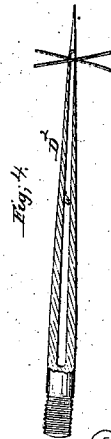
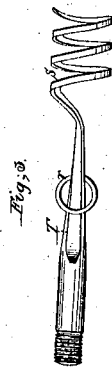
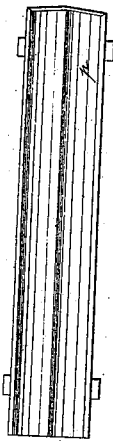
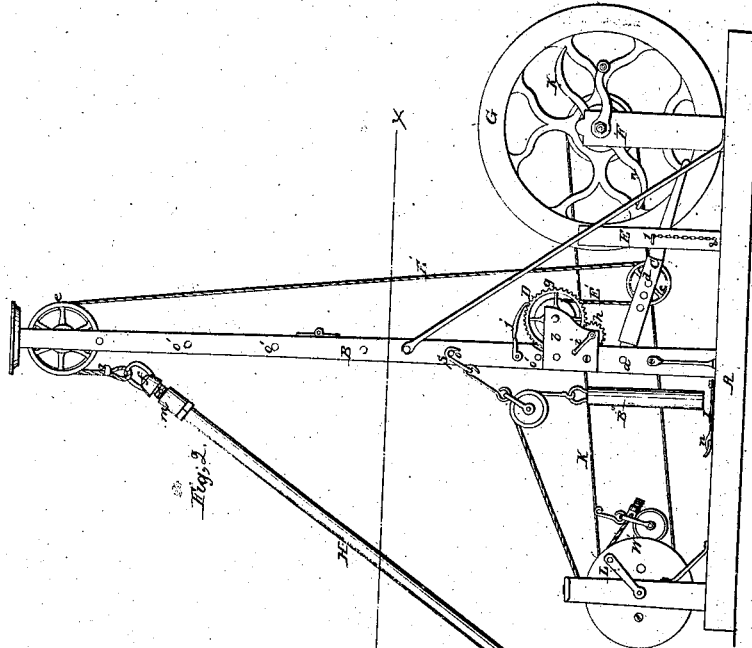
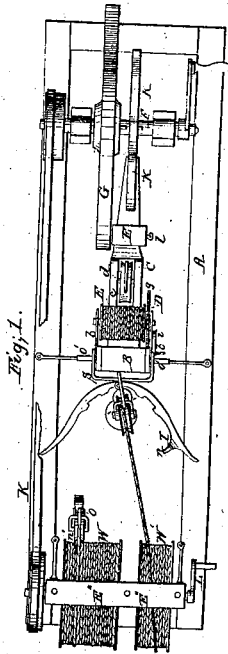


W. Hyde,
Boring Artesian Wells.

N^o 46,673.

Patented Mar. 7, 1865.



Witnesses;
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UNITED STATES PATENT OFFICE.

WALTER HYDE, OF NEW YORK, N. Y.

IMPROVED WELL-BORER.

Specification forming part of Letters Patent No. **46,673**, dated March 7, 1865.

To all whom it may concern:

Be it known that I, WALTER HYDE, of No. 769 Broadway, (room 21,) in the city, county, and State of New York, have invented a new and Improved Well-Borer; 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, in which—

Figure 1 represents a horizontal section of this invention, the line *xx*, Fig. 2, indicating the plane of section. Fig. 2 is a side elevation of the same. Fig. 3 is a detached elevation of a device for removing broken drills. Fig. 4 is a detached sectional elevation of a borer used in clay or soft ground. Fig. 5 is an end view of the same.

Similar letters of reference indicate like parts.

