W. A. SMITH.

BLOWING DEVICE FOR PERCUSSIVE TOOLS.

APPLICATION FILED DEC. 5, 1918.

1,384,641. Patented July 12, 1921.

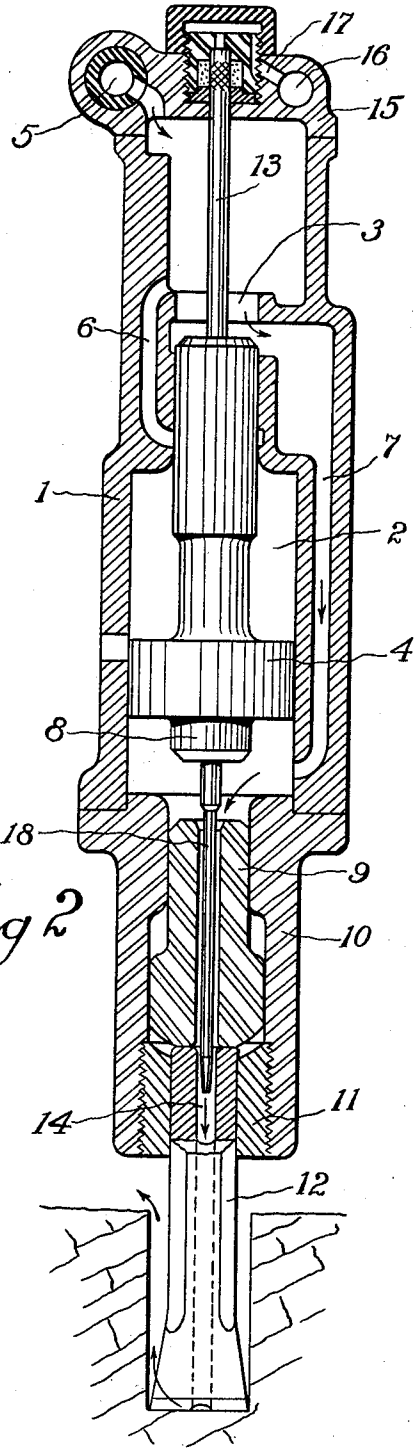

Fig 2

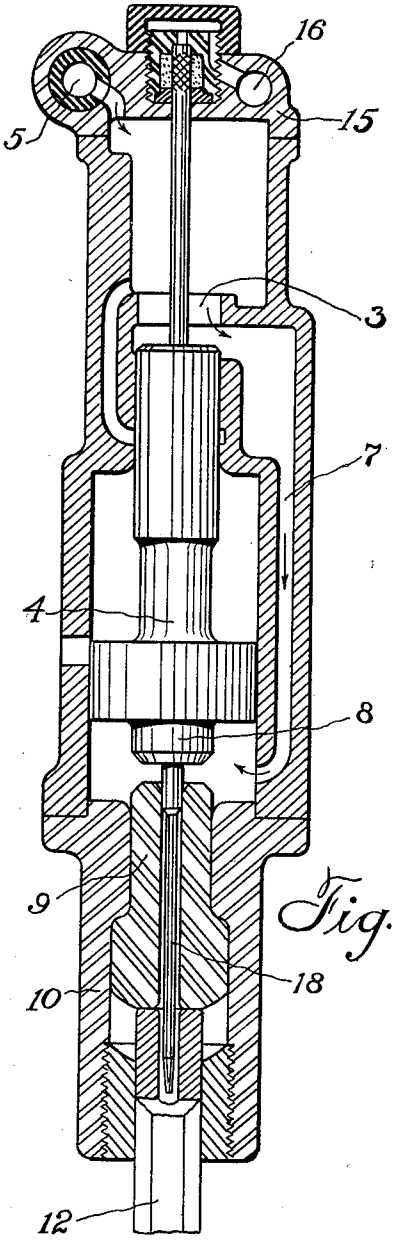

Fig. 1.

