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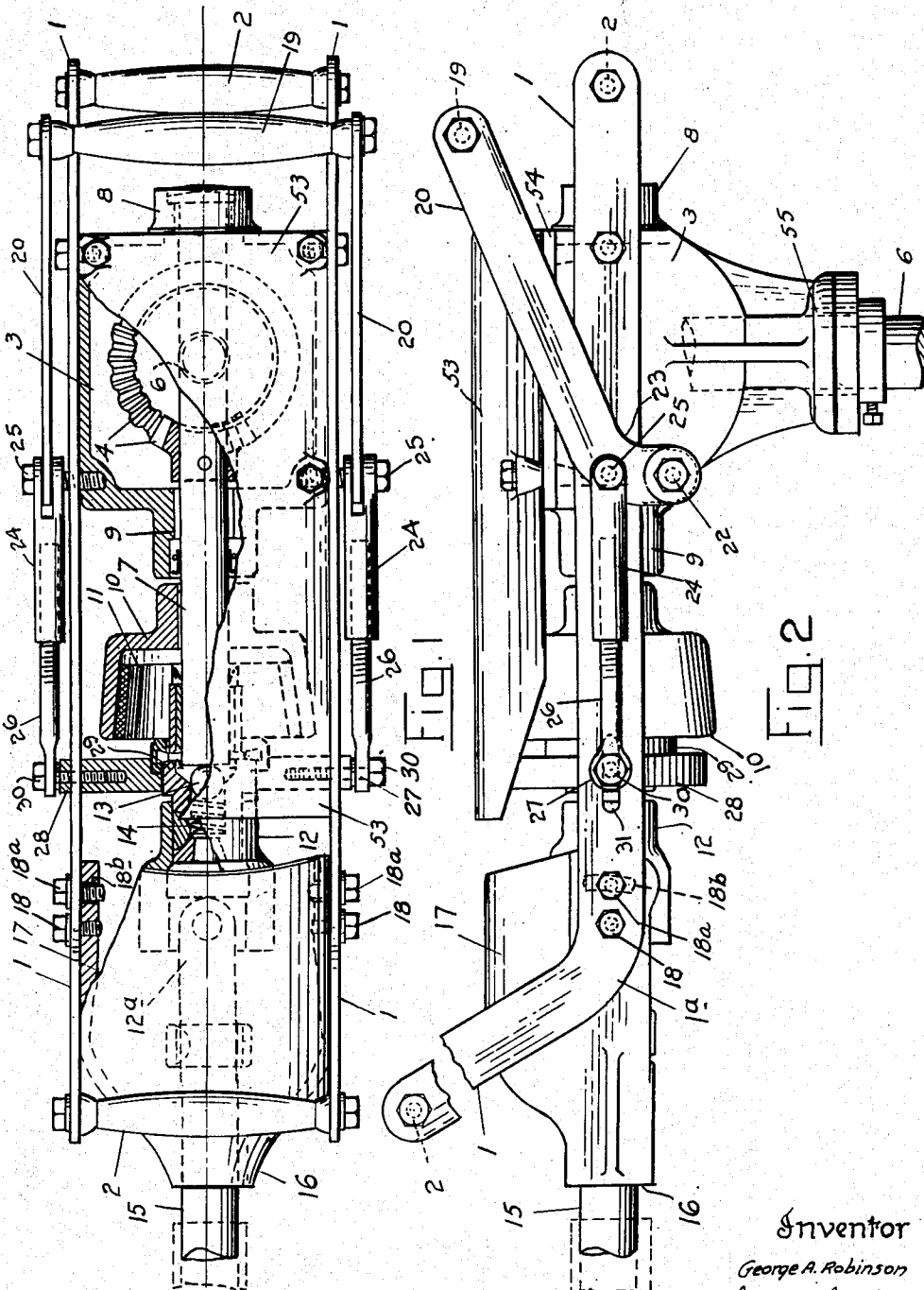
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2,617,629

