2 Sheets—Sheet 1.

J. T. DOUGINE.

Excavating-Machine.

No. 225,001. Patented Mar. 2, 1880.

Fig. 1.

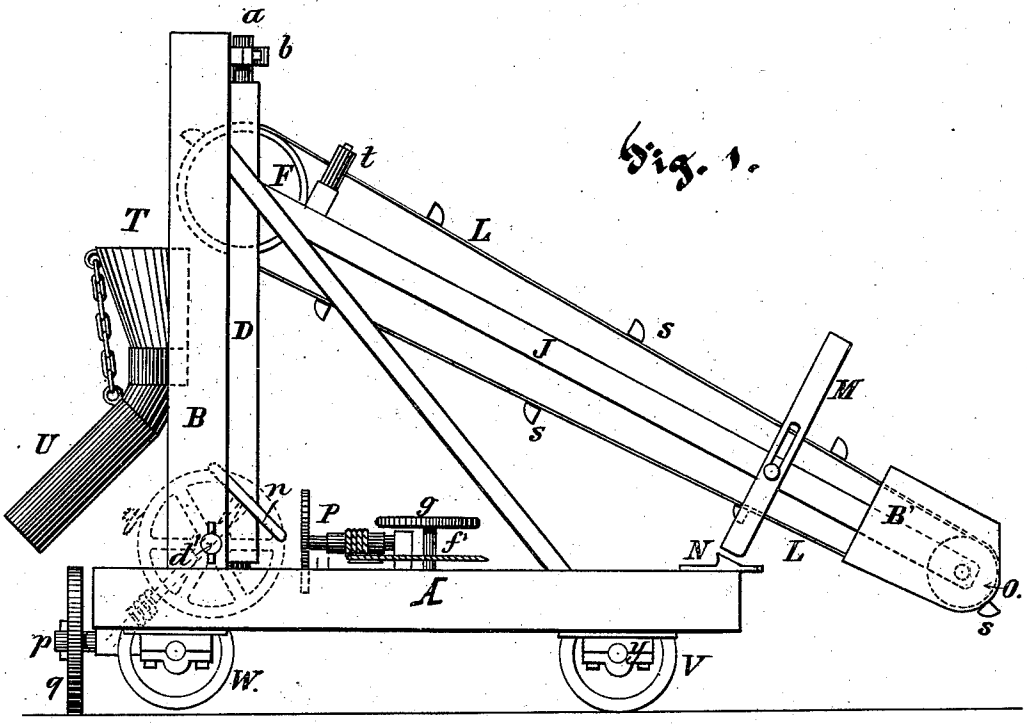
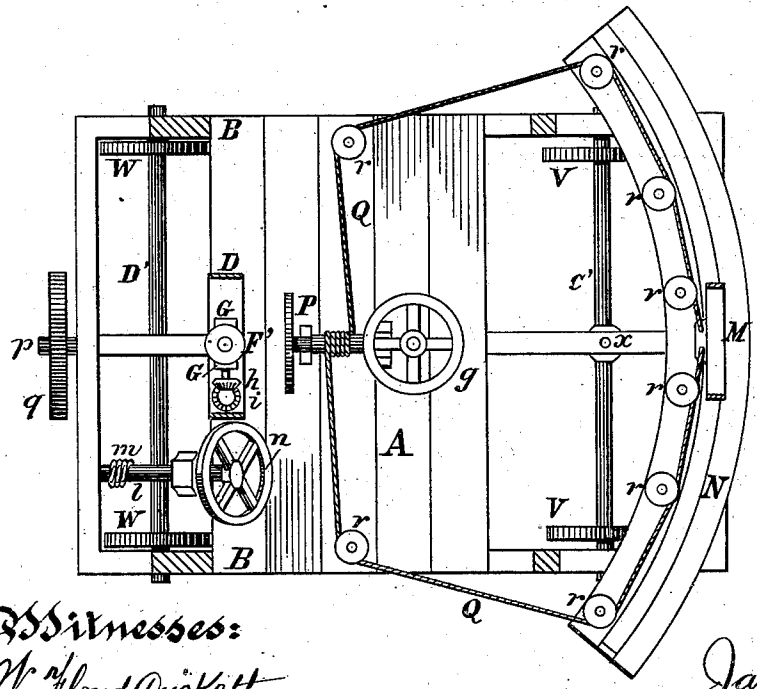


Fig. 2.



