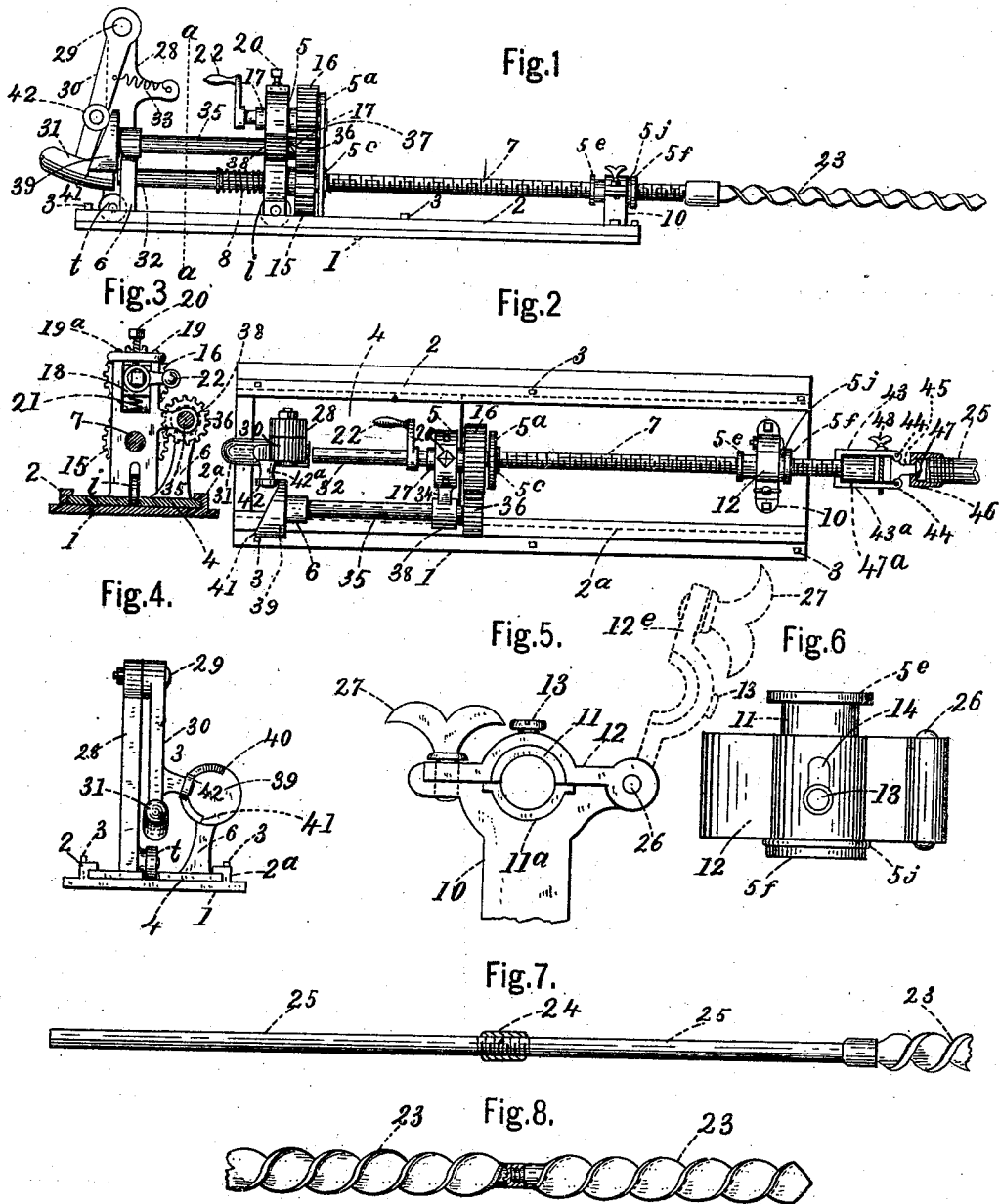


(No Model.)

W. E. EVERITT.
EARTH BORING AND DRILLING MACHINE.

No. 502,958.

Patented Aug. 8, 1893.



Witnesses.

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UNITED STATES PATENT OFFICE.

WALTER E. EVERITT, OF BUFFALO, NEW YORK.

EARTH BORING AND DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 502,958, dated August 8, 1893.

Application filed April 12, 1893. Serial No. 470,006. (No model.)

To all whom it may concern:

Be it known that I, WALTER E. EVERITT, a citizen of the United States, residing in Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Earth Boring and Drilling Machines, of which the following is a specification.

