

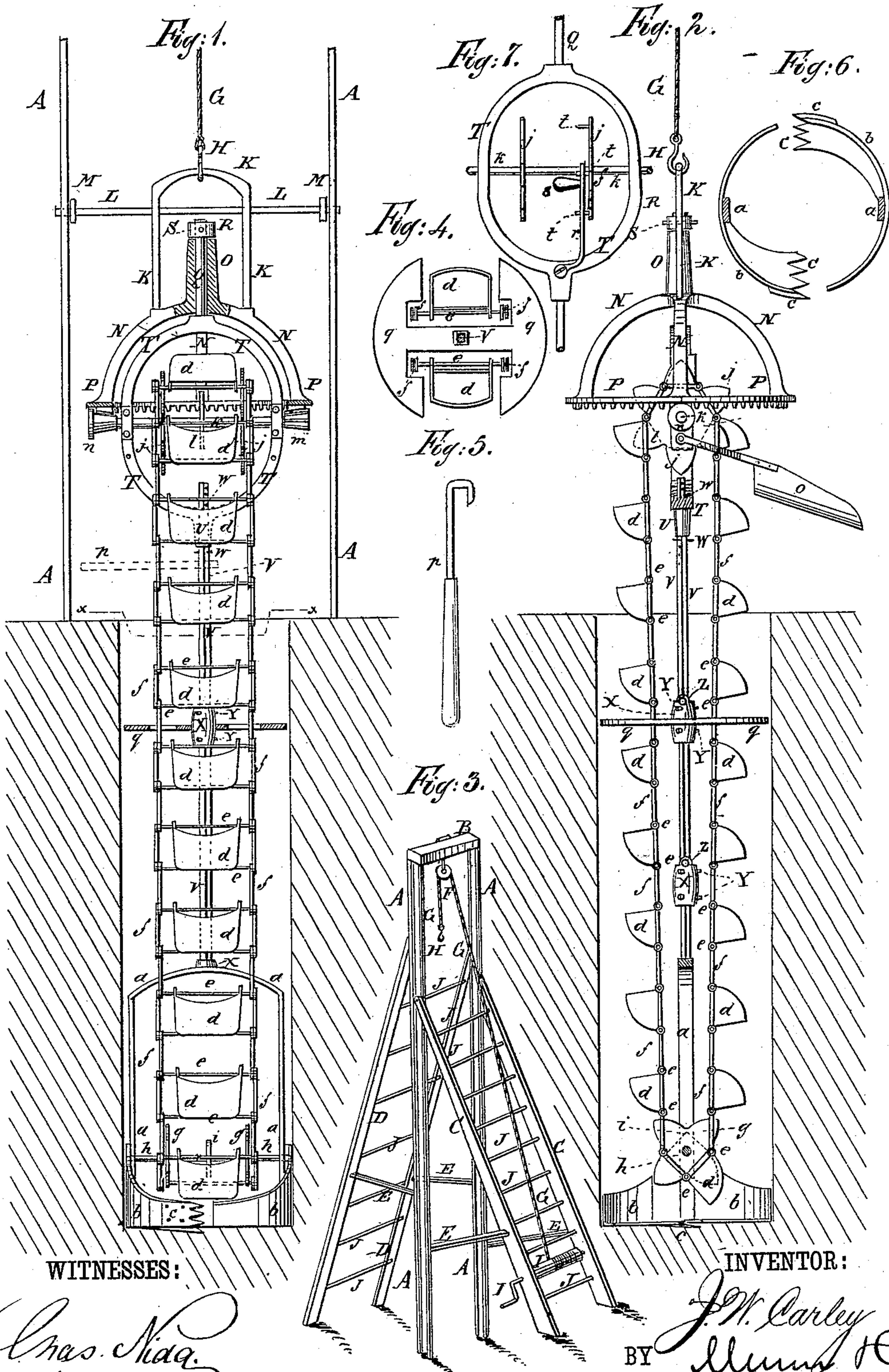
(No Model.)

J. W. CARLEY.

Earth Borers and Excavators.

No. 234,532.

Patented Nov. 16, 1880.



