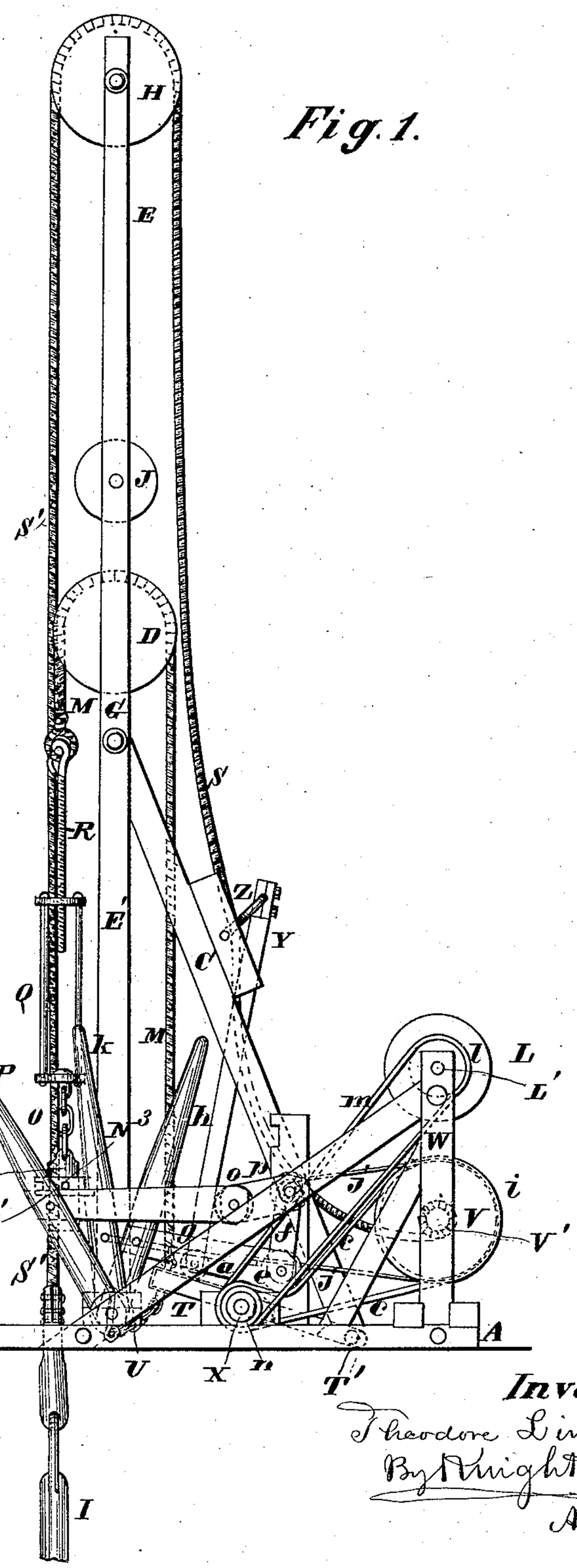
(No Model.) 3 Sheets—Sheet 1.

T. LINDELL.

ROCK AND EARTH BORING APPARATUS.

No. 286,837. Patented Oct. 16, 1883.

Fig. 1.



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T. LINDELL.

ROCK AND EARTH BORING APPARATUS.

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Fig. 2.

