No. 876,048. PATENTED JAN. 7, 1908.

P. FENTON & F. W. WAECHTER.

EARTH BORING MACHINE.

APPLICATION FILED APR. 12, 1907.

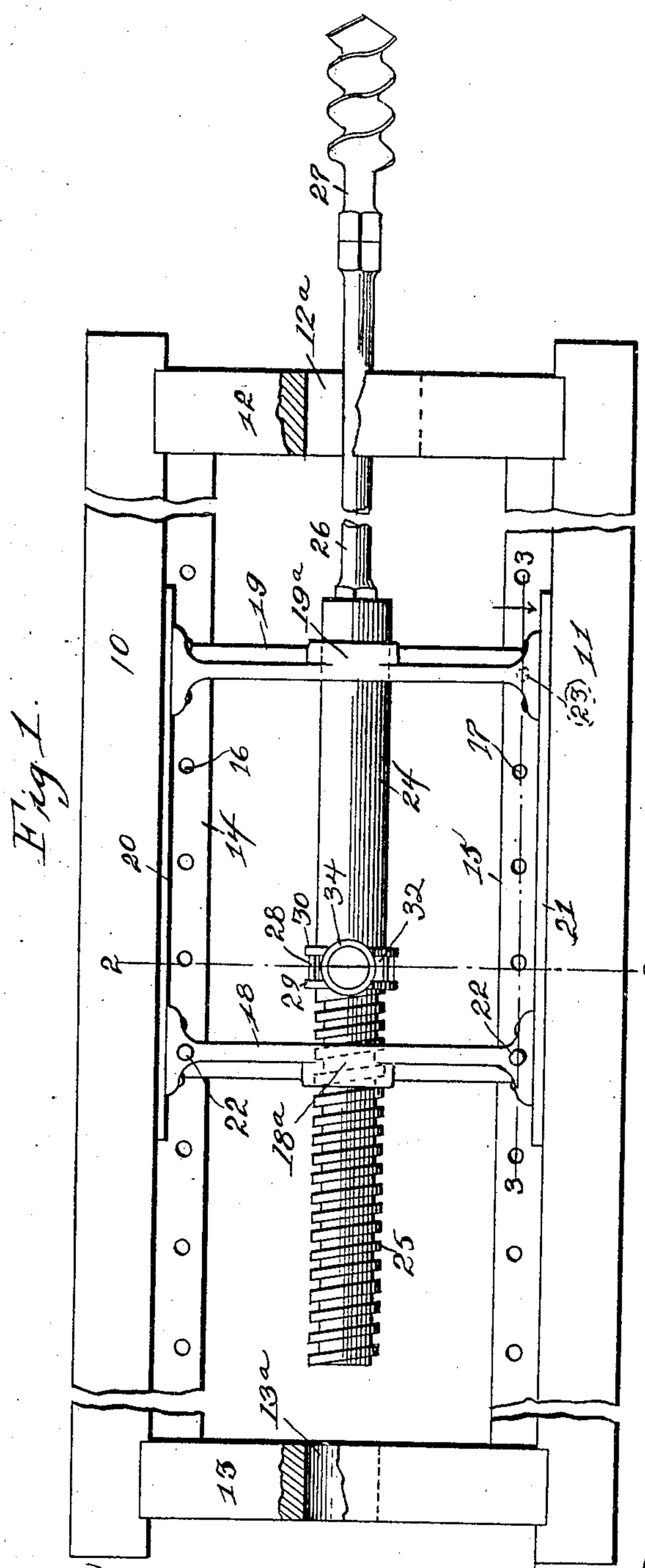

Fig. 1.

