

(No Model.)

2 Sheets—Sheet 1.

M. E. PUGH.
EXCAVATING MACHINE.

No. 582,683.

Patented May 18, 1897.

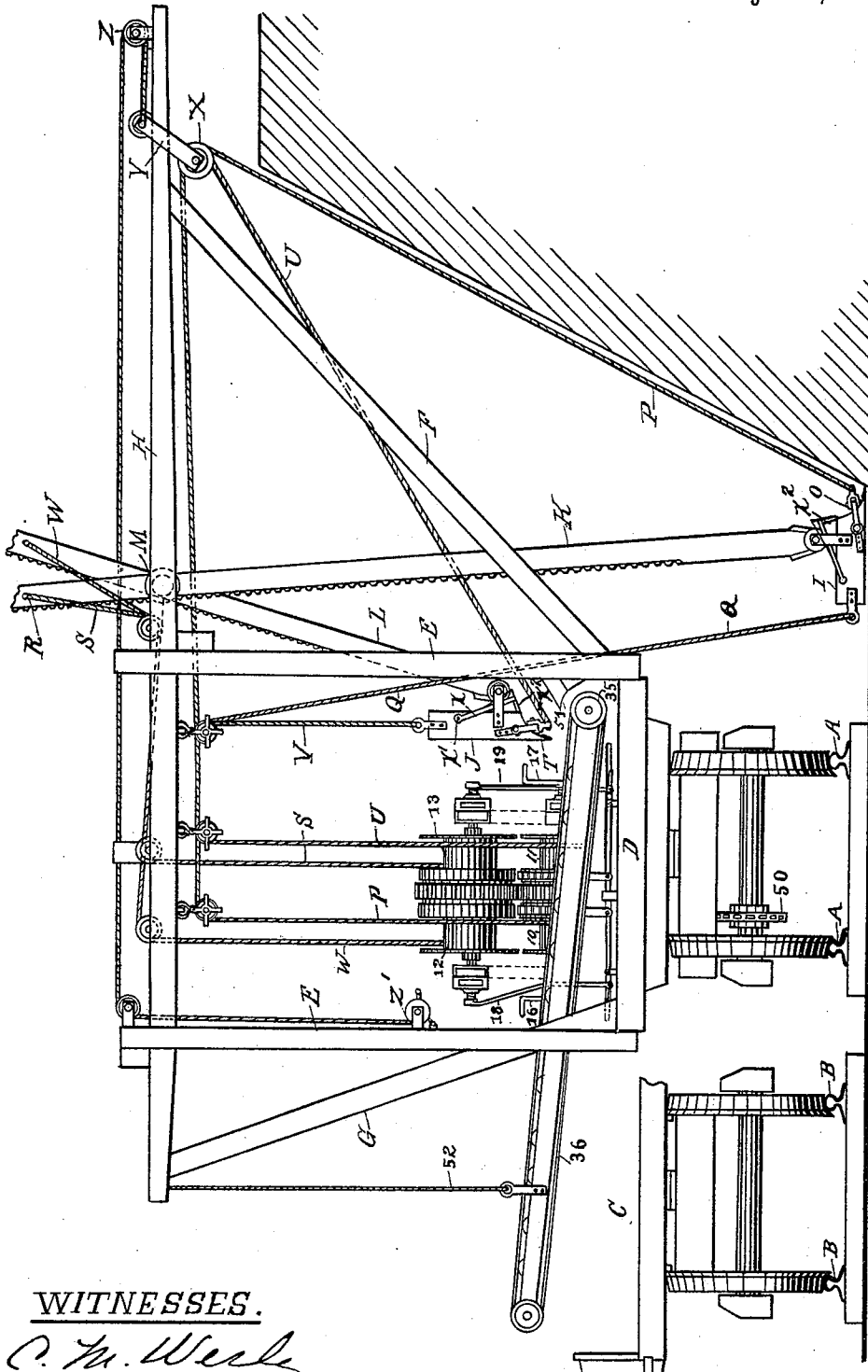


Fig. 1.

WITNESSES.

