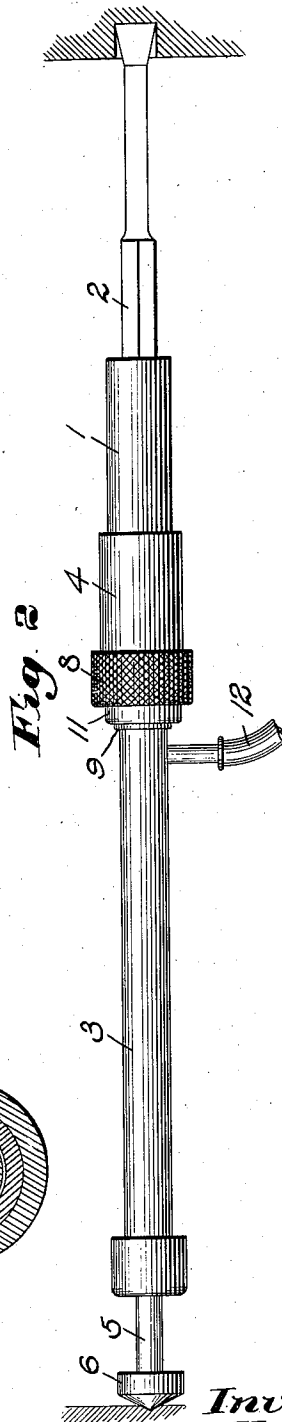
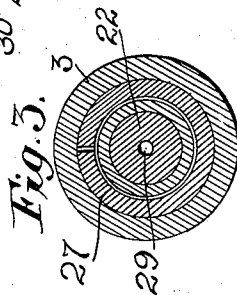
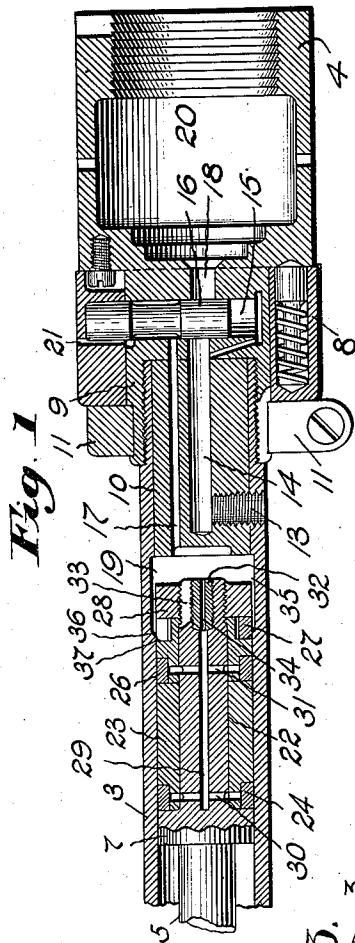


G. H. GILMAN.  
PRESSURE FED TOOL.  
APPLICATION FILED MAR. 2, 1908.

1,000,905.

Patented Aug. 15, 1911.



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# UNITED STATES PATENT OFFICE.

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## PRESSURE-FED TOOL.

1,000,905.

Specification of Letters Patent. Patented Aug. 15, 1911.

Original application filed February 2, 1907, Serial No. 355,493. Divided and this application filed March 2, 1908. Serial No. 418,727.

*To all whom it may concern:*

Be it known that I, GEORGE H. GILMAN, a citizen of the United States, residing at Claremont, in the county of Sullivan, State of New Hampshire, have invented an Improvement in Pressure-Fed Tools, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to pressure fed tools, being more particularly concerned with the provision of means for rendering the pressure feeding devices of such tools practical and effective.

This application is a division of my prior co-pending application, Serial No. 355,493, filed February 2, 1907.

My invention will be best understood by reference to the following description when taken in connection with the accompanying illustration of one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings:—Figure 1 represents in fragmentary sectional elevation a tool appliance to which is applied one form of my invention; Fig. 2 represents in side elevation, on a smaller scale, the tool appliance shown in Fig. 1; and Fig. 3 is the transverse section taken through the expanding ring in Fig. 1 and on an enlarged scale.

Referring to the drawings and to the embodiment of my invention there shown, I have illustrated the principles thereof by showing its application to a pneumatic hammer drill of ordinary and usual construction.

