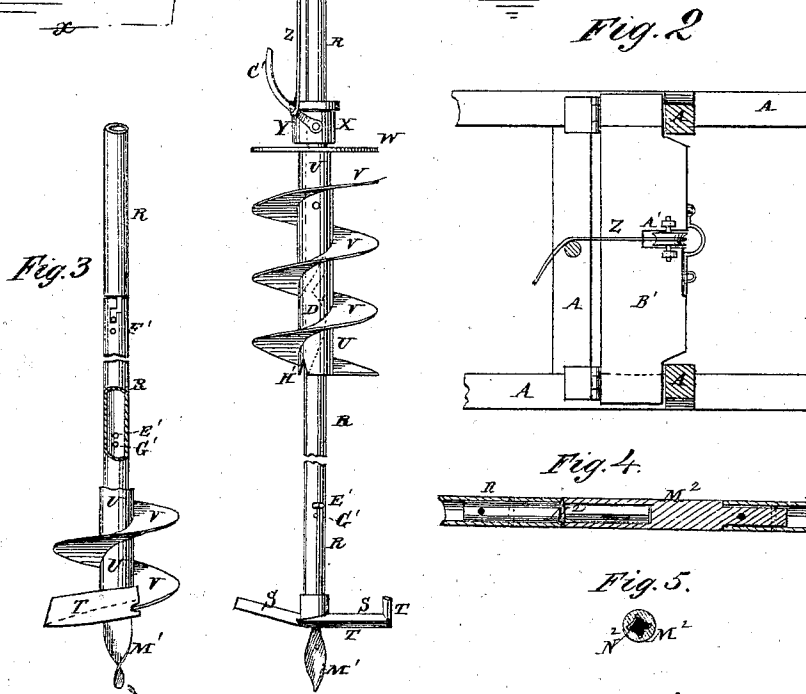
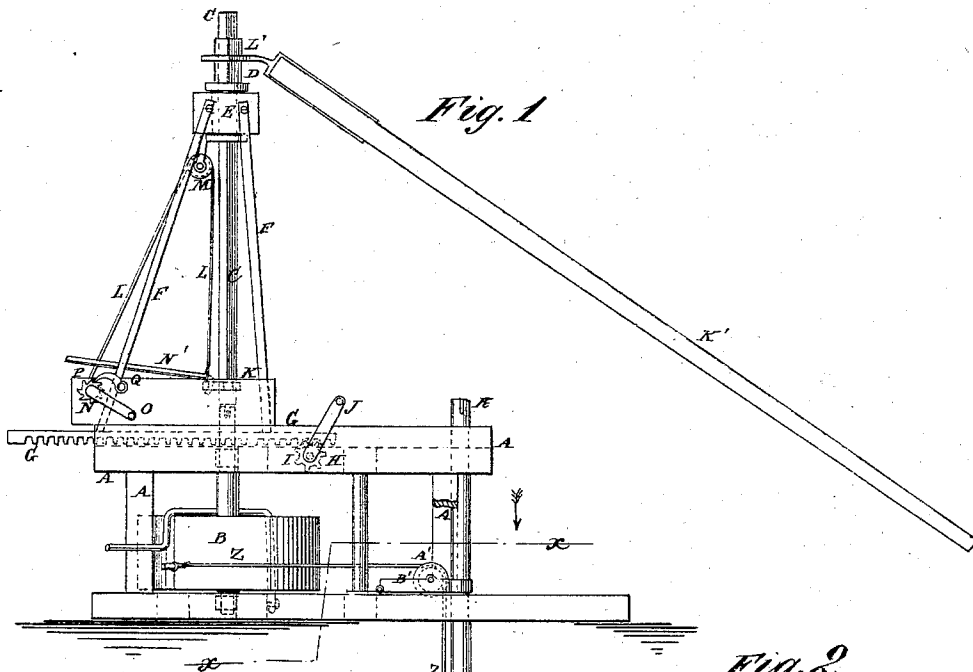


Well-Boring Apparatus.

No. 147,857.

Patented Feb. 24, 1874.



Witnesses:

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UNITED STATES PATENT OFFICE.

ALFRED WHITE MORGAN, OF BROWNVILLE, NEBRASKA.

