

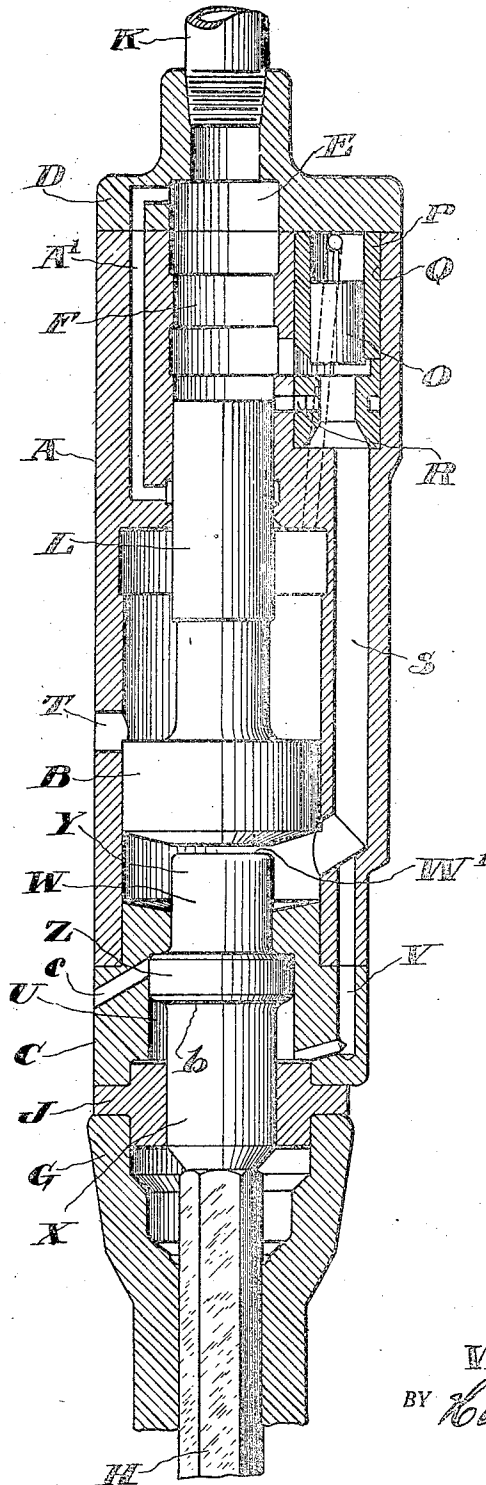
July 6, 1926.

1,591,930

W. A. SMITH

BALANCED ANVIL BLOCK

Filed June 20, 1925



INVENTOR.
William A. Smith
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HIS ATTORNEYS.

UNITED STATES PATENT OFFICE.

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

BALANCED ANVIL BLOCK.

Application filed June 20, 1925. Serial No. 38,476.

This invention relates to fluid actuated rock drills, but more particularly to the percussive element of certain types of rock drills, in which a member or anvil block is interposed slidably between the hammer piston and the drill steel for transmitting the blows of the piston to the drill steel.

Heretofore in drills of this type, considerable annoyance has been caused by the tendency of the drill to recoil from the work at a certain point during the cycle of operations. This is particularly the case in hand held machines in which the recoil of the drill is transmitted directly to the operator. It is accordingly an object of this invention to eliminate the tendency of a rock drill to recoil from the work at a certain period during the cycle of operation.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention consists of the combinations of elements, features of construction and arrangement of parts having the general mode of operation, substantially as hereinafter described and more particularly pointed out in the appended claims and illustrated in the accompanying drawings.

The drawing shows a rock drill in elevation sectioned longitudinally, illustrating one embodiment which the invention may assume in practice.

Referring more particularly to the drawing, the invention is shown embodied in a rock drill of the hand held type, having a cylinder A and a piston B adapted to reciprocate within the cylinder. A front cylinder washer C is supported within the front end of the cylinder A and serves as a closure for said front end. The back end of the cylinder is sealed by a back head D which in this instance is provided with a bore E to form an extension to a reduced rearward bore F of the cylinder. A front head G is arranged at the front end of the drill to receive slidably a hollow drill steel H. In this instance, the front head is centralized with the front cylinder washer C by means of a flanged bushing J. The parts comprising the drill casing, namely the cylinder A, the back head D, the front cylinder washer C, the front head G and the flanged bushing J may be held in operative position with respect to each other by any suitable and convenient means such as for instance, side rods (not shown) which may be arranged on op-

posite sides of the drill for clamping these parts firmly together.

