

March 2, 1926.

1,575,146

H. S. BROWN

PORTABLE BORING MACHINE

Original Filed Oct. 3, 1919 3 Sheets-Sheet 1

Fig. 2.

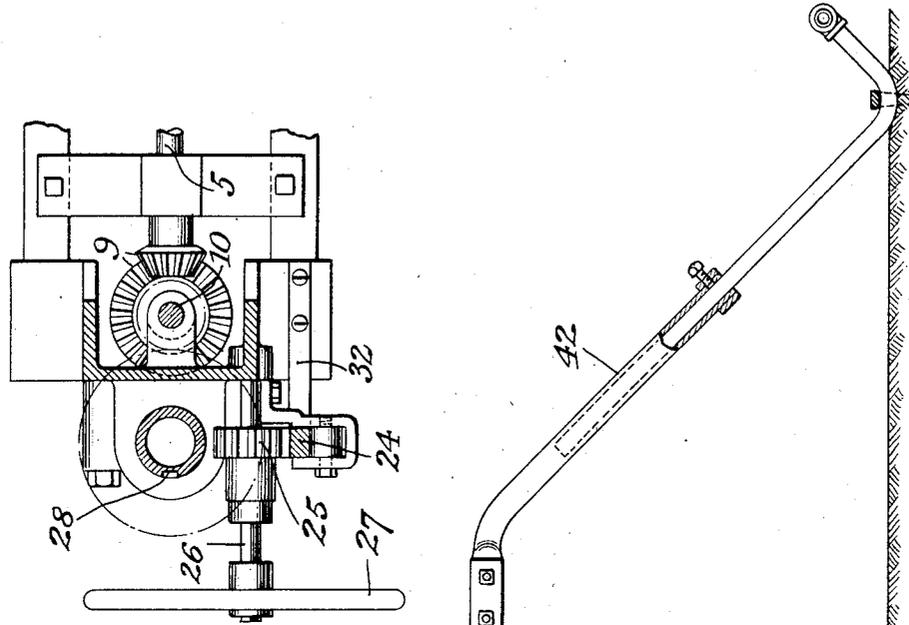
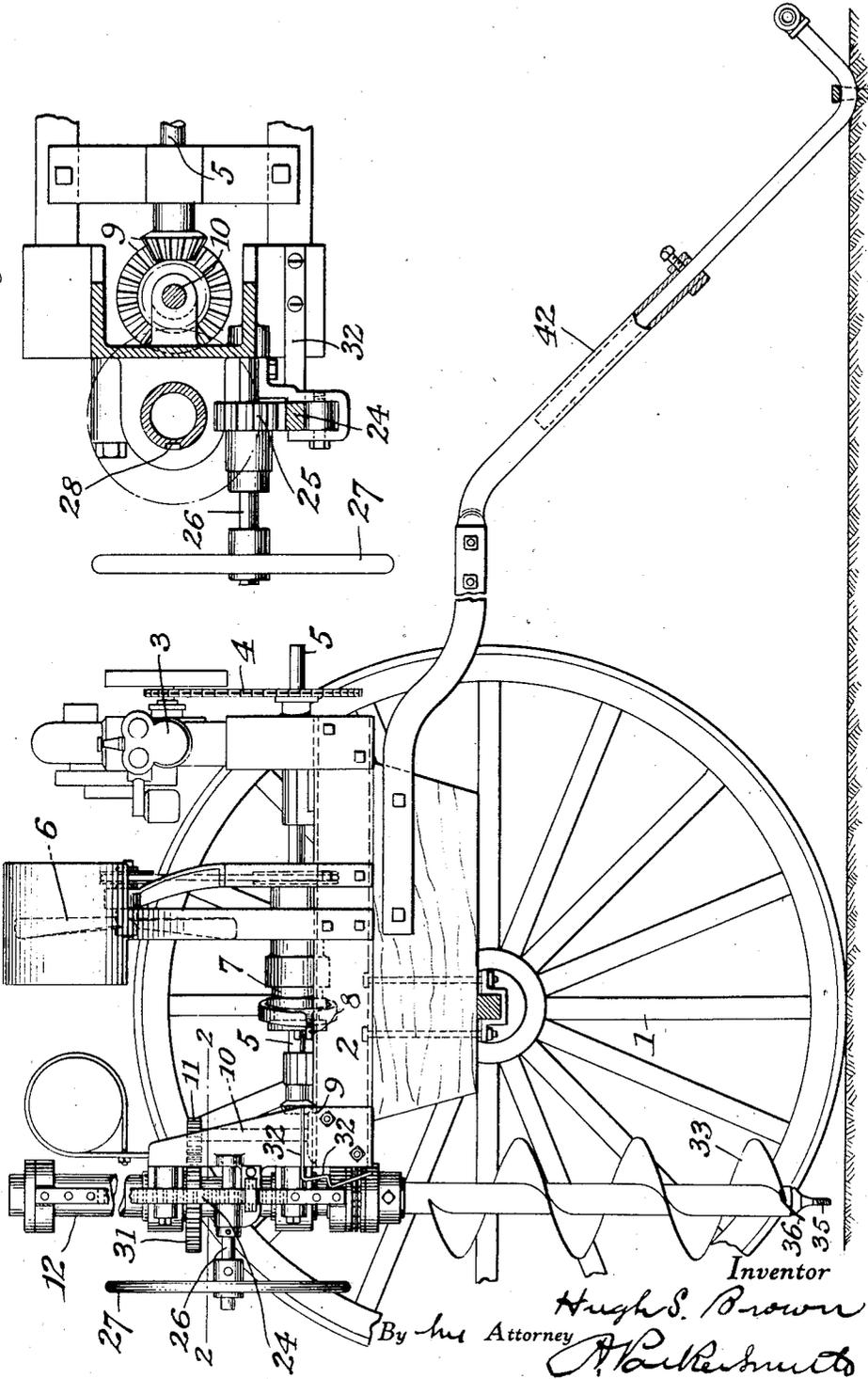