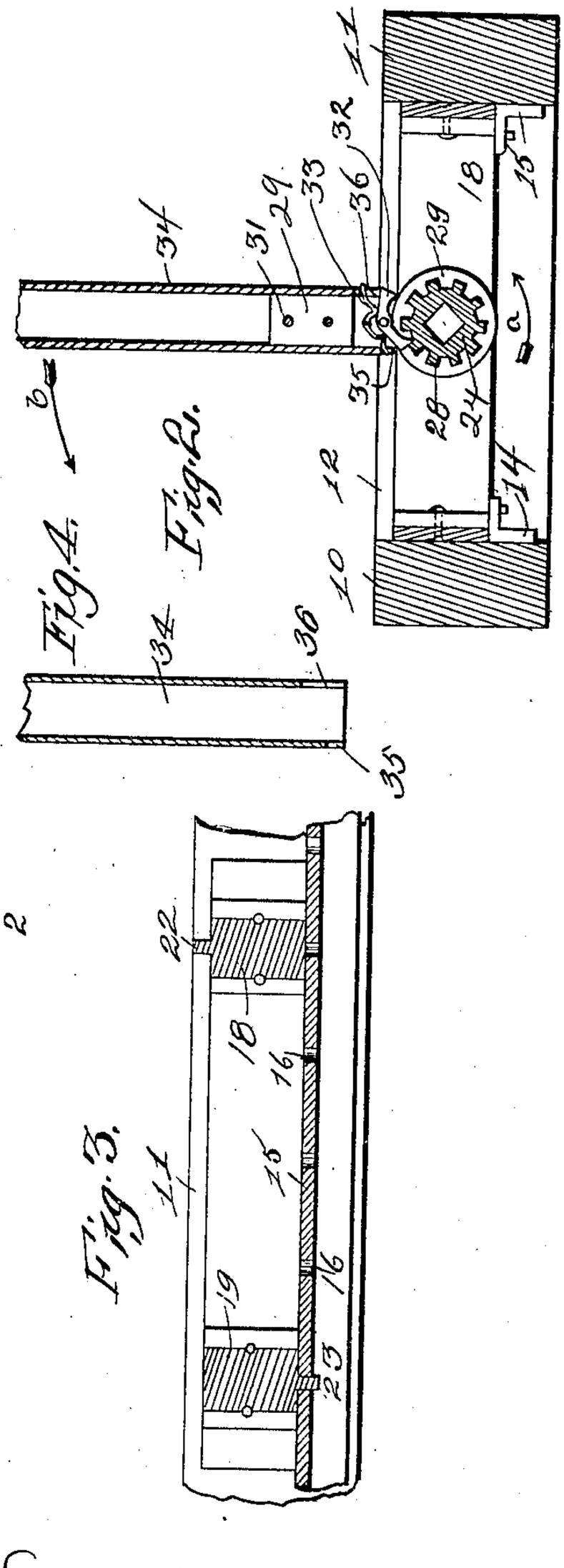

Fig. 4.

Fig. 2.

Fig. 3.

Witnesses:
L. L. Leibrock.
R. H. Orwig.

Inventors: Patrick Fenton,
Fredrick W. Waechter.
By Thomas G. Orwig & Co. Attorneys.

UNITED STATES PATENT OFFICE.

PATRICK FENTON AND FREDRICK W. WAECHTER, OF KNOXVILLE, IOWA.

EARTH-BORING MACHINE.

No. 876,048. Specification of Letters Patent. Patented Jan. 7, 1908.

Application filed April 12, 1907. Serial No. 368,095.

To all whom it may concern:

Be it known that we, PATRICK FENTON and FREDRICK W. WAECHTER, citizens of the United States, residing at Knoxville, in the county of Marion and State of Iowa, have invented a new and useful Earth-Boring Machine, of which the following is a specification.

The object of this invention is to provide improved means for boring laterally in the earth.

A further object of this invention is to provide improved means for boring laterally in the earth in either direction.

A further object of this invention is to provide improved means for rotating an auger in either direction.

Our invention consists in the construction, arrangement and combination of elements hereinafter set forth, pointed out in our claims and illustrated in the accompanying drawing, in which—

Figure 1 is a plan of the machine, portions being broken away to economize space. Fig. 2 is a cross-section of the machine on the indicated line 2—2 of Fig. 1. Fig. 3 is a longitudinal section on the indicated line 3—3 of Fig. 1. Fig. 4 is a detail section of a portion of a tubular handle employed in this device.

In the construction of the machine as shown, a frame is built up of longitudinal bars 10, 11 connected near their ends by cross-bars 12, 13. Angle plates 14, 15 are fixed to and extend longitudinally of the inner faces of the bars 10, 11. The angle plates 14, 15 have their horizontal flanges extending inward toward each other and pierced by a plurality of apertures 16, 17. Machine heads 18, 19 are mounted transversely of the frame and are connected at their ends by plates 20, 21 rigidly secured thereto. Pins 22 are formed on and extend upward from end portions of the machine head 18 and pins 23 are formed on and extend downwardly from the end portions of the machine head 19. The pins 23 normally engage in one or the other of the holes 16, 17 in the angle plates 14, 15 and prevent longitudinal movement of the machine head and plates 20, 21 longitudinally of the frame. The machine heads and plates 20, 21 may be inverted and turned end for end in order that the pins 22 on the head 18 may engage one or the other of the holes 16, 17 in the angle plates, thus reversing the direction of operation of the machine as hereinafter described. A screw box 18^a is formed in the central portion of the machine head 18 and a smooth box or bearing 19^a is formed in the central portion of the machine head 19. A feed bar 24 is mounted in the boxes of the machine heads 18, 19 and is formed with a screw 25 fitting the screw box. A stem 26 is detachably connected to one end portion of the feed bar 24 and an auger 27 may be detachably connected to the opposite end portion of said stem. The stem 26 extends through a horizontal opening 12^a in the cross bar 12 and the screw 25 may extend through a horizontal opening 13^a in the cross-bar 13. A gear 28 is formed on or fixed to the central portion of the feed-bar 24. Eye-stems 29, 30 are pivotally mounted on the feed bar 24 on opposite sides of the gear 30. The radial portions of the eye-stems 29, 30 contact with each other and are connected by rivets, bolts, or pins 31. The eye-stems are of such length that they may be turned entirely around the feed bar 24 without contacting with either of the angle plates 14, 15. A double-ended pawl 32 is pivoted to and between eye-stems 29, 30 and is adapted to engage at either end with the gear 28. A spring 33 may be mounted on and between eye-stems 29, 30 and impinge the double-ended pawl 32. A tubular handle 34 is provided and is of such size that it may embrace at one end the radial portions of the eye-stems 29, 30. Slots 35, 36, of unequal length, are formed longitudinally of one end portion of the handle 34 diametrically opposite each other.

