(No Model.)

J. G. CARLINET.

PNEUMATIC TOOL.

No. 546,223. Patented Sept. 10, 1895.

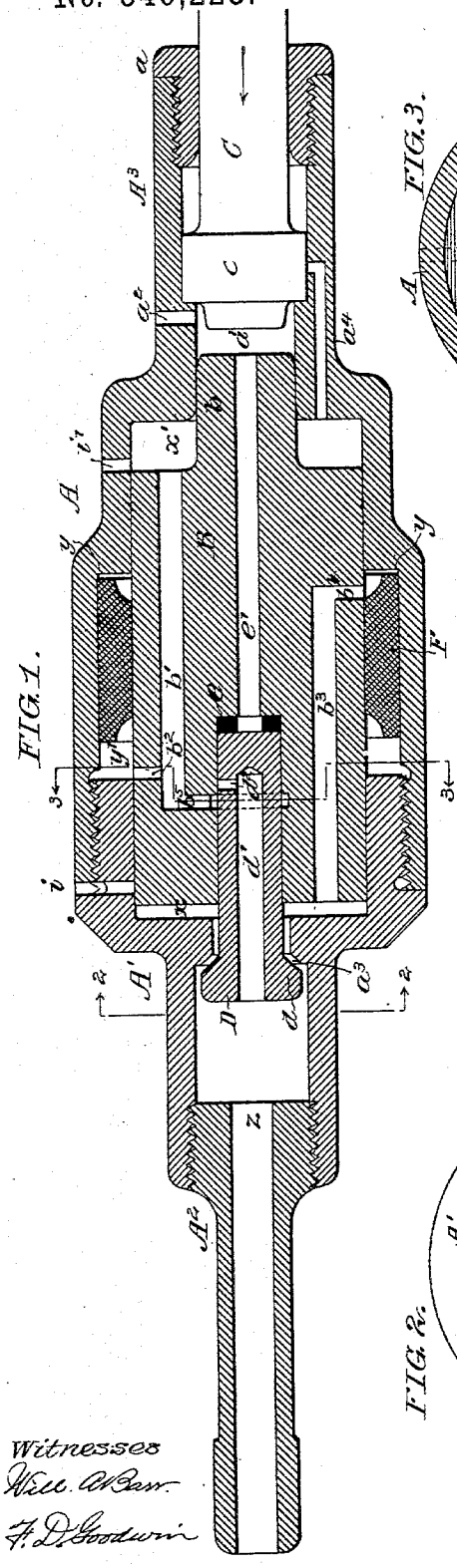

FIG. 1.

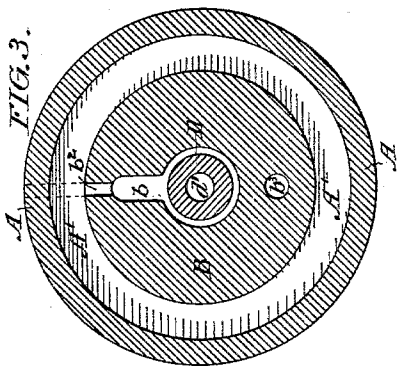

FIG. 3.

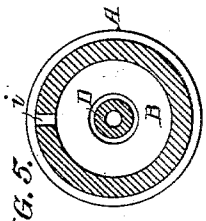

FIG. 5.

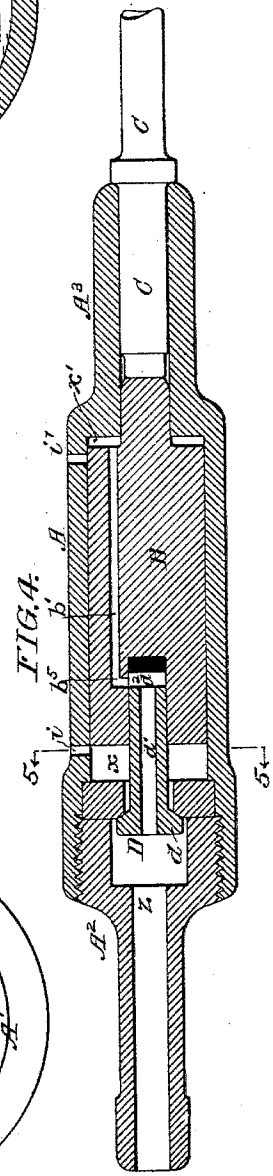

FIG. 4.

