R. T. SCOTT.

PNEUMATIC HAMMER.

APPLICATION FILED NOV. 7, 1910.

1,003,154. Patented Sept. 12, 1911.

2 SHEETS—SHEET 1.

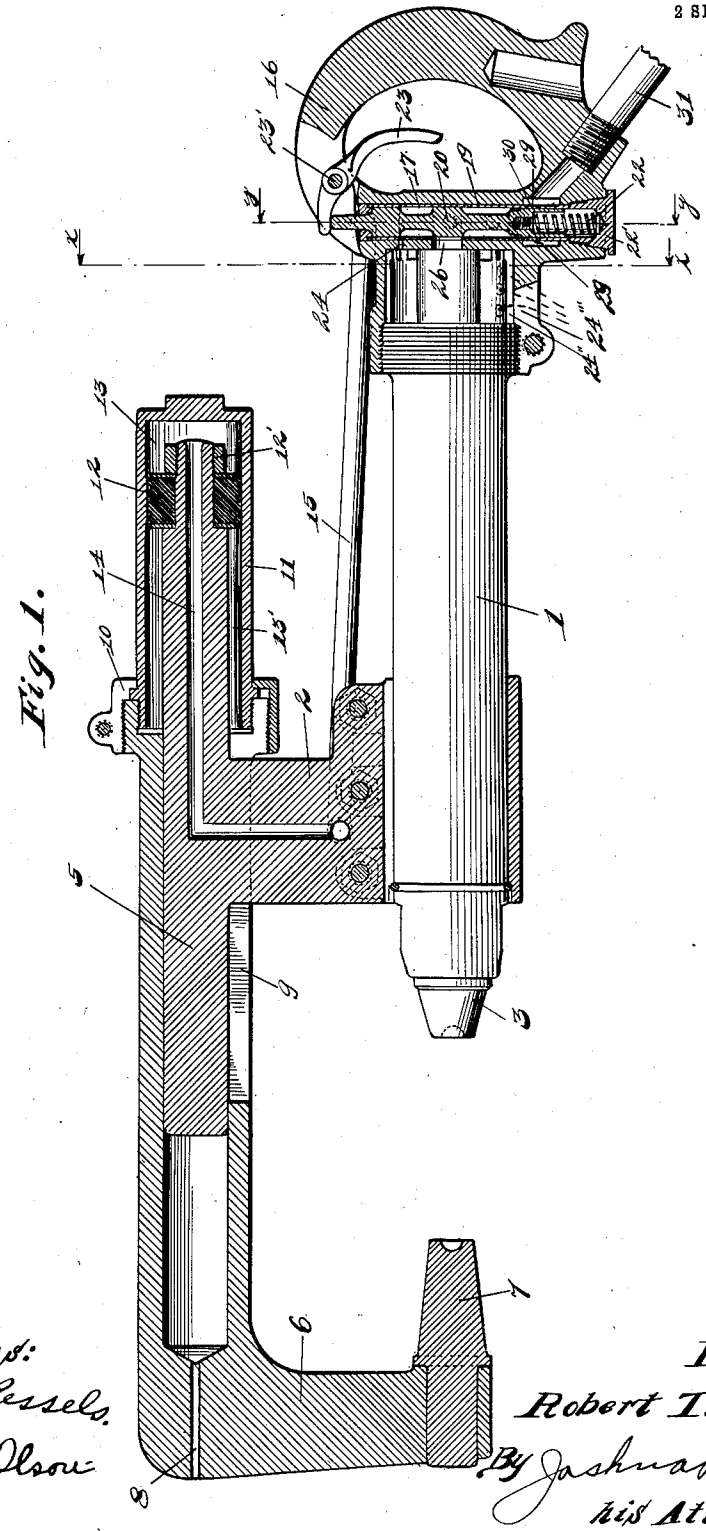

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 1.