The details of the drill are not shown, it being sufficient to say that in the apparatus described the cutting tool 2 is held in a suitable chuck at the end of the drill tool cylinder 1, and is struck a series of rapidly reoccurring blows by a reciprocatory piston (not shown) within the drill tool cylinder, all of which is well understood by those skilled in the art.

Associated with the drill tool I have shown pressure fluid feeding means for holding the cutting tool up against its work, said means acting also to feed the tool as the cut deepens. My invention is in no respect limited to the particular type of feeding means shown, but the same herein consists of a cylinder 3 having one end fixedly attached

to the head 4 of the drill tool and the opposite end provided with a packed aperture through which projects the piston rod 5, carrying at its end the pointed foot 6 adapted to be braced against a vertical side wall of a mine or quarry, in which the apparatus is used. Within the cylinder the piston rod is secured to the piston 7, so that when air is admitted to the cylinder between the piston and the forward cylinder head or that next adjacent the drill tool, the cylinder with its attached head is pressed forwardly in much the same fashion as if the hammer drill were pressed forward against the work by the hand of the operator.

For controlling the admission of pressure fluid not only to the feeding cylinder but also to the tool itself, there is provided a rotatable sleeve 8 which is mounted upon a reduced portion 9 of the drill tool head 4. Into the end of the reduced head portion 9 is threaded the end of the feeding cylinder 3, so that the latter and the cylinder head block 10, the latter closing the end of the cylinder, are seated against and fixedly held by the walls of the drill head.

To retain the sleeve 8 longitudinally in position there is provided the split clamping collar 11, which is clamped about the necked-down end of the reduced head portion 9. In order that this clamp may also assist in securing the cylinder end more firmly, the interiorly threaded necked-down portion of the head portion is preferably provided with two or more longitudinal slits (not shown) so that when the clamping collar is set up tight it also clamps the head and the cylinder into firm threaded engagement with each other.

Pressure fluid is supplied jointly from any suitable source (not shown) to the feeding cylinder and the tool by the pipe 12, which latter has a threaded nipple connected to the admission opening 13 at the side of the cylinder near its attachment to the drill tool. Communicating with the admission opening 13 is the main supply port 14 which extends longitudinally forward through the cylinder head block 10 and the tool head to the valve chamber 15, in which latter is arranged the throttle valve 16 of the piston type controlled by the rotatable sleeve 8. Opening out of the valve chamber are two passages 17 and 18, the former being ar-

5 ranged parallel with the admission port 14 and leading back to the pressure space 19 within the feeding cylinder. The second and shorter passage 18 leads from the valve chamber in the opposite direction to the pressure space 20 of the drill tool where it is supplied to the tool cylinder through the control of a suitable differential or other valve (not shown) of any usual or suitable construction.

10 As is more fully set forth in my aforesaid prior copending application, through means of the rotatable sleeve 8; the throttle valve 16 may be moved to control both the feeding pressure fluid and the tool pressure fluid, this being accomplished in the present instance by successive steps. The valve in one position connects the feeding cylinder passage 17 with the atmosphere through the vent opening 21 opening outwardly from the valve chamber 15, so that no pressure is maintained in the feeding space of the feeding cylinder. In the second position the valve cuts off the feeding cylinder passage from communication with the vent opening and opens the same to the live pressure fluid passage 14,—this acting to press the drill against the work. Further movement of the valve, while maintaining the pressure fluid supply to the feeding cylinder space, also admits the same in greater or less amount to the drill port 18 to operate the tool.

35 While the piston may be of any desired construction in order to better prevent leakage from the pressure cylinder, the piston, in the apparatus shown, has a reduced end 22 (Fig. 1) on which there is provided a sleeve 23. The inner end of said sleeve has formed thereon a shoulder adapted to receive a packing ring 24, which latter, therefore, rests between the shoulder and the enlarged portion of the piston 7. Beyond the sleeve 23 there is also provided another shouldered sleeve carrying a second packing ring 26. On an outer shoulder of the sleeve 25 is arranged a split expanding ring 27 and this, together with the sleeve 23, is retained in place by the feed-piston-nut 28 secured to the threaded end of the reduced piston portion 32. The reduced piston portion is provided with an axial passage 29 extending part way into the same and opening into the pressure space 19, radial passages 30 alining with the piston ring 24 and other radial passages 31 alining with the piston ring 26 being extended from the axial passage through the piston and the respective sleeves, so as to admit pressure fluid constantly to the inside of the piston rings. So long, therefore, as feeding pressure fluid is admitted to the pressure space, it also acts to expand the rings and better to prevent leakage. A tapered plug 32 is threaded into the end of said piston and

