V. H. Lyon,

Boring Artesian Wells.

No. 52,868. Patented Feb. 27, 1866.

Fig. 2.

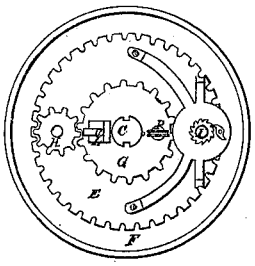


Fig. 4.

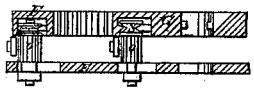


Fig. 1.

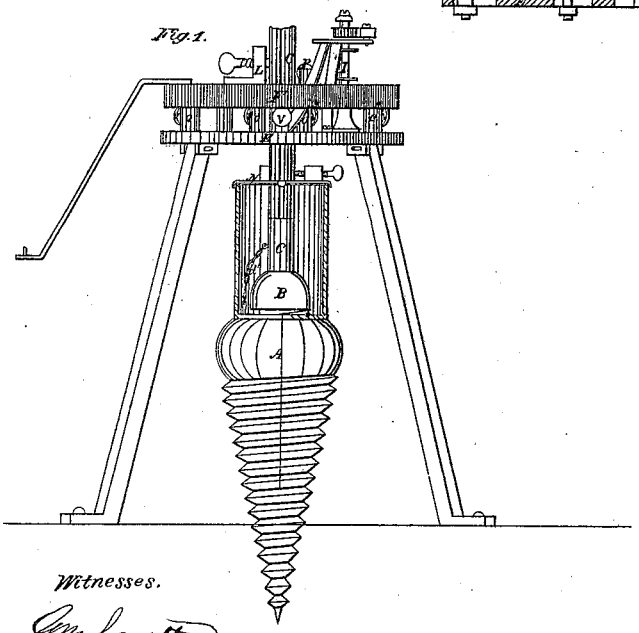
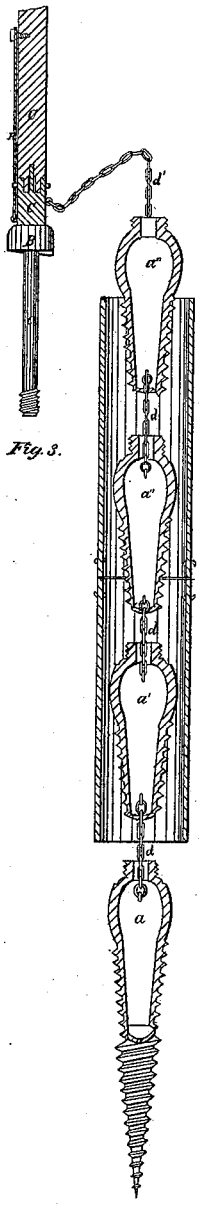


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

VIRGIL H. LYON, OF PLAINFIELD, INDIANA.

IMPROVED DEVICE FOR BORING WELLS.

Specification forming part of Letters Patent No. **52,868**, dated February 27, 1866.

To all whom it may concern:

Be it known that I, VIRGIL H. LYON, of Plainfield, in the county of Hendricks and State of Indiana, have invented a new and useful Machine for Boring Wells and Sinking Tubes; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of the same, in which—

Figure 1 is an elevation of the machine ready for operation. Fig. 2 is a top view, showing the plan of the gearing. Fig. 3 is a view of the screw-mole as separated and being drawn through the tube. Fig. 4 is a section through the gearing and table, showing how the master-wheel F and center wheel G are supported by and run on the small friction-rollers *s* and *v*.

Similar letters of reference indicate corresponding parts in the several figures.

The object of this invention is to provide the means of sinking wells and tubing the same with cheap tubes, such as common round earthenware drain-tile, whereby the cost of making them will be greatly lessened.

To this end I construct a conical screw-mole and attach the same to a shaft coupled together in sections, by means of which and with the aid of suitable machinery the mole is bored into the earth the requisite depth, the mole and shaft being so arranged as to carry down tubing that forms the wall of the well, the screw-mole being arranged so as to be separated after having been sunk to the required depth and drawn out through the tube.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

In Fig. 1, A is the conical screw-mole, formed as shown, and made in pieces or sections, as shown separated in Fig. 3. The sections *a' a'' a'''* of the mole are dowel-pinned at the bottom into the main piece or section *a*, and are held together at the top by means of the bell-shaped cap B, which is made fast to the shaft C, and which screws down on the neck of the mole. There is a short screw on the lower end of the shaft C, that screws down into the solid part of the screw-mole. This, with the cap B and dowel-pins in the lower ends of the pieces *a' a'' a*, serves to hold them securely and firmly together. The cap B has a shoulder, as shown, that catches against a shoulder on the main piece *a* of the mole, that prevents the screws of the cap B and that on the lower end of the shaft from being wedged by the act of driving the mole down.

The top part of the screw-mole is smooth and is the mole proper, the screw being merely to carry the mole down. The mole presses and packs the earth as it descends and makes the walls smooth and hard, and being somewhat larger than the tube, the latter follows it down.

The several pieces or sections *a a' a'' a'''* are connected together by chains *d*, as shown in Fig. 3, the upper part of the mole being made hollow to make room for the chains. The object of constructing the mole in pieces and connecting them together by chains, as described, is that when the well is bored to the proper depth the mole may be separated in pieces by reversing the shaft a few turns, which unscrews the cap B and lower end of the shaft, which may then be drawn up, bringing with it first the piece *a'''*, which is connected to the shaft by a chain, *d'*, followed, in turn, by the pieces *a''*, *a'*, and *a*, the mole being made in as many pieces as required to make them small enough to pass freely through the tube.

