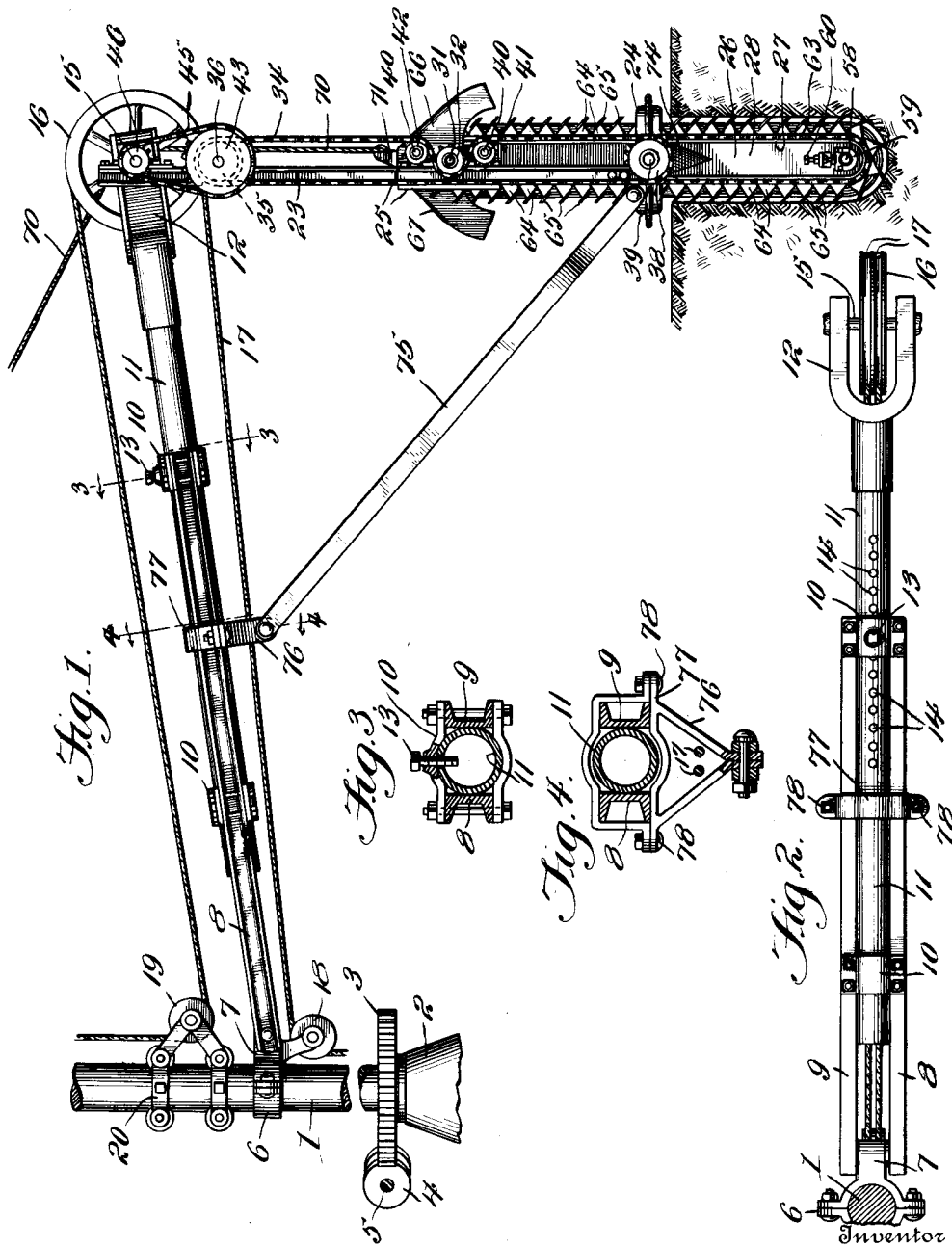


E. L. HALLE.  
POST HOLE DIGGER.  
APPLICATION FILED FEB. 3, 1912.

Patented Jan. 14, 1913.

3 SHEETS—SHEET 1.

1,050,361.



Witnesses  
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3 SHEETS—SHEET 2.

