

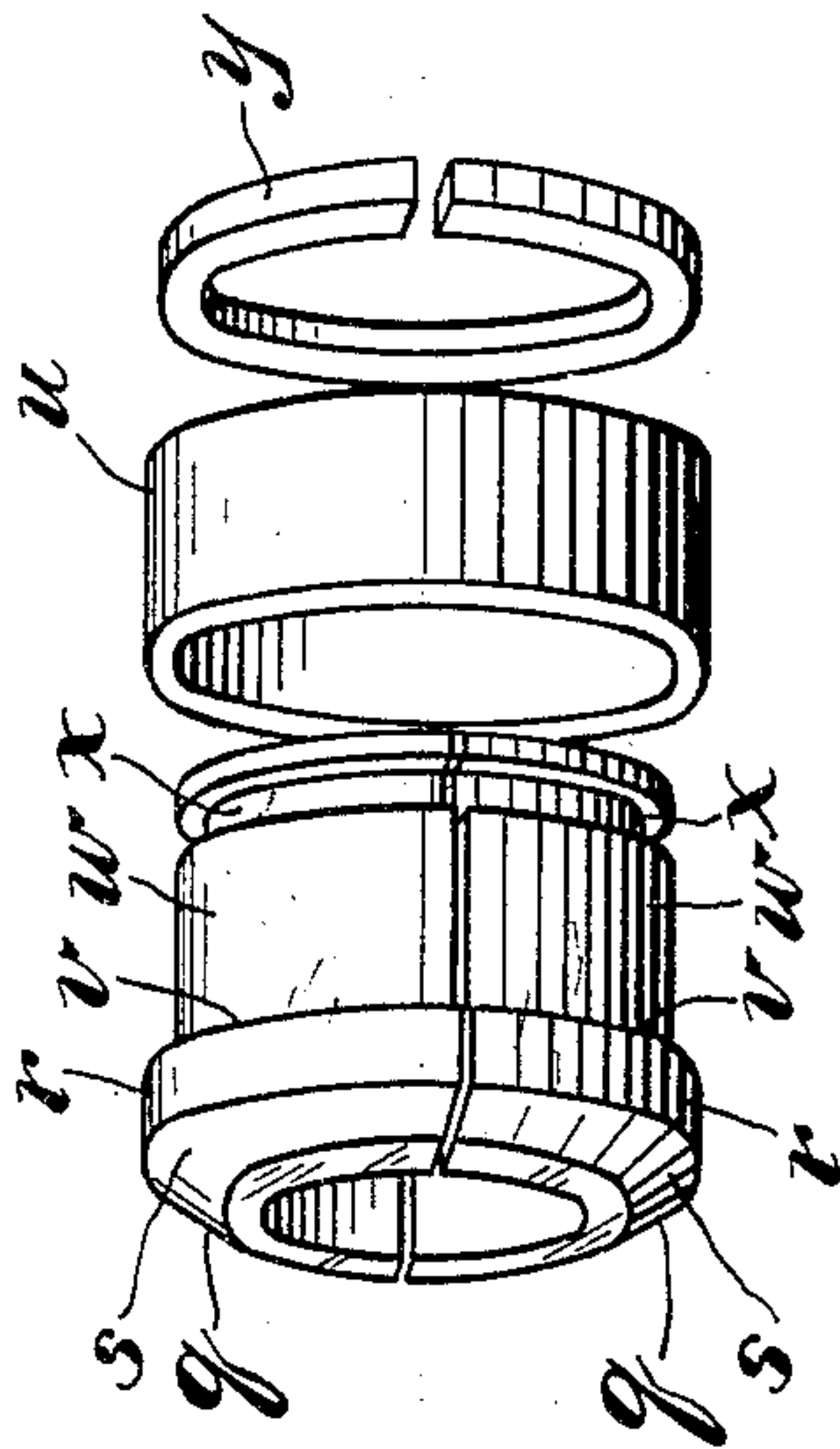
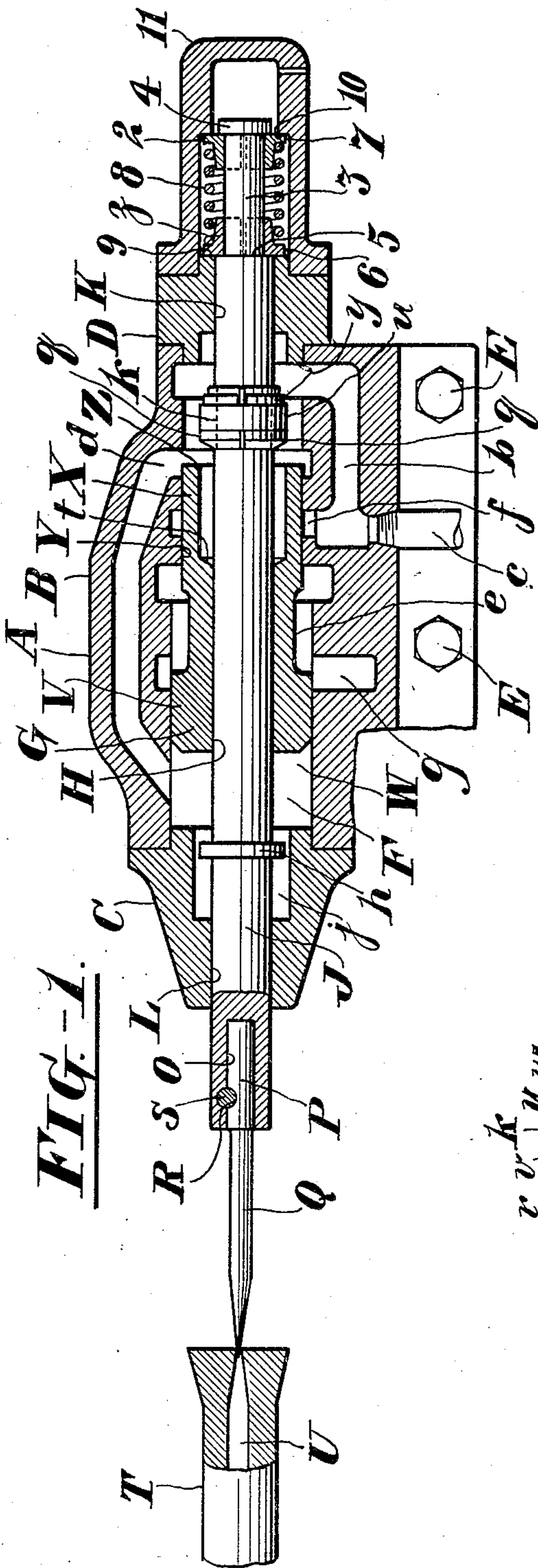
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SHANK AND BIT PUNCH

