

March 29, 1927.

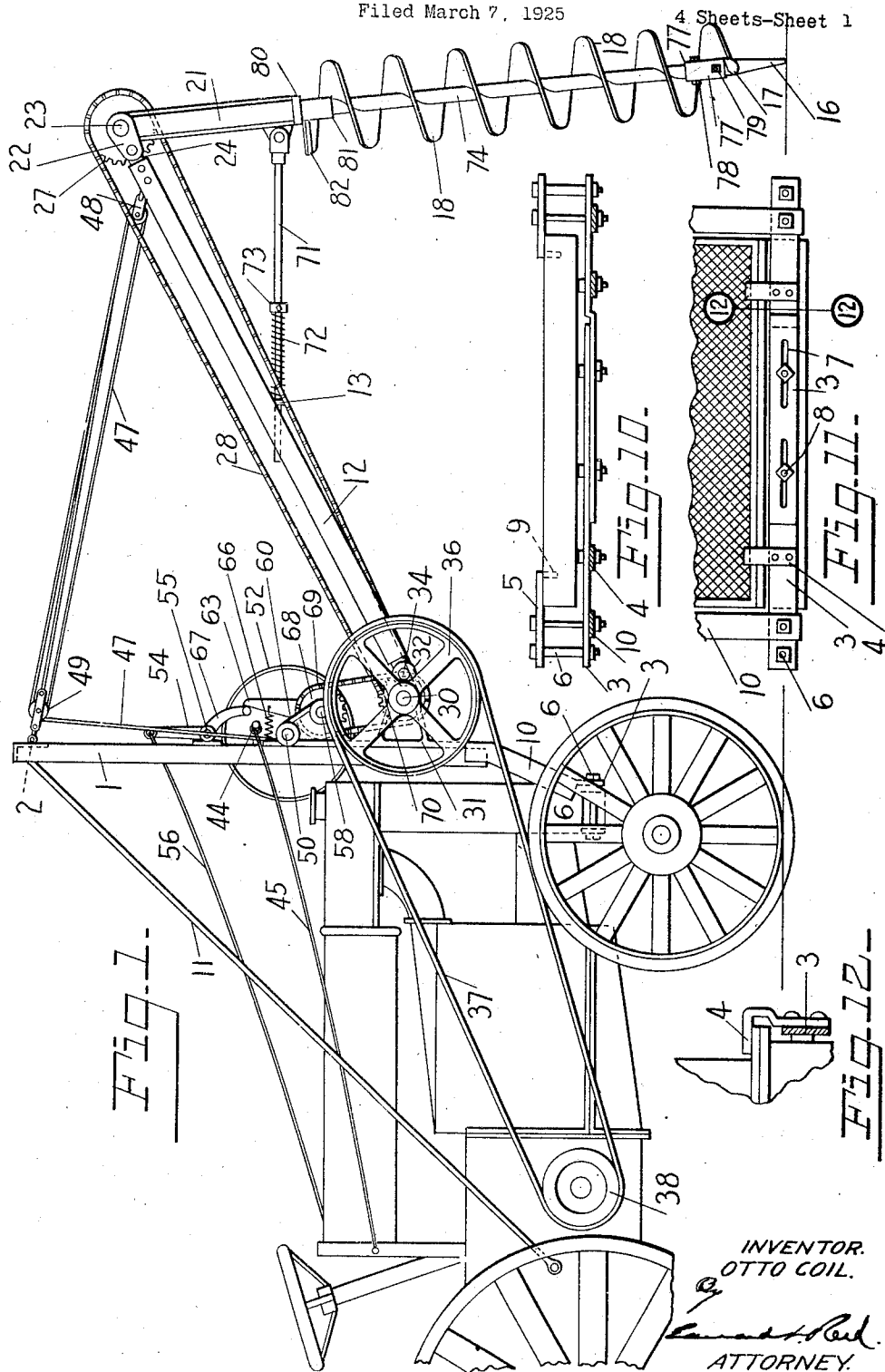
O. COIL

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POSTHOLE DIGGER

Filed March 7, 1925

4 Sheets-Sheet 1



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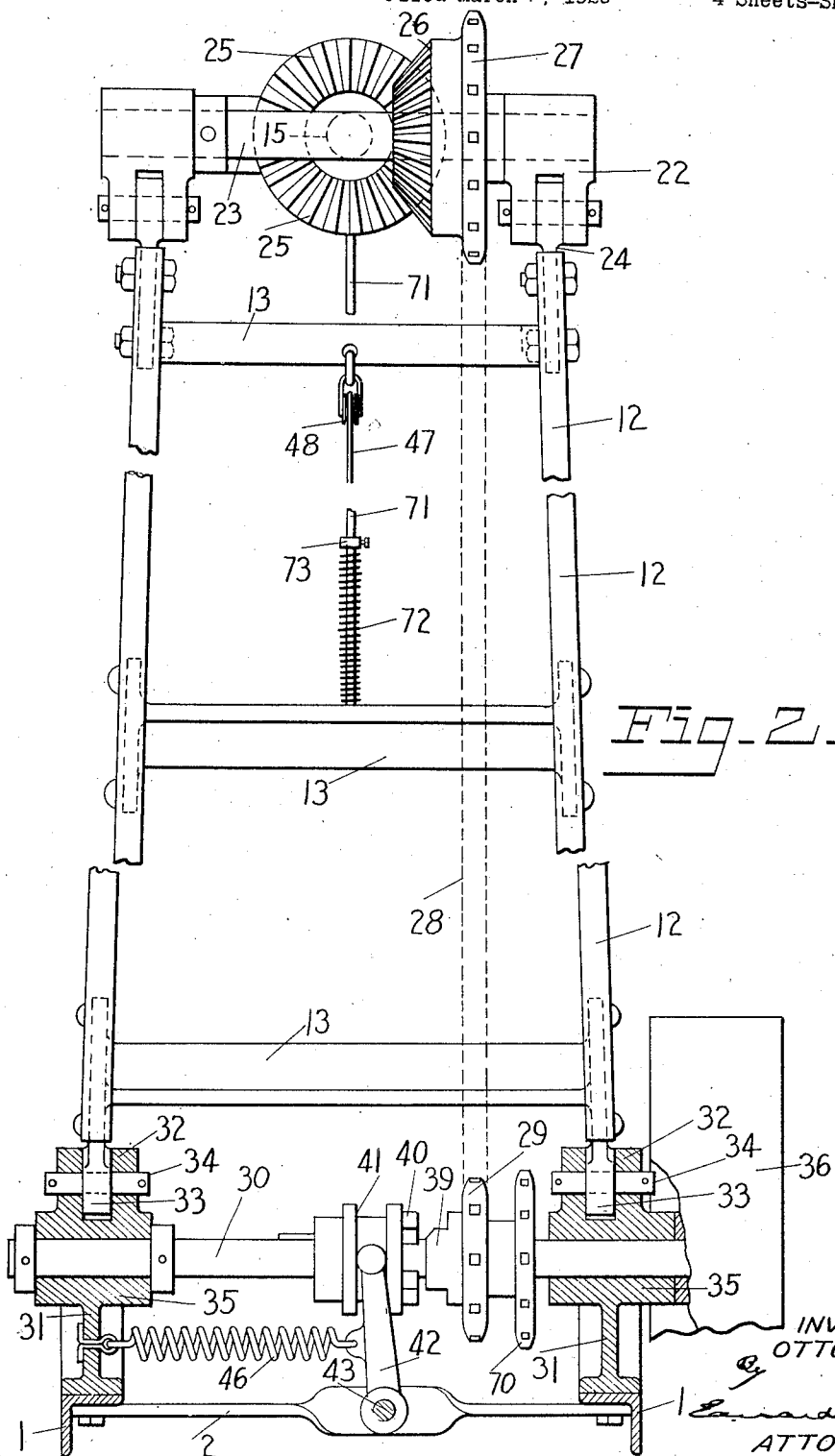
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POSTHOLE DIGGER

Filed March 7, 1925

4 Sheets-Sheet 2



INVENTOR.
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March 29, 1927.

