

May 31, 1949.

C. F. BOYER

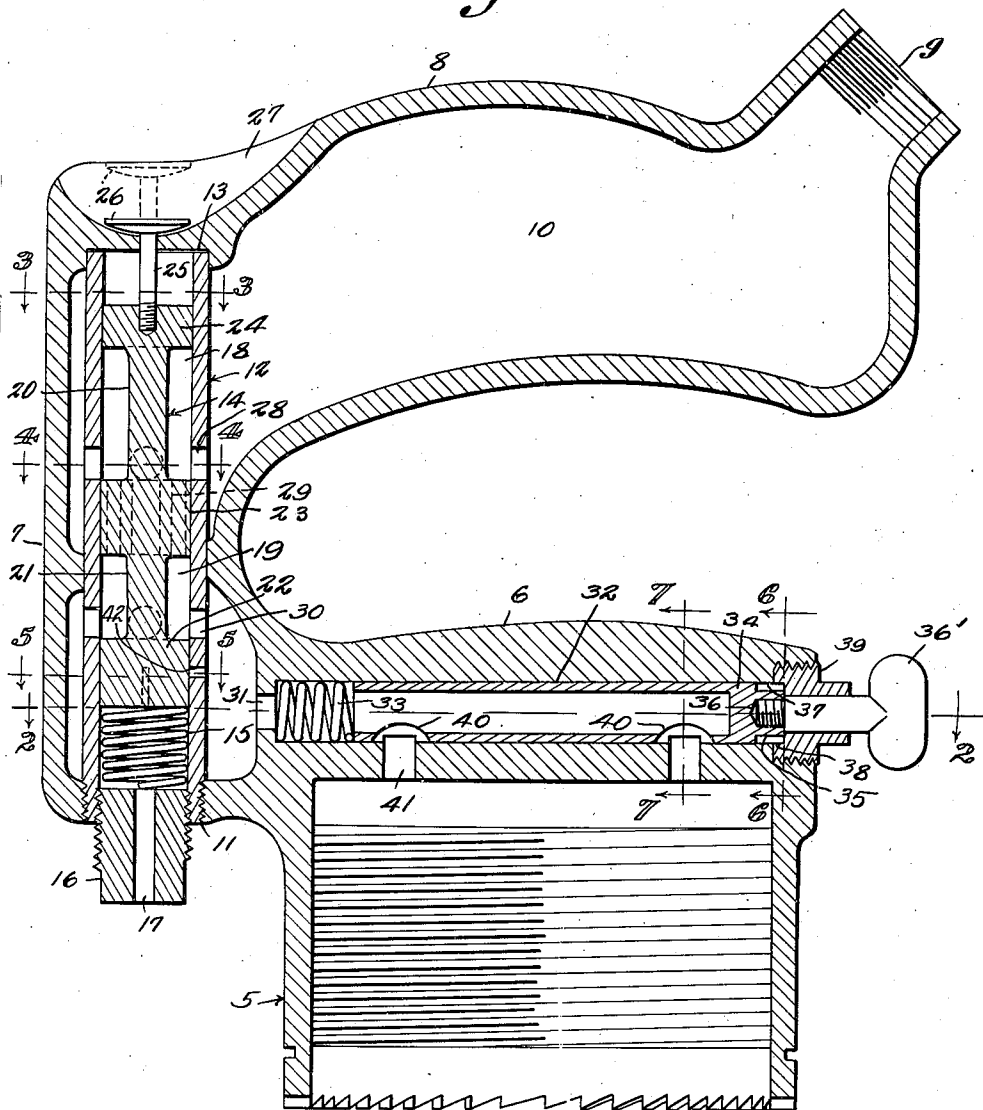
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SAFETY DEVICE FOR PNEUMATIC TOOLS

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2 Sheets-Sheet 1

*Fig. 1.*



*C. F. Boyer*

INVENTOR

BY *Chas. H. Co.*  
ATTORNEYS.

