

(No Model.)

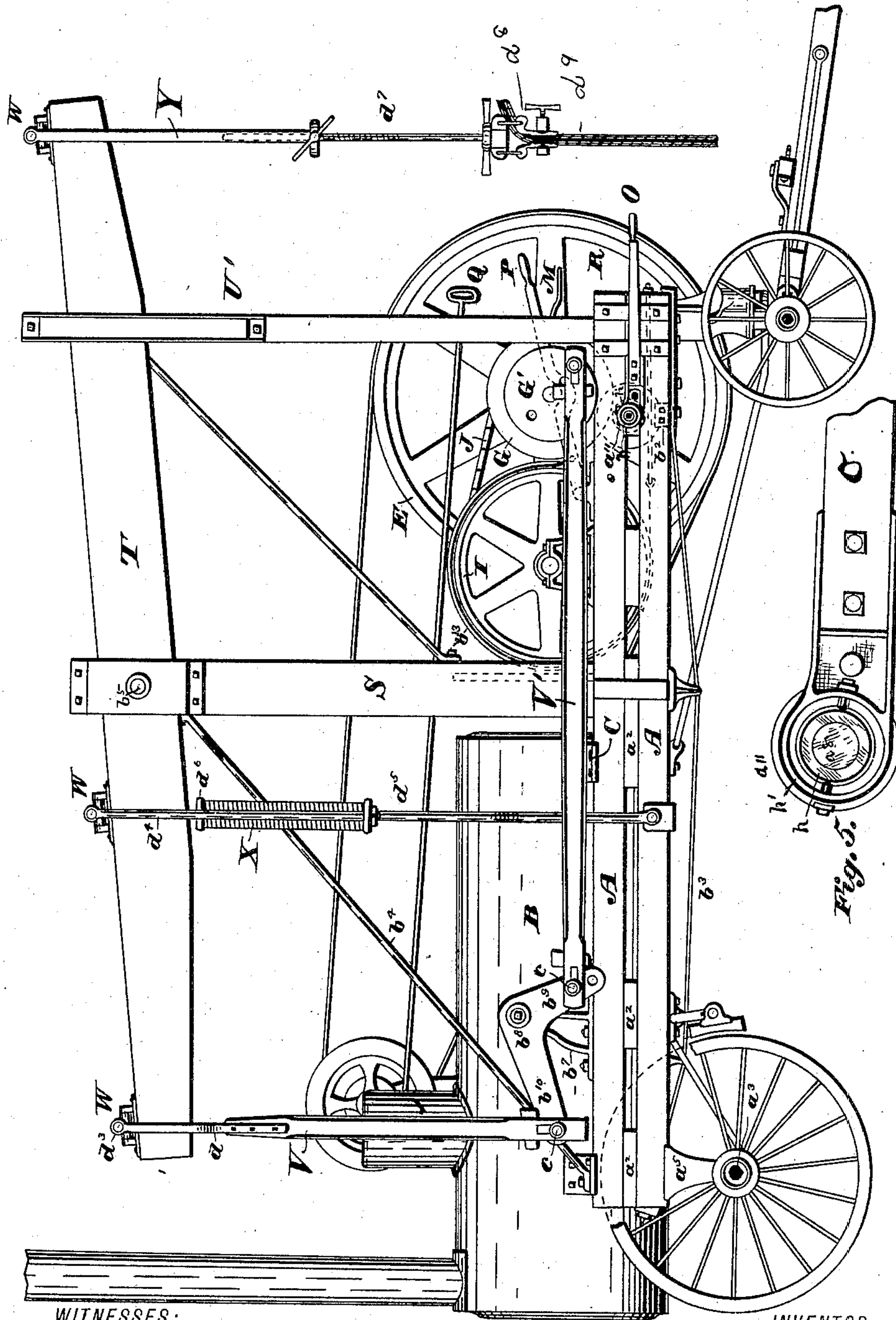
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E. W. POORMAN.

