise intended to restrict the invention to the precise details of construction, combination and arrangement of elements as shown and described herein other than may be necessary to meet the requirements of the prior art and scope of the appended claim.

In the drawings:

Figure 1 is a side elevational view of the rear portion of the motor truck showing the invention installed thereon.

Figure 2 is a sectional elevational view for more clearly illustrating certain details of construction to be hereinafter more fully referred to.

Figure 3 is a horizontal sectional view taken substantially on the line 3—3 of Figure 1.

Figure 4 is a rear elevational view of the motor truck showing the invention prepared for operating, and illustrating in dotted lines the horizontal position of the mast for horizontal boring.

Figure 5 is a view taken substantially on the line 5—5 of Figure 1.

Figure 6 is a sectional view taken substantially on the line 6—6 of Figure 7.

Figure 7 is a sectional view taken substantially on the line 7—7 of Figure 6.

Figure 8 is a view of a slide member and illustrating in section certain details of construction to be hereinafter more fully referred to and

Figure 9 is a longitudinal sectional view through a portion of the drill pipe and the boring tool associated therewith.

Referring to the drawings by reference numerals it will be seen that 5 indicates generally a motor driven vehicle, and in accordance with the present invention there is suitably mounted on the rear end portion of the frame of the truck a base frame 11 that at its rear end projects beyond the corresponding end of the truck frame. Mounted on the rear end of the frame 11 are a pair of ring like members 12, 13 between which is interposed a spacer ring 14, and the members 12, 13 and 14 are secured together through the medium of bolts 15. The member 12 is provided on one side thereof with oppositely disposed lugs 12' which are secured to the frame 11 as at 17. The parts 12, 13 and 14 form an internally grooved circular casing in which is constrained to rotate an apertured disk 16 which has bolted or otherwise secured thereto as at 17 the sections or parts of a two-part gear case 18.

The gear case 18 has extending therefrom in reverse directions tubular extensions 19 provided at their outer ends with glands 20. Alined tubular shaft sections 21—21 have end portions journalled in the extensions 19, and clamped between the inner ends of the sections 21 internally of the gear case 18 is a bevel gear 22. Bolts 23 secure the flanged confronting ends of the sections 21 and the gear 22 in assembled relation.

Suitably journalled in the frame 11 is a power take-off shaft 24 that has one end journalled in bearings provided in a tubular extension 25 extending forwardly from the gear case 18. The shaft 24 comprises a plurality of sections connected by a universal joint or in any other suitable manner and at one end the shaft 24 is connected with the transmission in any suitable manner for driving the shaft 24. The end of the shaft 24 terminating within the casing 18 is equipped with a gear 24' meshing with the gear 22 for driving the latter. Carried by the disk 16 is a mast, the sides 25 of which are formed of angle iron, and have their lower ends riveted or otherwise secured to lugs 26 projecting rearwardly from the disk 16 at relatively opposite sides of the gear case 18 as will be clear from a study of Figures 3 and 6. At their upper ends the sides 25 of the mast are connected by a cross bar 27. The said mast is braced through the medium of a brace rod 28 that has its upper end forked and secured to the upper ends of the sides 25 of the mast. The lower end of the brace rod 28 is apertured for accommodating the power shaft 24 in a manner to permit the brace rod to swing with the mast. The sides 25 of the mast have secured thereto opposed channel guides 29

with which are engaged lateral projections 30 provided on a slide frame 31.

The slide frame 31 is provided at its upper and lower ends with bearings 32 in which are journalled the ends of a tube 33, the arrangement being such that the tube 33 is secured against longitudinal movement relative to the frame 31.

The drill pipe 34 is hollow and is polygonal in cross section. The upper end of the drill pipe 34 is coupled to the lower end of the tube 33 through the medium of a suitable coupling 35 as will be clear from a study of Figure 8. On the lower end thereof the drill pipe 34 is provided with a suitable drilling tool 36 which is also hollow.