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C. F. BOYER

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2 Sheets-Sheet 2

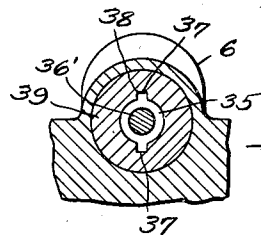
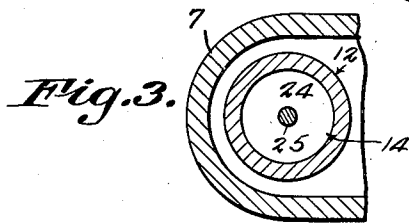
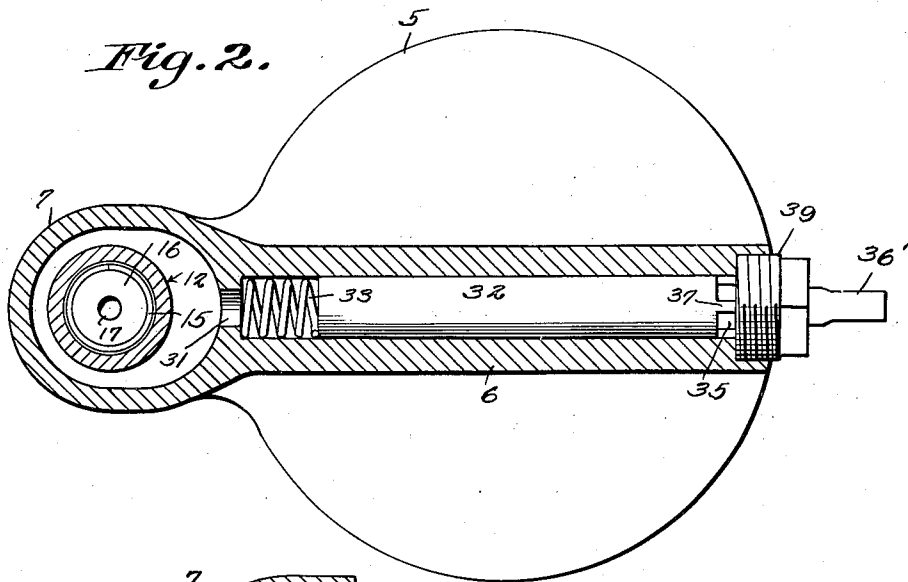


*Fig. 6.*

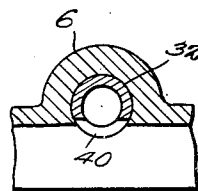
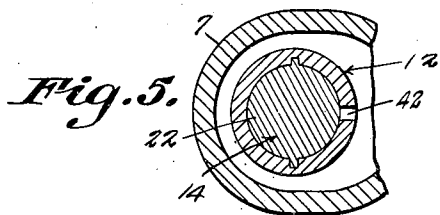
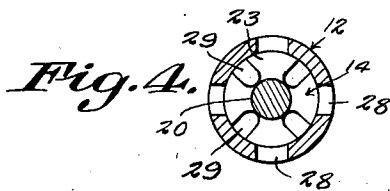


*Fig. 7.*

*C. F. Boyer*

INVENTOR

BY *C. F. Boyer & Co.*  
ATTORNEYS.

## UNITED STATES PATENT OFFICE

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## SAFETY DEVICE FOR PNEUMATIC TOOLS

Charles F. Boyer, Allentown, Pa.

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## 1 Claim. (Cl. 121—35)

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This invention relates to safety appliances for pneumatic tools, and more particularly, has reference to improvements, in the nature of safety devices, in the construction of pneumatic riveters or chipping machines, or related pneumatic tools.

By way of background, it is pointed out that pneumatic riveters as presently constructed are provided with an air valve lever that projects from the grip of the tool to a dangerous extent. It is well known to those skilled and of long experience in the art that the present arrangement has resulted in many persons being seriously injured, and even killed. It has frequently happened that a riveting machine will be accidentally jarred from its position in which left by the operator, by someone accidentally tripping over the air supply hose leading to the tool, or by reason of some similar accidental occurrence. When this occurs, the projecting lever presently used in these tools is frequently jarred to operative position, by the tool being pushed against some other object. The tool is thus likely to rebound, since it is not being held, and strike nearby persons, or throw them off balance.

The primary object of the invention is to provide a pneumatic tool of the character described which will be so constructed and arranged that accidents of the type stated above can not occur. It is proposed to attain this object by reason of the provision of a novel type of safety lever construction, which will be incapable of being moved to operative position except by the operator of the tool himself.

It is a further object of the invention to provide a pneumatic tool in which the customary air valve and cylinder embodied therein are so arranged as to serve the additional function of reinforcing and strengthening the tool, so that it will not tend to break as easily, and in the weaker portions of the tool, as is presently the case.