EARTH AND ROCK DRILLING MACHINE.

No. 371,968.

Patented Oct. 25, 1887.



WITNESSES:

*Harry Freese.*  
*Chas. V. Miller*

*Fig. 1.*

INVENTOR  
*Emanuel W. Poorman*

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(No Model.)

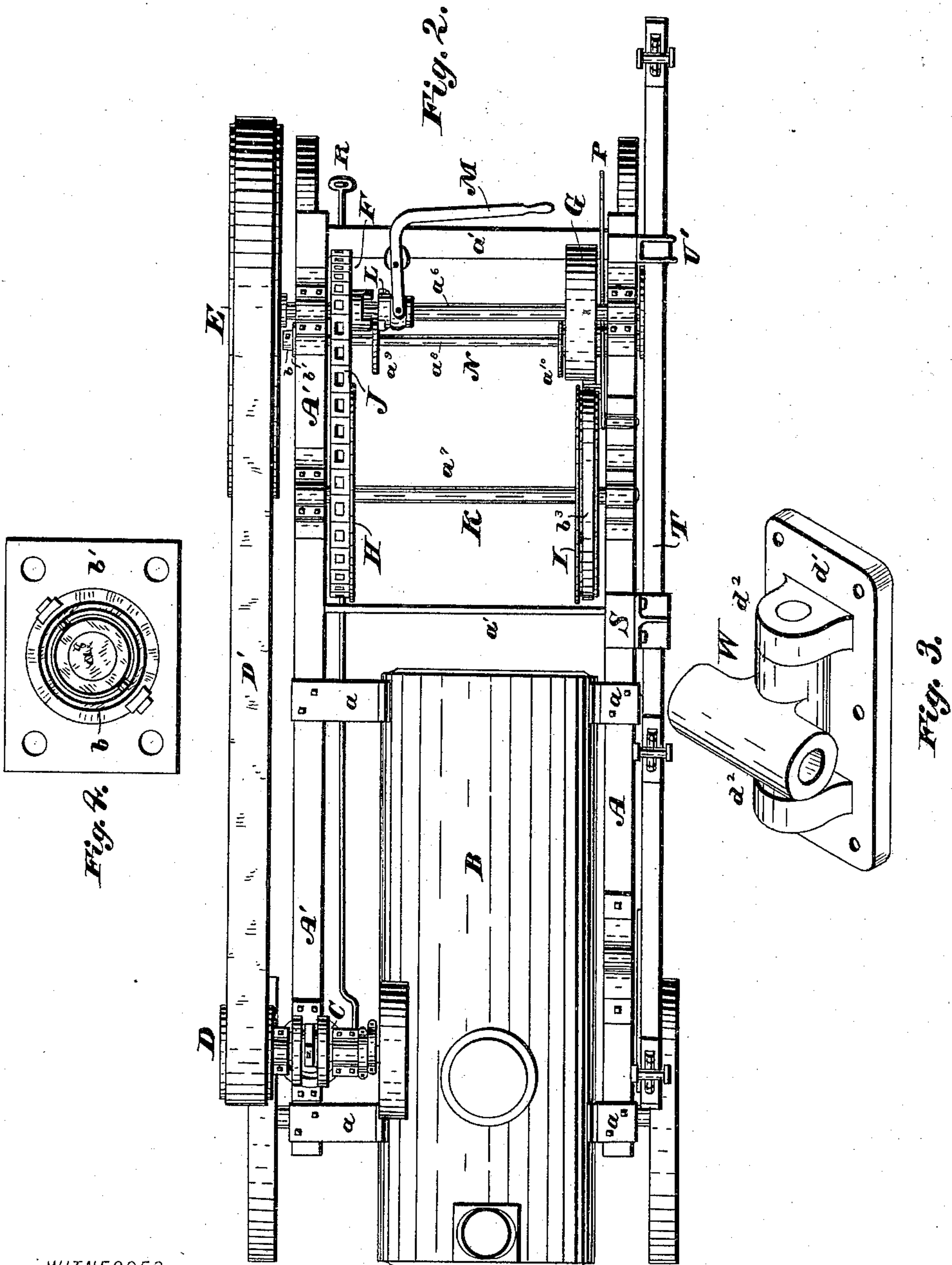
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*Harry Grease*  
*Chas. R. Miller*

*Emanuel W Poorman* INVENTOR

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# UNITED STATES PATENT OFFICE.

