

July 10, 1934.

W. E. FORNEY

1,966,008

POST HOLE DIGGER

Filed June 24, 1933

3 Sheets-Sheet 1

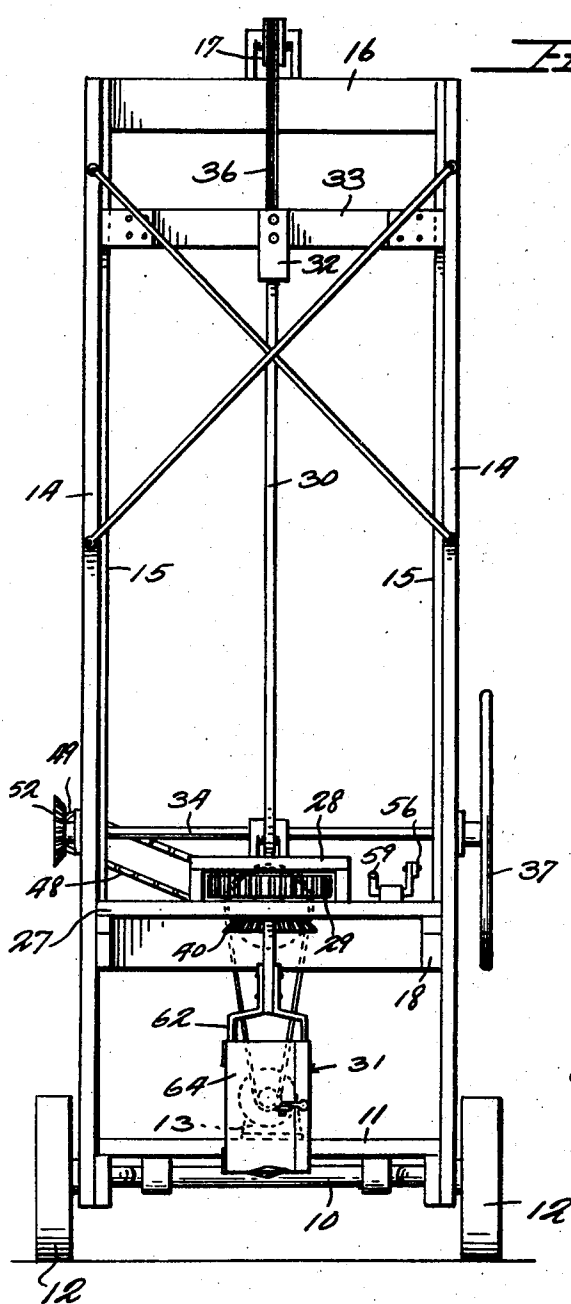


Fig. 1

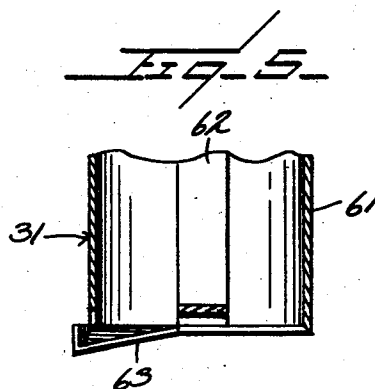


Fig. 5

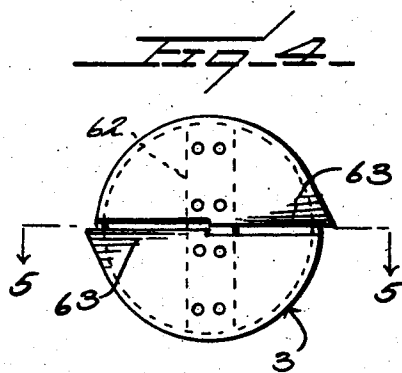


