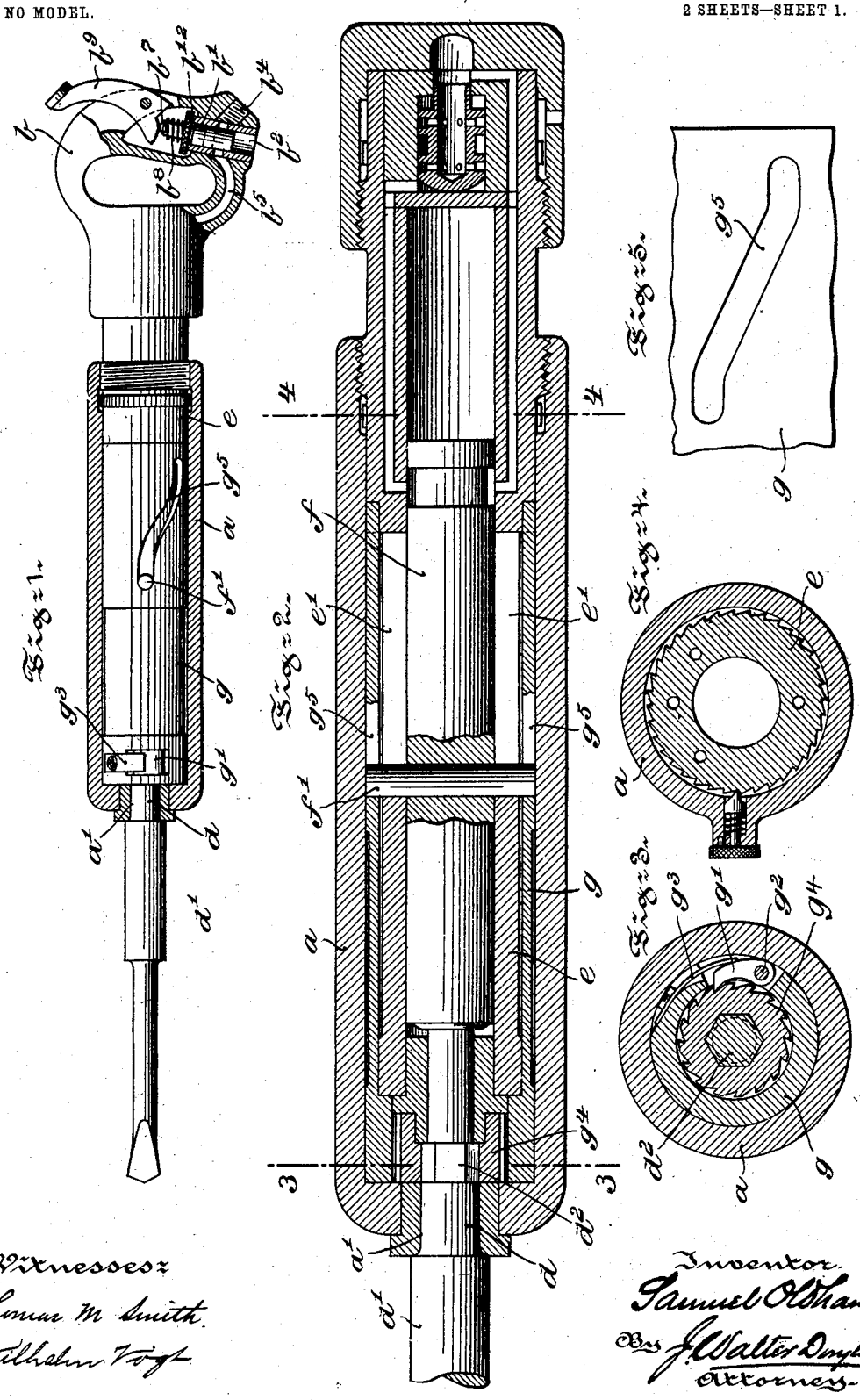
No. 739,440. PATENTED SEPT. 22, 1903.

S. OLDHAM.

IMPACT TOOL.

APPLICATION FILED OCT. 21, 1902.

NO MODEL. 2 SHEETS—SHEET 1.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 6.

