

B. X. BLAIR & J. A. PAUL.
Earth-Boring Machines.

No. 149,827.

Patented April 21, 1874.

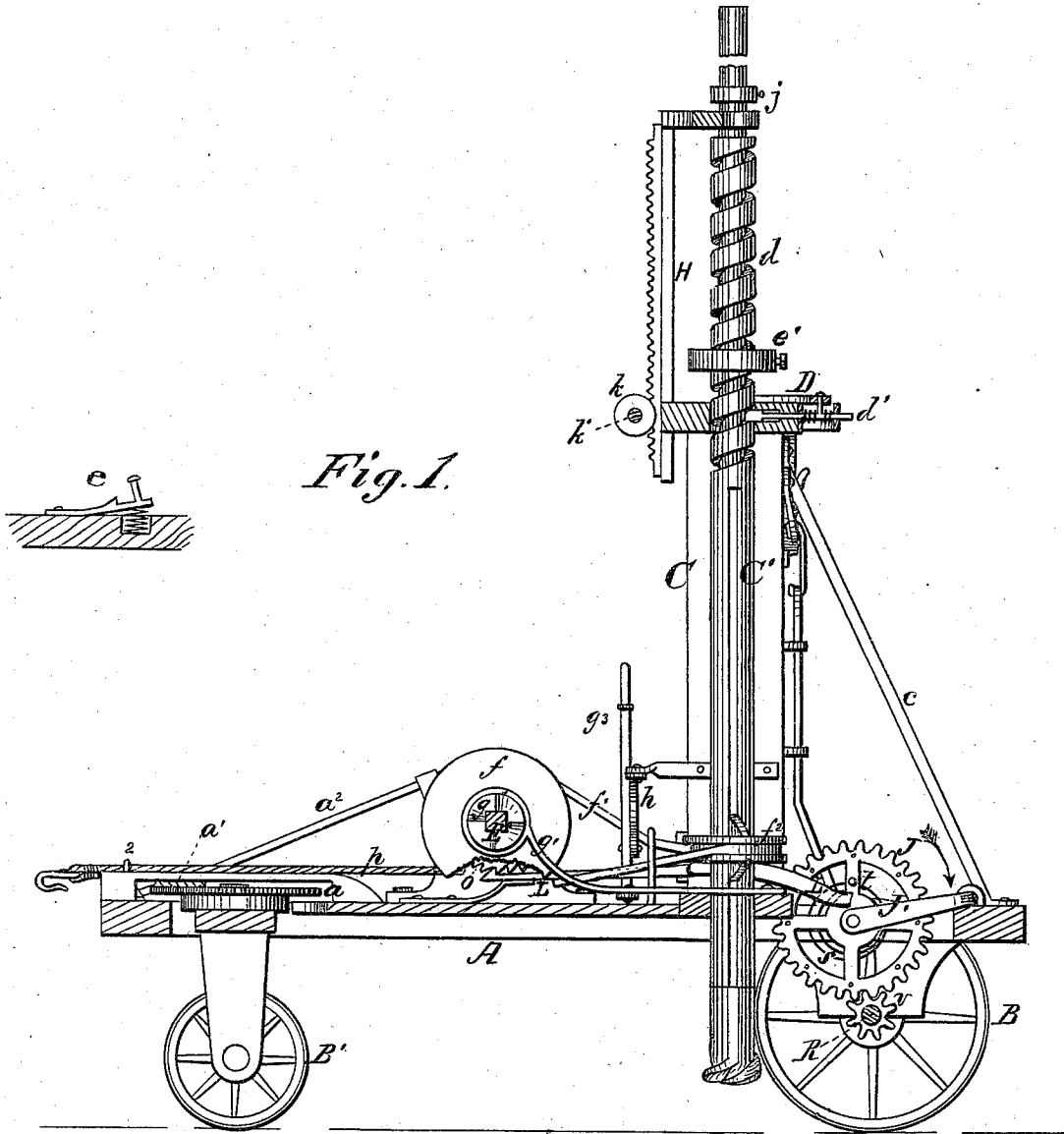
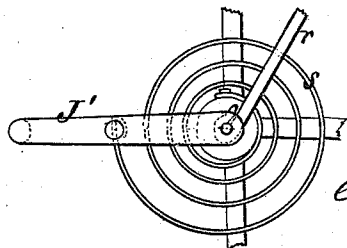


Fig. 1.

