J. Moulton,

Stone Drill.

No. 46,813. Patented Mar. 14, 1865.

Fig. 3.

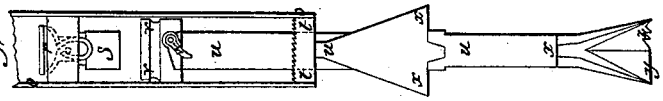


Fig. 4.

Fig. 2.

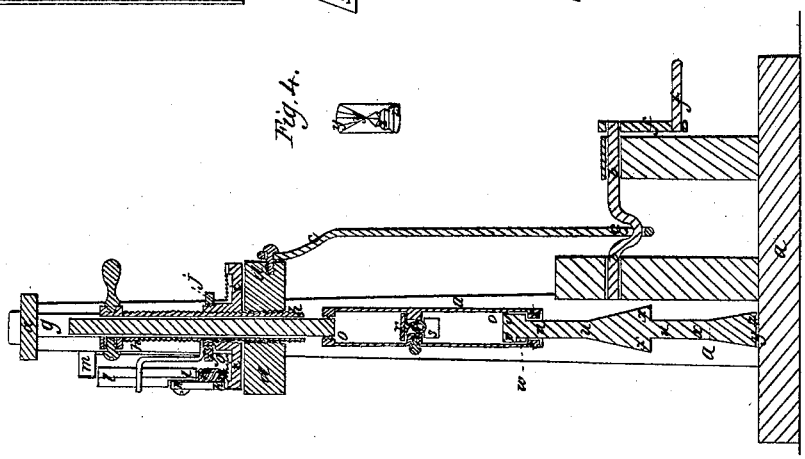
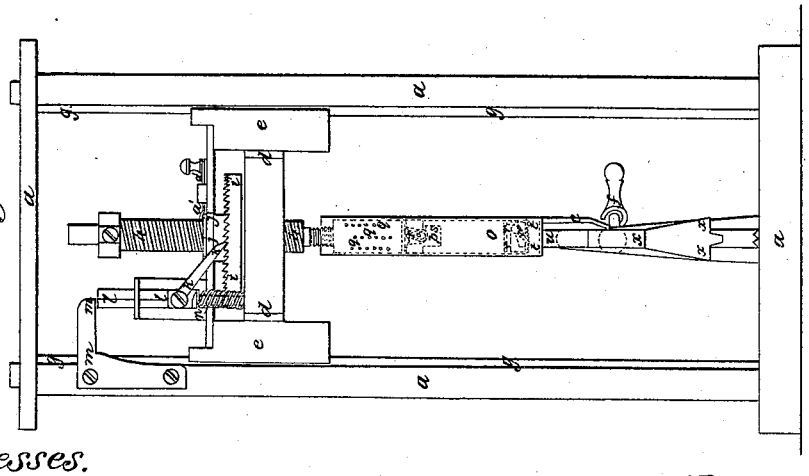


Fig. 1.



Witnesses.

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UNITED STATES PATENT OFFICE.

JOEL MOULTON, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN DRILLING-MACHINES.

Specification forming part of Letters Patent No. **46,813**, dated March 14, 1865.

To all whom it may concern:

Be it known that I, JOEL MOULTON, of Boston, in the county of Suffolk, and State of Massachusetts, have invented certain new and useful Improvements in Drilling-Machines; and I do hereby declare that the following description, taken in connection with the accompanying plate of drawings, hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements by which my invention may be distinguished from all others of a similar class, together with such parts as I claim and desire to have secured to me by Letters Patent.

My improvements in drilling apparatus are intended more especially for the boring of oil-wells and for the removal of water therefrom, but can also be used for other purposes.

My improvements are as follows: First, a peculiar construction of the cutting-edge of the drill, having for its object a more complete disintegration of the material to be cut than has been possible by the use of an ordinary drill, and also insuring its uniform wear both at its center and edges; second, forming on the drill-shaft or attaching thereto one or more reamers for the purpose of enlarging the bore cut by the drill; third, causing an intermittent rotary motion to be given to the drill-shaft and reamers by means of an arrangement of devices to be hereinafter described; fourth, combining with the drilling mechanism a pumping apparatus so connected therewith that water or other liquid can be ejected from the well by means of the up and down motion of the drill-shaft itself.

I will now proceed to describe in detail the construction and operation of my improved drilling apparatus.

