A. H. TAYLOR.

HAMMER DRILL.

APPLICATION FILED FEB. 19, 1909.

975,905. Patented Nov. 15, 1910.

Fig. 1.

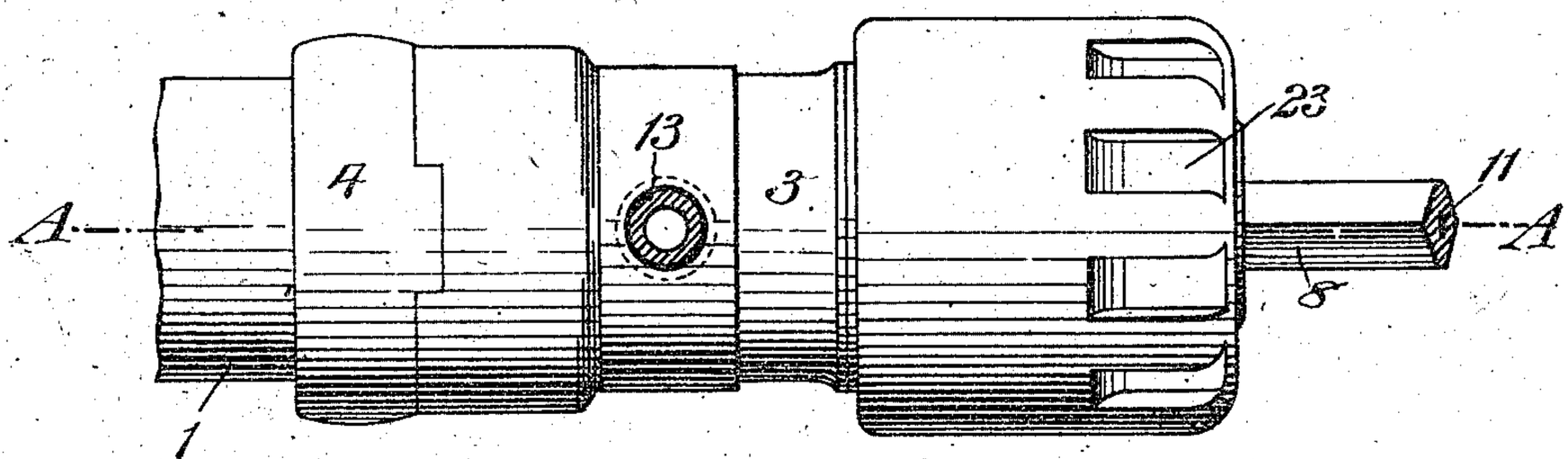


Fig. 2.

