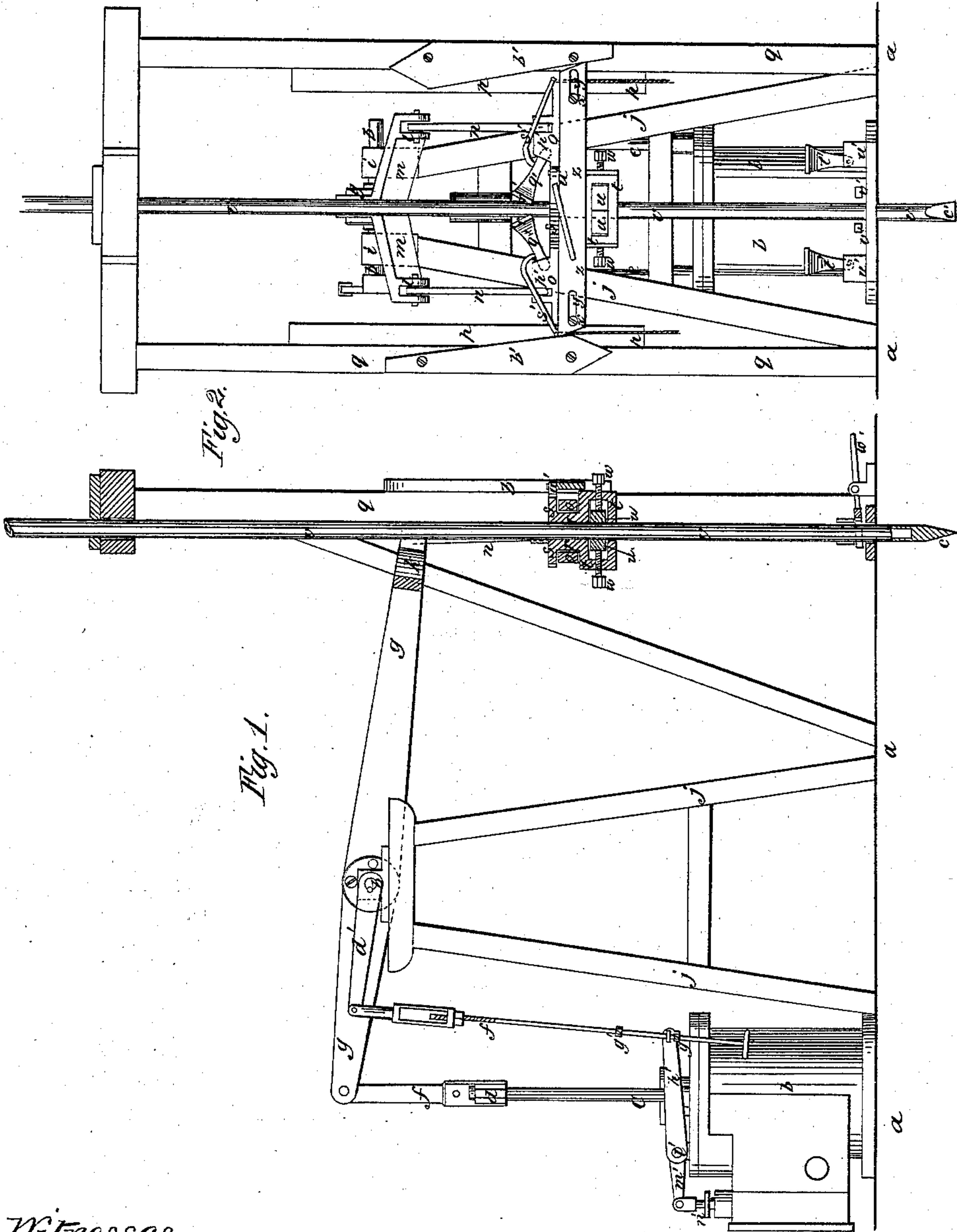


M. E. Abbott,

Boring Artesian Wells.

N^o 54, 836.

Patented May 22, 1866.



Witnesses.
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UNITED STATES PATENT OFFICE.

M. E. ABBOTT, OF SUMMIT HILL, PENNSYLVANIA.

IMPROVED DRILLING-MACHINE FOR WELLS.

Specification forming part of Letters Patent No. 54,836, dated May 22, 1866.

