Sheet 1, 2 Sheets.

J. J. Couch.

Drilling Mach.

No. 6,237. Patented Mar. 27, 1849.

Fig. 1.

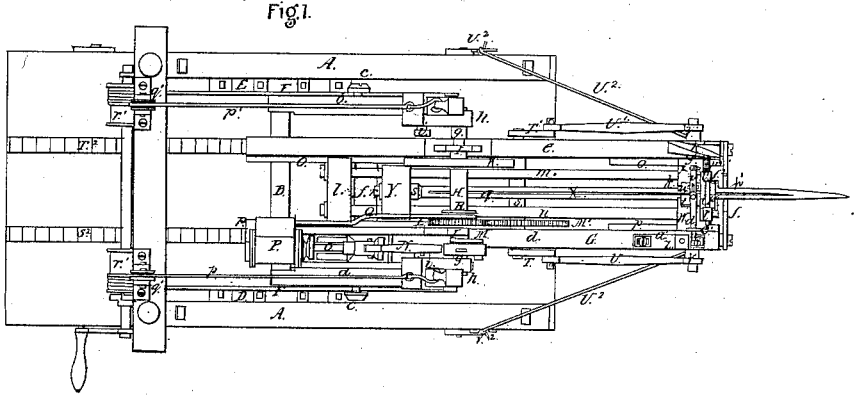
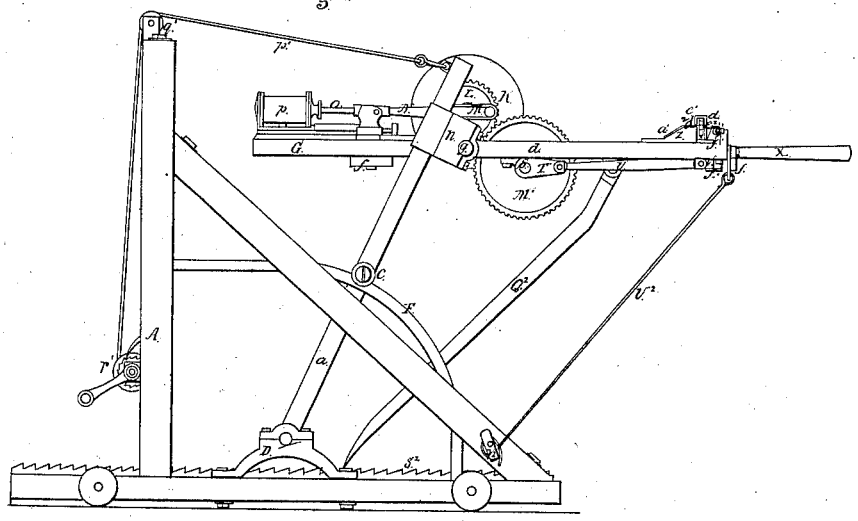


Fig. 2.



Sheet 2, 2 Sheets.

J. J. Couch.

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No. 6,237.

Patented Mar. 27, 1849.

Fig. 1.

Fig. 3.

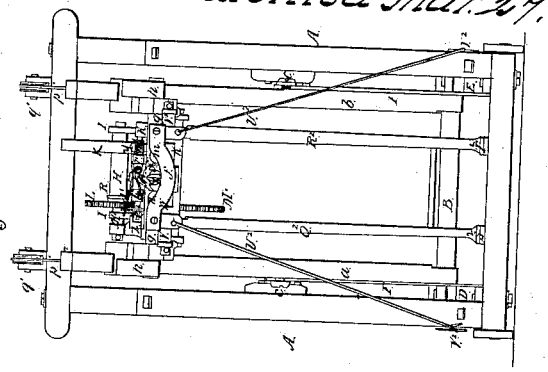


Fig. 6.

Fig. 5.

