

H. LEINEWEBER.
PNEUMATIC TOOL.

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938,774.

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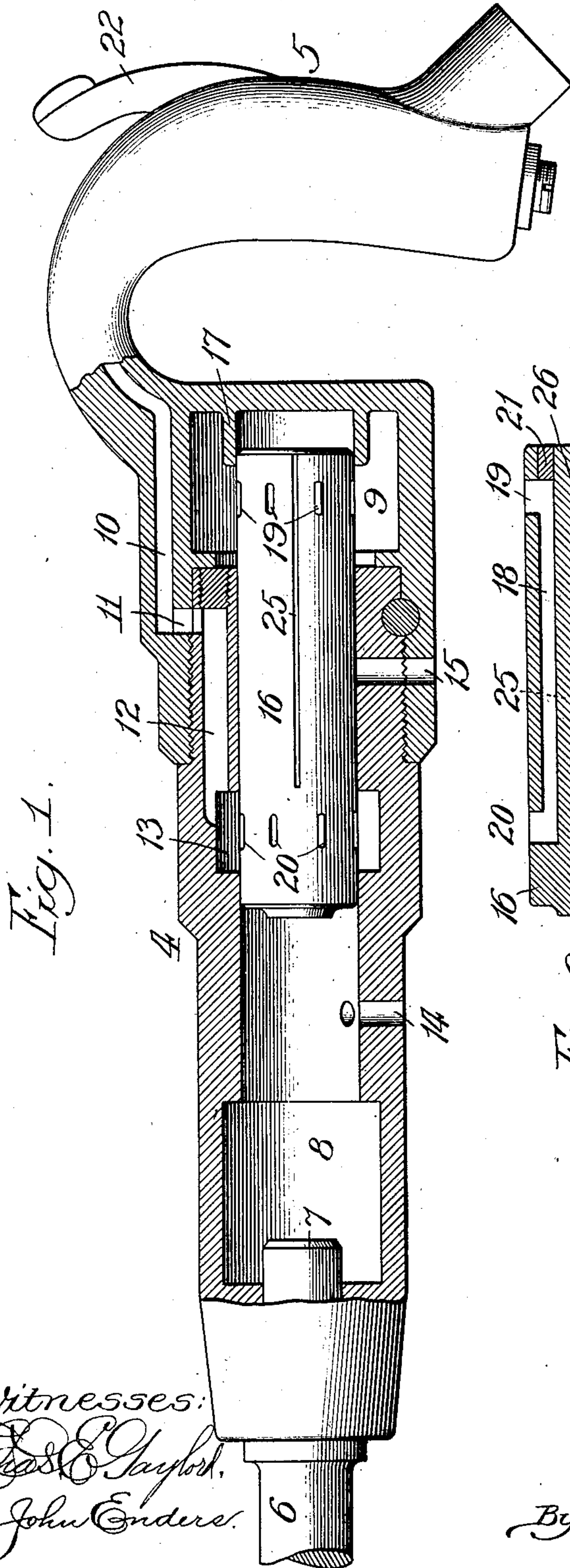


Fig. 1.