Another important object of the invention is to provide a novel shut-off valve arrangement so designed as to provide an additional safety feature, that will provide positive means of preventing air from entering the barrel of the tool, when the tool is not in use.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts, hereinafter more fully described and pointed out in the claim, it being understood that changes may be made in the construction and arrangement

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of parts without departing from the spirit of the invention as claimed.

Referring to the drawings:

Figure 1 is a longitudinal, vertical, sectional view through a pneumatic tool constructed in accordance with the invention.

Figure 2 is a view taken substantially on line 2—2 of Figure 1.

Figure 3 is a view taken on line 3—3 of Figure 1.

Figure 4 is a view taken on line 4—4 of Figure 1.

Figure 5 is a view taken on line 5—5 of Figure 1.

Figure 6 is a view taken on line 6—6 of Figure 1.

Figure 7 is a view taken on line 7—7 of Figure 1.

Referring to the drawings in detail, the reference character 5 designates generally the head of the tool, which is of conventional formation, and is internally threaded for the purpose of receiving one end of the barrel (not shown).

The other end of the head 5 is closed, except for openings to be described hereinafter, and extended transversely across the closed end of the head is a tubular member 6, which is preferably formed integral with the head 5, and with the handle 7 of the tool, that extends from one end of the tubular member 6 in a direction away from the head 5, and which is formed at its other end with the customary grip 8. The grip 8 is formed at one end with an opening 9 which is threaded in order to receive a coupling (not shown) with an air supply hose.

The grip 8 is further formed so as to be hollow from end to end, thus defining an air chamber 10 through which air entering the tool from the air supply hose moves, thereafter entering the handle 7, tubular member 6, head 5, and finally, the barrel.

The handle 7 is also formed hollowly from end to end, and at one end is in communication with the air chamber 10. At its other end the handle 7 is formed with a threaded opening 11. Extended through this opening, and extending longitudinally of the handle 7 is the air valve cylinder 12, which is preferably of cylindrical formation, and is formed so as to be open at both ends. One end of the air valve cylinder 12 is threaded for engagement by the threaded opening 11 of the handle 7. The other end of the air valve cylinder 12 is seated in a recess 13 formed in the opposite end of the handle 7. This construction is clearly shown in Figure 1,

and it is seen that by reason of this construction, the air valve cylinder 12 is immovably and firmly positioned in the handle 7.

Slidable in the air valve cylinder 12 is the air valve of the tool, which has been generally designated by the reference character 14. As shown in Figure 1, the air valve 14 is shorter in length than the air valve cylinder 12. One end of the air valve 14 abuts against one end of a coil spring 15 which is inserted in the air valve cylinder 12. The other end of the spring 15 is engaged by the inner end of the plug 16, that is threaded into the end of the cylinder 12. The plug 16 is formed with a longitudinal bore 17 that communicates at one end with the interior of the cylinder 12, and at the other end with the atmosphere, this bore being in the nature of an air release outlet, to be described in greater detail hereinafter.

The air valve 14 is formed with cutaway portions 18 and 19, and since the air valve 14 in blank is cylindrical in form, the formation of these cutaway portions results in their defining stems 20 and 21 respectively, a valve head 22 at one end, an intermediate closure member 23, and a valve head 24 at the other end.

The valve head 24 is formed with a central opening, which is threaded for receiving the stem 25 of the thumb lever 26, the stem 25 extending through an opening in the closed end of the handle 7, in which opening it fits snugly for slidable movement relative to the handle.

As shown clearly by Figure 1, the thumb lever 26 is seated in a relatively deep and elongated recess 27, which is proportioned to receive the thumb of the operator of the tool. The full line position of the thumb lever 26 illustrates the position taken by the lever when it is being held in operative position by the thumb of the user, that is, in position to permit air to move through the tool to the barrel. The dotted line position illustrates the position taken by the thumb lever 26 when it is in normal or inoperative position. As clearly shown by the drawing, when the thumb lever is in inoperative position, that is in the position assumed when the valve is closed, it is in no way projected beyond the wall or surrounding crest of the recess 27.

Intermediate the ends of the air valve cylinder 12, there are formed in the wall of the cylinder inlet ports 28. The formation and arrangement of the inlet ports is particularly well shown in Figure 4. These ports are adapted to be closed upon movement of the intermediate closure member 23 of the air valve 14. By reference to Figure 1, it is seen that the tendency of the spring 15 to expand will normally cause the air valve 14 to be slidably moved within the air valve cylinder 12, in a direction to cause the closure member 23 to close the inlet ports 28. In this position of the air valve 14, the thumb lever 26 is in the dotted line position illustrated.