This invention consists in the arrangement of an oscillating lever which has its fulcrum on a pivot secured in an upright post, and which is provided with a roller at about the middle of its length to operate in combination with the rope from which the borer is suspended, and with a windlass and tappet-wheel, in such a manner that when the rope, after having been wound round the windlass, is drawn through under the roller in the oscillating lever and over a pulley in the top of the upright post, any up-and-down motion imparted to the roller in the oscillating lever produces twice as much motion of the drill—that is to say, if the roller be depressed one inch the drill rises two inches, and vice versa, and by these means the height of the stroke is doubled. A double gear is attached to the windlass and a hand-crank to the pinion. By means of this crank the drill is easily raised or lowered, according to the pleasure of the operator, whether the machine is in motion or not, and the danger of breaking the drill is avoided, which arises either from too large an accumulation of drillings in the well or from the fact of the drill getting into bad openings in the rock. Furthermore, the height of the stroke can be adjusted to a fraction of an inch. For the purpose of holding the drill when the joints are loosened a pair of shears are applied to the platform, which are locked together by a catch, so that they hold securely

all the weight below against any accident. Two windlasses are combined with the boring-machine—one to contain the drill-rope and intended to be worked by a belt from the main or fly-wheel shaft of the machine, and the other to contain the bracket-rope and intended to be operated by hand—said double windlass being applied in combination with a stirrup catching over pins projecting from the sides of the upright post in such a manner that the drill can be readily raised and the drill-hole bored out at any moment.

A represents a platform or frame of wood or any other suitable material, and supported by wheels, if desired, so that it can be readily transported from place to place. From this platform rises a post, B, to a height of twenty feet, (more or less,) and through the lower part of this post passes a pin, *a*, which forms the fulcrum for a lever, C.

D is a windlass, which has its bearings in lugs or brackets *b*, secured to the sides of the post B and a rope, E', which is wound on said windlass, one of its ends being secured to the same, extends under a pulley, *c*, which is situated in a mortise in the lever C, and has its bearing on a pin, *d*, passing transversely through said lever, as clearly shown in Fig. 1 of the drawings, and thence the rope passes up over a pulley, *e*, secured on the top end of the post B, and it connects with a swivel, *f*, fastened in the upper end of the drill-rod. Mounted on the shaft of the windlass D is a cog-wheel, *g*, which gears in a pinion, *h*, and a handle, *i*, which is secured to the end of the arbor of said pinion, serves to turn the windlass in either direction, so as to raise or lower the drill, as may be desired. A pawl, *j*, which engages with the teeth of the cog-wheel *g*, prevents the same from turning backward and holds the drills at the desired height. The lever C extends through a slot in the standard E, which rises from the platform A, and its point is exposed to the action of cams or tappets, *k*, which are mounted on the main shaft F of the machine. These cams are so shaped that they depress gradually the tip of the lever, and in order to reduce the friction said tip may be protected by a metal plate, or a friction-roller may be inserted in it. The main shaft F is revolved by the action of a belt stretched over the fly-wheel G, and driven by a steam-engine or other suitable source of

power, and if it is desired to interrupt or stop the action of the cams on the lever C said lever is depressed, and a pin, *l*, is passed through the standard E, as shown in Fig. 2 of the drawings.

If the lever C is depressed, the distance between the pulley *c* and the windlass and also between said roller and the pulley *e* is increased, and consequently both branches of the drill-rope—viz., that between the windlass and pulley *c* and that between the pulley *c* and *e*—are lengthened, or, in other words, a quantity of rope is taken up equal to the double motion of the pulley *c*, and consequently the height to which the drill is raised is twice as large as the downward motion of the pulley *c*. By this arrangement the stroke of the drill can be increased to any desired extent. The drill-rod H is connected to the swivel *f* so that the same can easily revolve in either direction, and if the lever C is depressed so that the drill-rope is strained and the drill-rod suspended above the bottom of the hole already drilled, the rope untwists slightly, and the drill, together with the drill-rod, revolve in one direction, but as soon as the drill strikes and the strain is taken off from the rope the latter resumes its original twist and the swivel turns independent of the drill rod. An intermittent rotary motion is thus imparted to the drill without the aid of a complicated mechanism, and the operation of drilling is thereby considerably facilitated. The drill-rod is composed of a series of sections, which are united by couplings *m*. These couplings are made square at their lower ends, and if it is desired to insert a new section, the square part of the last or uppermost coupling is inserted between the clamps or shears I, which are fastened to the platform, as shown in Fig. 1. A catch, *n*, serves to lock the shanks of these shears together, and by their action all the weight below is securely held and the new section can be readily inserted. In the same manner the drill-rod can be taken apart, if it should be desirable, with the greatest ease and convenience.