Fig. 1.



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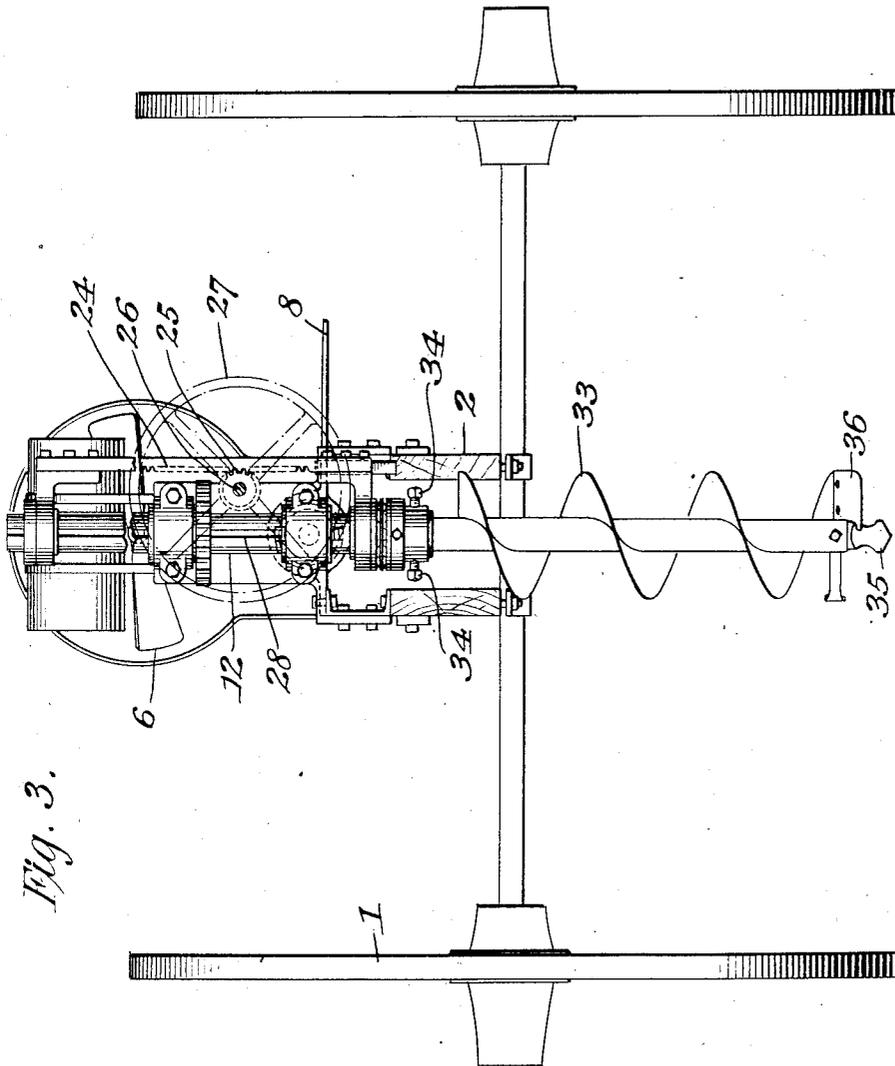


Fig. 3.

