Dec. 15, 1925. 1,566,060

G. S. WRIGHT

EARTH DRILLING OR EXCAVATING MACHINE

Filed Aug. 28, 1922 2 Sheets-Sheet 1

Fig. 2

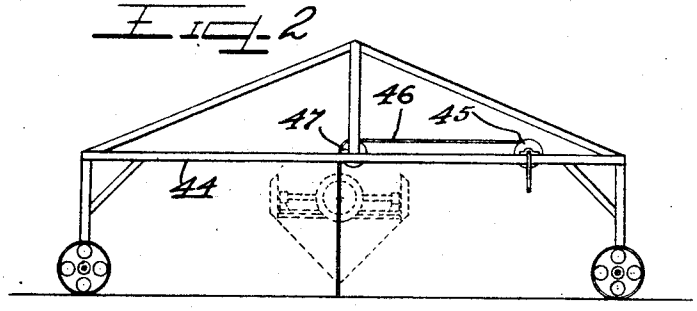
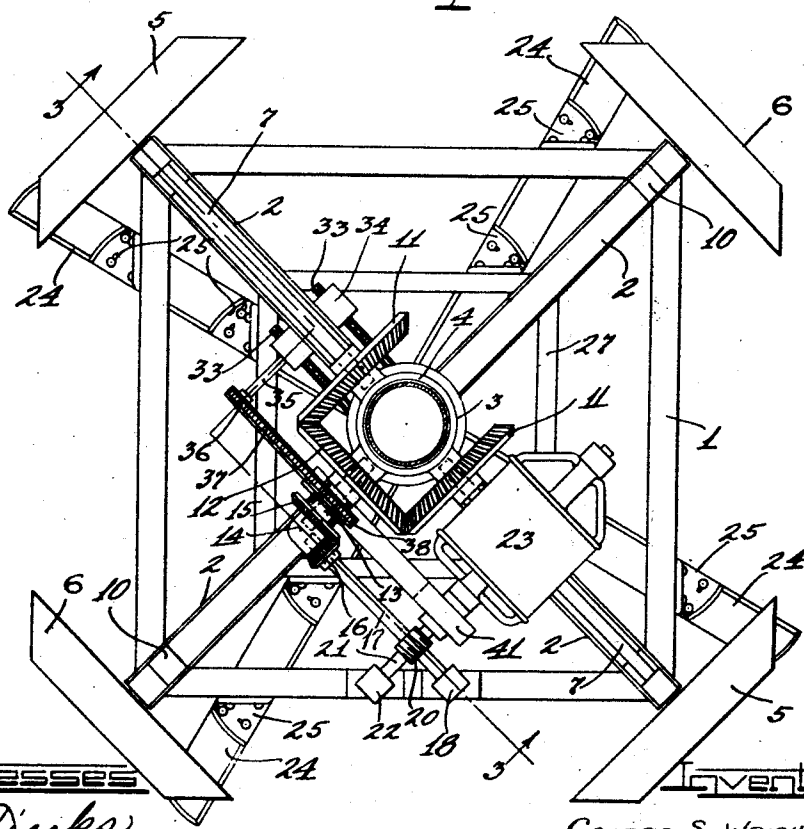