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2 Sheets—Sheet 2.

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Fig. 3

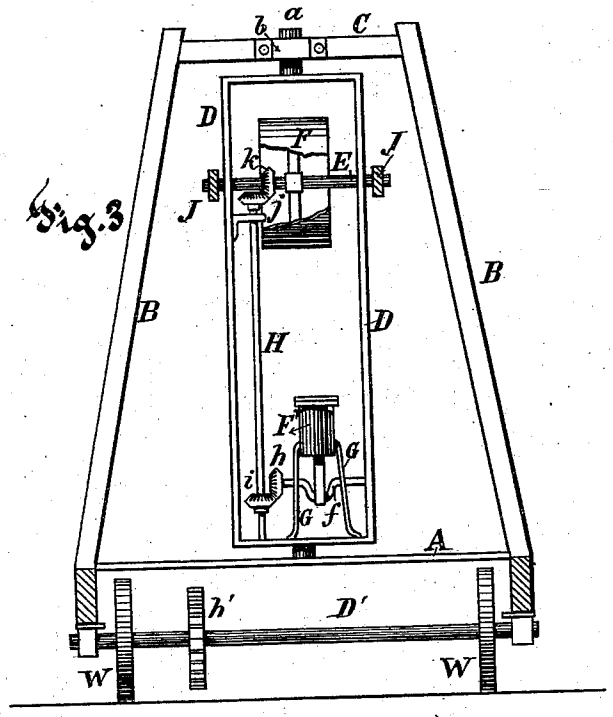
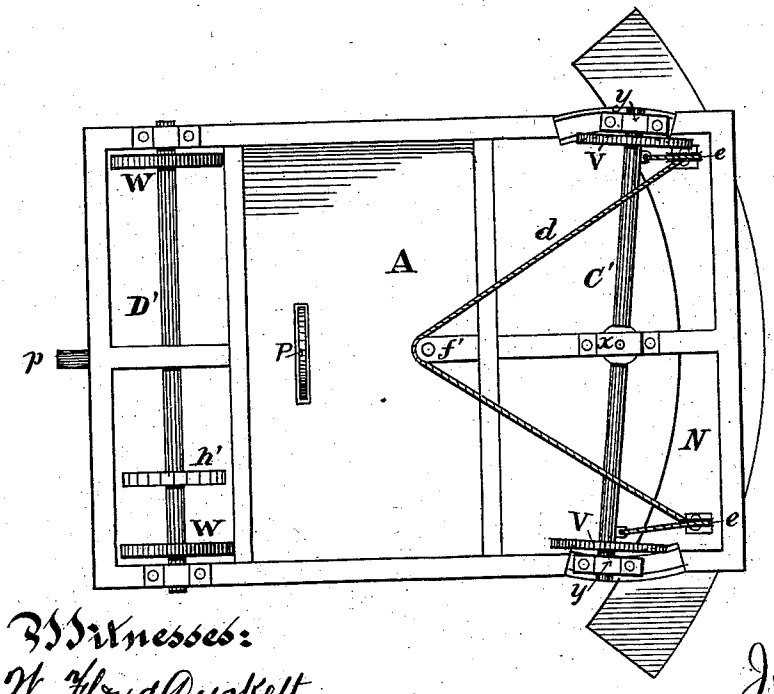


Fig. 4



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UNITED STATES PATENT OFFICE.

JAMES T. DOUGINE, OF SAN FRANCISCO, CALIFORNIA.

EXCAVATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 225,001, dated March 2, 1880.

Application filed August 18, 1879.

