



# UNITED STATES PATENT OFFICE.

JOHN C. CAMPBELL, OF CHICAGO, ILLINOIS, ASSIGNOR OF TWO-THIRDS  
TO CLINTON C. MURPHY AND JOHN H. ALLEN, OF CHICAGO, ILLINOIS.

## PNEUMATIC TOOL.

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*To all whom it may concern:*

Be it known that I, JOHN C. CAMPBELL, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Pneumatic Tools, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

In the use of pneumatic hand-tools, and more particularly in the use of pneumatic riveters or riveting-hammers, there is great danger of the accidental shooting out of the plunger and of the rivet-set with consequent liability of loss of these parts and of injury to persons who may be struck thereby.

The object of the present invention is to provide improved means for preventing the accidental shooting out of the plunger and of the rivet-set or other tool that may be operated by the plunger.

The invention consists in the features of novelty hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the claims at the end of this specification.

Figure 1 is a view in side elevation, showing my invention as applied to a pneumatic riveter. Fig. 2 is a view in central longitudinal section. Fig. 3 is a detail plan view of one of the clamps with which the springs are connected. Fig. 4 is a view in side elevation, showing a modified form of the invention.

While the invention is shown as applied to a pneumatic riveter or riveting-hammer, it is obviously susceptible of use in connection with other similar tools, and I do not wish the invention, therefore, to be understood as restricted to the specific use shown and described.

A designates the body or cylinder of the riveter, to the upper end of which a handle B is connected in the usual manner. The cylinder A is fitted with a piston C, adapted to reciprocate within the cylinder A. The operation of the piston C within the cylinder will be effected by compressed air, and the admission of the air to the cylinder will be controlled

by suitable valve mechanism in a manner that will be readily understood by those familiar with this class of devices. The compressed air will be admitted through a suitable channel in the handle B, this channel connecting with an air-hose, as well understood. Inasmuch as the mechanism for operating the piston forms no part of the present invention, I do not deem it necessary to particularly describe the same, since it will be readily understood that this invention is susceptible of use regardless of the particular means that may be employed for controlling the movements of the piston within the body or cylinder of the device. As shown, the outer end of the cylinder A is provided with a bushing or nozzle D, within which fits the stem of the rivet-set E.

The construction and operation of the above-described parts are well understood by those conversant with this class of tools. The admission of air to the cylinder is controlled by a trigger *b*, located in the handle B, and in the absence of my invention if the trigger *b* should be accidentally operated, as by striking against some object or by catching in the clothing of the operator, the piston C would be shot from the cylinder, carrying with it the rivet-set E. In order to guard against such accidental shooting of the piston and rivet-set, I provide the means hereinafter described; but I wish it distinctly understood that while I set forth what I regard as the preferred form of the invention I do not wish the invention—so far, at least, as concerns its broad features—to be understood as restricted to the details of construction hereinafter set forth.

As shown, the rivet-set E is provided around its head with the usual annular groove or channel *e'*, and at this point the set is encircled by a clamp F, having ears *f* and *f'*, through which pass the bolts *f<sup>2</sup>* and *f<sup>3</sup>*, respectively. The bolt *f<sup>2</sup>* serves to hold the sections of the clamp F securely upon the rivet-set and passes through the eye *g* at the end of a coiled spring G, while the bolt *f<sup>3</sup>* passes through the eye *g'* of a similar coiled spring G'. The upper ends of the coiled

springs G and G' are formed, respectively, with elongated loops or eyes  $g^3$  and  $g^4$ , through which pass the bolts  $k$  and  $k'$  of the clamp or ring K. This clamp or ring K is similar to the clamp or ring F and encircles the body or cylinder C above the expanded portion adjacent its end. The bolt  $k$  serves to hold the clamp or ring K in position, passing, as this bolt does, through the ears  $k^2$ . Obviously the ring K might be formed in half-sections, in which case the bolt  $k$ , passing, as it does, through the ears  $k^4$ , would also serve in uniting the sections of the ring. From the foregoing description it will be seen that when the parts are in position for use, as shown, the piston will serve to operate the rivet-set in the usual manner, the long slots at the upper ends of the springs G and G' allowing for the usual movement of the rivet-set. If by accident the trigger in the handle should be tripped at a time when the set is not upon the work, the springs G and G' would take up the shock of the blow of the piston on the inner end of the rivet-set and would prevent the set and piston from being shot out of the cylinder.