My invention relates to certain improvements in machines for boring long distances horizontally or at any angle through the earth, and it will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of the machine complete. Fig. 2, is a plan view of the machine showing also the removable device at the front of the same that is used when withdrawing the auger or boring tool, a small portion being in section, showing also the connecting extension bars. Fig. 3, represents a vertical section cutting through line *a a* Fig. 1, showing the crank arm and gearing near the rear of the machine. Fig. 4, is a back view of the drill operating mechanism at the rear of the machine, showing also the rear end of the base and slideways, all portions beyond it being omitted. Fig. 5, is an enlarged detached front elevation of the front box and sleeve through which the screw shaft passes. Fig. 6 is a top view of the same, showing the way in which the upper half of the screw sleeve is secured to it. Fig. 7, is a side elevation of two of the extension bars and a portion of an auger bit connected thereto. Fig. 8, is a side elevation showing two of the auger shaped or twisted extension bars secured together.

The base 1, of the machine is a flat plate of iron, either cast or wrought iron and is provided with slideways 2 and 2^a, one on each side of the top of the base plate. These slideways may be made removable if desired and secured to the base plate by ordinary screw bolts, 3, or they can be cast in one piece with the base plate. In these slideways is fitted a plate, 4, shown in Figs. 2, 3 and 4. Near the one end of the plate, 4, is rigidly secured two upright frame pieces 5 and 5^a, and near the opposite end of said plate is a substantially upright supporting frame piece, 6. The

screw shaft, 7, is mounted in suitable boxes in the frame pieces 5 and 5^a, and is prevented from moving but a short distance longitudinally by the collars 5^c and 5^e, the spring, 8, always keeping the collar, 5^c up to the side of the frame piece, 5^a, while free to act.

At the front of the base 1 and rigidly secured to it is a vertical supporting frame piece, 10, and mounted in this frame piece is a sleeve composed of two pieces 11 and 11^a, the upper half, 11, has a longitudinal movement in the top cap, 12, and is kept thereto by a screw, 13, which passes through the slot, 14, in the cap, see Figs. 5 and 6, and screws into the upper half of the sleeve, thereby securing it to the cap, 12, and permitting it to be moved a short distance longitudinally back and forth within the cap. The object of this construction will appear farther on.

Near the rear end of the screw shaft, 7, and between the frame pieces 5 and 5^a, is rigidly secured to said shaft, 7, in any well known way, a spur gear wheel, 15. Above the spur gear, 15, and engaging with it is another spur gear wheel, 16. This gear wheel, 16, is rigidly secured to a stud or short shaft, 17, which is mounted in a removable box which is shown in Fig. 3, and designated by the numeral, 18. The box is kept in place by caps, 19, and bolts, 19^a, and a set screw 20, provides the means for holding the box down and the two gear wheels in gear, against the force of a spiral spring, 21, which tends to hold the box 18 up. On the short shaft, 17, is a crank arm and handle, 22, by which the boring tool and gearing is operated. The upper gear wheel 16, is (as will be noticed) made easily removable by means of the boxes, 18.

The screw-shaft, 7, is provided with a screw thread which passes through a corresponding screw thread in the sleeve 11 and 11^a, which sleeve being mounted in the stationary support 10, and having the collars, 5^c and 5^e, is held stationary while boring through the ground or comparatively soft earth by the collar 5^e, as the support 10, against which the collar 5^e is forced is stationary, said support 10 being rigidly secured to the base plate 1.

From the above construction it will be seen that by turning the crank arm in the proper direction, the gear wheel, 16, turns the gear wheel, 15, and consequently the shaft 7, which

operation causes the said shaft, 7, to screw through the sleeve 11 and 11^a, and draws the plate, 4, its frames 5 and 5^a, and all parts connected with it forward until the frame, 5^a, reaches the collar, 5^c.

On the front end of the boring or screw shaft, 7, is secured by the usual screw portion, either an earth boring auger bar, 23, or any suitable tool for drilling rock, (for which this device is adapted) when a large stone or rock happens to be in the way while boring into the earth. These earth boring auger bars, 23, may be made in sections secured together so as to be extensible to any practicable length, substantially as shown in Fig. 8. When gas pipe is used for extending the auger they are secured together substantially as shown in Fig. 7, by means of the usual screw portion, 24, the extensible bars being designated by the numerals, 25, in said Fig. 7.

It will be noticed that the cap, 12, is pivoted by a pin, 26, to the supporting frame piece, 10, which cap, 12, can be turned up by loosening the thumb screw 27 as shown by the dotted lines, 12^c, in Fig. 5, so that the sleeve, 11, is lifted away from the screw shaft, 7, thereby allowing said shaft to be raised out of the screw thread in the sleeve, 11^a, and then drawn back, together with the plate, 4, and all the mechanism connected with it, after which the shaft can be again secured within the sleeve 11 11^a, as before mentioned by shutting down the cap, 12, and then securing it rigidly in place by the thumb-screw, 27. The object of this construction is to provide the means for adding another extension bar whenever necessary.

If in boring through the earth, a large stone or rock should be in the way an ordinary earth boring tool would not go through it, a blow or a succession of blows as the drill is being slowly turned is required for drilling through rock.

