(No Model.) 2 Sheets—Sheet 1.

E. WALTON.

EARTH BORING MACHINE.

No. 454,605. Patented June 23, 1891.

FIG-1-

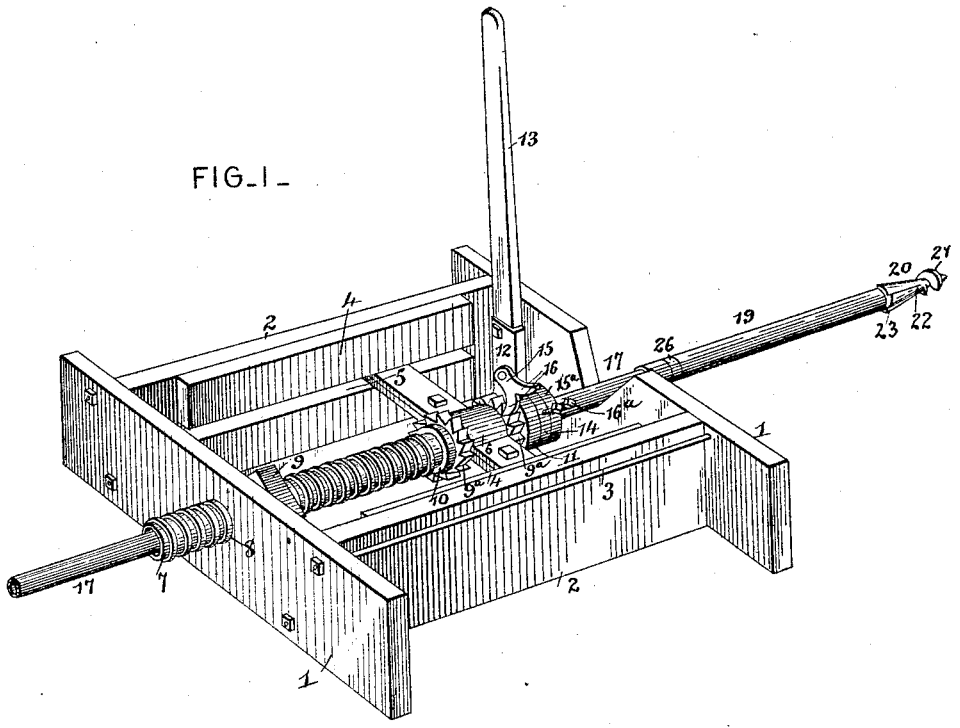


FIG-8-

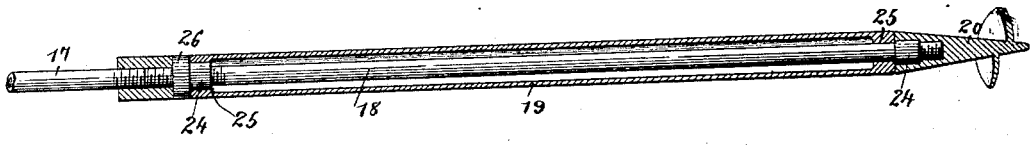
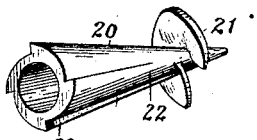


FIG-7-



Witnesses

Jas. K. McCathran

Wm. Bagger

Inventor

Edward Walton

By his Attorneys,

C. A. Snow & Co.

(No Model.) 2 Sheets—Sheet 2.

E. WALTON.

EARTH BORING MACHINE.