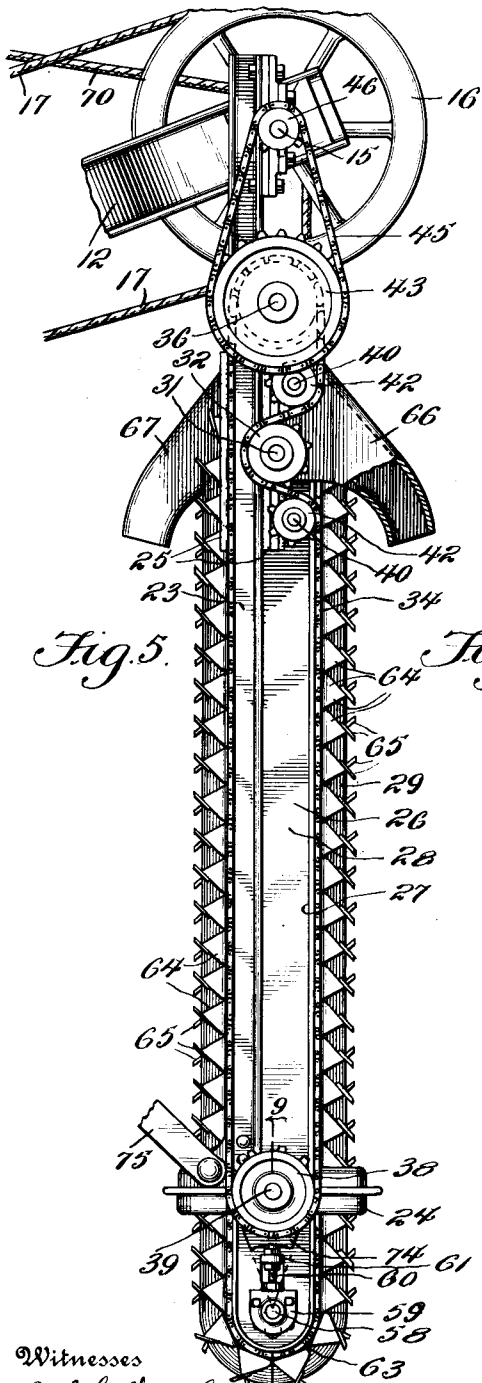


Fig. 5.

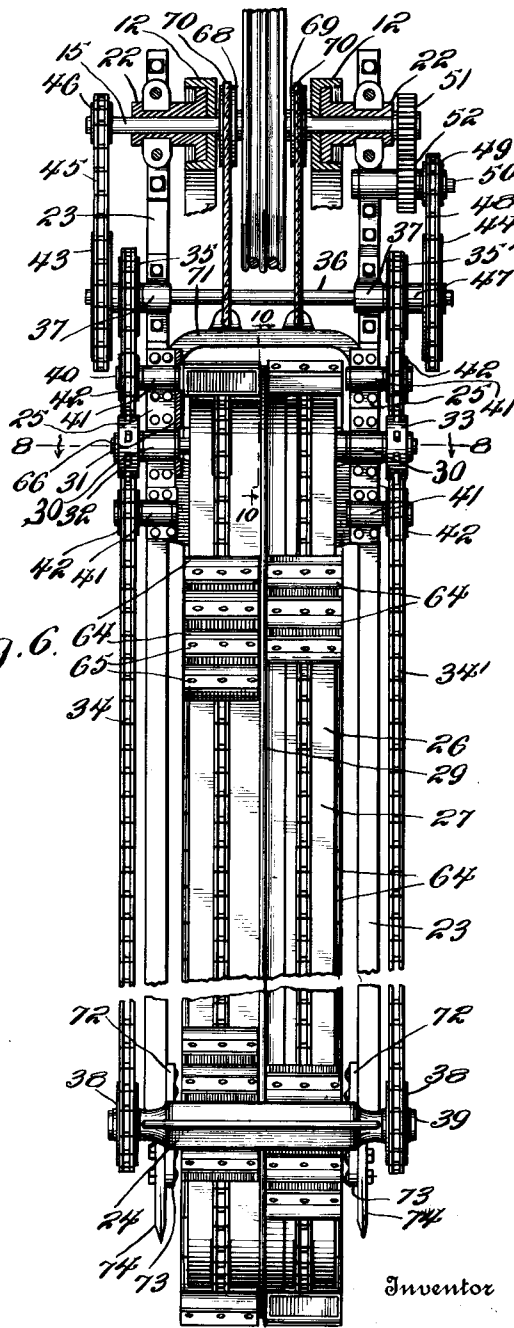


Fig. 6.

