No. 775,784. PATENTED NOV. 22, 1904.

C. J. SMITH.

PNEUMATIC HAMMER.

APPLICATION FILED MAY 23, 1904.

NO MODEL.

Fig. 1.

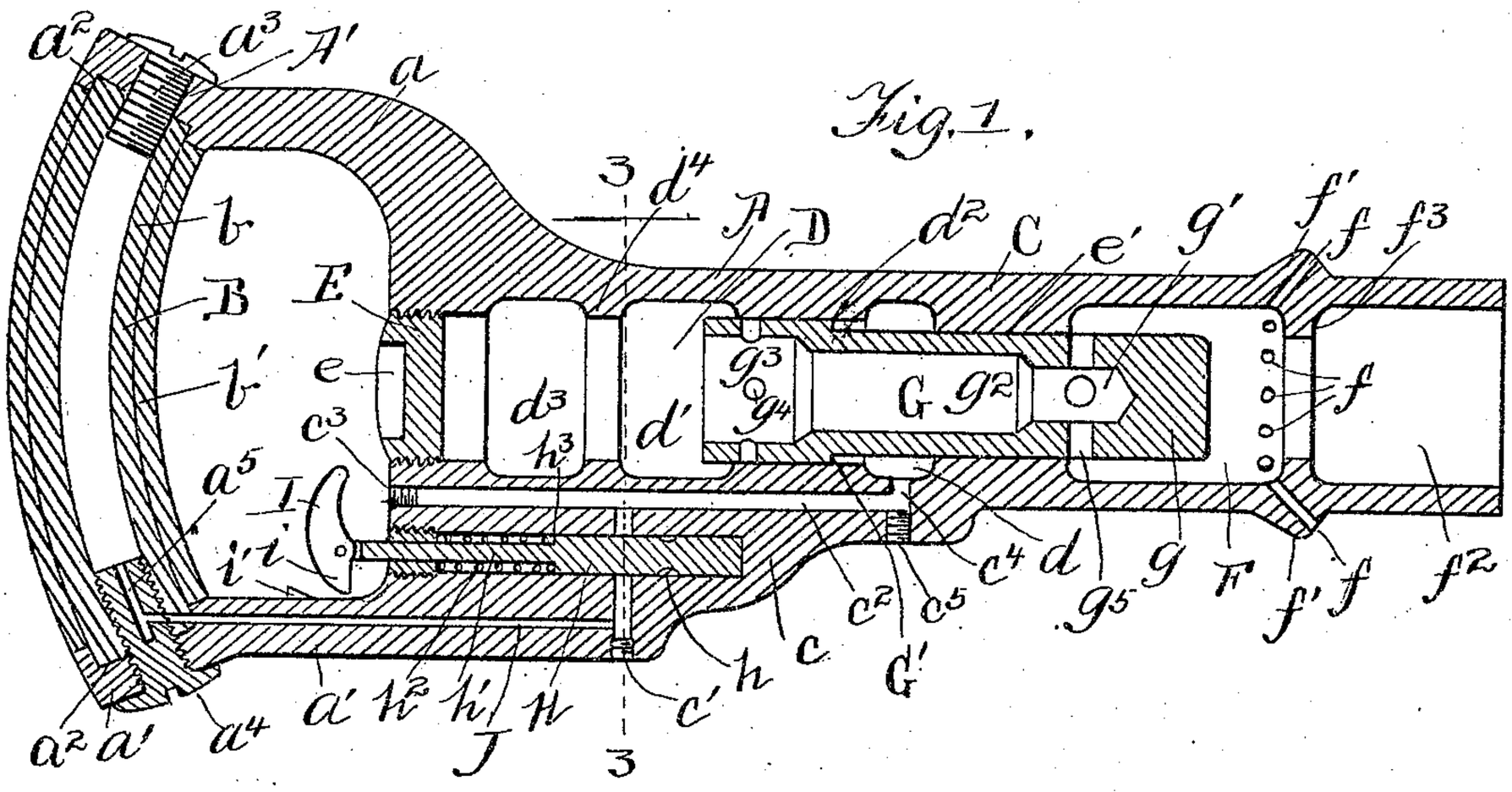


Fig. 2.