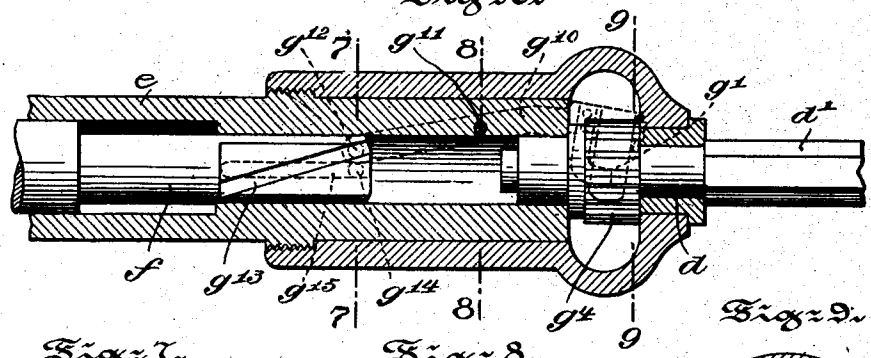


Fig. 7.

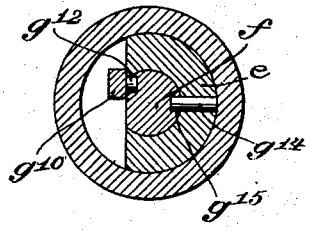


Fig. 8.

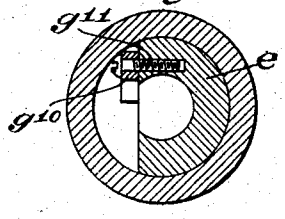


Fig. 9.

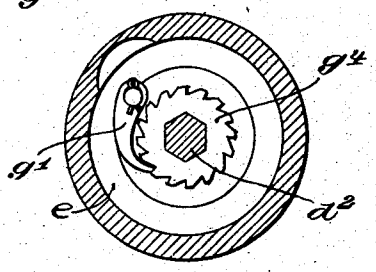


Fig. 10.

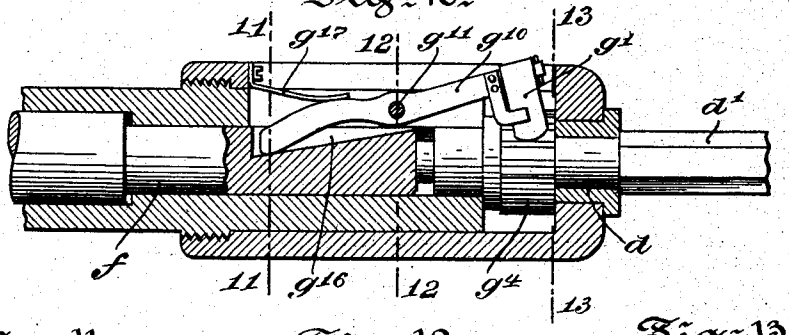


Fig. 11.

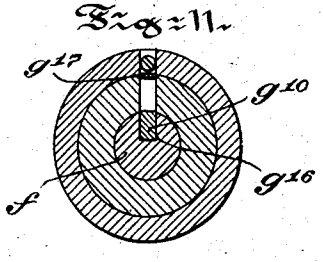


Fig. 12.

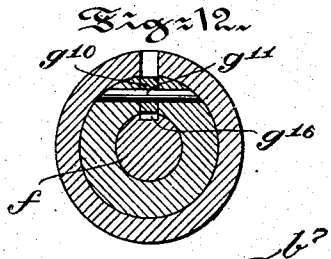


Fig. 13.

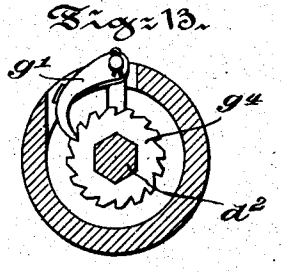
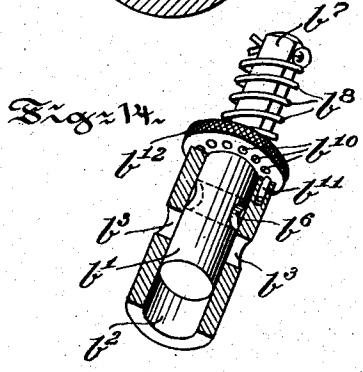


Fig. 14.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 739,440. Patented September 22, 1903.