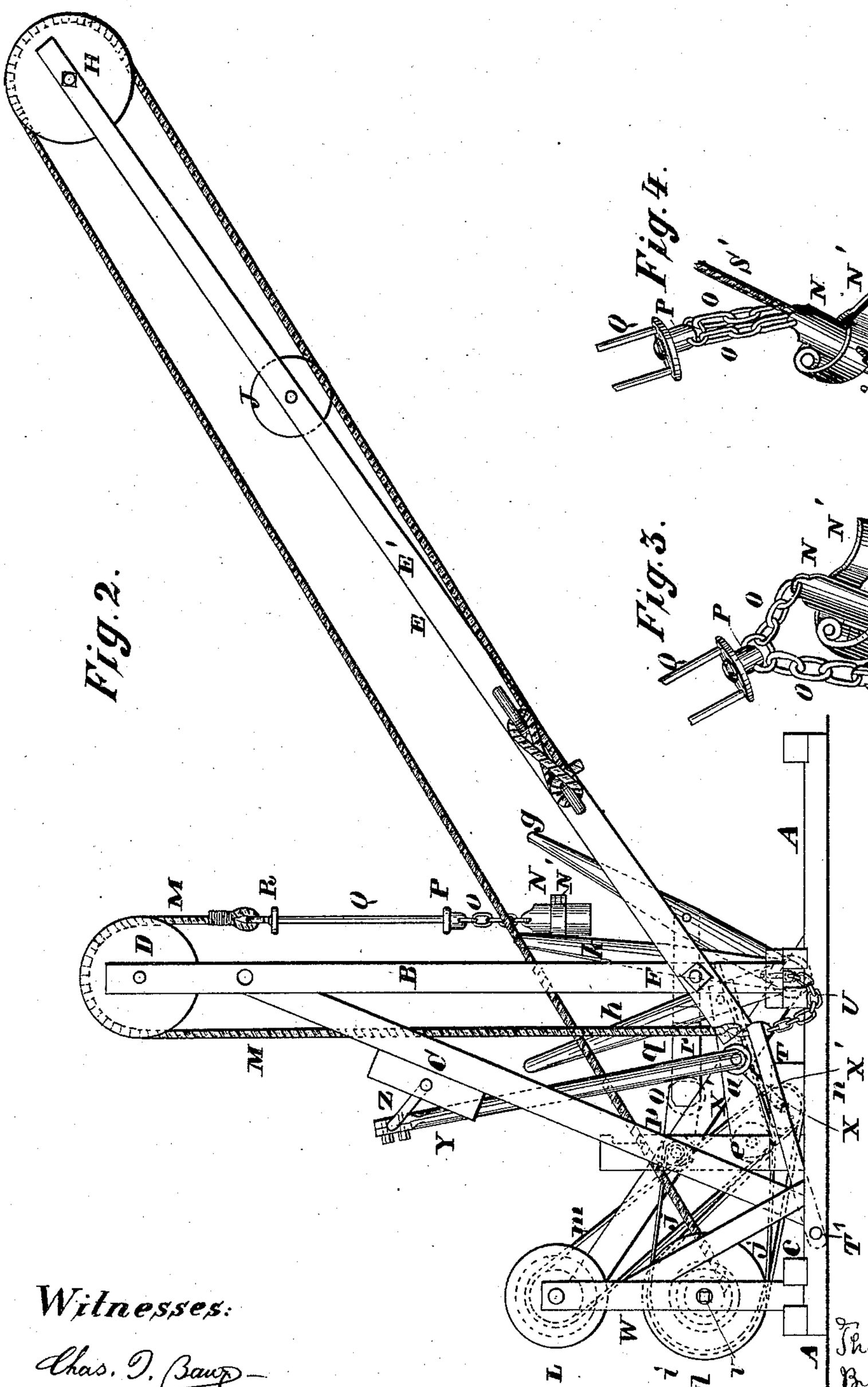

Fig. 4.

Fig. 3.

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Fig. 5.

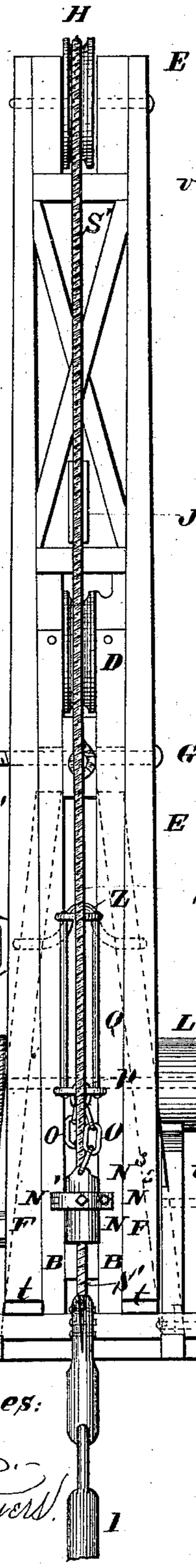


Fig. 6.