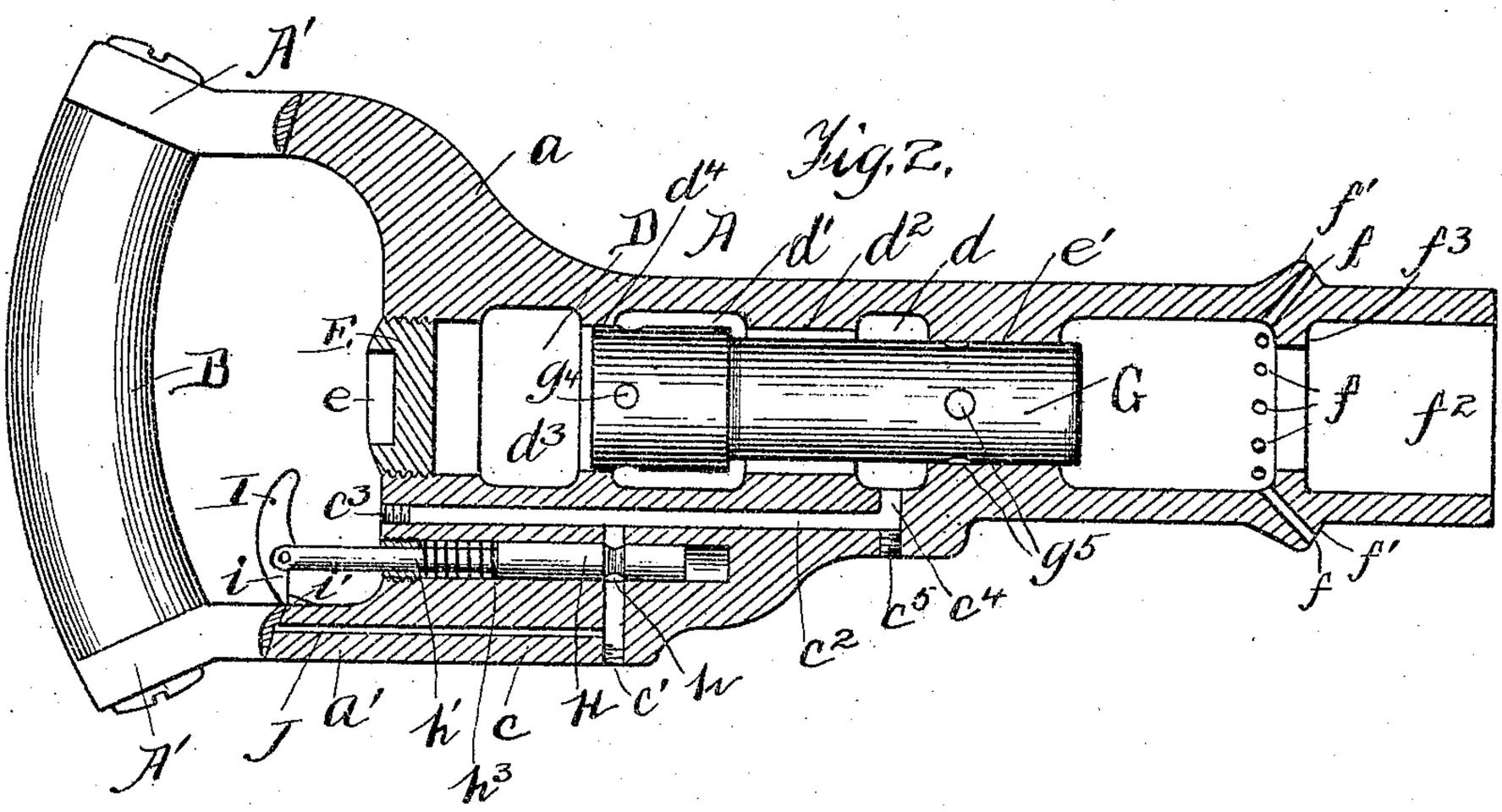
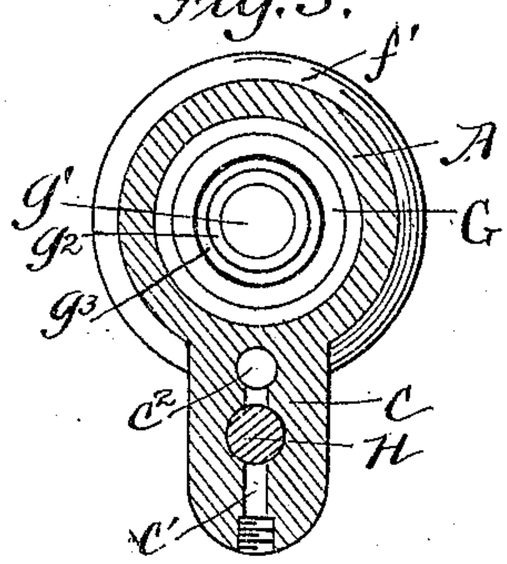


Fig. 3.