EMANUEL W. POORMAN, OF CANTON, OHIO.

## EARTH AND ROCK DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 371,968, dated October 25, 1887.

Application filed June 4, 1887. Serial No. 240,236. (No model.)

*To all whom it may concern:*

Be it known that I, EMANUEL W. POORMAN, a citizen of the United States, and a resident of Canton, county of Stark, State of Ohio, have invented a new and useful Improvement in Earth and Rock Drilling Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to improvements in portable machines for drilling earth and rock.

The object of my invention is to provide a machine that is economical in construction, thereby greatly reducing the initial cost, and the assembling of parts in such form as to bring all of the operative parts within the reach of a single attendant; and it consists of the hereinafter-described machine and of the detail and combination of parts as set forth in the claims.

Figure 1 is a side elevation of an earth and rock drilling machine representing my invention. Fig. 2 is a plan view of same. Fig. 3 is a view in perspective of a swivel journal-box and supporting-plate, enlarged. Fig. 4 is an end view of a pivoted journal-box and face of supporting-plate, enlarged. Fig. 5 is an end view of a journal-box pivoted in a yoke attached to the end of hand-lever, hereinafter explained.

As in machines of this kind, a strong and rigid frame is necessary for successful operation, I prefer to make the said frame of side pieces or sills, A A and A' A', secured together by cross-girders  $a'$  and block  $a^2$ , the ends of which are placed between the said sills and secured in said position by through-bolts, thus forming a rigid truss for the support of the machine. The rear axle,  $a^3$ , is connected to the frame by a bracket,  $a^5$ , and brace. The front end of frame is connected to the axle by a swivel-bolster, which may be of any of the well-known and approved plans. The boiler B is supported on side frame, A A', by bracket  $a$ . The engine C, which in this case is vertical, rests on the side frame, A' A'. Cross-shaft  $a^6$  is provided, on which there is mounted a band-wheel, E, chain-wheel F, clutch L, face-wheel G, and crank-wheel G'. There is also provided a cross-shaft,  $a^7$ , having mounted on the ends thereof chain-wheel H and brake-wheel I, said shaft and wheel forming a spool, K, on

which the drill-rope may be wound, and a brake by which the movement may be regulated. The driving sprocket-wheel F and the driven wheel H are connected by a sprocket-chain, J.

Motion is given to the spool K by the engine through the belt D', connecting the engine-wheel D with belt-wheel E, the clutch L connecting the chain-wheel F with the shaft  $a^6$ . The said clutch L may be engaged with or disengaged by the use of the shifting-lever M. A winding-spool, N, for the shell pump-rope, (not shown,) is formed of the cross-shaft  $a^8$ , having heads  $a^9$  and  $a^{10}$  and a face-wheel,  $a^{11}$ , the face-wheel  $a^{11}$  to coincide with the face-wheel G. The ends of shaft  $a^8$  are supported in pivoted journal-boxes, one of which,  $b$ , has a pivoted connection in plate  $b'$ , which is bolted to the side of the sills A'. The other end of the shaft is supported by and rotates in a journal-box,  $h$ , that is pivoted in a yoke-support,  $h'$ , on the end of lever O, (see Figs. 2 and 5,) by which the end of the shaft  $a^8$  may be vibrated and by which the face-wheel  $a^{11}$  may be raised up and held against the face of wheel G for the purpose of winding up the pump-rope. A reverse movement of the lever will bring the wheel  $a^{11}$  in contact with a brake-block,  $b^2$ , by which the rotary movement of the spool may be arrested; and when lowering the rope and pump the speed may be regulated or arrested by the friction of wheel  $a^{11}$  on the block  $b^2$ . The object of the pivoted journal-box is to allow the end of the shaft  $a^8$  to be vibrated, so as to bring the wheel  $a^{11}$  in contact with either the wheel G or brake-block  $b^2$  without cramping or binding in the bearing.

