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E. O. ROOD.

DITCHING, DREDGING, OR EXCAVATING MACHINE.

No. 386,438. Patented July 17, 1888.

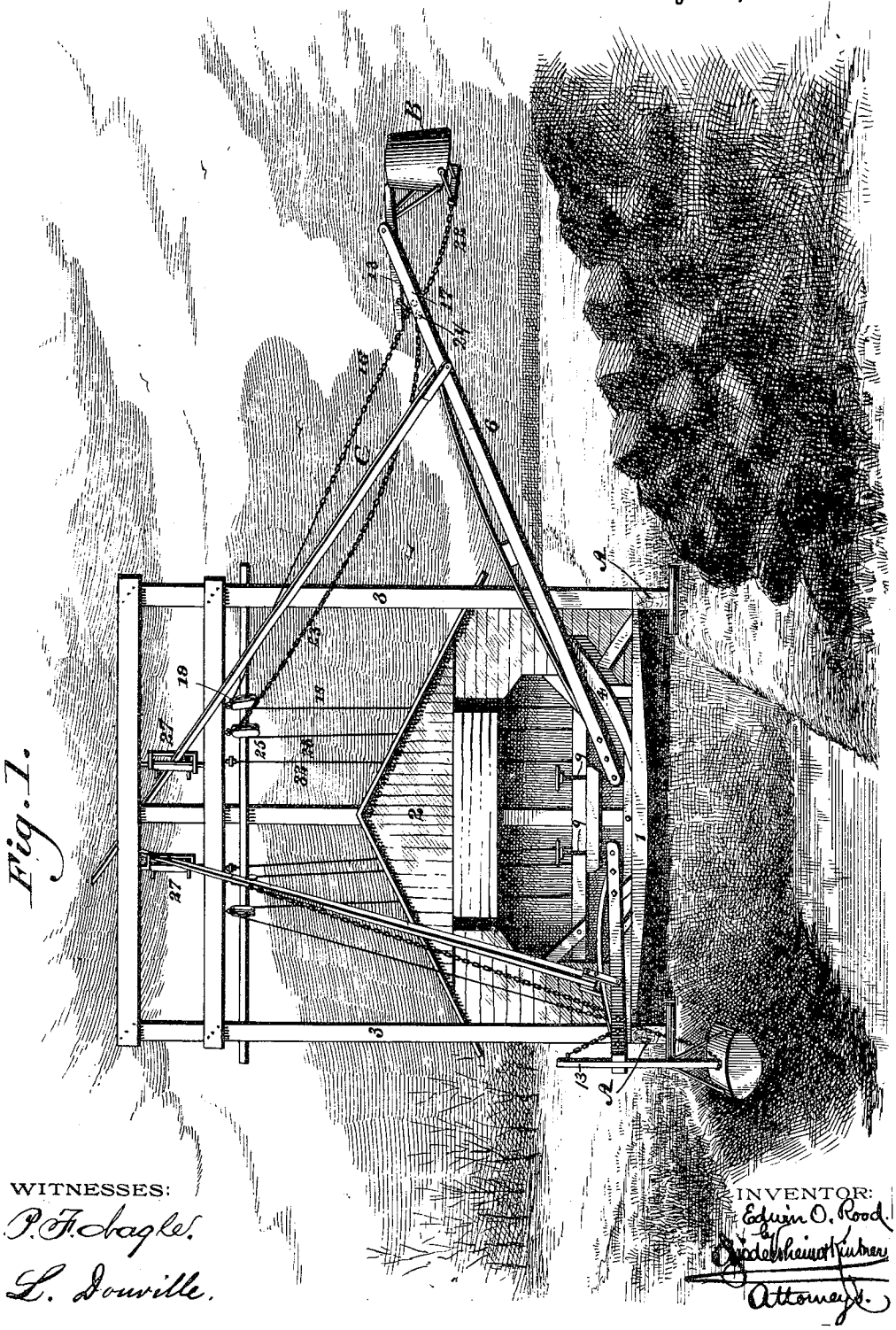

Fig. 1.