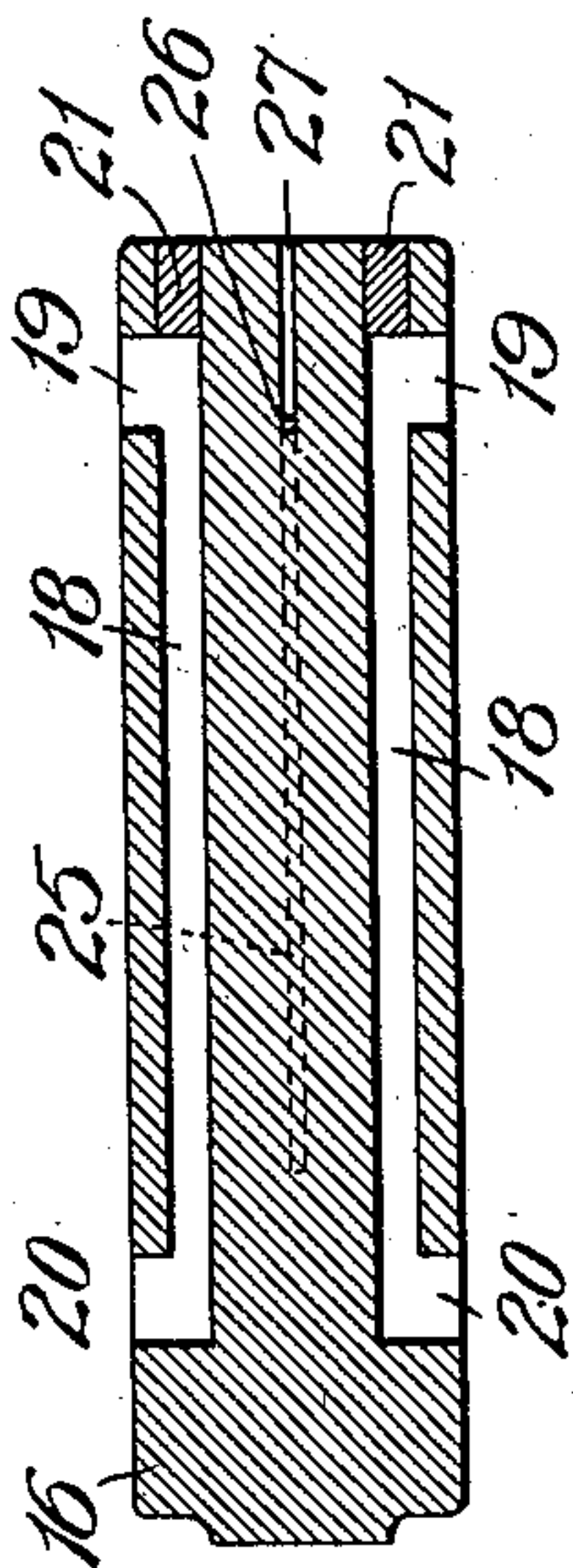


Fig. 2.