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SHANK AND BIT PUNCH

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This invention relates to shank and bit punches, but more particularly to an anvil block for devices of this type.

One object of the invention is to enable the working implement, such as a punch pin to be driven into the work and removed therefrom by the direct application of the blows of the hammer piston.

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

In the drawings in which similar reference characters refer to similar parts,

Figure 1 is a longitudinal sectional elevation of a shank and bit punch having the invention applied thereto,

Figure 2 is an enlarged longitudinal elevation partly in section of a detail, and

Figure 3 is a perspective view of the parts comprising the removable head for the anvil block.

Referring more particularly to the drawings, A designates generally a shank and bit punch comprising a cylinder B and front and back heads C and D respectively.

The shank and bit punch A may be secured in operative position, either on a drill sharpener (not shown) whereon machines of the type to which the present invention pertains are usually mounted, or to any other suitable support, bolts E being indicated for this purpose. Within the cylinder B is formed a piston chamber F to accommodate a reciprocatory hammer piston G having a longitudinal bore H therethrough to receive slidably an anvil block J.

The anvil block illustrated extends entirely through the piston and is disposed slidably rearwardly of the piston chamber F in a bore K in the back head D. Similarly the front head C is provided with a bore L to slidably support the forward portion of the anvil block J.

In the form of the construction shown the anvil block J also serves as a tool holder and accordingly has a socket O in its front end to receive the shank P of a punch pin Q. The punch pin Q may be of a well known type, that illustrated having a notch R in one side to accommodate a locking pin S which extends transversely through the an-

vil block for locking the punch pin securely thereto.

The work whereon the punch pin Q is adapted to operate is designated by T and represents a working implement, such as a drill steel, having a passage U therethrough for conveying cleansing fluid from the rock drill to a hole being drilled. The passage U is shown as being contracted at its end to illustrate a usual condition of this portion of the passage after a prior sharpening operation. The passage U of course is of insufficient area at its end to pass the required amount of cleansing fluid and therefore it becomes necessary to open the ends of the passage U to the correct proportions. This is the function of the punch pin Q.

The piston G is of the differential type having a head V which lies in a forward enlarged portion W of the piston chamber F and a stem X extending into a reduced portion Y of the piston chamber.

In the type of machine illustrated the piston G acts as the pressure distributing agency. The rearward end surface Z of the stem X may be constantly exposed to pressure fluid conveyed into the reduced portion Y of the piston chamber by a passage b leading from a supply connection c.

At a point forwardly of the juncture of the passage b and the reduced portion Y of the piston chamber is a front inlet passage d which leads forwardly through the cylinder B to a point near the forward end of the enlarged portion W of the piston chamber. The inlet opening of the inlet passage d is so located that in the rearward position of the piston G communication between the passages b and d will be cut off by the stem X of the piston.

The admission of pressure fluid to the rearward end of the enlarged portion W of the piston chamber is controlled by a neck e adjacent the head V of the piston. The neck is of such length that it may establish communication between a supply passage f associated with the supply connection c and with the rearward end of the enlarged portion W of the piston chamber. The exhaust of pressure fluid from the ends of the enlarged por-

tion W is effected through an exhaust port *g* leading from a point intermediate the ends of the enlarged portion W of the piston chamber to the atmosphere, said port *g* being controlled by the head V of the piston.

In accordance with the present invention the anvil block J is provided with a collar *h* adjacent the forward extremity of the piston chamber F. The collar *h* is preferably an integral portion of the anvil block J and may, in certain positions of the anvil block, extend into a recess *j* in the front head C, said recess opening into the front end of the piston chamber F.

In that portion of the anvil block J adjacent the rearward end of the reduced portion Y of the piston chamber is an annular groove *k* having abutments or shoulders *o* and *p* at its rearward and forward ends respectively.

The groove *k* is adapted to receive a removable head for the anvil block comprising a pair of semi-cylindrical members *q* bored to receive the reduced portion of the anvil block J. The members *q* in this instance are provided at their front ends with flanges or shoulders *r*, the forward surfaces *s* of which are adapted to receive blows of impact delivered thereagainst by the piston G and are formed to correspond to a surface *t* within the piston stem X.

The members *q* are conveniently held in the groove *k* by means of an endless band or ring *u* adapted to encircle the members which it snugly engages and abutting with its front end the rearward surfaces *v* of the shoulders *r*. For the accommodation of the ring *u* on the members *q* said members are provided with partly cylindrical surfaces *w* of a length substantially equaling the length of the ring *u*. Immediately rearwardly of the surfaces *w* are formed partly annular grooves *x* in the members *q* and adapted to lie in the same transverse plane for the reception of a split spring ring *y* which acts as an abutment for the ring *u*.

The groove *k* and therefore the members *q* are so located that when the anvil block J occupies a neutral position the said members will lie outside of the range of the blows of the piston G. In this position of the anvil block the collar *h* will lie within the confines of the recess *j* and therefore also outside of the range of travel of the piston G.

Means are provided for automatically restoring the anvil block J to a neutral position in the absence of pressure against the anvil block for either moving the collar *h* or the members *q* into the path of the hammer piston G. The means provided for this purpose comprises two pairs of split collars *z* and 2 disposed on a stem 3 formed on the rearward end of the anvil block J. On the extreme rearward end of the stem 3 is a shoulder 4 which acts as an abutment for the collars 2, and at the forward end of the stem

3 is a shoulder 5 on the anvil block which in one position of the anvil block may act as an abutment for the collar *z*. The collars *z* and 2 are provided at their outer ends with flanges 6 and 7 against which act the ends of a spring 8 which encircles the collars *z* and 2 and holds said collars in the operative position.