After the drill-rod has been adjusted to the desired length the drill is let down by turning the windlass back, and when the point of the drill touches the bottom of the hole the pawl *j* is thrown in gear with the cog-wheel *g*, and by turning the pinion in the proper direction the stroke of the drill can be readily adjusted. If the drill-rope is taut when the point of the drill touches the bottom of the hole the full stroke of the lever C is transmitted to the drill, but if the drill-rope is slack when the point of the drill touches the bottom of the hole a portion of the stroke of the lever is taken up by the slack of the rope, or if the windlass is turned so that the point of the drill is slightly elevated above the bottom of the hole the blow exerted by the drill will be light, and it can be adjusted at pleasure.

The drill D* is secured in the lower end of

the drill-rod, and its pot is made about twenty inches in length and four inches wide, of the best cast-steel, and provided with lips or flanges two inches wide by twenty inches in length and three-eighths of an inch in thickness.

For the purpose of removing broken tools I use a drill-extractor T, such as represented in Fig. 3 of the drawings. It is provided with a cork-screw, *s*, similar to the coil used on ramrods of fire-arms, which is intended to work itself over the end of that portion of the rod or tool remaining in the hole, and a loose ring, *r*, catches over said end, and when the extractor is drawn up it retains the rod or tool caught in this ring and raises it up to the surface.

For boring into clay or soft ground I use a tool, D², such as represented in Figs. 4 and 5. The outward shape of this tool is similar to an ordinary post-hole auger, but it is provided with an air-channel, *w*, extending down through its shank, so that when the ground closes up air-tight above the flanges of the drill the air is allowed to pass down and the operation of raising the drill is facilitated.

For the purpose of raising the drill-rod, and also to raise and lower the bucket which serves to clear out the dirt and rubbish accumulating in the hole, I use a double windlass, W W', to one of which motion is imparted by a belt, K, from the main shaft, whereas the other windlass, W', is turned by a hand-crank, L.

The rope E from the windlass W is furnished with a sheave, *n'*, suspended from a hook, *o*, which catches in a stirrup, S, which is adjustable on pins *o'*, projecting from the edges of the post B. A similar sheave and hook are attached to the rope E'', which winds on the windlass W', and from which the bucket B'' is suspended. By this arrangement both the drill-rope and the bucket-rope are in such a position that they can be conveniently operated, and the drill as well as the bucket can be lowered to or raised from a depth of six hundred or more feet with little trouble or loss of time.

The several sections of the drill-rod, when the same are not used, are laid in a trough, P, which is necessary not only to keep them from the ground, but to steady and guide their lower ends when the same are raised one by one and lowered in the well. This arrangement enables one man to manage the rods, and by having a string running from the post to the engine he can start the machine at pleasure, and as soon as his drill works clear and the proper length of stroke is found he can walk around to the engine, fire up, try the steam, light his cigar, and return to the drill to find that it has been steadily turned by the rope, and has perhaps cut away the rock half an inch, and he leisurely slackens the rope by the hand-gear and crank on the post, and the operation goes on without interruption.

I claim as new and desire to secure by Letters Patent—

1. The pulley *c'* arranged in the oscillating lever C, in combination with the drill-rope E, pulley *g*, windlass D, and tappet-wheels or cams, constructed and operating substantially as and for the purpose set forth.

2. The double-gear *g h*, pawl *j*, or its equivalent, and hand-crank *i*, applied, in combination with the drill-rope and cams, substantially as herein described, so that the stroke of the drill can be adjusted and the drill raised or lowered while the machine is running.

3. The shears I, applied in combination with the platform A and sectional drill-rod H, substantially as and for the purpose specified.

4. The use of a double windlass, W W', and adjustable stirrup S, in combination with the drill-rope E' and bucket-rope E'', constructed and operated substantially as and for the purpose described.

WALTER HYDE.

Witnesses:

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C. L. TOPLIFF.