To all whom it may concern:

Be it known that I, M. E. ABBOTT, of Summit Hill, in the county of Carbon and State of Pennsylvania, have invented new and useful Improvements in Machines for Drilling Artesian, Oil, or other Deep Wells; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The present invention consists—

First, in a new and peculiar arrangement of devices attached to one end of the engine-beam and moving up and down with the same upon suitable guides of the machine for imparting the necessary revolving motion to the drill rod or shaft as it is raised thereby.

Second, in hanging within the frame, through the vertical movement of which, as above referred to, the drill is revolved, two or more jaws, so that as the frame moves in an upward direction the drill-rod is correspondingly raised thereby, in combination with similar jaws hung upon the platform or any other suitable stationary part of the machine for holding or retaining the drill-rod in such elevated position as the frame moves downward, the lifting-jaws then sliding freely over the rod, or, if desired, being disengaged therefrom, when the rod is again lifted by the upward travel of the frame and again held as before, thus gradually raising it to the necessary or desired height in or entirely out of the well. To lower the drill-rod it is only necessary as the frame is on its downward movement to disengage the stationary and holding jaws of the rod, the frame or lifting-jaws then being closed about and grasping the rod by the weight of the same and carrying it down with the frame, where it is held by then throwing or dropping the stationary jaws into proper position therefor as the frame moves upward with its jaws disengaged from the rod, and so on until the drill has been lowered to the desired or requisite depth, when the devices for revolving it are connected therewith, they being disconnected therefrom during both the raising and lowering movements of the drill, as above described.

Third, in regulating the vertical play of the frame in which the drill-rod is inserted and

operated upon, as described, by means of a peculiar arrangement of devices connected with the fulcrum or shaft on which the beam of the engine turns and the steam and exhaust ports of the piston-cylinder, whereby the play of the piston within the cylinder can be adjusted at pleasure, thus imparting to the beam, and through it to the drill, a greater or lesser movement in a vertical plane, according as may be desired.

In accompanying plate of drawings my improvements are represented, Figure 1 being a partial side view of the same with a portion of the devices for revolving the drill shown in section, and Fig. 2 an end view.

a a in the drawings represent the platform or bed-plate of the machine, on one end of which a vertical steam piston-cylinder, *b*, is secured, to which steam is admitted in any of the ordinary modes through a suitable steam port or ports; *c*, the piston-rod, secured at its upper end to a horizontal cross-bar, *d*, moving upon, at each end, vertical guiding-rods *e e* of the top end of the piston-cylinder *b*, to which cross-bar, and at its center, is hung, by a short connecting-rod, *f*, one end of a horizontal beam, *g*, turning by its fulcrum-shaft *h* in bearings *i i* of a vertical supporting-frame, *j*, of the bed-plate *a*. To the other end, *k*, of the horizontal beam *g*, upon the outer ends, *l*, of each of its angular projecting arms *m n*, is hung, by vertical connecting-arms *n n*, a horizontal cross-bar or frame, *o*, moving at each end upon guides *p p* of two vertical parallel standards, *q q*, of the bed-plate *a*.

In the center of the bar or frame *o* is a hollow bushing, *r*, on the upper end of which is a horizontal ratchet-wheel, *s*, and on the lower end a box, *t*, in which are sectional pieces *u u*, between which the vertical drill-rod *v*, inserted within and passing through the hollow bushing *r*, is tightly grasped and held, when desired, by means of the set-screws *w w* of the box *t*.

Parallel with the box or frame *o*, and secured thereto by means of screws *x x* at each of its ends, passing through the slots *y y*, is a horizontal sliding cross bar or plate, *z*, having upon its upper edge a spring-pawl, *a'*, engaging with the ratchet-wheel *s* and moving in and between two vertical-inclined parallel ways, *b' b'*, of the standards *q q*.

As the piston of the piston-cylinder moves in a downward direction through the force of the steam admitted thereto the horizontal frame *r* and drill-rod secured therein are consequently raised, the drill-rod at the same time being partially revolved through the horizontal movement of the sliding bar *z*, caused by the inclined ways in and between which it travels acting upon the ratchet-wheel *s*, with which the pawl *a'* of the said sliding bar engages, as is evident without further description, until the piston reaches the full limit of its upward movement, when, steam being withdrawn and exhausted therefrom, the drill and its frame is left free to fall by its own weight to and upon the rock or other material in which it is intended to drill or bore a hole, striking it with its wedge-shaped end *c'*, and indenting it as desired. The drill is then raised and again dropped, as before described, and so on as long as desirable or necessary to sufficiently break away the rock.