IMPROVEMENT IN WELL-BORING APPARATUS.

Specification forming part of Letters Patent No. **147,857**, dated February 24, 1874; application filed October 4, 1873.

To all whom it may concern:

Be it known that I, ALFRED W. MORGAN, of Brownville, in the county of Nemaha and State of Nebraska, have invented a new and useful Improvement in Well-Boring Apparatus, of which the following is a specification:

Figure 1 is a side view of my improved apparatus. Fig. 2 is a detail horizontal section of a part of the same, taken through the line *x x*, Fig. 1. Fig. 3 is a side view of the boring-shaft and dirt-carrier, parts being broken away to show the construction. Fig. 4 is a longitudinal section of the shaft-coupling. Fig. 5 is a cross-section of the same.

Similar letters of reference indicate corresponding parts.

The invention is an improvement in well-borers of the class in which a spiral-flanged auger is arranged to be operated by a sweep or other suitable device, and to be raised from the well to discharge the earth loosened by, and packed upon, the spiral flange. The improvement relates to the construction and combination of devices, as specifically indicated in the claims, but hereinafter described generally in connection with other devices more or less necessary to form a successfully-operating boring apparatus.

A represents the frame-work of the machine, the forward end of which, that is placed over the place where the boring is to be done, is made without any cross-bars. To the rear part of the frame A is pivoted the hoisting-drum B. The end of the upper journal of the hoisting-drum has a slot formed in it to receive the cross-pin attached to the lower end of the driving-shaft C. The driving-shaft C is made square, and passes up through a square hole formed in the sleeve D, which works in a hole in the block E. The block E is attached to, and supported by, the upper ends of four or more rods, F, the lower ends of which are attached to the two bars G, which slide back and forth in ways in the top longitudinal bars of the frame A. Upon the under side of the bars G are formed rack-teeth, into which mesh the teeth of the two small gear-wheels H, attached to the shaft I, which works in bearings attached to the top bars of the frame A, and to the end of which is attached the crank J. K is a collar, which turns freely upon the lower

part of the driving-shaft C, but cannot move up or down upon it. To the collar K is attached a rope, L, which passes over a pulley, M, pivoted to the block E. The other end of the rope L is attached to the shaft N, which works in bearings in bars or plates attached to the rods F or rack-bars G. To one end of the shaft N is attached a crank, O, and with it is connected a ratchet-wheel, P, and pawl Q, to hold it securely in any position into which it may be turned.

By this construction, by turning the crank O, the driving-shaft C will be raised from the journal of the drum D, and by turning the crank J the driving-shaft C will be carried over the boring-shaft R, with which it is coupled in the same manner as with the journal of the drum B, the arm N' enabling it to be readily guided into place.

The boring-shaft R is made in sections, so that it may be made of any desired length. To the lower end of the lower section of the boring-shaft R is rigidly attached a cross-bar, S, one arm of which projects horizontally, and has its outer end bent upward at right angles, and to its forward part is attached the cutter T, the outer end of which is bent upward, and is secured to the bent-up end of the arm of the cross-bar S.

The vertical part of the cutter T is designed to shave off the sides of the well and leave them smooth. The horizontal and vertical parts of the cutter T may be made in one piece or separately, as may be desired, and may be adjusted so as to enter the ground faster or slower, as the character of the soil may require. The other arm of the cross-bar S is inclined upward, as shown in Fig. 1.

By this construction, when the cutter T encounters a stone, the boring-shaft is slightly raised, so that the cutter T may pass over it and again enter the ground at its other side, and the upward inclination of the other arm of the cross bar S enables it to pass over the stone without raising the cutter, and so on until the cutter passes beneath the said stone and thus removes it.