My improvements are represented in the accompanying plate of drawings, of which Figure 1 is an elevation, and Fig. 2 a central vertical transverse section, of my improved drilling apparatus. Fig. 3 is an enlarged detail view of the tube and drill, and Fig. 4 is a view showing the teeth or under side of the drill.

a a a in the drawings represent the supporting frame-work of my improved apparatus; *b b*, the crank-shaft, *c c*; the connecting-rod attached to a cross-piece, *d d*. The latter is attached to or forms part of two slides, *c c*, which, by the revolution of the crank *f f*, are made to travel up and down in suitable ways, *g g*. Through the cross-piece *d d* extends a screw-shaft, *h h*, which has an intermittent rotary motion imparted to it by means of the ratchet-wheel *i i* and screw-collar *j j*, forming part of the latter, the ratchet-wheel *i i* having motion imparted to it by means of a pawl, *k k*, attached to a vertical rod, *l l*. This rod *l l* has an up-and-down motion given to it, so as to operate the pawl *k k* by striking as it rises with the cross-piece *d d* against a suitable stop, *m m*, and by the retracting power of a coiled spring, *n n*. To the bottom end of the screw-shaft *h h* is secured a tube, *o o*, having an induction-orifice at *p*, and eduction-apertures at *q q*, and containing suitable valves, *r r* and *s s*, constructed in a similar manner as those of any ordinary pump. In the lower end of the tube *o o*, is formed a ratchet-wheel, *t t*, through which plays the drill-shaft *u u*, the latter having its top so formed as to fit the bore of the tube *o o* and constitute a piston-head, *v v*, therein. To the piston-head *v v* are attached two pawls, *w w*. Thus it will be seen that the vertical and intermittent rotary motion imparted to the tube *o o* by the means hereinabove described will cause an intermittent rotary motion to be given to the drill-shaft *u u*, because the teeth of the ratchet-wheel *t t* are brought as the latter rises successively to engage with the pawls *w w*. The drill-shaft *u u*, being raised and rotated by the rachet-wheel *t t* coming in contact with the pawls *w w*, drops by its own weight when the tube *o o* is lowered, and its up-and-down motion causes its piston-head *v v* to work in such a manner in the tube *o o* as to perform the operation of pumping, as will readily be understood without further explanation. Attached to or forming part of the drill-shaft *u u* are the reamers *x x*, of larger diameter than that of the drill itself, for the purpose of enlarging the bore cut by the drill as the work progresses. There may be one or more of these reamers, as may be desired.

The cutting-edge of the drill is formed as shown in Fig. 4, having one set of teeth, *y y*, which radiate from its center, and another set of teeth, *z z*, which extend transversely across the drill. The object of this arrangement of the teeth of the drill is to more thoroughly pulverize the surface operated upon, and to

causea uniform wear upon its whole surface—that is, equally from its center to its circumference.

When it is desired to raise or lower the drill-shaft *u u*, the screw-shaft *h h* is prevented from turning by means of a sliding bolt, *a' a'*, which can be made to engage with a vertical slot extending the whole length of the screw-shaft *h h*, so that the turning of the screw-collar *j j* of the ratchet-wheel *i i* will thus raise or lower the drill according to which way it is turned.

Instead of the tube *o o*, the stock in which the drill-shaft works vertically may consist of rods or bars which form guides for the shaft in its upward and downward motions, and the pawls or cams which act to rotate the drill-shaft may be thrown down by springs, if required.

The object of the eduction-openings *q q* is to enable the pump to inject water into the crevices of the shaft or well, which, after it has been sunk into the ground, is covered more or less on the sides with the dust or detritus, which often prevents the issuing of the oil from the crevices. This pump ejects the water through the openings *q q* into the said crevices, so as to open the way for the flow of the oil.

Having thus described my improvements, I shall state my claim as follows:

What I claim as my invention, and desire to have secured to me by Letters Patent, is—

1. Constructing the cutting-surface of the drill with teeth arranged with regard to it and each other, as described, and for the purpose specified.

2. The arrangement of devices for giving an intermittent rotary motion to the drill, operating as hereinabove described.

3. Combining with the drilling mechanism a pumping apparatus operated by the head of the drill-shaft itself, as described.

4. Giving the intermittent rotary motion to the drill-shaft *u u* by devices inside of the tube or stock *o* as the latter is alternately lifted and depressed, the drill-shaft rising and falling within the stock.

JOEL MOULTON.

Witnesses:

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