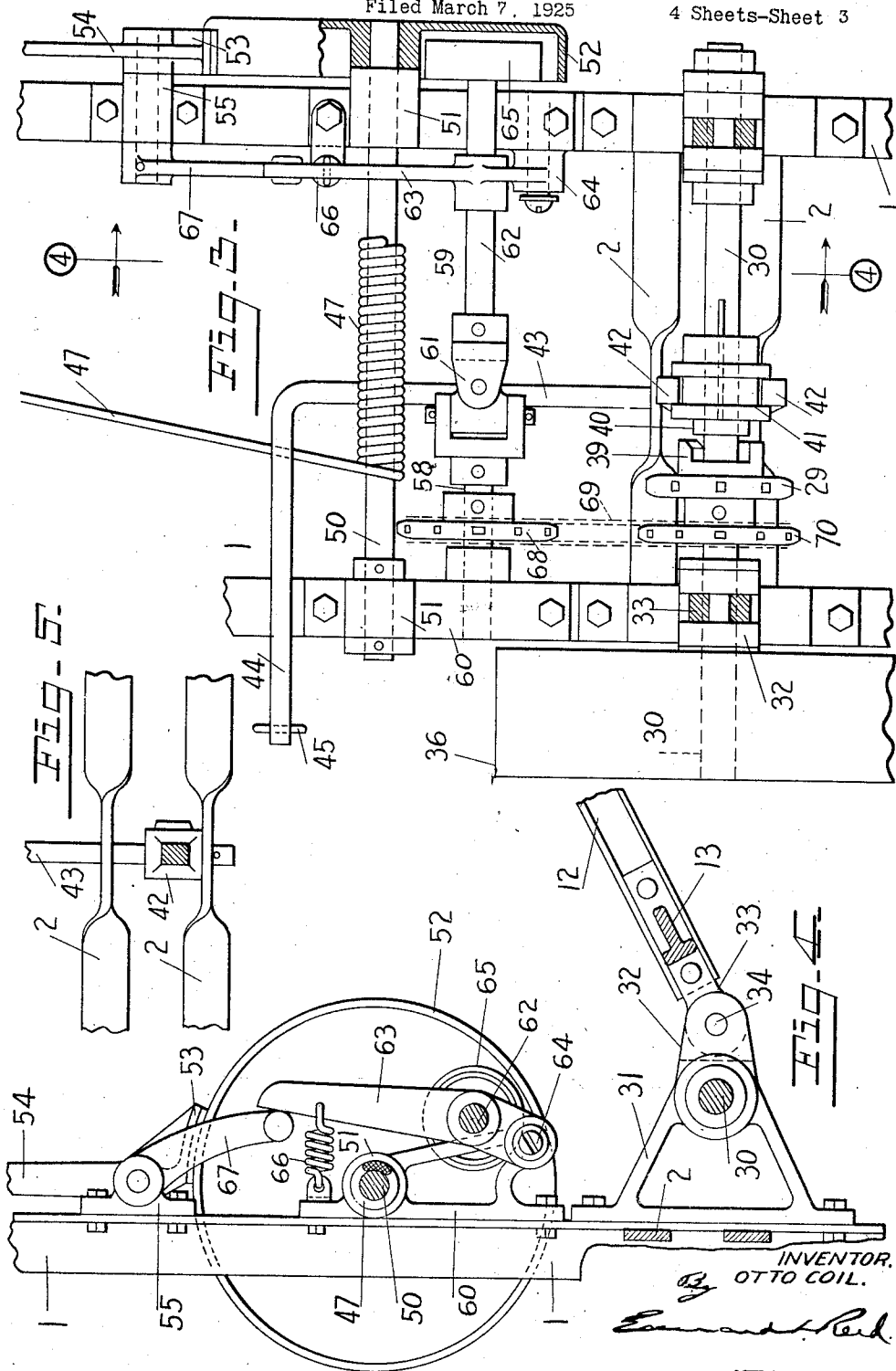
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POSTHOLE DIGGER

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