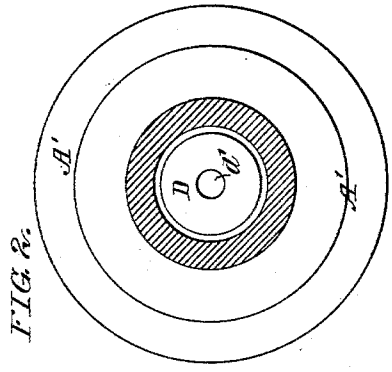

FIG. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

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PNEUMATIC TOOL.

SPECIFICATION forming part of Letters Patent No. 546,223, dated September 10, 1895.

Application filed May 27, 1895. Serial No. 550,812. (No model.)

To all whom it may concern:

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

The object of my invention is to so construct a pneumatic tool that it can be made of few parts, and in which a single valve controls the admission of fluid under pressure to the ends of the cylinder.

A further object is to so arrange the tool-carrier in the casing that it will not be affected by the fluid in the cylinder when the hammer is returned.

A still further object is to so construct the parts that the vibration of the tool will automatically cease as soon as removed from the work, dispensing entirely with the ordinary hand-valves.

These objects 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 a transverse sectional view on the line 2 2, Fig. 1. Fig. 3 is a transverse sectional view on the line 3 3, Fig. 1. Fig. 4 is a longitudinal sectional view of the tool in its simplest form. Fig. 5 is a transverse sectional view on the line 5 5, Fig. 4.

A is the casing of the tool, preferably made in the form illustrated, and screwed into the casing is a cap A′ having an extension A^2 to which the flexible fluid-pipe is connected. The casing A has at the opposite end an extension A^3, in which the tool-carrier C finds its bearing. The head *c* of the tool-carrier works between a shoulder on the extension A^3 and the follower *a*, which is screwed into the extension A^3.

B is the plunger-hammer having a portion *b*, which at all times rests in the channel *a′* in the casing. This projection of the hammer strikes the head *c* of the tool-carrier at each reciprocation of the hammer, and in the extension A^3 is a vent a^2 communicating with the channel *a′* at all times, so that the pressure of the fluid will not affect the tool-carrier except through the hammer.

When the tool is held by the operator in working position, the tendency is to force the tool-carrier in the direction of the arrow, Fig. 1, against the shoulder of the casing, so that the tool-carrier will always be in position to be struck by the hammer; but when the operator sets the tool down after working, the stroke of the hammer will be greater, as the hammer and tool-carrier will move forward their full distance. The increased movement of the hammer will throw the ports out of line with the valve, thus stopping the tool.

As soon as the tool is pressed to the work again, the hammer will be moved in the casing to such a position that its ports will be in line with the ports of the valve, and the hammer will be again set in motion.

Adapted to the hammer B and to the cap A′ of the casing is a valve D, having a portion *d* adapted to a seat a^3 on the cap A′ and pressed against its seat by constant pressure at the rear, the main body of the valve extending into the central opening in the hammer.

When the portion *d* of the valve is off its seat, the space *x* at the rear of the hammer B is in communication with the fluid-inlet passage *z*, and the fluid under pressure will force the hammer forward to strike the blow on the tool-carrier, and after the hammer reaches a certain point the central passage *d′* of the valve will communicate through a port d^2 with a port b^5 and channel *b′* in the hammer, which communicate with the chamber *x′* in front of the hammer, and in the meantime the exhaust-port *i* will be uncovered by the hammer B, so as to exhaust the fluid under pressure from the chamber *x*, and consequently the valve D will seat itself on the seat a^3 and prevent the admission of fluid into the space *x*. On the return movement of the hammer B the port b^5 will move out of line with the port d^2 of the valve D and cut off the admission of fluid to the forward end of the cylinder, and the exhaust-port *i′* of the space *x′* will be uncovered, allowing the air under pressure to escape. A certain lost motion in the first return stroke of the hammer B is taken up, after which the hammer will move the valve off its seat a^3 and allow fluid under pressure to pass into the space *x* under the hammer, and the operation is repeated.

I preferably insert a washer *e* in the bottom of the valve-chamber, and I form a passage *e′* in the hammer, which gives a communication

between the valve-chamber and the atmosphere through the channel a' and exhaust-port a^2, although in some instances this is not absolutely necessary.

In the casing is an exhaust-passage a^4, which communicates with the space x' in the front of the hammer and opens into the channel a', as clearly shown in Fig. 1, and this passage a^4 is closed when the tool is in operation by the head c of the tool-carrier; but when the tool is out of operation the carrier, being thrown to its full outward limit, uncovers the passage a^4, so that the said passage will communicate with the atmosphere and prevent the accidental starting of the tool due to the accumulation of fluid under pressure in the space x', which would leak through defective joints or packing.