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UNITED STATES PATENT OFFICE.

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PNEUMATIC HAMMER.

SPECIFICATION forming part of Letters Patent No. 775,784, dated November 22, 1904.

Application filed May 23, 1904. Serial No. 209,332. (No model.)

To all whom it may concern:

Be it known that I, CLARK J. SMITH, a citizen of the United States, residing at Ottumwa, in the county of Wapello and State of Iowa, have invented certain new and useful Improvements in Pneumatic Hammers, of which the following is a specification.

In the art to which the present invention relates difficulty has hitherto been experienced in making a pneumatic hammer the handle of which would be so arranged and constructed as to relieve the hand and arm of the operator from the jar and vibration incident to use. This jar or vibration is not only unpleasant, but dangerous to health, in that it causes the arm to swell and become numb and sore.

The present invention is so arranged and constructed that the handle will be sufficiently elastic to prevent injurious effects and at the same time sufficiently rigid to enable the successful operation of the tool.

Another object of the invention is to provide means for locking the air-supply valve when the hammer is in use, thereby relieving the operator from the necessity for holding the valve-controlling mechanism open during the operation of the hammer. This is a feature of great importance, for the reason that it is often necessary to operate the handle for a long period of time without closing the valve, and under the circumstances it becomes difficult for the operator to manipulate the valve and at the same time keep perfect control of the hammer.

Another object of the invention is to provide an exhaust which will serve to force away the dust and chips from the operator's face when the device is used as a drill.

The invention consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings illustrating the invention, Figure 1 is a longitudinal sectional view of the device with the air-valve closed and the hammer in projected position; Fig. 2, a view, partly in section, showing the air-valve open and the hammer in retracted position; and Fig. 3, a cross-sectional view taken on line 3 3 of Fig. 1.

The hammer of the present invention is constructed to have a frame A, provided with an upper handle-arm a and a lower handle-arm a', which arms terminate in outwardly-distended ends A', each provided with a recess a^2 and screw-bolts a^3 and a^4, the latter of which is provided with an air-passage a^5. The handle B is composed of elastic tubing, preferably rubber hose, and, as shown, consists of two sections—an inner section b, having its ends fitted into the recesses in the heads of the handle-arms, and an outer section b', surrounding the inner section. This arrangement holds the air-passage a^5 to communicate with the interior of the handle.

The frame of the handle, which is preferably formed from a single piece of cast metal, is provided with a cylindrical casing C, provided at its lower side with an elongated rib c, in the bottom of which is located an air-port c', adapted for the attachment of a rubber hose or other means for supplying compressed air to the hammer. The air-port communicates with a longitudinally-extending air-passage c^2, closed at its outer end by means of a plug c^3, and said passage terminates in an inwardly-extending passage c^4, drilled through the rib in the frame and closed at its outer end by means of a plug c^5. The casing is provided on its interior with a cylindrical chamber D, which is divided into a series of compartments by means of inwardly-projecting annular flanges. The inwardly-extending passage c^4 opens into an annular chamber d, to the rear of which is a chamber d', separated from the chamber D by means of an annular flange d^2, and said chamber d' communicates with a rear chamber d^3, separated from the chamber d' by means of annular guide-flanges d^4 of equal diameter with the flange d^2, and the interior of the casing is closed at the rear end by a screw-threaded plug E, provided with a square hole e for the insertion of a wrench or other similar instruments.

Forward of the guide-flanges d^2 and d^4 is an annular flange e' of less interior diameter than the flanges hitherto mentioned, and the different flanges serve as a guideway for the reciprocating member, hereinafter described. Forward of the flange e' is an air-discharge

chamber F, provided with a series of diagonally-extending discharge-openings f, arranged to discharge through an annular shoulder f', so that as the air is exhausted it will blow out in a funnel shape and serve to force away the chips, dust, or refuse from the face of the operator, thereby greatly facilitating ease and certainty of operation. The end of the device f^2 is open for the insertion of a hammer, drill, or similar implement, which is adapted to abut against a shoulder f^3 in front of the discharge-opening.

