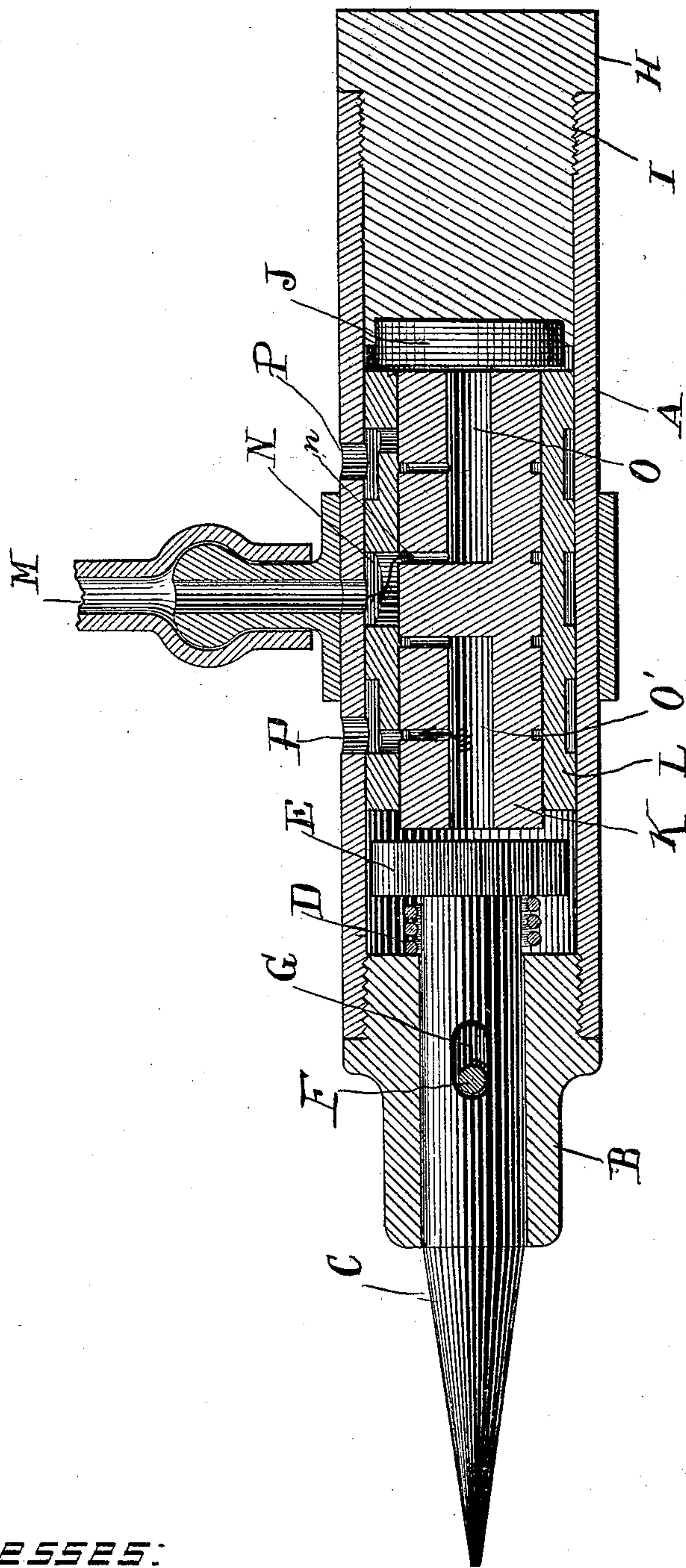


(No Model.)

W. E. GIBBS.  
PNEUMATIC PERCUSSION TOOL.

No. 486,774.

Patented Nov. 22, 1892.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

WILLIAM E. GIBBS, OF NEW YORK, N. Y.

## PNEUMATIC PERCUSSION-TOOL.

SPECIFICATION forming part of Letters Patent No. 486,774, dated November 22, 1892.

Application filed March 16, 1892. Serial No. 425,137. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM E. GIBBS, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Pneumatic Percussion-Tools, of which the following is a specification.

My invention relates to a percussion-tool employing some fluid, and preferably atmospheric air, as a means for conveying motion; and it consists of a tubular handle, at one end of which is a reciprocating tool moving in suitable bearings and at the other end an adjustable plug for regulating the amount of throw or travel of the moving parts contained within the tube.

