

C. W. ROOD.
EXCAVATING MACHINE.

APPLICATION FILED AUG. 15, 1910.

1,057,457.

Patented Apr. 1, 1913.

3 SHEETS—SHEET 1.

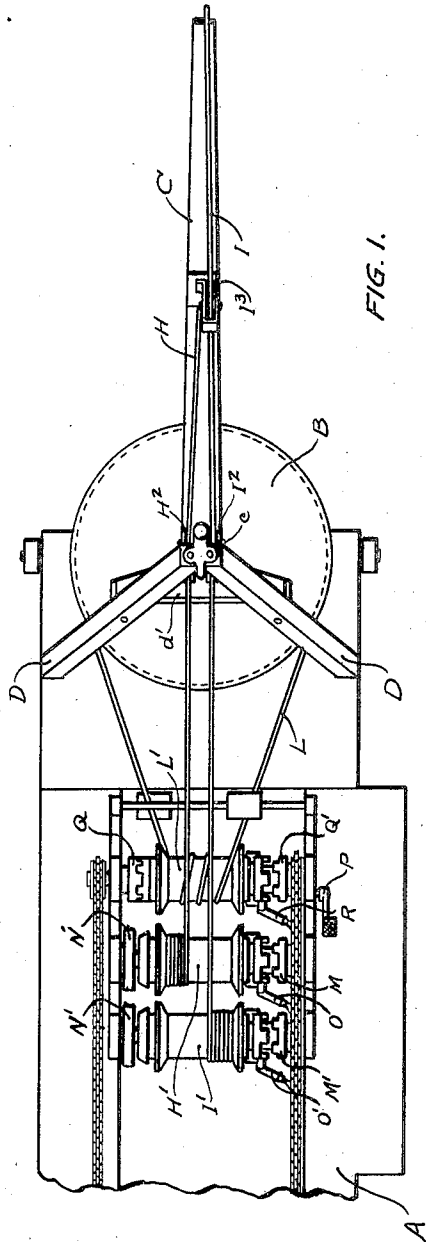


FIG. 1.

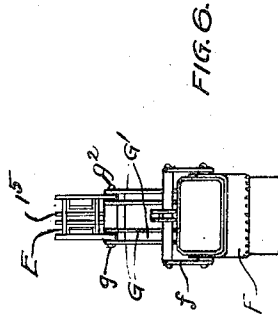


FIG. 6.

