A. H. BOTSFORD.

Earth-Auger.

No. 216,372. Patented June 10, 1879.

Fig. 1.

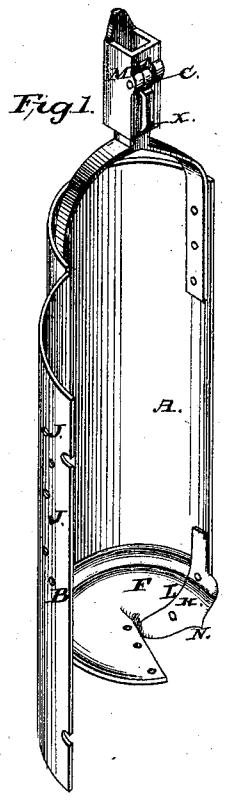


Fig. 2.

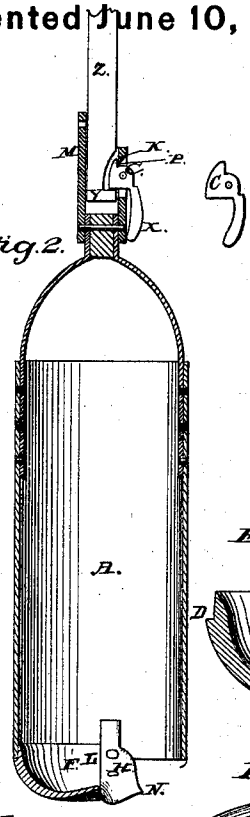


Fig. 6.

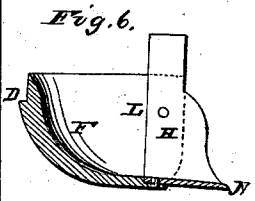


Fig. 5.

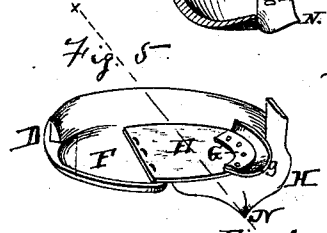


Fig. 7.

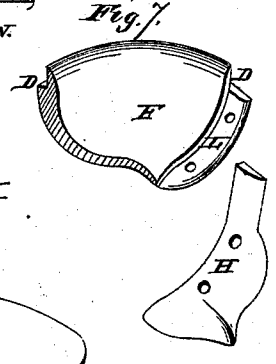


Fig. 3.

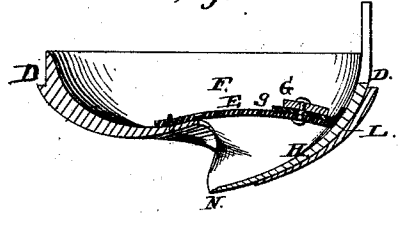
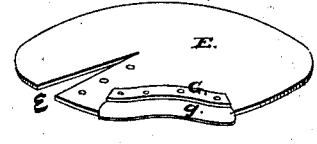


Fig. 4.



Attest:

Hugh Jones

Cabe Bodwin

Inventor:

Andrew H. Botsford

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ANDREW H. BOTSFORD, OF ST. LOUIS, MISSOURI, ASSIGNOR TO PHINEAS HELM, OF SAME PLACE.

IMPROVEMENT IN EARTH-AUGERS.

Specification forming part of Letters Patent No. **216,372**, dated June 10, 1879; application filed April 30, 1879.

To all whom it may concern:

Be it known that I, ANDREW H. BOTSFORD, of the city of St. Louis, in the county of St. Louis and State of Missouri, have invented certain new and useful Improvements in Earth-Boring Augers; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in the construction and arrangement of an earth-boring auger which will work in any kind of hard earth, that will fill easily, will operate in quicksand with sure results, and that can be easily attached to and detached from the shaft.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, which form a part of this specification, and in which—

Figure 1 is a perspective view of the auger thrown open. Fig. 2 is a sectional view of the auger attached to the shaft. Fig. 3 is a cross-section of the auger-bottom with the cutting-bit and valve attached. Fig. 4 is a perspective view of the auger-valve, showing a modification thereof. Fig. 5 is a perspective view of the auger-bottom and valve. Fig. 6 is a cross-section of the bottom on the line *x x*, Fig. 5, showing the bit in position. Fig. 7 is a similar section, showing the bit detached.

A represents a segment of a cylinder, forming the body of the auger, and B is the door thereof, hinged at one side, as shown in Fig. 1. F is the auger-bottom, with one side dropped down by a regular incline, forming one thread of a screw, and curved at the lower outer extremities. This bottom is formed with an offset, D, to receive the lower end of the pod A, and also with an offset, L, to receive the cutting-bit H. This bit is made of wrought-steel, and formed with a point, N, and curved upward at its outer extremity, to form a perpendicular cutting-edge.

The door B of the cylinder is formed with apertures J, for the purpose hereinafter described.

M is a coupling for attaching the auger to the shaft Z, which is held in place by the latch C dropping into the notch K in the end of the shaft. The latch C is provided with a catch, P, which presses on the inner wall of the coupling M, relieving the handle X from part of the strain when the shaft Z is drawn upward. On the latch C is also a shoulder, Y, which enters the notch K, and receives the upward pressure of the shaft.

The shaft Z may be extended to any height by adding sections, coupling the same together by similar couplings M.

To the upper lip of the auger-bottom is attached a rubber valve, E. This valve has secured to it, near its edge, a metal plate, G, which is bent in the form of an arch, said plate securing to the valve a thin piece of rubber, *g*, which projects beyond the edge of the disk.

In operation the point N first strikes the earth, entering more easily by reason of its peculiar shape. The pod A, being attached to the outer surface of the bottom F, gives the body of the auger greater diameter than the bottom of the auger at a point where the earth enters, which facilitates the raising of the earth and the filling of the auger, while the side cut of the bit H, projecting beyond the radius of the body of the auger, cuts a hole larger than the auger, giving room for the free working of the auger, and for the downward passage of air as the auger is withdrawn, thus avoiding a vacuum.

In penetrating quicksand the door and valve are used. As the auger fills the valve is lifted upward. When the auger is withdrawn the quicksand presses against the valve, closing it down and forming a tight vessel, from which the sand cannot escape. The plate G prevents the valve from pressing down below the edge of the door, which would form an opening, and the thin rubber *g*, pressing outward against the door, insures greater tightness there.

The apertures J in the door B are for the escape of water, because if the water is restrained from flowing off the top of the load it is liable to work down, and, finding ever so small an opening, wash the entire load through it.

In connecting the shaft Z to the auger it is only necessary to lower the end of the shaft into the coupling M, when it will press upon

the catch C, which will turn out of the way until the gib at the end of the shaft has passed, and then, dropping into place, hold all secure.

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

1. The combination of the pod A, having the coupling M, the latch C X, having square shoulder Y, and catch P, with the shaft Z, having notch, as described, substantially as and for the purposes set forth.

2. The rubber valve E in the auger-bottom, provided with the plate G and rubber strip *g*, as and for the purposes set forth.

3. The combination of the pod A, the bottom F, formed with offsets D L, cutting-bit H, formed with the point N, and the rubber valve E, all substantially as and for the purposes herein set forth.

ANDREW H. BOTSFORD.

Witnesses:
ALPHEUS BALLARD,
JOSEPH G. COLEMAN.