Fig. 1



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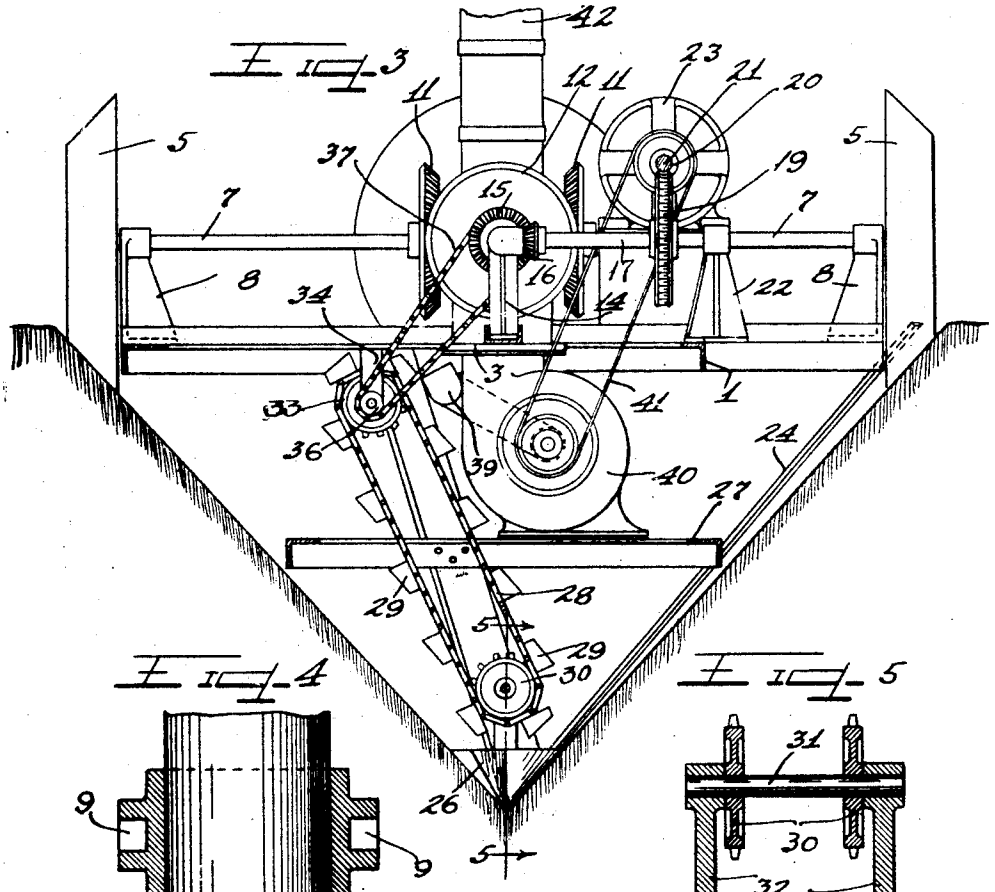


FIG. 4

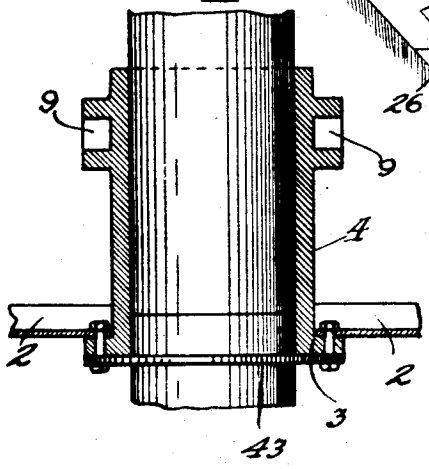
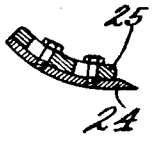


FIG. 5

FIG. 6



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UNITED STATES PATENT OFFICE.

GEORGE S. WRIGHT, OF ULYSSES, KANSAS.

EARTH DRILLING OR EXCAVATING MACHINE.

Application filed August 28, 1922. Serial No. 584,638.

To all whom it may concern:

Be it known that I, GEORGE S. WRIGHT, a citizen of the United States, and a resident of the city of Ulysses, in the county of Grant and State of Kansas, have invented certain new and useful Improvements in an Earth Drilling or Excavating Machine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to an earth drilling or excavating machine, primarily designed for digging silos but susceptible of other uses.

It is an object of this invention to provide a self-contained excavating machine that revolves under its own power and automatically advanced with the excavation.

It is a further object of this invention to provide such a self-contained unit with means for loosening or cutting and removing the excavated material.

With these and other objects in view, which will become more apparent in the following description and disclosure in the drawing, this invention comprises the novel mechanisms and combinations hereinafter described and more particularly pointed out and defined in the appended claims.

In the accompanying drawings which illustrate a preferred embodiment of this invention and in which similar reference numerals refer to similar features in the different views:

On the drawings:

Figure 1 is a top plan view of the machine.

Figure 2 is a movable derrick for elevating the drilling machine from a pit.