POSTHOLE DIGGER

Filed Sept. 19, 1950

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

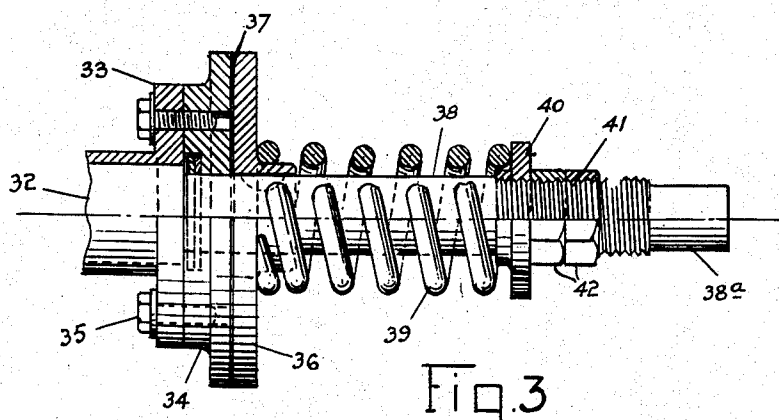


Fig. 3

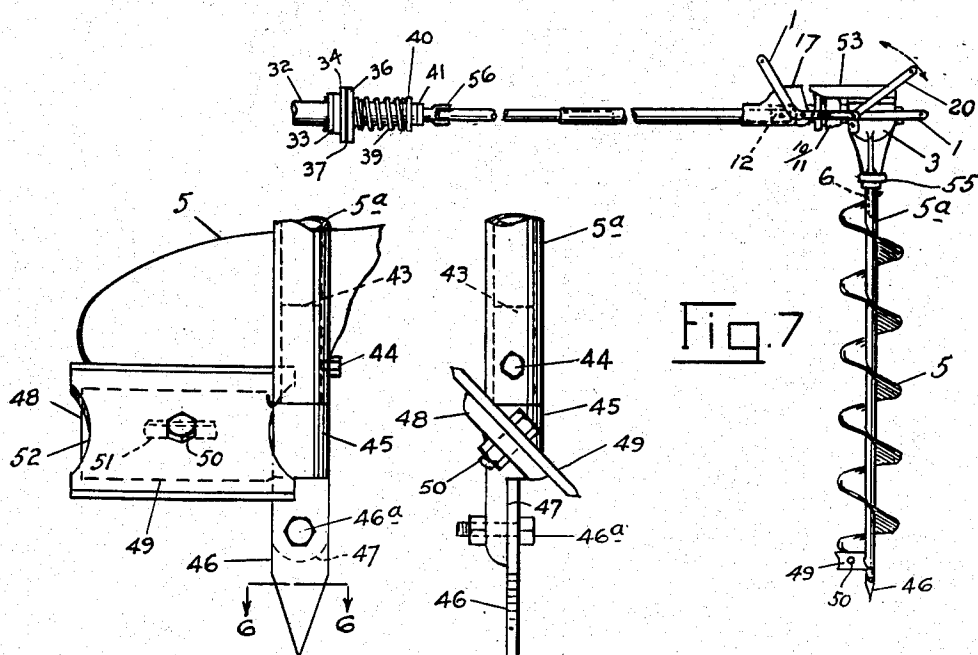


Fig. 4

Fig. 5

Fig. 6

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POSTHOLE DIGGER

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4 Claims. (Cl. 255-19)

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This invention relates to a post hole digger of the auger type and which is driven by gears mounted at the head of the auger from a power take-off source of energy, and the objects of the machine are to provide a unit of this nature which may be readily transported, is easy to operate, and with which holes to be dug may be quickly spotted on account of both the flexible joints at the shaft ends and the fact that this drive shaft is telescopic, with the advantage that holes will be put down inexpensively when compared with conventional types of such diggers.

A further object of importance is the provision of manipulating handles incorporated in the head of the auger drive gear mechanism, which handles include means to quickly engage and disengage the drivable parts through a friction type cone clutch, thereby controlling the rotation of the auger, and also by which the auger is guided for drilling in any desirable direction.

A still further object is the provision of a special shaft bearing and casing associated with the auger manipulating handles, which due to its pivotal connection therewith in a transverse manner to permit vertical planar movement only between the shaft and auger gear mechanism, apart from shaft rotation, prevents side twist between these parts due to possible excessive torque occurring in the auger spindle, providing for safety in handling during drilling.

A cutter blade is provided at the ground-engaging end of the auger which is removably attached thereto, and which blade is obliquely edged on two parallel sides so that it may be reversed and also turned over as the edges wear down during digging. This single blade is adjustably mounted on a bracket connected indirectly to the auger spindle, and its radius for cutting operations may be adjusted within certain limitations depending on the dirt-raising capacity of the auger flights to the surface.

With the exception of those parts specifically mentioned, together with an original improved type of bit and bit holder and its connector parts with the end of the auger, the other parts are more or less of conventional design and use. However, another object in my invention resides in a flat plate type spring loaded slip clutch which frictionally connects the drive shaft with the power take-off mechanism of the tractor as a safety measure.