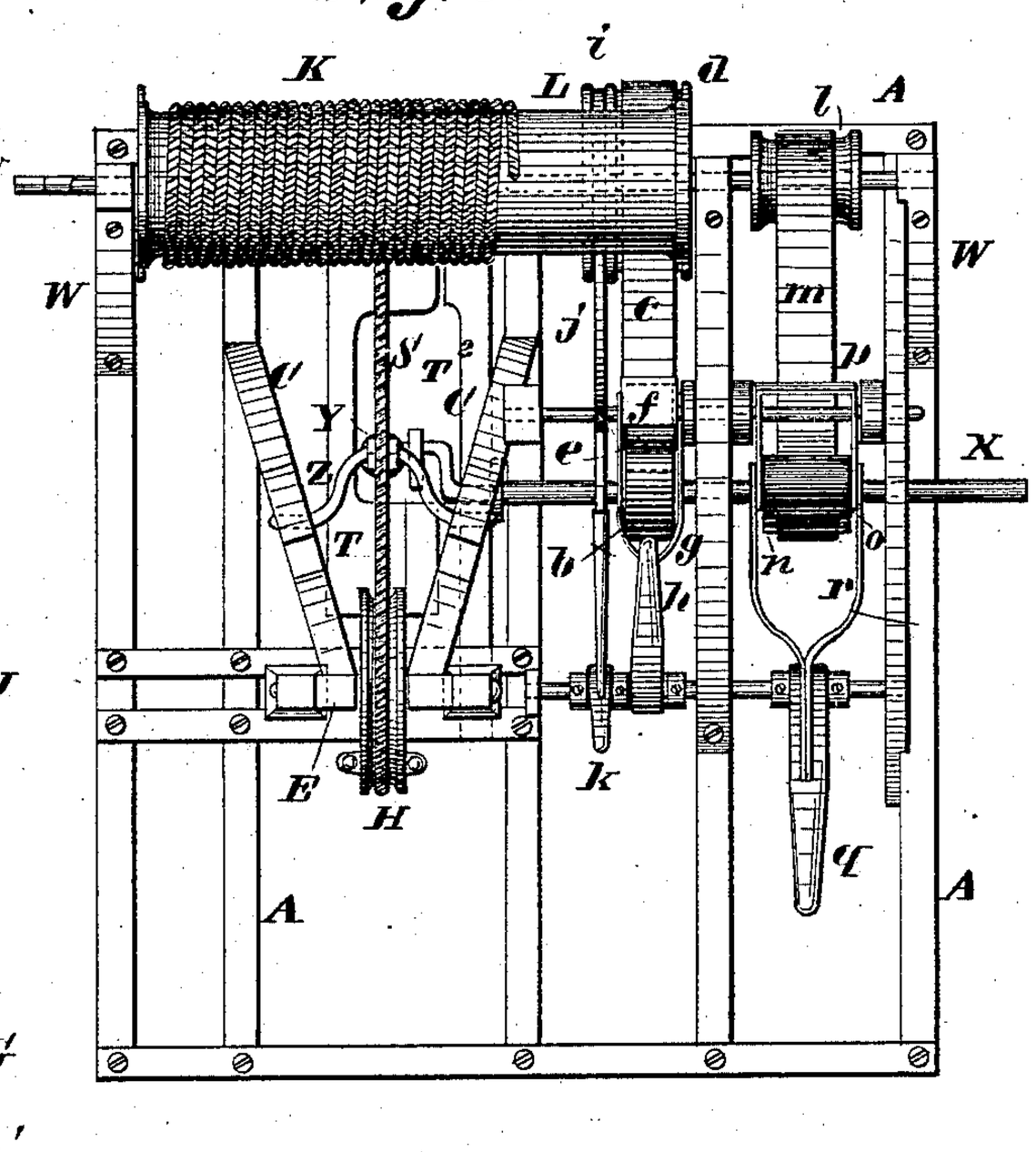
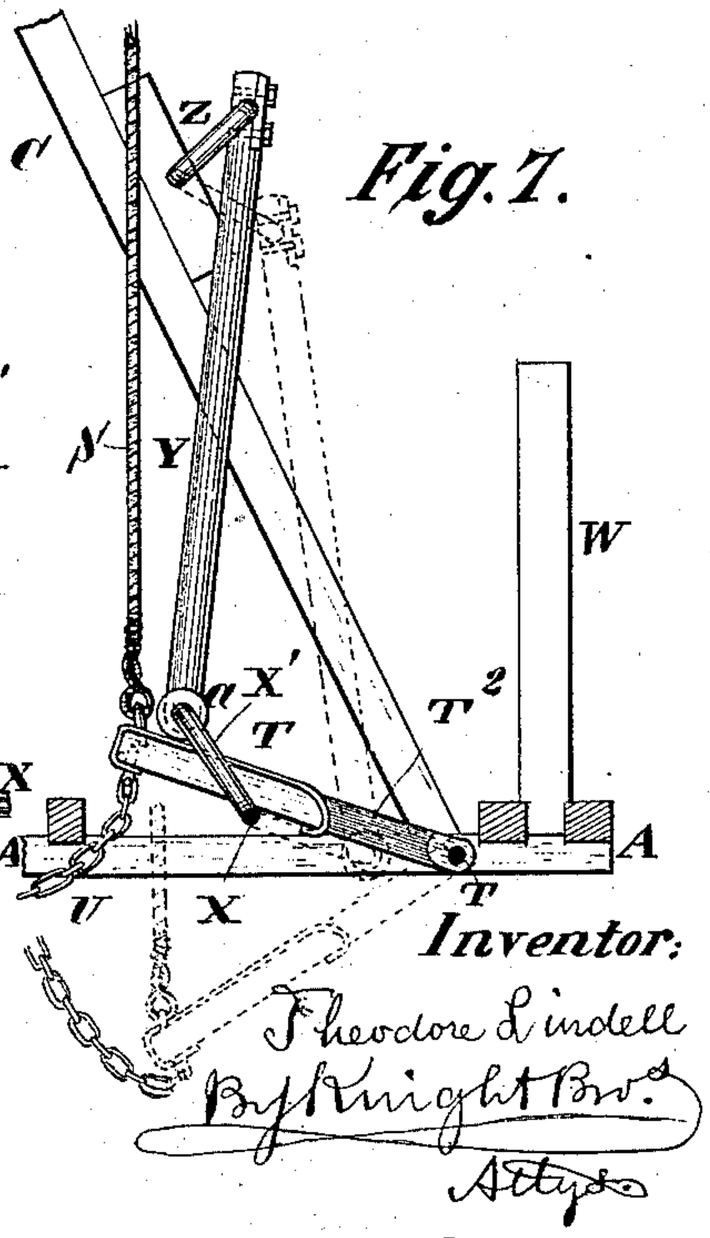