The arrangement of the collars *z* and 2 and the cooperating shoulders 4 and 5 of the anvil block is such that when the anvil block J is moved longitudinally in one direction or the other the spring 8 will be compressed, and upon release of pressure against the anvil block the spring 8 will react to restore the anvil block to a position where both the collar *h* and the member *q* will lie outside the range of travel of the hammer piston.

In order to insure such compression of the spring 8 the collar *z* is adapted to seat against an end surface 9 of the back head D when moving the anvil block in one direction, and the collar 2 is adapted to seat against a shoulder 10 in a cap 11 to assure compression of the spring 8 when moving the anvil block in the rearward direction. The cap 11 may be secured to the back head in any suitable manner. In addition to the functions described, this cap also serves as a closure for the rearward end of the anvil block and the associated parts, thereby preventing the exposure of these parts to dust and other matter which, when drawn into the machine, would prove detrimental to the cooperating movable surfaces thereof.

The operation of the device is as follows: Whenever it is desired to drive the punch pin Q into the work, such as the drill steel T, the work may be pressed against the punch pin and the anvil block J be thus moved rearwardly to a point where the collar *h* will lie within the range of the blows of the piston G, it being assumed that the piston G is then in operation. By means of the rapidly repeated blows against the collar *h* the punch pin Q will be driven into the drill steel.

After the punch pin Q has entered the drill steel T to its full extent or to the extent required for opening the passage U the drill steel T may be moved in a direction to draw the anvil block J forwardly so that the collar *h* will lie within the recess *j*. This movement of the anvil block will be readily accomplished by means of the drill steel, since when the comparatively cold punch pin Q is driven into the drill steel the heated end of the drill steel will shrink to such a degree that it will adhere closely to the punch pin. Upon forward movement of the anvil block the head comprised of the members *q* will be drawn into the rearward end of the piston chamber and the surface *t* of the piston G will then strike against the members *q* and thus withdraw the punch pin Q from the drill steel. After the punch pin Q has been released from the drill steel the anvil block

J will immediately be moved to a neutral position by the spring 8 which, as will readily be understood, has been compressed while the anvil block J occupied its forwardmost position.

I claim:

1. An anvil block for reciprocatory hammer tools comprising a stem having means spaced along its length to form abutments, a plurality of members disposed between the abutments to form a head and having registering grooves, an endless band arranged about said members to prevent lateral movement of the members with respect to the anvil block, and means in the groove to form an abutment for one end of the band.

2. An anvil block for reciprocatory hammer tools comprising a stem having means spaced along the length thereof to form abutments, a plurality of members disposed between the abutments to form a head and having registering grooves at one end, flanges at the outer end of the members, an endless band arranged about the members to hold the members against lateral movement with respect to the anvil block and abutting with one end against the flanges, and means in the groove to form an abutment for the other end of the band.

3. An anvil block for reciprocatory hammer tools comprising a stem having an annular groove, shoulders at the ends of the groove forming abutments, a pair of partly cylindrical members disposed in the groove to bear with their ends against the abutments and having registering external grooves, partly cylindrical external surfaces on the members, flanges at the front end of the members, an endless ring snugly engaging the cylindrical surfaces to hold the members against lateral movement with respect to the anvil block and abutting the flanges with its front end, and a spring ring in the external grooves forming an abutment for the rear end of the ring.

4. An anvil block for reciprocatory hammer tools comprising a stem having an annular groove, shoulders at the ends of the groove forming abutments, a pair of partly cylindrical members disposed in the groove to bear with their ends against the abutments and having registering external grooves, partly cylindrical external surfaces on the members, flanges at the front end of the members, an endless ring of the same length as the cylindrical surfaces and snugly engaging the cylindrical surfaces to hold the members against lateral movement with respect to the anvil block and abutting the flanges with its front end, and a spring ring in the external grooves forming an abutment for the rear end of the ring.

In testimony whereof I have signed this specification.

DUDLEY W. HART.