F. W. UMBREIT.

DITCHING MACHINE.

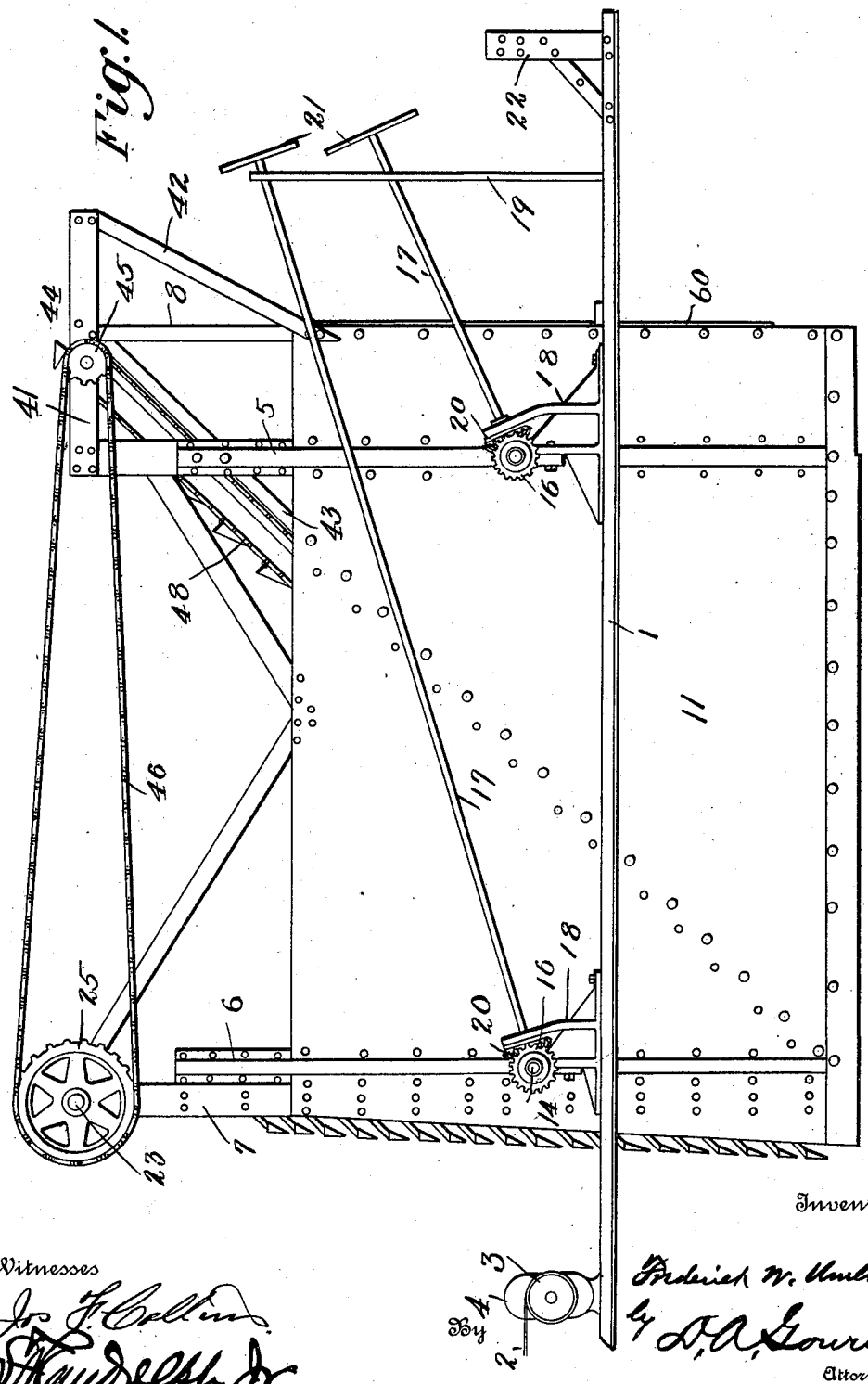
APPLICATION FILED APR. 10, 1909.

1,000,309.

Patented Aug. 8, 1911.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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3 SHEETS—SHEET 2.

