

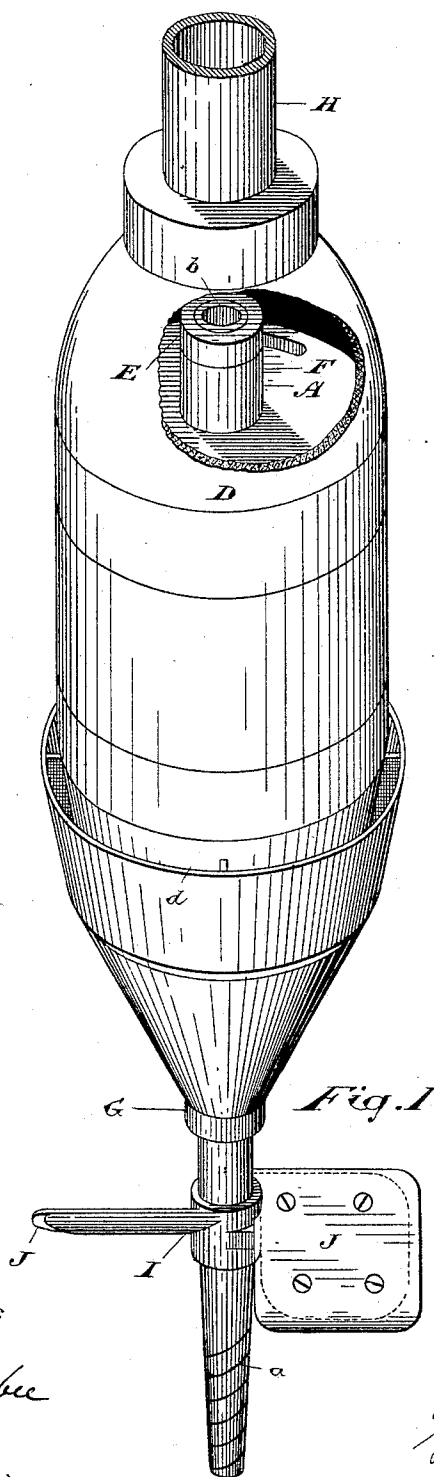
(No Model.)

2 Sheets—Sheet 1.

J. CANAN.
MACHINE FOR BORING SOIL.

No. 460,369.

Patented Sept. 29, 1891.



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W. G. Mcmillan.

Inventor

James Canan
By Donald C. Ridout & Co.
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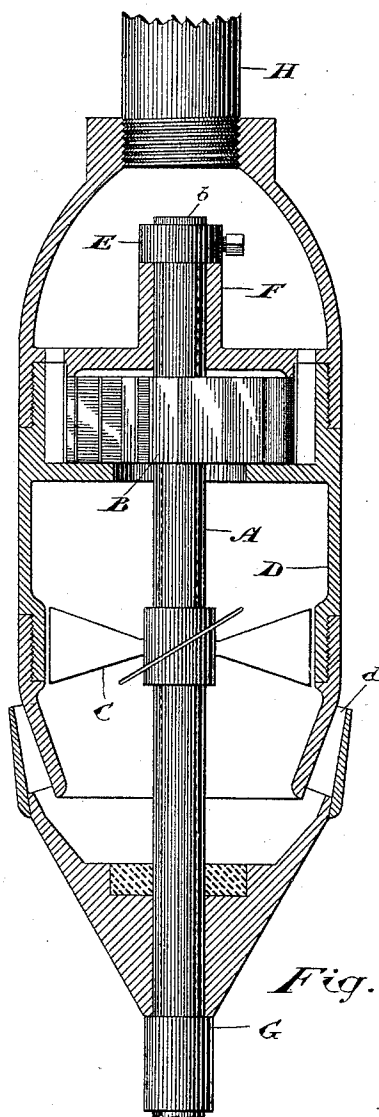


Fig. 2

Witnesses

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UNITED STATES PATENT OFFICE.

JAMES CANAN, OF PORT COLBORNE, CANADA.