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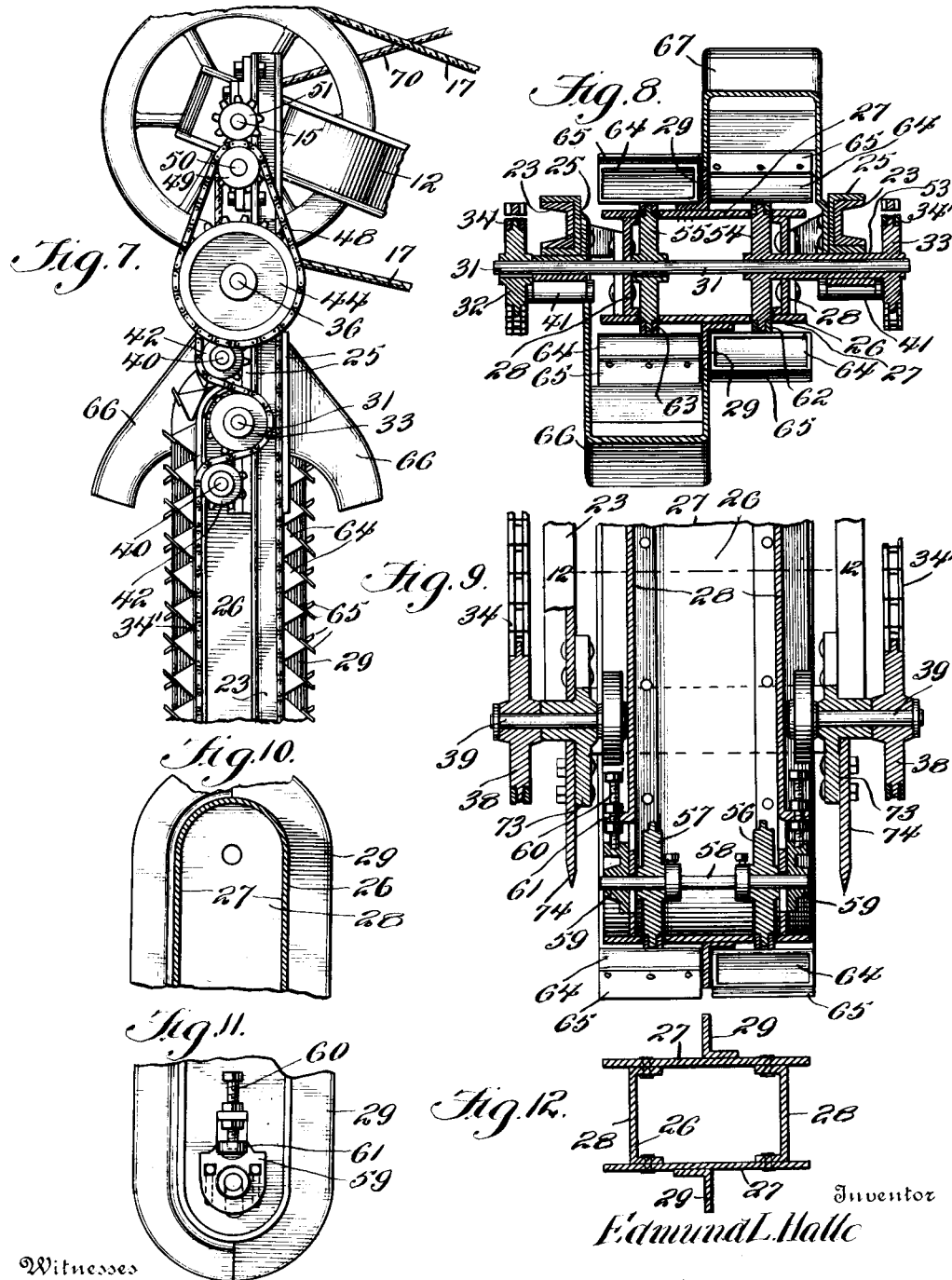
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# UNITED STATES PATENT OFFICE.

EDMUND L. HALLE, OF WAUKESHA, WISCONSIN.

