

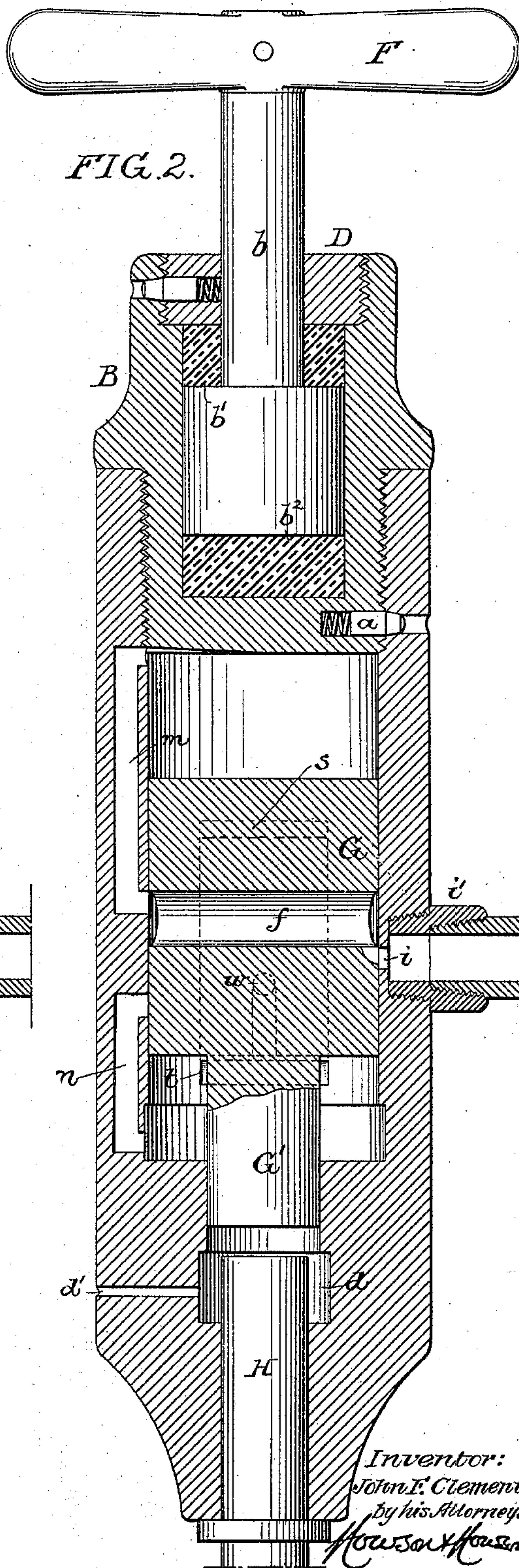
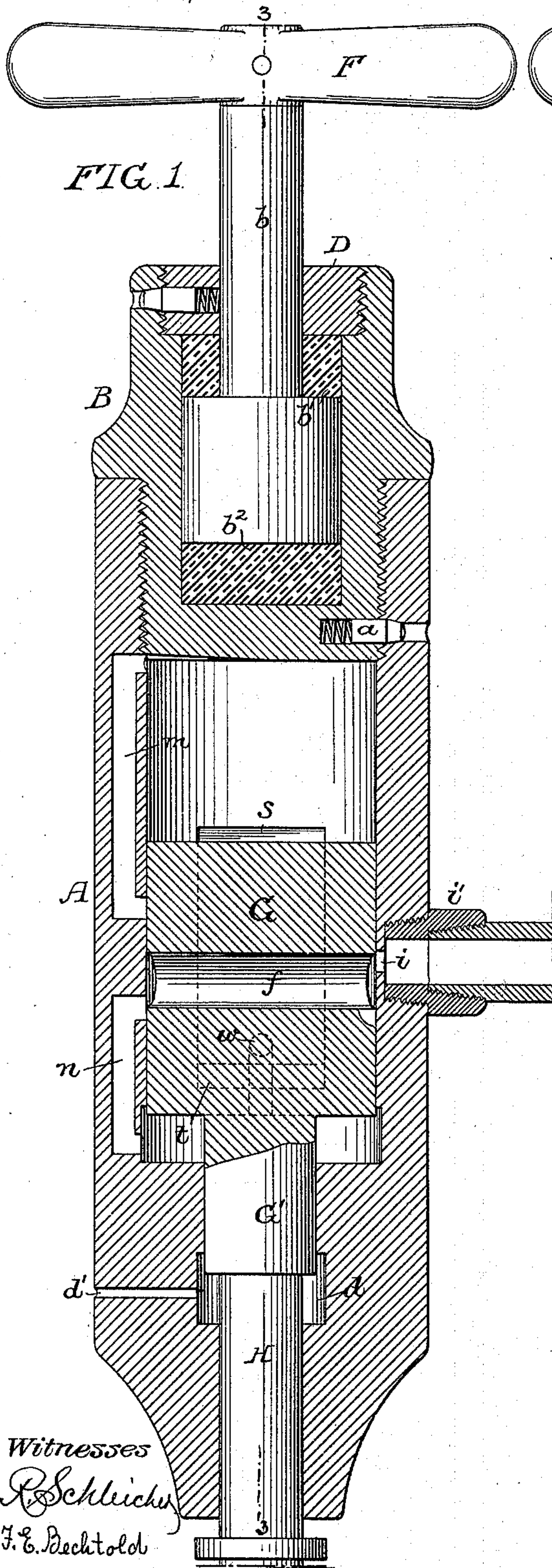
(No Model.)