In order to enable the height to which the drill-rod can be raised to be regulated at pleasure, I secure to and upon one end of the fulcrum *h* of the engine-beam *g* a projecting arm, *d'*, to the outer end of which is hung a vertical rod, *f'*, having adjustable tappets *g' g'*, between which plays the crank-arm *h'* of the horizontal shaft *l'*, turning in bearings of the top of the piston-cylinder, to the crank or arm *m'* of which shaft the piston-rod *n'* of the steam-valve is hung. By increasing or decreasing the distance between the adjustable tappets on the rod *f'* the length of time to which steam is admitted to the piston-cylinder can be thus regulated at pleasure, the crank-arm *h'*, as the rod *f'* plays up and down within the end of the same, abutting against, in turn, the upper and lower tappets, thereby, through the connecting devices described, closing and opening the steam-valve of the cylinder, as is evident without further description.

On upper side of frame *o*, and turning in bearings *p' p'* of the same, are two jaws, *q' q'*, placed upon opposite sides of the drill-rod *v*, and with their ends *r' r'* in contact therewith, made of a slightly-concave shape to more fully conform thereto, which jaws have bent arms *s' s'* for raising and disconnecting them from the drill-rod when desired. Similar jaws *t' t'* are hung within suitable bearings *u' u'* of the bed-plate *a*, and also grasp the drill-rod *v*, as before described, for the jaws *q' q'*, a lever-frame, *v'*, being hung upon the bed-plate, by depressing the outer end, *w'*, of which the jaws can be lifted from contact with the rod.

If, after having drilled for some distance in the well, it should become necessary or deemed advisable to clear out the débris within it, or to repair the drill-rod, or for any other purpose whatsoever which would require the drill-rod to be lifted from the well, I first disconnect the drill from the devices by which it is revolved, and then, throwing off the lower stationary

jaws, *t t*, of the bed-plate as the frame *v* ascends by the downward movement of the piston, its jaws *q' q'*, grasping the rod, lift the same a distance corresponding to the length of the vertical movement of the frame, when, the frame having reached the limit of its upward movement, by dropping the jaws *t' t'* into connection with the drill and disconnecting the jaws *q' q'* therefrom, the drill is thus held in such elevated position while the frame moves downward, the lifting-jaws then again grasping the drill, while the lower or holding jaws, *t' t'*, are disengaged therefrom as the frame moves upward, again correspondingly lifting the drill, and so on until the drill-rod has been raised entirely from the well or to a sufficient height therein.

To lower the drill-rod it is only necessary to reverse the movements of the jaws—i. e., connect the upper jaws with and disconnect the lower jaws from the drill-rod upon the downward movement of the frame, and vice versa upon the upward movement, which, as is apparent, will accomplish the desired result.

In the various movements hereinabove described for the drill-rod it may be here remarked that suitable guides may be provided therefor at proper points of the well, in order to impart the necessary steadiness thereto and to prevent it from being wrenched or otherwise strained.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The arrangement of devices herein described for imparting to the drill-rod a movement in a vertical plane, the same consisting in securing it within the frame or cross-bar *o*, moving on suitable vertical guide rods or bars *p p* and connected with the engine-beam *g* in any proper manner, substantially as set forth.

2. Revolving the drill through the vertical movement of the same by means of the sliding plate *x* moving in and between parallel inclined guides *b' b'*, and provided with a spring-pawl, *a'*, engaging with the ratchet-wheel *s* of the frame *v*, arranged and operating substantially in the manner described.

3. The combination of the jaws *q' q'* and bent arms *s' s'*, arranged and operating with the rod *v* in the manner and for the purpose herein specified.

4. The combination of the jaws *t' t'* and lever-frame *o*, arranged and operating with the rod *v* in the manner and for the purpose herein specified.

5. In the described combination with the drill-rod *v* and the beam *g* for operating the same, the crank-arms *d' h' m'*, rods *f n'*, and adjustable tappets *g g'*, arranged and employed, substantially as set forth, to regulate the stroke of the drill.

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Witnesses:

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