UNITED STATES PATENT OFFICE.

SAMUEL OLDHAM, OF FRANKFORD, PENNSYLVANIA.

IMPACT-TOOL.

SPECIFICATION forming part of Letters Patent No. 739,440, dated September 22, 1903.

Application filed October 21, 1902. Serial No. 128,108. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL OLDHAM, a citizen of the United States, residing at Frankford, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Impact-Tools, of which the following is a specification.

My invention has relation to that class of impact-tools in which a piston or hammer reciprocates in a cylinder and delivers on its downstroke a blow upon a tool; and in such connection it relates to the construction and arrangement of such a tool.

The principal object of my invention is to provide in a pneumatic tool or hammer, in conjunction with a reciprocatory piston, a tool-shank arranged in the path of and adapted to be struck by the piston upon its downstroke, a ratchet secured to the tool-shank, a means for turning the ratchet, and a mechanism controlled by the piston on its upstroke and arranged to operate said means.

The nature and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a side elevational view, partly in section, of an impact-tool embodying main features of my invention. Fig. 2 is an enlarged longitudinal sectional view of the main body of the tool. Figs. 3 and 4 are cross-sectional views taken, respectively, on the lines 3 3 and 4 4 of Fig. 2. Fig. 5 is a plan view of the cam-groove in the sleeve surrounding the piston or hammer. Fig. 6 is a longitudinal view of a modified form of mechanism for turning the tool-shank. Figs. 7, 8, and 9 are cross-sectional views taken, respectively, on the lines 7 7, 8 8, and 9 9 of Fig. 6. Fig. 10 is a view similar to Fig. 6, but illustrating a still further modified form of tool-turning mechanism. Figs. 11, 12, and 13 are cross-sectional views taken, respectively, on the lines 11 11, 12 12, and 13 13 of Fig. 10; and Fig. 14 is a perspective view, partly sectioned, of the throttle or cut-off valve for the tool.

Referring to Figs. 1 to 5 of the drawings, a represents the external casing of the tool, to one end of which is secured the operating-handle b. In the other end of this casing a is arranged the socket a', adapted to receive the shank d of a tool d'. Within the casing a is arranged the cylinder e, in which reciprocates a piston or hammer f. Between the casing a and cylinder e is provided a sleeve g, arranged to oscillate around said cylinder e. The lower end of the sleeve g has its periphery cut out to receive a pawl g', as clearly illustrated in Fig. 3. This pawl g' is pivoted, as at g^2, in the sleeve g and has a movement inward of the sleeve g under the influence of the spring g^3. The pawl g' is adapted to engage the teeth of a ratchet-wheel g^4, arranged within the sleeve g. This ratchet g^4 has a polygonal-shaped opening for the reception of a correspondingly-shaped extension or head d^2, formed on the tool-shank d. By so shaping the opening in the ratchet g^4 and the head d^2 of the shank d the tool may be readily inserted in the socket a' and ratchet g^4 and as readily removed therefrom. When inserted in said ratchet g^4, it is evident that the tool will turn with said ratchet. Motion is conveyed to the sleeve g, and consequently to the pawl g', as follows: The piston or hammer f is provided with a transverse pin or shaft f', working in longitudinal slots e' of the cylinder e. The pin or shaft f' projects beyond the cylinder e and enters cam-slots g^5 in the sleeve g, as illustrated in Figs. 2 and 5. The pin or shaft f' by preference projects diametrically through the piston f and each end traverses successively a straight slot e' of the cylinder e and a cam-slot g^5 of the sleeve g. In this instance the slots e' in the cylinder e and cam-slots g^5 in the sleeve g are diametrically arranged in respectively the cylinder and sleeve.

From this description it will be understood that the piston or hammer f reciprocates in a straight line in the cylinder e without turning therein and in its reciprocation the pin or shaft f' oscillates the sleeve g first in one direction and then in an opposite direction, the slots g^5 being arranged so that a predetermined throw of the sleeve results from a movement up or down of the pin f'. The oscillation of the sleeve g, say, from right to left, as illustrated in Fig. 3, causes the pawl to bear against the teeth of the ratchet g^4 and to turn said ratchet and the tool d' a predetermined distance. The oscillation of the sleeve g in an opposite direction causes the pawl g' to slide loosely on the teeth of the

ratchet g^4, and no movement of said ratchet or of the tool d takes place. It is desirable that the movement of the ratchet and tool should take place before the tool-shank d is struck by the hammer or piston f, and hence the slots g^5 are so arranged that the sleeve g oscillates to the left to turn through the pawl the ratchet g^4 upon the upstroke of the piston or hammer.