2 Sheets—Sheet 1.

J. F. CLEMENT.
IMPACT TOOL.

No. 573,260.

Patented Dec. 15, 1896.



Witnesses
R. Schlicht
F. E. Bechtold

Inventor:
John F. Clement
by his Attorneys
Houson & Houson

(No Model.)

2 Sheets—Sheet 2.

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FIG. 4.

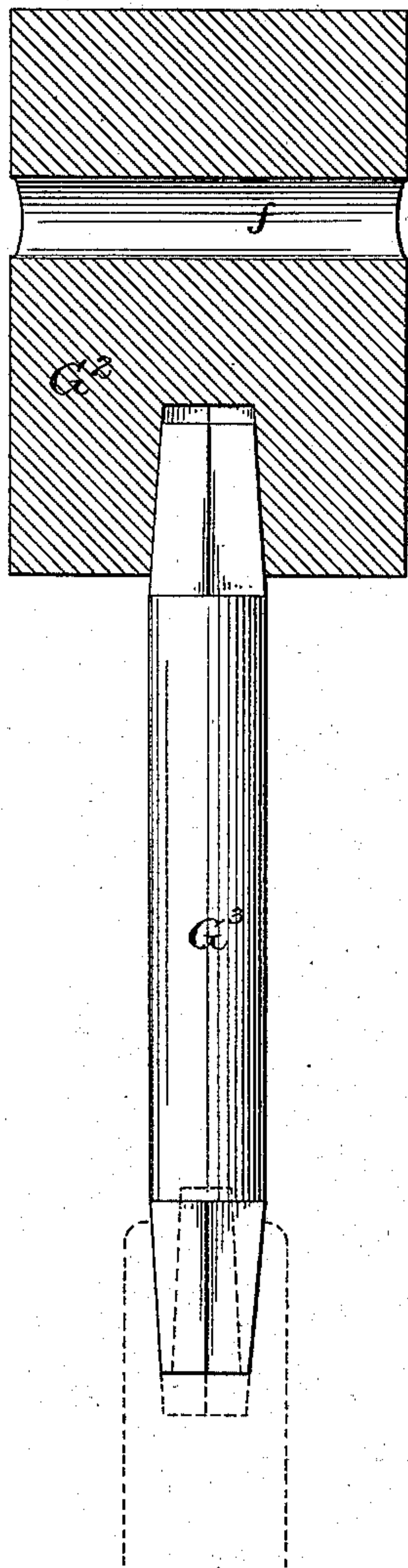
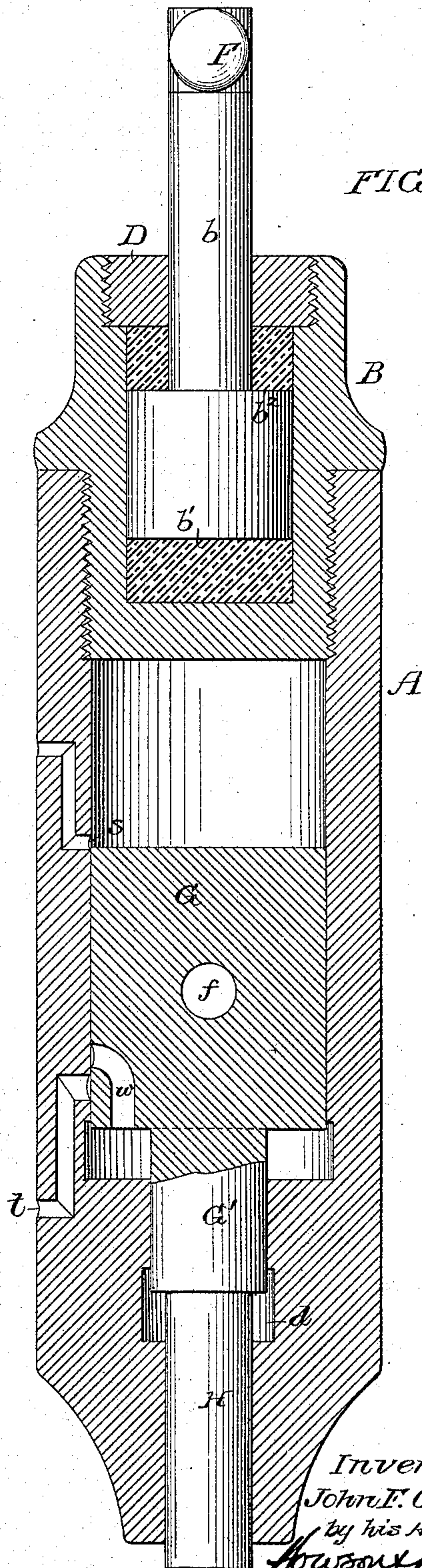