Figure 3 is a vertical section of the machine at work taken substantially upon the line 3—3 of Figure 1.

Figure 4 is an enlarged fragmentary section of the central supporting sleeve.

Figure 5 is an enlarged section upon the line 5—5 of Figure 3.

Figure 6 is a fragmentary detail view showing the adjustment for the cutting elements.

The mechanism illustrated in the accompanying drawing broadly comprises a plurality of downwardly conveying cutters with self-impelled mechanism for imparting rotation thereto in combination with mechanism for conveying the dirt from the bottom of the hole or pit and a blower for exhausting the same.

The illustrated embodiment of this invention comprises a rotary support consisting of a frame 1 preferably of square formation. Channel members 2 extend inwardly from the corners of said frame and are spliced or secured to an annular flange 3 of a cylindrical and central sleeve 4 (Fig. 4). The frame is supported by means of the wheels 5 and 6 which are provided with outwardly converging or bevelled peripheries. The wheels 5 are keyed upon shafts 7 journalled in upstanding bearings 8 supported upon the channel members 2 with their inner ends mounted in bearing apertures 9 in the sleeve 4. The wheels 6 are supported upon short stub shafts journalled in upstanding lugs 10 supported upon the channel members 2 and constitute idler wheels. Bevelled gears 11 are keyed upon the shafts 7, one adjacent each inner end thereof and these gears mesh with a driving gear 12 keyed upon a short shaft 13 journalled at its inner end in a third bearing aperture 9 of sleeve 4 and journalled at its outer end in an upstanding bearing 14. A small bevel gear 15 is keyed upon the shaft 13 and meshes with a bevel pinion 16 keyed upon a shaft 17 journalled at its inner end in the bearing 14 and at its outer end in a bearing 18 (Fig. 1) secured to the frame. A worm wheel 19 is keyed upon the shaft 17 intermediate its ends and meshes with a worm 20 upon a motor shaft 21 journalled at its outer end in a bearing 22 extending upwardly from the frame; the motor being represented by the reference numeral 23 and being suitably supported from one of the channel members 2. It will be apparent that operation of the motor will drive shaft 17 which is geared to shaft 13 whereby gear 12 will be driven for imparting rotation to the gears 11 and shafts 7 for rotating the wheels 5 which will rotate in opposite directions causing the four wheels to travel in a circular path.

The rotary support just described carries an earth-boring device which comprises a plurality of cutting or boring elements in the form of knives 24 which are adjustably secured near their upper or outer ends to the frame 1 by means of angle clips 25 (Fig. 1) which form adjustable connections

with the knives for varying the depth of cut. These knives are suitably spaced around the frame 1 and converge downwardly to a point; the lower ends thereof being secured to or partially embedded in a conically pointed block 26. Intermediate their ends, the knives are adjustably secured to a square frame 27 by means of angle clips 25 adjustably connected to the knives. The frame 27 may be formed by angle irons or the like suitably connected at their ends. These knives have suitably formed or downwardly inclined cutting edges for excavating or cutting, and as the earth is thuswise loosened it gravitates to or collects in the bottom of the hole or pit and is conveyed upwardly by a belt or sprocket conveyer 28 having suitable buckets 29. The conveyor is trained over a pair of sprockets 30 secured upon a shaft 31 journalled in a pair of upstanding bearings 32 on the block 26, and over a pair of sprockets 33 rotatably supported by a bracket 34 secured to one of the channel members 2. The sprockets 33 are mounted upon a shaft 35 supplied with a sprocket wheel 36 at its outer end. A sprocket chain 37 is trained over the sprocket wheel 36 and over a sprocket wheel 38 on shaft 13.

As the excavated earth is raised by the buckets 29, it is dumped into a hopper or chute 39 leading to a rotary blower 40 supported upon the frame 27, and driven by a belt 41 trained over a pulley on the motor shaft. The blower 40 has a vertical exhaust pipe 42, made in removable sections, which extends through the sleeve 4 and the ring 43 bolted to the lower end thereof.

