No. 671,925. Patented Apr. 9, 1901.

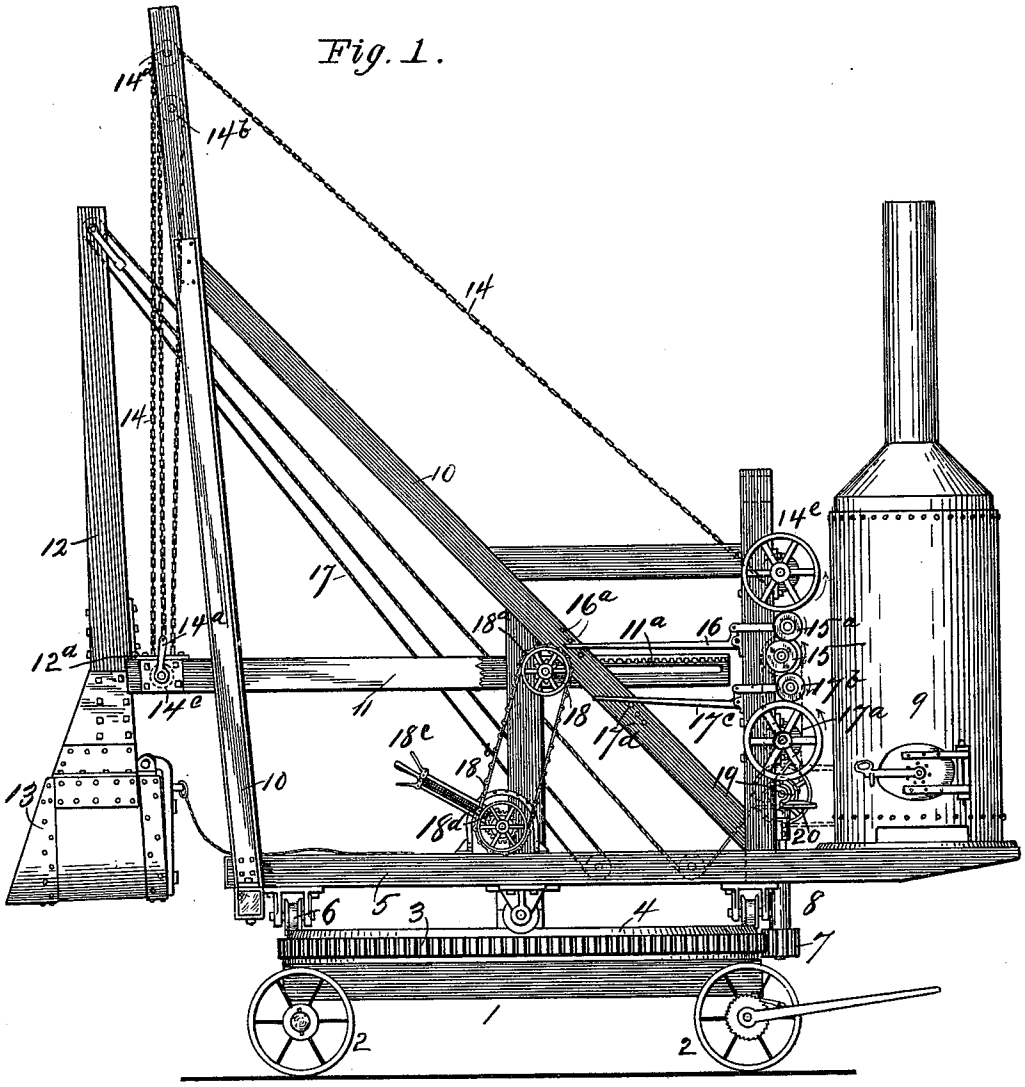
D. H. SNYDER.

EXCAVATING MACHINE.

(Application filed May 7, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

David C. Walter

L. C. Bruce

INVENTOR.

Dillon H. Snyder,

By his Atty.

Munn & Co.

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Fig. 2.