In some instances when large tools are constructed I may reduce the tremble by arranging an annular piston F within the casing, and so communicate the spaces $y\ y'$ in the casing at each end of the piston with the fluid under pressure that when the hammer strikes a blow the piston F will move in the reverse direction, counteracting the trembling effect of the blow to a certain extent, and as the hammer returns fluid under pressure may move the piston in the opposite direction, which will also tend to reduce the tremble caused by the return stroke.

As shown in Fig. 1, the space y' communicates with the passage b' through the port b^2, and the space y communicates with the space x at the back of the hammer through the passage b^3 and port b^4 in the hammer. This piston I preferably make of leather or rawhide, and is preferably shaped as shown in the drawings; but it may be made of metal and of any shape without departing from my invention.

In Figs. 4 and 5 I have shown the tool in its simplest form, dispensing with the annular piston.

I claim as my invention—

1. The combination of the casing, a tool carrier, hammer within the casing adapted to strike the tool carrier, a valve adapted to a seat in the casing and having a port, a port in the hammer communicating with the forward end of the casing, with exhaust ports in each end of the casing, the whole so constructed, that as the hammer moves forward, the valve will be off its seat so as to admit fluid under pressure to the rear of the hammer and when the hammer is moved to a certain position the ports of the valve will be uncovered forming communication with the forward end of the casing, the valve in the meantime being seated, substantially as described.

2. The combination in a pneumatic tool, of the casing, the hammer therein, a channel a' in the casing, a tool carrier adapted to said channel and a projection on the hammer resting at all times within the channel and a valve for admitting fluid under pressure first to one end of the cylinder and then to the other, substantially as described.

3. The combination of the casing, the channel a' therein open to the atmosphere at all times, a hammer adapted to reciprocate within the casing and having a projecting end extending into the passage a', a valve having a port, the hammer also having a port, said valve being so constructed as to admit fluid under pressure to either end of the casing, the tool carrier being free to move forward to such an extent that when the tool is relieved of pressure the hammer will have an increased throw so as to throw its ports out of line with the valve automatically and stop the reciprocation of the hammer, substantially as described.

4. The combination of the casing, the tool carrier, the plunger hammer adapted to reciprocate within the casing and act upon the tool carrier, a fluid passage in the casing communicating with the space at each end of the hammer, with a valve adapted to a seat in the casing and arranged to cover or uncover a port in the hammer and to be acted upon by the hammer on its return stroke so as to move it off its seat, with outlet ports communicating with the space at each end of the casing and to be covered and uncovered by the hammer in its reciprocation, substantially as described.

5. The combination of the casing, the hammer within the casing, a tool carrier acted upon by the hammer, a valve adapted to the casing and to the hammer, inlet and outlet ports, an annular piston adapted to reciprocate in the casing, spaces at each end of the piston communicating with the outlet and inlet ports, the ports being so arranged that the piston will travel in a direction opposite to that of the hammer, substantially as described.

6. The combination of the casing having a reduced portion, a tool carrier adapted to reciprocate in the said reduced portion, a cap attached to the casing and having an extension to which the fluid pressure pipe is connected, the fluid passage z in said cap, a seat communicating with the space x in the rear end of the casing, said cap having a valve seat a^3, a plunger B adapted to reciprocate in the casing and having a projection b adapted to reciprocate in the channel a', and to strike the tool carrier on its forward movement, a port b^5 and a passage b' extending to the forward end of the hammer, a valve D having a head adapted to the seat a^3 and adapted to a valve way in the hammer B, a passage d' and a port d^2 in the valve, said port d^2 aligning with the port b on the forward movement of the hammer and on the return movement of the hammer the valve will be moved by the hammer off its seat, with exhaust ports $i\ i'$ one communicating with the one end of the casing and the other with the opposite end of the casing and so arranged that the ham-

mer will cut off communication with the ports and the spaces at the end of the casing, substantially as described.

7. The combination of the casing, the hammer therefor, mechanism for reciprocating the hammer, a channel a' within the casing, a tool carrier adapted to said channel, the hammer having a part b also adapted to the channel, with a passage a^4 forming communication with the space in front of the hammer and the channel a', said passage being closed by the tool carrier except when the tool carrier is out of use and moved to its extreme forward position, the said channel being open to the atmosphere at all times, 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:
WILL A. BARR,
JOS. H. KLEIN.