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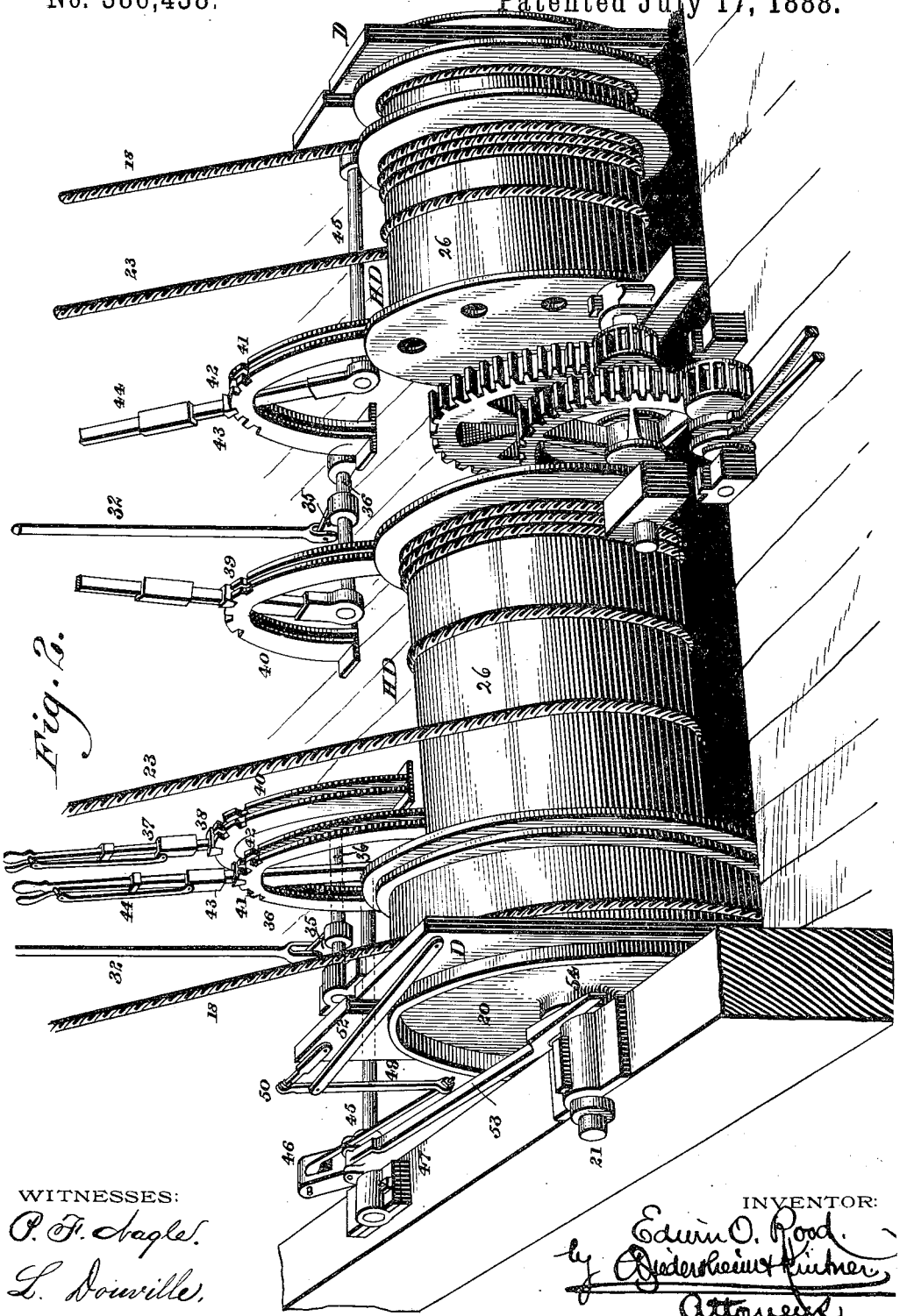

Fig. 2.

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E. O. ROOD.

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Fig. 4.

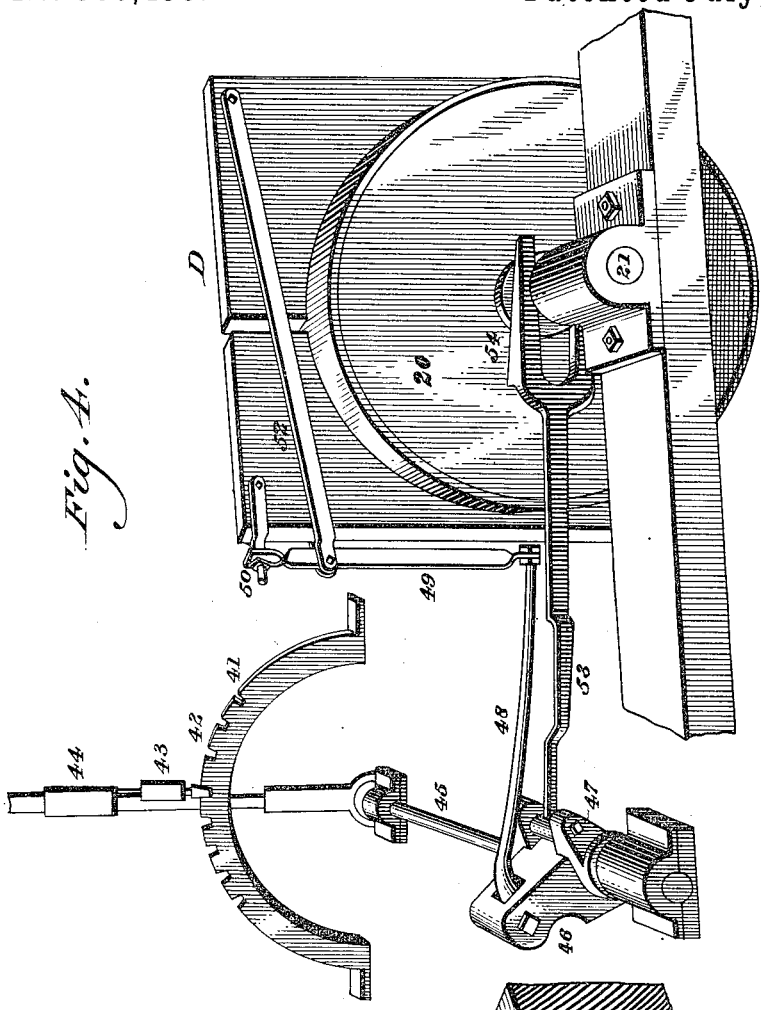
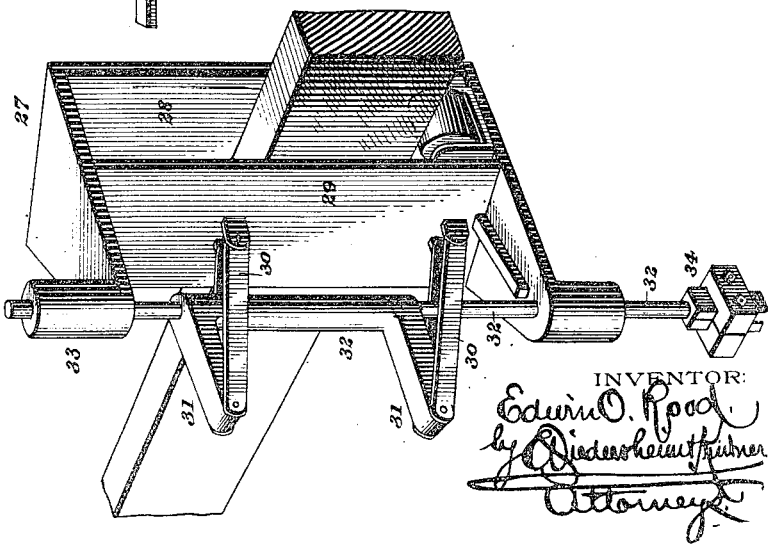