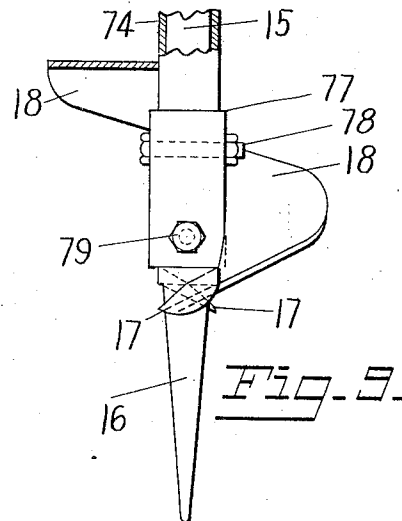
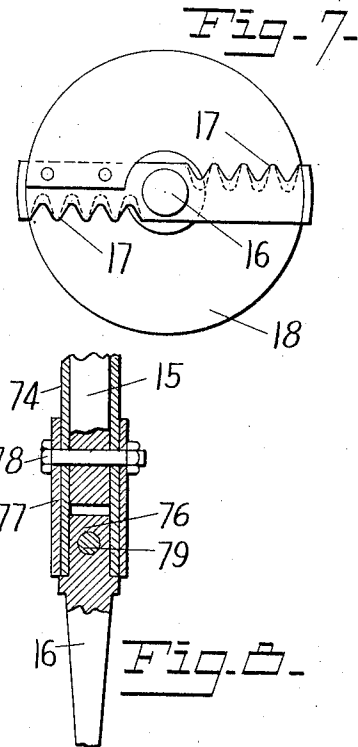
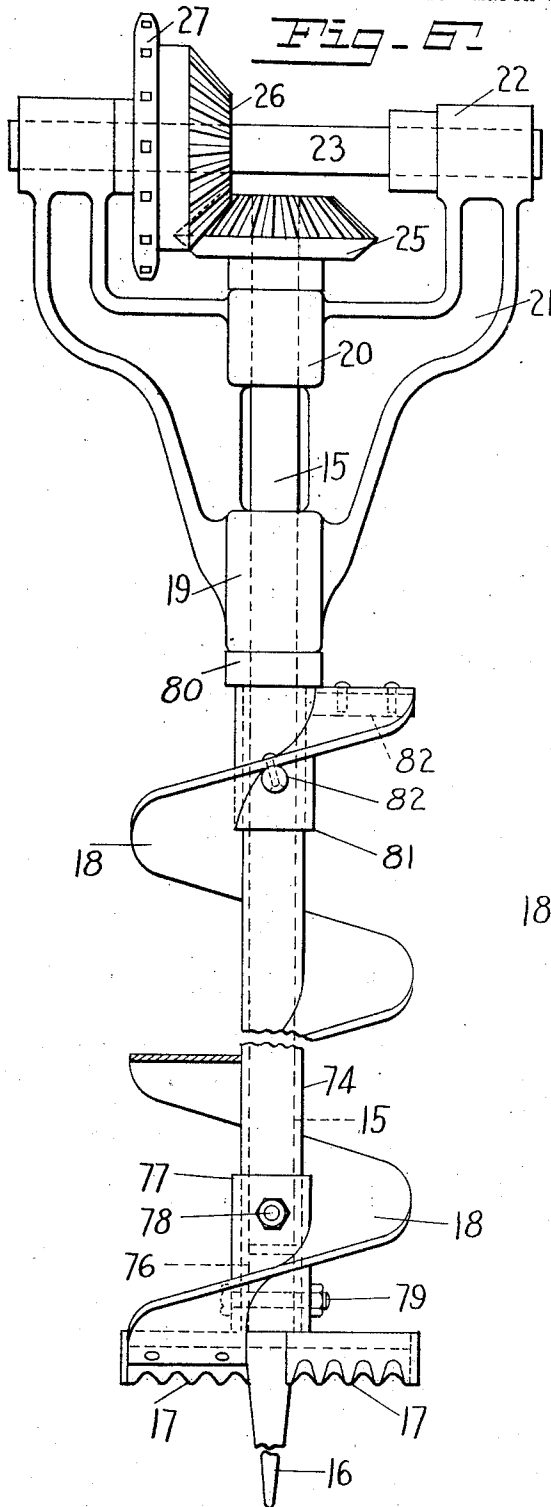
O. COIL