C. M. Welch
E. C. Duffey

M. E. Pugh
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INVENTOR.

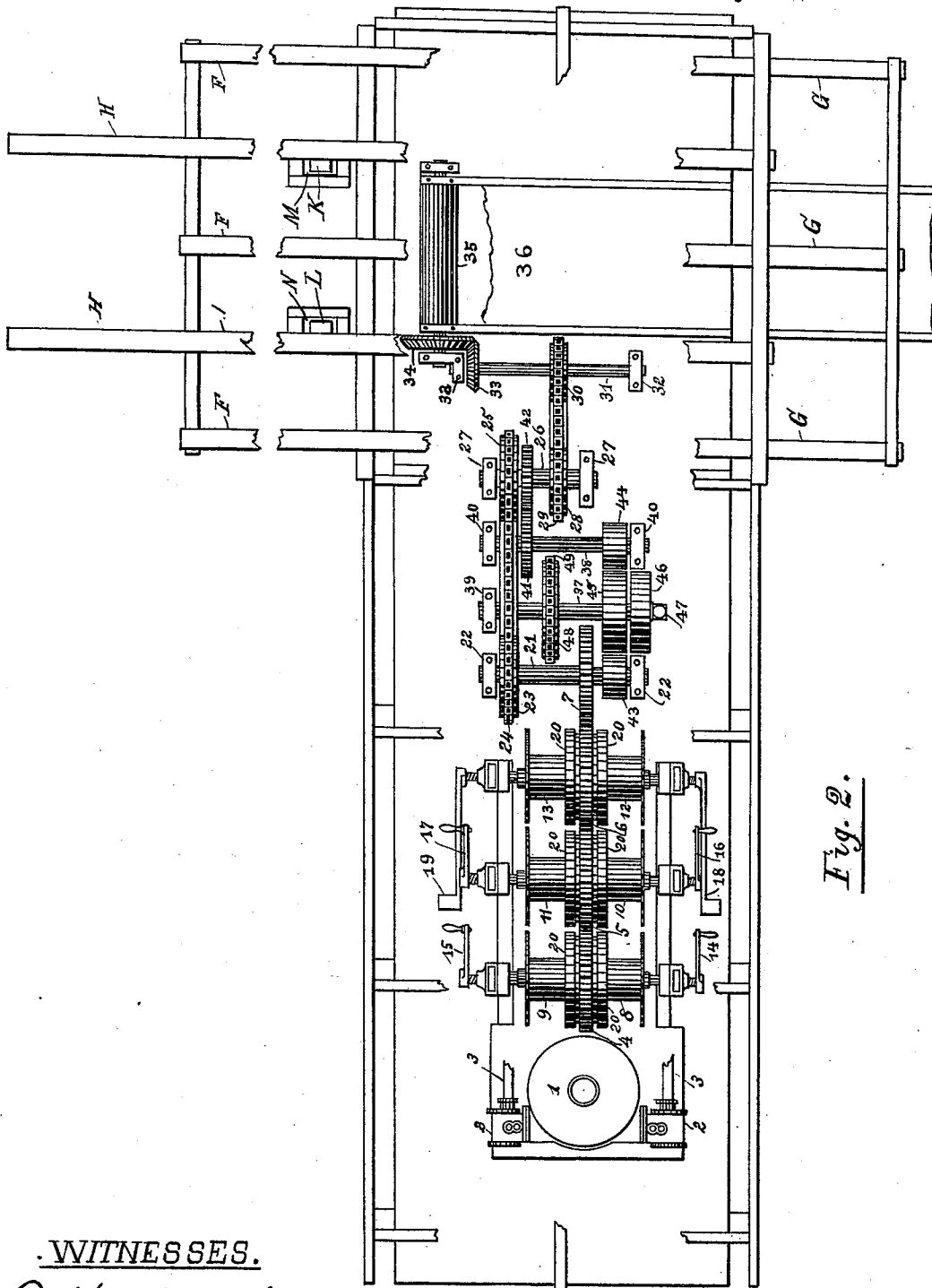
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2 Sheets—Sheet 2.

M. E. PUGH.
EXCAVATING MACHINE.

No. 582,683.

Patented May 18, 1897.



WITNESSES.

C. M. Werle
E. C. Duffy

INVENTOR.

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UNITED STATES PATENT OFFICE.

MORTON E. PUGH, OF CHICAGO, ILLINOIS.

EXCAVATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 582,683, dated May 18, 1897.

Application filed June 16, 1896. Serial No. 595,794. (No model.)

To all whom it may concern:

Be it known that I, MORTON E. PUGH, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful
5 Improvements in Excavating-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying
10 drawings, and to the letters and figures of reference marked thereon, which form part of this specification.

My invention relates to improvements in
15 excavating or shoveling machines, and particularly to that class in which shovels or dippers are fastened to the ends of long handles operating from stationary booms by means of engines running continuously; and
20 it consists in the mechanism hereinafter described, and particularly pointed out in the claims.