Witnesses.
E. A. Bates.
Geo. E. Upham.

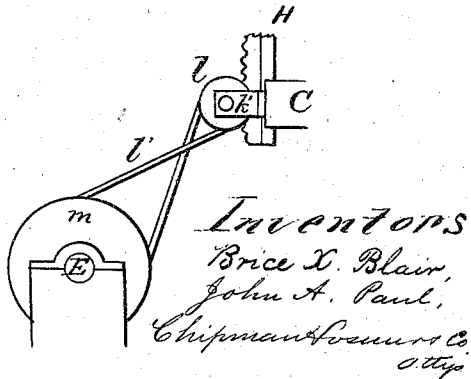
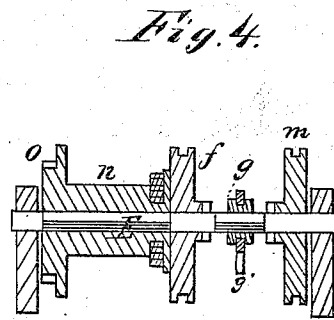
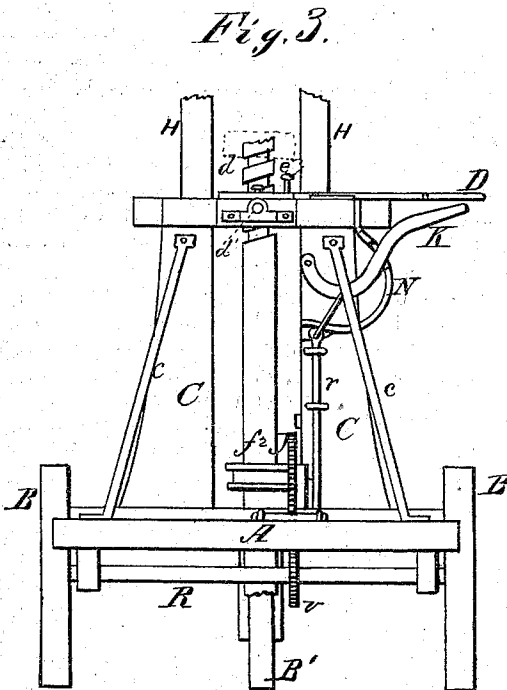
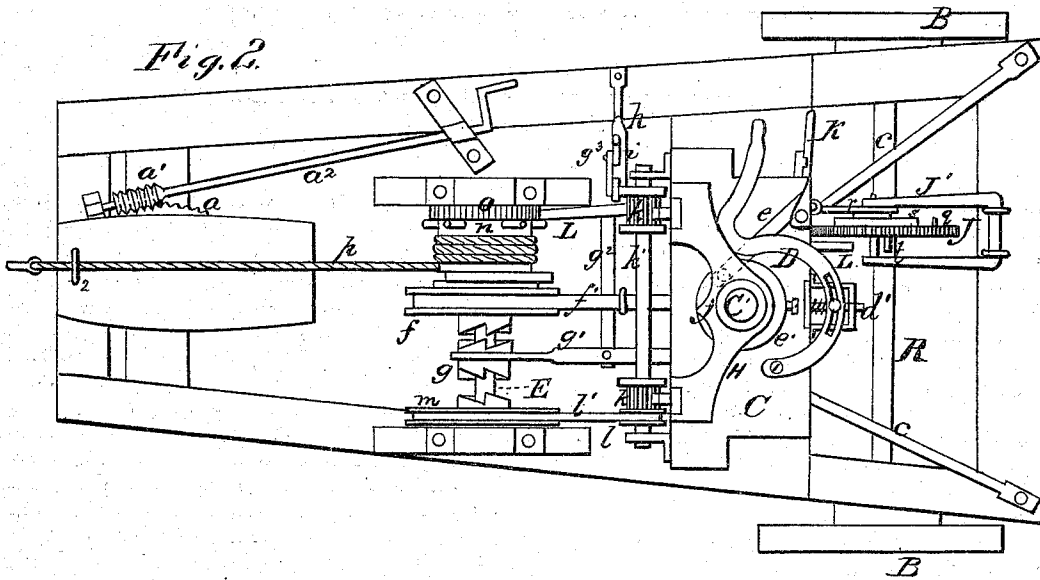


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UNITED STATES PATENT OFFICE.