Fig. 3.



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(No Model.) 7 Sheets—Sheet 4.

E. O. ROOD.

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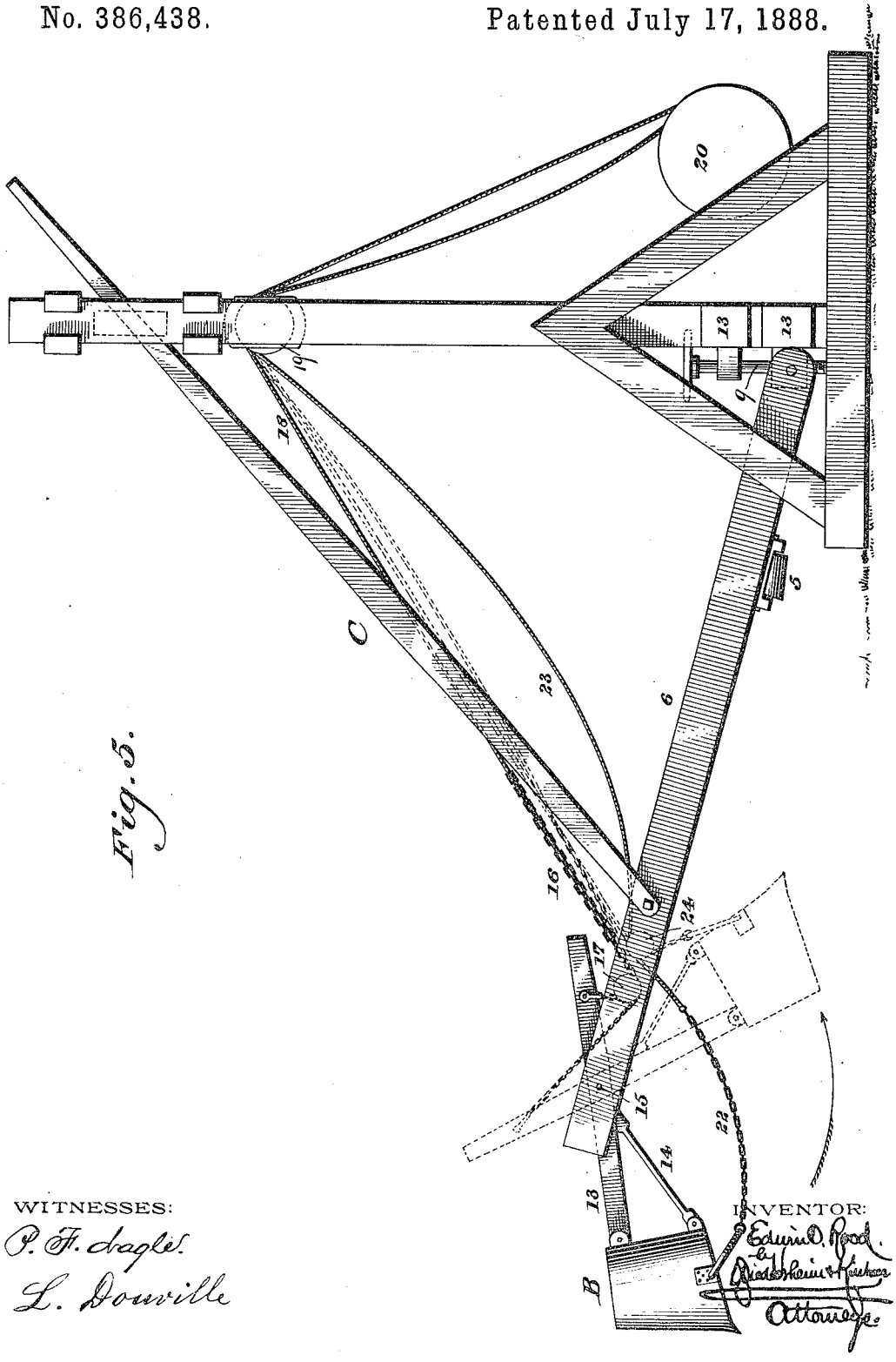

Fig. 5.