Within the interior of the casing is a reciprocating member G, of hardened steel, provided with a solid head g, adapted to strike the tool and provided on its interior with forward, middle, and rear bores g', g^2, and g^3 of increasing size, and the rear end of the reciprocating member is enlarged to provide an annular shoulder G', and the rear bore is open and provided with air-inlet openings g^4 for the admission of air. The valve-bore g' is provided with vent-openings g^5, adapted to vent air into the discharge-chamber F when the hammer is in projected position, as shown in Fig. 1.

The air-inlet port is controlled by means of a reciprocating valve H, provided with an annular groove h, adapted to allow of the admission of air when in line with the port or passage c, as shown in Fig. 2, and adapted to shut off the supply of air when in projected position. (Shown in Fig. 1.) The valve is provided with a handle h' of lesser diameter than the head portion, and said handle is surrounded by a coiled spring h^2, which abuts against a shoulder h^3 and serves to keep the valve in projected position. The handle portion of the valve projects outside of the casing and is provided on the end with a pivoted trigger I, provided with a catch end i, adapted to be caught and held by an abutment i' when the valve is drawn back, as shown in Fig. 2, and to be released from said abutment by slightly turning the trigger to one side to clear said abutment. This arrangement allows the valve to be opened and locked, so that it will not be necessary for the operator to hold the valve retracted by means of his finger, which is a tiresome and difficult operation in some classes of work.

Air is supplied to the interior of the handle through a port or passage J, which leads from the air-inlet c' and communicates with the passage a^5 in the screw-bolt a^4, so that when compressed air is admitted to the hammer or drill for the purpose of operating the same, pressure will be created within the rubber handle, which serves to inflate the same and render it sufficiently rigid to provide a firm support for the operator's hand and at the same time sufficiently flexible to prevent the jarring or vibration of the reciprocating member from being imparted to the hand and arm of the operator.

In operation the valve is drawn back in the position shown in Fig. 2, admitting air through the passage c^2 into the annular chamber d and the trigger locked into position to prevent the return of the valve. The admitted air will strike the shoulder G' when the reciprocating member is in projected position and force the same back into the chamber d', allowing the air to pass around the smaller portion of the reciprocating member inside of the walls of the flange d^2. The air will then be admitted into the interior of the reciprocating member, the head of which will have been drawn back sufficiently to close the vent-openings g^5, so that the admitted air will drive the member forward to strke a blow and to assume the position shown in Fig. 1 prior to the striking of successive blows. After the reciprocating member has been projected to its fullest extent the air will vent into the discharge-chamber F and out of the radially-arranged discharge-openings. During the operation of the hammer the compressed air will be admitted into the rubber handle to inflate the same and to afford a firm support for the operator's hand.

The parts are so arranged that they may be easily removed for cleansing or repair, and the casing is of a shape and construction which enables it to be cast from a single piece of metal, thereby greatly reducing the expense of manufacture and strengthening the construction.

Although the invention has been described with considerable particularity as to details, I do not limit myself to the precise form and construction herein shown and described.

What I regard as new, and desire to secure by Letters Patent, is—

A tool of the character described, having a pair of extending arms, and a bridge member held between said arms to form a handle for said casing, said casing having bores on its interior of two different diameters, a hollow reciprocating member having an enlarged head adapted to fill the bore of greater diameter, and an elongated body portion adapted to fill the bore of lesser diameter, the head forming a shoulder in conjunction with the body portion adapted to be contacted by pressure to drive the reciprocating member in one direction, an annular air-receiving chamber at the junction of the bore of lesser diameter with the bore of greater diameter, a second annular chamber formed in the casing, of greater diameter than either of the bores, into which the head portion is adapted to be driven at the completion of a stroke in one direction, said reciprocating member having apertures in its head portion, said head-receiving annular chamber and said second annular chamber being in communication with each other when the reciprocating member is in one position, and out of communication with each other when the reciprocating member is in another

position, said reciprocating member being provided with discharge-openings at the end opposite its head adapted to be contacted by the walls of the bore of lesser diameter when pressure is initially admitted to the interior of the reciprocating member and open for the discharge of air at the completion of its reciprocation, said casing being provided with an annular, elongated chamber into which the exhaust end of the reciprocating member is adapted to move at the completion of the reciprocation, and into which the air is discharged from the reciprocating member, said casing being provided with a thickened portion having apertures, said apertures discharging the exhaust-air at an angle to the axial line of the casing, and toward the work to be operated upon, and said casing being provided with air-supply passages leading into the air-receiving chamber, and a throttle-valve in said passage for controlling the air-supply, substantially as shown and for the purposes specified.

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Witnesses:
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