MACHINE FOR BORING SOIL.

SPECIFICATION forming part of Letters Patent No. 460,369, dated September 29, 1891.

Application filed March 31, 1891. Serial No. 387,096. (No model.)

To all whom it may concern:

Be it known that I, JAMES CANAN, of the village of Port Colborne, in the county of Welland, in the Province of Ontario, Canada, have invented a certain new and Improved Machine for Boring Soil Under Water, of which the following is a specification.

The object of the invention is to design a simple machine which will rapidly bore into soil under water; and it consists, essentially, of a shaft, to which a turbine and an Archimedean screw are fixed and contained in a casing supplied with water under pressure, and having openings arranged in such a manner that the water forced into the said casing will, in escaping, act upwardly against the soil loosened by cutting-blades fixed near the end of the hollow shaft, substantially as hereinafter more particularly explained, and then definitely claimed.

Figure 1 is an outside view of my improved boring-machine partially broken away. Fig. 2 is a sectional elevation of same.

A represents a hollow shaft, to which a turbine B and a propeller or Archimedean screw C are fixed. A casing D is arranged as indicated to contain the turbine B and propeller C. A collar E, clamped on the shaft A, rests upon the step F, formed within the casing D, as indicated. Suitable bearings are otherwise provided for the shaft A, so that it can be made to revolve freely. A collar G, clamped to the shaft A, butts against the end of the casing D, so that with the collar E the shaft is securely held, so that it cannot move vertically within its casing D. H represents a piece of gas-pipe, by which the casing D is connected to a powerful pump. I cut or form a coarse screw *a* on the end of the shaft A, and a little above the said coarse screw I fix to the said shaft A a two-blade cutter I, the blades being set at such an angle that they will not only cut into the soil against which they are pressed, but will elevate the loosened soil so cut. I provide steel plates J, which are detachably connected to the blades of the cutter. These plates are sharpened and, in fact, form the cutting-edges of the cutter I. They are made detachable, so that they can readily be removed to be replaced by new ones when they are worn out or when they require sharpening.

The water which is forced into the casing D under a high pressure passes into the hollow shaft A through its open end *b*, and thence through the hole at its bottom end, and as the water is thus forced through at a very high pressure the water escaping through the bottom end of the shaft A acts upon and excavates the soil into which the said shaft penetrates. The water which does not pass through the shaft A is forced through the turbine B, thus causing the said turbine to revolve, and as the turbine is fixed to the shaft A, the said shaft also revolves and carries with it the cutters I, which quickly cut and excavate the soil into which the machine penetrates. After the water has passed through the turbine B it immediately comes in contact with and is acted upon by the propeller or Archimedean screw C, so as to increase the pressure of the water after it has left the turbine and force it through the opening *d*, formed around the casing D, as shown. The water thus forced through the opening *d* acts against and forces upwardly the soil loosened by the cutters I, and by the water forced through the end of the revolving shaft A. In this way my boring-machine quickly penetrates the soil under water and makes a perfect hole to receive the pile it is intended for. I may mention here that I prefer to make the hole slightly smaller than the pile it is made for, so that the said pile may be gently tapped into position and be a good solid fit for the hole.

Should the machine encounter rock, I provide a diamond drill, which may be readily attached to the end of the shaft A.

As I do not claim anything in the mechanism for raising and lowering my boring-machine, it is not necessary to describe or show any such mechanism in this specification. It will be sufficient to say that suitable mechanism must be provided by which my boring-machine may be readily lowered to the bottom of the water and as easily withdrawn after it has performed its work. It is also necessary to provide simple mechanism by which the pile may be easily lowered and guided into the hole prepared by the said boring-machine.

Although I consider that a turbine wheel connected to the shaft A and operated by the

water will be the best means for revolving the said shaft, it would of course be possible to drive it by means of steam or gearing, in which case the turbine would be dispensed
5 with and the other power substituted, and although I consider the turbine the best form of wheel to use any, suitable water-wheel might be used.