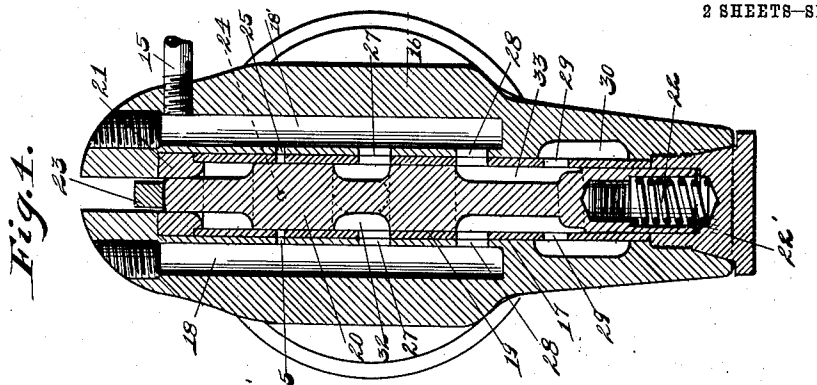


Fig. 3.

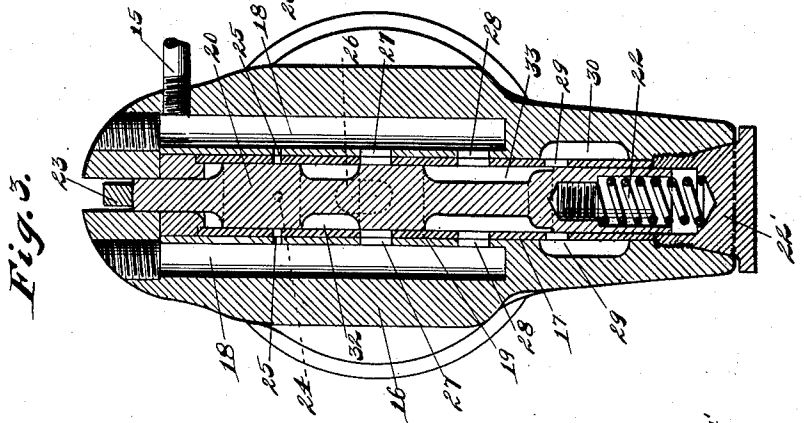
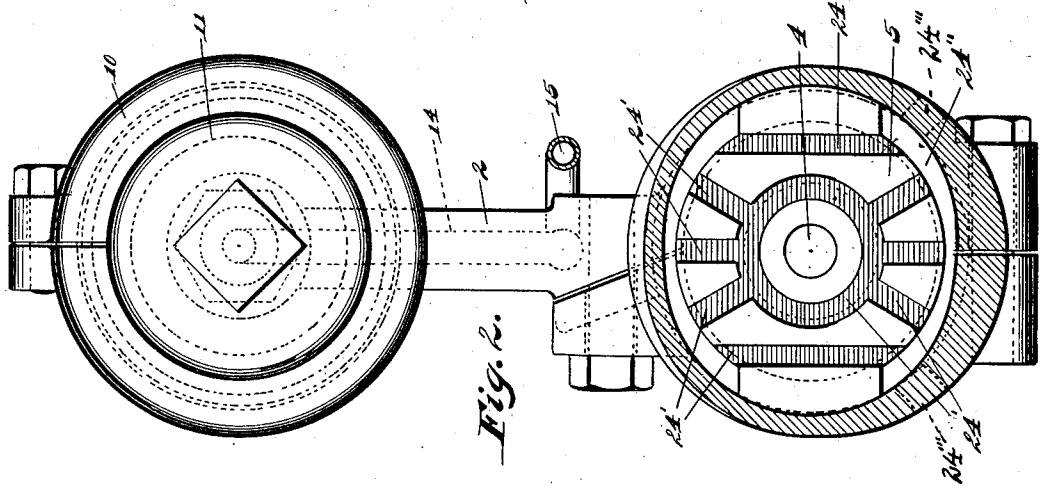


Fig. 2.



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UNITED STATES PATENT OFFICE.

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PNEUMATIC HAMMER.

1,003,154. Specification of Letters Patent. Patented Sept. 12, 1911.

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To all whom it may concern:

Be it known that I, ROBERT T. SCOTT, a citizen of the United States, and a resident of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Pneumatic Hammers, of which the following is a specification.