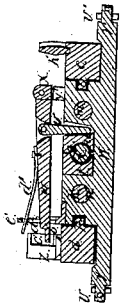
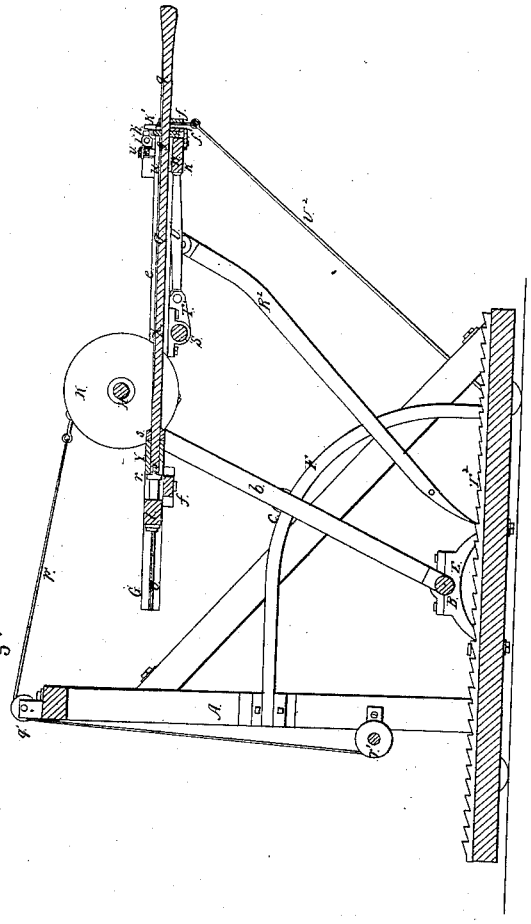


Fig. 4.



UNITED STATES PATENT OFFICE.

JOS. J. COUCH, OF NORTH BRIDGEWATER, MASSACHUSETTS.

MACHINERY FOR DRILLING ROCKS.

Specification of Letters Patent No. 6,237, dated March 27, 1849.

To all whom it may concern:

Be it known that I, JOSEPH J. COUCH, now or late of North Bridgewater, in the county of Plymouth and State of Massachusetts, have invented a new and useful Improvement in Machinery for Drilling Rocks, &c., in Tunnels, Drifts, or in other Places where the said Improvement May be Advantageously Employed; and I do hereby declare that the same is fully described and represented in the following specification and accompanying drawings, letters, figures, and references thereof.

Of the said drawings Figure 1 denotes a top view of my drilling machine, its sliding drill frame being disposed in a horizontal position. Fig. 2 is a side elevation of the same. Fig. 3 is a front end elevation of it, and Fig. 4 is a vertical central and longitudinal section of it.

The object of my improvement is to enable a drill to be placed and operated in any desirable position or direction. It is well known that in making rock excavations, whether for open cuttings, tunnels or drifts, it becomes very desirable to drill the blast holes either in horizontal, vertical or inclined positions as circumstances may require. To do this with facility and dispatch, I have devised the hereinafter described mechanism.

In the drawings above mentioned A, exhibits a standing frame for supporting the operative parts of the mechanism. B is a transverse and horizontal shaft whose journals are sustained and revolved in boxes made in the upper parts of standards D, E′, elevated above the bottom platform or board of the frame A. To said shaft the lower ends of two parallel bars *a*, *b*, are connected, the said bars being made to extend upward or above the shaft. Each of the said bars *a*, *b*, has a clamp screw *c*, applied to it and made to operate in such manner as to enable a person to place the bar at any desirable inclination to the horizon, and to there confine it by clamping it to a quadrantal arc F, fastened to the frame A.

In connection with the bars *a*, *b*, I make use of what I term the supporting and directing frame G, of the drill slide and drill. The said frame is composed of two parallel bars *d*, *e*, connected together by one or more cross bars *f*, and arranged between the bars *a*, *b*. Each of the said bars *d*, *e*, has a journal *g*, projecting perpendicularly from its outer side, and resting in a box *h*, so adapted to the adjacent bar *a* or *b*, as to slide up and down upon it. The slide of each box (*h*) has a set screw *i*, extending through it and made to abut against the bar (*a* or *b*) encompassed by the slide, the said set screw and slide being for the purpose of enabling a person to adjust the turning journals and bearings of the frame G, at any desirable elevation on the bars *a*, *b*.