The object of my invention is, first, to provide a traveling power-shovel and car running upon tracks, with a parallel pair of tracks
25 adjacent thereto, so that the cars to be filled with the excavated material need not be moved as the operation of filling proceeds, but the shovel-car is itself propelled by its engine; second, to provide a pair of shovels
30 or dippers upon the ends of handles working through stationary booms, which may be operated either simultaneously or alternately, and, third, to provide means for pressing the
35 dippers into the material to be excavated and work the same along the material until filled, and then to hoist and dump them upon an endless carrier to convey the material to the cars to be filled. I accomplish these objects
40 by means of the mechanism illustrated in the accompanying drawings, forming part of this specification, and in which—

Figure 1 represents an end elevation of the shovel-car and its shoveling mechanism and
45 the cars to be loaded, and Fig. 2 is a plan view of the shoveling-car platform and its machinery.

Similar letters and figures of reference refer to the same device in both views.

50 A A represent a pair of parallel tracks upon which the machine-car travels, and B B a

pair of tracks parallel to the former upon which the stationary cars stand to be filled.

C represents one of the stationary cars, with its usual body, frame, truck, axles, and
55 wheels.

D is the framework, upon which is secured the platform for the machinery. It is supported on the usual trucks and wheels running on rails A A.
60

E E are uprights, and F G diagonal struts, for supporting the stationary booms H, of which there are two, one for each of the dippers. The shovels I J are pivotally secured to the ends of two long "handles" K L,
65 respectively, which pass through framed openings M N on said booms. Dipper I has secured to a bail O at its forward end a cable P, at its rear end a cable Q, and the handle K has secured near its upper end at R a
70 cable S. In a similar manner dipper J has at its forward end a bail T, to which is attached a cable U, and to its rear end a cable V, and the dipper-handle L has attached near its upper end a cable W. Cable P is used
75 for pulling the dipper I along the bank or material to be excavated, thus filling it. Q is for hoisting it and putting it into dumping position after it has been filled, and cable S is for the purpose of pulling back on dipper-handle K above its pivotal point N in the boom, thus forcing the dipper into the bank. The cables U V W perform precisely similar functions for the dipper J.

The filling-cables P U pass over pulleys X, 85 revolving in a trolley-carrier Y, to which cables are secured, passing over fixed pulleys Z on the ends of the booms and then backward and downward to some fixed point within convenient reach of the operator, where they
90 are passed over fixed pulleys Z', which are provided with pawls and ratchets and handles for ranging out the trolleys as the work of excavating proceeds.

The hoisting device is provided with six
95 drums, which are operated by appropriate gearing from a pair of engine-cylinders. Each dipper is controlled by three drums, one for filling, one for bringing the dipper into dumping position, and one for pressing the dipper into
100 the material during excavation. These drums are each provided with a screw or other clutch

device, foot or hand operated, for throwing them into frictional connection with the power mechanism for revolving them, and each drum is provided with a band-brake, which 5 may be operated by hand or foot. In practice these clutch devices and friction-brakes for each dipper are all connected by appropriate simple angle-levers, lock-shafts, &c., so that all will lead to one stand, where a single oper- 10 ator can control them all without leaving his position; but in the drawings I have shown the various clutches, &c., attached and operated at each drum for the sake of simplicity of illustration.

Referring to Fig. 2, which shows the machinery in plan, 1 is the boiler, 2 2 is a pair of engine-cylinders, and 3 3 the piston-rods operated from said cylinders and connecting with a driving-shaft and gearing, which may be 20 varied to suit the designer, for operating a gear 4. Gear 4 sets into motion the gears 5, 6, and 7. The gears 4 5 6 are located on the shafts of well-known friction-hoists, and the friction-drums 8 9 10 11 12 13 are located on 25 said shafts to revolve loosely thereon until thrown into frictional engagement therewith by the screw-clutches or other appropriate devices. Thus drum 8 has its screw or other clutch handle 14, drum 9 the handle 15, drum 30 10 its handle 16, drum 11 its handle 17, and drum 12 its handle or foot-operated clutch mechanism 18, and drum 13 its handle or foot-operated clutch mechanism 19. Each of the six drums is provided with a band-brake of 35 well-known character controlled by hand or by foot, as desired, and passing around the brake-pulleys 20.