BRICE X. BLAIR AND JOHN A. PAUL, OF HUNTINGDON, PENNSYLVANIA.

IMPROVEMENT IN EARTH-BORING MACHINES.

Specification forming part of Letters Patent No. **149,827**, dated April 21, 1874; application filed January 17, 1874.

To all whom it may concern:

Be it known that we, BRICE X. BLAIR and JOHN A. PAUL, of Huntingdon, in the county of Huntingdon and State of Pennsylvania, have invented a new and valuable Improvement in Earth-Boring Machines; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a sectional view of our earth-boring machine. Fig. 2 is a plan view of the same. Figs. 3 and 4 are detail views.

This invention relates to certain novel improvements in machinery for boring holes into the earth for setting posts, and for other purposes. Our objects are, mainly, to automatically stop the forward movement of the machine when it arrives at the proper places for boring the holes, thereby enabling us to make the holes at regular distances apart; also, to utilize the draft of the team which draws the machine from one place to another for actuating the auger, as will be hereinafter explained.

The following is a description of our improvements:

In the annexed drawings, A represents the horizontal bed of the machine, which is mounted on two rear transporting-wheels, B B, and a front-caster guide-wheel, B¹, the vertical shaft of which latter has a spurred segment, *a*, on it, with which engages an endless screw, *a*¹, on the front end of an inclined rod, *a*². This rod is mounted in suitable bearings on the carriage-bed A, and has a crank-handle on its rear end, by turning which the machine can be guided. C designates an upright frame, which rises from the carriage-bed near one end, and is steadied by means of inclined braces *c c*. C' is the auger-shaft, which is guided below by the carriage-bed, and above by the cross-head of frame C. The upper portion of this shaft C' has a helical groove, *d*, in it, which receives, at times, the end of a spring-pin, *d'*, to which a hand-lever, D, is pivoted. When pin *d'* is in its groove *d*, rotation given to the shaft C' will cause this shaft to descend, and the pin *d'* will be held by a spring-catch, *e*, which engages

with lever D. When the shaft C' has descended as far as required, a collar, *e'*, on this shaft will depress the latch or catch *e*, thus releasing the lever D, and allowing pin *d'* to spring out of its groove *d*, which will stop the farther descent of the auger-shaft. Collar *e'* is adjustable for boring holes of different depths. Shaft C' receives rotation from a pulley, *f*, which is on a horizontal shaft, E, mounted in journal-boxes on the carriage-bed A. This pulley is loosely applied on its shaft, but engaged with it by means of a sliding double clutch, *g*, which is adjustable by means of a lever, *g*¹, connecting-rod, *g*², and a vibrating hand-lever, *g*³, which latter can be fixed in any one of three positions by means of notches *i* in a bracket, *h*. An endless belt, *f*¹, passes around pulley *f*, and also around a pulley, *f*², which is applied on the auger-shaft C', and connected to this shaft by means of a feather and groove. The upper end of the auger-shaft C' is connected by a collar, *j*, to the cross-head of a vertically-movable frame, H, which has rack-teeth on it, that engage with two pinion-wheels, *k k*, on a shaft, *k'*. The uprights of frame H are guided in the cross-head of frame C, and the shaft *k'*, which has its bearings on this cross-head, carries on one end a pulley, *l*, over which a belt, *l'*, passes, that leads from a pulley, *m*, on shaft E. Pulley *m* is applied loosely on its shaft, but engaged with it, when it is desired to raise the auger-shaft, by means of the clutch *g*. On the shaft E is keyed a windlass, *n*, and a ratchet-wheel, *o*. The windlass *n* has radial handles applied to it for winding upon it a draft-rope, *p*, and taking up the slack of this rope after each operation of boring a hole. This rope extends forward over the carriage-bed, and through a staple, 2, and is hitched to the draft-team, or to a draft-engine, and it is through the medium of this rope that the auger-shaft is rotated, as will be hereinafter explained. J designates a toothed wheel of any suitable diameter, the shaft of which has its bearings in the free end of a frame, J', which is pivoted to the rear cross-beam of the carriage-bed A. Wheel J engages, when depressed, with a pinion, V, on the shaft R, to which the wheels B B are secured. Surrounding the shaft of wheel J is a convolute spring, *s*, one end of which is secured to this wheel, and the other end to

