I. M. Singer,

Stone Drill.

No. 1,151 Patented May 16, 1839.

Fig: 1.

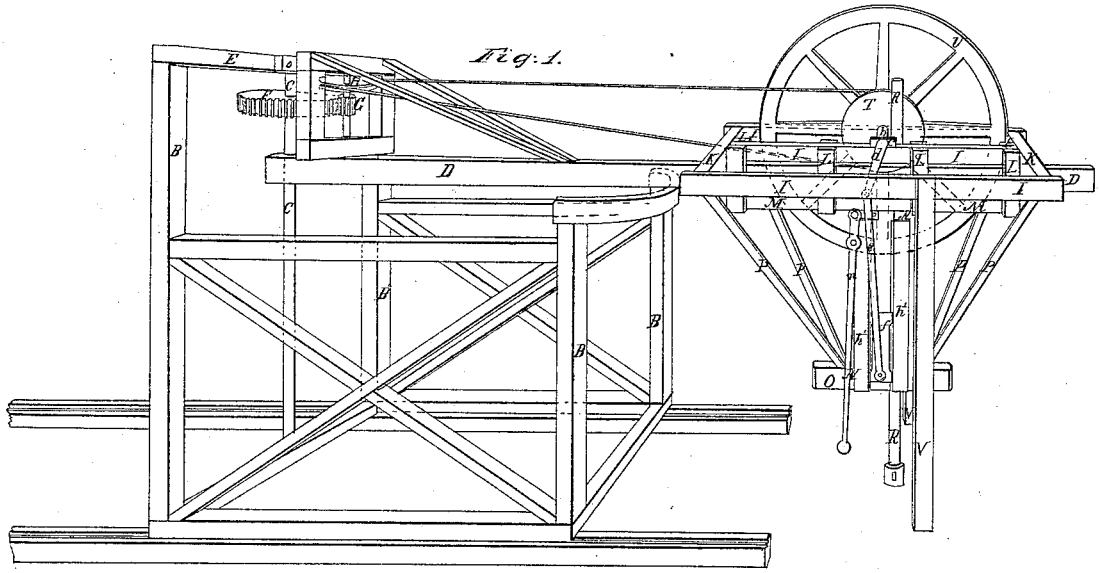

Fig: 2.

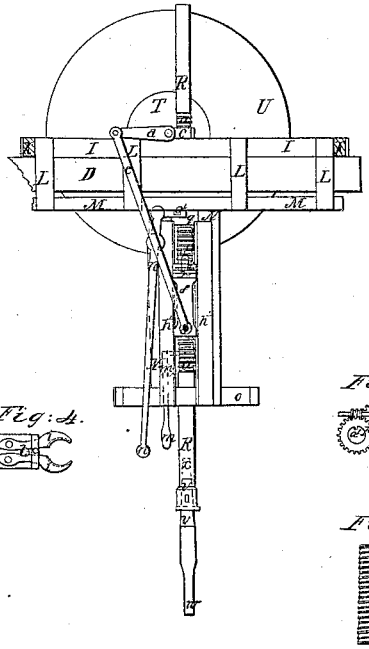

Fig: 3.

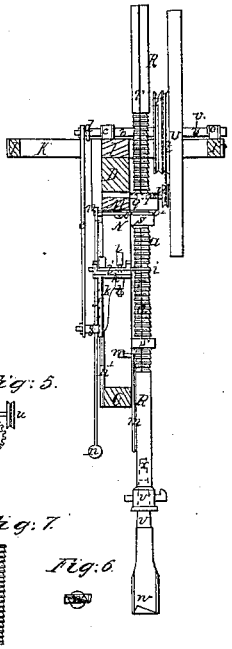

Fig: 4.

Fig: 5.

Fig: 7.

Fig: 6.

UNITED STATES PATENT OFFICE.

ISAAC M. SINGER, OF LOCKPORT, ILLINOIS.

MACHINE FOR DRILLING ROCK.

Specification of Letters Patent No. 1,151, dated May 16, 1839.

To all whom it may concern:

Be it known that I, ISAAC M. SINGER, of Lockport, in the county of Will and State of Illinois, have invented a new and useful Improvement in Machines for Drilling Rock, and that the following is a full and exact description thereof, reference being had to the drawings accompanying, and the same parts are designated by the same letters of reference in all the different figures.

Figure 1, is a perspective view of the frame of the machine, and the sliding frame to which the drilling apparatus is attached. Fig. 2, a side vertical projection of the drilling machinery and sectional view of the sliding frame. Fig. 3, an end view of the same, with the sliding frame in section. Fig. 4, a top view of the jaws or clasps that raise the drill stock, and Fig. 5, a horizontal projection of the worm and worm wheel that give a rotary motion to the drill stock.

