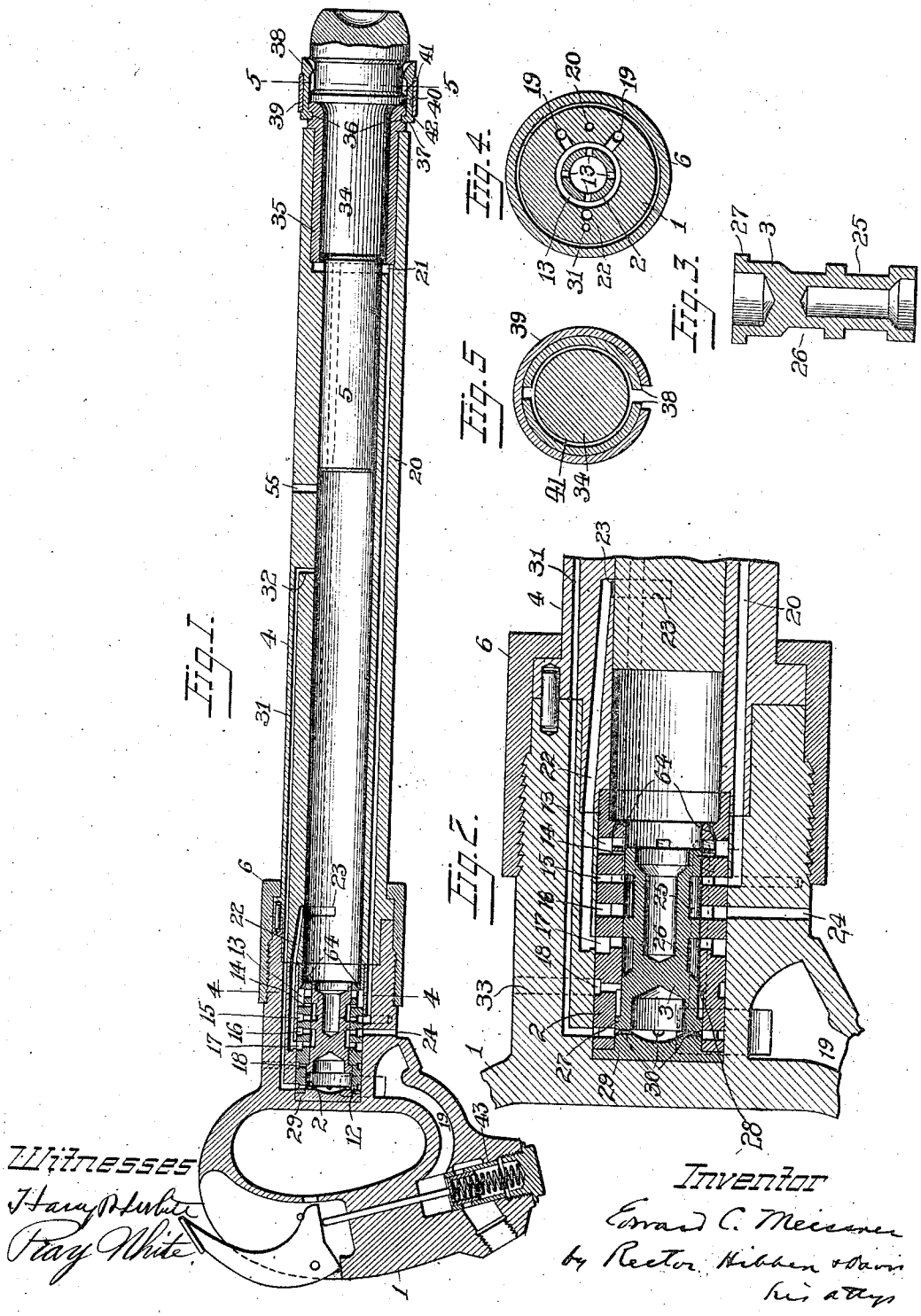
E. C. MEISSNER.

PNEUMATIC HAMMER.

APPLICATION FILED MAY 28, 1906.

1,028,124.

Patented June 4, 1912.



UNITED STATES PATENT OFFICE.