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3 Sheets-Sheet 3

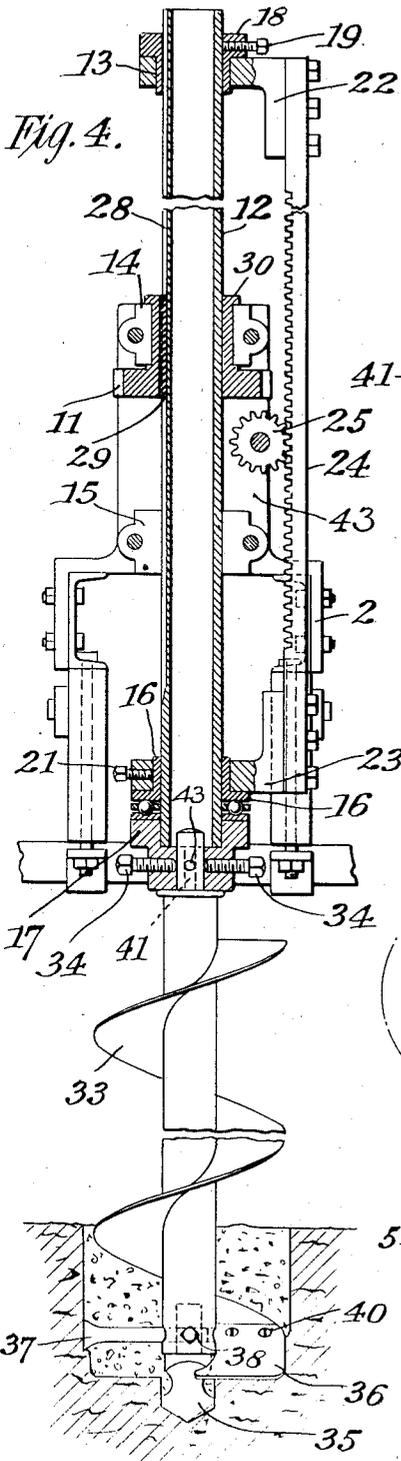


Fig. 4.

Fig. 8.

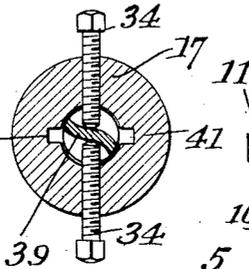


Fig. 7.

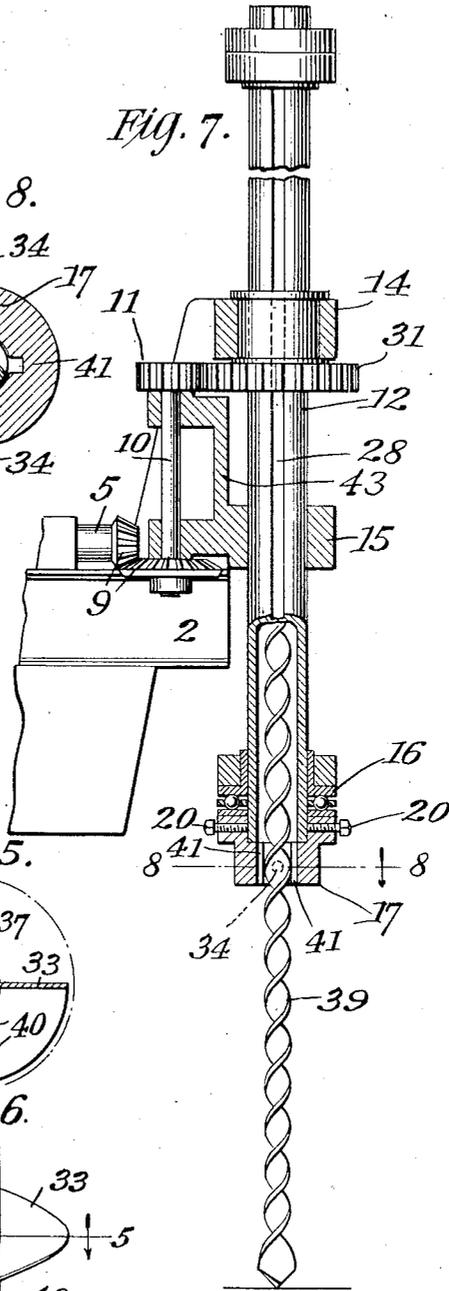


Fig. 5.