The nature of my invention consists, in drilling rock, by means of a drill operated in a machine by a crank, and its appendages, in such manner, that the drill is raised the same height at each successive stroke, without altering, or setting, any part of the machinery, from the commencement of the hole, to its termination, other than removing the drill, for the purpose of clearing the hole.

The frame to which my improvement is attached, is formed of timber of sufficient strength, and size to give the requisite support to the drilling apparatus, and is in width about thirty feet, or such width as to admit the horses employed, to travel within the frame in a circle around a vertical shaft at the center of the circle, to which they give motion by a sweep firmly secured to the vertical shaft.

The frame as represented at Fig. 1, is a little longer than its width, with a circular rest A, secured to the top of the two front posts B, and having the vertical shaft C, for its center and placed at a height sufficient for the long arm or crane D, to rest and turn upon in changing the drill from one position to another, which may be varied the width of an excavation for a canal or rail-road without changing the position of the frame.

The back, or the end of the frame farthest from the drill, is raised above the other part of the frame, and the upper end of the shaft C, turns in a box secured to the upper transverse timber E, secured to the top of the posts B′, Fig. 1. The back end of the crane, or arm, D is coupled, or clasped, to the vertical shaft C, in such a manner that the shaft turns within the arm and the shaft C, forms a center for the crane D, and the circular timber A, forms the middle support.

A little above the crane a large wheel F, is firmly secured to the vertical shaft C, and gives motion to a pinion G, upon a shaft placed within a small vertical frame resting upon and secured to the crane D, and the crane being coupled to the shaft C, the wheel F and pinion G have the same relative position, with each other, without regard to the angle of the crane. Above the pinion G and secured to the same shaft is a pulley H, that gives motion to the crank pulley by a band. This frame may be constructed in any applicable form, and such motive power employed as found most convenient.

The drilling apparatus is secured to a frame, and connected to that part of the crane that projects beyond the front of the frame. The upper part of the drilling frame is formed of three longitudinal pieces I, Figs. 1, 2 and 3, connected at their ends to two transverse pieces K, of such length and strength as the nature and size of the machine may require.

The center longitudinal piece I, of the sliding frame is of the same width of the crane D, as seen at Fig. 3, and is placed upon its upper surface, and secured to the crane in a substantial manner by four vertical guides L, at each side of the center longitudinal piece I, projecting downward and confined to another piece of timber M, beneath the crane similar to the one above the crane. This lower piece M, is placed a little below the crane for the purpose of introducing wedges to secure it to the crane in different positions. Beneath the timber M, and secured thereto, are two vertical posts or stands N, that project downward a suitable distance for the motion of the slide, and their lower ends are prevented from spreading, by being framed to a timber O, as shown at Figs. 1, 2 and 3.

The posts N, receive additional support from the braces P, Fig. 1, which extend from the feet of the posts, to near the outer ends of the side longitudinal timbers I. Longitudinally at the center of the sliding frame, near the crane at the back side (as shown in drawing Figs. 1 and 2) is placed

the drill-stock, R, and secured to the two posts N, by the stands, S, which are formed of metal, through which the drill-stock slides in a vertical direction as seen at Figs. 2 and 3. A space near the two ends of this drill-stock is left plain and cylindrical, but the greater part of its length, is serrated, or notched by grooves *a*, formed therein, the upper edge being at right angles with the periphery, and the under edge of the groove slants downward and outward in an oblique direction to the surface of the drill-stock, a little above the groove below, thus leaving a small parallel space between each groove to prevent too great wear by the friction of the drill-stock against the stands, as seen at Figs. 2 and 3. Or there may be formed a spiral groove or screw upon the drill-stock (in place of the circular grooves) the thread being in the form of the projections between the grooves, before described, as at Fig. 7. Transversely in the sliding frame and directly back of the drill-stock is placed the crank shaft *b*, Figs. 1, 2 and 3 and moves in boxes *c*, secured to the upper edge of the center and back longitudinal pieces I.