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DITCHING, DREDGING, OR EXCAVATING MACHINE.

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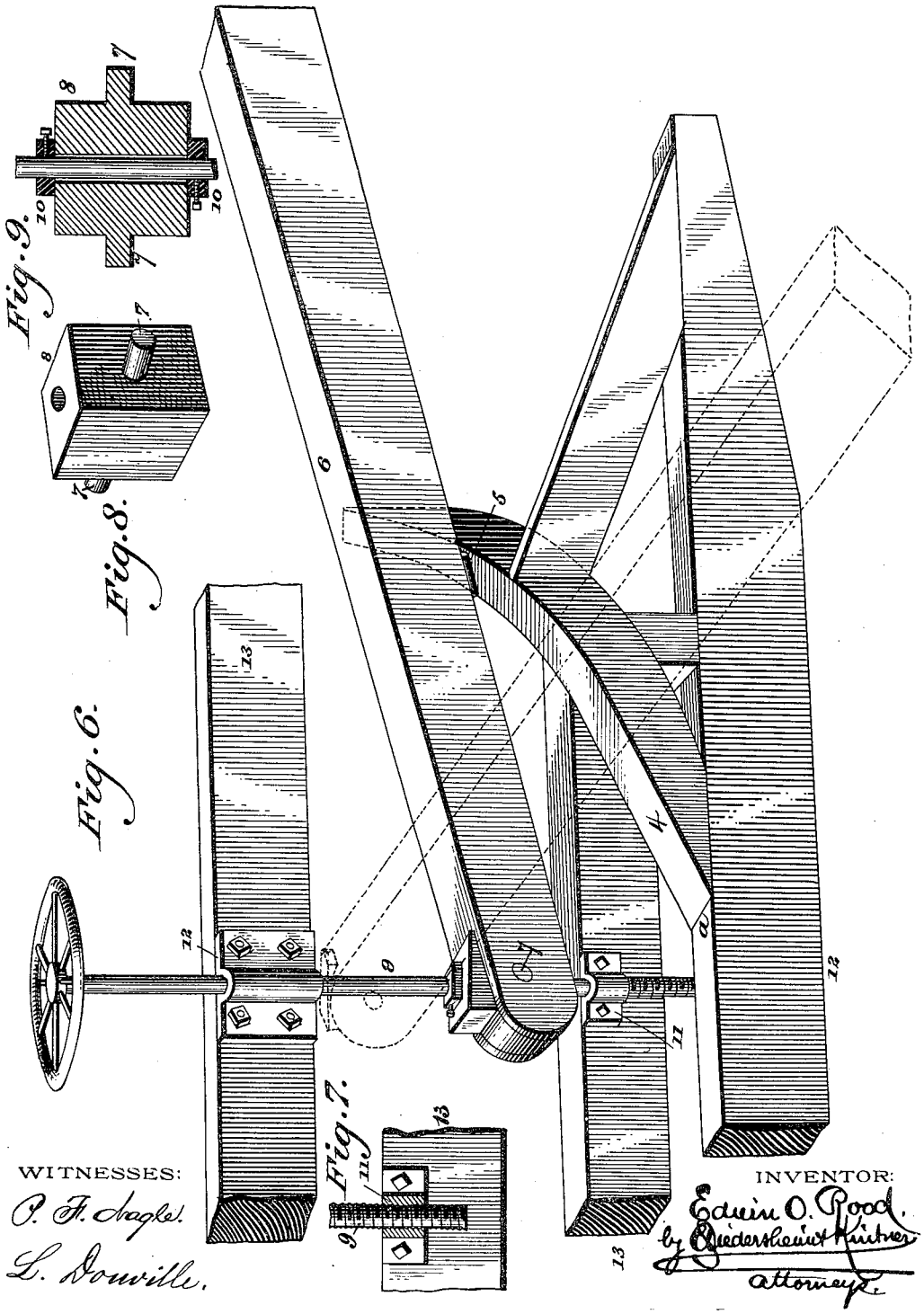

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(No Model.) 7 Sheets—Sheet 6.

E. O. ROOD.

DITCHING, DREDGING, OR EXCAVATING MACHINE.

No. 386,438. Patented July 17, 1888.

Fig. 12.

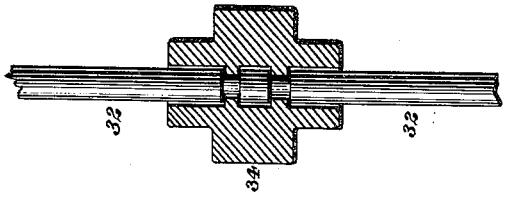

Fig. 10.