INVENTOR.
W. a. Smith
BY Joseph N. Schofield
ATTORNEYS.

UNITED STATES PATENT OFFICE.

WILLIAM A. SMITH, OF EASTON, PENNSYLVANIA, ASSIGNOR TO INGERSOLL-RAND COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

BLOWING DEVICE FOR PERCUSSIVE TOOLS.

1,384,641. Specification of Letters Patent. **Patented July 12, 1921.**

Application filed December 5, 1918. Serial No. 265,401.

To all whom it may concern:

Be it known that I, WILLIAM A. SMITH, a citizen of the United States, residing at Easton, in the county of Northampton and State of Pennsylvania, have invented a certain new and useful Improvement in Blowing Devices for Percussive Tools, of which the following is a specification.

This invention relates to percussive tools which are usually of the hammer type and in particular to a blowing device for a tool of this type.

The objects of the present invention are to provide a blowing device for the above type of tool which will be simple, compact, and one which may readily be applied to present tools without alteration of the main portions or parts of the tool. A further object of the invention is to provide a blowing device which may be utilized conveniently by merely raising the tool slightly to operate the blowing and pressing it down again when the blowing is not desired.

With the above and other objects in view my invention consists in the features of construction and operation set forth in the following specification and illustrated on the accompanying drawing, forming a part hereof, in which—

Figure 1 shows a sectional view taken longitudinally of the complete tool with the parts in the position assumed while drilling, and

Fig. 2, shows a similar view with the parts in the position assumed while the blowing is taking place.

Referring more particularly to the figures of the drawings, 1 refers to the cylinder, which may be of any convenient or desired form. In the embodiment of the invention selected for illustration the cylinder 1 comprises pressure chambers of two different diameters 2 and 3 in which reciprocates a piston 4 having portions fitting both diameters of the cylinder. The piston 4 is of the valveless type which is a well known form for this type of tool and does not require additional explanation.

Motive fluid is admitted at 5 and exerts a constant pressure against the rear end of the piston 4 and passages 6 and 7 control the admission of fluid to either end of the larger bore 2 of the cylinder 1. At the forward end of the piston 4 an extension 8 is provided which serves as a striking portion and at the forward end of the stroke of the piston 4 strikes the rear face of the anvil block 9. The anvil block 9 is located within a front head 10 fastened to the front of cylinder 1 in any usual or convenient manner, usually this being accomplished by means of side bolts (not shown). Partly closing the front end of the front head 10 is the chuck 11 which may be threaded into the front head and provided with a hole corresponding to the shape of the drill steel 12.

Extending from one end to the other of the tool is a rod 13 which may be either solid or hollow, the one shown being hollow for the purpose of admitting water to the hole 14 provided in the drill steel 12. The rod 13 is preferably fastened in any convenient manner to the back head 15 with which the tool is provided. The back head 15 is provided also with a source of water supply which enters at 16 and, passing through passage 17, is admitted to the bore extending through the rod 13. It will thus be seen that water may be supplied directly to the hollow drill steel 12 in the usual manner. In order to force the water down through the hollow drill steel in drilling deep holes it becomes necessary at times to augment the pressure. This is especially true where the material being drilled is soft and the cuttings tend to clog the drilling. To accomplish this purpose is the particular function for which the present device has been devised.

At a point near the rear end of the anvil block 9 the rod 13 is reduced in diameter as shown at 18 or its cross sectional area is reduced so that a free passage is provided between the sides of the rod 13 and the walls of the hole through the anvil block 9 permitting a flow of motive fluid from the front end of bore 2 of the cylinder 1 through anvil block 9 and drill steel 12. This flow of motive fluid can take place only when the anvil block is in the position indicated in Fig. 2 in which it is at the forward end of the cavity in which it is located. In the normal working position indicated in Fig. 1, in which the anvil block 9 surrounds the portion of the rod 13 of full diameter, only the limited amount of air which can leak between the rod 13 and the anvil block 9 can pass down through the steel. Should it be desired to dispense entirely with the water supply and depend solely upon the

motive fluid for blowing the cuttings from the hole the rod 13 may be made solid but reduced in diameter or having its cross sectional area reduced if desired in the same manner as above indicated, although this reduced portion could preferably be made much shorter than shown, simply serving as a guide to keep the rod central of the anvil block, or obviously the reduced portion could be entirely omitted in which case, however, the advantages of the guide would be lost.