H is a driving shaft arranged across and above the frame G, and having its journals supported by bearings or standards I, I, fastened to the said frame. The said shaft has a fly wheel K, a gear wheel L, and a crank M, fixed to it as seen in the drawings, the said crank being jointed to the connecting rod N, of the piston rod O, of a steam cylinder P, fixed upon the rear part of the frame G, and having a suitable valve chest and valves, and made to receive its steam by means of a flexible tube or other suitable contrivance connected with a steam generator arranged in some convenient position near the said cylinder. The valve or eccentric rod of the valve chest is seen at Q, and the eccentric for operating it at R.

The cogged wheel L engages with a gear wheel M, fixed on a crank shaft S, the said shaft being placed directly underneath the frame G, as seen in the drawings. Two cranks T, T′, are attached respectively to the two ends of the shaft S, and have connecting rods U, U′, extending from them, each of said rods being jointed to one of two ears or projections V, V′, which extend from the head *k*, of a slide frame W, which is composed of two heads or blocks *k*, *l*, and two long connecting bars *m*, *n*. The rotations of the crank shaft S, produced by the steam engine, impart to the sliding frame W, a reciprocating rectilinear motion, the said frame being supported by and made to slide upon four ways or slides *o*, *o*, *p*, *p*, two of which are affixed to each of the main bars of the frame G, as seen in Figs. 1 and 4.

X denotes the drill or shank thereof, which consists of a long metallic cylindrical rod, having a groove *q*, cut in it and extending nearly from end to end of it. The upper end or that end next to the steam cylinder passes through and revolves in a crosshead Y, which slides freely upon the two parallel bars *m*, *n*, of the frame W.

Collars r, s are fixed on the drill rod, on opposite sides of the head Y, as seen in Fig. 1, the said collars being for the purpose of confining the drill rod to the cross-head. The drill rod is also supported in bearings t, u, inserted in the cross head k of the frame W, as seen in Fig. 1, the said bearings being more particularly shown in Fig. 5, which denotes a vertical section of them, the shaft, and the slide head k, the said section being taken perpendicularly to the axis of the drill rod.

A wedge v, is inserted between the bearing u, and one end of the socket or space for the reception of the bearings, the said wedge being jointed to and made to depend from a lever whose fulcrum x, is at one end, and on the top of a small post or standard y, erected on the slide head k. The other end of the lever w, operates in connection with a cam block z, a view of the inner side of which is shown in Fig. 6. The said cam block is made with a groove b', in its inner face and it has an inclined spring a', placed over one or the rear end of the said groove, the spring being fastened to the top of the cam block. That end of the groove not covered by the spring, flares or widens out, as seen at c'. The lever w, also has a spring d', fixed to it as seen in Fig. 5, the said spring being made to rest against and under a horizontal cross bar e', supported by two short vertical posts d^2, e^2, between which the lever extends, the said posts being erected on the slide block k. The spring d' operates to force down the lever w, and the wedge v, and by so doing causes the wedge to push the bearing and gripping block u hard up against the drill rod X, and so as to hold or grasp it firmly. When the lever w, passes up and over the spring a', it will be raised up by the inclination of said spring, and so as to lift the wedge v, and thus relieve the drill rod from the pressure or grasp of the bearings t, u. Immediately after the lever w passes the cam block, it drops downward, and on the recession of the slide head k, it passes through the groove b', and underneath the spring a', and lifts said spring and moves beyond it.

The drill is rotated or turned on its axis by means of the following mechanism. A ratchet wheel f', is arranged on the front side of the slide block k. The drill passes and moves freely through the said ratchet wheel, which has a stud or projection g (see Fig. 7 which is a view of the ratchet wheel as detached from the drill) which is made to enter the long groove q, of the drill, the object of the same being to so connect the ratchet to the drill rod, that any revolution or rotary motion of the former will create a corresponding rotary motion of the latter, the drill rod being permitted to pass freely in a longitudinal direction through the ratchet wheel. The ratchet wheel is turned by the combined action of a pawl or click h', a slide rod i', and a crank k'. The rod i', slides through bearings l', l', projecting from the slide head k, and the said rod has a spring m', applied to it in such manner as to press it against the cam k', which is fastened upon the frame G. When the drill advances or is thrown forward, the slide rod i', is carried in contact with the cam k', and moved by it in such manner as to force the click h', against the ratchet wheel and thereby cause a partial rotation of the same, and the drill.