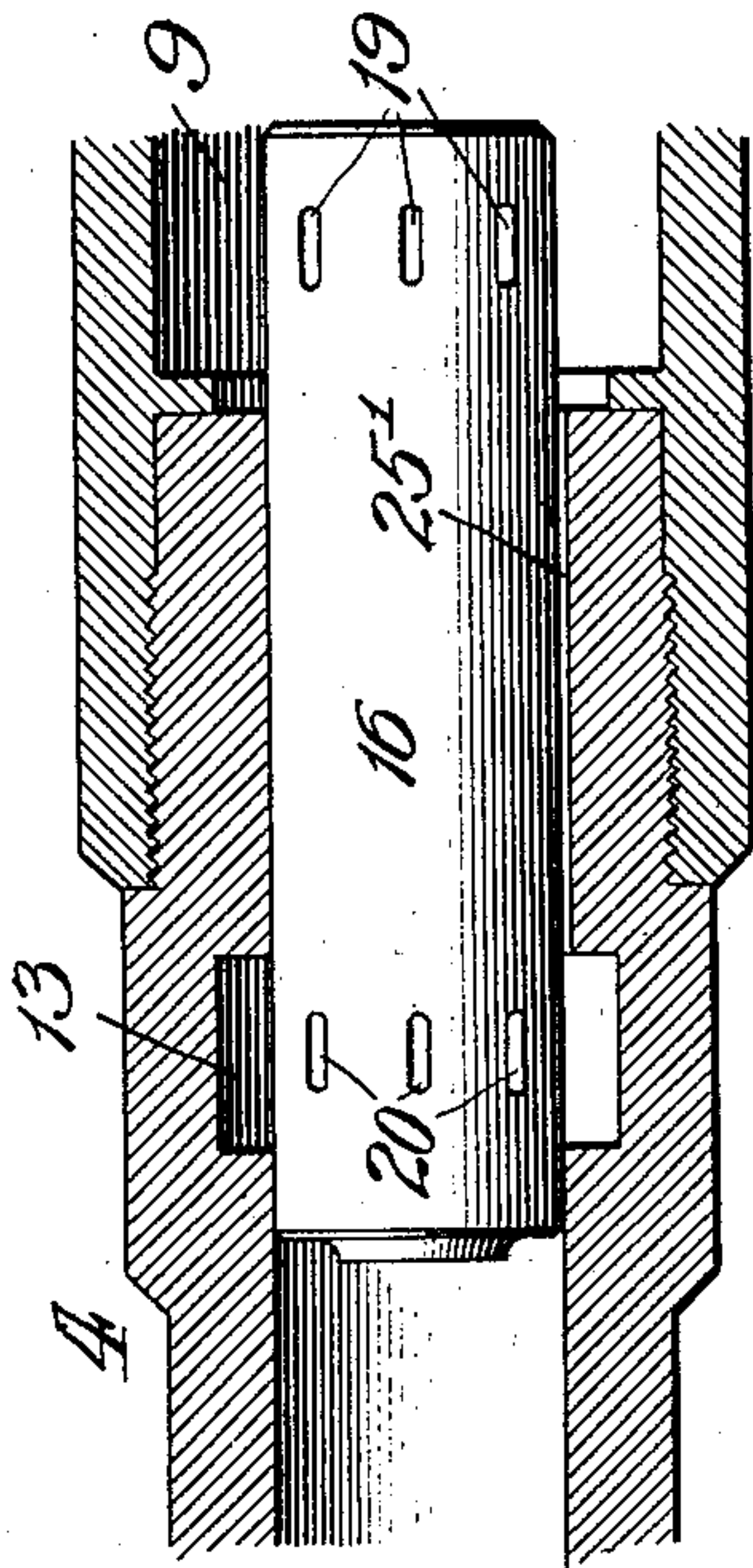


Fig. 3.

Witnesses:

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UNITED STATES PATENT OFFICE.

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PNEUMATIC TOOL.

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To all whom it may concern:

Be it known that I, HERMAN LEINEWEBER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Pneumatic Tools, of which the following is a specification.

My invention relates to an improvement in the class of valveless pneumatic tools employing a reciprocating piston actuated by air-pressure introduced through the piston alternately against its opposite ends into air-chambers between which the piston works in the casing.

My object is to provide a novel construction of means for overcoming the tendency in the piston, when the tool is laid aside, or its operation is interrupted, to attain the "dead-point" in the casing, which renders the starting of its operation more or less difficult. This tendency is due to leakage along the piston between it and the barrel of air-pressure until it becomes equalized in both end-chambers, causing the piston to seek the midway position or "dead-point" between them.

I have especially devised my present improvement for use in the construction of pneumatic tool shown and described in United States Letters Patent No. 778,319, granted to me on the 27th day of December, 1904, and therefore illustrate it in that connection in the accompanying drawing, in which—

Figure 1 is a view, mainly in longitudinal sectional elevation, of the pneumatic tool of the aforesaid patent, provided with my improvement in its preferred form; Fig. 2, a longitudinal section of the piston provided with my improvement in a modified form and shown partly by a dotted representation, and Fig. 3, a broken longitudinal section of the barrel with the piston in elevation within it and showing my improvement in another modified form.

The casing or barrel 4 is provided on one end with a handle 5 and carries in its opposite end a desired tool 6, shown broken, with the stem 7 projecting into the air-chamber 8, formed in the forward end of the casing which contains in its opposite end the larger air-chamber 9. A supply-passage 10 for the actuating compressed air leads in the handle, wherein it is valve-controlled as in the aforesaid patent, or otherwise, to a series of

ports, one of which is represented at 11 extending transversely through the casing and opening into branches of the passage 10, one of which branches is shown at 12, extending lengthwise in the casing-wall and terminating at an annular enlargement forming a pressure-feeding chamber 13 in the casing between the end-chambers therein. Exhaust-ports are provided at 14 and 15. The piston 16, confined in the casing to reciprocate between a hollow cushioning boss 17 in the chamber 9 and the tool-stem 7 in the chamber 8, is closed at both ends and contains a desired number (one or more) of longitudinal ducts 18, each terminating at its opposite ends, respectively, in lateral openings 19 and 20 in the piston near its ends. These ducts are bored in the piston preferably from its rear end, where they are closed by plugs 21.

The operation of the device constructed as described is the same as explained in my aforesaid patent; that is to say: with the parts in the relative positions in which they are represented in Fig. 1, pressing the thumb-lever 22, admits air-pressure through the passage 10, ports 11 and branches 12 into the feeding chamber 13, whence it enters the piston-openings 20 and passes through the ducts 18, discharging therefrom at the openings 19 into the chamber 9, wherein it acts against the respective end of the piston to drive the latter against the tool-stem 7. At the end of this forward stroke of the piston the openings 19 register with the chamber 13, and the air in the chamber 9 escapes through the exhaust-port 15. With the piston-openings 19 so registering with the feeding-chamber 13, pressure enters those openings to pass through the piston-ducts into the chamber 8, therein to act against the forward end of the piston and produce its backstroke, in making which it uncovers the exhaust-ports 14 permitting escape through them of the pressure in the chamber 8.

