C. A. DAWLEY.

PULSATORY TOOL.

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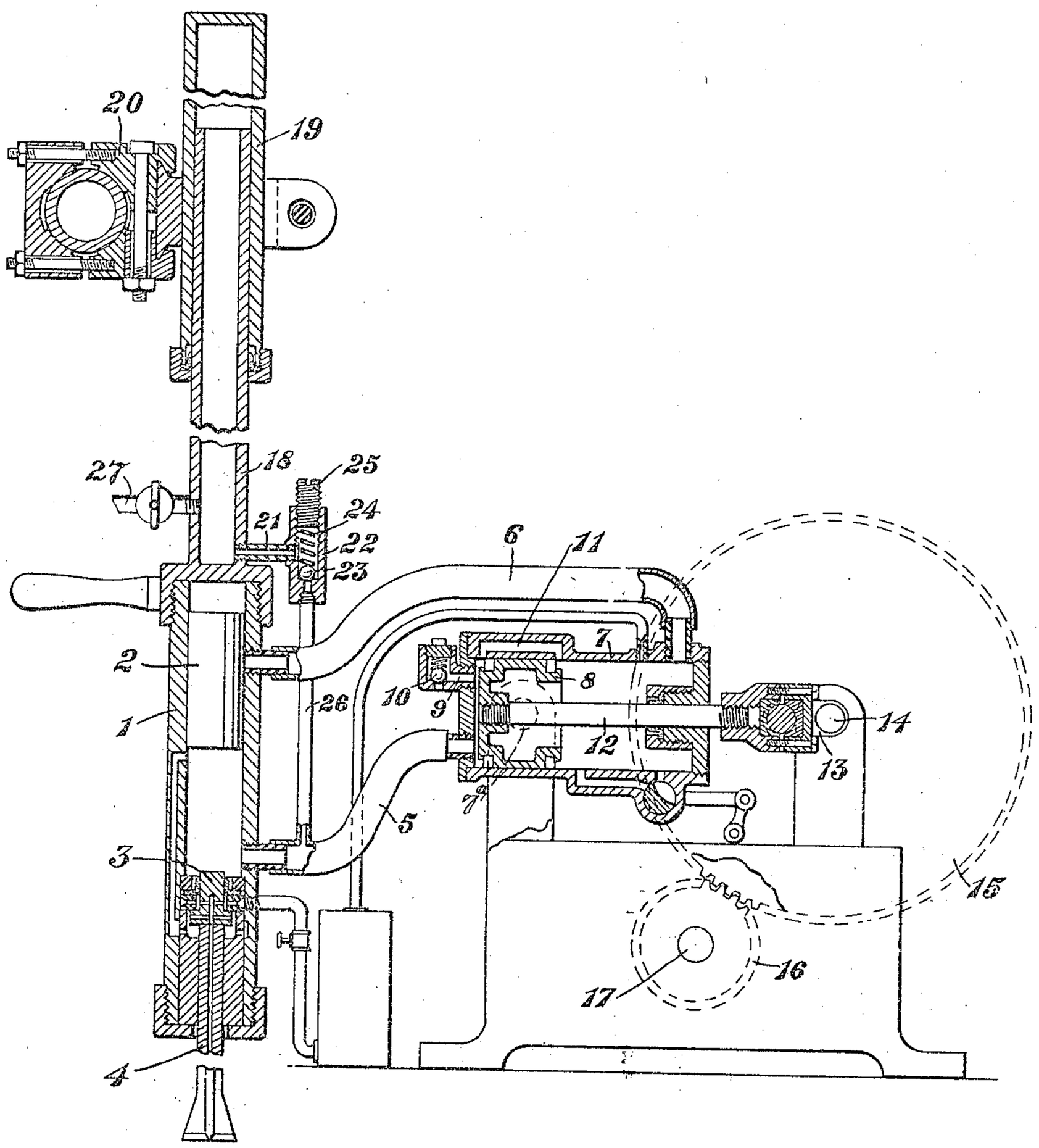

WITNESSES:

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PULSATORY TOOL.

1,154,977. Specification of Letters Patent. Patented Sept. 28, 1915.

Original application filed May 13, 1908, Serial No. 432,618. Divided and this application filed March 26, 1912. Serial No. 686,433.