To all whom it may concern:

Be it known that I, JAMES T. DOUGINE, of the city and county of San Francisco, in the State of California, have invented certain new and useful Improvements in Excavating-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention has reference to certain improvements in that class of digging and excavating machines in which the endless belt or chain that carries the digging and elevating scoops or buckets is mounted in a swiveling frame, like a boom, so it can be swung from side to side in order to dig a ditch, canal, or excavation of the desired width.

It also relates to a novel arrangement for operating the car or carriage on which the digging and elevating mechanism is mounted, all as hereinafter described.

Referring to the accompanying drawings, Figure 1 represents a side elevation; Fig. 2, a plan view; Fig. 3, a front elevation, and Fig. 4 a view of the under side of the platform of my improved digging-machine.

Let A represent the platform of a car or carriage on which the excavating and elevating machinery is mounted. Upon the rear end of this platform I construct a frame, which consists of the two upright timbers B B, the upper ends of which are connected by a cross-beam, C, as shown.

D is an upright swiveling frame, the lower end of which is supported by a vertical step or bearing which rests in a socket on the platform, while the upper end is supported by a vertical journal or trunnion, *a*, which is held in a box, *b*, at the middle of the upper cross-timber, C, of the frame. In this swiveling frame I mount the endless elevating-belt and the mechanism that drives it, so that when the frame swivels around the mechanism will preserve its relative position.

Extending across the frame D, near its upper end, is a horizontal shaft, E, on which is a large pulley, F, which forms the upper or driving pulley of the endless digging and carrying belt or chain. The shaft E is driven by an engine which is supported on bearings inside the swiveling frame. In the present instance I have represented an upright engine, F′, which is supported on standards G G inside the swiveling frame. These standards are secured to the lower cross-plate of the frame D, so that the standards and engine form a part of the swiveling frame-work.

A horizontal crank-shaft, *f*, is supported in the standards G G below the engine, and its crank is connected with the pitman of the engine. On the end of this shaft is a bevel-wheel, *h*, which engages with another bevel-wheel, *i*, on an upright shaft, H, which steps in the lower plate of the frame D and extends up alongside the side plate of the frame. The upper end of this upright shaft is supported by a bracket which projects from the upright side of the frame, and it has a bevel-wheel, *j*, on its upper end, which engages with another bevel-wheel, K, on the pulley-shaft E. By this arrangement the entire driving mechanism is carried within the swiveling frame D, so that when the frame is turned all the parts preserve their proper relative position.

J J are the side plates of the boom-frame, around which the endless belt L travels. The projecting ends of the shaft E pass through the upper ends of these plates, as shown, or these may be secured to the swiveling frame by eyebolts, so as to admit of a vertical motion, and the plates are strongly connected together at intervals by cross-bars. This frame is long enough to reach forward to the required distance beyond the forward end of the platform A, and its forward end is supported by a frame, M, which travels on a circular track, N, on the forward end of the platform. A pulley, O, is mounted between the forward ends of these plates J J, and the endless belt or chain L passes over this pulley at the lower end of the frame and over the pulley F at the upper end of the frame.

A winch or windlass, P, is mounted on the platform A, around which the middle of a rope, Q, is wound several times. The ends of this rope then pass in opposite directions around a series of horizontally-mounted pulleys, *r*, on track N, and their ends are attached to the opposite sides of the traveling frame M, so that by rotating the windlass in either direction the frame is caused to move around the track and carry the outer end of the endless belt with it.

The buckets *s*, which are attached to the

endless belt L, are simple digging and elevating buckets, similar to those ordinarly used for such purposes.

On each side of the belt, near its upper end, and, if desired, near its lower end also, I mount an upright guide-roller, *t*, to keep the belt steady and prevent it from getting off its pulleys. Over the lower end of the belt I also secure a shed or hood, B′, which will prevent the earth from caving down upon the belt and moving buckets, as hereinafter described.

A stationary hopper, T, is secured to a cross-bar just back of the upper end of the elevator, so that the material which is carried up by the buckets will be dumped into it as the buckets pass over the upper pulley. To the lower end of this hopper a swiveling spout, U, is attached, through which the material that is dumped into the hopper is conducted, and either delivered into carts or upon a secondary or independent belt.