As shown in Fig. 1 a relatively fine groove, or "needle-groove", 25 is formed lengthwise in the outer surface of the piston to extend to its rear end from near the plane of the openings 20. Should the piston occupy the central dead-point position referred to, it must, to be operated, be preparatorily actuated to the end of its stroke since then, obviously, the pressure-supply from the feed-

ing-chamber 13 to either chamber 8 or 9 is shut off by the piston. By providing the needle-groove 25, with the piston at the aforesaid dead-point, when air-pressure for starting the operation is admitted into the feeding-chamber, with which the groove then registers, the latter will soon conduct from the chamber 13 sufficient air-pressure into the chamber 9 to dislodge the piston from that central position by forcing it to the end of its forward stroke, after which it will be reciprocated regularly in the manner described of its normal operation.

In Fig. 2 the groove 25, which is shown by a dotted representation, terminates short of the rear end of the piston at a transverse needle-bore 26 therein leading preferably to its longitudinal center where it meets the inner end of a needle-hole 27 bored centrally into the piston from its rear end to open into the chamber 9, for starting the piston from the dead-point in the manner described. The needle-like passage may, furthermore, be provided, as represented in Fig. 3, by forming a groove 25¹, like the groove 25 in the inner wall of the casing instead of in the piston, to extend from the feeding-chamber 13 to the rear power-chamber 9. With any of the described forms of piston-starting pressure-feed passage the result in overcoming the dead-point of the piston is produced in the same manner; and the same may, obviously, be embodied in still other forms, with the needle-like passage leading lengthwise of the piston, whether in the latter or in the casing-wall, for feeding from a supply-chamber 13 air-pressure for initially starting the piston to overcome its dead-point, which is the gist of my invention.

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

1. In a pneumatic tool, the combination of a handle-equipped casing carrying the tool and provided with an air-pressure inlet, end-chambers and an intermediate feeding-chamber for the air-pressure in the casing, said feeding-chamber communicating with said inlet, a piston reciprocally confined in the casing, having a duct terminating at its ends in lateral openings in the piston to register with said feeding-chamber, and a needle-like passage extending lengthwise of the piston, with one end communicating with an end-chamber, and connecting

said last-named chamber with said intermediate chamber, for the purpose set forth.

2. In a pneumatic tool, the combination of a handle-equipped casing carrying the tool and provided with an air-pressure inlet, end-chambers and an intermediate feeding-chamber for the air-pressure in the casing, said feeding-chamber communicating with said inlet, a piston reciprocally confined in the casing, having a duct terminating at its ends in lateral openings in the piston to register with said feeding-chamber, and a needle-like passage extending lengthwise of the piston, with one end leading to the rear end-chamber, and connecting said last-named chamber with said intermediate chamber, for the purpose set forth.

3. In a pneumatic tool, the combination of a handle-equipped casing carrying the tool and provided with an air-pressure inlet, end-chambers and an intermediate feeding-chamber for the air-pressure in the casing, said feeding-chamber communicating with said inlet, a piston reciprocally confined in the casing, having a duct terminating at its ends in lateral openings in the piston to register with said feeding-chamber, and a needle-like passage formed in the piston lengthwise thereof and extending from a point between its ends to its rear end, for the purpose set forth.

4. In a pneumatic tool, the combination of a handle-equipped casing carrying the tool and provided with an air-pressure inlet, end-chambers and an intermediate feeding-chamber for the air-pressure in the casing, said feeding-chamber communicating with said inlet, a piston reciprocally confined in the casing, having a duct terminating at its ends in lateral openings in the piston to register with said feeding-chamber, and a needle-like passage consisting of a groove in the piston-surface extending from near its forward end, a transverse bore in the piston with which the rear end of said groove connects, and a bore extending in the piston from its rear end to the inner end of said transverse bore, for the purpose set forth.

HERMAN LEINEWEBER.

In presence of—

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