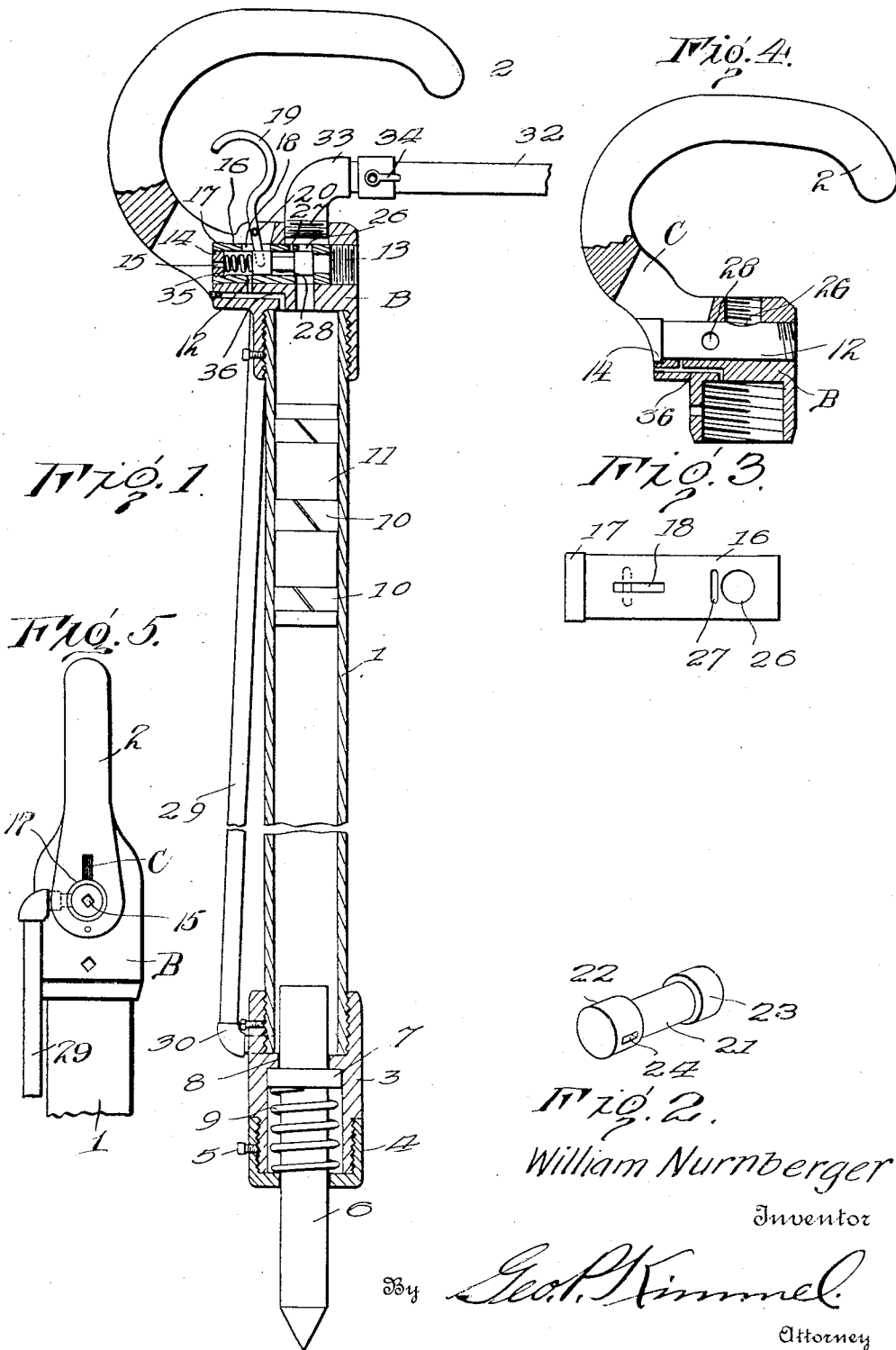


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RIVET BREAKER.
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WILLIAM NURNBERGER, OF HUNTINGTON, WEST VIRGINIA.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM NURNBERGER, a citizen of the United States, and resident of Huntington, in the county of Cabell and State of West Virginia, have invented certain new and useful Improvements in Rivet-Breakers, of which the following is a specification.