The rear portion of the sliding plate, 4, (or it may be properly called a carriage) is provided with a vertical standard, 28, rigidly secured thereto and moving with said plate when the machine is operating. At the top of the standard 28, is pivoted by a pin, 29, a swinging arm, 30, having at its free end a hammer, 31, of some softer material than the rear end, 32, of the screw bar, 7, such as brass, copper or soft iron. This hammer is kept forward, (and the effect of its blow is increased) by a spiral spring, 33. (Shown in Fig. 1.)

Projecting out from the frame piece, 5, is a supporting arm, 34, having a box 38, in which is mounted a shaft, 35, provided with a spur gear wheel, 36, which gears in with the wheel, 15. This gear wheel, 36, is secured to the shaft, 35, by a set screw, 37, see Fig. 1 which can be loosened so that said wheel will run loosely on said shaft when it is desired to disengage said shaft, 35, and its gear wheel 36, so that it will not be operated while the machine is used for boring soft earth. Near

the opposite end, said shaft, 35, is mounted in a box on the standard, 6, which is also secured rigidly to the plate, 4, or carriage and moves with it, and at the end of the shaft, 35, is rigidly secured a cam wheel 39, and extending around near the edge of said wheel (on its face) is an inclined cam. This rotating cam starts at the point, 40, (see Fig. 4,) and gradually inclines upward to the point, 41. (If desired more than one cam of this kind can be put on the same wheel.) On the arm, 30, is a small friction roller, 42, (see Fig. 1) which rests against the face of the cam.

From the above construction it will be seen that if the cam be made to rotate (during the operation of the machine) as it passes the friction roller, 42, the hammer will be moved backward from the end, 32, of the shaft, 7, until the point 41 is passed, when it is instantly released and the hammer strikes a blow on the end 32 of the shaft, 7, thereby driving the drill against the rock and cutting it in the usual way. When thus operating with the drill, it can be slowly turned by the crank arm, 22. The force of the concussion does not come on the sliding plate, 4, or its supporting frames, because the collar 5^c, and its sleeve 11 and 11^a, allows the shaft 7, and its drill to be driven forward at least a half inch more or less without interfering with the supporting frames and the moment the force of the blow ceases the spiral spring, 8, brings it back to the starting point.

The operation of the device will be clearly understood from the foregoing description and drawings.

When it is desired to withdraw the extension bars and drill the device shown at the front end of the machine (in Fig. 2) is used. It consists of the two holding hook jaws 43 and 43^a, which are pivoted by pins, 44, to the swivel 45. This swivel is secured in the holding piece, 46, so as to turn easily therein and is kept in place by the swivel head, 47. The holding piece, 46, is provided with an internal screw threaded portion adapted to receive either the screw end of an extension bar or the end of the auger or grinding tool. The hook portions when attached as shown in Fig. 2, are rigidly secured to the part, 47^a, by the thumb screw, 48. By this means the extension pieces and the auger portion or drill can be withdrawn without unscrewing the connecting portions by reversing the action of the screw bar, 7, as will be readily understood.

I claim as my invention—

1. In an earth boring machine, the combination with a screw bar, 7, having its rear end extending back beyond the frame in which it is mounted, of a collar 5^c, located on the screw bar at the front of the supporting frame, a spiral spring at the rear of the supporting frame, 5, for holding the screw bar back until stopped by the collar 5^c, a sliding carriage on which the rear end of the screw bar and its operating gearing is mounted in a suitable frame adapted to receive it, a longitudinally

movable screw threaded sleeve mounted in a stationary support at the front of the machine in which the screw bar operates and moves said carriage, a spur gear wheel adapted to gear in with the screw bar gear wheel and secured to a horizontal shaft mounted in suitable boxes on the sliding carriage, a pivoted swinging hammer mounted on a support on said sliding carriage, a spiral spring for drawing it forward and a cam wheel on the horizontal shaft for operating said hammer, substantially as and for the purposes described.

2. In a boring machine, the combination with the screw bar, 7, of a removable holding swivel consisting of two pivoted holding hook bars, a thumb screw for securing them when placed on the front of the screw bar and a means secured by a swivel to the hook bars and provided with an internal screw thread adapted to receive the screw end of the extension auger boring bar, as and for the purposes described.

3. In an earth boring machine, the combi-

nation with the screw bar, 7, having its front end mounted so as to operate in a screw sleeve connected with a stationary support, and its rear end mounted so as to turn in a supporting frame mounted on a movable carriage adapted to be drawn forward by said screw bar, 7, a gear wheel mounted and rigidly secured on said screw bar, 7, and connecting with another gear wheel mounted above it in the same frame, means for operating it, and a gear wheel secured to a horizontal shaft so as to gear in with the gear wheel on the screw shaft and mounted in boxes in a frame rigidly secured to the sliding carriage, a cam wheel, 39, connected to the opposite end of said shaft and means for releasing said wheel from the horizontal shaft to stop the operation of the said cam wheel and hammer, 31, substantially as described.

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