I am aware that it has been proposed in the
10 United States Patent No. 80,225, issued to James Robertson July 21, 1868, to drive a turbine arranged in a casing forming part of an excavating apparatus, and I am also aware that it has been proposed to drive cutters in
15 excavating apparatus by screws or propellers set in a casing through which water is drawn, as in the United States Patent No. 317,080, issued to Caleb H. Booth May 5, 1885; but neither of these patents show my invention
20 and are essentially different from it. In each of those patents the apparatus is designed mainly to stir up the soil or sand at the bottom of bodies of water and draw or suck up the matter so stirred. Mine, on the
25 contrary, acts in the reverse manner by forcing the water against the soil, whereby I get the effect of the force of the water under great pressure, as in the well-known system of hydraulic mining. Moreover, my apparatus
30 will act on dry soil and is not dependent on drawing up water to carry the excavated soil away, as is the case in the patents referred to.

What I claim as my invention is—

1. A casing arranged to contain a turbine
35 fixed to a vertical shaft suitably supported and extending through the bottom of the said casing, having a boring device attached to the lower end of said shaft, and a pipe constructed and arranged to supply water under pressure
40 to and downward through said casing, substantially as and for the purpose specified.

2. A casing arranged to contain a turbine fixed to a vertical shaft suitably supported and extending through the bottom of the said
45 casing, which casing is provided with upwardly-directed openings for the escape of the water forced into it, and a pipe constructed and arranged to supply water under pressure to said casing, whereby it is driven through
50 said openings, substantially as and for the purpose specified.

3. A casing arranged to contain a turbine fixed to a vertical shaft suitably supported and extending through the bottom of the said
55 casing, in combination with cutting-blades fixed to the said shaft outside of the said casing, and a pipe constructed and arranged to supply water under pressure to said casing, substantially as and for the purpose specified.

60 4. A casing connected to a pump and arranged to contain a turbine fixed to a hollow shaft suitably supported and extending

through the bottom of the said casing, which casing is provided with upwardly-directed
65 openings for the escape of the water forced into it, in combination with a propeller or Archimedean screw fixed to the hollow shaft within its casing, substantially as and for the purpose specified.

5. A casing connected to a pump and arranged to contain a turbine fixed to a hollow shaft suitably supported and extending
70 through the bottom of the said casing, which casing is provided with upwardly-directed openings for the escape of the water forced into it, in combination with a propeller or
75 Archimedean screw fixed to the hollow shaft within its casing and with cutting-blades fixed to the said shaft outside of the said casing, substantially as and for the purpose
80 specified.

6. A casing, a rotating vertical shaft therein projecting through the bottom, a boring device attached to the lower end of said shaft,
85 and a pipe constructed and arranged to supply water under pressure to and downward through said casing, substantially as and for the purpose specified.

7. A casing, a rotating hollow shaft therein projecting through the lower end of the casing, a boring device attached to the lower end
90 of said shaft, and a pipe supplying water under pressure to said hollow shaft, substantially as and for the purpose specified.

8. A casing, a rotating hollow shaft therein
95 projecting through the lower end of the casing, cutters on said projecting end, and a pipe for supplying water under pressure to said hollow shaft, substantially as and for the purpose
100 specified.

9. A casing, a pipe supplying water to said casing, a rotating shaft carrying a propelling-wheel thereon constructed and arranged to
105 act on the water immediately over said propelling-wheel and increase its pressure, and means, substantially as described, for rotating said shaft, as and for the purpose specified.

10. A casing, a rotating hollow shaft therein having a projecting end adapted to loosen the
110 soil, means, substantially as described, for rotating said shaft, and a pipe arranged to convey water to and downward through said hollow shaft, substantially as and for the purpose specified.

11. A casing, a hollow rotating shaft therein
115 having its lower end projecting through the casing and provided with cutters, and a pipe adapted to convey water to said hollow shaft, substantially as and for the purpose specified.

Toronto, March 19, 1891.

JAMES CANAN.

In presence of—

CHARLES C. BALDWIN,
JOHN E. CAMERON.