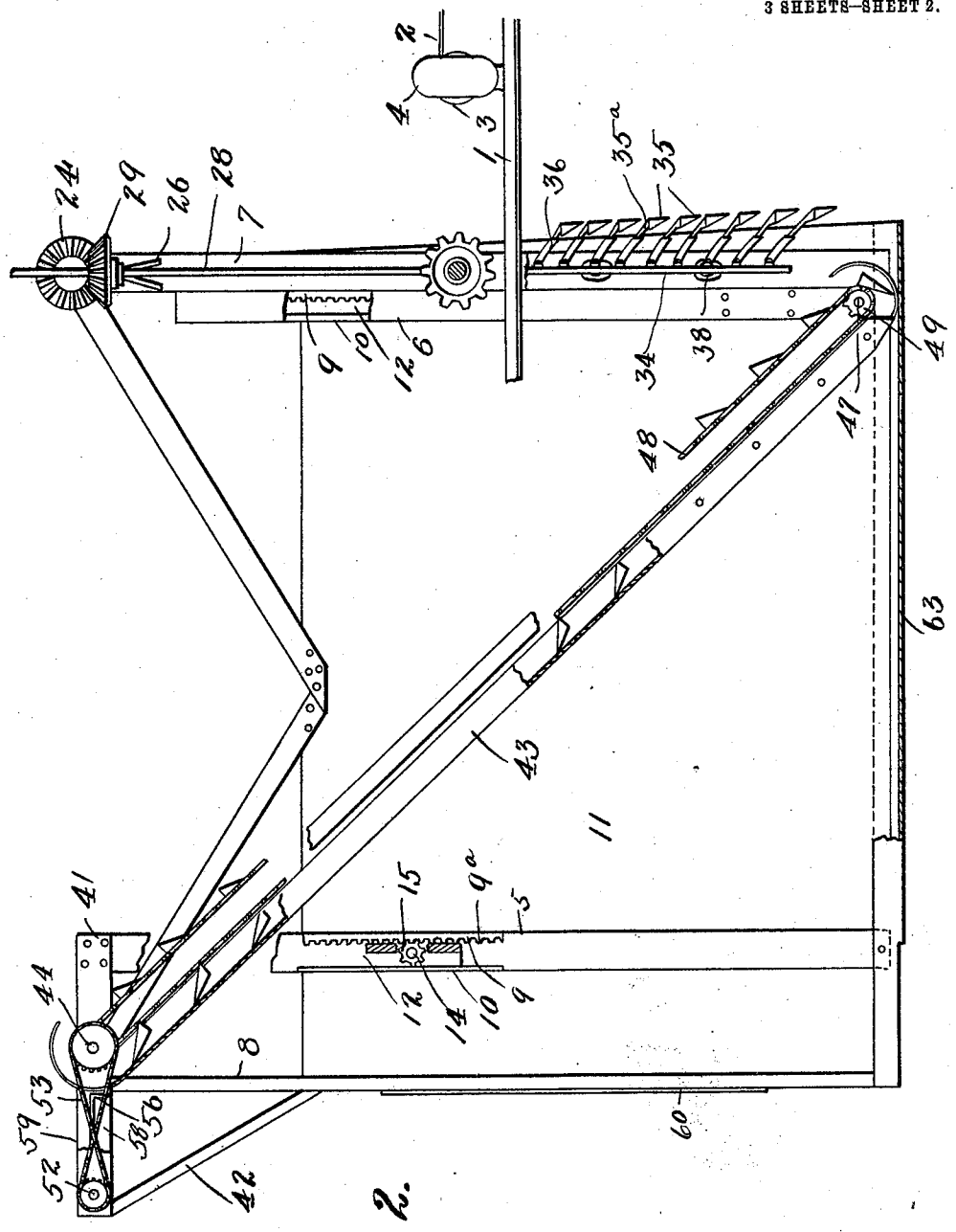

Fig. 2.

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3 SHEETS—SHEET 3.

Fig. 3.

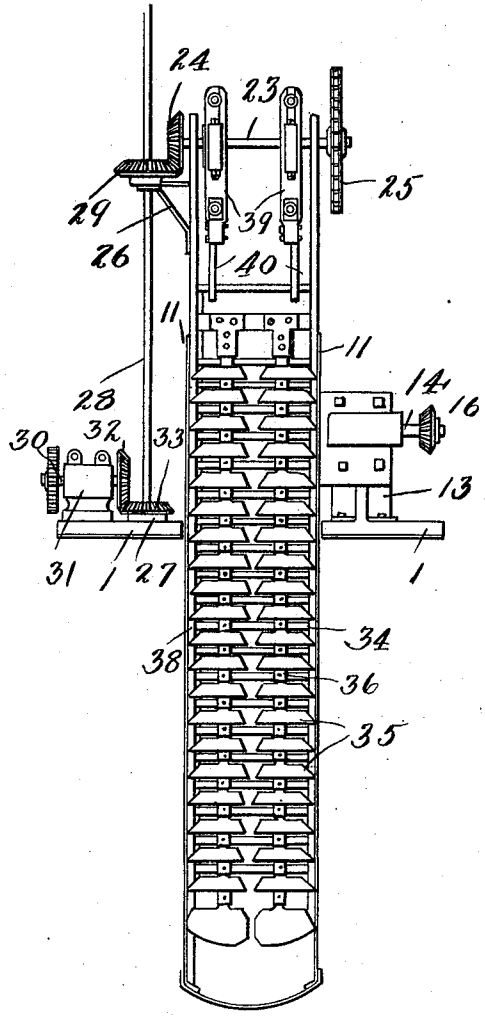


Fig. 4.