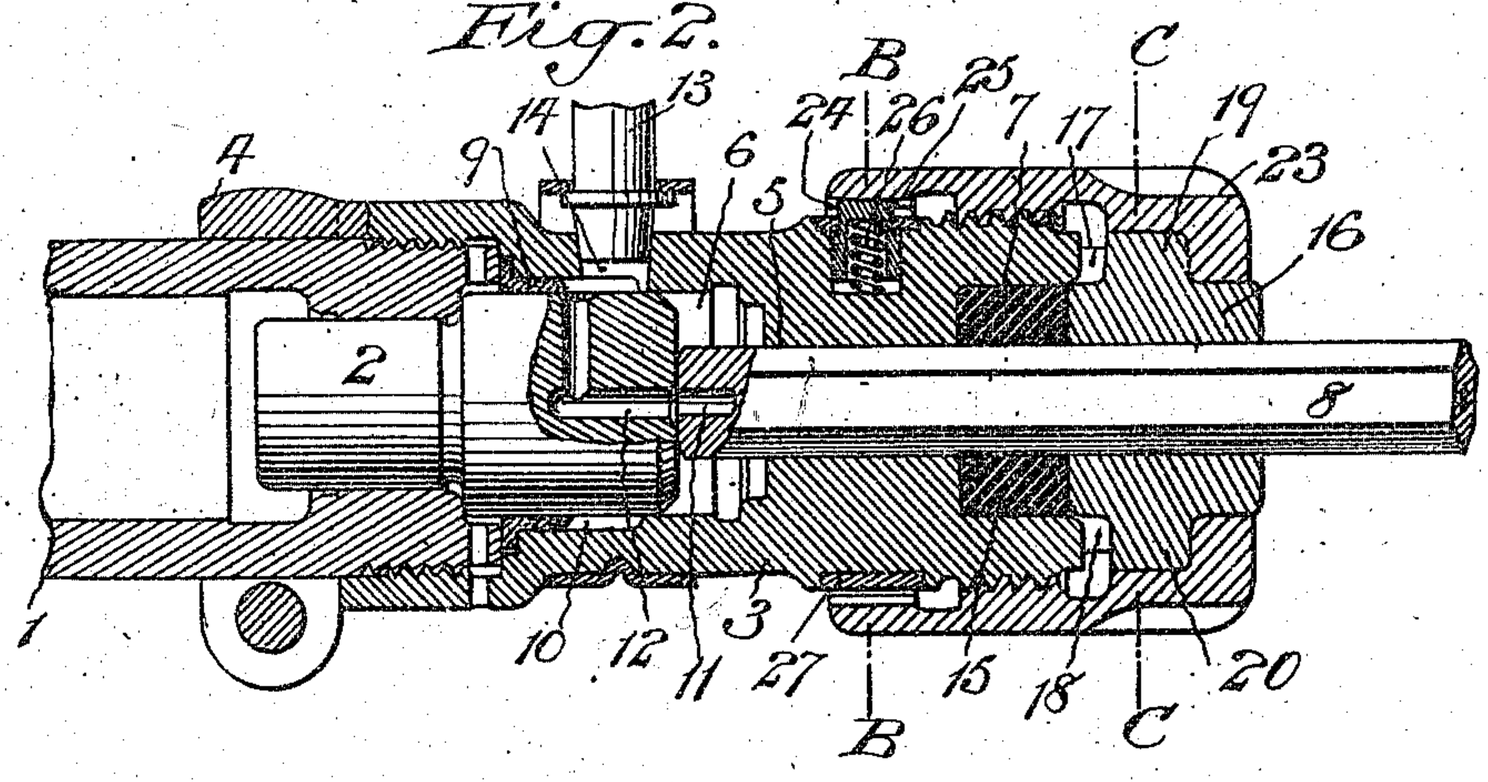


Fig. 3.

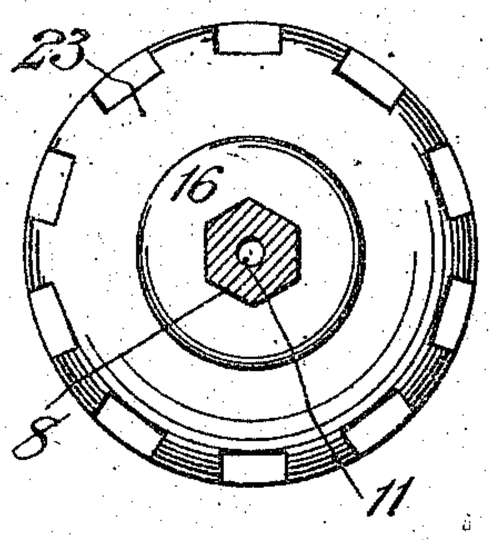


Fig. 4.

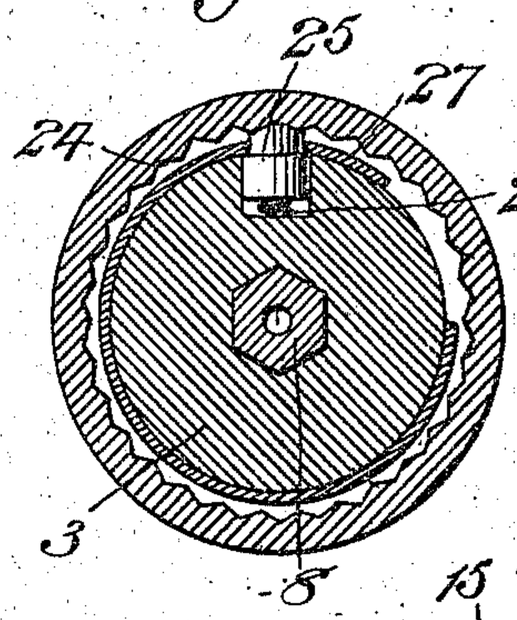


Fig. 5.

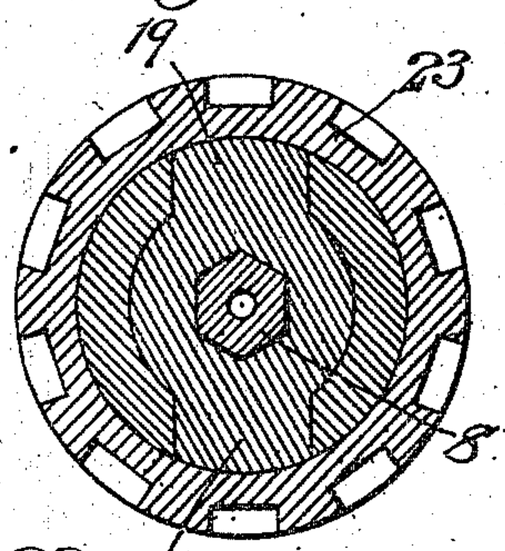


Fig. 7.