In practical operation the machine is placed on the bottom of an excavation, the stem 26 of the desired length and the auger 27 are mounted thereon. The eye-stems are turned upward and a handle 34 is applied thereto in such manner that the slots 35, 36 receive the end portions of the spring 33 and pawl 32. If it is desired to rotate the auger 27 in the direction of the arrow *a* in Fig. 2 the handle is mounted as shown and in such position the slot 36 permits the adjacent end portions of the spring 33 and pawl 32 to rise freely within it, while the shorter slot 35 will not permit the adjacent end portion of the spring 33 to rise materially, thus holding the adjacent end portion of the pawl 32 normally in contact with the gear 28. Then the upper end portion of the handle 34 is moved manually in the direction of the arrow *b*, thus causing the pawl 32 to engage and rotate the gear 28 in the desired direction. Such rota-

tion of the gear revolves the feed-bar 24, stem 26 and auger 27 and causes said members to move longitudinally through engagement of the screw 25 in engagement with the box 18. Such operation advances the auger laterally into the earth. When it is desired to unscrew the auger, the handle 34 is removed and reversed relative to the eye-stems so that the slot 35 receives the opposite end portions of the spring 33 and pawl 32. Thus the action of the pawl 32 is reversed and opposite movement of the handle 34 effects a reverse movement of the feed-bar, stem and auger. When it is desired to bore into the earth in the opposite direction, the stem 26 and auger 27 are detached from the feed-bar, the feed-bar, machine heads 18, 19 and plates 20, 21 are lifted out and turned over end for end and replaced, thus disengaging the head 19 from the angle plates and engaging the head 18 with said plates. Then the stem 26 and auger 27 are attached to the feed-bar and extend through the cross-bar 13. Before the machine is inverted the handle 34 is removed and after the operation of inversion, the eye-stems are turned around the feed-bar so that they are directed upwardly and can again receive attachment of the handle. After the machine is inverted as described, the feed-bar and connected parts may be operated by oscillation of the handle 34 as hereinbefore described.

We claim as our invention—

1. An earth boring machine, comprising a frame, angle plates on said frame, connected machine heads in said frame and engaging said angle plates, a feed bar mounted in said machine heads, screw connections between said feed bar and one of said machine heads, means for connecting an auger to said feed bar and means for rotating said feed bar.

2. An earth boring machine, comprising a frame, angle plates on said frame, machine heads invertibly mounted on said angle plates, connections between one of said machine heads and the angle plates, a screw box in one of the machine heads, a smooth box in the other machine head, a feed bar mounted in said boxes, an auger attached to said feed bar, and means for rotating said feed bar.

3. In an earth boring machine, angle plates formed with holes, a machine head and pins on said head engaging in said holes.

4. In an earth boring machine, angle plates formed with holes, machine heads, plates connecting said machine heads, and pins on said machine heads adapted to engage in said holes.

5. In an earth boring machine, machine heads arranged parallel with each other, one of said heads formed with a screw box, the other of said heads formed with a smooth box, plates connecting said heads, means for anchoring said heads, a feed bar mounted in the boxes of said heads, a gear on said feed bar, eye-plates on said feed bar adjacent said gear, a reyersible pawl on said eye-plates engaging said gear and a handle removably and replaceably mounted on said eye-plates.

6. In an earth boring machine, a feed bar, a gear thereon, eye-plates loosely mounted on said feed-bar, a pawl on said eye-plates adapted to engage said gear, a spring mounted on said plates and adapted to engage said pawl, and a handle mounted on said eye-plates, said handle formed with opposite slots of unequal length adapted to limit oscillation of the pawl and determine the action of said pawl on the gear.

PATRICK FENTON.
FREDRICK W. WAECHTER.

Witnesses:
WM. A. NICHOLS,
E. E. WARNER.