1,622,704

POSTHOLE DIGGER

Filed March 7, 1925

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

OTTO COIL, OF FAYETTE COUNTY, OHIO.

POSTHOLE DIGGER.

Application filed March 7, 1925. Serial No. 13,679.

This invention relates to post hole diggers and one object of the invention is to provide a device for digging post holes and the like which can be mounted upon a tractor, or other motor driven vehicle, and operated by the motor of that vehicle.

A further object of the invention is to provide such a device which can be quickly and easily mounted on or removed from the motor vehicle and which will be of such a character that it can be readily accommodated to tractors or vehicles of different kinds and sizes.

A further object of the invention is to provide such a mechanism which will be simple in its construction and operation and which can be readily controlled by the operator from the driver's seat on the vehicle.

A further object of the invention is to provide such a device which will be of a very strong durable character and which can be produced at a relatively low cost.

Other objects of the invention will appear as the mechanism is described in detail.

In the accompanying drawings Fig. 1 is a side elevation of a mechanism embodying my invention, showing the same mounted on the front end of a tractor; Fig. 2 is a plan view of the boom, partly broken away and with the supporting frame in section; Fig. 3 is a front elevation of the driving and controlling mechanism, partly broken away; Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 3, looking in the direction of the arrows; Fig. 5 is a detail view of the mounting for the clutch actuating device; Fig. 6 is a front elevation of the auger and its supporting device partly broken away; Fig. 7 is a bottom end view of the auger; Fig. 8 is a sectional detail view of the connection between the auger shaft and the auger point; Fig. 9 is a side elevation of a lower portion of the auger; Fig. 10 is a plan view, partly in section, of the clamping device for securing the frame to the motor vehicle; Fig. 11 is a front elevation of the same; and Fig. 12 is a section taken on the line 12—12 of Fig. 11.

In these drawings I have illustrated one embodiment of my invention and have shown the same as mounted on the front end of a tractor but it will be understood that this particular embodiment has been

chosen for the purpose of illustration only and that the mechanism may take various forms and may be mounted on motor vehicles of various kinds.

In that embodiment of the invention here illustrated the mechanism comprises a main upright frame 1 consisting of substantially parallel side members rigidly connected one to the other by suitable cross bars, two of which are shown at 2. This frame may be mounted on the tractor in any suitable manner but the connection is preferably a detachable one and of such a character that the mechanism may be quickly and easily mounted on or removed from the tractor, thus enabling the tractor to be equipped with the post hole digging mechanism when desired, and the connections are preferably also of such a character that the mechanism may be mounted on the tractor without change in the construction thereof. In the present instance, I have secured to the lower end of the frame a transverse bar 3 adapted to engage the lower portion or base of the radiator frame and having hook shaped members 4 to engage over the edge of that frame or base and hold the main frame 1 against downward movement. Cooperating with the bar 3 is a clamping member 5 arranged on the opposite or rear side of the base of the radiator and connected with the bar 3 by bolts 6, whereby the clamping members and the bar may be drawn into firm clamping engagement with the base of the radiator, or other supporting part. The front bar or main clamping member may, if desired, be made adjustable so as to accommodate it to radiators of different widths and to this end I have shown the same as formed of two overlapping parts provided with registering slots 7 through which extend bolts 8 by means of which the two parts may be rigidly connected in any adjusted position. The clamping member or bar 5 may also be in one or more pieces. As here shown, this member comprises two separate short bars which extend inwardly so as to overlap the base or frame of the radiator a distance sufficient to provide the desired clamping connection. Where the inner portion of the base is in the form of an angle iron these inwardly extending bars may have hook shaped ends 9 to engage over the edge of that bar and

thus more firmly connect the same thereto. The lower portions of the side members of the main frame are preferably formed separate from the upper portions of those members, as shown at 10, so that the lower portion of the frame will be interchangeable with relation to the upper portion and by using lower portions of different sizes or by adjusting the lower portion to different widths a single main frame 1 may be mounted on any one of a number of vehicles of different sizes and kinds, it being only necessary to so position or shape the lower members 10 as to establish the proper connection between the clamping device and the upper part of the main frame. The main frame is supported in an upright position by means of brace rods 11 extending downwardly and rearwardly from the upper end thereof and connected with any suitable fixed part of the vehicle.