The gear-wheel 7 is located on a shaft 21, revolving in fixed bearings 22. On shaft 21 40 is located a sprocket-wheel 23, over which passes the sprocket-chain 24. Sprocket-chain 24 meshes with a sprocket-wheel 25, located on a shaft 26, which revolves in bearings 27. On shaft 26 is secured another sprocket-wheel 45 28, which meshes with the sprocket-chain 29, which then passes over a sprocket-wheel 30 on a shaft 31, revolving in bearings 32. The shaft 31 has fixed to it a bevel-gear 33, which meshes with bevel-gear 34, which drives on 50 an endless carrier-belt roll 35.

36 represents the endless belt passing over roll 35, and this belt is located under the dippers when they are ready to dump and conveys the material continuously to the cars on 55 the side-track. Between the shafts 21 and 26 and parallel thereto are located two shafts 37 38 in suitable bearings 39 40, respectively.

On shaft 38 is keyed a gear-wheel 41, which receives its motion from a gear-wheel 42, keyed 60 on shaft 26. On shafts 21 and 38, respectively, are secured friction-pulleys 43 and 44, preferably of equal size. On shaft 37 is secured a larger friction-pulley 45, which is normally out of contact with both friction-pul- 65 leys 43 44, but which may be thrown into contact with either 43 or 44, as desired, by means of an eccentric and lever mechanism well

known to mechanics. On shaft 37 there is also located a sprocket-wheel 48, over which 70 passes a sprocket-chain 49. The sprocket-chain 49 passes over a sprocket-wheel 50, located on one of the axles of the wheels supporting the machine-platform, and which is shown in Fig. 1.

By throwing the eccentric-lever 47 to the 75 right or left the friction-wheel 45 is caused to engage either the friction-roll 44 or 43 and the shovel-car is caused to advance or go backward along its track. After the dippers are filled the engines may be reversed to revolve 80 the drums in a reverse direction, or I may allow the engines to run continuously and introduce a train-roll for reversing the movement, if desired, as is well known in engines which operate mechanism to be run in oppo- 85 site directions at will without stoppage of the engine. These are mechanical details that concern the designer and do not involve the main spirit of my invention.

The cable connections described above are 90 made over appropriate guiding-pulleys which are either swiveled or stationary, as found to give the best lead to the drums, and then each passes to its appropriate drum. The three drums on each side of the center line of the 95 machinery (shown in Fig. 2) are for the two sets of dippers, respectively, to perform the work of guiding the dipper in scooping, pressing into the material, and for elevating into a dumping position. Cable P passes over 100 drum 10. Q winds over drum 8, and W winds over drum 12. In the same way the cables for dipper J are suitably led in pulleys, so that cable U winds over drum 11, cable V 105 over drum 9, and cable S over drum 13. The dippers are either operated simultaneously or alternately, as desired, and dump on the continuous-belt carrier 36 to the cars C.

51 is an apron to guide the excavated material upon the carrier, and 52 is a guy-rope by 110 means of which the carrier 36 can be raised and lowered.

The operation of the device is as follows: The engines being started, lever 47 is thrown 115 to the right or left, so as to throw friction-roll 45 into engagement with either roll 44 or 43, and the machine-car is propelled into position where the shovels are to work. The guide-trolley Y is then ranged out to its proper po- 120 sition on its boom H and secured. For shovel I the drums 10 and 8 are caused to be thrown into motion by means of friction-clutches 16 14, respectively, thus winding up cables P and Q, thus lifting the dipper-handle K. At 125 the same time drum 12 is set in motion by its friction-clutch 18 and a pull is exerted on the end of dipper-handle at R to turn about its pivot-point M, thus pressing the dipper I into the embankment. After the dipper has 130 reached the end of its cut and is full the cover, which consists of the arms α , hinged to the sides of the shovel at a point α' , having the wall α^2 at right angles to said arms adapted

to close the mouth or opening of the bucket, is lowered by an attendant and the dipper is ranged inward until it is over the carrier 36, in the position shown for dipper J in Fig. 1, when the attendant opens its cover and allows the material to drop upon the carrier, which conveys it to the cars.

The operation of dipper J is precisely similar to that of dipper I and need not be explained. It is operated by its own set of drums, &c., and an attendant.

When one car has been filled, the shovel-car is moved by its self-propelling mechanism to the next car of the train.

Having fully explained the nature of my invention, what I desire to claim by Letters Patent is—

1. In an excavating-machine, the combination of an excavating-dipper pivoted between its ends upon a handle, a fixed overhead boom secured to the framework of a traveling platform, said boom being provided with an opening through which the handle passes, a cable secured to the front end of the dipper and passing over a trolley-pulley on said boom and then to a winding-drum, a second cable attached to the rear of the dipper and passing by suitable pulleys to a second winding-drum, a third cable secured to the handle above the boom and leading to a third winding-drum, with power mechanism for operating and controlling the movement of the said drums in either direction, substantially as described.

