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1,461,460

R. C. SCHROTH, JR. ET AL

POWER HAMMER

Filed June 10, 1920

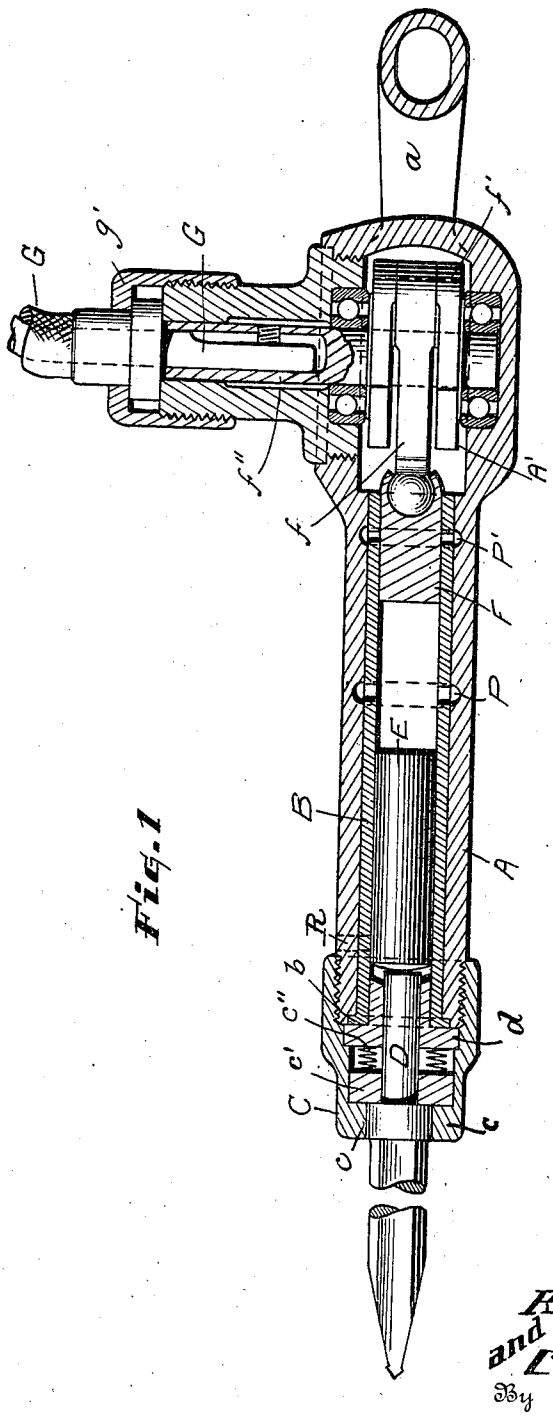


Fig. 1

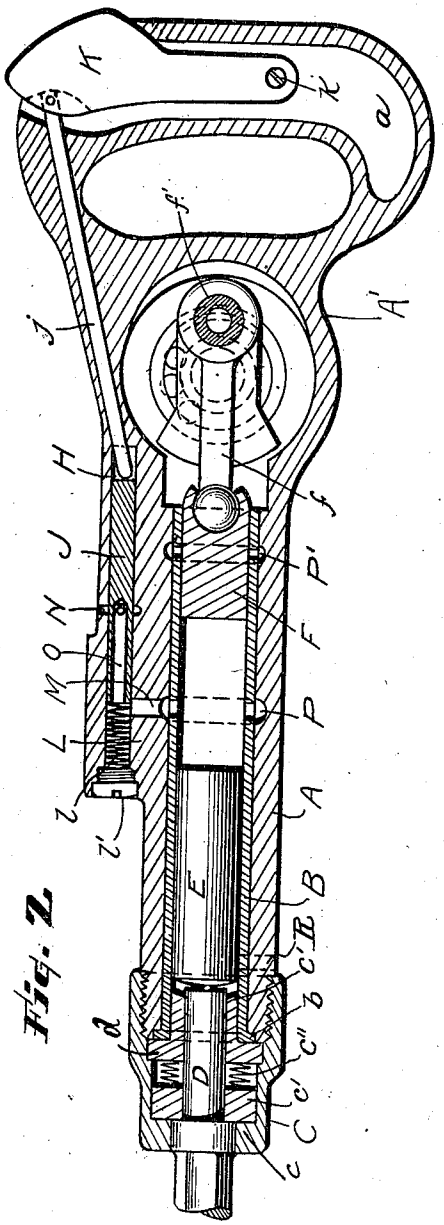


Fig. 2

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UNITED STATES PATENT OFFICE.

ROBERT C. SCHROTH, JR., OF NEW YORK, N. Y., AND CLAUDE A. HERMAN, OF BRIDGEPORT, CONNECTICUT.

POWER HAMMER.

Application filed June 10, 1920. Serial No. 387,839.

To all whom it may concern:

Be it known that we, ROBERT C. SCHROTH, Jr., a citizen of the United States, and resident of New York City, in the county of New York and State of New York, and CLAUDE A. HERMAN, a citizen of the United States, and resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Power Hammers, of which the following is a specification.

This invention relates to new and useful improvements in power hammers wherein the power is conveyed through the medium of a rotating flexible shaft to a reciprocating plunger and from the reciprocating plunger or piston to the impact tool through an air cushion.

The object of this invention is to provide a construction as outlined in which the vibration and jar is entirely eliminated in so far as the operator is concerned through the arrangement of an air cushion between the power and the tool.

Other objects reside in the particular construction and arrangement of parts hereinafter more specifically described and claimed.

Reference will be had to the accompanying drawings forming a part of this specification and wherein like reference characters designate corresponding parts throughout the several views, in which:—

Fig. 1 is a transverse vertical sectional view and

Fig. 2 is a longitudinal transverse sectional view.