The crank *d*, is secured to the inner end of the crank shaft and in front, and near to the guides L, Figs. 1 and 2. A pitman *e*, extends from the outer end of the crank *d*, to near the bottom of the slide or carriage *f*, to which it is attached by the stud *g*, and the carriage moves and is confined between the vertical ways *h'*, which are secured to the front of the posts, or stands N, Figs. 1, 2 and 3.

h, Figs. 2 and 3, is the top of the carriage that projects inward to the opposite side of the stands N, and at the top of this projection are placed the jaws *i*, Figs. 2, 3 and 4 that raise the drill-stock. These jaws *i* are secured to each side of the top of the carriage or projection *h*, near the middle between the two ends thereof, with their circular ends projecting beyond the top of the slide and connecting with the grooves upon the drill-stock as shown at Figs. 3 and 4. At the opposite or front ends of the jaws, is placed a spring *j* that forces open that end and closes the opposite ends upon the grooves of the drill-stock, at such times as desired. At each end of the projection *h*, is placed a clasp that admits the lateral motion of the jaws beneath them, and are secured to the plate *h*, by screws as shown at Figs. 2, 3 and 4. A brace *k*, Fig. 3, extends from near the bottom of carriage, to near the end of the projection *h*. At the outer end it unites with a small circular projection that extends downward from the projection *h;* through it is formed a small hole, and a pin *l*, inserted and secured by a nut at the bottom, or a pin, and is of such length as to admit of a vertical movement sufficient to operate the jaws *i*, by the action of wedge, or conical part of the pin *l*. That part of the pin *l*, that extends above the top of the carriage, is sufficiently large, that when it is between the jaws *i*, to open them so that they will pass up and down without coming in contact with the drill-stock and the lower end being smaller than the upper, the pin is formed wedge shaped, or conical at the uniting of the two different diameters and this conical part operates against the jaws *i*, in connecting with, and disengaging from the drill stock.

In the operation, when the carriage has reached its lower position, the pin *l*, strikes against the upper end of a bent lever *m*, Figs. 2 and 3, and raises the pin so that the small part comes between the jaws, which admits them to connect with the drill stock, which is effected by the action of the spring *j*, and when the carriage returns and has arrived at its upper position, the upper end of the pin is brought in contact with the timber M, and forced down and opens the jaws and the drill-stock falls by its own gravity. By changing the position of the lever *m*, so that the pin *l*, will not come in contact with the lever, the large part of the pin will remain between the jaws and the carriage can continue its motion without putting the drill stock in operation until desired.

A lever *n*, Figs. 1, 2 and 3, is secured to the front of the sliding frame to stand N, and gives motion to a catch *o'*, Figs. 2 and 3, which connects with the drill-stock (at the pleasure of the operator) and prevents it from returning, when it is brought up by the carriage, and used for removing the drill, for the purpose of clearing the hole, &c.

A worm wheel *p* Figs. 3 and 5, is secured in the stand *q*, Fig. 3, which is connected by a pin, or feather, *a'*, with the groove *r*, in the drill stock, and is moved by the worm *s*, Fig. 5, which receives its motion from the pulley *t*, upon the fly-wheel shaft, which pulley is connected to the pulley T, that gives motion to the fly wheel, as seen at Fig. 3. A band passes from the pulley *t*, around and gives motion to the pulley *u*, on the outer end of the worm shaft. The wheel *p*, gives a circular movement, to the drill-stock at each successive stroke, that the drill may not strike in the same place in succession. The balance wheel U, placed between the center and back longitudinal pieces I, serves to regulate the motion of the machine.

The shank *v*, of the drill is made conical and fits in a socket *x*, in the lower end of the drill stock, corresponding with the taper of the shank *v*, and the taper of the shank

and hole in the drill-stock, receives the whole force of the drill, when in operation without the aid of shoulders upon the shank of the drill; a key is inserted to prevent its being drawn out should it strike into a seam as shown at Figs. 2 and 3.

The lower end of the drill, or the cutting portion *w*, is formed with two broad ends, or transverse cutting edges, with the bottom cutting edge formed obliquely from one of the broad ends to the other as seen at Figs. 2, 3 and 6. These broad ends or transverse ends are formed circular corresponding with the circumference of the hole, and by the outer edge of the drill being round and fitting to the circumference of the hole, it must necessarily follow that the hole will be round, and true, and thus avoiding those three cornered holes usually made with a flat drill. The sliding frame receives additional support from the posts V, Fig. 1, placed at opposite sides of the frame, as shown at Fig. 1.

What I claim as my invention and desire to secure by Letters Patent is—

1. The combination of the frame in which the drill works, with the frame of the driving power by means of the arm D, for the purpose and in the manner herein described.

2. I claim the drill stock R, the jaws *i*, and the pin *m*, the same being constructed and combined in the manner and for the purpose as herein set forth and described.

3. I also claim the peculiar form of the point of the drill, or cutting portion, the same being constructed in the manner and for the purpose as before described.

ISAAC M. SINGER.

Witnesses:
D. K. MORSELL,
LUCIAN OSGOOD.