the latter is split at 33, so that the plug expands the piston end within the threaded nut 28 and prevents any loosening of the parts. The plug is provided with an axial passage 34, which places the piston passage 29 in communication with the pressure space 19. The inner end of the feeding cylinder is enlarged slightly at 35 where its walls engage the ring 27 in the contracted condition of the piston, so that the expansion of the ring tends to retain the piston normally in that position, rendering it more convenient for purposes of transportation or handling. The enlarged portion of the cylinder, however, is beveled at 36 and the end of the ring is also rounded at 37, so that pressure fluid when admitted will readily force the piston outward by forcing the ring to contract and ride over the beveled wall. This construction constitutes a convenient retention device for retaining the apparatus in its contracted condition.

While I have shown and described in detail one form of my invention it is to be understood that the same is not to be limited to the particular detail or form or relation of parts shown, but that extensive modifications may be made therein without departing from the spirit of my invention.

#### Claims.

1. The combination with a pressure fluid tool of extensible pressure fluid feeding means therefor, comprising a feeding cylinder, with its cooperating piston, and means normally to retain said apparatus in its contracted condition, said means being releasable by the admission of feeding pressure fluid to the feeding cylinder.

2. The combination with a pressure fluid tool of a feeding cylinder therefor, a cooperating piston and means normally maintaining the piston at one end of the cylinder, said means being inoperative to retain the piston against the feeding pressure fluid.

3. The combination with a pressure-fluid tool of a feeding cylinder therefor, a feeding piston and an expansible member in said piston, said cylinder having a suitable formation in its walls with which said member cooperates to hold the piston fixed against extension, said expansible member being so located as to engage with said holding cylinder formation in the contracted position of the piston.

4. The combination with a pressure fluid tool of extensible pressure fluid feeding means therefor, comprising a feeding cylinder with its cooperating piston, and yieldable means normally to retain said apparatus in its contracted condition but automatically permitting the extension of said feeding means through application of force to the piston.

5. The combination with a pressure fluid tool of extensible pressure fluid feeding

means therefor, comprising a feeding cylinder with its cooperating piston, and an expansion ring carried by said piston, said cylinder being provided with a suitable enlargement to engage with said expansion ring when the feeding apparatus is in its contracted condition.

6. The combination with a pressure fluid tool of extensible feeding means therefor, comprising a feed cylinder with its cooperating piston, said piston and cylinder being provided one part with an expansible member and the other part with a cooperating depression adapted to be engaged by said expansible member to retain the apparatus in its contracted condition, said piston and cylinder being automatically releasable when the apparatus is in use to permit extension of the feeding means.

7. The combination with a pressure-fluid tool of expansible pressure feeding means therefor comprising a feeding cylinder member with its cooperating piston member contained within the cylinder, a yieldable part on one member having a beveled edge and said other member having a cooperating depression engageable with the yielding part when the apparatus is contracted and in a condition for disuse, said beveled edge permitting the enforced disengagement of said parts.

8. In a pressure fluid tool, extensible pressure fluid feeding means including a feeding cylinder having an enlarged portion in

the cylinder walls, a cooperating piston, a split expanding ring carried by said piston and adapted to engage said enlarged portion to retain the piston in contracted position, the engaging walls of the ring and cylinder being fashioned to cause the ring to yield and permit extension of the piston within the cylinder on application of fluid pressure to the piston.

9. The combination with a pressure-fluid tool 1, of a feeding cylinder 3, the piston 7, the expanding ring 27, and the enlargement 35 in the interior of the cylinder for receiving the ring when expanded.

10. The combination with a pressure fluid tool of expansible fluid feeding means therefor, comprising a feeding cylinder with its cooperating piston, said piston and cylinder being provided one part with a yielding member and the other part with a cooperating member having a depression adapted to be engaged by the said yielding member to retain the apparatus in its contracted position, said members having a beveled formation to permit automatic release of the piston under fluid pressure.

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

GEORGE H. GILMAN.

Witnesses:

ALEXANDER HICKS,  
E. J. BURCHARD.