WITNESSES

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Charles H. Rood

By Chamberlin & Freundreich,

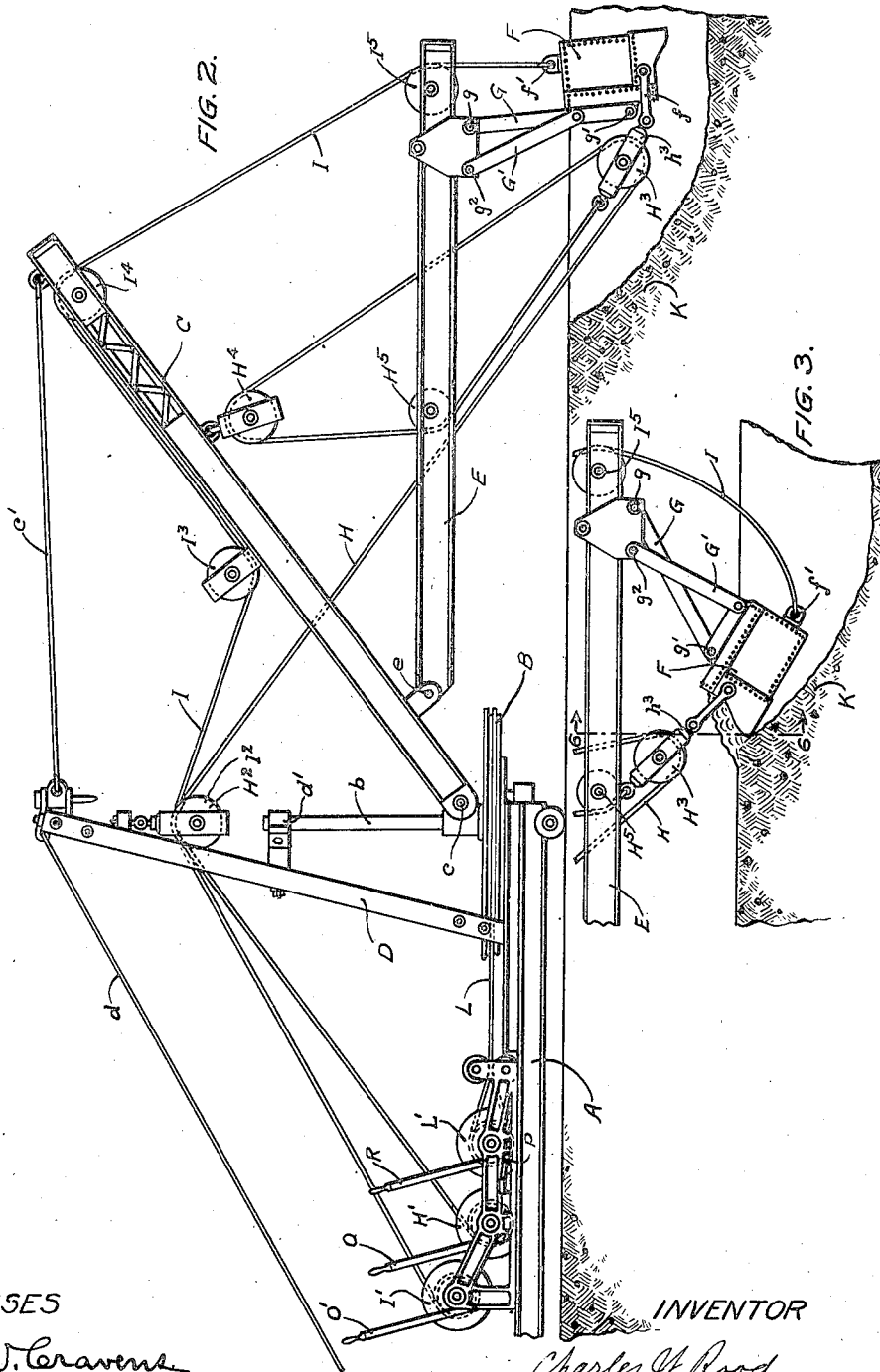
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