From the above description it will be readily understood that the to-and-fro or reciprocatory movement of the piston is transformed and transmitted by an oscillatory movement of the sleeve g into a step-by-step rotation of the ratchet g^4, and consequently of the tool d'. This rotation of the tool is of importance and desirable, for instance, in drilling holes in blocks of stone or metal, and, so far as I am aware, in this class of tools, in which the shank of the tool is separated from the piston and receives from time to time blows therefrom, said shaft has not been turned automatically by the movement of the piston or hammer.

In Figs. 6 to 9 an equivalent but modified form of mechanism for turning the ratchet g^4 and tool d' is illustrated. In this instance instead of a sleeve an oscillating lever g^{10} is used. This lever g^{10} carries the pawl g', which operates the ratchet g^4 and is pivoted intermediate of its ends, as at g^{11}, in the cylinder e. The inner end of the lever g^{10} is provided with a stud or button g^{12}, traveling in a cam-slot g^{13}, formed in the lower end of the piston f. A pin g^{14}, projecting inward from the cylinder e, enters a straight slot g^{15}, also formed in the lower end of the piston f and serves to prevent the piston turning during its reciprocation in the cylinder e.

In Figs. 10 to 13 the construction is similar to that illustrated in Figs. 6 to 9; but in this instance the inner end of the lever g^{10} rests in a straight slot g^{16}, the base of which is inclined. A spring g^{17}, bearing on the inner end of the lever g^{10}, presses said inner end down upon the inclined floor or base of the slot g^{16}. In the handle b of the tool is arranged a throttle or cut-off valve of improved construction. As preferably constructed it consists of a plug b', arranged to slide up and down in a tube b^2. The tube b^2 has two openings b^3 diametrically arranged and connecting the live-fluid inlet b^4 with the inlet b^5 in the handle of the tool. The plug b' also has a duct b^6 traversing it and adapted to register with the openings b^3 of the tube b^2 when depressed against the action of a spring b^8. The plug b' has a squared shank b^7, around which is coiled the spring b^8, this spring normally tending to withdraw the shank b^7 and plug b' from the tube. A trigger b^9 is arranged to bear on the shank b^7 and when depressed to force said shank b^7 and plug b' inward in the tube to cause the duct or opening b^6 of the plug to register with the opening b^3 in the sleeve b^2. On the squared shank b^7 is placed a collar b^{12}, having a series of holes b^{10} arranged to receive successively a pin b^{11}, projecting from the top or rim of the tube b^2. The collar b^{12} when turned will turn the plug b' and cause the duct b^6 to register more or less with the openings b^3 of the tube. When the required adjustment of the duct b^6 is obtained by the turning of the collar b^{12}, the collar is locked to the tube b^2 by causing the pin b^{11} to enter the appropriate hole b^{10}.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an impact-tool, a reciprocating piston, a cylinder wherein said piston is adapted to move, a tool-shank arranged in the path of and adapted to be struck by the piston upon its downstroke, a ratchet secured to the tool-shank, a pawl arranged to turn said ratchet in one direction and a mechanism located outside the cylinder and controlled by the piston in its upstroke, said mechanism arranged to operate the pawl and thereby turn the ratchet and tool-shank.

2. In an impact-tool, a tool-shank, a ratchet to which the tool-shank is secured, a pawl arranged to operate said ratchet to thereby turn the tool-shank, a cylinder, a piston reciprocating in said cylinder and arranged to strike the tool-shank on its downstroke, a sleeve located outside said cylinder and having a cam-groove, said sleeve arranged to turn on said cylinder, and a pin carried by said piston and arranged to enter the cam-groove of the sleeve, said pin traversing a straight groove in said cylinder.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

SAMUEL OLDHAM.

Witnesses:
J. WALTER DOUGLASS,
THOMAS M. SMITH.