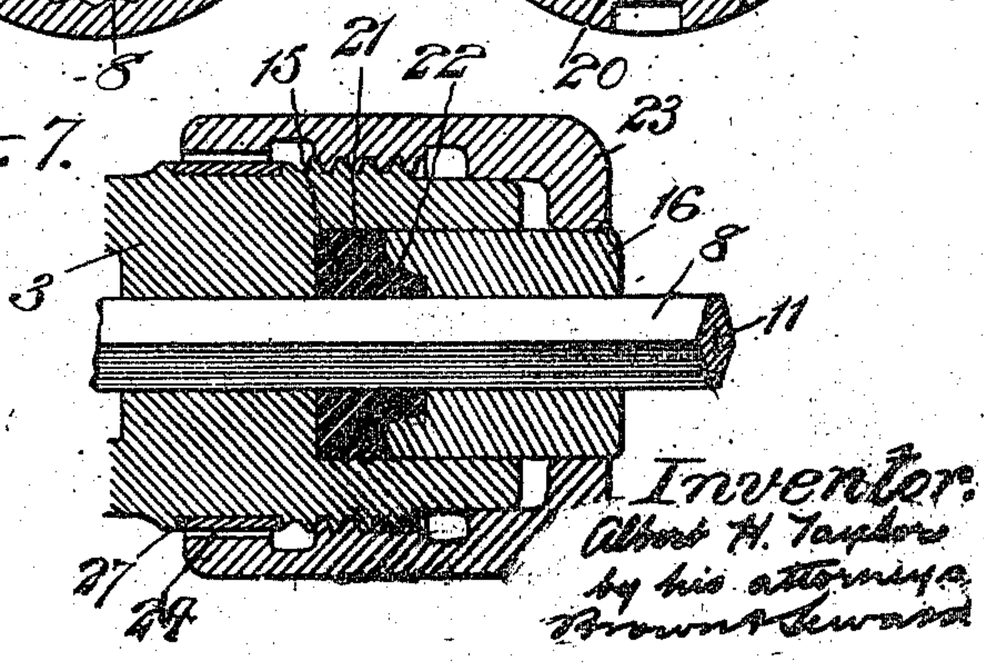
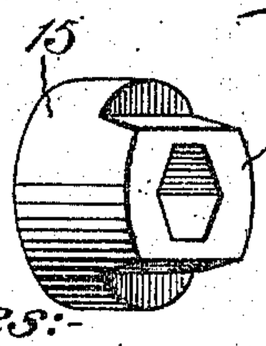


Fig. 6.



Witnesses:-

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Albert H. Taylor

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UNITED STATES PATENT OFFICE.

ALBERT H. TAYLOR, OF EASTON, PENNSYLVANIA, ASSIGNOR TO INGERSOLL-RAND COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

HAMMER-DRILL.

975,905. Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed February 19, 1909. Serial No. 478,795.

To all whom it may concern:

Be it known that I, ALBERT H. TAYLOR, a citizen of the United States, and resident of Easton, in the county of Northampton and State of Pennsylvania, have invented new and useful Improvements in Hammer-Drills, of which the following is a specification.

This invention relates to improvements in hammer drills and has for its object to provide certain improvements in the construction, form and arrangement of the several parts at the front end of the drill whereby the leakage of the pressure fluid around the drill steel within the front head is prevented thus insuring a constant supply of the pressure fluid to the cutting faces through the drill steel.

In the accompanying drawings, Figure 1 represents in side elevation the front end of a hammer drill embodying this invention, Fig. 2 is a longitudinal central section through the same, taken in the plane of the line A—A of Fig. 1, Fig. 3 is a front end view of the drill, the drill steel being shown in section, Fig. 4 is a transverse section taken in the plane of the line B—B of Fig. 2, Fig. 5 is a transverse section taken in the plane of the line C—C of Fig. 2, Fig. 6 is a detail view in perspective of the elastic washer which forms the fluid-tight packing for the drill steel within the front head, and Fig. 7 is a detail longitudinal central section through the drill in a plane at right angles to Fig. 2.

The hammer cylinder is denoted by 1 and its anvil block by 2. The front head 3 which forms the drill steel holder is secured to the front end of the hammer cylinder as, for instance, by being screwed thereon, and it is locked in position by a clamping ring 4. This front head is provided with a reduced bore 5, intermediate inner and outer enlarged bores 6 and 7 through which reduced bore the shank of the hollow drill steel 8 is inserted into position to have its end engaged by the anvil block 2. This reduced bore 5 in the front head is made to conform to the cross sectional shape of the drill steel.