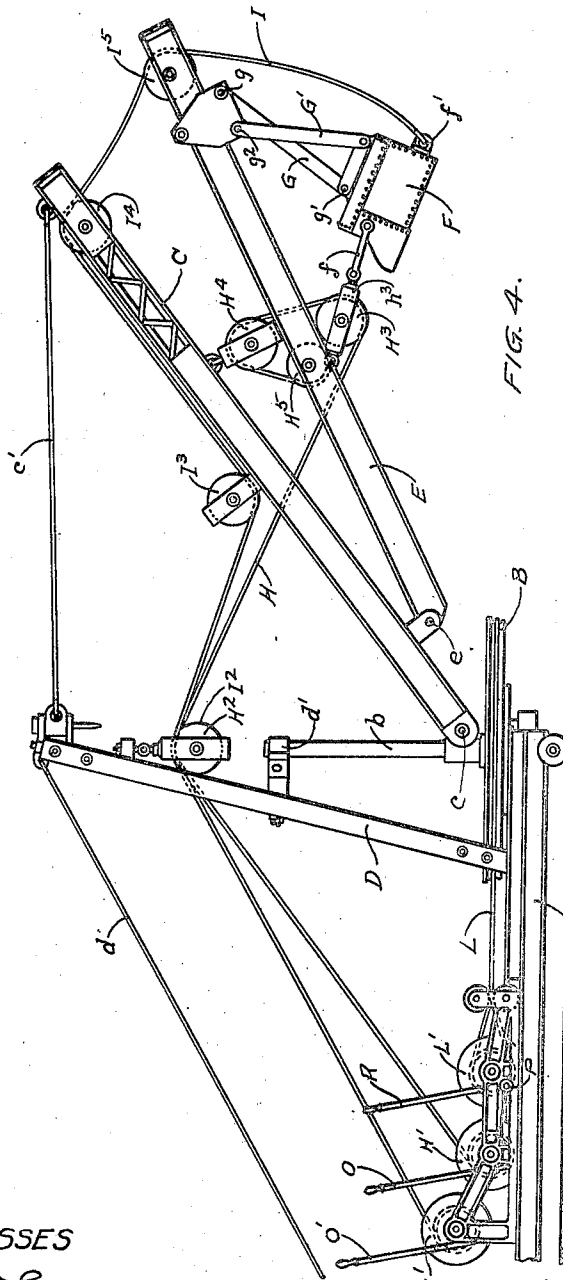


FIG. 4.

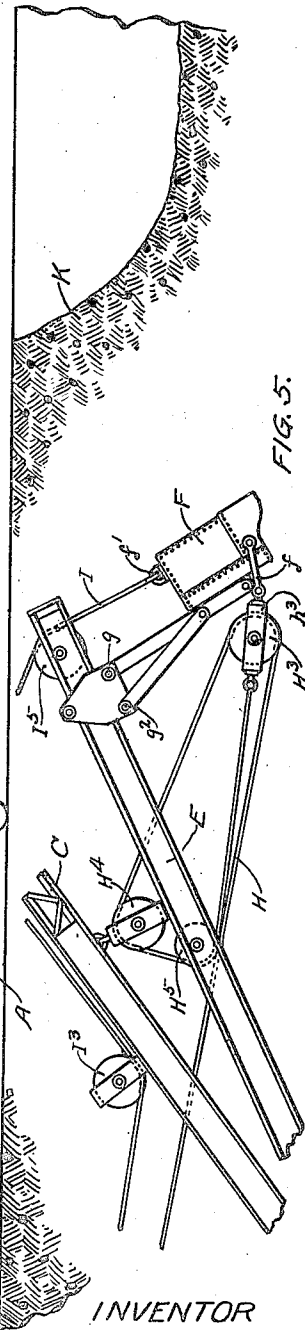


FIG. 5.

WITNESSES

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UNITED STATES PATENT OFFICE.

CHARLES W. ROOD, OF GRAND RAPIDS, WISCONSIN.

EXCAVATING-MACHINE.

1,057,457.

Specification of Letters Patent.

Patented Apr. 1, 1913.

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To all whom it may concern:

Be it known that I, CHARLES W. ROOD, a citizen of the United States, residing at Grand Rapids, county of Wood, State of Wisconsin, have invented a certain new and useful Improvement in Excavating-Machines, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention has for its object to produce a simple and novel form of excavating machine, by which the excavating of the material and the disposal of the excavated material will be effected efficiently and with facility.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but for a full understanding of my invention and of its object and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1 is a plan view of a machine arranged in accordance with a preferred form of my invention; Fig. 2 is a side elevation showing the machine just before the dipper begins a working stroke; Fig. 3 is a view similar to Fig. 2, showing only a fragment of the machine, the dipper being illustrated in the position which it occupies after it has started on its cutting stroke; Fig. 4 is a view similar to Fig. 2 showing the condition of the parts after the dipper has completed its stroke and has been raised into a position in which it is ready to be dumped; Fig. 5 is a view similar to Fig. 4, showing only a fragment of the machine and the condition of the parts during the dumping of the dipper; and Fig. 6 is a section on line 6—6 of Fig. 3.

Referring to the drawings, A represents a suitable platform or carriage on which the working mechanism is mounted. At one end of the member A is a turn table B. On the turn table is mounted a crane C pivotally connected to the turn table at its lower end, as at *c* so as to have capacity for angular adjustment in a vertical plane.