My invention relates to improvements in pneumatic hammers and has for its object the production of a hammer of this character in which will be provided an anvil or work-holding means adapted, when the tool is in operation, to maintain the proper relation of the work to the hammer or plunger of the latter, and to withstand the blows of the plunger directed upon the work.

A further object is the production of a device of the character mentioned which will be of durable and economical construction and efficient in operation.

Other objects will appear hereinafter.

With these objects in view my invention consists in a pneumatic hammer characterized as above mentioned and in certain details of construction and arrangements of parts all as will be hereinafter more fully described and particularly pointed out in the appended claims.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification and in which,

Figure 1 is a substantially central longitudinal section of a pneumatic hammer embodying the preferred form of my invention, Fig. 2 is an enlarged transverse section taken on substantially line *x*—*x* of Fig. 1, and Figs. 3 and 4 are enlarged transverse sections taken on substantially line *y*—*y* of Fig. 1, the valve piston of the compressed air controlling valve being shown in different positions in said sections.

The preferred form of my invention as illustrated in the drawings comprises a pneumatic hammer 1 which may be of any ordinary or preferred design, the same being rigidly held in a frame 2, said frame, as will be observed, being permitted to embrace said chamber at its lower end and for securely clamping the same therein. At the forward extremity of the hammer 1 is the plunger 3 of the latter which is adapted, upon the admission of compressed air through the opening 4 at the rearward extremity of said hammer to be operated or reciprocated in the usual manner.

The frame 2 is substantially T-formed, and upon the upper transversely extending portion 5 thereof is slidably mounted a holder 6 carrying an anvil 7, the latter being arranged coaxially with the plunger 3 of the hammer. An air vent 8 provided in the forward extremity of the holder 6 serves an obvious purpose, the under side of the longitudinally extending tubular portion of said holder being longitudinally slotted as at 9 for the accommodation of the depending portion of the frame 2 when the anvil holder is slid upon the latter. Secured by means of a union 10 to the rearward extremity of the holder 6 is a cylinder-forming extension or cap 11, the forward extremity of the latter being threaded in the rearward extremity of said holder. Carried at the rearward extremity of the rearwardly extending portion 5 of the frame 2 is a piston 12 locked in position thereon by means of a nut 12′. Said piston snugly fits within the cylinder-forming member 11 permitting, however, of reciprocatory movement of the latter. With this arrangement it will be seen that upon admission of air under pressure to the chamber 13 formed at the rearward side of the piston 12, said air will operate upon the rearward head of said chamber, that is of the member 11 to effect the rearward movement of the holder 6 upon the frame 2 and hence movement of the anvil 7 toward the plunger 3. The chamber 13 at the front side of the piston 12 communicates, as will be observed, at its forward extremity with the rearward end of slot 9 so that no resistance will be afforded to the return movement of the cylinder-forming member 11 upon the piston 12. Formed in the frame 2 is a passage 14 communicating at its rearward extremity with the chamber 13 and at its opposite extremity with the forward extremity of a rearwardly projecting pipe 15.

Secured rigidly upon the rearward extremity of the hammer 1 is a handle-forming member 16. Formed in said member 16 is a central vertically extending cylindrical opening 17 and at opposite sides of said opening 17 adjacent thereto parallel chambers 18 and 18′, the chamber 18′ communicating with the rearward extremity of the pipe 15, as clearly shown in Figs. 3 and 4. Fixed in the opening 17 is a snugly fitting

tubular valve casing 19 in which is slidably mounted the valve piston 20. Upward movement of said valve piston 20 is limited by a block 21, said piston being normally held in engagement with said block, that is at its upward terminal of movement in the casing 19 by means of a compression spring 22, the latter being secured in position by means of a screw plug 22′ threaded in the under side of the member 16 coaxial with the opening 17. Downward movement or sliding of the piston 20 may be effected manually through the medium of a trigger 23 which is pivoted at 23′ in the handle member 16, said trigger being arranged, as will be observed, so that the lower end thereof may be readily engaged by the fingers when the handle 16 is engaged by the hand.