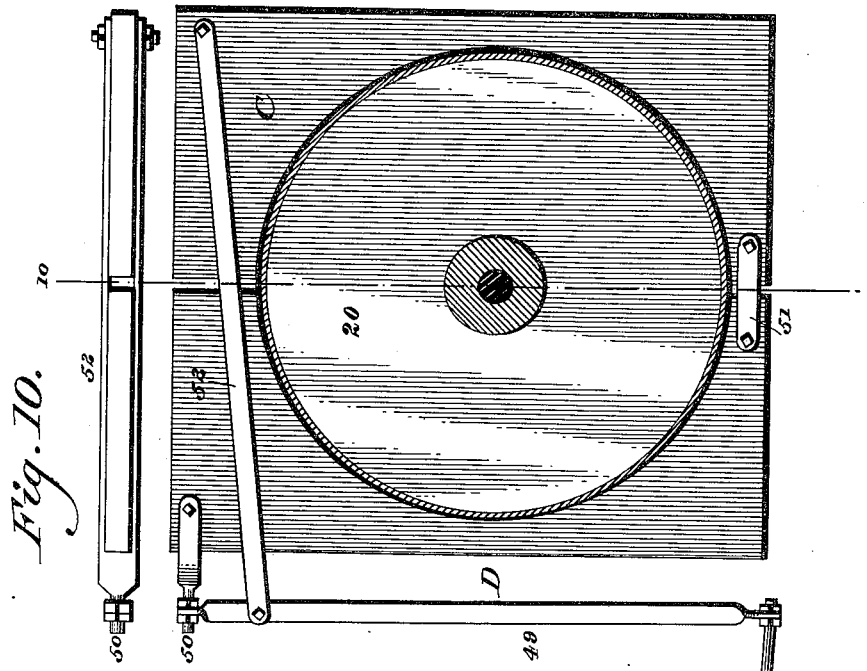

Fig. 11.

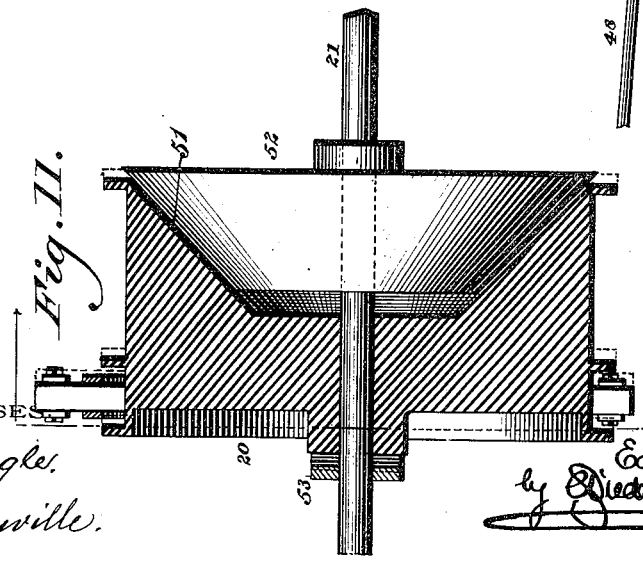

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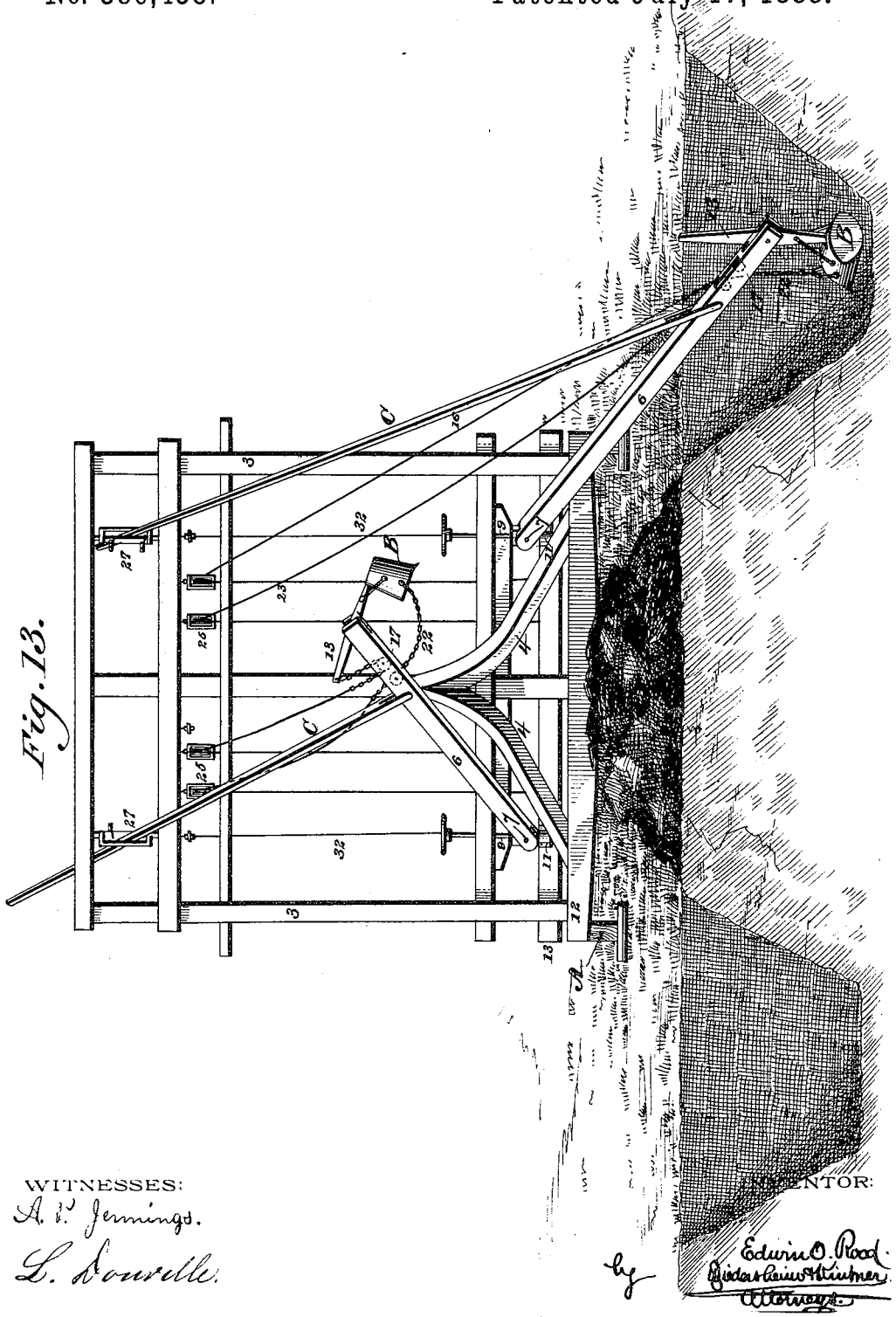
Fig. 13.