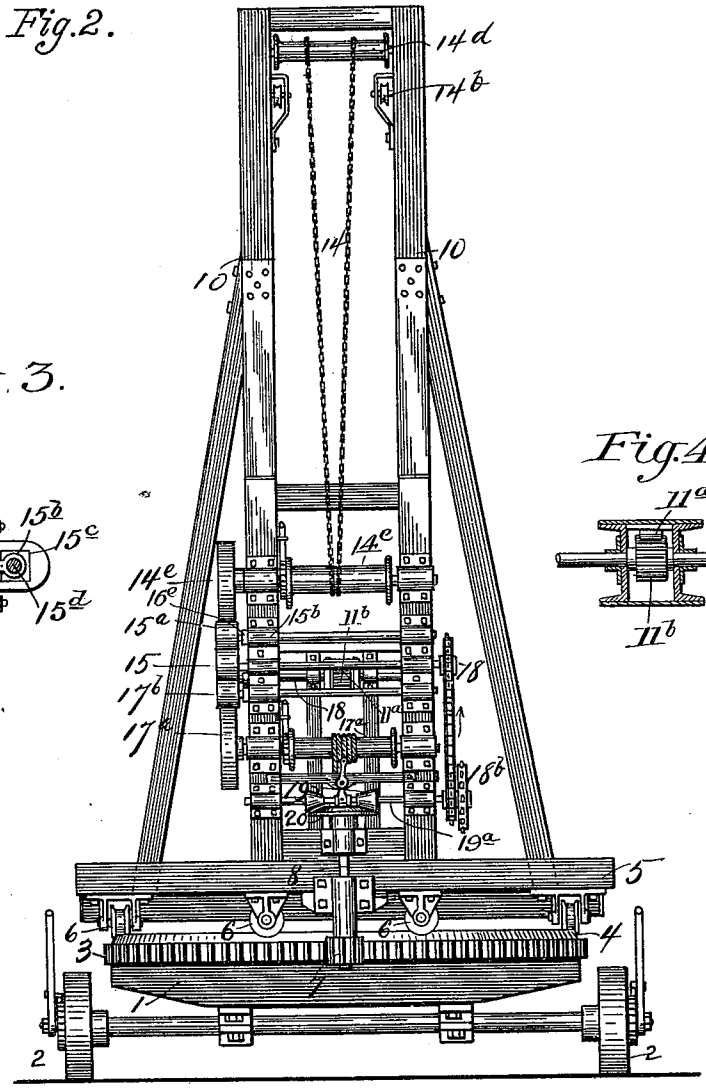


Fig. 3.

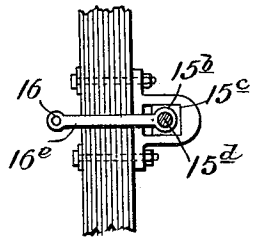
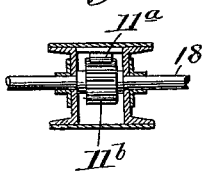


Fig. 4.



WITNESSES:

David C. Walter

C. E. Dunn

INVENTOR.

Dillon H. C. Snyder.

By his Attorney,

Munn & Co.

UNITED STATES PATENT OFFICE.

DILLON H. SNYDER, OF TOLEDO, OHIO, ASSIGNOR OF ONE-HALF TO CHARLES M. HARRISON AND NATHAN BABCOCK, OF NAPOLEON, OHIO.

EXCAVATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 671,925, dated April 9, 1901.

Application filed May 7, 1900. Serial No. 15,698. (No model.)

To all whom it may concern:

Be it known that I, DILLON H. SNYDER, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Excavating-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to small portable excavating-machines especially well adapted for operating in pits and trenches; and one object is to provide a construction whereby the digging operation may be carried on in any direction without moving the base of the machine.

The further object of my invention is to provide a novel and convenient mechanism for powerfully actuating and for guiding and controlling the scoop or shovel hereinafter referred to.

I attain these objects by means of the mechanism and arrangement of parts hereinafter described, and shown and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my machine ready for operation; Fig. 2, a rear elevation of the same with the boiler, engine, dipper, dipper-arm, and boom removed; Fig. 3, a side elevation of a bearing of a shaft of a friction-wheel hereinafter referred to, showing a device for moving one end of a shaft laterally; and Fig. 4 is an enlarged transverse sectional elevation of the boom, hereinafter referred to, together with the shaft, pinion, and rack provided to actuate said boom longitudinally.

Like numerals of reference indicate like parts throughout the drawings.

In the drawings, 1 is a stout frame mounted on a low truck, the wheels of which, 2, may be actuated manually or by any suitable mechanism connected with the engine of the machine. Upon the frame 1 is secured a circular rack 3, upon which is a circular track 4. 5 is a stout platform or frame resting upon grooved rollers or wheels 6, which rest and travel upon the circular track 4. A pinion 7, having a vertical shaft 8, is suitably connected with the engine of the machine, and by the rotation of this pinion in engagement with the circular rack 3 the frame or platform 5 and its superimposed load are caused to rotate horizontally, as a turn-table. The boiler 9 and the engine (not shown in the drawings) are fixed upon a projecting portion of the floor-frame 5 at one side of the machine, the weight of the derrick, dipper, dipper-arm, and boom being disposed at the opposite side of the floor-platform, so that the two weights balance each other. From the side of the floor-frame opposite the boiler spring two upright pieces 10, suitably braced, as shown, and forming a derrick.