## POST-HOLE DIGGER

1,050,361.

Specification of Letters Patent.

Patented Jan. 14, 1913.

Application filed February 3, 1912. Serial No. 675,111.

*To all whom it may concern:*

Be it known that I, EDMUND L. HALLE, a citizen of the United States, residing at Waukesha, in the county of Waukesha and State of Wisconsin, have invented new and useful Improvements in Post-Hole Diggers, of which the following is a specification.

This invention relates to machines of that type commonly known in the art as post hole diggers and one of the principal objects of the invention is the provision of a simple and efficient machine of this character which will have a relatively great range of adjustment so as to be adaptable for all classes of work.

While the machine is especially designed for digging or forming holes for the reception of telegraph, telephone, trolley poles, or the like, alongside of railroad tracks where frequently it is necessary to dig the holes on the top of steep embankments or at the bottom of fills, it will be understood that it is also adapted for other purposes of similar nature.

Another object of the invention is the provision of novel cutting mechanism which obviates the difficulty heretofore encountered in cutters of this type, namely, the lateral thrust of the cutter chains or buckets which when controlled in one direction, frequently were bound in the hole in such manner as to stop the rotation thereof.

Another object of the invention is the provision of a novel form of cutting mechanism which includes a freely movable cutter mounting frame which carries the cutters or bucket chains downwardly by gravity, thus feeding the cutters gradually according to the hardness of the ground and thereby avoiding sticking or jamming as where the cutters are forced into the ground.

Further objects of this invention will appear as the following specific description is read in connection with the accompanying drawing, which forms a part of this application, and in which:—

Figure 1 is a side elevation with the truck and driving mechanism omitted. Fig. 2 is a top plan view of the boom with parts broken away and with the mast in section.

Fig. 3 is a section on the line 3—3 of Fig. 1. Fig. 4 is a similar view on the line 4—4 of Fig. 1. Fig. 5 is an enlarged detail side elevation of the cutter frame and its associated parts. Fig. 6 is an enlarged front elevation of the cutter frame with parts omitted and parts in section. Fig. 7 is a detail elevation of the opposite side of the cutter frame not shown in Fig. 5. Fig. 8 is a horizontal section on the line 8—8 of Fig. 6. Fig. 9 is a detail vertical section on the line 9—9 of Fig. 5. Fig. 10 is a vertical section on the line 10—10 of Fig. 6 and showing only the frame. Fig. 11 is a detail side elevation showing the manner of adjusting the bucket chains on the frame. Fig. 12 is a sectional view on the line 12—12 of Fig. 9 showing the bucket frame only.

Referring more particularly to the drawing, 1 represents a suitable mast which is revolvably mounted in a bearing 2 and carries a worm gear 3 operated through a worm 4 on a worm shaft 5. The mechanism for operating the worm shaft and rotating the mast has not been shown nor has the vehicle upon which the bearing 2 is mounted as these parts form no part of this invention. Adjustably mounted upon the mast is a clamp 6 having a forwardly extending lug 7 to which the separated side bars 8 and 9 of the boom are pivoted. These members are connected together by clamping plates 10 and slidably mounted between the members and the clamping plates is a tubular extension member 11 provided with a yoke head 12 at its outer end. The forward clamping plate has an adjusting screw 13 passing therethrough which is adapted to engage one of a plurality of holes 14 formed in the boom extension 11. By this means, it will be seen that the boom may be adjusted as to length by removing the set screw from the apertures and loosening the clamping plates.

Journaled in the yoke head 12 is a shaft 15 upon which a double groove rope sheave 16 is secured and operating over this sheave is a driving rope or cable 17, the lower strand or leg of which passes over a guiding pulley 18 carried by the clamp 6 and extends

to the operating mechanism, not shown. The opposite or upper strand or leg of the driving cable passes over a pulley 19 which is carried by an adjustable frame 20 slidably mounted upon the mast 1.

Secured to the yoke head 12 and surrounding the shaft 15 are bearing members 22 upon which are journaled the guide rods 23 whose lower ends are connected by means of the yoke frame 24. Slidably mounted upon the guide bars is a cross head 25 which carries a frame 26 consisting of side plates 27 and inset end plates 28. The frame also carries a continuous flange 29, the purpose of which will be hereinafter described.