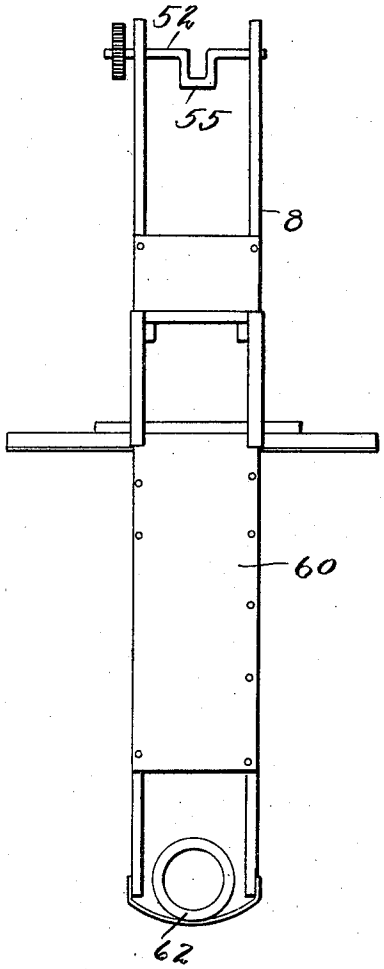


Fig. 5.

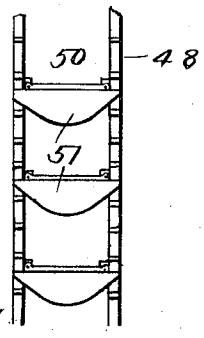
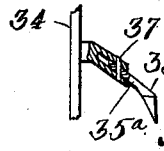


Fig 6.



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UNITED STATES PATENT OFFICE.

FREDERICK W. UMBREIT, OF CLARION, IOWA, ASSIGNOR OF ONE-HALF TO LINUS P. STILLMAN, OF DOLLIVER, IOWA, AND ONE-HALF TO JAMES E. WILLIAMS, OF DENVER, COLORADO.

DITCHING-MACHINE.

1,000,309. Specification of Letters Patent. **Patented Aug. 8, 1911.**

Application filed April 10, 1909. Serial No. 489,128.

To all whom it may concern:

Be it known that I, FREDERICK W. UMBREIT, a citizen of the United States, residing at Clarion, in the county of Wright and State of Iowa, have invented certain new and useful Improvements in Ditching-Machines, of which the following is a specification.

My invention relates to machines for digging ditches and has for its object the provision of a machine having a mechanically operated digging device in the front to break down the earth, a casing behind the digging device to hold back the side walls, a conveyer to carry the earth from the front and dump it in the rear of the machine, and a chamber under the conveyer for laying pipe or tiles while the digging and refilling progresses, said chamber being partly floored to form a place for the operator to stand as well as to smooth the bottom of the ditch wherein is placed the pipe or tile and hold back any sandy or marshy formations that might be encountered.

My invention will be described in detail hereinafter and illustrated in the accompanying drawings in which—

Figure 1 is a side view in elevation of my improved ditching machine, Fig. 2, a longitudinal sectional view, Fig. 3, a front view, Fig. 4, a rear view with some of the parts omitted, Fig. 5, a fragmental view of the elevator, and Fig. 6, an enlarged view of one of the picks.

In the drawings similar reference characters indicate corresponding parts in all of the views.

My improved ditching machine is mounted on two shoes 1 constructed to slide over the surface of the ground and is drawn forwardly by means of a rope or cable 2 secured to a stake (not shown) toward which the ditch is to be dug, and wound upon a windlass 3 operated by a suitable motor 4 of any preferred type supported on the shoes 1.

Slidably mounted between the shoes 1 is a casing consisting of a frame composed of vertical beams 5 and 6 adjacent to the front and rear ends thereof, and beams 7 and 8 at the front and rear respectively, the former being inclined slightly to the rear. Secured to the outer faces of beams 5 and 6 are strips 9 and 10, the former being provided with gear teeth 9^a, and secured to the outer faces of strips 9 and 10 and to beams 7 and 8 are plates of metal 11 that constitute the vertical walls of the digging apparatus, said plates when in position serving to hold back the sides of the ditch while being dug. The plates 11 are spaced apart over the beams 5 and 6 to form slots 12.

13 indicates supports secured to the shoes 1 in which are journaled shafts 14 and said shafts have pinions 15 secured thereto mounted in slots 12 and meshing with gear teeth 9^a, and said shafts also have beveled gear wheels 16 secured thereto.

