(No Model.)

J. G. CARLINET.

PNEUMATIC TOOL.

No. 534,812. Patented Feb. 26, 1895.

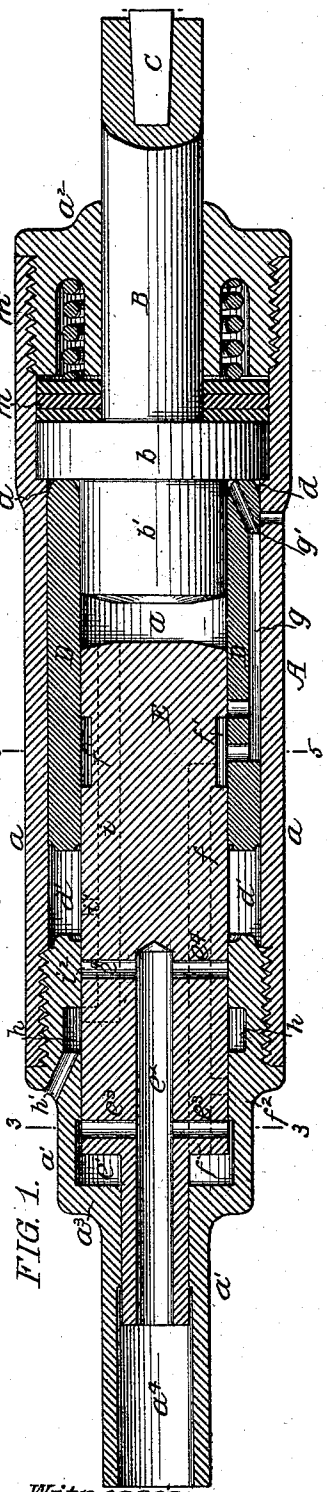

FIG. 1.

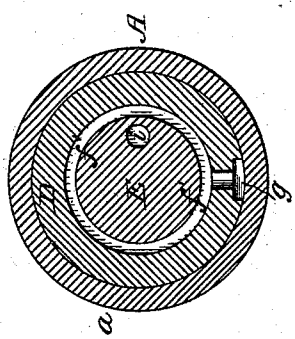

FIG. 5.

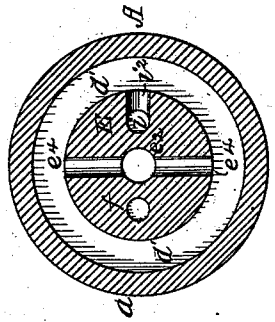

FIG. 4.

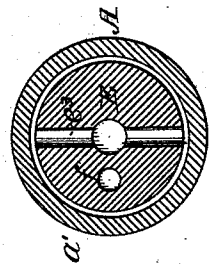

FIG. 3.

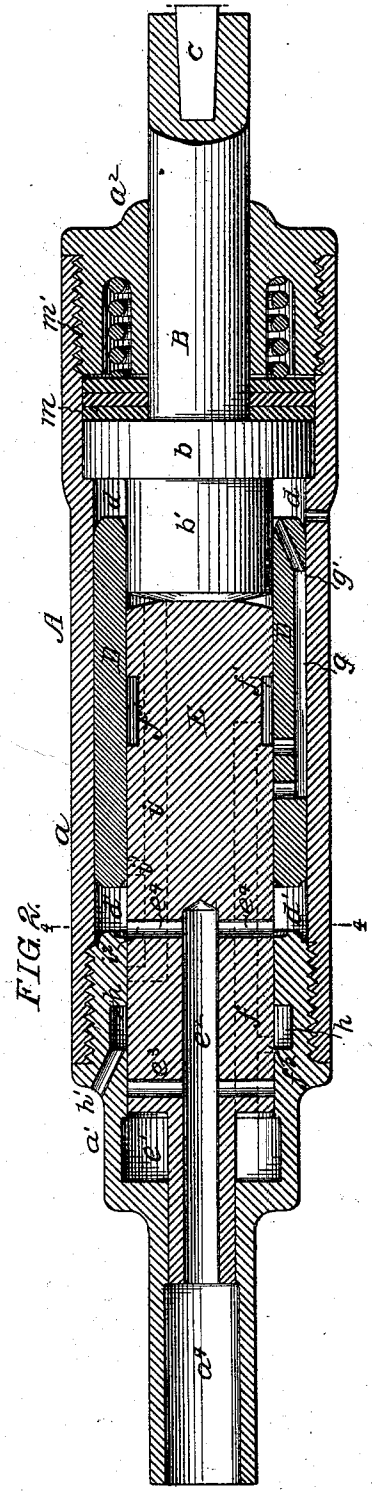

FIG. 2.

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UNITED STATES PATENT OFFICE.

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PNEUMATIC TOOL.

SPECIFICATION forming part of Letters Patent No. 534,812, dated February 26, 1895.

Application filed October 24, 1894. Serial No. 526,829. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. CARLINET, a citizen of the United States, residing at Philadelphia, Pennsylvania, have invented certain Improvements in Pneumatic Tools, of which the following is a specification.

The object of my invention is to construct a pneumatic tool in such a manner that the jar and trembling caused by the striking of the tool upon the article to be cut will be to a great extent lessened.

In pneumatic tools as ordinarily constructed, owing to the number of strokes given in rapid succession the operator is prevented from working continuously with the tool as the strain upon the nerves is very great owing to the fact that the operator takes the back thrust of the tool when the plunger is driven forward.