FIG. 3.



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UNITED STATES PATENT OFFICE.

JOHN F. CLEMENT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE
CLEMENT PNEUMATIC TOOL COMPANY, OF CAMDEN, NEW JERSEY.

IMPACT-TOOL.

SPECIFICATION forming part of Letters Patent No. 573,260, dated December 15, 1896.

Application filed May 7, 1896. Serial No. 590,561. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. CLEMENT, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Impact-Tools, of which the following is a specification.

One object of my invention is to so construct an impact-tool of the valveless class as to prevent side pressure upon the reciprocating piston or hammer, a further object
10 being to arrest the reciprocation of the hammer except when the tool is at work, and a still further object being to adapt the tool for use with different kinds of chisels or cutting-tools. These objects I attain in the manner hereinafter set forth, reference being had
15 to the accompanying drawings, in which—

Figure 1 is a longitudinal section of an impact-tool constructed in accordance with my
20 invention. Fig. 2 is a similar view showing the piston or hammer in a different position. Fig. 3 is a transverse section on the line 3 3, Fig. 1; and Fig. 4 is a view of a special form of hammer constituting part of my invention.
25

In Figs. 1, 2, and 3, A represents the cylinder of the tool, which has at the rear end a cap B, firmly secured thereto by screwing it into the end of the cylinder, a spring-plug *a*,
30 carried by the cap and adapted to an opening in the cylinder, serving to prevent the unscrewing of said cap until said plug has been first pushed inward, so as to be free from engagement with the cylinder. The cap is bored
35 out centrally to receive the enlarged forward end of the stem *b* of a handle F, said stem being seated upon a block or washer *b'*, of rubber or other elastic material, located at the inner end of the opening in the cap,
40 which block is slightly compressed by the stem of the handle, the latter being retained in longitudinal position to insure such compression by means of an annular washer *b''*, of elastic material, bearing upon the shoulder
45 formed by the enlargement of the stem *b*, and retained in position by an annular retainer D, screwed into the outer end of the cap B. By this means the handle F is confined to the cylinder A in a longitudinal direction, but yet is free to turn or swivel on
50 the cylinder to suit the convenience of the workman using the tool, the elastic cushions

preventing any shock or jar from being transmitted to the handle.

Snugly fitting in the bore of the cylinder 55 is the reciprocating piston or hammer G, which has extending transversely through it an opening *f*, which is always in communication with an inlet-port *i* in one side of the cylinder, this inlet-port communicating
60 in any suitable manner with a supply of motive fluid under pressure.

In the present instance the tool is intended for use with compressed air, and the inlet-port *i* is in communication with a nozzle *i'*,
65 to which the air-conveyer pipe is directly applied, but any other available means of conveying the motive fluid to the inlet-port *i* may be adopted without departing from my invention.
70

In the side of the cylinder opposite that having the inlet-port *i* are two double-ended conveyer-ports *m* and *n*, the rear end of the rear port *m* communicating with the rear end of the cylinder and the forward end of the
75 forward port *n* communicating with the forward end of said cylinder. In the cylinder are also formed two exhaust-ports *s* and *t*, the port *s* serving to permit of the escape of motive fluid from the rear end of the cylinder
80 and the port *t* providing for the escape of motive fluid from the forward end of the cylinder, these ports by preference being independent of each other and each consisting of inner and outer radial portions connected by a
85 longitudinal passage, so that while they provide for the free escape of motive fluid from the cylinder they will prevent the access of sand, metal chips, or other foreign matters into the cylinder. The rear exhaust-port is
90 preferably of less area than the forward exhaust-port, so as to provide for a freer escape of motive fluid from the front end of the cylinder than from the rear end of the same.