Journaled in bearings 30 carried by the cross head, and extending through the frame is a chain driving shaft 31 having sprocket wheels 32 and 33 arranged on opposite ends thereof to receive the driving chains 34 and 34' which extend from sprocket wheels 35 and 35' on a shaft 36 which is journaled in bearings 37 carried by the guide rods or bars 23, to sprocket wheels 38 mounted upon stub shafts 39 carried by the yoke frame 24. In order to hold the chains 34 in engagement with the sprockets 32, suitable stub shafts 40 are journaled in bearings 41 carried by the cross head 25 and carry upon their ends idler sprockets 42 which are arranged upon opposite sides of and, out of alinement with the sprocket wheels 32. The shaft 36 is provided upon its outer ends with sprocket wheels 43 and 44, the former being driven by a chain 45 which passes over a sprocket wheel 46 carried on the shaft 15. The sprocket wheel 44 is mounted upon a sleeve 47 which is loosely journaled upon the shaft 36 and also carries the sprocket wheel 48 which operates over a sprocket 49 carried by a stub shaft 50 which is driven through a gear 51 meshing with a similar gear 52 upon the stub shaft 50. It will, therefore, be seen that the chains 34 and 34' are driven in opposite directions.

The sprocket wheel 33 is carried upon a sleeve 53 which is rotatably mounted upon the shaft 31 and carries at its inner end a sprocket wheel 54 which corresponds with a similar sprocket wheel 55 keyed directly to the shaft 31. These sprocket wheels project through the frame 26 at its upper portion and on opposite sides of the rib 29. Corresponding sprockets 56 and 57 are journaled upon a shaft 58 and pass through the lower end of the frame 26 in similar positions to the sprockets 54 and 55. The shaft 58 is secured in bearing blocks 59 which are slidably mounted between the projecting ends of the side plates 27 of the frame and are held in adjusted position by set screws 60 mounted in opposite ears 61 which are struck up from the end plates of the frame. Pass-

ing over the sprockets 54 and 55 and 56 and 57 are chains 62 and 63 which carry conveyer buckets 64 being reinforced with cutting blades 65 projecting from their forward upper edges. It will readily be seen that these conveyer chains are operated in opposite directions and in order to dump the material therefrom, there is secured to and projecting from opposite sides of the cross head suitable chutes 66 and 67 which receive the dirt from the buckets and discharge it upon opposite sides of the hole formed.

In order to raise the frame 26 after the hole has been dug, there is loosely journaled upon the shaft 15 a pair of grooved pulleys 68 and 69 over which there are passed the lifting ropes 70 which are connected to the yoke 71 secured to the upper portion of the cross head. These ropes may be connected to any suitable type of raising mechanism, not shown. When the frame 26 is elevated so that the bearing 41 on the cross head contacts with the bearings 37 on the guiding rods 23, the boom will be elevated if the winding mechanism, just mentioned, is further operated. The downward movement of the frame 26 is limited by contact of the lower bearings on the cross head with the arm 72 which is carried by the yoke 24 and to which the guide bars 23 are connected. This yoke also has projecting from its lower end similar attaching arms 73 to which the penetrating members 74 are secured. These members are adapted to enter the ground upon opposite sides of the hole and to support the weight of the boom and its associated mechanism and are also adapted to prevent any lateral movement of the parts.

In order to prevent the guide bars 23 from swinging upon the end of the boom while the device is in operation, I provide a brace member 75 which is connected at its lower end to opposite sides of the yoke 24 and at its upper end is connected to the depending arms 76 of a clamp 77 which surrounds the boom and is held in adjusted position thereon by means of the bolts 78. The position of this clamp member upon the boom does not have to be changed until the level of the ground changes, at which time the bolts 78 are loosened so as to permit the guiding rods 23 to swing freely upon the shafts 15. This will permit the guiding rods and frame to automatically assume a vertical position. When the penetrating members 74 have entered the ground the bolts 78 may be tightened so as to maintain the angular relation between the guide rods 23 and the boom and thereby prevent swinging of the frame as the same enters the ground.

What I claim as new is:—

1. In a hole digging apparatus, the combination with a boom, of a support depend-

ing from the boom, a frame freely slidably mounted upon the support, a plurality of cutting elements carried by the frame and comprising continuous bucket elevators, and means to drive one of the elevators in an opposite direction to the others.