To the lower side of the center of the cross-bar S is attached a flat steel plate, M¹, bent or twisted into spiral form, and made pointed, to serve as a bit to force its way into the soil

when the cutter T does not enter the soil freely. U is a hollow cylinder, of such a size as to slide up and down freely upon the boring-shaft R, and to which is attached a spiral plate, V, which receives the dirt from the cutter and carries it out of the well-hole. To the hollow cylinder U, a little below its upper end, and a little above the upper end of the spiral V, is placed a disk or wheel, W, which serves as a guide as the carrier is being raised and lowered, and also, and especially, as a stop, since, as soon as the dirt passing up the spiral V strikes the said wheel W, the cutter can go no farther into the ground. This prevents the possibility of the carrier being overloaded or clogged. Upon the upper end of the hollow cylinder U is placed a loose collar, X, to the opposite sides of which are pivoted the ends of a bail, Y, to which is attached the end of the hoisting-rope Z, which passes up over a pulley, A', pivoted to the forward or outer edge of the plank or frame B', around a vertical guide-roller pivoted to the frame A, and its other end is attached to the drum B. The inner edge of the plank or frame B' is hinged to the frame A, so that its outer or pulley edge may be raised to cause the rope Z to pass up upon the drum B, and also to move the pulley A' out of the way as the loaded carrier is raised from the well-hole by a crane. To the bail Y is attached, or upon it is formed, an arm, C', of such a length that when the said bail Y is lowered the outer end of the arm C' may project beyond the outer edge of the wheel W and spiral V, to take hold of the side of the well-hole and prevent the bail Y from being carried around by and with the carrier U V and shaft R. This prevents the hoisting-rope Z from being wound around the shaft R. In the lower part of the interior of the hollow cylinder U is secured a guide-plate, D', or in it is formed a groove, which, as the carrier U V slides down the shaft R, strikes a pin, E', attached to the shaft R, and turns the said carrier into such a position that, when the lower end of the cylinder U rests upon the cross-bar S, the lower end of the spiral V may rest in a longitudinal groove in the rear edge of the horizontal arm of the cross-bar S, and the pin E' may be in such a position as to serve as a stop to prevent the carrier U V from being turned by the pressure of the dirt against the spiral V. In the upper part of the lowest section of the shaft R, just above the upper end of the cylinder U, is formed a hole, F', to allow air to pass into the said shaft R, which air escapes through a hole, G', in the lower part of the shaft R, just below the pin E'. The air passes down along the plate or groove D', and escapes through a notch, H', in the lower edge of the cylinder U, which notch, when the carrier is fully lowered, is designed to come directly over the inclined arm of the cross-bar S. The inlet and outlet of the air-passage are thus above and below

the carrier, and so arranged that they cannot become filled with dirt. K' is the sweep, to which the power is applied. To the upper end of the sweep K' is attached a square socket, L', to receive and fit upon the upper part of the driving-shaft C. M² is a socket, and N² is the shank of the coupling for connecting the adjacent ends of the sections of the tubular shaft R. The shank N² is made square, and may have its sides slightly concaved longitudinally, and the cavity of the socket M² is so formed that the shank N² will fit into it. Upon the outer ends of the socket M² and shank N² are formed round tenons to fit into the ends of the tubular shaft-sections R, which tenons have each two or more holes formed through them to receive the rivets or pins by which they are secured in place in said sections.

I have shown in Fig. 3 a bayonet-joint connection of the shaft-sections, which may sometimes be employed with advantage.

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

1. The cross-bar S, having one arm inclined upward, and its other arm, horizontal with its end, bent upward at right angles, and so formed as to receive a cutter, in combination with the boring-shaft R, substantially as herein shown and described.

2. The cutter T, in combination with the cross-bar S, the pointed and twisted flat plate M, and the boring-shaft R, substantially as herein shown and described.

3. The plate or groove D' and pin E', in combination with the cylinder U of the dirt-carrier, and with the boring-shaft R, cross-bar S, and cutter T, substantially as herein shown and described.

4. The air-holes F' G', formed in the tubular shaft R, and arranged, in connection with the carrier U V, guide D', and pin E', substantially as herein shown and described.

5. The combination of the crank J, shaft I, small gear-wheels H, and toothed racks G with the frame A, rods or frame F, block E, and sleeve D, and the square upper section of the boring-shaft, to which the sweep is applied, substantially as herein shown and described.

6. The combination of the rope L, pulley M, and crank-shaft O N, provided with a ratchet-wheel and pawl, P Q, with the rods or frame F, block E, and the square upper section C of the boring-shaft, substantially as herein shown and described.

7. The combination, with the hollow sections of shaft R, of the coupling device, having a socket, M², and shank N², as shown and described.

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Witnesses:

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