In the accompanying drawings:—Figure 1, is a longitudinal sectional view of my improved pneumatic tool with the outer plunger in action. Fig. 2, is a similar view with the central plunger in action. Fig. 3, is a transverse section on the line 3—3, Fig. 1. Fig. 4, is a transverse section on the line 4—4, Fig. 2. Fig. 5, is a transverse section on the line 5—5, Fig. 1.

A tool made in accordance with my invention operates in the same manner as if the two pistons were arranged in two chambers in the casing and the compressed fluid acting upon them independently, one plunger returning while the other is moved forward. Thus the returning piston takes up the jar or trembling caused by the acting piston striking the blow.

Referring to the accompanying drawings, A is the casing made up of three parts, the cylinder a, and the heads a', a^2, screwed into the cylinder, as shown in the drawings. The heads may be fastened in any manner desired without departing from my invention. Adapted to the head a^2 is an anvil B carrying the tool c and having an annular head b and a central head b' projecting beyond the annular head.

D is an annular piston fitting snugly within the casing A and adapted to reciprocate between the head a' and the annular head b of the anvil. d d' are the fluid chambers one at each end of the piston in the casing.

Within the cylindrical piston D is a central piston E also adapted to slide in the head a' as well as in the annular piston. This piston E reciprocates between the head b' of the anvil B and the shoulder a^3 of the head a'. e e' are fluid chambers one at each end of the central piston E, so that it will be seen that the pistons D and E each have independent fluid chambers. If, for instance, the fluid enters the space d in front of the annular piston D it will force the piston D back, but will not act upon the piston E. The fluid in the chamber e' at the back of the piston E will force the said piston toward the anvil at the same time that the fluid acts upon the piston D so that in all cases the casing itself intervenes between the two pistons.

I preferably make the passages for the ingress and escape of fluid in the manner shown in the drawings.

The inlet passage a^4 in the head a' for the fluid under pressure, preferably compressed air, communicates with the passage e^2 extending part way into the piston E and this passage communicates with transverse passages e^3 and e^4; the passages e^3 communicating directly with the chambers e' at the back of the piston E when the piston is in the position shown in Fig. 1, and the passages e^4 communicating with the chambers d' back of the piston D when the piston E is in the position shown in Fig. 2.

f is a passage in the piston E extending from the chamber e' to an annular chamber f' formed by grooving the piston E. This chamber communicates with a passage g cut in the piston D which in turn communicates with the chamber d through the passage g' so that when the pistons are in the positions shown in Fig. 1, fluid under pressure is admitted to the chamber e' at the back of the piston E and to the chamber d in front of the piston D, simultaneously. The air in the chamber e in front of the piston E exhausts through the passage i in the piston E into the annular chamber h in the head a' and through the exhaust h'; while the air from the chamber d' exhausts through the passage i' into the

passage *i*. When the pistons are in the positions shown in Fig. 2, the fluid inlet port communicates with the chamber *d'* through the passage e^4 and with the chamber *e* through the chamber *d'*, passage i^2 and passage *i*, Fig. 4.

The fluid from the chamber *e'* exhausts through the passages *f* and f^2 and exhaust chamber *h*, while the fluid exhausts from the chamber *d* through the passages *g'* and *g*, *f'*, *f* and f^2 and exhaust chamber *h*. Thus by this arrangement of the ports and passages rapid movement is imparted to both pistons in opposite directions.

I preferably arrange between the anvil and the head a^2 of the casing a series of washers *m* and a coiled spring *m'* in order to form a yielding abutment for the anvil.

It will be understood that two or more pistons may be arranged side by side in some instances instead of concentric, as shown in the drawings without departing from the main feature of my invention.

I claim as my invention—

1. The combination in a pneumatic tool of the two pistons both mounted in the casing and independent of each other and operating in opposite directions, with independent fluid chambers for the pistons, and valve mechanism by which fluid under pressure is admitted to the forward end of one piston and to the rear end of the other piston simultaneously, substantially as described.

2. The combination in a pneumatic tool of the casing, the anvil, the concentric plungers, independent chambers at each end of each plunger, valve mechanism through which fluid under pressure is admitted to the forward end of one piston and the rear end of the other piston simultaneously so that the pistons will move in opposite directions, substantially as described.

3. The combination in a pneumatic tool, of the casing, the heads *a'*, a^2, the anvil having heads *b b'*, the annular piston D and the central piston E, with inlet and exhaust ports arranged substantially as described, so that fluid under pressure will be admitted in front of one piston simultaneously with the admission of fluid at the rear of the other piston, substantially as described.

4. The combination in a pneumatic tool, of the casing, the anvil having the annular head *b* and the central head *b'*, the annular piston D and the central piston E, inlet and exhaust passages in the piston E, a passage in the piston D, said passages being so arranged that fluid under pressure will be admitted to the forward end of one piston and at the rear end of the other piston simultaneously, substantially as described.

5. The combination in a pneumatic tool, of the casing, the anvil having the two heads, the annular piston D and a central piston E, inlet passage for the fluid under pressure in the casing, the passage e^3 in the central piston, transverse passages e^3 e^4 communicating alternately with the chambers *e'* and *d'* in the casing and a passage *f* forming a communication between the chambers *e'* and the annular chamber *f'*, a passage *g* in the piston D communicating with the chamber *f'* and with the chamber *d* in front of the piston D, an exhaust chamber *h* in the casing, the passage *i* in the piston E extending from the chamber in front of said piston and communicating alternately with the chamber *d'* and exhaust chamber *h*, substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN G. CARLINET.

Witnesses:
WILL. A. BARR,
JOSEPH H. KLEIN.