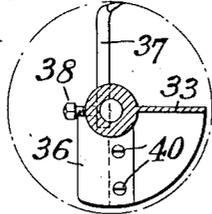
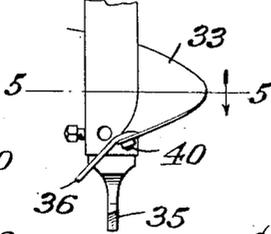


Fig. 6.



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UNITED STATES PATENT OFFICE.

HUGH S. BROWN, OF ROSELLE PARK, NEW JERSEY, ASSIGNOR TO THE HUBRON COMPANY, INC., A CORPORATION OF NEW JERSEY.

PORTABLE BORING MACHINE.

Application filed October 3, 1919, Serial No. 328,251. Renewed August 6, 1925.

To all whom it may concern:

Be it known that I, HUGH S. BROWN, a citizen of the United States of America, residing at Roselle Park, county of Union, State of New Jersey, have invented certain new and useful Improvements in Portable Boring Machines, of which the following is a specification.

My invention relates generally to boring apparatus and more particularly consists of an apparatus designed to bore holes of relatively large diameter in the earth to serve as post holes, and deeper holes of smaller diameter to receive charges of explosives. The best form of apparatus at present known to me is illustrated in the accompanying three sheets of drawings in which, Fig. 1 is a side elevation of the machine arranged to dig post holes, with parts broken away.

Fig. 2 is a detail horizontal section on line 2-2 of Fig. 1, with parts broken away.

Fig. 3 is a front elevation of the machine, parts being broken away.

Fig. 4 is an enlarged detail vertical section of the boring apparatus in the plane of Fig. 3, parts being broken away.

Fig. 5 is a horizontal section on line 5-5 of Fig. 6.

Fig. 6 is a detail of the cutting end of the auger at right angles to the plane of Fig. 4.

Fig. 7 is an elevation and partial section of the parts shown in Fig. 4, on a plane at right angles to that of Fig. 4, an auger of smaller diameter and greater length being shown in position, and

Fig. 8 is a section on line 8-8 of Fig. 7.

Throughout the drawings like reference characters indicate like parts. 1, is a two wheeled vehicle supporting the main frame or chassis 2, carrying a two cylinder opposed gasoline motor 3, driving through sprocket chain 4, the main shaft 5, which, through the usual friction clutch 7, operated by clutch lever 8, rotates vertical counter shaft 10, through bevel gearing 9. A fan 6, is belt driven from shaft 5. On the upper end of shaft 10, is pinion 11, meshing with gear 31, having the sleeve-like hub 30, journaled in upper main bearing 14, carried by chassis 2. A vertical tool-holding sleeve 12, is movable axially in hub 30, but is compelled

to rotate with it by means of slot 28, with which meshes key 29, on hub 30. 15, is a second or lower main bearing for sleeve 12, also carried by main frame or chassis 2.

Bearings 14 and 15 are formed at the upper and lower ends, respectively, of an integral bearing block 43, supported at its lower end on main frame 2, and a short horizontal shaft 26 is journaled in said bearing block 43, between bearings 14 and 15. This compact integral construction affords rigidity combined with light weight in the support for the tool holding member 12.

13, is an upper thrust bearing formed in yoke 22, supported by vertical rack bar 24, and 16 is a lower thrust bearing carried by and clamped by setscrew 21, in yoke 23, at the lower end of rack bar 24. An upper thrust collar 18, is clamped to sleeve 12, by set screw 19, and rests on thrust bearing 13, thereby supporting sleeve 12, in position. A lower thrust collar 17, is clamped to the lower end of sleeve 12, by setscrews 20, 20, the adjacent faces of bearing 16 and collar 17, having ball races in which run the ball bearings best shown in Figs. 4 and 7. A pinion 25, fast on horizontal shaft 26, journaled in main frame 2, meshes with rack bar 24, and, when rotated by hand wheel 27, raises or lowers rack bar 24, and with it the tool holding sleeve 12, journaled in yokes 22 and 23, carried by said rack bar, as previously described. 32, is a spring catch mounted on the main frame as shown in Fig. 1, and adapted to hook under the lower end of rack bar 12, when the latter is in its highest position, and so support the rack bar 24, and sleeve 12, when the boring apparatus is not in operation.