Means is provided for forcing air under pressure down through the drill pipe 34 to discharge from the tool 36 in advance of the tool for removing the cuttings from the hole during the drilling operation; and such means consists in the present instance of a suitable pump 37 that has a chain and sprocket drive connection 38 with the shaft 24. Rigid pipe sections 39, 40 are swivelly connected together at one end as at 41 and at its free end the rigid pipe section 39 is suitably connected with the outlet of the pump 37. The free end of the rigid pipe section 40 is swivelly connected to one end of a flexible hose 42, and the hose 42 at its other end is swivelly connected as at 43 with the upper end of the tube 33. Thus it will be seen that air under pressure will be forced from the pump 37 through the conduit formed by the pipe section 39, 40 and the hose 42 down through the drill pipe 34 to discharge in advance of the boring tool 36 as and for the purpose above stated.

For rotating the tool drive is transmitted to the drill pipe 34 through the medium of the shaft 24 and gearing 24', 22, it being noted that gear 22 as shown in Figure 7 is provided with a hub 44 the bore of which is polygonal and corresponds in cross section to the cross section of the drill pipe 34 so that a sliding connection is provided between the hub of the gear and the drill pipe for transmitting movement of the gear 22 to the drill pipe, and at the same time permitting axial or sliding movement of the drill pipe relative to the gear and its associated parts.

For feeding the drill during the boring operation there is suitably mounted on the frame 11 a winch 45 on which is wound a cable 46 that is trained over pulleys 47 48 and anchored at its free end to the lowermost end of one of the guides 29 as at 49. (See Figures 2 and 5). It will thus be seen that when the cable 46 is wound on the drum or winch 45 a downward pull is exerted on the frame 31 for feeding the tool during the rotary drilling operation. In this connection it will be noted that the pulley 47 is suitably mounted adjacent the lower end of the mast, having suitable connection with one of the aforementioned bolts 15 as shown in Figure 2. The pulley 48 is suitably mounted on one side of the frame 31 adjacent the end of the frame as will also be clear from a study of Figure 2.

For raising the drill the free end of the cable 46 is disconnected from the lower end of the said one guide 29, and is trained over a pulley 50 suitably provided at the upper end of the mast, and then secured to an eye 51 provided on the upper end of the frame 31 at the side thereof opposite to the pulley 48. It will thus be seen that with the cable connected to the frame 31 a lowering of the frame and the drilling tool connected therewith will be accomplished by paying out the cable, while a raising of said frame 31 and the filling tool will be accomplished by winding the cable on the drum or winch 45.

The winch 45 is driven from the shaft 24 through the medium of a worm shaft 52 meshing with a worm gear 53 provided on one end of the winch, and also having a chain and sprocket drive connection 54 with said shaft 24. Suitable clutch means designated generally by the reference character 55 is also provided for controlling alternately the establishment of, and interruption of drive between the worm shaft 52 and the shaft 24.

From the foregoing it will be apparent that during actual drilling operation the cable 46 will be trained over the pulleys 47, 48 and anchored at one end as before mentioned as at 49 for feeding the drill tool, while at the same time the tool will be caused to rotate through the drive transmitted thereto by the gearing 24', 22 from the shaft 24. At the same time the pump 37 will be operated for continually forcing air under pressure down through the drill pipe to discharge into the hole being bored in advance of the tool 36, and by such a circulation of air the cuttings are removed from the hole in advance of the drill tool thus facilitating the drilling operation.

For vertical drilling the parts are set in the position shown in the drawings. When it is desired to drill through a wall or bank of rock or dirt the mast and the gear case 18 may be readily swung from the vertical or full line position of Figure 4 to the dotted line position in said figure, the disk 16 readily revolving within the casing formed by the elements 12, 13 and 14.

Having thus described my invention, what I wish to claim as new is:

In a portable drilling machine, a motor truck, an internally grooved circular casing fixedly mounted on the rear end of the truck and disposed vertically, an apertured disk revolubly mounted in the casing and engaging the groove thereof, a gear case fixedly secured to one side of the disk and revoluble therewith, lugs projecting from one side of the disk and at diametrically opposite sides of the gear case, a mast having sides secured adjacent one end to said lugs, earth-boring mechanism mounted on said mast, and driving means for said mechanism including gearings arranged within said gear case.

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