From what has been hereinbefore specified it will be seen that when the sliding frame W, is drawn back, the drill rod X, will be firmly grasped by the bearings t, u, and so as to cause it to recede with the frame W. Also that until the lever w meets and mounts the inclination of the spring a', the said bearings t, u, will continue their grasp of it, and in consequence of the same the drill rod will be moved forward by and with the frame W, which latter it will be seen is moved by the cranks T, T′, and connecting rods U, U′. An impulse or forward movement being thus given to the drill rod, it is next to be disengaged from the grasp of the bearings t, u, so as to permit it to continue its motion through or by means of the momentum so imparted to it. Thus it will be seen that when the drill strikes against the rock, the shock or percussion of the blow cannot injuriously affect the machinery which holds and operates the drill rod, as the drill rod is so disengaged from it as to move forward and recoil back entirely independent of the mechanism by which it is advanced.

I am aware that a drill has been lifted up by mechanism and afterward allowed to fall down by the power of gravity. This constitutes no part of my invention, although when the drill is made to operate in a vertical or nearly vertical line, the descent of the drill will be aided by the power of gravitation. One particular part of my invention consists in applying to the drill such mechanism as will move it or throw it forward, against any object independently of the power of gravity and thereby enable me to use the drill in either a horizontal or an inclined direction as circumstances may require.

The bars a, b, have chains or ropes p', p', attached to their upper ends. The said chains or ropes are made respectively to pass over pulleys q', q', (fixed on the top of the main frame) and to descend and wind on a windlass r', arranged as seen in the drawings. By means of the said windlass and ropes, the inclined position of the bars a, b, may be readily adjusted as circumstances may require.

The front end of the frame G, may be supported in any position by two struts Q^2, R^2, which are jointed to it at their upper ends; and at their lower ends they are respectively stepped into two toothed racks or rails S^2, T^2, arranged as seen in the drawings.

The frame G, has one or more guy ropes U^2, each of which is made to pass from or near the front part of the said frame, and toward and around a belaying contrivance V^2, suitably disposed, the same being to prevent the frame G, from rising upward while the drill is in operation.

1. I claim as my invention the combination of the bars *a*, *b*, or any equivalent therefor, the frame G, and its journals and slide boxes as constructed adapted to one another and made to operate together substantially in the manner and for the purpose of supporting the drill and directing it into any desirable position substantially as specified.

2. I also claim a combination made up of the following elements, viz, 1st mechanism for throwing or moving the drill forward, and drawing it backward when it is placed in such a position that it would not be advanced by the action of gravity alone as it has heretofore been made to operate, the said mechanism being the crank shaft, cranks and connecting rods, directly connected with the slide frame W, and the supporting and directing frame G, or any well known equivalent machinery applied to produce similar movements of the drill. 2nd. The gripping apparatus or that by which the drill rod is seized, or clamped to the drill frame at the proper times, the same consisting of the bearings or jaws *t*, *u*, the wedge *v*, lever *w*, and spring *d'* and its cross bar *e'* directly over said jaws. 3d. The apparatus which causes the jaws to relax their hold of the drill and set it free or independent of the drill frame W, and so that it may be impelled forward by its momentum, and suffered to recoil without injury to the rest of the machinery, the same consisting of the cam block Z, and its inclined spring *a'*, constructed and applied as described; it being expressly understood that I lay no claim to any combination of machinery so arranged as merely to lift or draw back a drill and so that it may act or fall against the substance to be drilled by the power of gravity alone, the invention or improvement claimed by me being a combination of such mechanism, and a mechanism for throwing or impelling the drill independently of the power of gravity, in order that the drill may be placed and operated in any inclined position as well as in a vertical position.

In testimony whereof I have hereto set my signature this sixteenth day of November, A. D. 1848.

JOSEPH J. COUCH.

Witnesses:
R. H. EDDY,
CALEB EDDY.