A boom 12 is pivotally mounted on the main frame 1 and extends forwardly therefrom and, as here shown, comprises two side members spaced apart and connected one to the other by tie bars 13. Supported from the outer end of this boom is an auger 14 which comprises a shaft 15 having at its lower end a point 16 and bits 17 and also having a spiral rib 18 leading from the bits to the upper portion of the auger. The auger may be mounted on the boom in various ways but, in the present device, the shaft 15 thereof is journaled in bearings 19 and 20 formed in a yoke 21, the arms of which are provided with bearings 22 by means of which the yoke is pivotally mounted on a shaft 23 which in turn is journaled in bearings 24 in the outer ends of the boom arms. The shaft 15 of the auger has rigidly secured thereto a beveled gear 25 which meshes with a corresponding bevel gear 26 mounted on the shaft 23 and has rigidly secured thereto a sprocket wheel 27. The sprocket wheel 27 is connected by a sprocket chain 28 with a second sprocket wheel 29 mounted on a main driving shaft 30. In the present construction, I have rigidly secured to the side members of the main frame 1 forwardly extending bearing brackets 31. The outer portion of each bracket is bifurcated to form pivot lugs 32 between which is mounted a bearing member 33 rigidly secured to and forming a part of the adjacent arm of the boom and this bearing member is pivotally mounted on the pivot lugs by means of a pivot pin 34. Each bearing bracket is also provided between its inner and outer ends with a bearing 35 in which the driving shaft 30 is mounted. This driving shaft is preferably driven from the motor of the vehicle on which the mechanism is mounted and it may be connected with that motor in any suitable manner. In the present mechanism, a pulley 36 is

rigidly secured to one end of the shaft and is connected by means of a belt 37 with a second pulley 38 which is operatively connected at the motor and which, in the present instance, forms a part of the tractor on which the mechanism is mounted.

The sprocket wheel 29, which drives the auger, is loosely mounted on the shaft 30 and has rigidly secured thereto a clutch member 39 with which cooperates a second clutch member 40 slidably mounted on the shaft but held against rotation relatively thereto. The clutch member 40 is here shown as provided with a circumferential groove 41 into which extend the two arms of a clutch shifting yoke 42, which yoke is rigidly secured to a vertical rod or a shaft 43 rotatably mounted in the transverse members 2 of the main frame. This rod extends upwardly from the transverse members 2 of the frame and has, at its upper end, a transversely extending portion 44 which is connected with a rod or cable 45 which extends rearwardly to a point adjacent to the operator's seat. In the present arrangement, there is no actuating device connected with the rod 45 but obviously a suitable actuating device, such as a lever, may be provided therefor in a well known manner. A spring 46 acts on the clutch shifting yoke 42 to hold the clutch normally in its disengaged position, so that the shaft 30 may rotate in the sprocket wheel 29 without operating the auger. When the auger is to be operated the yoke 42 is moved against the tension of the spring 46, by means of the rod or cable 45, to engage the clutch member 40 with the clutch member 39 of the sprocket wheel.

The boom 12 and the auger carried thereby are supported in elevated positions and their movement about the axis of the boom controlled by means of a cable 47 which passes about a sheave 48 near the outer end of the boom and about a second sheave 49 near the top of the main frame 1. The cable extends downwardly from the sheave 49 and is secured to and wound about a suitable drum which, in the present device, consists merely of a shaft 50 journaled in suitable bearings 51 on the respective side members of the main frame 1. Rigidly secured to one end of the shaft 50 is a brake drum 52 with which cooperates a brake shoe 53 rigidly secured to an actuating arm 54 which is pivotally mounted on a bearing bracket 55 rigidly secured to the main frame. The actuating arm 54 has connected therewith, a suitable actuating member, such as a rod or cable 56, which extends to a point adjacent to the operator's seat to enable the brake to be controlled by the operator. Obviously when the friction of the brake shoe 53 on the brake drum 52 is relieved the boom and auger will move downwardly, if unrestrained, by their own weight and the cable

will be unwound from the drum 50. During the digging operation the brake shoe is retained in an inoperative position so that the auger and boom may move downwardly as the digging progresses.