33, is the post hole digging auger having a helix of about 8 to 12 inches diameter, usually, the shank of which auger is held by setscrews 34, 34, in collar 17, which projects over the end of sleeve 12, and is further prevented from rotating in said collar by radial pin 43, engaging slots 41, 41, in the collar. This auger has the usual center bit 35, and the lower or cutting edge of the auger is formed by removable knife 36, held in position by small stove bolts 40, 40. A clearance cutter 37, is mounted in and extends radially from the center bit 35, and is radially

adjustable therein, being clamped in position by setscrew 38. Its cutting edge is parallel to the axis of the helix and is preferably located about 180 degrees from the cutting edge of knife 36.

The smaller, longer auger 39, for boring deep holes to receive explosives is shown in position in Fig. 7, being firmly clamped by setscrews 34, 34, which engage the opposite faces of the helix forming the auger.

The tool holding sleeve 12, is preferably made of such length that when in its lowest position the tool holding thrust collar will touch the ground. A telescoping tongue 42, rests on the ground when the apparatus is in operation and holds the main frame in the proper position to give the tool the desired angle of adjustment to bore a vertical or inclined hole. The post hole auger is relatively short, being usually about 4 feet long. The smaller auger 39, is much longer, usually about 15 feet long so that it extends all the way through sleeve 12, and when the latter has been fed down to the limit of its axial motion, the setscrews 34, 34, are loosened, the sleeve raised to its uppermost position, clamped on to the auger again and the boring resumed. The operator forces the augers down into the earth as they are rotated by the motor 3, by turning hand wheel 27, and when the hole is dug the tool is withdrawn by reversing the rotation of wheel 27.

During the boring the thrust of the feed motion is transmitted through the ball bearing, so that friction is reduced to a minimum. When the post hole auger is used the clearance cutter 37, is adjusted so as to slightly enlarge the hole cut by the knife 36, on the cutting end of the helix. This allows the rest of the helix to clear the walls of the hole and greatly reduces the frictional resistance to rotation of the auger. The knife 36, or cutting end of the helix is made separate therefrom so that it can be made of harder metal to prolong its useful life, and also to allow of replacement when worn out.

When it is desired to bore under a tree so as to place a dynamite charge under it to loosen the soil around the roots, the auger 39, is used, the telescoping tongue 42, being shortened so as to tip the apparatus backward and allow an inclined hole to be bored which will reach directly under the tree at a certain depth, dependent on its angle to

the plane of the horizon and the distance from the tree trunk at which it is started.

This apparatus bores rapidly through any kind of soil and is only stopped when encountering solid rock. If the tool strikes any ordinary sized boulder it merely worms over toward one side and bores away beside the obstacle.

Having described my invention, I claim:

1. In an earth boring machine the combination, with the main frame, of a vertically arranged bearing block having its lower end fastened to said main frame and having vertically arranged journal bearings in its upper and lower ends, an upright, tool holding, cylindrical member adapted to rotate in said bearings, a pinion mounted on a horizontal shaft, which shaft is journaled in said bearing block between the said vertically arranged journal bearings, a vertically arranged rack bar meshing with said pinion and connected to said tool carrying member, and means for rotating said pinion.

2. In a portable boring machine the combination, with a main frame and motor supported thereon, of an upright tool holding sleeve, a plurality of journal bearings for said sleeve, a vertical rack bar to which the uppermost and lowermost of said journal bearings are connected, an intermediate bearing having a support carried by the main frame, gearing supported from said last mentioned bearing support and connected to the motor and engaging the sleeve to rotate the same, and a pinion journaled on this bearing support and meshing with the rack.

3. In a boring machine the combination of a main frame having several journal bearings arranged one over the other, a sleeve slidable up and down, and rotatable, in said bearings, provided at each end with an inwardly facing thrust collar, a rack bar provided with an outwardly facing thrust bearing at each end surrounding the sleeve and adapted to cooperate with the opposing thrust collar on the sleeve, a gear wheel having a hollow hub slidably mounted on the sleeve and rotatably mounted in one of the above mentioned journal bearings in the main frame, means for rotating said gear wheel, a pinion journaled in the main frame and meshing with the rack, and means for clamping a boring tool in said sleeve.

HUGH S. BROWN.