The advantage of the bit holder mentioned above is that it independently attaches the bit to the auger spindle, and this holder is removable for replacement.

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A further advantage in connection with these invented parts is that the gears are in a sealed oil bath enclosing case, and consequently wearing out of these parts is nearly negligible.

With these objects and advantages in view this invention consists in the novel features of construction hereinafter described and claimed, and in the drawings accompanying this specification it must be observed that similar numerals refer to similar parts through the several views thereof.

Fig. 1 is a plan view of the auger handling member with covers of casings fragmented to show the internal elements, which are partly sectionalized.

Fig. 2 is a side elevational view of the handle assembly connected with the drive shaft and the driven auger spindle.

Fig. 3 is a part sectionalized view of the slip clutch assembly connecting the power take-off shaft collar with the telescopic shaft.

Fig. 4 is a view of the bit, bit holder shank and cutting blade, in elevation.

Fig. 5 is a side view of Fig. 4.

Fig. 6 is a section on line 6-6 in Fig. 4.

Fig. 7 is an elevational view of the assembled digger.

Referring to the drawings the numeral 1 signifies one of a pair of left and right side machine-supporting handle bars in parallel relationship, and connected together transversely by handles 2. A gear box 3 is supported between these side bars disposed nearer to one handle 2 than the other. This gear box encloses a set of bevel gears 4 for driving an auger 5 dependently supported therefrom, the hollow spindle 5a of which auger is carried by a shaft forming part of the said gear assembly.

A central drive shaft 7 runs horizontally between and parallel with the two side bars 1 and through the gear box 3, in which box are bearings 8 for the end of said shaft, and 9 to intermediately journal the shaft. This shaft extends longitudinally between the side bars to carry the fixed member 10 of a cone clutch keyed to the shaft 7. The male part 11 of this clutch bears slidably on the shaft 7, and is a rigid part of a universal joint assembly 12, which joint includes a ball 13 and cooperative spring 14, the assembly being a thrust bearing for the shaft 7. The coupled member 12a of this universal joint connects with a drive shaft 15 of the telescopic type, which is driven from and by the take-off power source of a tractor. The auger driving end of this shaft 15 is journaled in a special

purposed bearing 16 integral with a casing 17, the latter enclosing the said universal joint, and is pivotally associated with and lies between the side bars 1 by means of studs 18. Stud 18a are threaded into the bars 1 and engage slots 18b in the sides of the casing 17. At this end of the hand-hold assembly adjacent the casing 17 at side bars 1 are bent upwardly as at 1a so that the handle 2 at this end will conveniently bridge over the casing 17.

A clutch operating handle 19 bridges over the gear box 3 being mounted pivotally on the side bars 1 by side rods 20. This handle is for controlling the operation of the clutch for starting or stopping the running of the gears and the auger. These rods 20 are bent at their bottom ends for their pivotal attachment to lugs 21 projecting downwardly from the side bars 1, by means of bolts 22, to swing radially thereabout, the axes of which bolts are the fulcrums for the rods 20, the elbow bend being shown at 23. At each of these elbow bends is pivotally attached a connecting rod 24 by means of a pivot bolt 25 for association with the clutch. Each said connecting rod is drilled hollow and threaded at the end opposite to the pivot bolt to receive a shackle bolt 26 for longitudinal screwable adjustment of the connecting rod. The eyes 27 of this shackle bolt are affixed pivotally to a cross plate 28 set transversely between the side bars 1, which plate is associated with the slidable and rotatable stem 29 of the inner member 11 of the clutch, member 11 being slidable on the shaft 7. Bolts 30 connect the eyes 27 with the said plate 28.

The side bars 1 have slots 31 therein to receive the bolts 30 in a slidable manner. Thus by proper manipulation of the handle 19 with the rods 20 the clutch may be engaged or disengaged by the coactive relationship of the connecting rods 24, the rods 20 and the slide plate 28, preferably while holding one or other of the end handles 2.