Communicating at its rearward extremity with the interior of the valve casing 19 adjacent the upper extremity thereof is a forwardly projecting passage 24 which communicates at its forward extremity with grooves 24′ formed in the rearward extremity of the hammer 1, said grooves 24′ communicating at their lower extremities with a channel 24″ formed in the end of the handle member 16, said channel 24″ communicating with openings 24‴ formed in the under side of said forward end portion of said handle member. Thus it will be seen that communication is established between the passage 24 and the outside atmosphere so that air admitted to said passage from the interior of the valve casing 19 will be exhausted. Arranged coplanar with the passage 24 are similar laterally extending passages 25 which communicate at their outer extremities with the chambers 18 and 18′, as clearly shown in Figs. 3 and 4. Extending forwardly from the interior of the valve casing 19, the same being longitudinally spaced from the passages 24 and 25 is a larger passage 26 which registers at its forward extremity with the compressed air admission opening 4 at the rearward extremity of the hammer 1. Arranged substantially coplanar with the passage 26 are laterally extending passages 27 which communicate at their outer extremities with chambers 18 and 18′. Arranged below the passage 27 and separated therefrom are laterally extending openings 28 which communicate at their outer extremities with the chambers 18 and 18′, the inner extremities of said passages communicating with the interior of the valve casing 19. Formed in said valve casing below the passages 28 and spaced therefrom are laterally extending openings 29 which communicate with an annular chamber 30 formed in the handle member 16 adjacent the lower extremities of said valve casing. The chamber 30 is in open communication with the forward extremity of an air supply pipe 31, which is threaded as shown in the handle member 16, the opposite extremity of said pipe 31 being connected with any suitable source of compressed air supply.

Formed in the outer surfaces of the valve piston 20 are two annular longitudinally separating grooves 32 and 33. Said grooves are so positioned in said valve piston that when the latter is in its normal position as shown in Fig. 1, the groove 32 will communicate only with the inner extremities of the passages 24 and 25, the groove 33 communicating only with the inner extremities of the openings 29. Hence with this construction it will be seen that when the device is not in use or when the trigger is not engaged compressed air will not be admitted to the hammer 1, the compressed air fed to the handle member 16 through the pipe 31 not being permitted to pass beyond the chamber 30 since the openings 29 leading therefrom are closed by the lower end of the valve piston 20. Therefore under normal conditions the hammer will be inert. The groove 32 establishing communication between the passages 24 and 25, and open communication between the chamber 13 in the anvil holder and the outside atmosphere will evidently be established, so that free movement of said anvil holder will be permitted. Upon lowering the valve piston, through the medium of the trigger 23 to the position shown in Fig. 3, the groove 32 will be moved from communication with the passages 24 and 25, the inner ends of said passages being closed by the upper end of said valve piston so that exhaust from the chamber 13 will be prevented. When said valve piston is so positioned the lower end of the groove 33 will be brought into communication with the openings 29, said groove establishing a communication between said openings and the passages 28. This being so it will be seen that communication will be established between the compressed air supply and the pipe 15 and hence the chamber 13. The admission of compressed air to said chamber 13 will effect, as before described, the movement of the anvil 7 toward the plunger 3 or to a position against the head of the rivet to be acted upon by said plunger. In this position of the valve piston no communication will have been established between the hammer 1 and the compressed air supply since the passages 27 will still be covered by said valve piston as clearly shown in Fig. 3. Upon further depression of said valve piston to the position shown in Fig. 4 the groove 32 will be brought to a position in which the same will establish communication between the passages 27 and the passage 26 which leads to the hammer 1. In this position of the valve piston a communication will therefore obviously be established between said

hammer 1 and the compressed air supply pipe and also between the latter and the pipe 15 and hence the chamber 13.