In order to lift the boom and auger at the end of the digging operation I have provided means whereby the drum 50 may be actuated from the main driving shaft 30. In the present arrangement of the mechanism this is accomplished by providing a hoisting shaft which consists of two parts 58 and 59, the part 58 being journaled in a fixed bearing 60 on the main frame and the part 59 of the shaft being connected with the part 58 thereof by means of a universal joint 61 and having its outer portion journaled in a floating bearing 62 which, as here shown, is formed in a lever 63 pivotally mounted at 64 on the main frame. The outer end of the shaft 59 extends into the brake drum 52 and has rigidly secured thereto a friction wheel 65 which is movable into and out of contact with the inner periphery of the brake drum 52, this movement of the friction wheel being controlled by the movement imparted to the floating portion 59 of the shaft by means of lever 63. A spring 66 acts on the arm 63 to hold the friction wheel normally in an inoperative position. The upper end of lever 63 lies in the path of an arm 67 rigidly connected with the actuating arm 54 for the brake shoe 53, so that the movement of the arm 67 by the actuating arm will move the lever 63 forwardly about its axis 64 and thus carry the friction wheel into frictional contact with the drum. The fixed part 58 of the hoisting shaft has secured thereto a sprocket wheel 68 which is connected by a sprocket chain 69 with a sprocket wheel 70 of the driving shaft 30. Consequently when the driving shaft 30 is in operation and the friction wheel 65 is moved into engagement with the brake drum this drum will be rotated in a direction to wind the cable 47 onto the drum or shaft 50 and thus hoist the boom and auger so as to move the latter out of the hole which has been dug and to lift the same the desired distance above the ground. It will be noted that the brake 53 and a friction wheel 65 are controlled by the same actuating mechanism. When the mechanism is idle the brake shoe will be in operative engagement with the brake drum and the boom and auger will be retained in their elevated positions. At the beginning of the digging operation the actuating arm 54 is operated sufficiently to relieve the brake 53 and permit the auger to move downwardly and is retained in this position during the digging operation. At the end of the digging operation a further movement is imparted to the actuating arm and this further move-

ment will carry the friction wheel 65 into contact with the brake drum and cause the auger to be hoisted. At the end of the hoisting operation the actuating lever is relieved and a spring 66 on lever 63 will move the friction wheel into an inoperative position and will act on the brake, through the arm 67, to press the same into operative engagement with the brake drum.

Suitable means are provided for controlling the position of the auger with relation to the boom and, as here shown, this means comprises a rod 71 pivotally connected at its forward end to the lower portion of the yoke 21 and having its rear portion slidably mounted in one of the transverse tie bars 13 of the boom 12. A spring 72, confined between the tie bar and a fixed stop or collar 73 on the rod, holds the rod normally in its outermost position but permits the end of the yoke to move rearwardly with relation to the boom. By adjusting the stop or collar 73 on the rod the initial position of the auger may be varied. In the operation of the device I prefer that at the beginning of the digging operation the auger should occupy a slightly inclined position, as shown in Fig. 1, and as the boom moves downwardly about its axis and the upper end of the auger is moved outwardly, during the digging operation, the auger will assume a substantially true vertical position at the end of the digging operation. This results in a slight enlargement or elongation of the upper portion of the hole but this is not objectionable and it is preferable to the use of a more or less complicated mechanism which would be necessary to maintain the auger at all times in a true vertical position.

The auger itself may be of any suitable character preferably, as above stated, it is of the spiral type and, as here shown, it comprises a tubular body portion 74 to which the spiral rib 18 is secured and through which the shaft 15 extends. The shaft 15 terminates a short distance above the lower end of the tubular body portion 74 and the point 16 of the auger is provided with a shank 76 which extends into the lower end of the tubular body portion 74. The shaft 15 is preferably connected directly with the point 16 and the cutting edges or bits 17 of the auger so that the major digging strains are imposed upon the shaft 15 and not upon the tubular body portion of the auger. In the present construction, I have mounted about the lower end of the tubular body portion 74 a sleeve or coupling member 77 to which the lower portion of the spiral 18 and the bits 17 are rigidly secured. A bolt 78 extends through the sleeve, the body portion and the lower end of the shaft 15 to rigidly connect these members one to the other, and a second

bolt 79 extends through the sleeve, tubular body portion and the shank of the auger point to rigidly connect these members one to the other, thereby rigidly connecting the shaft with the bits and the point of the auger.

In the operation of the mechanism the tractor is advanced along the line of the fence to position the point of the auger at the point where the hole is to be dug and the brake 53 is released to permit the auger to move downwardly so that the point thereof will engage the ground. The clutch 40 is then shifted to connect the driving shaft with the auger and the digging operation commenced. As the auger moves downwardly it will gradually move toward a true vertical position so that at the end of the digging operation the auger will be in substantially a vertical position. When the hole has been dug to the desired depth the actuating arm 54 of the brake shoe is moved a further distance to the rear so as to cause the friction wheel to operatively move the brake drum, and at the same time to maintain the brake shoe 53 out of engagement with the brake drum. In this manner an operative connection is established between the driving shaft and the hoisting drum or shaft 50 which causes the cable 47 to be wound onto the drum and the outer end of the boom elevated and the auger to be lifted out of the hole. When the elevation has been completed the actuating arm 54 is released, thus permitting the connection between the hoisting drum and the driving shaft to be interrupted and the brake shoe to again engage the drum and to retain the auger in its elevated position. The tractor is then advanced to the next location and this operation is repeated.