A slip clutch is introduced adjacent to the power take-off source of power shaft collar 32, and is connected directly to the flanged coupling 33 thereof by a friction assembly. This assembly consists of two flange plates, one of which 34 is attached by bolts 35 to the said flange coupling 33, and the other plate 36 faces against this one and with an angular friction plate 37 therebetween, the plate 36 being keyed to a shaft 38. This shaft 38 is therefore driven by the power take-off shaft 32 through the slip clutch, and is connected to a telescopic shaft (Fig. 7), at its end 38a, for driving the auger drive gears 4. A spring 39 is braced between the plate 36 and a take-up nut 40 screwable on to a threaded portion of the shaft 38 as at 41. A couple of lock nuts 42 keep the nut 40 in place, and these nuts are so disposed for adjustment of the spring at sufficient compression to maintain non-slip between plates 34 and 36 under normal working conditions of the auger.

Another feature of my invention is the bit for attachment to the ground-engaging end of the auger spindle. The auger spindle 5a being tubular the shank 43 of this bit assembly is inserted therein, and a set screw 44 secures it. An enlarged portion 45 of the shank 43 acts as a shoulder for the auger stem. The bit member 46 is attached by a bolt 46a to the vertical flat face 47 of a recessed bottom portion of the shank 45 so set in as to be centrally aligned with the axis of the shank and the auger spindle. The cutting edges of this bit member are shaped for

rotative cutting as shown cross sectionally in Fig. 6.

A bracket 48 projects from one side of the enlarged portion 45 of the shank with its imaginary center line perpendicular to the axis thereof. A cutting blade 49 is affixed removably on to this bracket to the rotatively advancing face thereof by a bolt 50, the bracket being tilted as shown to present a normal cutting angle for the blade.

A slot 51 in the blade provides a means for adjustment relative with the radius of the auger flights. The blade is so sharpened that it may be turned over, and its cutting edges reversed as wear takes place, and it may be turned over endwise to give further cutting advantages. The ends of the blade are cut away as at 52 to fit the obliquely curved shape of the shank 45.

A cover plate 53 extends over the clutch from the top cover plate 54 of the gear box 3, to which it is bolted. The gears 4 run in an oil bath in the box 3, and the auger stem 5 is journaled in a vertical bearing 55 depending from the box 3, which bearing is of the thrust type. A thrust collar 56 is affixed to the shaft 6 adjacently below this bearing 55, and is secured to the shaft by a set screw 56a. This collar prevents possible jamming of the gears 4 due to auger thrust during digging operations.

It should be noted that the pivotal action between the shaft 15 and this hand hold assembly is in an upward and downward direction on the trunnion studs 18 to accommodate the raising and lowering of the auger. A universal joint 57 which connects the shaft 38a with the telescopic shaft 15 accommodates the free movement for spotting hole locations with the auger.

The importance of the journal 16 for the shaft 15 which is within the casing 17, is here emphasized, since this prevents any danger from the sudden turning of the hand hold assembly about the auger axis, which might be caused by additional torque occurring in the auger spindle.

What I claim and for which I desire to secure Letters Patent:

1. A post hole digger assembly comprising a pair of elongated side bars disposed in spaced parallel relationship and joined at corresponding end portions by a handle element, a gear housing rigidly carried between said side bars at end portions thereof remote from the first said end portions, drive and driven shafts journaled in said gear box and interconnected by gears, the driven shaft being rotatable about a vertical axis and adapted to be connected to an auger for driving the same, a bearing casing supported between said side bars adjacent the first said end portions and having a driving shaft rotatably carried thereby, said driving and drive shafts being interconnected by first and second interengageable clutch members, means for effecting interengagement of said clutch members, and a control handle carried by said side bars and pivotal about a horizontal axis and connected with said means for effecting operation thereof, said handle element and control handle providing a pair of handles for manipulating the auger whereby lifting of the assembly by said handles disengages said clutch members deactuating the auger, and lowering of the assembly and manual pressure against the control handle effects interengagement of the clutch members for driving the auger.

2. The assembly of claim 1 wherein said driving shaft includes a pair of sections interconnected by a universal coupling, one of said sec-

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tions being rotatable with one of said clutch members, said bearing casing being pivotally carried by said side bars about an axis aligned with the pivotal axis of said universal coupling whereby lifting and lowering of the assembly relative to the source of rotative power can be accomplished.

3. The assembly of claim 1 wherein said means includes a plate longitudinally slidably carried by said side bars for effecting movement of one of said clutch members relative to the other of said clutch members.

4. The assembly of claim 1 wherein the first said end portions are upwardly bent so that said handle element overlies said bearing casing, the ends of said side bars remote from said bent end portions being joined by a handle element with said control handle in juxtaposition thereto,

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whereby the juxtaposed handles can be manually squeezed together to effect tight frictional engagement between the clutch members for operating the auger.

GEORGE A. ROBINSON.

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