EDWARD C. MEISSNER, OF ST. LOUIS, MISSOURI, ASSIGNOR TO CHICAGO PNEUMATIC TOOL COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

PNEUMATIC HAMMER.

1,028,124. Specification of Letters Patent. Patented June 4, 1912.

Original application filed November 12, 1900, Serial No. 36,212. Divided and this application filed May 28, 1906. Serial No. 319,098.

To all whom it may concern:

Be it known that I, EDWARD C. MEISSNER, a citizen of the United States, residing at St. Louis, Missouri, have invented certain new and useful Improvements in Pneumatic Hammers, of which the following is a specification.

This invention relates to pneumatic hammers and to certain features of construction of the pneumatic hammer which is shown and described in an original application filed on November 12, 1900, Serial No. 36,212, of which application the present application is a division.

The present invention relates to certain advantageous features of construction and operation and consists, first, in the provision of a novel arrangement of exhaust which is supplemental to the main or regular exhaust, and second, in the provision of novel means for constantly admitting a restricted supply of the live air into the rear end of the piston chamber.

In the drawings, Figure 1 is a longitudinal section of a pneumatic hammer embodying my invention; Fig. 2 a section of the rear end of the cylinder and the handle socket and the parts therewithin, which section is enlarged as compared with the scale of Fig. 1; Fig. 3 a section of the valve alone; Fig. 4 a section on line 4—4 of Fig. 1; and Fig. 5 a section on line 5—5 of Fig. 1.

Referring to the embodiment of my invention as herein shown the hammer comprises a grasping handle 1, a barrel or cylinder 4 secured thereto in suitable manner as by means of a coupling sleeve 6, a piston 5 arranged to reciprocate in the cylinder, a valve bushing 2 in the socket portion of the grasping handle, a valve 3 within the bushing together with ports and passages governed by said valve for controlling the admission and exhaust of pressure to and from opposite ends of the cylinder for the reciprocation of the piston in the operation of the hammer.

The bushing 2 forms the chamber in which the valve 3 operates and is provided with a series of ports and circumferential grooves which register with certain ports and passages located in the socket of the handle and in the cylinder. The bushing is provided at its rear end with the series of ports and groove 12 and is provided intermediate of its length, beginning at a point near its forward end, with a series of circumferential grooves and ports marked respectively 13, 14, 15, 16, 17 and 18, which are arranged to register either with each other by means of grooves in the valve or to register with passages in the handle-socket as hereinafter explained. The groove and ports 13 are always exposed to the live air which is admitted from the source of supply past the throttle valve 43 and through the passage 19 in the handle, such passage being extended longitudinally of the handle-socket (as shown in dotted lines in Fig. 2) so as to emerge in the interior of such handle socket in position to register with the groove and ports 13. The ports 15 are in position to register with the rear end of a passage 20 extending longitudinally of the handle-socket and also of the cylinder and communicating with the forward end of the piston chamber through a port 21. The exhaust for the rear end of the piston chamber is in the form of a groove 23 which communicates with a passage 22 extending through the rear end of the cylinder and the forward end of the handle-socket and terminating in such handle-socket in a position to register with the groove and ports 17 in the bushing. This exhaust port or groove 23 is located forward of the valve bushing and at such a distance therefrom as to permit the piston on its rearward or return stroke to close such exhaust port or groove 23 before the end of such stroke and to thereupon compress the air between the rear end of the piston and the forward end of the valve with the result that such trapped air is compressed to a degree in excess of the normal or working pressure of the live air and caused to shift the valve rearwardly in a manner hereinafter more particularly explained. The exhaust groove 23 and exhaust passage 22 which leads to the groove or series of ports 17 are arranged to be placed in communication with the main or regular exhaust ports and passages 24 in the handle socket by means of the valve 3,

with the result that when the valve is in one position, in the present instance its forward position, the ports 17 are in communication with said exhaust port and passage 24.