While I have shown and described one embodiment of my invention I wish it to be understood that I do not desire to be limited to the details thereof as various modifications may occur to a person skilled in the art.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a mechanism of the character described, an upright frame, a boom pivotally mounted at one end on said frame, an auger carried by the other end of said boom, operating mechanism mounted on said frame and said boom to raise and lower said boom and to rotate said auger, means for rigidly mounting said frame on the forward end of a motor vehicle with the boom extending forwardly from said vehicle, and detachable means for operatively connecting said operating mechanism with the motor of said vehicle.

2. In a mechanism of the character described, an upright frame, a boom pivotally

mounted at one end on said frame, an auger carried by the other end of said boom, operating mechanism mounted on said frame and said boom to raise and lower said boom and to rotate said auger, means for rigidly mounting said frame on the forward end of a motor vehicle with the boom extending forwardly from said vehicle, detachable means for operatively connecting said operating mechanism with the motor of said vehicle, and means extending rearwardly from said frame for controlling said operating mechanism.

3. In a mechanism of the character described, a frame, a longitudinally adjustable clamping member secured to the lower portion of said frame, cooperating clamping devices connected with said clamping member, to secure said frame to a part of a motor vehicle, means carried by the first mentioned clamping member to engage said part of said vehicle and hold said frame against downward movement, a boom mounted on said frame, an auger carried by said boom, and means for operatively connecting said auger with the motor of said vehicle.

4. In a mechanism of the character described, an upright frame, a boom pivotally mounted on a fixed axis on said frame, an auger carried by said boom, means supported by said boom for rotating said auger, hoisting mechanism for said boom mounted on said frame, means for rigidly mounting said frame on a motor vehicle, and detachable means for operatively connecting said rotating means and said hoisting mechanism with the motor of said vehicle.

5. In a mechanism of the character described, an upright frame, a boom pivotally mounted on a fixed axis on said frame, an auger carried by said boom, means supported by said boom for rotating said auger, a driving member mounted on said frame and operatively connected with said rotating means, hoisting mechanism for said boom mounted on said frame, means for operatively connecting said hoisting mechanism with said driving member, means for rigidly mounting said frame on a motor vehicle, and detachable means for operatively connecting said driving member with the motor of said vehicle.

6. In a mechanism of the character described, a frame, a boom pivotally mounted on said frame, an auger carried by said boom, means supported by said boom for rotating said auger, a driving member mounted on said frame and operatively connected with said rotating means, a hoisting drum mounted on said frame, a cable connecting said drum with said boom, a brake to hold said boom normally against rotation, means to establish an operative connection between said drum and said driving member, means for detachably mounting said frame

on a motor vehicle, and detachable means for operatively connecting said driving member with the motor of said vehicle.

7. In a mechanism of the character described, a frame having means for mounting the same on a motor vehicle, a boom pivotally mounted on said frame, an auger pivotally supported from the outer end of said boom, means supported at the outer end of said boom for rotating said auger, a driving member mounted on said frame and operatively connected with said rotating means, a hoisting drum, a cable connecting said hoisting drum with said boom, a brake to hold said hoisting drum normally against rotation, means for establishing an operative connection between said hoisting drum and said driving member, and a single actuating device for controlling said brake and the connection between said drum and said driving member.

8. In a mechanism of the character described, a frame having means for mounting the same on a motor vehicle, a boom pivotally mounted on said frame, an auger supported from the outer end of said boom, a driving member mounted on said frame, an operative connection between said driving member and said auger, a hoisting drum mounted on said frame, a cable connecting said hoisting drum with said boom, a brake drum secured to said hoisting drum, a brake member acting on said brake drum to control the position of said boom, an actuating member movable into and out of engagement with said brake drum, an operative connection between said actuating member and said driving member, and means for controlling the engagement of said brake member and said actuating member with said brake drum.

9. In a mechanism of the character described, a frame having means for mounting the same on a motor vehicle, a boom pivotally mounted on said frame, an auger supported from the outer end of said boom, a driving member mounted on said frame, an operative connection between said driving member and said auger, a hoisting drum mounted on said frame, a cable connecting said hoisting drum with said boom, a brake drum secured to said hoisting drum, a brake member acting on said brake drum to control the position of said boom, a shaft rotatably mounted on said frame and operatively connected with said driving member, a friction wheel connected with said shaft for rotation therewith and for movement relatively thereto transversely to its axis of rotation, said friction member being so arranged that it will be moved into and out of operative engagement with said brake drum by said transverse movement, and means for moving said brake member out of engagement with said brake drum and for

moving said friction wheel into operative engagement with said brake drum.