Fig. 4

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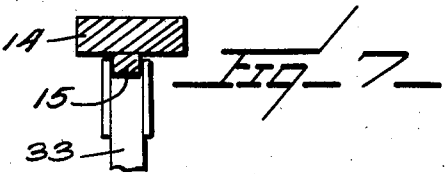
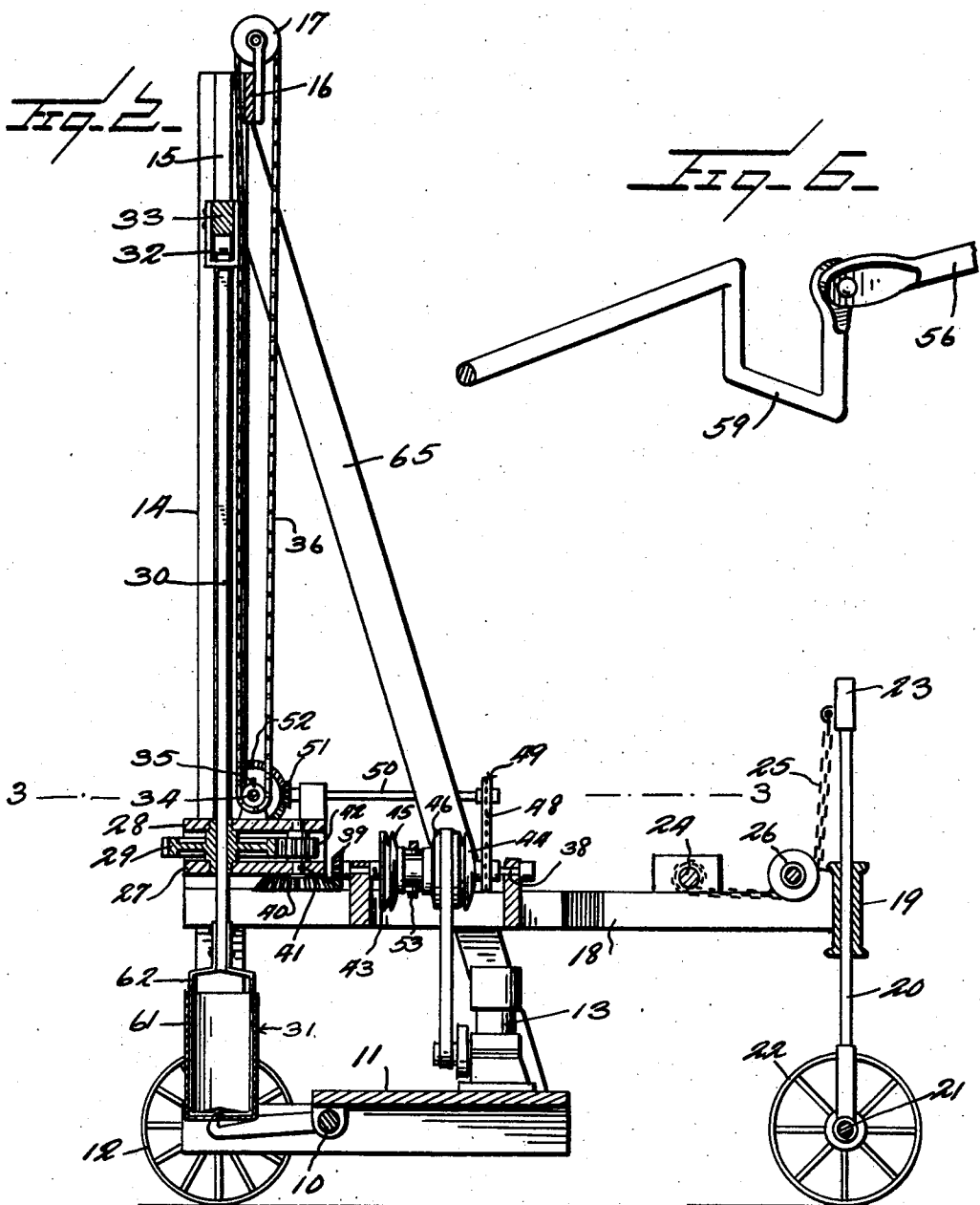
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3 Sheets-Sheet 2



