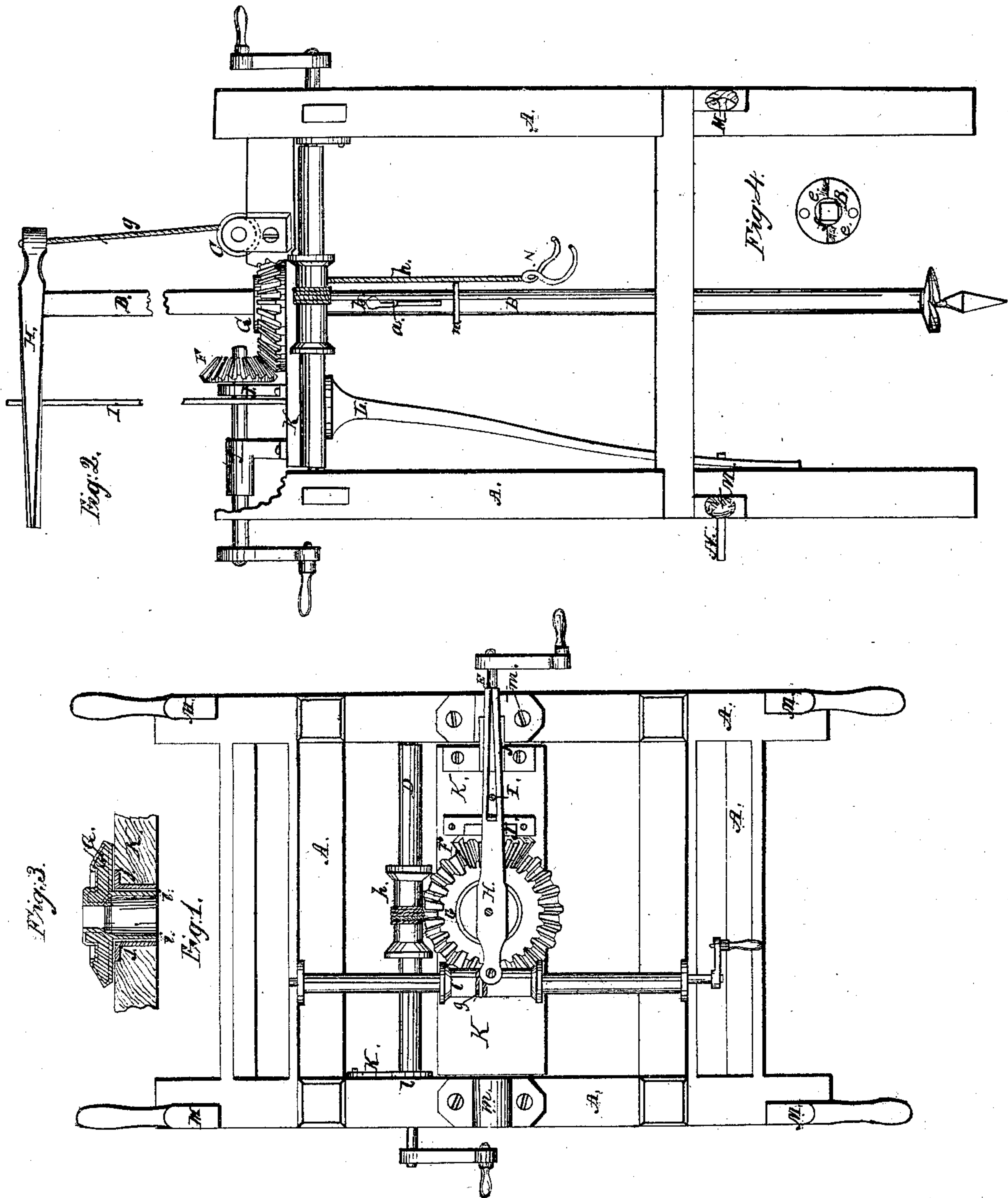


J. E. Race.
Earth Auger.

N^o 80,217.

Patented Jul. 21, 1868.



Witnesses.
J. E. Wood
M. V. Thompson.

Inventor
John Edwin Race

United States Patent Office.

JOHN EDWIN RACE, OF CHICAGO, ILLINOIS.

Letters Patent No. 80,217, dated July 21, 1868.

IMPROVED EARTH-BORING MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOHN EDWIN RACE, of the city of Chicago, in the county of Cook, and State of Illinois, have invented certain new and useful Improvements in Boring-Machine for Boring Earth; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a top or plan view,

Figure 2 a side view, with part of the upper framework cut away,

Figure 3 a vertical section of bevel-wheel, showing the bearings, and

Figure 4 an end view of the bit or borer.

Like letters refer to the same parts in all of the figures.