The invention relates to pneumatic tools of the reciprocating type, wherein the hammer piston impacts directly on the shank of the working tool and consists more particularly, though not exclusively in the provision of a novel arrangement of air passages for controlling the piston.

The primary object of the invention is the provision of a hammer of this character, which will permit the direct action of the compressed fluid of the piston, thus giving a stronger and quicker response thereof upon the operation of the controlling valve.

A still further object of the invention is to provide a hammer of this character, wherein the controlling valve is associated with the handle and being of such a construction as to cause but a single impact of the piston, and automatic return of the same upon each actuation and release of the valve.

It further consists of a novel construction of a pneumatic hammer having means associated therewith for quickening the action of the piston and means for returning the same.

It further consists of a hammer including means for securing the handle to the cylinder and having a trigger associated with the handle permitting the operation of the controlling valve at will.

Other features of advantage and construction will more clearly hereinafter appear in the detailed specification.

For the purpose of illustrating the invention, there is shown in the accompanying drawing, one form thereof, which is at present preferred, since the same will give in practice satisfactory and reliable results, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

In the accompanying drawing:

Figure 1 is a sectional elevation of a pneu-

matic hammer constructed in accordance with the invention.

Fig. 2 is a detailed perspective view of the valve used in connection with the invention.

Fig. 3 is a plan view of the valve cylinder.

Fig. 4 is a fragmentary vertical sectional view through the head showing the valve removed and the point of connection of the tube 29 therewith.

Fig. 5 is a fragmentary edge elevation showing in detail the connection of the pipe 29 with the head.

Similar reference characters indicate corresponding parts throughout the several views in the drawing.

Referring to the drawing in detail, the pneumatic tool constructed in accordance with the invention comprises a piston cylinder 1 to which is connected a suitable handle 2. An extension 3, in the form of a coupling is provided in threaded engagement with the lower end of the cylinder 1. A cap member 4, having an aperture in the end thereof, is threadedly engaged with the extension 3. A set screw 5 is engaged in the cap member 4 to insure a positive retention of the cap member relative to the extension as upon the operation of the piston and the impact caused thereby the said cap member would have a tendency to become loosened.

The working tool 6 is provided with an annular shoulder 7 on the shank thereof which is adapted to engage an internal flange 8 formed in the extension to limit the inward movement of the working tool. A coiled spring 9 is provided within the extension and cap member and surrounds the working tool so as to play against the shoulder 7 to normally retain it in engagement with the flange 8 and at the same time provide a cushioning means for the piston 8 and a return for the same.

A plurality of piston rings 10 are mounted upon a floating piston 11 which is slidably mounted in the cylinder 1, and is adapted at times to engage the end of the shank 6 of the working tool. It is to be understood that a suitable rubber washer may be used in lieu of the spring. A head constituting the valve block B in its entirety is mounted on the upper end of the cylinder 1 and is in threaded engagement therewith. A transversely extending opening or bore 12

is provided in the valve block, one end of the opening or bore being threaded to receive a plug 13, while the opposite end is formed with a shoulder 14. A valve cylinder 16 is mounted in the transversely extending opening or bore 12 and is provided with an enlargement 17 on one end thereof to abut the shoulder 14, the cylinder being frictionally held in the head. Within the end of the cylinder 16 having the enlargement 17 is a plug 15. A longitudinally extending opening 18 is provided in the valve cylinder 16 and this opening provides a way for the trigger 19, which is pivotally connected to the handle as at 20 and also forms an exhaust passage. A valve 21 is slidably mounted in the cylinder 16 and is provided with spaced enlarged portions forming heads 22 and 23 on the ends thereof for a purpose which will be hereinafter described.