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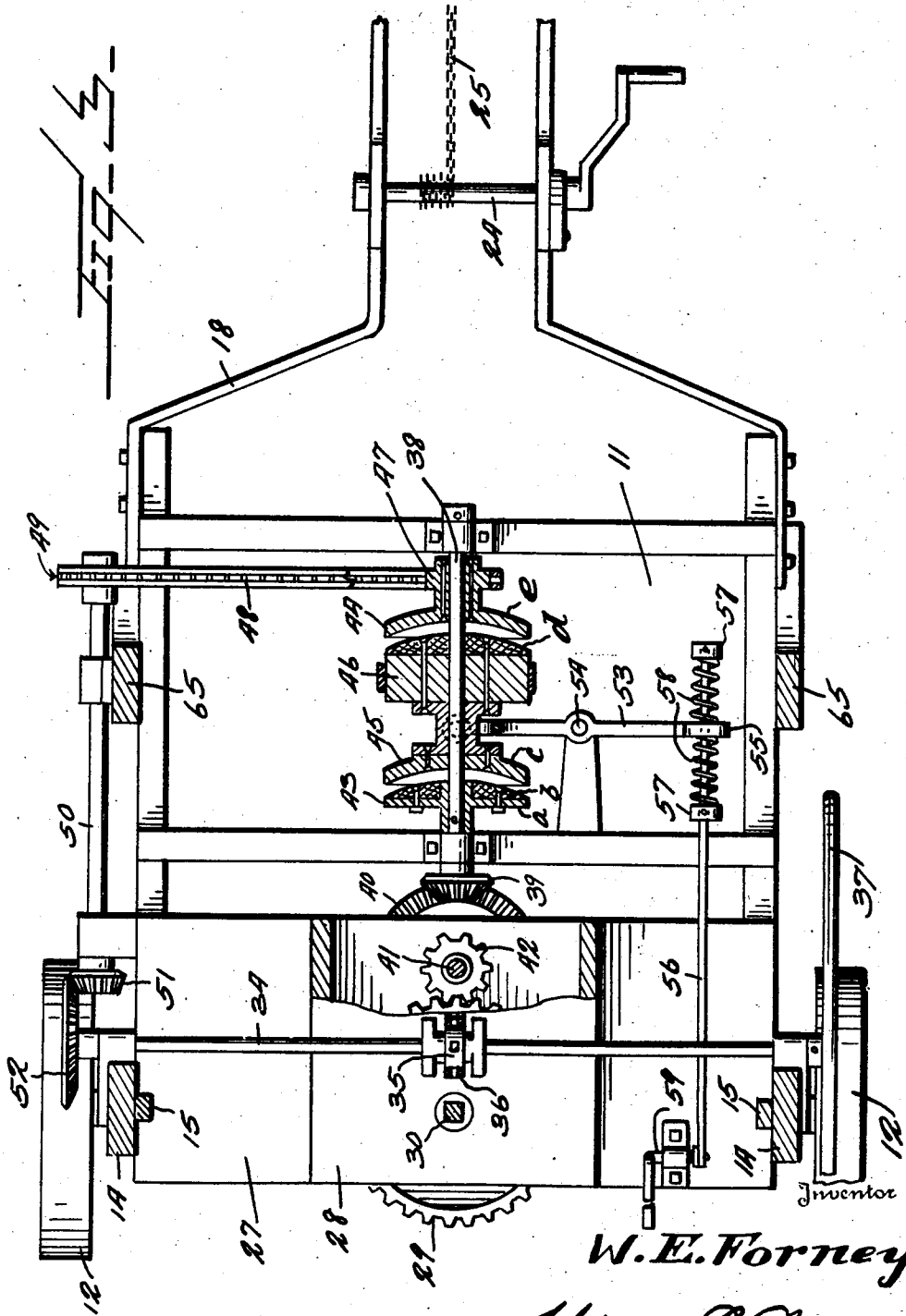
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,966,008

POST HOLE DIGGER

William E. Forney, Abilene, Kans.

Application June 24, 1933, Serial No. 677,475

3 Claims. (Cl. 255—19)

This invention relates to post hole diggers and particularly that type of post hole digger in which an auger is used driven by a motor.

One of the objects of this invention is to provide a machine of this character in which the auger shaft and the auger are moved downward to feed the auger or moved upward to withdraw the auger from the hole by power under the control of the operator and wherein manually operable means are provided for feeding or raising the auger and its shaft.

A further object is to provide a construction of this character having a motor geared to the auger shaft to drive it and to provide manually operable means for disconnecting the motor from the auger shaft and connecting it to the auger elevating or lowering means or connecting the power to the auger shaft and disconnecting it from the raising or lowering means.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is an end elevation of a post hole auger embodying my invention.

Fig. 2 is a vertical longitudinal section of the machine.

Fig. 3 is a longitudinal sectional view on the line 3—3 of Fig. 2.

Fig. 4 is a bottom plan view of the auger.

Fig. 5 is a fragmentary vertical section thereof on the line 5—5 of Fig. 4.

Fig. 6 is a fragmentary perspective view of the jointed connection between the sections of the clutch operating lever, and

Fig. 7 is a detail sectional view taken through one of the cross head guides.