The specific invention herein referred to consists, essentially, of an independent piston combined with a valve, both the valve and piston being tubular in shape and arranged concentrically one with the other, the piston being located within the valve and both the valve and the piston being adapted to receive pressures from the fluid and to utilize their joint or successive concussions in operating the reciprocating tool.

I obtain by means of the construction I am about to describe an economy of service, inasmuch as I utilize the superficial area of the valve as well as the piston in receiving pressure and conveying force to the tool, and in addition to this eliminate a drawback which has heretofore obtained in respect to movements of this kind, and that is the retardation of the piston by the valve action. In the present invention the movement of the valve co-operates with the movement of the piston, and, as before stated, the added or successive blows will both be received upon the tool.

I will now describe my invention with particular reference to the accompanying drawing, which forms a part of this specification. This drawing represents a longitudinal section of the percussion-tool embodying my improvements.

A is a tubular handle, which constitutes at the same time the working cylinder of the instrument. This tube is closed at one end by a perforated plug B, holding a tool C, supported by means of a suitable coiled spring D, located within the tube and seating upon the plug and affording a bearing for the cap

E of the tool C. A pin F, attached to the plug B and sliding in a slot G of the tool C, serves to retain the said tool in a constant lateral position.

At H, I show a plug adjustable within the tube A by means of screw connection I, and provided at the inner end of said plug is a cushion J, made preferably of rawhide or of some other suitable material. When the plug H is screwed in, it shortens the length of the piston stroke. When it is screwed out, it lengthens the stroke.

Within the working cylinder formed by the tube and between the aforesaid reciprocating tool and the inner end of the plug H the piston and its accompanying valve are arranged to travel. The piston is shown at K and it is provided with suitable port-holes and longitudinal orifices, which I will particularly describe. Arranged concentric with the said piston and exteriorly to it is a valve or supplementary piston L, the two parts K and L being made to fit each other snugly and so proportioned that they will be of about equal weight. It will be seen also by referring to the drawing that the walls of the piston K are somewhat thicker than the walls of the valve or supplementary piston L; but the superficial area of the two parts will be about the same, as the diameter over all of the valve L is much greater than that of the piston K, so that fluid pressures upon the ends of the two parts will bear against approximately equal surfaces, and their weights being about the same they will move with the same or approximately the same velocity and force. These two pistons are provided with ports so arranged that by their reciprocating motion between the tool and the plug H the outer annular piston will act as a slide-valve for the admission of air or other fluid to each end of the piston alternately.

At M, I show a main port through which the air or other fluid enters. From this point it follows the direction of the arrow and enters the center port N of the valve or outer piston, and from this port enters the corresponding part n, in the center piston, from which point it moves through the central orifice O of the middle piston against the rear of the instrument, thereby forcing both pistons in a direction toward the point of the drill. As this



action is going on the air in the other end of the tool will move outwardly through the orifice O' in the direction of the arrow through the port-holes P, arranged successively, as shown. The pistons will move forward together; but the inner one, being the longer, strikes the percussion-tool first, driving the tool in, and the pressure of the air on the outer piston continuing it is also driven against the tool; but by the relative motions of the pistons the position of the ports is changed at this moment, so that the working air is admitted at the other end and a return stroke takes place similar to the direct stroke in every way. These strokes follow each other with great rapidity, giving a series of blows on the tool, from which they are transmitted to the point. This tool of course may be of any form desired for cutting, riveting, chasing or any other available purpose.

As before stated, the plug H is made adjustable longitudinally, thereby giving means for regulating the length of the stroke of the pistons.

It will be seen that the pistons are entirely free to rotate in the tubes, as the ports are connected by continuous annular orifices, and being symmetrical they may be inserted either end first; and it will also be seen that by making one act as a valve I utilize the effort which

moves it in giving two blows at each stroke instead of one as has heretofore been the custom, thus availing myself of the energy which has hitherto not only been wasted, but which actually retarded the movements of the piston.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination, in a percussion-tool, of two concentric pistons of different lengths adapted to give successive blows, as set forth.

2. The combination, in a percussion-tool, of a centrally-located cylindrical piston with an auxiliary piston of somewhat shorter length, the two pistons arranged to deliver successive blows, substantially as shown and described.

3. In a percussion-tool, the combination of the concentric pistons arranged to give successive blows and one piston adapted to operate as a valve for the other.

4. The combination of the concentric pistons, the casing containing same, the percussion-tool C, and the stroke-adjusting plug H, all arranged substantially as and for the purposes set forth.

WILLIAM E. GIBBS.

Witnesses:

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