A recessed portion 24 is provided in the head 22 to loosely receive the free end of the trigger. A circular opening 25 provided in the valve cylinder 16 is adapted to receive the compressed fluid and direct the same at times into engagement with the piston when the valve is actuated. The transversely extending opening 27 is provided to at times permit the compressed air to be directed into the space between the heads of the valve 21 when closed and from there into the tubular member 29 which communicates with the cylinder 16 through port 28, the member being also connected with an angle coupling 30 to the extension provided on the opposite end of the cylinder.

It is thus obvious that when the air is directed through the tube member 29 the piston is automatically returned to the upper portion of the cylinder 1 and is thus in position to be directed again onto the working tool. The supply pipe 32 is connected to the valve block by means of the angle coupling 33. A cutoff valve 34 is provided in the supply pipe 32 to permit the reduction or a complete cutoff of the fluid when desired.

A pneumatic cushioning means is provided and includes an exhaust port to prevent the back kick of the piston after its driving action which is common in the standard forms of rivet breakers now in use. The piston on its return stroke must necessarily exhaust the compressed fluid that actuated the same on its driving motion, which exhaust is retarded to some degree and the return of the piston at this time provides the cushioning. It will be seen that on the down stroke of the piston in the cylinder 1 the air in advance of the piston will pass outwardly through pipe 29 into the space between the heads of the valve 21 and said space at this time is coincident with the slot 18 which latter aligns with the cutaway portions C in the handle, and exhausts to the

atmosphere, the down stroke of the piston being effected by the opening of the valve 21.

The operation of the improved rivet breaker tool is as follows:

Upon each actuation of the trigger 19 the head 23 of the valve is moved away from the opening 26 permitting the compressed fluid to act directly upon the piston 11 and actuate the working tool 6, after which the coiled spring 35 which acts against one end of the valve automatically returns the latter to a position, so that the head 23 will engage the opening 26, thus completely sealing said opening and permitting the compressed air to pass through the aperture 27 and the port 28 as above described, then through the tube member 29 into the lower end of the cylinder for the return of the piston. It is, of course, to be noted that an exhaust channel 36 is provided in the valve block to receive the air from the upper portion of the cylinder 1 upon the up stroke of the piston so that the air in said upper portion of the cylinder can pass into the atmosphere for the exhaust thereof. On the up stroke of the piston 11 the air above the same in the cylinder 1 passes upwardly through the passage 36 into the valve cylinder rearwardly of the valve, which is now in closed position so that the said air can escape through the slot 18 and the cutoff portion C to the atmosphere. When the valve is shifted to uncover the opening 26 the portion 23 thereof will close the port 27 so that air will be shut off from the tube member 29 for its entry into the lower portion of the cylinder 1, as will be apparent.

It will be obvious that I have devised a novel and useful construction of a pneumatic tool, which embodies the features of advantage enumerated as in the statements of the invention and the above description; and while I have, in the present instance shown and described a preferred embodiment thereof, which will be found in practice to give satisfactory and reliable results, it is to be understood that the same is susceptible of modification in various parts, as come properly within the scope of the appended claim, without departing from the spirit of the invention, or sacrificing any of its advantages.

What is claimed is:

In a pneumatic tool, the combination of a piston cylinder having threaded ends, an extension in threaded engagement with one end of the cylinder, a head detachably engaged with the opposite threaded end of the cylinder and forming a valve block having a transverse bore in communication with the piston cylinder, a valve cylinder mounted in the head and having a threaded end, a removable plug engaged in the threaded end of said valve cylinder, said valve cylinder

having a slot and double openings in its upper portion, a double headed valve slidably mounted in the valve cylinder and having one of its heads alternately opening and closing said double openings, a trigger 5 pivotally mounted in the head and working through the slot for connection with the valve to actuate the same, and a compressed fluid supply means connected with 10 the head for establishing communication through the openings in the valve cylinder with the piston cylinder and the space in said valve cylinder between the heads of the valve, and a tube leading from the valve cylinder to the lowermost portion of the 15 piston cylinder, said valve head having a cutaway portion accommodating the trigger and communicating with the slot in the valve cylinder for establishing communication between the same and the atmosphere. 20

In testimony whereof I affix my signature hereto.

WILLIAM NURNBERGER.