2. In an excavating-machine, the combination of a dipper for excavating, a handle pivoted thereto and extending through a fixed overhead boom supported by framework upon a platform, cables for raising, lowering, and forcing forward said dipper, winding-drums and power mechanism located on said platform for operating said cables, with a continuously-moving adjustable carrier located on said platform, beneath the dipper when in its dumping position, for the purpose of conveying the excavated material to its point of delivery, substantially as described.

3. In an excavating-machine, the combination of a platform adapted to be propelled over rails by power mechanism upon the platform, an elevated fixed boom extending across said platform and provided with an opening, a handle passing through said opening, a dipper pivoted to the lower end of said handle, a cable secured to the front end of said dipper, leading to a pulley near the end of said boom, and thence to a winding-drum operated by said power mechanism, a second cable secured to the rear of said dipper and leading to a second winding-drum operated by the power mechanism, with a third cable attached to the handle above the boom and leading to a third winding-drum operated by said power mechanism, whereby the dipper is lowered, raised, forced into the material to be excavated and brought rearward and lowered into a dumping position by said cable, substantially as described.

4. In an excavating-machine, the combination of a platform adapted to be propelled over a track by power mechanism on said platform, an elevated fixed boom extending across said platform, a dipper-handle adapted to pass through and swing on said boom, a dipper pivotally secured to the lower end of said handle, means for raising, lowering, and forcing forward said dipper into the material to be excavated, an endless carrier upon which the material is to be dumped, a car located upon a track, parallel to the first-named track, into which the carrier is to convey said material, with power mechanism for moving the platform upon its track and for operating the dipper mechanism, substantially as described.

5. In an excavating-machine, the combination of a self-propelling platform adapted to run upon tracks, two parallel, fixed, overhead booms extending across said platform, a handle passing through an opening in each of said booms, a dipper pivotally secured on the end of each handle, independent means for lowering, pressing forward and raising each of said dippers, a traveling carrier upon which the dippers dump the excavated material, with a car, or cars, located on tracks parallel to the first-named tracks into which the material is conveyed by said carrier, substantially as set forth.

6. In an excavating-machine, the combination of two fixed, parallel, overhead booms located upon a traveling car, a dipper-handle arranged to raise and lower and to swing from each of said booms, a dipper pivoted to the lower end of each of said handles, a cable attached to the forward end of each dipper and passing over a suitable pulley on each of said booms, a second cable attached to the rear of each of said dippers, a third cable secured to each of said handles above the respective booms, winding-drums for raising and lowering said cables, with power mechanism located on said car for operating said drums, substantially as described.

7. In an excavating-machine, the combination of two, parallel, fixed, overhead booms extending across a platform, a dipper-handle passing through an opening in each of said booms and capable of swinging therein, a dipper attached to the lower end of each of said handles, a cable attached to the front of each of said dippers, a second cable attached to the rear of said dippers, and a third cable attached to each of said handles above the booms, power mechanism for operating said cables to raise, lower, and force the dippers into the material to be excavated, with an automatic carrier for conveying the material after it has been dumped, substantially as described.

8. In an excavating-machine, the combination of two fixed, parallel, overhead booms extending across a platform, openings in each of said booms, dipper-handles extending through each of said openings, dippers pivoted

- on the lower ends of said handles, a cable attached to the front end of each dipper and passing over a pulley on each of said booms, a cable attached to the rear of each dipper, a cable attached to each handle above the booms, independent power mechanism for winding said cables, with a traveling carrier to convey the excavated material from said dippers to its point of delivery, substantially as described.
9. The combination of a car located on a track, power mechanism for propelling the car along the track, two parallel, fixed, overhead booms extending across the car, a dipper-handle adapted to move through and swing in an opening on each of said booms, dippers on the ends of each of the handles, a cable attached to the front of each dipper, a cable attached to the rear of each dipper, a cable attached to each of said handles above the booms, independent means, operated from said power mechanism, for winding said cables, an endless-belt carrier for conveying the excavated material from the filled dippers, with a car located on a track running parallel with the first-named track for receiving the said material, substantially as described.
- In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.
- MORTON E. PUGH.
- Witnesses:
ABNER T. YOUNG,
MAUDE SHOURDS.