In using the device the same is first arranged in proper position relative to the rivet to be acted upon. The trigger 23 is then actuated to depress the valve piston 20 to the position shown in Fig. 3. This being done the rivet will be securely clamped between the anvil 7 and the plunger 3, such clamping being effected by the effect of the compressed air which is admitted to the chamber 3 upon such positioning of the valve piston 20. The trigger 23 will then be pulled still farther to effect the complete depression of the valve piston, in which event compressed air will be admitted to the hammer to effect the reciprocating operation of the plunger 3 with the result desired. Upon completing the upsetting operation of the rivet the trigger will be released, whereupon the valve piston 20 will be returned to normal position by means of the spring 22. Upon said valve piston returning to normal position communication will be established, as before described, between the chamber 13 and the outside atmosphere permitting of the exhaust of compressed air therefrom, consequently effecting the release of the anvil 7 and permitting of the removal of the tool for further operation.

A tool of the construction set forth is durable and economical, the same is of great efficiency in operation, and is not susceptible to readily becoming inoperative.

While I have shown what I deem to be the preferable form of my device I do not wish to be limited thereto as there might be various changes made in the details of construction and arrangements of parts described without departing from the spirit of the invention as comprehended within the scope of the appended claims.

Having described my invention what I deem as new and desire to secure by Letters Patent is:

1. In a device of the class described, the combination of a frame; a pneumatic hammer secured rigidly in said frame; a compressed air supply pipe communicating with said hammer; an anvil coaxial with said hammer and mounted in a holder movable upon said hammer frame, said holder being adapted upon the admission of compressed air thereinto to carry said anvil toward said hammer; and means governing the compressed air passages to said hammer and said anvil holder adapted when operated to admit compressed air first to said holder and then to said hammer, substantially as described.

2. In a device of the class described, the combination of a frame; a pneumatic hammer secured rigidly in said frame; a compressed air supply pipe communicating with said hammer; a manually operable valve governing the passage of air from said supply pipe to said hammer; an anvil coaxial with said hammer and mounted in a holder movable upon said hammer frame, said holder being adapted upon the admission of compressed air thereinto to carry said anvil toward said hammer, said before mentioned valve governing the passage of air to said anvil holder so that in the operation of said valve compressed air will be admitted first to said holder and then to said hammer, substantially as described.

3. In a device of the class described, the combination of a frame; a pneumatic hammer secured rigidly in said frame; a compressed air supply pipe communicating with said hammer; an anvil coaxial with said hammer and mounted in a holder movable upon said hammer frame, said holder being adapted upon admission of compressed air thereinto to carry said anvil toward said hammer, there being a passage establishing communication between said anvil holder and said compressed air supply pipe; and a manually operable valve governing both of said before mentioned passages, said valve being adapted in normal position to establish communication between said holder and the outside atmosphere, the same being adapted when operated to admit compressed air first to said holder and then to said hammer, substantially as described.

4. In a device of the class described, the combination of a frame; a pneumatic hammer secured rigidly in said frame; a compressed air supply pipe communicating with said hammer; an anvil coaxial with said hammer and mounted in a holder movable upon said hammer frame; a cylinder formed in one end of said holder; a piston mounted in said cylinder and fixed to said hammer frame whereby compressed air admitted to said cylinder effects the movement of said anvil frame and anvil toward said hammer, there being a compressed air supply passage communicating with said cylinder; and a manually operable valve governing said passages so that in the operation of said valve compressed air will first be admitted to said anvil holder and then to said hammer, substantially as described.

5. In a device of the class described, the combination of a frame; a pneumatic hammer secured in said frame; a compressed air supply pipe communicating with said hammer; a valve having a manually slidable valve piston governing the passage of air from said supply pipe to said hammer; an anvil coaxial with said hammer and mounted in a holledr slidable upon said hammer frame; a cylinder in one end of said holder; and a piston mounted in said cylinder and fixed to said hammer frame whereby com-

pressed air admitted to said cylinder effects the movement of said anvil frame and anvil toward said hammer, there being a compressed air passage establishing communication between said cylinder and said compressed air supply pipes, said passage being governed by said before mentioned valve, said valve being adapted when said valve piston is in normal position to establish communication between said cylinder and the outside atmosphere and when said valve piston is operated to admit compressed air first to said cylinder and then to said hammer, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT T. SCOTT.

Witnesses:
HELEN F. LILLIS,
JOSHUA R. H. POTTS.