It is obvious that the broad feature of the invention—viz., the provision of a yielding retaining device for the rivet-set—may be employed in many forms besides the construction shown in the drawings. Thus, for example, the connections between the clamps or rings F and K may, as shown in Fig. 4 of the drawings, be simple rods R, having loops or eyes at their ends, and in such case a single coil-spring S may be interposed between the clamp or ring K and the upper shoulder of the expanded portion  $a$  of the cylinder, such spring encircling the cylinder. In other ways also the invention may obviously be modified without departing from its scope.

I am aware that it has heretofore been the practice to provide a spring-latch at the end of the body or casing of a pneumatic tool, said spring-latch having its free end adapted to engage with the shoulder on the tool or set, and thus prevent the tool or set from dropping out of the casing; but in such prior device the spring-latch does not have its opposite ends secured, respectively, to the casing and to the tool or set and is not adapted to retain the tool or set against accidental displacement by the blow of the piston. On the contrary, the retaining-latch of the prior devices is necessarily light and freely yielding in order to permit the operator to insert or remove the tool or set.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In apparatus of the character described, the combination with the body and with the tool or set, of a yielding connection upon the outside of the body and extending between and secured at its opposite ends to the body

and the tool or set respectively and arranged to retain said tool or set against accidental displacement by the blow of the piston.

2. In apparatus of the character described, the combination with the body and with the tool or set, of plural yielding connections arranged at different points upon the outside of the body and having their inner ends fastened to said body and their outer ends fastened to the tool or set and arranged to retain the tool or set against accidental displacement by the blow of the piston.

3. In apparatus of the character described, the combination with the body and with the tool or set, of a yielding connection having its opposite ends secured respectively to the body and to the tool or set, said yielding connection comprising plural springs arranged at different points upon the outside of the body and serving to retain said tool or set against accidental displacement by the blow of the piston.

4. In apparatus of the character described, the combination with the body and with the tool or set, of a plurality of coiled springs arranged upon the outside of the body and interposed between the body and the tool or set and serving to retain the tool or set against accidental displacement.

5. In apparatus of the character described, the combination with the body and with the tool or set, of a yielding connecting device for preventing the accidental displacement of said tool or set under the blow of the piston, comprising a spring and a lost-motion connection having its opposite ends secured respectively to the body and to said tool or set.

6. In apparatus of the character described, the combination with the body and with the tool or set, of clamps connected respectively to said body and to said tool or set upon their exterior surfaces and lost-motion connections between said clamps.

7. In apparatus of the character described, the combination with the body and with the tool or the set, of a clamp secured to said body, a clamp secured to said tool or set and means yieldingly connecting said clamps.

8. In apparatus of the character described, the combination with the body and with the tool or set, of clamps upon said parts and connections extending between said clamps, said connections comprising coiled springs.

9. In an apparatus of the character described, the combination with the body having a piston and having an unobstructed opening at its free end through which the tool may be withdrawn and having a tool provided with a shank setting within said opening, of a yielding retaining device having its ends secured respectively to the tool and to the body and arranged to hold the tool against accidental displacement by the blow of the piston.

10. In apparatus of the character described,

the combination with the cylinder and a plunger within said cylinder, said cylinder being provided at its free end with an opening through which said plunger may be withdrawn, a tool setting within the free end of the cylinder, of a clamp connected to the head of said tool, a clamp connected to the out-

side of the cylinder adjacent its free end, and spring mechanism located between said clamps.

JOHN C. CAMPBELL.

Witnesses:

ALBERTA ADAMICK,  
LILLIAN PRENTICE.