A cup washer 9 is located around the head of the anvil block 2 to form a fluid-tight packing to prevent the pressure fluid from working back into the hammer cylinder. A pressure fluid chamber 10 surrounds the head of the anvil block 2.

The bore 11 of the hollow drill steel 8 is in open communication at all times with this chamber 10 through a duct 12 in the head of the anvil block, the longitudinal branch of which duct is in alinement with the bore 11 in the drill steel and the transverse branch of which duct opens into the chamber 10.

A pressure fluid supply pipe 13 is secured to a hole 14 in the side wall of the front head in communication with the chamber 10.

An elastic washer 15, preferably of rubber, is inserted within the outer enlarged bore 7 of the front head, the bore of which washer conforms to the cross sectional shape of the drill steel 8.

A bushing 16 is located in front of the elastic washer 15, which bushing is locked against rotary movement with respect to the front head but permitted a longitudinal movement with respect thereto, for instance, by providing the outer end of the front head with open ended slots 17, 18, and the bushing 16 with lugs 19, 20 entering said slots. The bore of the bushing 16 conforms to the cross sectional shape of the drill steel 8.

The elastic washer 15 and the bushing 16 are interlocked, as, for instance, by providing the elastic washer with a flattened lug 21 on its outer face and the bushing with a recess 22 in its inner face for receiving said lug.

A nut 23 has a screw threaded engagement with the outer end of the front head 3 and also engages the bushing 16. This nut is yieldingly held in any of its rotatively adjustable positions as, for instance, by providing its inner end with an interior annular series of ratchet teeth 24 arranged to be engaged by a spring pressed pawl 25 seated in the front head.

The spring which forces the pawl into engagement with the teeth 24 is denoted by 26 and the pawl is limited as to its outward movement by a circumferential band spring 27 so as to permit the removal of the nut without displacement of the pawl.

In operation, the nut 23 is first unscrewed sufficiently to remove the pressure of the bushing 16 on the elastic washer 15. The drill steel is then inserted into its position through the bushing 16, the washer 15 and

t' ' small bore 5 of the front head. The nut 23 is then screwed inwardly thus causing the bushing 16 to insert a sufficient amount of pressure upon the elastic washer 15 to cause it to expand to form a fluid-tight joint between the drill steel and the front head. The fluid may then be introduced through the supply pipe 13 into the hollow drill steel.

It will be seen that the elastic washer 15 absolutely prevents the leakage of the pressure fluid as it is being fed to the drill steel.

When it is desired to remove the drill steel, the nut 23 is unscrewed sufficiently to cause the bushing to remove its pressure from the elastic washer 15 and thus free the drill steel from the grip of the elastic washer.

The pawl and ratchet connection between the front head and nut serves to prevent the vibrations of the drill from causing the nut to unscrew.

The packing shown and described but not claimed herein forms the subject matter of applicant's co-pending application filed June 5, 1909, Serial No. 500,279.

What I claim is:—

1. In a hammer drill, a front head having outer and inner enlarged bores and an intermediate reduced bore, an anvil block having its head located in the inner enlarged bore, a drill steel fitted to the intermediate reduced bore, an elastic washer located in the outer enlarged bore and means for causing the washer to grip and release the steel.

2. In a hammer drill, a front head having outer and inner enlarged bores and an intermediate reduced bore, an anvil block having its head located in the inner enlarged bore, and provided with a pressure fluid passage, said front head having a pressure fluid chamber therein surrounding the anvil block, a hollow drill steel fitted to said intermediate reduced bore and in open communication with the pressure fluid feeding chamber through the passage in the said anvil block, an elastic washer in said enlarged outer bore and means for causing the washer to grip the steel to prevent the leakage of pressure fluid around the steel.

3. In a hammer drill, a front head having outer and inner enlarged bores and an intermediate reduced bore, an anvil block having its head located in the inner enlarged bore, and provided with a pressure fluid passage, said front head having a pressure fluid chamber therein surrounding the anvil block, a hollow drill steel fitted to said intermediate reduced bore and in open communication with the pressure fluid feeding chamber through the passage in the said anvil block, an elastic washer in said enlarged outer bore, means for causing the washer to grip the steel to prevent the leakage of pressure fluid around the steel, and a washer surrounding the head of the anvil block for preventing the leakage of the pressure fluid to the hammer cylinder.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this 17th day of February, 1909.

ALBERT H. TAYLOR.

Witnesses:
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CHAS. B. BRUNNER.