17 indicates shafts journaled in standards 18 secured to supports 13 and standard 19 mounted on shoes 1, said shafts having beveled gear wheels 20 secured thereto and meshing with beveled gear wheels 16, and hand operated wheels 21 on their ends which are so elevated that they may be reached from a platform 22 erected at the rear of the shoes 1 for the use of the operator.

It will be apparent from this construction that the casing may be raised and lowered as desired by the operator by turning shafts 17, the depth and pitch of the ditch being positively secured thereby, as the shoes 1 will at all times rest upon the surface of the ground and the position of the digging device relative thereto will determine the character of work accomplished.

23 indicates a shaft journaled on the upper ends of beams 7 and having a beveled gear wheel 24 secured to one end thereof and sprocket wheel 25 secured to its other end.

26 indicates a laterally extending bracket secured to one of the upright beams 7, 27 a journal box on the shoe 1 on the corresponding side of the machine, 28 a shaft rectangular in cross section journaled in journal box 27 and slidably and rotatably mounted in bracket 26, and 29 a beveled gear wheel resting on the bracket, loosely engaging the shaft 28 and meshing with beveled gear wheel 24.

30 indicates a shaft journaled in support 31 mounted on shoe 1 driven by motor 4, and having a beveled gear wheel 32 secured thereto that meshes with beveled pinion 33 secured to shaft 28.

34 indicates a frame made up of vertical and horizontal bars and having a series of digging knives 35 mounted thereon the shanks 35^a being secured in socket members 36 on the frame 34 by means of wooden, or other easily fractured pin 37 that is strong

enough to withstand the resistance of ordinary soil but which will break should the digging knife or pick encounter a stone or other hard substance to permit the shank 35ª to retreat into the socket so that the blade cannot break.

38 indicates projections secured adjacent to the front end of the digging device in which the frame 34 is slidably mounted.

39 indicates eccentrics mounted on shaft 23 and connected to frame 24 by means of links 40.

The vertical beams 6 and 8 are, as shown, extended above the top of metal plates 11 and have horizontal beams 41 secured thereto that are extended beyond the rear of beam 8, the rear ends of said beams being supported by braces 42.

43 indicates a trough of sheet metal or other preferred material secured to plates 11 and beams 6 and 41 and, as shown, inclining upwardly from the lower front end of the digging device.

44 indicates a shaft journaled on beams 41 having a sprocket wheel 45 secured thereto and geared to sprocket wheel 25 by means of chain 46.

47 indicates a shaft journaled adjacent to the lower ends of beams 5 and 48 an endless chain conveyer geared to sprocket wheels 49 on said shafts 44 and 47. Conveyer 48 has cross rods 50 secured thereto on which brackets 51 are pivotally secured consisting of scoop-like receptacles that engage the bottom of trough 43 and push the dirt that is broken down by the digging knives 35 up to the top of the trough.

52 indicates a shaft journaled adjacent to the ends of horizontal beams 41 and rotated by a belt and pulley gearing 53, and 54 an arm secured to crank 55 in shaft 52 and having a blade 56 on its free end.

57 indicates a cross-piece secured to beams 41 to support arm 54.

It will be understood from this construction that the arm 54 and blade 56 constitute a hoe-like structure that is given a reciprocating motion by crank 55 so as to scrape the dirt off of the brackets 51 as they reach the top of the trough, the mechanism being so timed as to secure this operation, and the dirt falls through the opening 58 in platform 59, secured to beams 41 into the ditch behind the digging frame, a plate 60 being secured to the rear end of the frame to prevent the dirt from piling up inside of the casing, an opening 61 being left, however, in which the pipe 62 is laid.

63 indicates a plate secured to the bottom of the vertical plates 11, to form a platform for the operator who lays the pipe as the machine progresses and also serves to hold back soft formations of soil that may be encountered.

The plate 63 is preferably made shorter than the length of the casing with an opening at the rear end of the casing, where the pipe is laid when progressing through solid soil formations but when soft formations are encountered the pipe may be laid on the plate 63, to insure getting it in the proper position the plate sliding out from under the pipe as the machine progresses.

Having thus described my invention what I claim is:—

1. In a ditching machine, shoes adapted to slide on the surface of the ground, a casing mounted between said shoes consisting of vertical beams, strips secured to said beams, one of said strips having gear teeth, and plates of rigid material secured to said strips and spaced apart over said beams to form slots, shafts journaled on said shoes, pinions secured to said shafts and meshing with said gear teeth, and means to rotate said shafts to raise and lower the casing.

2. A ditching machine comprising shoes adapted to slide on the surface of the ground, a casing having gear racks thereon mounted between said shoes, journal supports secured to said shoes, shafts journaled in said supports, pinions secured to said shafts and meshing with said gear racks, hand operated means to rotate said shafts to raise and lower the casing, a frame slidably mounted in the front of the casing, digging knives secured to said frame and an endless bucket conveyer mounted in the casing.

FREDERICK W. UMBREIT.

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