Fig. 7.



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UNITED STATES PATENT OFFICE.

THEODORE LINDELL, OF CLARKSVILLE, MISSOURI, ASSIGNOR OF ONE-HALF TO PER SWAINSON, OF SAME PLACE.

ROCK AND EARTH BORING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 286,837, dated October 16, 1883.

Application filed November 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, THEODORE LINDELL, of Clarksville, in the county of Pike and State of Missouri, have invented a certain new and useful Rock and Earth Boring Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

The scope of my invention is set forth in the claims.

Figure 1 is a side view of the machine or apparatus in working condition. Fig. 2 is a side view with the derrick partly elevated. Fig. 3 is a perspective view of the clamp by which the working-rope is attached to the main rope, the parts being in the open position; and Fig. 4 is a similar view, except that the clamp is shown attached to the main rope. Fig. 5 is an end elevation. Fig. 6 is a top view. Fig. 7 is a detail in elevation of the heavy pitman by which the drill is lifted, and of the lever which it actuates.

A is a ground-frame of any suitable construction.

B B are upright standards firmly attached to the frame and braced by braces C C. These standards form a derrick and carry a pulley, D, grooved at the periphery to carry a rope or cable. In addition to forming a derrick, the standards B give support to a movable derrick composed of timbers E′ E′, hinged at F to the standards.

The movable part of the derrick is shown elevated in working position in Figs. 1, 5, and 6, whereas in Fig. 2 it is shown only partly raised. When the part E is in working position, its timbers E′ stand close to the outer sides of the uprights or standards B, and are secured thereto by a key-bolt, G, transfixing all the timbers. (See Fig. 5.)