frame J'. This spring is designed to throw the wheel J back to its normal position when the boring-shaft ceases to operate. A pin, *q*, is applied into one of many holes through wheel J, which pin is adjustable into any one of these holes, and it is designed for checking the forward rotation of its wheel against a stop, *q'*, when it is desired to bore a hole. Another pin, *t*, is fixed into one of the spokes of wheel J on the opposite side of this wheel. The object of pin *t* is to release the ratchet-wheel *o* on shaft E from pawl L, and allow this shaft to rotate when it is desired to unwind the rope *p* from the windlass *n*. K designates a curved hand-lever, which is pivoted to the rear side of one of the uprights of frame C, and connected, by a rod, *r*, to the free end of frame J'. The lever K can be fixed in a depressed position, or in an elevated position, by adjusting it into notches formed in an arc, N, secured to frame C.

To operate the machine, the rope is first wound upon the windlass *n*. The animals are hitched close to the front end of the carriage-frame. Wheel J is depressed, after properly adjusting pin *t*, and hand-lever D is adjusted in front of the spring-catch *e*. The attendant then grasps the crank on rod *a*² for guiding the machine, and starts the animals. As the machine is moved forward the wheel J will be slowly turned in the direction indicated by the arrow in Fig. 1, until pin *t* strikes the rear end of pawl L, when the windlass *n*, with its ratchet, will be released from this pawl, and the forward movement of the machine will instantly cease. The animals proceed to unwind rope *p* from its windlass, and the motion thus obtained is transferred to the auger-shaft by moving clutch *g* into gear with wheel *f*. When the proper depth of hole has been made, the operator shifts the clutch to the wheel *m*, which actuates the frame H, and lifts the auger out of its hole.

We should have previously stated that wheel J should be released from pinion *v* at the moment the windlass is released from its pawl L. Also, that when the auger has descended as far as desired, the collar *e'* on shaft C' will depress the latch *e*, and disengage pin *d'* from the groove in said shaft, and stop the descent of the same.

When a hole has been bored, and the auger raised out of it, the slack of rope *p* is wound upon windlass *n*, and the several parts of the machine are adjusted as above described, for another operation.

What we claim as new, and desire to secure by Letters Patent, is—

1. In an earth-boring machine, the windlass *n*, ratchet-wheel *o*, and pawl L, in combination with the spur-wheel J on frame J', spring *s*, pins *q* *t*, lever K, connecting-rod *r*, and the pinion spur-wheel U on axle B, substantially as and for the purposes described.

2. The spring-pin *d'*, lever D, catch *e*, collar *e'*, combined with an auger-shaft, C', having a screw-shaped groove, *d*, in it, substantially as described.

3. The lifting-frame H, combined with the auger-shaft C', and with pulleys *l* *m* and shifting-clutch *g* on windlass-shaft E, substantially as described.

4. The pulleys *f* *f*², windlass *n*, clutch *g*, ratchet-wheel *o*, pawl L, and draft-rope *p*, combined in a boring-machine, substantially as described, and for the purposes set forth.

In testimony that we claim the above we have hereunto subscribed our names in the presence of two witnesses.

BRICE X. BLAIR.
JOHN A. PAUL.

Witnesses:

T. W. MYTON,
J. C. BLAIR.