The nature of my invention consists in providing an earth-boring machine with a hollow bit or auger-shaft, to overcome or avoid the great suction found in withdrawing the auger loaded with earth; in making the point of the auger of a separate rod or bar; in a novel mode of withdrawing the auger; in locating and attaching the gearing and auger to a rock-shaft or beam; in providing the machine with a device for settling the auger; in providing the gear-wheel, by which the shaft of the auger is supported and operated, with a collar-bearing, and in the several combinations hereinafter set forth and claimed.

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

The frame A, for a size suitable for boring holes for fence-posts, is made of three by two and one-half timbers, four feet and six inches high, two feet square at the top, and two by three feet at the bottom. Other sizes and dimensions can be used, however. In the middle of this frame, at the top, I attach a rocking-beam, K, by means of boxes or bearings, *m*. To this beam, K, are attached all of the parts which operate in boring, so that the position of the auger can be varied toward either of the inclined sides, without changing the relative position of any of the operative parts.

One advantage of this arrangement of the parts on a rocking-beam is, that the auger can be thrown to one side of the machine, and then, by canting the machine, holes can be bored by the side of an old fence without removing any portion of the fence.

On the middle of this beam K, I make a hole about three and one-half inches in diameter, and insert therein a collar or bearing, *j*, (fig. 3,) for the bevel-wheel G. The wheel G is about eleven inches in diameter, and, so far as the cogs are concerned, is of the usual construction. Its centre is somewhat raised, and a square mortise is made through it. To the under surface I cast a hollow or cylindrical projection, *i*, the hollow being somewhat larger than the square mortise above it; and its outer surface or periphery fits the inside of the collar or bearing *j*, so that, by means of this projection *i*, the wheel is kept in place by and rotates upon the collar *j*. The wheel G is operated by the corresponding gear-wheel F, which is about seven inches in diameter, and is attached to the shaft E, which is rotated by the crank shown, when used for boring post-holes, and by a pulley when used for boring wells.

The shaft E is supported in and by the elevated journal-boxes or bearings J and J', which are also fastened to the rocking-beam. To the rocking-beam I also attach, or insert into it, a vertical rod or post, I, which extends upwards the height it is designed to move the auger, and its office is to guide the bar H and keep it in place. It passes through a slot in bar H, so that there will not be any binding, whatever the position of H may be.

I make my auger in two parts or sections, and either screw or weld them together. The upper section B' is right-angled or square, and fits the mortise in wheel G. The lower section B is circular and hollow. I make it usually of inch and one-quarter gas-pipe. Near the upper end of this section, I make a side slot, *b*, and at the lower end I make the hollow square, just enough to prevent the point from turning in the shaft, and at the extreme lower end of this shaft I attach, by a screw, the bits or cutters *c*. I then insert into the hollow portion B a rod, which is enlarged at its lower end, *d*, and forms the auger-point. It is provided with a square

shoulder, *c*, which fits the square opening in the end of the shaft, so as to make the point turn with the auger. The upper end of the rod, to which the point *d* is attached, is brought out through the slot *b* at *a*, and is kept out by placing a piece of iron under it, or by running a small bolt through the shaft behind it, and is thereby prevented from falling out, while the point is allowed to fall sufficiently low, when drawn out, to permit a current of air to pass through the hollow section, and prevent the usual suction when lifting the earth upon the auger out of the hole, so that one person can lift the auger with the earth easily.

In order to prevent the beam *K* from turning so as to bind on the shaft, and the wheels upon each other, and also to hold the auger in position, to the under side of the beam *I* attach a spring or bar, *L*, which extends down to the lower cross-bar of the frame *M*, where it is held in place by the pin *N'*, which is passed through one of a series of holes in the bar *m*, and through a slot in the spring or lever *L*.

When the auger has been bored into the earth, it is elevated by means of the crank-shaft *D*, which has a rope or chain, *h*, wound upon it. At the lower end of the rope *h*, I attach a grapple, *N*, which goes under the collar or projection *n* of the shaft of the auger. In wells where such ring or projection would be in the way, the grapple is made to clamp directly upon the shaft. Usually the bit of the auger will draw it into the earth sufficiently, but in sand it will not, so that to enable me to force it in, I pivot to the top of the auger-shaft a bar, *H*, which is slotted at one end, and the rod or post *I* passes through such slot. At the other end I attach the cord, rope, or chain *g*, which winds upon the shaft *C*, and forces the auger down. Its operation will be found detailed in the description.

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

1. The bar *H*, in combination with the rod or post *I*, rope *g*, and shaft *C*, when constructed and operating substantially as and for the purposes specified.
2. The combination and arrangement of the gear-wheels *F* and *G*, shaft *E*, and lever *L*, with the rocking-beam *K*, substantially as specified.

JOHN EDWIN RACE.

Witnesses:

L. L. BOND,
E. A. WEST.