WITNESSES:

INVENTOR:

Chas. Nida.
C. Sedgwick

BY

J. W. Carley
Hunt & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN W. CARLEY, OF COTTON GIN, TEXAS.

EARTH BORER AND EXCAVATOR.

SPECIFICATION forming part of Letters Patent No. 234,532, dated November 16, 1880.

Application filed July 24, 1880. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. CARLEY, of Cotton Gin, in the county of Freestone and State of Texas, have invented a new and useful Improvement in Earth Boring and Excavating Machines, of which the following is a specification.

Figure 1 is a side elevation, partly in section, of the improvement. Fig. 2 is a sectional elevation. Fig. 3 is a perspective view of the derrick. Fig. 4 is a sectional plan view taken through the line *x x*, Fig. 1. Fig. 5 represents a lever for operating the auger. Fig. 6 is a plan view of the auger. Fig. 7 is an elevation of the ring.

The object of this invention is to furnish machines for boring wells, prospecting and mining shafts, post-holes, and various other purposes where earth is to be loosened and removed, and which shall be so constructed as to operate continuously, except while sections are being added to the shaft and belt, the earth being removed as fast as it is loosened.

Similar letters of reference indicate corresponding parts.

A represents two upright guide-posts, which are connected at their upper ends by a cross-bar, B. The guide-posts A are held vertical by two inclined braces, C, in front, the upper ends of which are attached to the upper parts of the said guide-posts A, and in the rear by two inclined braces, D, the upper ends of which are attached to the posts A A. The derrick is strengthened by the horizontal braces E, attached to the posts A and to the inclined braces C D. To the center of the cross-bar B is swiveled the pulley F, around which passes the hoisting-rope G. To one end of the rope G is attached a hook, H, and its other end is attached to and wound around the windlass I, pivoted to the lower parts of the inclined braces C. To the inclined braces C and D are attached rounds J, to form a ladder for convenience in ascending the derrick when required. The derrick is placed over the place where the well or shaft is to be bored, and the hook H is hooked into the loop or bend of the bail K. To the upper parts of the arms of the bail K is attached the middle part of the cross-bar L, the ends of which enter and slide up and down in slots in the guide-posts A, so that the bail K will be made to

move up and down in a vertical line. To the cross-bar L, near its ends, are attached short cross-heads M to rest against the inner sides of the posts A, to prevent the said cross-bar L from having a longitudinal movement when being raised and lowered. The ends of the arms of the bail K are rigidly attached to or formed solidly upon the curved spokes N or to the hub O of the gear-wheel P, the teeth of which are formed upon the inner part of the lower side of its rim, the outer part of the said lower side being left smooth. With this construction the guide-posts A and the cross-bar L prevent the gear-wheel N O P from revolving, while allowing it to be raised and lowered freely.

The hub O of the gear-wheel P is made long, and through it passes the upper part or section Q of the auger-shaft, which has a collar, R, placed upon its upper end. The collar R rests upon the upper end of the hub O, and is secured to the upper end of the shaft-section Q by a pin, S, passing through the said collar and shaft, so that the shaft Q can turn freely within the hub O.

To the lower end of the section Q is rigidly attached the upper side of a vertical ring, T, upon the lower side of which is formed a square socket, U, to receive the upper end of the upper square shaft-section, V. The shaft-section V is secured in place in the socket U by pins W passed through the said section above and below the said socket U.

Several holes are formed through the upper part of the upper square section, V, to receive the pins W, so that the shaft may be lengthened and shortened to regulate the tension of the belt (hereinafter described.)

As the well increases in depth the auger-shaft is increased in length by adding other square sections, V, the adjacent ends of which are connected by couplings X. Each coupling X is made with a square cavity to receive and fit upon the ends of the shaft-sections V, and has holes formed through it to receive the pins Y, which also pass through holes in the said shaft-sections, so that the said shaft-sections can be easily connected and disconnected.

Upon one side of the upper end of each coupling X is formed a lug, Z, having a hole formed through it to receive the hook H of the hoisting-rope G, to support the lower part of the

machine while intermediate sections are being applied.

The lower end of the lowest section, V, is attached to the bend of a rail, *a*, the arms of which are attached to the barrel *b* of the auger. To the auger-barrel *b* are attached bits *c*, to loosen the earth and cause the auger to make its way into the earth. When the earth is soft the bits *c* can be made with smooth edges; but when the earth is hard the said bits should be made with serrated edges, as shown in the drawings.

