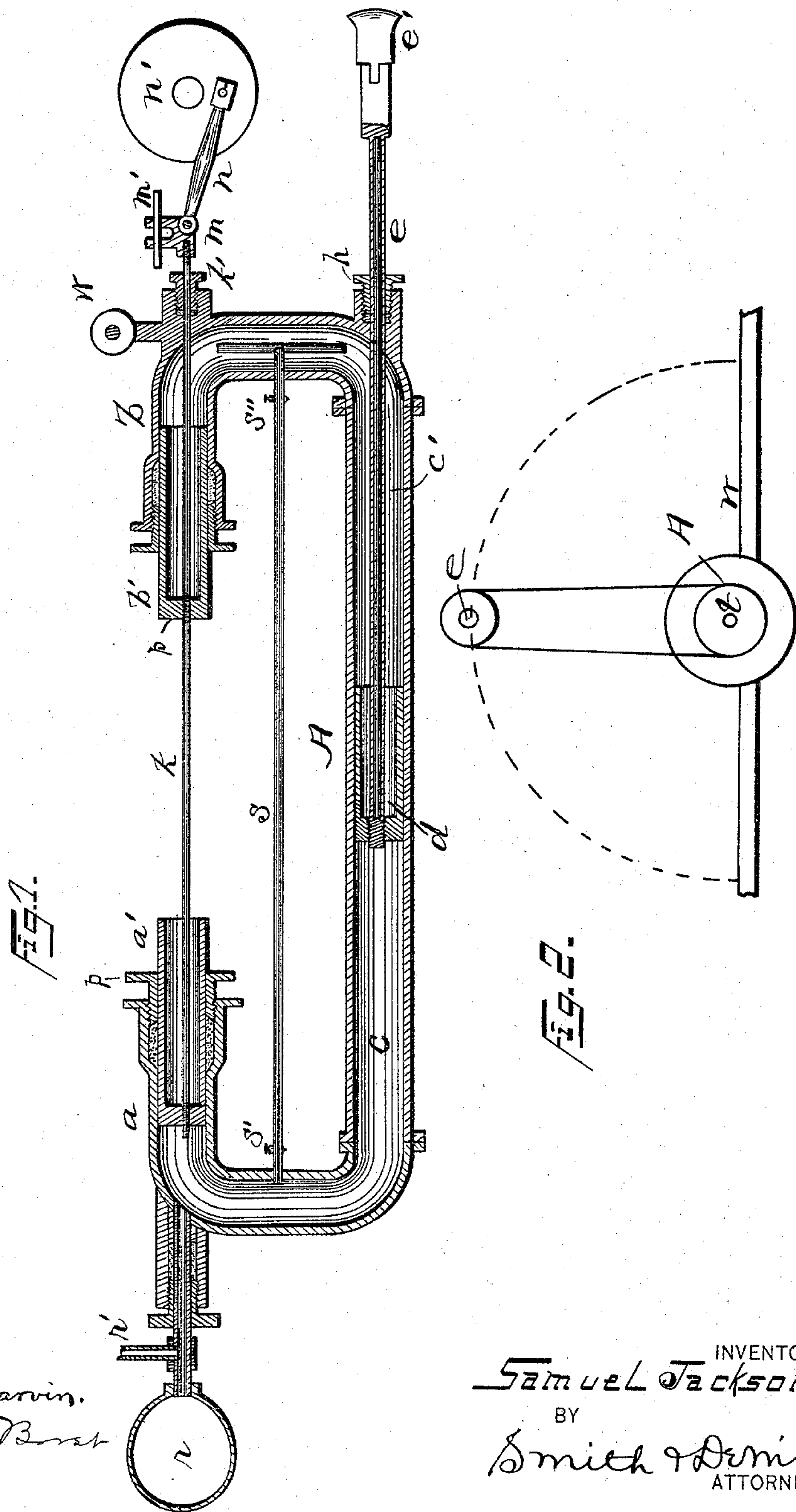


(No Model.)

S. JACKSON.
ROCK BREAKER.

No. 526,654.

Patented Sept. 25, 1894.



WITNESSES:
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W. M. Borst

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ATTORNEYS.

UNITED STATES PATENT OFFICE.

SAMUEL JACKSON, OF SYRACUSE, NEW YORK, ASSIGNOR TO EDWIN JACKSON, OF SAME PLACE.

ROCK-BREAKER.

SPECIFICATION forming part of Letters Patent No. 526,654, dated September 25, 1894.

Application filed January 22, 1894. Serial No. 497,594. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL JACKSON, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Rock-Breakers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to rock-breaking machinery, and particularly to that class in which a chisel is mounted upon a reciprocating shank, which is reciprocated by compressing a liquid first on one side of the piston head to which the shank is connected, and then reversing to compress it upon the other side forcing the shank and chisel downward to strike a blow, and that upon the other side lifting it from a blow into position for the next.