A metal brake-strap,  $b^3$ , embraces wheel I, one end of which is attached to the frame-timbers, the other to a brake-lever, P. By a downward movement of the handle end of the lever P the rotary movement of the spool K may be regulated or arrested when lowering the drill-tools.

A rod, Q, extending from the starting-valve (not shown) to the front of the machine is provided, as shown, by which the operator may start or stop the engine, as occasion may require. There is also provided a reversing-rod, R, by which the direction of motion may be changed. It will be noticed that all of the



hand-operated parts of the machine are assembled at the front end of the machine, near and within reach of the operator, which will be hereinafter explained.

5 The samson-post S is placed about midway and vertically over the side frame, A, and is further supported by the truss-rod  $b^{13}$  and brace  $b^4$ . At or near the upper end of said post there is provided a pivotal pin,  $b^5$ , by which the  
10 walking-beam T may be connected with the top of the post and about which it may be vibrated. A guide-post, U', is located on the corner of the frame A.

A bracket,  $b^7$ , is provided and attached to  
15 the frame A, as shown, to which a bell-crank,  $b^8$ , has pivotal connection, as shown, said bell-crank having wrist-pins  $c$  in the arms  $b^9$  and  $b^{10}$ . A horizontal connecting-rod, V', is provided, by which the crank-plate G' on shaft  
20  $a^6$  is connected to the arm  $b^9$  of the bell-crank  $b^8$ . The vertical coupling-rod V, by which the arm  $b^{10}$  of the bell-crank is connected to the walking-beam, is bifurcated at its upper end, the prongs  $d$  passing up on each side of the  
25 walking-beam. On the upper side of said beam there is provided a pivoted journal-box, W, of the form substantially as shown by Fig. 3, having two journal-boxes that are integral. The annular bore of the boxes cross each other  
30 about midway, and a supporting-plate,  $d'$ , with upwardly-projected lugs  $d^2$ , the said journal-box W having a pivotal connection with the lugs  $d^2$ , substantially as shown, the plate  $d'$  being bolted to the walking-beam.

35 At the upper end of the prongs  $d$  of the connecting-rod V there are perforations that coincide with the annular bore of the journal-box W, and through which a pin,  $d^3$ , is passed, forming a pivotal connection with the walk-  
40 ing-beam of such form as to withstand the jar and wear of such service without cramping or binding of the parts. The lower end of the rod V may be connected to the wrist-pin  $c$  on the bell-crank in any of the usual and approved  
45 plans, to relieve the machine of the jar caused by the falling of the rope and to assist in reversing the movements of the walking-beam. The coil-spring cushion X is provided at the upper end of the yoke  $d^4$ , attached to a swiveled  
50 journal-box, same as the rod V, hereinbefore described, the rod  $d^5$ , the upper end of which is connected to the head  $d^6$ , extending downward to the frame A, as shown in Fig. 1. The yoke Y, to which the feed-screw  $d^7$  is connected,  
55 is also supported by a pivoted journal-box, W, as hereinbefore described, by which the yoke, with the rope-clutch  $d^8$  and rope  $d^9$ , may vibrate without in any way cramping or binding the parts, the pivoted journal-box W  
60 adapting itself to the movements of the yoke Y.