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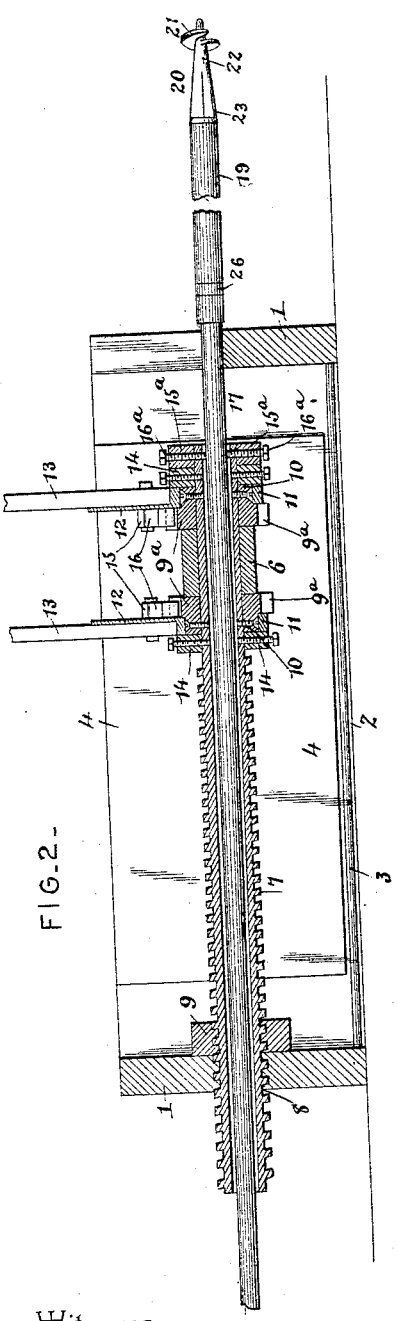

FIG. 2.

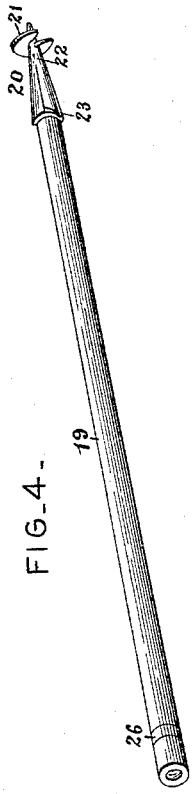

FIG. 4.

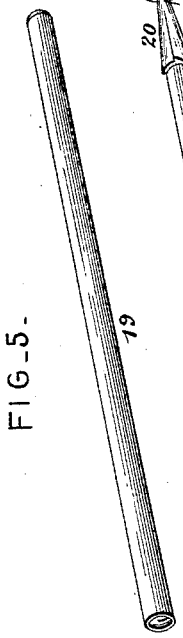

FIG. 5.

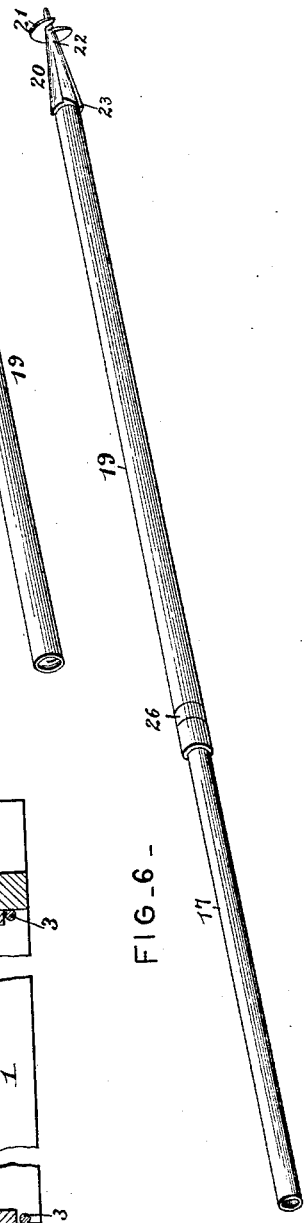

FIG. 6.

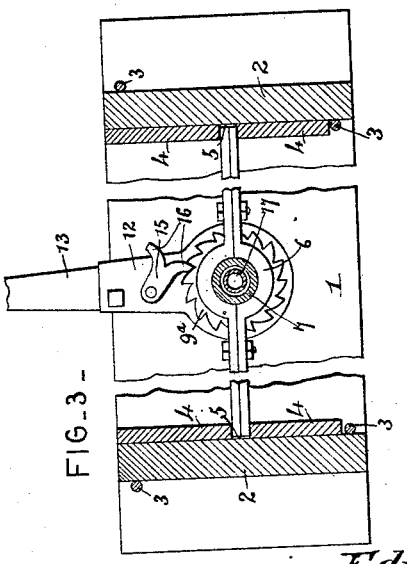

FIG. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

EDWARD WALTON, OF CHARITON, IOWA.

EARTH-BORING MACHINE.