Coming now to the method of operation, during normal drilling the position of the drill steel 12 and anvil block 9 is as shown in Fig. 1 during which practically no motive fluid is admitted to the drill steel 12 from the cylinder bore 2 as the full diameter of the rod 13 substantially fills the hole bored in the anvil block 9. The cuttings are therefore removed principally by the action of the water admitted to the drill steel 12 through the rod 13 from the back head 15. To augment the blowing effect the tool is slightly raised from the drill steel 12, so that the anvil block 9 is forced forwardly within the cavity of the front head 10 by the pressure of the motive fluid exerted within the forward end of the cylinder bore 2. This forward movement of the anvil block 9 serves to open the passage through the anvil block permitting motive fluid to pass down through the anvil block 9 to the drill steel 12.

As soon as the hole is sufficiently cleared of cuttings the tool may again be forced down to its work whereupon drilling will again occur at full efficiency. With the parts in the position shown in Fig. 2 the projection 8 at the forward end of the piston 4 enters the bore in the front head 10 in which the anvil block 9 is located, thus forming a pocket in which the motive fluid is trapped and forming an air cushion to prevent the piston striking against the front head while the air passage through the anvil block is open and thus injuring it.

It is to be understood that the present showing and description disclose only one specific embodiment of the present invention, and that other forms and modifications are included within the spirit and scope of the invention, as expressed in the appended claims.

What I claim is;

1. In a blowing device for percussive drills, a cylinder, a front head, an anvil block provided with a longitudinal hole within said front head, a rod extending through said cylinder and anvil block and reduced in cross section near its forward end so that when the drill cylinder is moved back, permitting said anvil block to move forward relatively thereto, communication is opened directly from the forward end of the drill cylinder through the anvil block to the hole in the drill steel.

2. In a blowing device for percussive drills, a cylinder, a front head, an anvil block contained within said front head, a hammer piston within said cylinder, a rod extending through said hammer piston and anvil block, said rod being reduced in cross section near the rear end of said anvil block to permit fluid to pass into a drill steel from the forward end of the cylinder during the return stroke of the piston when the drill is slightly raised and said hammer piston having a reduced extension at its forward end to form an air cushion in the forward end of the cylinder to prevent the piston striking the front head while motive fluid is being forced around the reduced portion of said rod and through the anvil block.

3. In a blowing device for percussive drills, a cylinder, a front head, an anvil block contained within said front head, a hammer piston within said cylinder, a rod extending through said hammer piston and anvil block, said rod being reduced in cross section near the rear end of said anvil block and fastened rigidly at the rear end of the cylinder, so that when the drill cylinder is moved back, permitting said anvil block to move forward relatively thereto, communication is opened directly from the forward end of the drill cylinder around said reduced portion of said rod and through said anvil block to the hole in the drill steel.

4. In a blowing device for percussive drills, a cylinder, a front head, a piston in said cylinder, an anvil block located at the forward end of said cylinder, a rod secured at the back end of the cylinder and passing through said piston and into said anvil block, a portion of said rod loosely fitting the hole in the anvil block when the block is in its rearward position, rearward movement of the drill cylinder producing relative forward movement of said anvil block and causing the block to slide off the portion of the rod fitting the said hole, and permitting a direct flow of motive fluid from the front end of the cylinder through the anvil block to the drill steel.

In testimony whereof, I have hereunto set my hand.

WILLIAM A. SMITH.

Witness:
ROBERT L. AMBROSE.