In using the aforedescribed excavator, it is contemplated that an initial conical hole be dug for receiving the machine as shown in Fig. 3. The machine may be set in position in the hole or removed therefrom by its carrier which is shown in Fig. 2. This carrier comprises a trussed frame 44 supported upon four wheels; the frame being sufficiently elevated from the ground to support the excavating machine freely thereunder, and for this purpose the carrier is provided with a windlass 45 or the like for winding a cable 46 thereon which is trained over a guide pulley 47 and connected to the excavating machine illustrated in dotted lines. The carrier may be drawn from place to place by a tractor or the like.

When the excavating machine has been set as shown in Fig. 3, the motor 23 may be started to drive the wheels 5 in opposite directions causing the frame 1 supported thereby to revolve in a circular path, and the knives which are supported by the frames 1 and 27 to revolve in a conical path. As the knives revolve with the frames, they will cut a layer of soil from the wall of the hole. The soil will gravitate to the bottom of the hole where it will be picked up by the bucket conveyor driven by the motor through the aforedescribed connections and dumped into the chute 39. The blower 40 which is simultaneously driven by the motor through the aforedescribed connections, will blow the soil delivered to it through the exhaust pipe 42, which may lead to a suitable point. The machine will automatically sink further into the hole as it is enlarged, and additional pipe sections may be added to the exhaust pipe 42 as becomes necessary until a hole of the required depth has been excavated.

The excavating machine embodying this invention is excellently adapted for excavating silos on farms. It can be readily conveyed from place to place. It is characteristic of this machine that it is a complete unit in itself in which all parts are simultaneously operated by a motor supported thereby and which partakes of the rotary movement of the machine. It may be termed a self-impelled unitary excavating machine that automatically sinks or feeds itself to its work.

I am aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim:

1. In a machine of the class described, a rotary support, converging earth cutting elements secured to said support and extending from the extremities of said support to its center, conveying and exhausting mechanism rotatable with said support and means carried entirely by said support for rotating the same and simultaneously operating said conveying and exhausting mechansim.

2. An earth excavating machine comprising a self-impelled rotary and automatically sinkable support and earth digging elements carried by said support, said elements extending from the extremities of said support to its center.

3. An earth excavating machine comprising a self-impelled rotary and automatically sinkable support, and an earth boring device secured to said support, said device having cutting means extending from the extremities of said support to its center.

4. An earth excavating machine comprising a self-impelled rotary and automatically sinkable support, an earth boring device secured to said support and earth conveying mechanism carried by said support, said device having cutting means extending from the extremities of said support to its center.

5. An earth excavating machine comprising a rotary self-impelled and automatically

sinkable support, an earth boring device secured to said support, said device having cutters extending from the extremities of said support to its center, and earth conveying and exhausting mechanism carried by said support and operable simultaneously with the rotation of said support.

6. An earth excavating machine comprising a self-impelled rotary and automatically sinkable support, and having cutting elements positioned on either side of the axis of rotation of said support, an earth boring device secured to said support, and earth exhausting mechanism carried by said support and simultaneously operable with the rotation of said support by the impelling force.

7. In an earth excavating machine, a truck, bevelled wheels for supporting said truck, mechanism for rotating said truck and converging cutting elements positioned on either side of the axis of rotation of said truck for the purpose set forth.

8. In an earth excavating machine, a truck supported for revoluble movement, mechanism carried by said truck for rotating the same, converging cutting elements carried by said truck, said elements being on either side of the axis of rotation of said truck, conveying and exhausting means driven by said mechanism, said truck automatically sinking during the operatioin thereof.

9. In an earth excavating machine, a self-impelled rotary support, converging cutting elements carried by said support, said elements being on either side of the axis of rotation of said support and extending from the extremities of the latter to its center, said support automatically sinking during the rotation thereof.

10. In an earth excavating machine, a truck supported for revoluble movement about its vertical axis, mechanism carried by said truck for rotating the same, converging cutting elements oppositely secured on either side of said vertical axis, and conveying and exhausting means driven by said mechanism, said truck automatically sinking during the operation thereof.

In testimony whereof I have hereunto subscribed my name.

GEORGE S. WRIGHT.