

1,102,271.

Patented July 7, 1914.

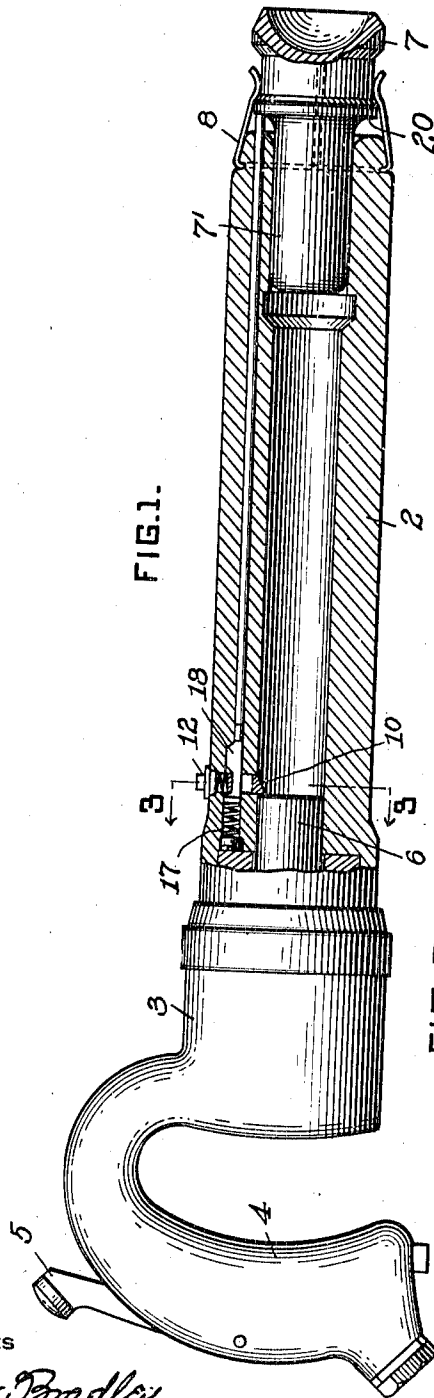


FIG. 1.

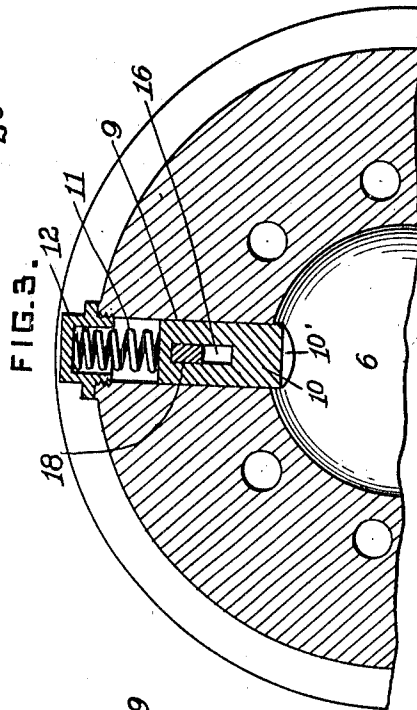
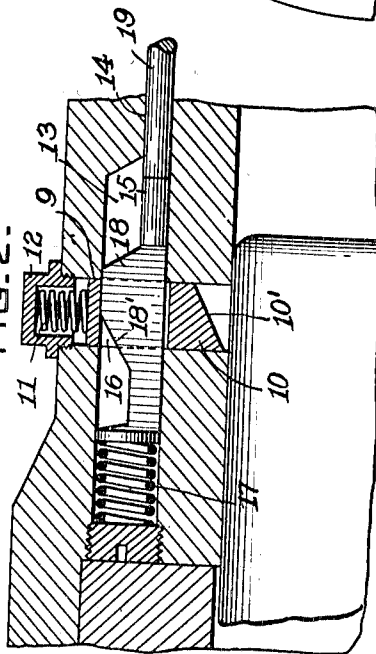


FIG. 2.



WITNESSES

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PNEUMATIC TOOL.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HARRY S. HUNTER, a citizen of the United States, and resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Pneumatic Tools, of which the following is a specification.

The primary object of this invention is to provide simple and efficient means for automatically locking the tool piston against movement within the cylinder when the tool is not in working position, thereby rendering it impossible for the piston to pulsate when the rivet set or other tool is not in engagement with the work.

It is not an uncommon occurrence to have the throttle valve of a pneumatic tool opened prematurely, either by accident or through error, causing the piston to deliver one or more blows to the rivet set or other tool before the latter is in position to transmit the blows to the work. In those types of tools wherein the movement of the rivet set is not restricted, premature piston strokes cause the set or other tool to be projected from the cylinder with much violence, endangering persons and property in its path. In those forms of tools in which free movement of the rivet set is restricted, or in which the set is held against movement when the tool is not in operative position, the force of the premature piston blow is transmitted to the tool cylinder and is liable to injure the latter or the confined set, or the means for confining the set. With the present invention these difficulties are overcome by providing a lock for automatically engaging and securing the piston in rearward position whenever the tool is out of operative engagement with the work.