As the earth is loosened by the auger, it is taken up by the buckets *d*, which are attached to bars or rods *e*. The ends of the rods *e* are attached to the links of the endless chains *f*, which links are connected together and to the rods *e* by spring-locked pins, spring-catches, or other suitable fastenings that will allow the said links to be easily disconnected to allow sections to be put in and taken out and again connected.

The buckets *d* are designed to have projections or shoes upon their outer sides to protect them from wear and to cause them to pulverize the earth as it is loosened by the bits *c*.

The endless chains *f* pass around the two four-toothed chain-wheels *g*, attached to the shaft *h*, which works in bearings in the auger-barrel *b*. To the center of the shaft *h* is attached a four-sided wheel, *i*, against a side of which a rear side of each bucket *d* rests while passing around the shaft *h* and taking up its load. The endless chains *f* also pass around two six-toothed chain-wheels, *j*, attached to the shaft *k*, which works in bearings attached to the opposite sides of the ring T. To the center of the shaft *k* is attached a six-sided wheel, *l*, against a side of which the rear side of each bucket *d* rests while passing over the said shaft *k*. To one end of the shaft *k* is attached a gear-wheel, *m*, the teeth of which mesh into the teeth of the gear-wheel P. To the other end of the shaft *k* is attached a small wheel, *n*, the face of which rests against the smooth part of the under side of the gear-wheel P, to hold the shaft *k* and the hanging part of the machine steady while being operated. With this construction the buckets *d* load themselves as they pass around the shaft *h*, and empty themselves as they pass over the shaft *k*. As the earth is discharged from the buckets *d* it falls into the spout *o*, by which it is guided to the ground around the hole being bored. The spout *o* is attached to and supported by the ring T. With this construction, as the auger is revolved, it carries the shaft *k* with it, and the contact of the gear-wheel *m* with the stationary gear-wheel P revolves the said shaft *k* and operates the endless chain of buckets, to

remove the earth as fast as it is loosened by the auger. With this construction the operations of boring and removing the earth go on simultaneously and continuously, except when the machine is stopped for the insertion of other sections of the auger-shaft and the endless chain of buckets.

The auger is turned to operate the machine by levers *p*, applied to the upper square section, V, of the auger-shaft.

Motion may be given to the levers *p* by hand-power, by horse-power, or by any other convenient power.

The endless chain of buckets is kept in place when moving up and down and when turning with the auger by the circular plates *q*, attached to the couplings X or to the shaft-sections V, and which are recessed and notched, as shown in Fig. 4, for the passage of the buckets *d* and chains *f*.

When the machine is constructed for digging post-holes it is made small and is designed to be attached to a small frame mounted upon wheels, so that it can be readily moved from place to place. The machine can also be arranged in a horizontal or inclined position and used for excavating and grading.

When digging in wet or sticky soil a spring, *r*, having a head, *s*, attached to or formed upon the side of its upper part, is attached to the lower part of the ring T in such a position that the upper end of the said spring *r* may extend along the side of one of the chain-wheels *j*, so as to be struck by pins *t*, attached to the said chain-wheel *j*, to cause the head *s* to strike each bucket *d* or the chain that carries the buckets *d*, as each bucket is passing over the chain-wheels *j*, and jar the said buckets, to cause them to discharge all their contents into the spout *o*.

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

1. The combination, with the shaft-section Q, of the square-socketed ring T, the square shaft-sections V, having holes to receive pins W, the couplings X, having square cavity, pin-holes, and apertured lug Z, the rope G, having hook H, the bail *a*, and the auger-barrel *b*, as shown and described.

2. The combination, with the auger, of the buckets *d*, arranged on rods *e*, the endless chain *f*, the shaft *h*, having chain-wheels *g* and four-sided wheel *i*, the shaft *k*, having two six-cogged chain-wheels *j*, the six-sided wheel *l*, the gear-wheel *m*, small wheel *n*, and gear-wheel P, as shown and described.

JOHN WESELY CARLEY.

Witnesses:

J. W. STOREY,
S. F. McMILLAN.