Referring to the drawings, it will be seen that supported on the axis 10 is a platform 11, the axle 10 having the wheels 12. A gas engine 13 is supported on the platform 11. Extending upward from the forward end of the platform 11 are the spaced uprights 14 and attached to the inner faces of these uprights are the guide strips 15. The uprights and the guide strips together constitute guides and part also of the supporting frame. The uprights are connected at their upper ends by the transverse bar 16 supporting a pulley or sprocket wheel 17. Above the platform 11 and extending parallel thereto is a horizontal frame designated generally 18, the rear end of this frame carrying a downwardly and rearwardly inclined sleeve 19. Through this sleeve passes a vertical supporting post 20, the lower end of which carries the axle 21 in turn carrying the wheels 22.

The upper end of the post 20 has resting on it a cap 23 and a small winding shaft or drum 24 is mounted in bearings upon the rear end of the frame 18 over which passes a chain or other flexible connection 25 passing over a pulley 26 and up to the cap 23. By this means the frame 18 may be raised relative to the wheels 22 or lowered relative thereto and thus the entire frame leveled on uneven ground so that the uprights or guides 14 will be in a vertical position at all times.

Mounted upon the frame 18 is a lower board or strip 27 and an upper parallel board or strip 28. Rotatably mounted in these members 27 and 28 is a gear wheel 29 having a many-sided opening through its center through which the auger shaft 30 passes. The auger shaft 30 has sliding engagement with the opening in the gear wheel 29 but has rotative engagement therewith. The lower end of the auger shaft carries the auger 31, the details of which will be later stated. The upper end of the auger shaft is mounted in a bearing 32 carried by the cross head 33 having sliding engagement with the guide members 15 mounted upon the uprights 14.

It will be understood that the cross head might have sliding engagement directly with these uprights, if desired.

Mounted upon the transverse shaft 34 supported in bearings on the frame 18 is a sprocket wheel 35 over which a sprocket chain 36 passes. This sprocket chain passes over the idle sprocket wheel 17 and the inner flight of chain is connected by any suitable means to the cross head 33. This shaft 34 carries upon its preferably at opposite ends the hand wheels 37 whereby this shaft 34 may be operated by hand. Means are also provided, as will be described, for connecting this shaft 34 to the motor 13 through suitable gearing shown in Figure 2.

Extending longitudinally of the frame 18 and supported in bearings thereon is a drive shaft 38, one end of which carries the beveled gear wheel 39 meshing with a beveled gear wheel 40 on a vertical shaft 41, this shaft 41 carrying upon it the pinion 42 engaging with gear wheel 29. Mounted upon the shaft 38 are two opposed clutch members designated generally 43 and 44. Clutch member 43 is fast on the shaft 38 while the clutch 44 is loose on the shaft. Disposed between these two clutch members 43 and 44 is a double sliding clutch element designated generally 45 which is loose upon the shaft 38 and which includes a belt wheel 46 which is driven from the engine 13. When the clutch element 45 is shifted to the left in Figure 3, and brought into engage-

ment with the clutch element 43, the shaft 38 will be driven, thus driving the gear wheel 29. When the clutch element 45 is shifted in the reverse direction out of engagement with the clutch element 43 and into engagement with the clutch element 44, the clutch element 44 will be driven and this carries the sprocket wheel 47 into engagement by means of the sprocket chain 48 with the sprocket wheel 49 mounted upon the shaft 50. This shaft 50 carries upon it the beveled pinion 51 in turn engaged with the beveled gear wheel 52 mounted upon the shaft 34. Thus the shaft 34 and, therefore, the auger raising or lowering means may be operated from the motor or disconnected therefrom to permit the auger to lower into the ground.

For the purpose of operating the clutch element 45, I provide the clutch operating lever 53 engaging the spool of the clutch 45, this lever being fulcrumed between its ends at 54 and at its outer end being provided with an eye 55 through which a shipper rod 56 passes. This rod carries upon it the two nuts 57 between which is disposed the coiled compression springs 58 which engage on each side of the eye 55. The rod 56 is connected at its forward end to a crank 59, the handle of which operates over a sector 60. When the crank handle is in a vertical position, the clutch element 45 is in its neutral position. When the handle 30 is shifted from its neutral position, the clutch element is thrown into engagement with the clutch element 44 to lift the auger and when the handle is shifted from its neutral position, the clutch element 45 will be engaged with the clutch element 43 to rotate the auger.

The auger, as shown in Figure 2, comprises as usual an outer cylindrical shell 61 braced by two longitudinally extending braces 62, the shell being open at its lower end.

Cutting knives 63 of the auger have their outer ends extending upward about one and one-half inches. These cutting knives or bits project outward from the shell about one-fourth or three-eighths of an inch. Thus when a hole is being bored and the cutting is obstructed by the root of a tree, the cutting knives or bits cannot slide under the root but cut the root off. The shell is provided with a door 64 so that when the auger is raised and full of dirt, the dirt may be discharged from the auger.