The forward wheels, V V, I place loosely upon the axle C′ and arrange the axle to swivel about its middle, while the rear wheels, W W, are fixed to the rear axle, D′, and this axle is stationary. The forward axle I arrange to swivel at its middle by either passing it through a king-bolt, *x*, which passes down through the middle beam of the carriage-frame, or by passing the king-bolt through the axle. Each outer end of the axle I also support in a movable box, *y*, which is attached to a circular plate or track on the under side of the side timbers of the carriage-frame by means of dovetail or equivalent connections. I then attach one end of a rope, *d*, to the axle near each end, and carry it forward over a pulley, *e*, in front of the axle, and then lead it back to a vertical shaft, *f*′, which passes down through the platform, and wind its middle several times around the lower end of the shaft. On the upper end of this shaft is a hand-wheel, *g*, by means of which the shaft can be rotated to wind up the rope in either direction and let it off correspondingly in the opposite direction.

By this means I can swing the front axle to an angle in either direction, and thus convert the front wheels into steering-wheels.

To drive the carriage forward while the endless-chain digger and elevator is in operation, I secure a toothed wheel, *h*′, to the rear axle and mount a shaft, *l*, at an angle in line with it. On this shaft is a worm, *m*, which engages with the toothed wheel *h*′, and on the upper end of the shaft is a hand-wheel, *n*, by means of which the shaft is rotated. This enables me to move the carriage slowly forward and backward by hand as it becomes necessary. The whole operating mechanism is within easy reach of the engineer, so that one man can run the entire machine.

At the middle of the rear end of the machine I secure a journal or spindle, *p*, so that it will project toward the rear, and when it is desired to turn the machine bodily I raise the rear end and place a large wheel, *q*, on this journal, so that it will carry the rear wheels, W W, clear of the ground. The wheel *q* will then stand at a right angle to the forward wheels, V V, so that the machine can be turned around within its length to face in any desired direction. This supplemental wheel, when not in use, I hang upon a supplemental journal, *d*′, on the side of the machine, so that it will always be at hand when required, as seen in dotted lines in Fig. 1.

In operating this machine the engine will drive the digging and elevating belt. I shall usually place the machine so that it will travel on the bottom of the excavation. The buckets on the endless belt will then dig and take up the material and make an under-cut in the face of the cut, so that the material will be caved down upon the frame. The hood B′ will prevent the earth from falling upon the belt and upward-moving buckets; but the buckets will take up and remove the loose earth thus caved down with great facility. When it is necessary to swing the forward end of the boom-frame around to get at the earth and widen the cut, the engineer has only to turn the hand-wheel *g* and wind up the rope on that side. If he wishes to move forward, he rotates the hand-wheel *n* and rotates the shaft *l*. This causes the worm-gear to rotate the rear axle and move the machine forward. In fact, this arrangement gives the engineer complete control over the entire machine.

I secure a great advantage in mounting the boom and driving mechanism in a single swivel-frame, as it enables me to secure greater strength and less liability of deranging the mechanism.

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

1. The combination, in an excavating-machine, with the excavating carrier-frame J, with its upper end hung in a swiveled frame, D, of the adjusting-frame M, semicircular track N, having a correspondingly-disposed series of pulleys, *r r*, cords Q, and windlass P, substantially as and for the purpose set forth.

2. The combination, with the excavating mechanism, its swiveling frame and carriage, of the swiveled axle C′, supporting the forward end of the frame or platform thereof, and with its boxes sliding in curved tracks affixed to said frame or platform, the rope or chain *d*, with its ends connected to the aforesaid axle and passing over pulleys *e e*, and at its center around a pulley, a shaft, *f*′, and hand-wheel *g*, substantially as and for the purpose set forth.

In witness whereof I have hereunto set my hand and seal.

JAMES T. DOUGINE. [L. S.]

Witnesses:
W. T. CLARK,
W. FLOYD DUCKETT.