Pressure fluid is supplied to the drill through a connection K secured to the back head D and constant pressure is maintained in the bore F. In this instance, the admission of pressure fluid through a passage A' to the back end of the cylinder is controlled by an extension L of the piston B and the admission of pressure fluid to the front end of the cylinder is controlled by a spool valve O operative within a bushing P inserted in a suitable bore Q formed in the rearward portion of the cylinder A. The valve O is so arranged with respect to the bore F that when the piston B nears the end of its forward stroke, a passage R is uncovered by the extension L to admit pressure fluid into the bushing P for unseating the valve, whereupon pressure fluid passes from the bore F through a passage S to the front end of the cylinder for returning the piston B. A free exhaust T is preferably formed intermediate the ends of the cylinder and is controlled by the piston B.

In accordance with the present invention, the front cylinder washer C is provided with an enlarged bore U which forms a pressure chamber and communicates with the front supply passage S through a passage V. Disposed within the front cylinder washer C is an anvil block W for transmitting the blows of the piston B to the drill steel H. In this instance, the anvil block W is provided with front and rear extensions X and Y respectively, said extensions being preferably of substantially equal diameter.

Means are provided for holding the anvil block against its seat during the period when pressure fluid is admitted to the front end of the cylinder. To this end a collar Z is formed on said block to provide a forward actuating and holding face b, said face being preferably of the same area as the impact face W' of the anvil block. In order to prevent the forming of a cushion between the collar Z of the anvil block and its seat, a vent c is formed in the washer C to enable the pressure fluid leaking into the back end of the chamber U to escape to atmosphere.

Ordinarily in machines of this type, the pressure to the machine necessary for efficient drilling is supplied by the operator by pressing downwardly on the drill. By so doing, the drill steel is projected into the

front head against the anvil block W and tends to press said anvil block to its seat. In this position of the anvil block the rearward extension Y projects well into the front end of the cylinder A and into the path of the piston. However, with the parts in this position and at the time that pressure fluid is admitted into the front end of the cylinder, the expansion of the pressure fluid acting against the face W' of the anvil block and the front face of the piston B tends to raise the drill casing and consequently moves the anvil block W forwardly with respect to the cylinder, so that when the piston B is again driven forwardly, the effect of its blows will be greatly reduced. By this invention this objectionable feature has been entirely eliminated, and due to the fact that pressure fluid is admitted to the chamber U simultaneously with the admission of pressure fluid to the front end of the cylinder, and also owing to the fact that the area of the actuating face b substantially equals the area of the rearward face of the extension Y, the anvil block is at all times in position to receive the full effect of the blow of the hammer piston B. As will be noted from the foregoing description, the admission of pressure fluid to the chamber U is intermittent, and since the exhaust of pressure fluid from said chamber takes place simultaneously with the exhaust of pressure fluid from the front end of the cylinder, the full force of the blow of the hammer piston may be obtained.

The above described invention has been found to be unusually efficient in operation. By its use the drilling efficiency of a machine of this type may be greatly increased and permits of longer continuous periods of operation without fatigue on the part of the operator as compared with drills not pro-

vided with this feature. A further advantage is that this construction permits of a considerably heavier piston being employed without causing the excessive vibration usually present in machines of this type.

I claim:—

1. In a fluid actuated rock drill the combination of a cylinder having a supply passage, a reciprocatory hammer piston in the cylinder, a hollow front cylinder washer having a pressure chamber in communication with the supply passage, an anvil block slidable in the washer and having a rearward face extending into the cylinder, and a collar on said anvil block slidable in the pressure chamber and having an actuating and holding face against which pressure fluid from the supply passage may intermittently act for counterbalancing pressure fluid acting against said rearward face during admission of pressure fluid into the front end of the cylinder.

2. In a fluid actuated rock drill the combination of a cylinder having a front supply passage, a reciprocatory hammer piston in the cylinder, a hollow front cylinder washer having a pressure chamber, an anvil block slidable in the washer and having an impact face extending into the cylinder, a collar on said anvil block, a forward actuating and holding face of the same area as the impact face, and a passage through the cylinder and the washer connecting the chamber with the supply passage to admit pressure fluid intermittently into said chamber simultaneously with the admission of pressure fluid to the front end of the cylinder for preventing movement of the anvil block during the admission of such pressure fluid.