11 is a boom projecting between the members of the derrick 10 and having pivotally secured to its outer extremity, as at 12^a, the dipper-arm 12, carrying a dipper or shovel 13 of the usual form or of any other preferred construction. The boom 11 is supported at its outer end by means of rope or chain 14, which at one end is secured to the boom, as at 14^a, passing thence over pulley 14^b, thence over a pulley 14^c on the boom, thence over a roller 14^d at the top of the boom, and thence to a drum 14^e, journaled in a stout upright frame in the rear of the machine. The opposite or inner end of the boom 11 is supported as follows: The boom is provided with a horizontal transverse slot, as shown in Fig. 1, in which slot is a toothed rack 11^a. Through this slot passes shaft 18, journaled upon the frame of the machine and having rigidly secured thereto a pinion 11^b in engagement with the toothed rack 11^a. It will be seen that the shaft 18 while permitting the longitudinal movement of the boom forms a support for the boom. The drum 14^e is driven and controlled by means of a friction-wheel 15 and an intermediate friction-wheel 15^a, mounted fixedly on shaft 15^d, journaled at one end in box 15^b, which slides in housing 15^c, as illustrated in Fig. 3. The opposite end of shaft 15^d is loosely journaled in the frame to allow lateral play of the sliding box 15^b. The friction-wheel 15 is driven by connections with the engine, the wheel 15^a being arranged to be thrown into and out of engagement with the driving-wheel and the driven wheel by means of lever 16, which is

connected with sliding box 15^b by means of connecting-rod 16^e. (See Fig. 3.) This lever may be held in any desired position by means of the pegs or stops 16^a. The dipper-arm 12 is swung on its pivot 12^a by means of the rope or chain 17, secured to the outer extremity of the dipper-arm and passing over a series of pulleys, as shown, to drum 17^a. This drum is driven and controlled by the driving friction-wheel 15 through an intermediate friction-wheel 17^b, which is, as above described, thrown into and out of engagement with the driving and driven wheels by means of lever 17^c. This lever may be secured in any desired position by means of stops or pegs 17^d.

Upon the boom 11, at its end opposite the pivot 12^a, is a rack engaged by a pinion upon the shaft 18. Upon this shaft is a driving-wheel 18^a, which may be driven either manually or by any suitable connection with an engine. In this example I have shown by way of illustration the wheel 18^a driven by a chain and sprocket 18^b and lever 18^c carrying a detent 18^d, arranged to be thrown into and out of gear with the driving sprocket-wheel. When the pinion on the shaft 18 is rotated, the boom 11 is projected and retracted, and thus when the dipper is in the position shown in Fig. 1 it may be driven bodily and powerfully in a right line directly against the face of a bank. This is found to be a valuable feature in finishing excavations having vertical banks or faces.

The pinion 7 on shaft 8 may be driven in either direction and the turn-table caused to swing as may be desired by means of a pair of cone friction-wheels 19, mounted and longitudinally movable upon shaft 19^a, suitably connected with the engine. The cones 19 are adapted to be thrown into or out of engagement with opposite sides of cone-wheel 20, fixed upon the shaft 8.

The operation of my device is as follows: The machine being in position and the engine being in motion, the boom 11 is lowered to the desired point by paying out the rope or chain 14. The cutting portion of the dipper or shaft 13 may now be caused to describe the arc of a circle by winding up the rope or chain 17 upon its drum, thus swinging the dipper-arm on its pivot. If desired, the dipper may be forced powerfully forward in a right line by means of the rack 11^a and pinion on shaft 18. At the same time, if desired, the boom may be lifted by means of the rope or chain 14. Thus it will be seen that the dipper may be given, either simultaneously or separately, three different motions—viz., a curvilinear motion upon its pivot 12^a, a horizontal movement with the boom 11, and a vertical movement by means of the rope or chain 14. The dipper having been filled and being ready to dump, a lever or treadle (not shown) throws the friction-gear 19 20 into operation. The device is now swung upon its turn-table to the proper position, where the load is dumped in the usual manner. Now by a reversal of the above operation the dipper or shovel is returned to the proper place and the operation is repeated, and so on.

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

1. In an excavating-machine, a boom, a dipper-arm, a dipper or shovel secured to said dipper-arm, pivotal connections between the boom and the dipper-arm, means for longitudinally projecting and retracting the boom, means for swinging the dipper-arm upon its pivot, and means for raising and lowering the boom.

2. An excavating-machine, comprising a truck, a turn-table thereon, an engine and boiler mounted on the turn-table at one side, a derrick on the turn-table at the opposite side, a boom, means for projecting and retracting the boom, means for raising and lowering the boom, a dipper-arm having a dipper or shovel secured thereto, pivotal connections between the end of the boom and the dipper-arm, and means for swinging said dipper-arm on said pivot.

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

DILLON H. SNYDER.

Witnesses:

WILBER A. OWEN,

L. E. BROWN.