D, D represent a pair of uprights mounted on the platform or carriage adjacent to and extending above the turn table.

The free end of the crane is anchored to these uprights by means of a tension member *c'* and the uprights themselves may be anchored by means of guy ropes or the like *d*. A firm bearing for the turn table may be obtained by extending the shaft *b* on which it is mounted through a bearing member *d'* carried by the uprights D.

E is a boom pivotally connected at one end to the crane near the lower end of the latter as at *e*.

F is the excavating dipper which is hung from the free end of the boom in such a manner as to be capable of swinging in the vertical plane containing the boom. In accordance with my invention, I do not hang the dipper directly from the boom but interpose a link between the dipper and the boom, one end of the link being pivoted to the boom and the other to the dipper. In this arrangement, when a pull is exerted upon the dipper to cause it to enter the material to be excavated, the cutting edge of the dipper does not describe a true circle but makes a long free sweep. Again, when the dipper is to be tilted to discharge its load, it turns more quickly than would be the case if it were pivoted directly to the boom. In the drawings I have illustrated a refinement of this connection there being, instead of a single arm, two arms or sets of arms. When two arms are employed it is necessary to cross them in order to give freedom to the sweep of the dipper. In the arrangement shown, there are two parallel links or arms G which are pivotally connected near the end of the boom as at *g*, at one end and have their other end pivotally connected to the dipper near the open end thereof, as at *g'*. A second pair of links or arms G' is connected to the boom somewhat farther from the end thereof as at *g*². The other ends of the members G' are connected to the side of the dipper near the bottom thereof.

The action of the dipper may be varied by changing the lengths of the arms or links, by changing the distance between their pivotal connections with the boom, or by changing the relative positions of their pivotal connections with the dipper; a variation in any one of these conditions changing the path described by the dipper both while excavating and while dumping.

In excavating, the dipper is controlled by a hoisting rope or cable H. One end of this

cable is connected with a drum H' and it then passes over a sheave H^2 mounted upon the uprights D, D , over a sheave H^3 which is mounted in a yoke or frame h^3 connected to the bail f of the dipper, thence over a sheave H^4 suspended on the underside of the crane, then over a sheave H^5 on the boom and down to the yoke h^3 where it is secured.

10 The dumping of the dipper is controlled by a dumping rope or cable I . One end of the dumping cable is wound upon a drum I' and the cable then passes over a sheave I^2 mounted upon the uprights D, D , under a sheave I^3 on the upper side of the crane, around a sheave I^4 at the free end of the crane and past a sheave I^5 at the free end of the boom down to the bottom of the dipper where it is secured as at f' .

20 In Fig. 2 the parts are shown in the positions which they occupy just before the dipper begins an excavating stroke. Assuming that the drum H' is caused to turn so as to wind up the hoisting cable: the dipper will be swung toward the right and gradually lifted as shown in Fig. 3, entering the soil K and cutting away a slice or layer. As the pull upon the hoisting rope is continued, the dipper makes a clean upward sweep until it is filled and finally it is raised clear of the ground and strikes against the underside of the boom. Further relative movement between the dipper and the boom is now prevented and if the pull upon the hoisting rope is continued, the boom will be lifted into the position illustrated in Fig. 4. Up to the time that the dipper strikes against the underside of the boom the dumping cable is slowly paid out so as not to interfere with the free movement of the dipper. The crane may now be swung to the right or to the left so as to bring the dipper over a spoil pile or over a wagon which is intended to receive the excavated material. In order to dump the load, the drum I' is set in rotation so as to tend to wind up the dumping cable. At the same time the drum H' is permitted to run slowly backward so that the hoisting cable will be paid out as the dumping cable is wound up, with the result that the boom retains its raised position while the dipper swings down into the position indicated in Fig. 5, permitting its contents to be discharged. 55 After the load has been dumped, the crane may be swung back to its original position or a little to one side of the original position, if an excavation of a width greater than the width of the dipper is to be effected, and the hoisting and dumping cables are both paid out so as to permit the boom and dipper to drop again into the positions indicated in Fig. 2.