10. In a mechanism of the character described, a frame having means for mounting the same on a motor vehicle, a boom pivotally mounted on said frame, an auger supported from the outer end of said boom, a driving member mounted on said frame, an operative connection between said driving member and said auger, a hoisting drum mounted on said frame, a cable connecting said hoisting drum with said boom, a brake drum secured to said hoisting drum, a brake member acting on said brake drum to control the position of said boom, a shaft rotatably mounted on said frame and operatively connected with said driving member, a friction wheel connected with said shaft for rotation therewith and for movement relatively thereto transversely to the axis of rotation, said friction member being so arranged that it will be moved into and out of operative engagement with said brake drum by said transverse movement, and an actuating device for first moving said brake member out of engagement with said brake drum and for then moving said friction wheel into operative engagement with said brake drum.

11. In a mechanism of the character described, a frame having means for mounting the same on a motor vehicle, a boom pivotally mounted on said frame, an auger supported from the outer end of said boom, a driving member mounted on said frame, an operative connection between said driving member and said auger, a hoisting drum mounted on said frame, a cable connecting said hoisting drum with said boom, a brake drum secured to said hoisting drum, a brake member acting on said brake drum to control the position of said boom, a shaft comprising two parts, one part of which is mounted in a fixed bearing on said frame and the other of which is mounted in a bearing movably mounted on said frame, a universal connection between the two parts of said shaft, an operative connection between the first mentioned part of said shaft, and said driving member, a friction wheel carried by the last mentioned part of said shaft and arranged for movement into and out of contact with said friction drum, a lever connected with said movable bearing, a spring acting on said lever to hold said friction wheel normally in an inoperative position, and means for moving said brake member into an inoperative position with relation to said brake drum and for actuating said lever to move said friction wheel into contact with said brake member.

12. In a mechanism of the character described, a frame having means for mounting the same on a motor vehicle, a boom pivotally mounted on said frame, an auger supported from the outer end of said boom, a

driving member mounted on said frame, an operative connection between said driving member and said auger, a hoisting drum mounted on said frame, a cable connecting said hoisting drum with said boom, a brake drum secured to said hoisting drum, a brake member acting on said brake drum to control the position of said boom, a shaft comprising two parts, one part of which is mounted in a fixed bearing on said frame and the other of which is mounted in a bearing movably mounted on said frame, a universal connection between the two parts of said shaft, an operative connection between the first mentioned part of said shaft and said driving member, a friction wheel carried by the last mentioned part of said shaft and arranged for movement into and out of contact with said friction drum, a lever connected with said movable bearing, a spring acting on said lever to hold said friction wheel normally in an inoperative position, an actuating arm pivotally mounted on said frame and connected with said brake member, and a second arm rigidly connected with the first mentioned arm and arranged to engage said lever to move said friction wheel into contact with said brake drum.

13. In a mechanism of the character described, a frame having means for mounting the same on a motor vehicle, a shaft rotatably mounted on said frame, a driving member connected with said shaft, a sprocket wheel rotatably mounted on said shaft, a clutch for connecting said sprocket wheel with and disconnecting the same from said shaft, a boom pivotally mounted on said frame adjacent to said shaft, an auger supported at the outer end of said boom, a shaft mounted at the outer end of said boom, a sprocket wheel mounted on said shaft, a chain connecting the two sprocket wheels one with the other, a driving connection between the last mentioned sprocket wheel and said auger, a hoisting drum mounted on said frame, a cable connecting said hoisting drum with the outer end of said boom, a second shaft mounted on said frame, a driving connection between the two shafts on said frame, and manually controlled means for establishing an operative connection between said second shaft and said hoisting drum.

14. In a mechanism of the character de-

scribed, a frame having means for mounting the same on a motor vehicle, bearing brackets rigidly secured to and extending forwardly from said frame, a shaft journaled in said bearing brackets, a driving member carried by said shaft, a sprocket wheel mounted on said shaft, a clutch for connecting said sprocket wheel with said shaft, a boom pivotally mounted on said bearing brackets adjacent to said shaft, an auger supported by the outer end of said boom, a sprocket wheel rotatably mounted on the outer end of said boom, a driving connection between the last mentioned sprocket wheel and the auger, and a sprocket chain connecting said last mentioned sprocket wheel with the first mentioned sprocket wheel.

15. In a mechanism of the character described, a frame having means for rigidly mounting the same on a motor vehicle, a driving member carried by said frame, a boom pivotally mounted on said frame, an auger pivotally supported at the outer end of said boom, an operative connection between said driving member and said auger, and means for so controlling the movement of said auger about its axis as to hold the same normally in an inclined position.

16. In a mechanism of the character described, a frame having means for mounting the same on a motor vehicle, a driving member carried by said frame, a boom pivotally mounted on said frame, an auger pivotally supported from the outer end of said boom, an operative connection between said driving member and said auger, and yieldable means for controlling the position of said auger with relation to said boom.

17. In a mechanism of the character described, a frame having means for mounting the same on a motor vehicle, a driving member carried by said frame, a boom pivotally mounted on said frame, an auger pivotally supported from the outer end of said boom, an operative connection between said driving member and said auger, a rod having one end pivotally connected with said auger and having its other end slidably mounted in a fixed part of said boom, a spring acting on said rod to move the point of said auger away from said boom.

In testimony whereof, I affix my signature hereto.

OTTO COIL.