(No Model.)

J. G. CARLINET.

PNEUMATIC TOOL.

No. 487,086. Patented Nov. 29, 1892.

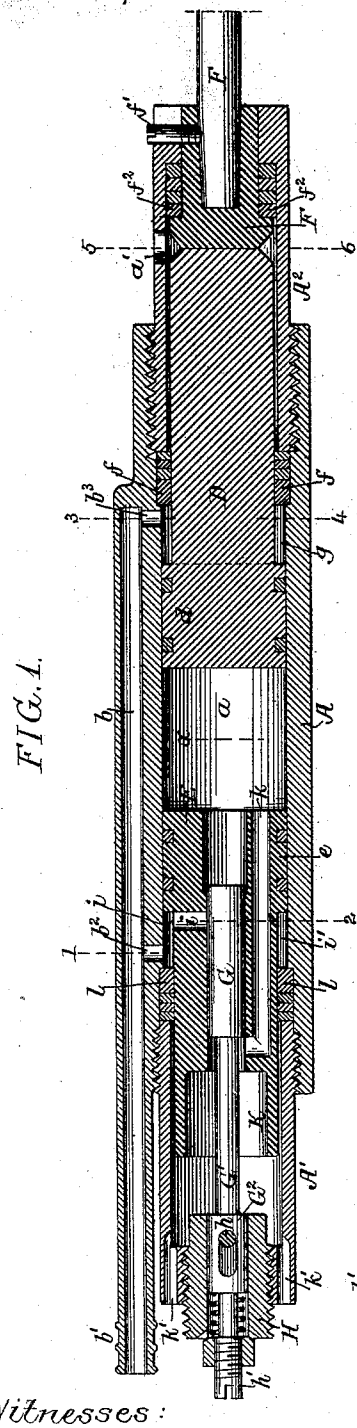

FIG. 1.

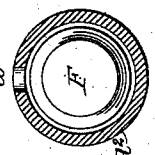

FIG. 5.

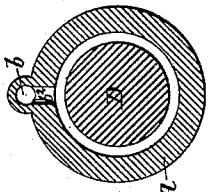

FIG. 4.

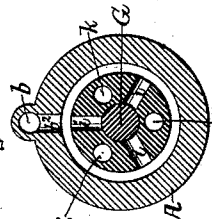

FIG. 3.

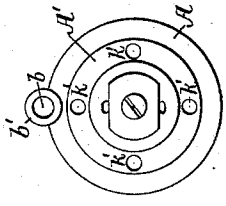

FIG. 2.

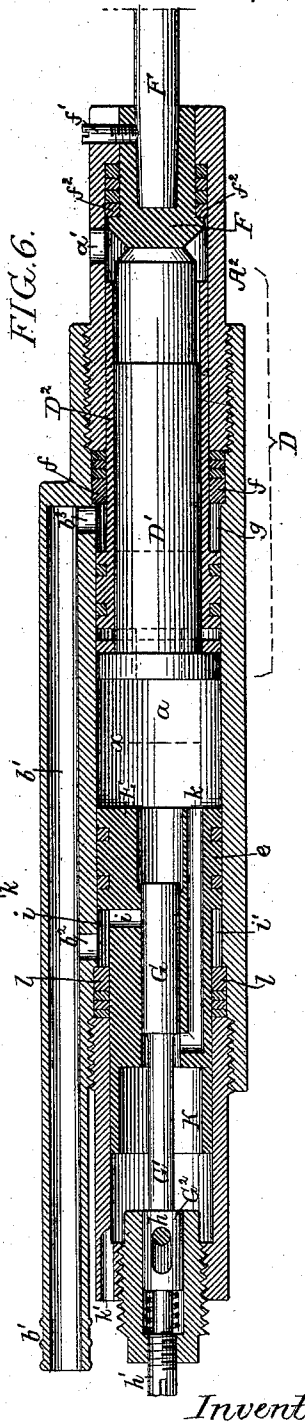

FIG. 6.

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by his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

JOHN G. CARLINET, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF SEVEN-TENTHS TO JAMES WOLSTENCROFT, WILLIAM O'NEILL, AND WILLIAM H. SOLEY, OF SAME PLACE.

PNEUMATIC TOOL.