When, however, the thumb lever 26 is depressed by the user as shown in the full line position of Figure 1, the inlet ports 28 are uncovered, and air may enter the cylinder 12.

When the air so enters the cylinder 12, it is forced through a plurality of longitudinal slots 29 formed in the intermediate closure member 23 of the air valve 14, these being particularly well illustrated in Figure 4. The air then moves through outlet ports 30 formed in the wall of the cylinder 12, and enters the opening 31 communicating between the handle 7 and tubular member 6. Movably positioned in the adjacent bore of the tubular member 6 is the sleeve or safety shut-

off valve 32. One end of the sleeve 32 is open, and is engaged by the spring 33 which is interposed between said end of the sleeve, and the adjacent end of the tubular member 6. The other end of the sleeve 32 is closed, as shown at 34, and from this closed end is extended a socket 35, that is formed with a threaded opening 36 in which is engaged one end of a key 36'. The outer wall of the socket 35 is provided with opposed lugs 37, that are receivable in slots 38 formed in the inner end of the plug 39 that is threaded into one end of the tubular member 6, and closes the bore formed in said member at that end.

Intermediate its ends, the sleeve 32 is formed with openings 40, that are adapted to be brought into communication with openings 41 provided in the closed end of the head 5. The particular formation and arrangement of my safety shut-off valve is such that when it is closed by the operator, it can not be accidentally opened. It is to be noted that in the operation of this valve, the user must first push the key 36' inwardly, in order to disengage the lugs 37 from the slots 38 formed in the inner wall of the plug 39. Having so disengaged the lugs 37, the key 36' may then be rotated, in order that the openings 40 will be brought out of register with the openings 41, the openings 41 thereby being closed off by the wall of the sleeve 32. Thus, no air can enter the barrel of the tool. It may be noted that by rotation of the key 36', the lugs 37 are then brought to bear against the inner wall of the plug 39, and the key 36' is effectively prevented from being forced outwardly under the force of the spring 33, until it has been rotated so that the lugs 37 may enter the slots 38, at which time, the spring 33 will automatically force the key 36' outwardly and hold it in such position.

As a further safety measure, it is to be noted that the thumb lever 26 is so proportioned, and so arranged relative to the tool and within the deep recess 27, that it would be exceedingly difficult for the lever to be jarred into operative position, or once jarred into operative position, to be retained therein. At the same time, it is conveniently accessible to the operator, whenever the tool is to be used.

The function of the air release opening 17, of course, is to permit air which has already entered the barrel to be expelled from the tool when the thumb lever 26 is released, shutting off the supply entering the tool from the air hose. To this end, I provide a release port 42 in cylinder 12. When the thumb lever 26 is depressed, this port is closed by the valve head 22. When, however, the thumb lever is released, valve head 22 uncovers the release port while closing the outlet ports 30. There is thus provided immediate communication between the atmosphere and the barrel, through the release port 42, spring chamber, and air release opening 17.

Another novel feature to be noted in my pneumatic tool is the fact that the air valve and cylinder means are positioned in the handle 7, rather than in the grip 8, as has been heretofore the common practice in the art. This novel arrangement results in the handle 7 being considerably reinforced, thereby making the danger of its breaking far less than has previously been the case. It is well known that previously, the handle 7 of a pneumatic tool of the type described will quite often break intermediate its ends, under pressure exerted by the user in operating the tool. This has been probably the weak-

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est part of the tool, and by reason of the arrangement of parts of the tool as described herein, it is seen that this portion of the tool will be considerably reinforced by the presence therein of the cylinder 12 and air valve 14.

What is claimed is:

In a pneumatic tool including a head, a grip, and a handle connecting the head and grip, a cylinder mounted in the handle, a plug in one end of the cylinder, the plug having an air release opening and the cylinder having an air release port near said end and having air inlet and outlet ports, an air valve slidable in the cylinder and grooved to define heads at opposite ends of the valve and a medially positioned closure member, the closure member and one head respectively adapted in one extreme position of the valve to open the inlet and outlet ports, said head in said position of the valve closing the air release port, and in the other extreme position to close the inlet and outlet ports while opening the air release port, a spring between said head of the valve and the plug and adapted to normally retain the valve in the second named position, a stem connected to the other head,

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the handle having an opening at one end and the stem being slidably positioned through the opening, and a thumb lever on the stem and comprising means for shifting the valve to its other extreme position.

CHARLES F. BOYER.

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