SPECIFICATION forming part of Letters Patent No. 454,605, dated June 23, 1891.

Application filed September 29, 1890. Serial No. 366,493. (No model.)

To all whom it may concern:

Be it known that I, EDWARD WALTON, a citizen of the United States, residing at Chariton, in the county of Lucas and State of Iowa, have invented a new and useful Earth-Boring Machine, of which the following is a specification.

This invention relates to earth-boring machines of that class which are employed to form a horizontal opening in the soil; and it has for its object to construct a machine of this class which shall be simple, durable, and easily manipulated.

My invention comprises mechanism for forcing the boring-tool in a forward direction, said boring-tool being so constructed as to force the dirt in an outward direction around the same without withdrawing it from the hole, and the said boring-tool is furthermore provided with a loose sleeve within which it revolves, and which serves as a bearing to steady it during operation.

The invention consists in the improved construction, arrangement, and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, Figure 1 is a perspective view of my improved boring-machine, one of the operating-handles of the same having been detached. Fig. 2 is a longitudinal vertical sectional view of the same. Fig. 3 is a vertical transverse sectional view taken through the box or bearing for the front end of the follower-screw. Fig. 4 is a perspective detail view of the boring-tool complete. Fig. 5 is a detail view of the loose bearing-sleeve. Fig. 6 is a detail view of the boring-tool, showing also the tubular rod working within the latter and holding the bit. Fig. 7 is a perspective detail view of the bit. Fig. 8 is a longitudinal sectional view of the boring-tool and bit complete.

Like numerals of reference indicate like parts in all the figures of the drawings.

The frame of my improved boring-machine is composed of the end pieces 1 1, which are spaced by the longitudinal side pieces 2 2, and connected by means of rods 3. The inner sides of the side pieces 2 2 are provided with flanges 4, having longitudinal grooves 5, which afford bearings for a longitudinally-sliding box 6.

7 designates an exteriorly-threaded tubular screw, the front end of which has a bearing in the box 6, and the rear end of which extends through an opening 8 in the rear end piece 1 of the frame.

9 designates a nut, which is mounted upon the screw 7, and which normally bears against the rear end piece 1 of the frame. The front end of the tubular screw 7 is provided on opposite sides of the box 6 with ratchet-wheels 9^a, having collars 10 to receive the screws or similar devices, whereby they are permanently and securely fastened upon the tubular screw, the front end of which latter is left unthreaded, as will be seen by reference to the drawings. Upon the collars 10 are journaled the rings 11, having outward-extending arms 12, to which are secured the operating levers or handles 13. The rings 11 are retained in position by means of collars 14, having set-screws or other suitable devices whereby they are permanently secured in position upon the screw. The inner sides of the levers or handles 13 are provided with pivoted dogs or pawls 15, which engage with the ratchet-wheels 9^a. Said dogs have oppositely-facing teeth 16, so that they may be reversed by simply folding them from one side to the other, thereby enabling the screw to be operated in either direction.

The front end of the screw 7 is provided with a ring or collar 15^a, having a series of set-screws 16^a or other suitable devices, by means of which the operating-tool 17 may be clamped and held securely within the tubular screw.

The boring-tool is composed of three principal parts—namely, the core 18, the sleeve 19, and the bit 20. The latter is provided with spiral flanges 21 to loosen the dirt, and its rear portion is conical or tapering, as will be seen at 22, and provided with longitudinal eccentric grooves 23. By this construction of the bit it will serve, first, to loosen the dirt, and, secondly, to compress or force it in an outward direction radially from the bit, so as to form an opening through which the operating-pipe and other parts of the device may pass. The core 18 consists of a pipe provided

at its ends with annular flanges or shoulders 24, forming bearings for the sleeve 19, which latter is preferably provided at its ends with interior shoulders or enlarged portions 25 bearing upon the said flanges. By this construction it will be seen that the contacting or bearing surfaces may be of limited extent, and that consequently friction during the operation of the device is greatly reduced. The rear end of the core-pipe 18 has an annular flange or collar 26, against which the rear end of the sleeve 19 abuts. The front end of said sleeve bears against the rear end of the bit, which is screwed up upon the front end of the core-pipe. The sleeve 19 is made of a length to fit neatly between the shoulder 26 and the bit.