In testimony whereof I have signed this specification.

WILLIAM A. SMITH.

Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,591,930, granted July 6, 1926, upon the application of William A. Smith, of Athens, Pennsylvania, for an improvement in "Balanced Anvil Blocks," an error appears requiring correction as follows: The present drawing should be canceled and the drawing containing the figure attached hereto should be inserted therefor as part of the Letters Patent; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 17th day of August, A. D. 1926.

[SEAL.]

M. J. MOORE,
Acting Commissioner of Patents.

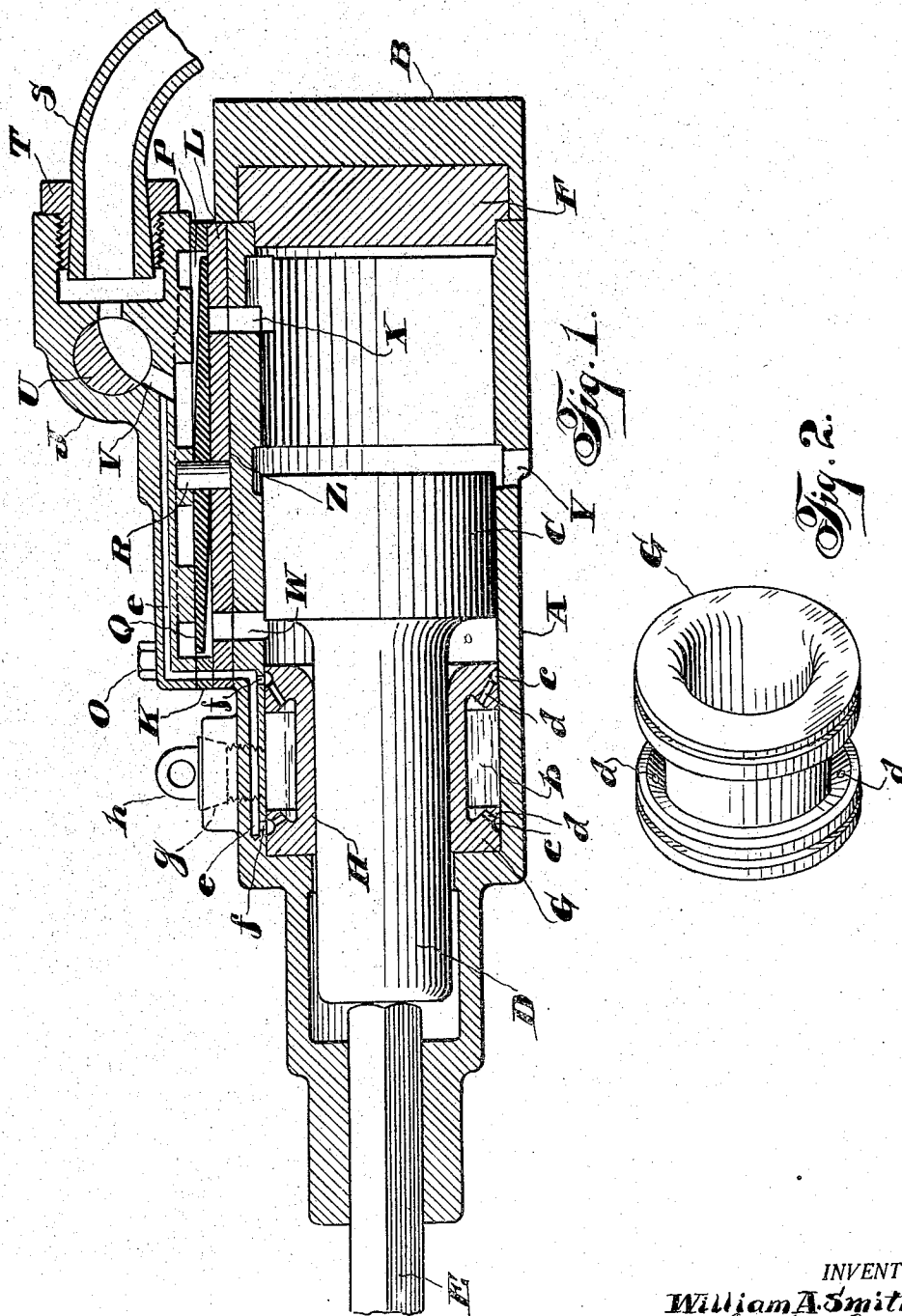
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