The advantages of a machine constructed as hereinbefore described are numerous. By locating the samson-post about at the center the walking-beam may be brought back so as to  
65 bring the drilling-rope and feed-screw near the end of the machine, so that one man may attend the operation of the machine and the drilling, as

well as to obtain a more powerful machine. By reversing the bell-crank and connecting the coupling-rod V' to the long arm  $b^{10}$  and the  
70 coupling-rod V to the short arm, the lifting power of the engine may be increased; or by changing the pins  $c$  in the bell-crank to or from the pivotal center by the use of the perfora-  
75 tion therein provided, and by so changing the pin in the crank-wheel G', the leverage may be varied so as to increase the lifting power of the machine as the depth of the hole is in-  
80 creased, and with it the weight of the rope and drills, the machine may be adapted to the work, and by the hereinbefore-described arrange-  
85 ments a less expensive, a lighter, and more easily handled and transported machine may be had, that is adapted for both shallow and deep drilling.

Having thus fully described the nature and object of my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the supporting-frame, of a centrally-located samson-post se-  
90 cured to said frame, a walking-beam pivoted to said samson-post, a bell-crank, a rod connecting said bell-crank with said walking-beam, a crank-wheel, and a bar connecting said crank-wheel with said bell-crank, for the  
95 purpose substantially as set forth.

2. The combination, in an earth and rock drilling machine, of a cross-shaft located in the front part of the machine, a band-wheel lo-  
100 cated on said shaft, whereby motion is imparted to the same, a sprocket-wheel located on said shaft, whereby motion is imparted to the drill-rope spool, a clutch operated by a suitable bell-crank lever, whereby said sprocket-wheel can be thrown in and out of engagement  
105 with said shaft, a face-wheel keyed to said shaft, whereby a winding-spool, N, is rotated, the walking-beam, and the driving mechanism whereby said band-wheel, and hence the shaft and walking-beam, are operated, substantially  
110 as set forth.

3. The combination, in an earth and rock drilling machine, of the cross-shaft  $a^6$ , having mounted thereon a chain-wheel, F, face-wheel G, and gear-clutch L, shipping-lever M, and a  
115 cross-shaft,  $a^7$ , having on one of its ends a chain-wheel, H, that coincides with wheel F on shaft  $a^6$ , said wheel forming one head of the spool K, and a chain or sprocket wheel by which the spool K may be rotated, and on the other end  
120 of the shaft a brake-wheel, G, forming the other head of the spool, and a brake-strap,  $b^3$ , lever P, and driving-chain J, substantially as shown and described, and for the purpose set forth.

4. The combination, in an earth and rock  
125 drilling machine, of the cross-shaft  $a^6$ , having mounted thereon a chain-wheel, F, face-wheel G, gear-clutch L, shipping-lever M, and a cross-shaft,  $a^8$ , having mounted thereon spool-heads  $a^9$  and  $a^{10}$ , and a face-wheel,  $a^{11}$ , one end of said  
130 shaft supported by and rotated in journal-box  $b$ , said box having a pivoted connection with supporting-plate  $b'$ , the other end supported by journal-box  $h$ , said box having a pivotal



connection with the lever-yoke  $h'$  and the lever O, by which the end of said shaft may be vibrated, so as to bring the face-wheel  $a^{11}$  into engagement with the face-wheel G, by which the wheel  $a^{11}$  and shaft  $a^8$  may be rotated, substantially as described, and for the purpose set forth.

5 5. The combination, with a walking-beam of an earth and rock drill, of the journal-box W, as described, the supporting-plate  $d'$ , having lugs  $d^2$ , the yoke Y, and feed-screw  $d^7$ , substantially as described, and for the purpose set forth.

10 6. The combination, in an earth and rock drilling machine, of a cross-shaft located on the

front end of the cross-frame, and having mounted thereon a crank-wheel, a bracket located 15 near the rear end of said supporting-frame, a bell-crank pivoted to said bracket, a rod connecting said crank-wheel to one arm of said bell-crank, the walking-beam, and a rod connecting the opposite arm of said bell-crank to 20 said walking-beam, substantially as set forth.

In testimony whereof I have hereunto set my hand this 1st day of June, A. D. 1887.

EMANUEL W. POORMAN.

Witnesses:

JNO. N. RAMSEY,  
W. K. MILLER.