In actual operation, when the auger is raised full of dirt, a large pan or shovel is placed over the hole, the door 64 is opened and the dirt allowed to roll out on to the pan or shovel. The pan or shovel is then pulled away and the auger let down for a new cut.

The operation of this mechanism will be obvious from what has gone before. After the frame has been rolled to a position where the post hole is to be dug, the clutch member 45 is shifted to engage clutch member 43 and this drives the shaft 38 and through the gear wheels 40, 42 and 29, rotates the auger shaft. Inasmuch as the shaft 50 is disconnected from the power at this time and the auger knives are formed so as to draw the auger downward, it is obvious that the auger and its shaft are moved downward, together, with the cross head 33. At this time, the auger may be forced downward also by rotating the hand wheel 37 on shaft 34. When the auger is filled, the clutch element 45 is shifted to disengage the clutch element 43 and engage clutch element 44, whereupon shaft 50 is rotated and through the chain 36 acts to lift the cross head and the auger. The auger may be held raised

by the hand wheel 37 or in any other suitable manner while the earth is being discharged from the auger as previously described.

While I have illustrated a certain form of clutch, I do not wish to be limited thereto. The clutch element 43 consists of a disk *a* of metal with a disk *b* of wood bolted thereto. The face of the disk *b* which confronts the clutch element 45 is preferably somewhat dished. The clutch element 45 has a metallic disk *c* confronting the disk *b* and bolted to the clutch element 45 and through the belt wheel 46 is a clutch element *d* of wood facing a clutch disk *e* of metal which is bolted to the sprocket wheel 47. Braces 65 extend downward from the uprights 14 to the main frame.

While I have illustrated certain details of construction and arrangements of parts, it is to be understood that many minor changes might be made without departing from the spirit of the invention as defined in the appended claims.

I claim:—

1. A post hole auger mechanism comprising a supporting frame having vertical guides at one end, wheels at opposite ends of the frame for supporting the frame, a vertical auger shaft disposed between said guides, a gear wheel supported on the frame and through which the auger shaft passes and with which it has sliding rotatable engagement, a cross head sliding on the vertical guides and with which the upper ends of the auger shaft has rotative engagement, means for raising said auger shaft including a second shaft mounted on the frame and having a sprocket wheel, a third shaft disposed at the middle of the frame and having a beveled gear wheel engaging the gear wheel supported on the frame and having a loose sprocket wheel thereon operatively engaged with the sprocket wheel of the second named shaft, a clutch member mounted upon the third shaft, a clutch member mounted upon the loose sprocket wheel, a power operated wheel loosely mounted upon the third shaft, clutch members mounted in connection with the power operated wheel and shiftable longitudinally of the third shaft to carry the clutch members either into engagement with the clutch member mounted on the third shaft or the clutch member mounted on the sprocket wheel, manually operable means for shifting said power operated wheel and its clutch members, a platform disposed below the frame but carried thereby, a motor mounted on the platform, and an operative connection between said motor and the power operated wheel.

2. A post hole auger mechanism including a supporting frame, a vertical auger shaft operatively supported upon said frame for vertical movement and for rotative movement, a motor carried on the frame, gearing for rotating said auger shaft including a clutch element, gearing for raising the auger shaft including a clutch element, a rotatable clutch element disposed between the first named clutch elements and shiftable from a neutral position into engagement with either of the first named clutch elements, manually operable means for shifting the intermediate clutch element, and means for rotating the intermediate clutch element from said motor.

3. A post hole auger mechanism including a supporting frame, a vertical auger shaft mounted upon said frame for vertical movement and rotative movement, a shaft supported on the frame, a clutch element mounted upon said shaft for sliding movement and rotative movement and

having opposed clutch faces, motor operated means for rotating said clutch element upon the shaft, gearing operatively engaged with the auger shaft to rotate it and including a clutch element concentric to the second-named shaft, gearing operatively connected to the auger shaft to raise it and including a clutch element mounted upon the second named shaft, manually operable means for shifting the first-named clutch element from a neutral position into engagement with either of the last named clutch elements to thereby either rotate the auger shaft or lift the auger shaft, and manually operable means for raising or lowering the auger shaft independently of the first-named raising means.

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15	90
20	95
25	100
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45	120
50	125
55	130
60	135
65	140
70	145
75	150