The piston or hammer G has a forwardly-
95 projecting stem G', which is guided in the forward end of the cylinder and acts upon the inner end of the stem or shank H of the chisel or other tool which is being used, the latter being guided in an opening at the forward end
100 of the cylinder, to which it fits with reasonable snugness. The stem G' when projected enters a chamber *d*, which is of slightly greater diameter than the opening in which

said stem is guided and has a lateral vent d' , so as to prevent the possibility of any cushioning of the blow by the compression of air in advance of the hammer-stem.

5 In the lower portion of the piston G is formed a right-angled opening w , one portion of which extends to the forward end of the piston, while the other portion extends to one side of the piston in line laterally with the
10 lower exhaust-port t .

The operation of the tool is as follows: When the parts are in the position shown in Fig. 2, the piston G is at the rear end of its stroke, the port t is uncovered, so as to permit the free
15 escape of motive fluid from the forward end of the cylinder, and the forward end of the port m is in communication with the transverse passage f of the piston, so that motive fluid flows freely from the inlet-port i through
20 said passage, and thence through the port m to the rear end of the cylinder, in order to drive the piston forward. After the projecting stem of the piston has delivered its blow upon the inner end of the tool-stem the ports
25 are in the position shown in Fig. 1, the exhaust-port s being now open, so as to permit of the escape of motive fluid from the rear end of the cylinder, and the forward port n being in communication with the transverse
30 passage f of the piston, so that motive fluid is directed to the forward end of the cylinder in order to drive the piston rearward therein, this rearward movement continuing until the parts again assume the position shown in Fig.
35 2, prior to a repetition of the before-described operations. When the cutting-tool is not being used, or is not pressed firmly against the work, the piston or hammer G will on its forward movement meet with no resistance, or
40 less than the normal amount of resistance, from the tool, and hence will pass forward beyond its normal point, thus opening communication between the passage w in the piston and the exhaust-port t . The air which
45 had entered the forward end of the cylinder before the piston completed its excessive forward stroke escapes therefrom through the passage w and exhaust-port t , so that after
50 the port i is closed by the forward movement of the piston there is no pressure in the forward end of the cylinder to drive said piston rearward. Hence the parts will remain inoperative until the tool is again pressed upon the work with sufficient force to move the piston
55 backward to such an extent as to again open the inlet-port i .

In the construction shown in Fig. 4 the piston G^2 is provided with a detachable stem G^3 , which is intended to be of such length that
60 its forward end will project beyond the cylinder, so that it can be adapted to a socket at the end of the tool-stem, as shown by dotted lines, the forward end of the stem G^3 also by preference having a socket formed in it,
65 so that it can be applied to an ordinary tool-stem as well, if desired. By forming a passage directly through the piston from one side

to the other for the conveyance of motive fluid from the inlet-port to the conveyer-ports of the cylinder I avoid side pressure, which invariably results when the passage is in the form of an annular groove in the piston and which is due to the impingement of the motive fluid upon the central or reduced portion of the piston. I therefore reduce the friction
75 upon the piston and facilitate the reciprocation of the same and at the same time prevent wear of either piston or cylinder due to the lateral pressure upon said piston.

Having thus described my invention, I
80 claim and desire to secure by Letters Patent—

1. The combination in an impact-tool, of a cylinder having an inlet-port, and conveyer-ports, one of the latter communicating with
85 one end of the cylinder and the other with the opposite end of the same, with a piston reciprocating in said cylinder and having an opening transversely through it which serves to convey the motive fluid from the inlet-port
90 to the conveyer-ports alternately as the piston is reciprocated, whereby side pressure upon the piston is prevented.

2. The combination in an impact-tool, of a cylinder having an inlet-port, conveyer-ports,
95 one communicating with one end of the cylinder, and the other with the opposite end of the same, and exhaust-ports for the opposite ends of the cylinder, with a piston reciprocating in said cylinder and serving by its
100 movements to direct motive fluid first to one end of the cylinder, and then to the other end of the same, and an escape-passage formed in said piston and serving to open communication between the forward end of the cylinder
105 and the forward exhaust-port, on excessive forward movement of the piston in the cylinder.

3. The combination in an impact-tool, of a cylinder, a piston reciprocating therein, and
110 a stem detachable from said piston, and projecting forwardly beyond the cylinder, said stem being constructed at its forward end for the reception of a tool-stem.

4. The combination of the cylinder, with
115 the handle confined longitudinally to the cylinder, but free to turn independently thereof.

5. The combination of the cylinder, with the handle having an elastic longitudinal connection with the cylinder but free to turn in
120 respect to the cylinder.

6. The combination of the cylinder, with the handle having a stem with enlarged end, elastic blocks or washers engaging the forward and rear portions of said enlargement
125 of the stem, and a confining-ring for said rear washer.

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

JOHN F. CLEMENT.

Witnesses:

F. E. BECHTOLD,
JOS. H. KLEIN.