SPECIFICATION forming part of Letters Patent No. 487,086, dated November 29, 1892.

Application filed April 20, 1892. Serial No. 429,912. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. CARLINET, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented a certain Pneumatic Tool, of which the following is a specification.

The object of my invention is to so construct a pneumatic tool as to avoid the jar caused by the striking of the tool upon the article being cut. This object I attain in the following manner, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of my improved pneumatic tool. Fig. 2 is an end view. Fig. 3 is a section on the line 1 2, Fig. 1. Fig. 4 is a section on the line 3 4, Fig. 1. Fig. 5 is a section on the line 5 6, Fig. 1; and Fig. 6 is a longitudinal sectional view of the tool having a compound plunger.

Pneumatic tools as ordinarily constructed are very hard upon the operator. The trembling of the tool, owing to the number of strokes given, prevents the operator from working with the tool continuously, the strain upon the nerves being very great, as the operator practically takes all the back thrust of the tool when its plunger is driven forward; and the main object of my invention is to overcome this difficulty, although I wish to cover other points relating to the general construction of the mechanism by which quick action is attained, at the same time making the tool of simple elements that can be readily manufactured and put together.

A is the casing, hollow throughout its entire length, forming the cylinder *a*. At one side of the casing is formed a passage *b*, terminating in a coupling-head *b'* at the rear end of the tool, to which the tube may be attached. This passage *b* is connected with the cylinder-chamber *a* through the passages b^2 b^3, as clearly shown in Fig. 1.

At the rear of the casing A is an extension-casing A', screwed into the casing A. At the forward end of the casing is another extension A^2, also screwed into the casing A. This casing A^2 carries the impact tool.

D and E are two plungers, D being the striking-plunger, and E the reaction-plunger. The plunger D has a head *d*, in which are suitable packing-rings. This head fits snugly within the cylinder *a* and can be reciprocated from the center *x* to the packing or cushions *f*, which are mounted between a shoulder on the casing A and the face of the extension A^2. The plunger D fits snugly in the packing *f* and extends to the head F, carrying the tool F'. This tool is secured to the head by a set-screw *f'* or by other means.

Between the head F and a shoulder on the extension A^2 is a cushion f^2, which is compressed slightly when the head F is struck by the plunger D, the head returning to its normal position after being struck owing to the character of the cushion.

In the extension A^2 is an opening *a'* to allow the free escape of any air that may pass beyond the head *d* of the plunger and into the space between the head F and the plunger. The air under pressure passes through the tube *b* into the passage b^2 to the center portion of the cylinder *a*, causing the plunger to strike the blow. The plunger is returned to its central position owing to the pressure of air in the space *g* back of the head *d*, the central space being open to the atmosphere.

In order to so operate the valves as to allow the plunger to return to its normal position, I construct the mechanism in the following manner: As before remarked, E is the reaction-plunger, having a head *e* and provided with suitable packing-rings. This head fits snugly in the cylinder *a* and projects into the extension A', as clearly shown in Fig. 1. This plunger E is hollow, and adapted to the plunger is a piston G, which is secured to a piston-rod G', carried by a head G^2, which has a slight reciprocating motion within the plug H, being limited in its motion by a pin *h*, which passes through a slot in the head G^2. The plug H is adjustable, and by turning it the valve-piston G can be so adjusted as to regulate the position of the plungers E and D, and consequently increase or diminish the blow given by the plunger D. A spring is mounted between the head G^2 and the plug, so that when the piston G is acted upon by the air in the center portion of the cylinder *a* it will compress the spring a sufficient distance to allow the valve to operate properly.