In the accompanying drawings, Figure 1 is a view of a pneumatic tool of well known type, the cylinder thereof being shown in section to illustrate the locking means in normal or piston-locking position. Fig. 2 is a longitudinal section of the lock mechanism on a larger scale than in Fig. 1, the lock being shown retracted as when the tool is in use. Fig. 3 is a cross-section of the lock mechanism and a portion of the cylinder, taken on line 3—3 of Fig. 1.

Referring to the drawings, 2 designates the cylinder of a pneumatic tool of conventional form, 3 being the upper or outer portion of the tool body containing the valve

mechanism, 4 the hand grip, and 5 the finger piece of the throttle valve. As the invention is not concerned with the valve mechanism, valve ports, etc., the tool body and hand grip are simply shown in outline.

6 is the piston operative in cylinder 2 which, in the embodiment here shown, is adapted to deliver blows to the shank portion 7' of the rivet set 7, the latter being movably held at the outer end of the cylinder by the usual spring clip 8. While the tool here shown is a rivet set, it will be understood that the invention is not restricted thereto, being adapted to be utilized in connection with any other tool to which blows may be imparted by the piston.

The wall of cylinder 2 is formed with the through opening 9, and movable therein is the latch-like bolt 10 which is adapted to be projected into the cylinder, as in Fig. 1, by spring 11 confined against the outer end of the bolt by the cap nut 12. The location of the bolt is preferably such as to engage the outer extremity of the piston when the latter is fully retracted, as in Fig. 1, the inner end of the bolt being beveled at 10' to pass the piston on the backward stroke of the latter and automatically lock it at the completion of such stroke.

Intersecting the bolt cavity is a longitudinal recess 13 in cylinder 2 from which extends rod passage 14 to the forward end of the cylinder, and slidable in cavity 13 is the bolt-retracting stem 15 which extends through slot 16 in bolt 10. A spring 17 confined in the cavity behind the headed end of stem 15 holds the latter normally projected toward the forward end of the cylinder, as in Fig. 1, its position then being such as not to interfere with the piston-locking action of the bolt.

Stem 15 is formed with enlargement 18 having one end beveled at 18', so that when the stem is retracted against the pressure of spring 17 the wedging face of the enlargement, operating in bolt slot 6, retracts the bolt out of piston-engaging position, as in Fig. 2, the bolt being thus held until stem 15 is permitted to move under the pressure of spring 17, whereupon the bolt is again projected into locking position by spring 11. The bolt-retracting stem 15 is actuated by rod 19 movable in the rod cavity 14, the rod projecting through the forward extremity of the cylinder and engaging the usual external shoulder 20 of the tool 7, said shoulder

der being located at the juncture of the body of the rivet set or other tool and its shank portion.

Operation: Spring 17 being stouter than spring 11, stem 15, rod 19, and the tool are held normally in forwardly projected position, as in Fig. 1, with the bolt in engagement with the extremity of the piston. This is the position of the parts when the tool is not in actual use, as between riveting operations, etc. Hence, even though the throttle is opened accidentally or prematurely, it is impossible for the piston to pulsate, so that no portion of the tool is subjected to shock or jar. As soon, however, as the tool as a whole is presented to and pressed against the work, the forward movement of the cylinder relatively to the rivet set or other tool 7 causes a corresponding movement of the cylinder relatively to the rod 19, thereby retracting the bolt by forcing it over the wedging face of enlargement 18 and contracting spring 17, as in Fig. 2, and with the tool thus in working position the piston is free to pulsate when the throttle is opened. But the instant the tool is removed from the work, or the forward pressure by the operator incident to holding the tool is relaxed, spring 17 forces stem 15, rod 19, and the rivet set into forward position and releases the bolt, so that it is in readiness to lock the piston at the completion of the next backward stroke.

It will be understood that while I have illustrated and described a desirable and preferred adaptation of the invention, it may be variously embodied in pneumatic percussion tools of different kinds, and for performing a variety of work, without departing from the spirit of the appended claims.

I claim:—

1. The combination with the cylinder and blow-imparting piston of a portable pneumatic tool, of a lock device carried by the tool for holding the piston inoperative, and means actuated by pressure of the tool against the work for releasing the lock.

2. In a pneumatic tool, the combination of a cylinder, a blow-imparting piston movable therein, a lock device adapted to hold the piston inoperative, and lock-actuating means movable longitudinally of the cylinder and adapted to be operated by pressure of the cylinder toward the work for releasing the lock.

3. In a pneumatic tool, the combination of a cylinder, a blow-imparting piston movable therein, a lock device adapted to hold the piston inoperative, and lock-actuating means adapted to be operated by pressure on the cylinder toward the work for moving the lock out of piston-holding position.