While it is of course preferable to have 65 the sheaves which I have described, these of

course serve only as guides and abutments and may be replaced by any other suitable devices.

The turn table may be actuated in any suitable way, preferably by means of a cable L which surrounds the turn table and has its ends wound upon a drum L' .

The drums H', I', L' are mounted upon the carriage or platform and may be driven and controlled in any suitable way. In the arrangement shown, the drums H' and I' are each provided with a clutch and with a brake, the clutches being indicated at M and M' respectively, and the brakes at N and N' respectively. O and O' are levers associated with the drums H' and I' respectively and are adapted to shift the drums into positions which will bring either the brakes or the clutches into play. When it is desired to pay out either of the cables controlling the dipper and boom, the corresponding drum is permitted to unwind under the influence of its brake, thus keeping the cable taut. The drum L' is provided with a brake P and with two power driven clutch devices Q and Q' . R is a controlling lever which is adapted to move the drum into operative relation with either of the clutch devices, one of which causes the turn table to be rotated in a clockwise direction while the other produces a movement in the opposite direction. These parts of my machine may, however, take any usual or preferred forms and therefore I deem it unnecessary to describe them more in detail.

While I have illustrated and described with particularity only a single form of my invention I do not desire to be limited to the specific details so illustrated and described; but intend covering all constructions and arrangements which fall within the terms employed in the definitions of my invention constituting the appended claims.

What I claim is:

1. In a digging machine, a boom, two links pivotally connected at their ends to the boom at points spaced apart lengthwise of the boom, a dipper, each of said links being pivoted at its free end to the dipper, the arrangement being such that when the dipper is occupying a digging position the links cross each other.

2. In a digging machine, a boom, two links pivotally connected at their ends to the boom at points spaced apart lengthwise of the boom, a dipper open at one end, each of said links being pivotally connected at its free end to the side of the dipper, the arrangement being such that when the dipper is occupying a digging position the links cross each other, and the link which is connected to the dipper nearest the mouth thereof being longer than the other one.

3. In a digging machine, an inclined crane, a boom lying beneath and pivotally

connected to said crane so as to be capable of swinging about a horizontal axis, a dipper flexibly suspended from the free end of the boom, a cable connected with the bottom of the dipper, sheaves on the end of the crane and on the end of the boom over which said cable passes, sheaves mounted in intermediate points on the crane and on the boom, and a second cable passing over said sheaves and attached to the front end of the bucket, and means for actuating said cables.

4. In a digging machine, a crane, a boom lying beneath and pivotally connected at one end to said crane so as to swing about a horizontal axis; a dipper mounted on the other end of the boom so as to swing therefrom, a sheave mounted on the crane above the boom, a sheave mounted on the boom, a third sheave carried by the dipper, and a cable secured at one end to the dipper and passing around all of said sheaves for the purpose of swinging the dipper and then hoisting the boom.

5. In a digging machine, a crane, a boom lying beneath and pivotally connected at one end to said crane so as to be capable of swinging about a horizontal axis, a dipper suspended from the other end of the boom so as to be capable of swinging thereon, guides on the outer ends of the crane and the boom, a dumping cable connected to the dipper and passing over said guides, a sheave on the crane above the boom, a second sheave on the dipper, and a hoisting cable connected to said dipper and passing over said sheaves, said dipper having a part thereon adapted to engage with the underside of the boom in a predetermined position of the dipper so as to cause the boom to be lifted when the hoisting cable is actuated.

In testimony whereof, I sign this specification in the presence of two witnesses.

CHARLES W. ROOD.

Witnesses:

JOHN A. GAYNOR,
NELLE P. DOLAN.