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UNITED STATES PATENT OFFICE.

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DITCHING, DREDGING, OR EXCAVATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 386,438, dated July 17, 1888.

Application filed January 19, 1888. Serial No. 261,260. (No model.)

To all whom it may concern:

Be it known that I, EDWIN O. ROOD, a citizen of the United States, residing in the city of Chicago, county of Cook, State of Illinois, have invented a new and useful Improvement in Ditching, Dredging, or Excavating Machines, which improvement is fully set forth in the following specification and accompanying drawings.

My invention consists of a ditching, dredging, or excavating machine having two swinging booms adapted to be operated alternately. By this provision the excavated earth or material may be thrown on opposite sides of a ditch or between two ditches, as desired.

It also consists of guides adapted to cause the shaping of the sides of a ditch or excavation.

It also consists of means for clamping or gripping the spar for holding the boom in position during the loading operation.

It also consists of means for adjusting the boom so that ditches of a different depth may be dug.

It further consists of novel features in the winding-drums, as will be hereinafter set forth.

Figure 1 represents a front elevation of a ditching, dredging, or excavating machine embodying my invention. Fig. 2 represents a perspective view of the winding-drums thereof and connected parts on an enlarged scale. Fig. 3 represents a perspective view of the gripping mechanism for the spar of the machine on an enlarged scale. Fig. 4 represents a perspective view of brake mechanism on an enlarged scale. Fig. 5 represents a side elevation of a boom, spar, &c., on an enlarged scale. Fig. 6 represents a perspective view of a portion of Fig. 5 on an enlarged scale. Figs. 7, 8, and 9 represent views of detached portions of Fig. 6. Fig. 10 represents side elevations of brake mechanism on an enlarged scale. Fig. 11 represents a section on line *x x*, Fig. 10. Fig. 12 represents a section of the lower portion of Fig. 3 on an enlarged scale. Fig. 13 represents a front view of a modification.

Similar letters of reference indicate corresponding parts in the several figures.

Referring to the drawings, A represents the sills on which is laid the floor 1, the latter supporting the house 2 and upright frame 3.

Sustained on the floor 1 are inclined planes 4 of segmental or curved form, and on the same ride the rollers 5, mounted on the under side of the swinging booms 6, each of the latter having its inner end hung on gudgeons 7 of a box, 8, through which is freely passed a screw, 9, it being noticed that the gudgeons 7 project horizontally from the box 8, and the screw is vertical.

Above and below each box are collars 10, which are screwed or otherwise clamped to the screw 9, whereby said box may be raised and lowered, due to the motions of the screw, the latter being fitted in a nut, 11, and guided in an eye, 12, said nut and eye being connected with beams 13 of a frame on the floor 1.

It will be seen that when the booms are operated in one direction they ride up the planes 4, and are thus elevated, the booms turning on the gudgeons 7.

The angle of the booms may be changed by operating the screws 9, whereby the inner ends of said booms are raised or lowered, by which provision the depth of the ditch to be dug may be varied.

In Fig. 1 the planes 4 diverge, and in Fig. 13 they converge. In the former case provision is made for digging or excavating a single ditch and depositing the earth or material to the sides thereof. In the latter case two ditches may be formed, and the earth or material deposited between the same.

B represents the scoops, shovels, or buckets of the machine, the same being connected with beams 13^a, which are braced, as at 14, said beams being pivoted to the booms 6, as at 15.

Chains 16 are connected with the inner ends of the beams 13 and passed around pulleys 17 on the booms near the outer ends thereof, said chains being connected with wire or other ropes, 18, passing around pulley-blocks 19, which are attached to the upper part of the frame 3, said ropes passing to and being connected with friction-drums 20, which are loosely fitted on a shaft, 21, the latter being mounted on the floor 1.

It will be noticed that the pulleys 25 are not

in a vertical line with the pivotal connections of the lower end of the boom, but are to the right and left, respectively, of the same, (see Fig. 1,) so that as chains 23 are wound upon the drums 26 and the booms are elevated the latter swing or move laterally, so as to come more directly under the pulleys.