4. In a pneumatic tool, the combination of a cylinder, a blow-imparting piston mov-

able therein, a bolt adapted to project into position to engage the piston and hold it inoperative, and a backwardly movable bolt-operating device normally projecting beyond the forward extremity of the cylinder and adapted to be moved rearwardly by pressure of the cylinder toward the work and operate the bolt.

5. In a pneumatic tool, the combination of a cylinder, a blow-imparting piston movable therein, a movable device carried by the tool and adapted to be moved by pressure of the tool toward the work, a piston lock, and an operative connection between said movable device and the lock.

6. In a pneumatic tool, the combination of a cylinder, a blow-imparting piston movable therein, a rod normally projecting beyond the forward end of the cylinder and movable longitudinally of the latter, a piston lock, and an operative connection between the rod and said lock for retracting the latter under pressure of the cylinder toward the work.

7. In a pneumatic tool, the combination of a cylinder, a blow-imparting piston movable therein, a spring-actuated piston-engaging bolt confined in the cylinder wall and normally projected into piston-engaging position, and a device adapted to be moved longitudinally of the cylinder by pressure of the cylinder toward the work, said device having wedging engagement with the bolt for retracting the latter.

8. In a pneumatic tool, the combination of a cylinder, a blow-imparting piston movable therein, a spring-actuated bolt confined in the cylinder wall and normally projected into piston-engaging position, a bolt-retracting device movable in the cylinder and a spring for holding said device normally extended toward the front end of the cylinder, said device when moved rearwardly adapted to retract the bolt, and means actuated by pressure of the cylinder toward the work for moving rearwardly the bolt-actuating device.

9. In a pneumatic tool, the combination of a cylinder, a blow-imparting piston movable therein, a spring-actuated lock confined in the cylinder wall and movable transversely of the cylinder and normally projected into piston-engaging position, a bolt-engaging wedge device movable longitudinally of the cylinder and adapted when moved rearwardly to retract the bolt, a spring for holding said device normally in forward position, and a rod movable longitudinally of the cylinder and adapted to be moved rearwardly by pressure of the cylinder toward the work and moving rearwardly with it the bolt-operating device.

10. In a pneumatic tool, the combination of a cylinder, a tool movably mounted at the forward end of the cylinder, a piston in the

cylinder for imparting blows to the tool, a piston lock, and a lock-releasing device adapted to be actuated by movement of the cylinder relatively to the tool when the latter is pressed against the work.

11. In a pneumatic tool, the combination of a cylinder, a tool movably mounted at the forward end of the cylinder, a piston in the cylinder for imparting blows to the tool, a piston lock, a rod movable longitudinally of the cylinder and adapted to engage the tool and be moved rearwardly by movement of the cylinder relatively to the tool when the latter is pressed against the work, an operative connection between the rod and lock for retracting the latter when the rod is moved by the tool, a spring for moving the lock into piston-holding position, and a spring for holding the rod normally in forward position.

12. In a pneumatic tool, the combination of a cylinder, a blow-imparting piston movable therein, the cylinder wall formed with intersecting longitudinal and transverse recesses, a piston lock movable in the transverse recess, a lock-actuating device movable in the longitudinal recess and adapted when moved in one direction to permit the lock to move into piston-holding position and when moved in a reverse direction adapted to retract the lock, and means for operating the lock-actuating device.

13. In pneumatic tool, the combination of a cylinder, a blow-imparting piston movable therein, the cylinder formed with intersecting longitudinal and transverse recesses, a slotted piston lock movable in the transverse recess, a spring for moving the lock

into piston-holding position, a wedge-shaped device movable in the said longitudinal recess and extending through the lock slot and adapted when in forward position to permit the lock to move into piston-holding position and when moved rearwardly adapted to retract the lock, a spring for holding the lock-actuating device normally in forward position, and a rod adapted to be moved rearwardly by pressure of the cylinder toward the work and thereby actuate said device to retract the lock.

14. In a pneumatic tool, the combination of a cylinder, a blow-imparting piston movable therein, a lock device movable in the cylinder wall and adapted to hold the piston when the latter is retracted, and lock-actuating means.

15. In a pneumatic tool, the combination of a cylinder, a blow-imparting piston movable therein, a lock device movable in the cylinder wall and adapted to engage the outer extremity of the piston when the latter is retracted, a tool movably mounted at the forward end of the cylinder and adapted to receive blows from the piston, and a lock-releasing device carried by the cylinder and engaging the tool and adapted to be operated to release the lock by forward movement of the cylinder relatively to the tool when the latter is pressed against the work.

In testimony whereof I affix my signature in presence of two witnesses.

HARRY S. HUNTER.

Witnesses:

J. M. NESBIT,
F. E. GAITHER.