My object is to produce a rock-breaker, consisting of a tubular chamber, divided into two compartments, of variable size, by means of a reciprocating piston head, the chisel shank being connected to said piston head; in which the ends of the chamber, or of the compartments, are in alignment or parallel with each other, or in any other manner by which said compartments may be erected and a reciprocating piston is seated in each end, said pistons being connected to each other and by a connecting rod, to a crank mechanism, whereby by the reciprocation of said pistons the liquid in one compartment is compressed, and that in the other is relieved of pressure; in which means are provided whereby part of the liquid in one compartment can be passed into the other, to vary the length of each compartment, by changing the normal position of the dividing piston head, and thereby feeding the chisel up or down; in which the body is pivoted upon a suitable support, whereby the chisel can be swung around in the arc of a circle, when cutting a trench, according to its width, and in which the upper compartment (or both) is provided with an air compression chamber, whereby the force of the blow of the chisel is increased.

My invention consists in the several novel features of construction and operation herein-after described and which are specifically set forth in the claims hereunto annexed.

It is constructed as follows, reference being had to the accompanying drawings, in which—

Figure 1, is a vertical section, partly in elevation, of the machine, omitting its support. Fig. 2, is a top plan of a support therefor, the dotted line indicating the pivotal swing of the machine and of the chisel.

A— is the tubular body, having curved end portions, arranged so that the ends —a— —b— are in alignment with each other. This body is divided into compartments —c— —c'— by the piston head —d— to which the tubular or solid shank —e— is connected and —e'— is the cutting chisel or tool mounted upon the shank, in any ordinary manner, —h— being a stuffing box through which the shank is reciprocated to strike a blow with the chisel and to retract it for another blow.

Pistons —a'— —b'— are mounted in the ends —a— —b— and are connected by the piston rod —k— which passes through the stuffing box —k'— and is connected to the cross-head —m— of which —m'— is a guide, and —n— is a pitman rod connected to said head and to the crank-pin upon the pulley or wheel —n'. The pistons —a'— —b'— are also provided with stuffing-boxes —p— of any ordinary construction, whereby the packing is adapted to be adjusted to make a liquid-tight joint and yet permit said pistons to be reciprocated.

At —r— I show an ordinary air-pressure chamber analogous to the class used upon force pumps which may be located at any place desired; and —r'— is an inlet pipe for letting the liquid into the compartment —c— when desired, a suitable stuffing box, or boxes, being provided for the pipe connected to said air-chamber, and also for the liquid inlet-pipe wherever it may be located.

A by-pass pipe —s— connects the compartments —c— —c', provided with stop-cocks, —s'— and —s'', and check valves (not shown) set both ways from the three-way cock at the junction of the main pipe and branches, and, if desired, having branches upon its lower end, within the compartment —c'— substantially as shown. In this manner, when said stop-cocks are open, then the raising of the piston —a'— will force a quantity

of the liquid from the chamber —c— down into the chamber —c'—, until a sufficient quantity of liquid is in the lower chamber, and then the stop-cock is closed, and the
 5 piston head —d— is supported by the liquid, or by the liquid and air in the compartment —c'— between said head and the piston —b'—. Then when the pistons —a'— —b'— are simultaneously raised, the liquid in the com-
 10 partment —c— is compressed, and that in the compartment c' is relieved, in equal degree, from pressure, and consequently the piston head is forced down to strike a blow with the chisel; and then when the movement
 15 of the pistons is reversed, the piston head is retracted ready for another stroke.

The chisel is fed downward by increasing the quantity of the liquid in the chamber —c— by pumping it from —c'—; and is fed
 20 upward by reversing this process.

At —t— I show one method of pivoting said body so that it can be swung so that the chisel will traverse an arc of a circle, as from one side of a trench to the other.

25 This apparatus is especially valuable for breaking up shale or other soft, friable rock, preparatory to its removal from the trench for a sewer, or water or gas main, doing the work very rapidly and effectively.

30 At —w— I show a pivotal mounting whereby the apparatus can be tilted to cut under.

It will be seen that my apparatus operates without any exhaust, and with no loss of liquid, except what may leak through the
 35 stuffing boxes; and that the same liquid can be used for a great length of time; and that any kind of liquid or gas can be used, preferably using, in cold weather, a kind which

will not congeal or be deteriorated by low temperature. This apparatus can be also used for 40 drilling wells, for drilling holes for blasting, for power hammers, and many other analogous purposes where a vertical blow is desired, or where it is desirable to have one piston follow another to transmit power for pro- 45 ducing a reciprocating movement of a tool or implement away from the pistons, or the place where the power is primarily applied for whatever purpose may be desired.

What I claim as my invention, and desire 50 to secure by Letters Patent, is—

1. A tubular body, pivotally mounted, and having its ends curved into alignment, a piston head in said body, a chisel carried by said head, pistons mounted in said ends, 55 connected to each other and to a pitman rod and means to actuate said pitman.

2. A tubular body, having its ends curved into alignment, pistons in said ends, a piston head in said body dividing it into liquid- 60 holding compartments, a chisel carried by said head, and means to transfer the liquid from one compartment, to the other to feed the chisel vertically.

3. A tubular body having its ends curved 65 into alignment parallel to said body, a reciprocating piston head in said body dividing it into compartments of variable size, a chisel carried by said head, connected pistons in said ends and means to reciprocate them. 70

In witness whereof I have hereunto set my hand this 28th day of December, 1893.

SAMUEL JACKSON.

In presence of—

C. W. SMITH,

HOWARD P. DENISON.