Connected with the bails of the shovels are chains 22, to which are attached wire or other ropes 23, the latter running on pulleys 24 on the booms 6, and also on pulley-blocks 25, and passing to and connected with the hoisting-drums 26, the latter being rigidly connected with the shaft 21, above referred to.

C represents spars, which are pivoted at their lower ends to the booms and passed at their upper ends through clamping or gripping devices 27, consisting of boxes or frames 28 and gripping-plates 29, which are guided on said frame so as to move toward and from the sides of said boxes. Pivoted to the plates are links 30, which are pivoted to the outer ends of arms 31, whose inner ends are secured to vertical rods 32, which are guided in ears 33 on the boxes 28, and each formed in sections which are connected by swivel-joints 34, so that said rods may turn with the boxes without twisting.

The lower ends of the rods are jointed to crank-arms 35, connected with rock-shafts 36, to one end of each of which is secured a lever, 37, which is provided with a locking dog or pawl, 38, which engages with either end of the notches or teeth 39 of a quadrant, 40, it being noticed that when the levers are operated in one direction the rods 32 are lowered, whereby, owing to the arms 31, the links 30 are forced inwardly, thus pressing the plates 29 against the spars and firmly gripping the same. When the levers are moved in the opposite direction, the rods are raised, whereby the plates 29 are withdrawn from the spars and the latter released. Adjacent to the quadrants 40 are quadrants 41, which have teeth or notches 42, with either of which engage dogs or pawls 43 on levers 44, it being noticed that the quadrants 40 and 41 are mounted on the floor 1. The levers 44 are secured to rock-shafts 45, which carry cranks 46 and 47.

To the cranks 46 are attached connecting-rods 48, to which are secured the levers 49, the upper ends whereof are attached at 50 to brakes D, the latter being formed in sections or shoes, each having semi-cylindrical faces to embrace the loose drums 20, it being noticed that the sections or shoes are connected at one end by links 51, whereby they may open and close. To one section of each brake are pivoted the brake-bars 52, which are pivoted to the lever 49 below the place of connection 50 of said lever with the other section of the brake. The loose drums 20 have conical recesses 51 in their inner sides to receive the friction-cones 52, which are rigidly secured to the shaft 21 and act as a clutch.

To the cranks 47 are pivoted rods or bars 53, the opposite ends, 54, of which are bifurcated to embrace the shaft 21, and made of wedge shape and bearing against the outer sides of the loose drums 20, so that at a proper time said drums are forced into engaging contact with the cones 52, and thus caused to rotate therewith.

It will be seen that the cranks 46 and 47 project in opposite directions or at right angles to each other. Consequently when the levers 44 are operated in one direction the wedge 54 is withdrawn, whereby the loose drums are disengaged from the cones and the rods 48 are forced from the brakes. Consequently, owing to the levers 49, the connection 50, and the bars 52, the two sections of the brake are forced toward each other, and thus closed on the loose pulleys, thus braking or holding the same. Now when the levers 44 are operated in the opposite direction, the brake-sections are separated and the loose drums released therefrom. Simultaneously therewith the wedges 54 are forced against the loose drums and the latter moved into locking-contact with the friction-cones, so as to receive rotation therefrom.

The operation is as follows: When the parts are in position, (shown in Fig. 1,) the left-hand shovel is represented as in the act of loading, while the right-hand shovel has its contents discharged and the boom is about to descend. When a shovel comes in contact with the earth, it is advanced, owing to the chains 22 and rope 23, the latter being wound upon the drum 26, said shovel turning with its beam 13^a on the boom 6, as shown by the dotted lines, Fig. 5. When the loaded shovel strikes the boom, the latter receives motion, owing to the continued winding of the rope 23 on the drum 26. Prior to this time the spar C has been gripped by the plate 29 and boxes 28, so as to hold the boom immovable during the loading operation. When the boom is about to ascend, the workman or operator moves the lever 37 so as to raise the rod 32, whereby the plate 29 is withdrawn and the spar released. The boom ascends and rides on the guide or plane 4, whereby it is both elevated and swung laterally or to one side, and continues to ascend to its full extent. When the lever 37 is moved, the lever 44 is also moved, whereby the loose drum is engaged with the adjacent friction-cone, so that said drum rotates and the slack rope 18 wound thereon, said rope then exerting a draft on the beam 13^a of the shovel. The engine or motor is now reversed, so as to rotate the shaft 21 in opposite direction to that previously running. The rope 23 is thus unwound and slackened, and the shovel under action of the cord 18 on the beam 13^a is overturned and its load dumped, the position of parts being shown at the right-hand side of Fig. 1. The operator now allows the rope 18 to play out, and controls the same by means of the brakes D, which are in turned controlled by the lever 44 in the hand of the operator. As

the rope 18 plays out, the shovel is permitted to descend, which it does, and the boom rides down the guide 4 to the position necessary for the shovel to take a fresh load. The engine or motor is again reversed and the grip operated so as to hold the spar. The rope 23 begins to wind, the shovel is advanced against the earth and takes a load, the shovel then being further carried toward the boom and the latter raised, after which the other operations are similar to those hereinbefore set forth.

It will be seen that the operation of the two booms and shovels with connected parts is such that as one shovel is being loaded the other is being unloaded.