A set-screw h' regulates the movement of the piston G. The inlet-passage i communicates with an annular space i', which in turn communicates with the air-inlet passage b^2. The passage i, as shown in Fig. 1, when the pistons are apart is closed, preventing air gaining access to the center portion of the cylinder a, but allowing both plungers to return to their central positions, air-pressure being at the back of the heads d and e. The air in the center portion of the cylinder when the stroke has been made is exhausted through the exhaust-passage k to a chamber K back of the piston E, from which it escapes to the atmosphere through ports k'. It will be noticed that compressed air is at all times at the back of the plungers D and E. The area of the back of each plunger is less than the face, and consequently the moment the admission-port i is closed and the space between the plungers is open to exhaust the plungers will be returned to their central positions. When the plungers reach this position, however, the air-inlet port i in the plunger E passes the end of the piston G, thus allowing air under pressure to enter the center portion of the cylinder, and in the meantime the exhaust-port k is closed by the head G, thus preventing the escape of air through the passages without first acting on the two plungers. Between the casing A and the extension A′ is a cushion-packing l, similar to the cushion-packing f at the opposite end of the tool. Thus it will be seen that while the stroke is sufficient to give the ordinary blow upon the tool the plunger E receives the back-thrust, so that the operator holding the casing A will not be subjected to the trembling of the tool, as heretofore.

In Fig. 6 I have shown a tool similar in construction to that shown in Fig. 1, with the exception that the plunger D is made in two parts for the purpose of returning the plunger proper D′ to its normal central line x at each stroke. There is sufficient lost motion between the sleeve-section D^2 and the center section D′ to allow for any rebound of the central section of the plunger D′, as the air will act upon the tubular section D^2 and move it. At the same time the air will move the plunger E, and the central section D′ of the plunger will not be moved to its central line until it is acted upon by the tubular section D^2, thus always insuring the return of the plunger to its center line and not have it pass beyond its line or not to the line.

I claim as my invention—

1. The combination, in a pneumatic tool, of the casing, the striking-plunger D, carrying a tool, and a counteracting plunger E, both mounted in the casing and independent of each other, with ports and valves whereby the plungers are moved from a center line outward and in opposite directions and returned to the center line simultaneously, substantially as specified.

2. The combination of the casing A, the passage at the side of said casing having inlet-ports b^2 b^3, plungers D and E, a tool-head acted upon by the plunger D, a piston G within the plunger E, and ports in said plunger, whereby as compressed air or other fluid is admitted through the inlet-passage the plungers will be moved apart and brought together, substantially as described.

3. The combination of the hollow casing A, having extensions A′ and A^2, a passage b at the side of the casing, with inlet-ports b^2 b^3 communicating with the interior of the casing, a tool-head carried by the extension A^2, and a piston G, carried by the extension A′, the striking-plunger D, and counteracting plunger E, and passages in said counteracting plunger so situated in respect to the piston G as to automatically cut off the supply and exhaust, substantially as described.

4. The combination of the casing A, the inlet-ports therefor, the plungers D and E within the said casing, a tool-head upon which the plunger D acts, a piston G within the plunger E, and inlet and exhaust ports in the plunger E, with mechanism for regulating the position of the piston G in relation to the ports, substantially as described.

5. The combination of the casing A, inlet-ports therefor, the plunger E, inlet and exhaust ports therein, and a piston acting in conjunction with the said ports with a two-part striking-plunger D, one adapted to slide within the other, substantially as described.

6. The combination of the casing A, the inlet-tube b, passages b^2 and b^3, forming communications between the tube and the interior of the casing, a tool-head carried by the casing, a tool-striking plunger D, having a head d, and a counteracting-plunger E, having a head e, inlet-ports i and exhaust-ports k in the plunger E, and a piston G, mounted within the plunger, the forward movement of the plunger being caused by the air or other fluid entering the central portion of the chamber between the two plungers through the passage b^2 and passage i and the return movement of the plunger being caused by air acting upon the rear of the heads of the plungers, substantially as described.

7. The combination of the casing A, inlet-ports therefor, the tool-head, the tool-plunger D, and the counteracting-plunger E, having inlet and exhaust ports therein, a piston G, mounted within said plunger E, a head G^2, connected to the plunger, and a spring back of said head, substantially as described.

8. The combination, in the casing A, of the inlet-ports therefor, the plungers D and E, inlet and exhaust ports in the plunger E, piston G within the said plunger, a head G^2, carrying said piston, and a spring with mechanism for adjusting the piston G in relation to the ports in the plunger E, substantially as described.

9. The combination, in a pneumatic tool, of

the casing, the plungers D and E therein, a tool-head at one end of said casing, and an adjustable valve-carrying plug at the opposite end of the casing, whereby the force of the blow is regulated, substantially as described.

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

JOHN G. CARLINET.

Witnesses:
HERBERT PUSEY,
HENRY HOWSON.