To all whom it may concern:

Be it known that I, CLARENCE A. DAWLEY, a citizen of the United States, residing in Plainfield, in the county of Union and State of New Jersey, (whose post-office address is 39 Cortlandt street, New York, N. Y.,) have invented certain new and useful Improvements in Pulsatory Tools, of which the following is a specification.

This invention relates to pulsatory tools and more particularly to an air feed for pulsatory drills whereby they can be fed toward the work by air pressure furnished from the pulsator operating the drill.

The present application is a division of my co-pending application Serial #432,618, filed May 13th, 1908.

Heretofore drills of the pulsatory type have been fed toward their work only by hand operated feeding devices and the object of the present invention is to supply this type of drill with a means whereby it can be fed toward its work automatically by air pressure produced in the system itself by the action of the pulsator used for operating the drill.

With this object in view I have invented a device a practical embodiment of which is shown in the accompanying drawing which shows a side elevation partly in section, of the complete drilling mechanism.

In the figure the drill itself is shown of the hammer type and comprises a cylinder 1 in which reciprocates a piston 2 which operates by its impact on anvil block 3, the drill steel 4. From ports near the opposite ends of the drill cylinder 1, flexible connecting pipes 5 and 6 lead to opposite ends of the pulsator cylinder 7. In the cylinder 7, pivoted on axle 7ª, reciprocates a piston 8 which consists of a cylindrical casing which is open at the front end thus affording a large clearance at this end. At the back end of the cylinder the piston has very little clearance. From the back end of the cylinder an inlet passage 9 which is controlled by a ball check valve 10, leads to the atmosphere. From the clearance space at the back end of the cylinder a port 11 leads to the intermediate part of this cylinder opening into it at such a point that the port will be opened only when the piston is at the extreme end of its back stroke.

The difference in the piston clearance at the two ends of the cylinder causes different pressures to be maintained in the two ends of the cylinder. In the embodiment shown high pressure is maintained in the back end of the cylinder which communicates with the front end of the drill cylinder while low pressure is maintained in the other end of the cylinder which communicates with the back end of the drill cylinder.

The piston of the pulsator is operated by piston rod 12, and crank 13 on shaft 14, which is operated by gears 15 and 16, and shaft 17 connected with a source of power.

To the back end of the drill cylinder 1 is secured a cylindrical piston 18 which telescopes in feed cylinder 19. This feed cylinder 19 is secured to a clamp 20 which in the operation of the drill is clamped on a stationary standard so that the cylinder 19 is held in a fixed position. Into the end of the piston 18 which is attached to the drill, an inlet pipe 21 leads to a valve chest 22. In the valve chest 22 is a ball check valve 23 held on its seat by a spring 24, the pressure of which on the ball 23, can be regulated by the screw 25. From the inlet side of the ball valve 23, a pipe 26 leads from some convenient source of air under pressure, for instance from the conduit 5 which leads to the high pressure end of the pulsator cylinder. A valve 27 is provided by means of which the fluid can be exhausted from the feed cylinder when desired.

The operation of the device is as follows: As the pulsator piston moves from the position shown in the figure to the other end of the cylinder it will cause the piston of the drill to move toward the front end of the drill, and as the pulsator piston approaches the front end of the pulsator cylinder, some air will be drawn through the check valve 10 into the back end of the cylinder. As the piston returns on its back stroke a certain amount of pressure will be generated in the back end of the cylinder and as a result air will be forced through the pipe 26 and check valve 23 into the space formed by the piston 18 and cylinder 19. As the check valve 23 allows no air to escape from the feeding device the pressure in the cylinder will be maintained at a point corresponding to the highest pressure produced by the piston of the pulsator on its back stroke or a certain amount below this pressure according to the

adjustment of valve 23 and will accordingly provide an effective means of feeding the drill toward its work.

The type of pulsator shown moreover is not essential to the success of the invention, as any other type may be used. Likewise any suitable form of valve can be used between the pulsator system and the air feed.

What I claim is:

1. In combination, a tool comprising a cylinder and its piston, a feed cylinder therefor, a piston in said feed cylinder, a pulsator for operating said tool, means for conveying fluid under pressure produced by said pulsator to said feed cylinder and means to retain the conveyed fluid in said feed cylinder.

2. In combination, a tool comprising a cylinder and its piston, a feed cylinder therefor, a piston in said feed cylinder, a pulsator for operating said tool and means for conveying fluid under pressure produced by said pulsator to said feed cylinder, comprising a passage containing a check valve.

CLARENCE A. DAWLEY.

Witnesses:
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