At the upper end of the derrick proper, E, is a grooved pulley, H, over which the drill-rope or main rope passes, and from which it descends vertically at S′, and is attached to the drill I. No novelty is claimed in this rope or drill, and further description is not required of the latter. Between the pulleys D and H is a pulley, J, intended for the sand-pump rope K, which is not shown in Figs. 1 or 2, (to avoid confusion, and especially as no novelty is claimed in the same,) but is shown in Figs. 5 and 6 coiled on a drum, L. The pulley D is generally used for the working-rope M, though this rope may be carried over the upper pulley, H, when commencing a bore. One end of the rope M is connected to the main or drill rope by a clamp.

I will now describe my preferred form of clamp.

N N′ are two jaws made to tightly clasp the rope, which should be protected by a wrapping of okum, cloth, or other suitable material. The jaws are held tightly upon the rope by a metal strap or clip, N′, hinged at one side and held by a bolt, N^2, at the other. N^3 is a screw bearing against one of the jaws. The jaws are connected by links O to the lower member, P, of a swivel, whose upper member, Q, is connected to rope M by screw-rod R, giving means for vertical adjustment of the drill to some extent, thus avoiding the frequent moving of the clamp N N′ on rope S. The other end of the rope M is attached to the free end of the lever T.

The lever T has fulcrum-bearing at T′ in the bed-frame, and oscillates in a vertical plane. U is a chain by which the free end of the lever is connected to the bed-frame, to limit the upward movement of the lever, the length of this chain being increased or diminished as may be required for this purpose.

The drum L for the sand-pump rope and the drum V, upon which the main drill-rope S is coiled, have journal-bearing in the standing frame W.

The main shaft X, by which the parts are driven, is turned by horse or steam power. It has upon its inner end a crank, X′, whose wrist passes through the lower end of a heavy pitman, Y, whose upper end is guided by an oscillating crank or arm, Z, whose wrist passes through the pitman, so that the pitman can have a compound oscillatory and vertical movement.

a is a friction-roll turning on the wrist of the crank X′, and which, by the rotation of the main shaft, is brought down upon the top of the lever T to force down the free end thereof, and thus by means of the working-rope M and

the part S′ of the main drill-rope S to lift the drill in the bore preparatory to another fall. The lever T has at one side a recess, T^2, to receive the lower end of the pitman and friction roll when the lever has been forced down to its lower position, and thus allow the lever to ascend, which it does by the weight of the drill and the overhanging part S′ of the rope S.

The weight of the pitman Y may be about one-half of that of the drill and the hanging part S′ of the rope, so that the resistance to be overcome in the upward and downward movement of the crank (in its rotation) shall be about equal, for it will be seen that the weight of the pitman resists the upward movement of the crank X′ and assists in the depression of the lever T and lifting of the drill. As the depth of the bore increases, the hanging part S′ of the rope S will of course increase in length and weight. To counteract this a weight may be attached to the pitman X, so that the resistance may still be equal during the upward and downward movement of the pitman.

The drum V is turned by the following means, (to wind up the rope S:) *b* is a belt-pulley upon the main shaft X, said pulley being connected by a loose belt, *c*, with a pulley, *d*, upon the shaft V′ of the drum V. The belt *c* is so loose that it ordinarily does not convey any motion to the shaft V′, the pulley *b* turning loosely in the belt. *e* is an idler-pulley, having bearing in a swinging hanger, *f*, whose free end is connected by a connecting-rod, *g*, to a lever, *h*. By moving the lever into the position shown in Figs. 1, 2, 5, and 6, the idler is made to bear upon the belt *c*, to tighten the same and give motion to the drum V and wind the rope S upon it. *i* is a brake drum or wheel upon the shaft V′, and *j* is an ordinary strap-brake surrounding the wheel *i*, and tightened upon the same by a hand-lever, *k*, in the ordinary manner. The brake acts to prevent the too rapid descent of the drill when returning it to the bore after use of the sand-pump.

The drum L, upon which the sand-pump rope K is coiled, is rotated (to coil up said rope) in the same manner as the drum V. The drum-shaft L′ carries a belt-pulley, *l*, connected by a loose belt, *m*, with a pulley, *n*, upon the main shaft. To cause the belt *m* to draw, it is forced down by an idler-pulley, *o*, upon a swinging hanger, *p*, whose free end is connected to a hand-lever, *q*, by a rod, *r*. By moving the upper end of the lever toward the drum-shaft, the belt *m* is tightened and the drum rotated. The drum-shaft V′ has a prismatic end, *v*, for the reception of a hand-crank to turn the drum V, if required.

t t are wedges that are driven beneath the ends of the movable derrick-frame E when the same is in working position. (See. Fig. 5.)