In the operation of the device tubular extension rods or pipes 17 may be provided to any desired number, such extension rods or pipes being connected with each other and with the boring-tool by means of sleeves or couplings of ordinary construction.

From the foregoing description, taken in connection with the drawings hereto annexed, the operation and advantages of my invention will be readily understood. The frame of the machine is suitably braced in the desired position. The boring-tool is passed through the tubular screw 7 and secured within the latter by means of the set-screws 16^a, extending through the collar 15^a at its front end. At the start the operating-screw is moved as far as possible to the rear end of the frame, then by alternately operating the levers or handles 13 the screw will be rotated to force the boring-tool in a forward direction and into the earth. When the screw has been run out its full length, the nut 9 is run down as close as possible to the block 6, which latter, after loosening the set-screw 16, may then be moved rearwardly in the frame until the nut 9 again abuts against the rear end piece of the latter, thus leaving the boring-tool in the hole. The set-screws 16^a are then tightened and the operation repeated, tubular coupling rods or pipes 17 being supplied whenever necessary. It will be observed that during operation the sleeve 19, apart from its forward motion, will ramain stationary, its function being simply to form a bearing for that end of the tubular operating-rod which is at the inner end of the hole, thereby causing it to run straight.

Instead of operating my improved boring-machine by hand, as herein described, power of any suitable description may be employed by substituting sprocket, belt, or grooved wheels for the ratchet-wheels 9^a, and connecting them by chains, belts, or wire rope with power of any suitable description.

Other modifications in the construction of the device may suggest themselves to the skilled mechanic, and I reserve the right to any such changes as may be resorted to without departing from the spirit of my invention.

Having thus described my invention, what I claim is—

1. In a boring-machine, the combination of the frame, the longitudinally-sliding box, the tubular screw having a bearing in the said box, the separate boring-tool mounted in said tubular screw, and a nut mounted upon said screw and adapted to abut against the rear end piece of the frame, substantially as set forth.

2. In a boring-machine, the combination of the frame, the longitudinally-sliding box, the tubular screw, the front end of which has a bearing in said box and the rear end of which extends to the opening in the rear end of the frame, a nut mounted upon said tubular screw and adapted to abut against the rear end piece of the frame, mechanism for operating the said screw, and means for securing the boring-tool within the latter, substantially as set forth.

3. The frame provided on its inner side with longitudinally-grooved flanges, in combination with the box mounted to slide in said grooves, the tubular screw having its front end journaled in said box, the nut mounted upon said screw and adapted to abut against the rear end piece of the frame, the ratchet-wheels secured upon said tubular screw adjacent to the sides of the box and provided with laterally-extending collars, the rings journaled upon said collars and having levers or handles secured thereto, the dogs or pawls pivoted to said levers, the flange or collar at the front end of the tubular screw having radial set-screws, and the boring-tool extending through the tubular screw, substantially as and for the purpose set forth.

4. In a boring-machine, the combination of the frame, the longitudinally-sliding box, the tubular screw having its front end journaled in said box, the nut mounted upon said screw and adapted to abut against the rear end piece of the frame, the boring-tool comprising an outer sleeve, a core revolving within the latter and a bit at the front end of said core, and the extension rods or pipes, substantially as and for the purpose set forth.

5. The combination of the core provided at both ends with shoulders or flanges, the sleeve provided at its ends with interior flanges bearing upon said shoulders, an enlarged collar formed upon the shoulder at the rear end of the core, and the bit mounted upon the front end of the core, substantially as and for the purpose set forth.

6. The combination of the core, the sleeve mounted loosely thereon, and the bit provided at its front end with spiral cutting-flanges and having a conical or tapering rear end provided with longitudinal eccentric grooves, substantially as and for the purpose set forth.

7. In a boring-machine, the combination, with a suitable frame, of a longitudinal tubular operating-screw, means for forcing the latter in a forward direction, mechanism for securing the boring-tool within said tubular

operating-screw, the boring-tool comprising a core, a sleeve mounted loosely upon the latter, and a bit provided at its front end with spiral cutting-flanges and having a conical or tapering rear end provided with longitudinal eccentric grooves, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

EDWARD WALTON.

Witnesses:
P. V. VANARSDALE,
J. B. SMITH.