In the drawing the casing is represented by the character A and is cylindrical in form, being provided with the internal sleeve B to form a suitable lining for the moving parts. It will be seen that an annular shoulder is formed in the lower end of the casing A for the reception of the external annular flange *b* formed on the lower end of the sleeve B. The upper end of the casing A is provided with crank casing A′ for the reception of a drive mechanism more fully hereinafter described, and terminates in the handle *a* in which is arranged the trigger mechanism.

The lower end of the casing A is formed with external screw threads for the attachment of the cap C including the tool socket, which is of cylindrical construction and has an inwardly projecting annular shoulder *c* that engages and guides the tool D. Within this cap C is positioned the cushion member *c′* and a guide block *d*, the latter being seated against an annular shoulder of the cap and projecting into the internal sleeve or cylinder B. The shank of the tool D is supported in the aligned central holes of these guide members *c′* and *d*, the shoulder of the tool being positioned against the cushion member *c′* while the free end extends through the block *d* to contact with the reciprocating free piston E. The cushion member *c′* is loosely mounted in the cap C and upon the shank of the tool D and is normally held against the shoulder of the tool by means of the springs *c″* to better take up the recoil of the stroke of the tool. Conventional ports R through the casing A and sleeve B are for an obvious purpose.

This free piston E is operated by the movement of the piston F, which latter is connected through the piston rod *f* with the crank shaft *f′*. For driving the crank shaft *f′* any suitable source of power may be provided and the power transmitted therefrom by means of the shaft G, the end of which is enclosed in the casing *g′*. The end of this drive shaft is connected to the crank shaft by any suitable means and in the present instance the end of the crank shaft denoted by *f″* is formed with a socket in which the end of the drive shaft is seated by means of the screw shown.

It will be seen that at L there is an enlarged offset portion of the casing having longitudinal bore H in which is arranged the slide valve J connected to the trigger K arranged in the handle and heretofore mentioned. The link *j* which connects the slide valve J and the trigger K is arranged for longitudinal movement so that pressure on the trigger K will cause a forward movement of the slide valve against the tension of the spring *l*. The spring *l* is seated in the lower end of the bore and contacts with the lower end of the valve and the adjustable screw *l′* which latter terminates the bore H.

The slide valve J includes a port 22 which at times serves to complete the passage from the interior of the casing to the atmosphere through the ports P, M and N. When this valve is shoved forward to close port O an airtight chamber is formed in the casing between the adjacent ends of the two pistons

E and F to provide an air cushion in said casing for a purpose more clearly hereinafter explained. The passage M terminates in the annular passage P and the latter communicates with the interior through a series of perforations formed in the inner sleeve or lining B. At P′ suitable oil ducts may be provided for the lubrication of the moving parts.

Referring more particularly to the operation it will be seen that through the driving shaft G movement of the crank shaft f′ and reciprocating piston F is secured. As long as the communication M is open to the atmosphere the reciprocation of the piston F will have no effect upon the free piston E. When, however, this communication is closed through the operation of the trigger K and the valve J the free piston E will receive the cushioned blow of the piston F upon its top end, which drives the other end against the shank of the tool D. Because of the air cushion formed in the chamber, between the two pistons all vibration or jar caused by the impact is entirely eliminated. When it is desired to stop the operation the trigger is released and the spring actuated valve will return to its normal open position to open the ports M, N and O to form a free passage from the cushion chamber to the atmosphere. It will also be apparent that the force of the blow can readily be controlled by simple adjustment of the valve and its trigger which in turn regulates the flow of air to or from the cushion chamber.

It will be quite obvious that numerous changes may be made in the details of construction without varying from the spirit of the invention.

What we claim as new and useful and desire to secure by Letters Patent, is:—

1. A power hammer comprising a crank, a cylinder enclosing said crank and provided with an air passage communicating with the interior through its wall, said cylinder further provided with an enlarged offset portion having a longitudinal bore, a positively driven piston for compressing and expanding the air in said cylinder, a free piston adapted to be operated by the compression and expansion of said air, a tool adapted to be actuated by said free piston, a slide valve arranged in said longitudinal bore and adapted to open and close said air passage, and means for operating said slide valve, said means including a trigger for moving said slide valve to the closing position of said air passage and a spring for moving said slide valve to the open position of said passage.

2. A power hammer including a cylinder having an air port and an enlarged offset portion having a longitudinal bore, a positively driven piston, a tool, a cushioning member for the tool, a free piston arranged between said positively driven piston and said tool, a slide valve in said longitudinal bore for closing said port whereby an air tight chamber is formed between the adjacent ends of the two pistons for the operation of said free piston, and means for operating said valve, said means including a trigger adapted to enter said longitudinal bore to move said valve against the action of a spring.

3. A power hammer comprising a crank, a cylinder enclosing said crank and provided with a chamber having a port, said cylinder further provided with a handle portion, a positively driven piston in said chamber, a free piston therein and adapted to actuate a tool, and means for forming an air cushion between said pistons or for destroying said air cushion, said means including a slide valve arranged in an offset portion of said cylinder and having a port communicating with the atmosphere and adapted to communicate with the port of said chamber, a spring for normally holding said ports in register whereby atmospheric air may enter said chamber, and a trigger adapted to cause the port of said chamber to be closed, said trigger arranged in said handle portion.

Signed at Bridgeport in the county of Fairfield and State of Connecticut this 9th day of June, A. D. 1920.

ROBERT C. SCHROTH, JR.
CLAUDE A. HERMAN.

Witnesses:
C. M. NEWMAN,
LILLIAN M. ALLING.