The operation is as follows: In commencing the bore the working-rope M may be carried over the upper pulley, H, to give sufficient elevation for the drill and the attachments, with sufficient rope between them and the pulley to work the drill; or the bore may be commenced by use of the rope S alone, the rope M being for the time dispensed with. To operate in this manner, the belt *c* is made tight to elevate the drill, and then the belt is allowed to run loose, the drill descending by its own weight and unwinding rope S from the drum V. The backward rotation of the drum should be stopped at the proper time by tightening the belt *c*. In the ordinary process of boring, the clamp N N′ is made fast to the rope S, and the drill first lifted a proper distance and then allowed to drop by the action of the pitman Y and roller *a* upon the lever T. As the depth of bore progresses the clamp may be lowered on the rope M, by means of the hanger screw-rod R, by turning the rod upward in the swivel. As the depth increases still more the clamp N N′ is set up upon the rope S. When the time comes for use of the sand-pump, the clamp N N′ is detached from the rope S and the drill drawn from the bore by means of the drum V, (turned by the rope *c*,) as before described. The sand-pump is then let down into the bore and operated as usual. The sand-pump is upon the rope K, and is operated by the drum L. When returning the drill to the bore, it is lifted up over the bore by the rotation of drum V, and then by the backward rotation of the drum the drill is allowed to descend, its speed of descent being limited by the brake *h i j*.

When moving the apparatus from place to place, it will be found advisable to lower the movable part E of the derrick. This may be done by making the rope S fast to the side timber E and lowering it by means of the drum V and brake *h i j* until within reach of the hands. Before commencing to lower, the wedges *t* are knocked out, and these are again driven into position when the part E is raised. The part E may be again raised into working position by the rope S, using the drum V as a windlass.

Where the drill becomes jammed fast in the bore, both ropes S and M may be used to raise it, a constant strain being kept upon it by the rope S, and intermittent jerks being given to it by means of the rope M and pitman Y to shake it loose. When operating with the main drill-rope S or the sand-pump rope K, the clamp N N′ is disconnected from rope S, except when used to loosen the drill in the bore, as aforesaid, and in this case the lever T is secured in its lower position, as shown in dotted lines in Fig. 7. In this case the crank X′ revolves freely without the friction-wheel *a* coming in contact with the lever. Generally, in addition to placing the lever T out of the course of the friction-wheel and crank, the lower end of the pitman Y is drawn off the crank-pin and swung over to a fixed place of rest, so that it remains stationary supported on the place of rest and the arm Z. It may be lifted by a lever fitting the pintle of arm Z.

I claim as my invention—

1. In a boring apparatus, the combination of a rope for operating the apparatus, a lever hinged to the frame at one end and secured to the rope at the other end, and a shaft provided with a crank adapted to revolve on said lever to depress the latter, as set forth.

2. In a boring apparatus, a lever, T, having recess T^2, in combination with a shaft having a crank revolving on the lever for depressing the latter, the recess receiving the crank to permit the lever to rise, as set forth.

3. The combination of working-rope M and the lever T with recess T^2 and the crank upon drive-shaft, carrying ponderous pitman Y, constructed to operate upon the lever substantially as set forth.

4. The combination of drive-rope M, lever T, crank X′, pitman Y, and supporting-arm Z, for the purpose set forth.

5. The combination of working-rope M, lever T, shaft X, crank X′, and chain U, for the purpose set forth.

6. The combination of working-rope M of a rock-boring apparatus, lever T, with recess T^2, and crank or operating shaft carrying friction-roller *a*, for the purpose set forth.

7. The combination of drive-shaft X with crank-arm X′, lever T, and drive-rope M, and the pulley *b*, belt *c*, tightener *e h*, drum V, and drill-rope S, substantially as set forth.

8. The combination of ropes M and S and a clamp, and an adjustable swivel, P Q R, connecting said ropes, for the purpose set forth.

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Witnesses:
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