The slope or pitch of the sides of the ditch is determined by the nature of the lower portions of the upper faces of the guides 4, and said portions may be changed, as desired, to vary said slope or pitch so as to increase or decrease the same.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A ditching, dredging, or excavating machine having two shovel-carrying booms adapted to be alternately operated, substantially as described.

2. A ditching, dredging, or excavating machine having two booms with connected shovels, two guides extending in opposite directions, chains or ropes connected with the shovels for raising and overturning the same, and winding mechanism, whereby the booms are alternately operated in order to advance and return the shovels to and from the ditch or excavation, load the same, and discharge the excavated material on opposite sides of the excavation, substantially as described.

3. A ditching, dredging, or excavating machine having a boom, a pivotal connection for said boom, consisting of a box with gudgeons and a screw passing through said box, and an inclined guide, said parts being combined substantially as described.

4. A ditching, dredging, or excavating machine having a boom, a spar pivoted to said boom, a box through which the upper end of said spar passes, a gripping device attached to said box, and mechanism, substantially as described, for operating said gripping device, said parts being combined substantially as and for the purpose set forth.

5. A ditching, dredging, or excavating machine having a pivotal boom whose axis is vertically adjustable for forming ditches or excavations of different depths, substantially as described.

6. A ditching, dredging, or excavating machine having a boom pivoted at its inner end and an inclined guide of circular form, on which said boom is adapted to bear, said parts being combined substantially as and for the purpose set forth.

7. A swinging boom pivoted to a box which is vertically adjusted by means of a screw, substantially as described.

8. In a ditching, dredging, or excavating machine, a swinging boom, in combination with the box 8, the screw 9, collars 10, and the nut 11, said box being freely fitted on said screw and connected therewith by said collars, substantially as described.

9. A ditching, dredging, or excavating machine having a boom pivoted at its inner end and having a roller on its under face and an inclined guide of segmental form, said parts being combined substantially as and for the purpose set forth.

10. In a ditching, dredging, and excavating machine, a boom pivoted to the frame of the machine and having a pulley thereon, a beam pivoted to the boom and having a shovel connected therewith, a pulley secured to the frame of the machine above and out of the vertical line of the pivoted lower end of the boom, a winding-drum, and a chain connected to said shovel and winding-drum and passing around said pulleys of the boom and frame, said parts being combined as described, whereby both a lateral and elevating movement is imparted to said boom.

11. In a ditching, dredging, and excavating machine, a winding-drum having a brake formed of linked sections and an operating device consisting of a lever pivoted at one end to one of the said sections and having a bar pivoted to the other section, the said bar being pivotally connected to said lever, said parts being combined substantially as and for the purpose set forth.

12. A fixed drum and a loose drum, in combination with a friction cone or clutch adapted to engage with said loose drum, in combination with chains or ropes connected with said drums and with opposite portions of the overturning shovel, substantially as described.

13. In a ditching, dredging, and excavating machine, a rising-and-falling boom pivoted at its lower end, a spar pivoted to said boom, and a guide in which the upper end of said spar has free play, said parts being combined substantially as and for the purpose set forth.

14. In a ditching, dredging, or excavating machine, a clamping or gripping device for the spar, consisting of a frame, a movable plate, a movable rod, and arms and links connected with said rod and plate, whereby the clamp or grip is operated, substantially as described.

15. In a ditching, dredging, and excavating machine, a rising-and-falling boom pivoted at its lower end and having rollers or pulleys thereon, a shovel having its beam pivoted to said boom, operating-chains connected, respectively, to said beam of shovel, a hoisting-drum, and a loose drum on the same shaft, said parts being combined substantially as and for the purpose set forth.

16. The rod 32 and the clamping or gripping device of the spar, in combination with the

rock-shaft 36, mounted on the frame of the machine, a lever, 37, connected with said shaft, a toothed quadrant, and a pawl on said lever engaging with said quadrant, substantially as described.

17. In a ditching, dredging, or excavating machine, a rock-shaft and an operating-lever therefor, in combination with a crank connected with said shaft, and a rod connected with said crank and with a brake, the latter embracing a winding-drum, which is loosely mounted on the shaft and rotated by the same through the medium of a friction cone or clutch fixed to said shaft, substantially as described.

18. In a ditching, dredging, or excavating machine, a winding-drum loose on its shaft, and a clutch rigidly connected therewith, in combination with means for causing the engagement of said drum and clutch, consisting of a wedge, a bar carrying said wedge, a crank connected with said bar, and a rock-shaft carrying said crank, substantially as described.

19. In a ditching, dredging, or excavating machine, a rock-shaft, 45, carrying two cranks, 46 47, projecting in opposite directions, in combination with a brake and clutch mechanism, said brake and mechanism being alternately operated by said cranks, substantially as described.

20. A ditching, dredging, or excavating machine having a boom, an adjustable pivotal connection for inner end of said boom, and a guide of segmental form having an inclined upper face, said parts being combined substantially as and for the purpose set forth.

21. A ditching, dredging, or excavating machine having a boom with pivotal connection for inner end, consisting of a box, a vertical screw, collars adjustable on said screw, and beams secured to the frame of the machine and having eyes attached thereto and in which said screw is guided, said parts being combined substantially as and for the purpose set forth.

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