The valve 3 is provided with two circumferential grooves 25 and 26, the former of which is arranged to control the admission and release of the compressed air to and from the forward end of the piston chamber, while the other groove 26 is arranged to control the exhaust of air pressure from the rear end of such piston chamber, the admission of air pressure to such rear end of piston chamber being controlled by the short end of the valve itself. This valve is of the differential type and in the present instance the larger pressure area is at the rearward end thereof, while the smaller pressure area is at the forward end and exposed to the rearward end of the piston chamber. As herein shown, the valve is made differential by the provision of an annular flange 27 at the rearward end thereof and to accommodate such enlarged end of the valve, the valve bushing 2 is counterbored at its rearward end for a distance substantially equaling the extent of travel or reciprocation of the valve, the forward stroke or movement of such valve being limited by the annular shoulder 28 at the bottom or end of such counterbore. The rearward end of the valve bushing is provided with a cap 29 which closes said bushing with the exception of a series of ports 30, which are arranged to communicate with the rearmost port or ports 12 in the valve bushing. The port 12 communicates with a port and passage 31 extending through the handle socket and longitudinally through the wall of the barrel or cylinder to a point intermediate the length of the latter and communicating with the piston chamber through a port 32, which is uncovered by the piston 5 so as to communicate with the piston chamber in the rear of the piston at a time just prior to the completion of the forward stroke of such piston and also to communicate with the forward end of such piston chamber in front of the piston after the latter has moved rearward but before the same has completed its rearward stroke. A vent or bleed opening 33 to the atmosphere is formed in the handle of the socket to permit of the free admission and exhaust of pressure in the counterbore in front of the annular flange 27 on the valve.

The front end of the cylinder or barrel is arranged to receive a sleeve or bushing 35 into which, in practice, is inserted the shank of the working tool which in the present instance is shown as a button or rivet-set 34, whose shank fits snugly within the sleeve or bushing 35. Inasmuch as it is desirable in a riveting hammer to have the rivet-set removably connected with the cylinder so as to practically form a part thereof when in use but at the same time to provide for sufficient play or longitudinal movement of one with respect to the other, I provide a clip device which, as shown, comprises a pair of substantially semi-circular pieces 38, preferably of sheet metal, which are provided at their rearward ends with inturned flanges 37 adapted to fit in a groove 36. This groove is here formed in the sleeve or bushing 35, inasmuch as the same projects beyond and in line with the front end of the barrel or cylinder proper, such bushing however, being practically a component part of the cylinder. The semi-circular pieces or sections 38 are held or clamped in place with a yielding pressure by means of a resilient split ring 39 of sheet metal which fits in groove 40 provided therefor on the outer surfaces of said pieces 38, whereby said pieces constitute clamping jaws for holding the rivet-set in operative position at the front end of the cylinder. In order to provide for the relative adjustment longitudinally between such rivet-set and the cylinder, I provide such jaws on their inner faces with a circumferential groove 41 and the rivet-set with an annular rib or flange 42 movable longitudinally in said groove. The rib and grooves above described are preferably beveled to facilitate the removal of the clip device and thereby facilitate the insertion and removal of the rivet-set or other tool. The shank of the rivet-set fits into the sleeve or bushing sufficiently tight to insure the return of the piston, but the rib 42 and groove 41 are arranged to permit a slight end-wise or longitudinal movement of the rivet-set in relation to the cylinder.

In addition to the main or regular exhaust through the port and passage 24 in the handle socket, I provide the hammer with a supplemental exhaust port which is independent of the main or regular exhaust as well as of the valve, such supplemental exhaust port being under the control of the piston. As herein shown, this supplemental exhaust is had through a port 55 extending through the wall of the cylinder near the front end thereof but far enough back to be uncovered by the piston in its forward stroke so as to freely exhaust the air pressure in the rear of the piston and to be uncovered by such piston shortly after the initiation of its return stroke, so as to exhaust the air pressure at the front end of the piston chamber in advance of the piston. By the provision of this supplemental exhaust port, which is thus capable of exhausting the air pressure directly to the atmosphere from the piston chamber on opposite sides of the piston, the exhaust of the air pressure at the proper times is facili-

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COMBINED ROUTER AND DIE SINKER.

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4 SHEETS—SHEET 1.

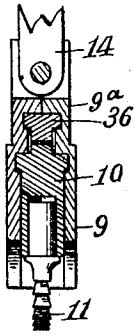

Fig. 10.

Fig. 1.

Witnesses

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