2. In a hole digging apparatus, the combination with a boom, and a support depending from the boom, of guiding means carried thereby, a frame freely slidably mounted on the guiding means, a plurality of cutting elements carried by the frame and comprising endless bucket elevators, and means for driving one of the elevators in an opposite direction to the other.

3. In a hole digging apparatus, the combination with a boom, and a support depending from the boom, of guiding means carried by the support, a frame freely slidably mounted on the guiding means, cutter elements rotatably mounted about said frame and comprising a plurality of continuous bucket elevators, and means for driving said elevators in opposite directions continuously independent of the position of the same with relation to the support.

4. In a hole digging apparatus, the combination with a pivoted boom, and a support depending from the boom, of guiding means carried thereby, a frame freely slidably mounted on the guiding means, a plurality of cutting elements carried by the frame and comprising endless bucket elevators, means for driving one of the elevators in an opposite direction to the other, and means for receiving and discharging the material elevated by said conveyers.

5. In a hole digging apparatus, the combination with a boom and a pivoted support depending therefrom, of guiding means carried thereby, a frame slidably mounted on the guiding means, a plurality of cutting elements carried by the frame and comprising endless bucket elevators, means for driving one of the elevators in an opposite direction to the other, and oppositely arranged chutes for receiving and discharging the material from the conveyers in opposite directions.

6. In a hole digging apparatus, a vertically and horizontally movable support, guide members pivoted to the support, a frame slidably mounted in the guide members, a plurality of cutter elements rotatably mounted upon the frame and comprising continuous bucket elevators, means to simultaneously drive the said elevators in opposite directions independently of the position of the frame on the guide members, and means to separate the elevators.

7. In a hole digging apparatus, the combination with a boom pivoted for vertical movement and for horizontal swinging, of guide members pivoted to the boom, a

ground engaging support carried by the guide members, a frame slidably mounted in the guide members, cutter elements rotatably mounted upon the frame and comprising a plurality of endless bucket conveyers, a driving shaft carried by the boom, and means operated by the driving shaft for continuously and simultaneously operating the conveyers in opposite directions independently of the position of the frame and the guide members.

8. In a hole digging apparatus, a vertically and horizontally movable support, guide members pivoted to the support, a frame slidably mounted in the guide members, a plurality of cutter elements rotatably mounted upon the frame and comprising continuous bucket elevators, means to simultaneously drive the said elevators in opposite directions independently of the position of the frame on the guide members, means to separate the elevators, and means to adjustably hold the guide members against movement on the boom.

9. In a hole digging apparatus, the combination with a boom pivoted for vertical movement and for horizontal swinging, of guide members pivoted to the boom, a ground engaging support carried by the guide members, a frame slidably mounted in the guide members, cutter elements rotatably mounted upon the frame and comprising a plurality of endless bucket conveyers, a driving shaft carried by the boom, means operated by the driving shaft for continuously and simultaneously operating the conveyers in opposite directions independently of the position of the frame and the guide members, a brace connected to the auxiliary support, and means to adjustably connect the opposite end of the brace to the boom.

10. In a hole digging apparatus, the combination with a boom pivoted for vertical movement and for horizontal swinging, of guide members pivoted to the boom, a ground engaging support carried by the guide members, a frame slidably mounted in the guide members, cutter elements rotatably mounted upon the frame and comprising a plurality of endless bucket conveyers, a driving shaft carried by the boom, means operated by the driving shaft for continuously and simultaneously operating the conveyers in opposite directions independently of the position of the frame and the guide members, and means carried by the frame for adjusting the tension of the conveyers.

11. A hole digging apparatus comprising a plurality of endless cutting elevators, means to drive one of the elevators in an opposite direction to another of the elevators, and means interposed between the cutters to hold them in separated relation throughout their length.

12. In a hole digging apparatus, the combination with a pivoted boom and a support pivoted thereto, of a frame freely slidably mounted on the support, a plurality of cutting elements carried by the frame and comprising continuous elevators, and means for driving the elevators.

In testimony whereof I affix my signature in presence of two witnesses.

EDMUND L. HALLE.

Witnesses:

E. EDMONSTON, Jr.,  
M. FROTHINGHAM.