In order to separate and withdraw the mole it should be sunk a short distance—say one foot—below the bottom of the tube. To do this the tube must be supported from the top in any convenient way to prevent it from following the mole, and the boring continued until the mole is sunk far enough below the tube to make room for it to be separated and drawn out, as before described.

It will be seen that as soon as the threads of the earth formed by the screw are broken by drawing out the piece *a'''* from its position in the mole into the space between the top of the mole and bottom of the tube the other pieces will come away more easily. When the mole is withdrawn the tube may be let down.

The shaft is made in sections of convenient length, and joined together by tenons and mortise and secured by a pin, as shown in Fig. 3. One section of the shaft is grooved on two opposite sides, this section being the one that passes through the center wheel, G, which has small friction-rollers on pins fixed on opposite sides of the hole in wheel G, through which the shaft passes, that fit into the grooves in the shaft. These small rollers hold the shaft and turn it with the wheel G as

it is revolved, and they also permit it to descend freely as it is drawn down by the conical screw-mole. The other sections of the shaft are added below the table, the grooved section being raised up and held by the set-screw L until the additional section is placed in position.

As the shaft C and mole A will have considerable weight, I have arranged a chain or cord, R, to be attached to the shaft at the bottom, by which it may be more readily drawn up out of the well by means of the windlass I operated by the gearing.

The chain is made in sections about the same length as the sections of the shaft. The bottom section of the chain is made fast to the lower section of the shaft just above the bell-shaped cap B, and the top of the chain is secured near the top of the first section of the shaft by means of a screw through the top link. When this is sunk nearly to the level of the earth the screw is taken out, another section of chain, is attached to the top of the first or lower section, and the top of the second one secured near the top of the second section of shaft by the same screw through the last link of the chain, as before, the same operation being repeated as the shaft is sunk into the earth. This arrangement is to prevent the chain from being wound around the shaft as it is turned. When the well is sunk to the required depth the last section of chain is taken up through the wheel G alongside the shaft, passed over the pulley P, and secured to the windlass. The pinion H is then removed so as not to revolve the shaft, the master-wheel F operating the windlass I, which winds up the chain and draws out the shaft and mole.

The gearing by which the shaft and mole are operated is attached to a table, E, supported on legs at a convenient height from the ground, and is arranged as shown in Figs. 1 and 2.

F is the master-wheel; G, the center wheel, through which the shaft passes, and H the pinion by which motion is communicated from the master-wheel F to the center wheel, G. The windlass I is also operated by the master-wheel F.

The master-wheel is simply a rim without arms, having the cogs on the inside. It is hollow on the under side to receive the small grooved friction-rollers S, and has a V-shaped rib, by which it is held, and revolves in the grooved rollers S, which are arranged on pivots or journals on the top of the short posts O O O. Smooth friction-rollers V are hung on pivots or journals on the outside of posts O, on which the outer and lower edge of the master-wheel rests and revolves. This arrangement enables me to dispense with the arms, by which I am enabled to operate the center wheel, G, which carries the shaft C and mole A in a more convenient manner. The center wheel, G, is arranged and runs on small friction-rollers in the same manner.

The posts O are set on the table E at about the angles of an equilateral triangle, and one of them to each wheel is fixed in the table E by a tenon through a mortise in the table so as to be adjustable, so that as the wheels F and G wear loose on the rollers the post may be drawn out and tightened against the rib of the wheels. It is by this means, also, that I am enabled to place the V-shaped rib of the wheels F and G in the grooves of the rollers S by moving the adjustable post toward the center, so as to let the wheel down to its proper place, and then drawing the post out until the rib rests in the grooves of all the rollers. These adjustable posts are secured by a nut on the under side of the table. The table also serves to keep the shaft in a vertical position, which gives proper direction to the screw-mole.

Any kind of tubing in sections may be used; but that which I have thought best and cheapest for the purpose is the common round earthenware drain-tile, from two to four inches internal diameter, in short sections of about three feet in length. Each section should have two or three small holes near each end, through which they may be secured together by means of wire links or otherwise, so that they may be lifted out if necessary, and also that they may be supported from the top while sinking the mole below it, as before described, for the purpose of taking it out through the tube.

N is a three-armed clamp, which is brought down upon the top of the sections of tube to hold them firmly down upon the mole, and also to hold it parallel with the shaft, and is secured to the shaft by means of a set-screw.

In quicksand, or in any place where from the nature of the soil the screw of the mole does not take hold and carry itself down, it may be necessary to add weight to force it down. In order to do this I raise the center wheel, G, up on the shaft and secure it there by means of the set-screw L, and add the required weight on top of the wheel. Of course in this arrangement the gearing is not used, and the shaft and mole are revolved by hand, or a lever may be attached directly to the shaft, to which a horse may be hitched. When the obstruction is passed the wheel may be let down to its place and operated in the usual manner.

The manner of boring the well and sinking the tube is a follows: The machine is set up as represented in Fig. 1, the feet being pinned securely to the earth. The shaft and mole are operated by means of the gearing. The screw draws the mole into the earth. When it has entered to the top the shaft is uncoupled, the grooved section is raised up, a section of tube is placed in position on the mole, a section of shaft is placed between the mole and grooved section and secured by pin at top and bottom, as shown in Fig. 3. The boring is continued, and sections of tube and shaft added as it descends, and also the chain R, as before described, for drawing out the shaft and mole.

The manner of taking out the mole has also been described.

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

1. The conical screw-mole A, shaft C, connecting-chains *d* and *d'*, cap B, clamp N, and cord or chain R, when constructed, arranged, and operated in the manner and for the purpose substantially as set forth.

2. The table E, wheels F and G, pinion H, posts O, friction-rollers S and V, and windlass I, when constructed, arranged, and operated in the manner and for the purpose substantially as set forth.

VIRGIL H. LYON.

Witnesses:
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