Aug. 3, 1926.

1,594,931

J. DITSON

SHANK AND BIT PUNCH

Filed June 24, 1925

2 Sheets-Sheet 1

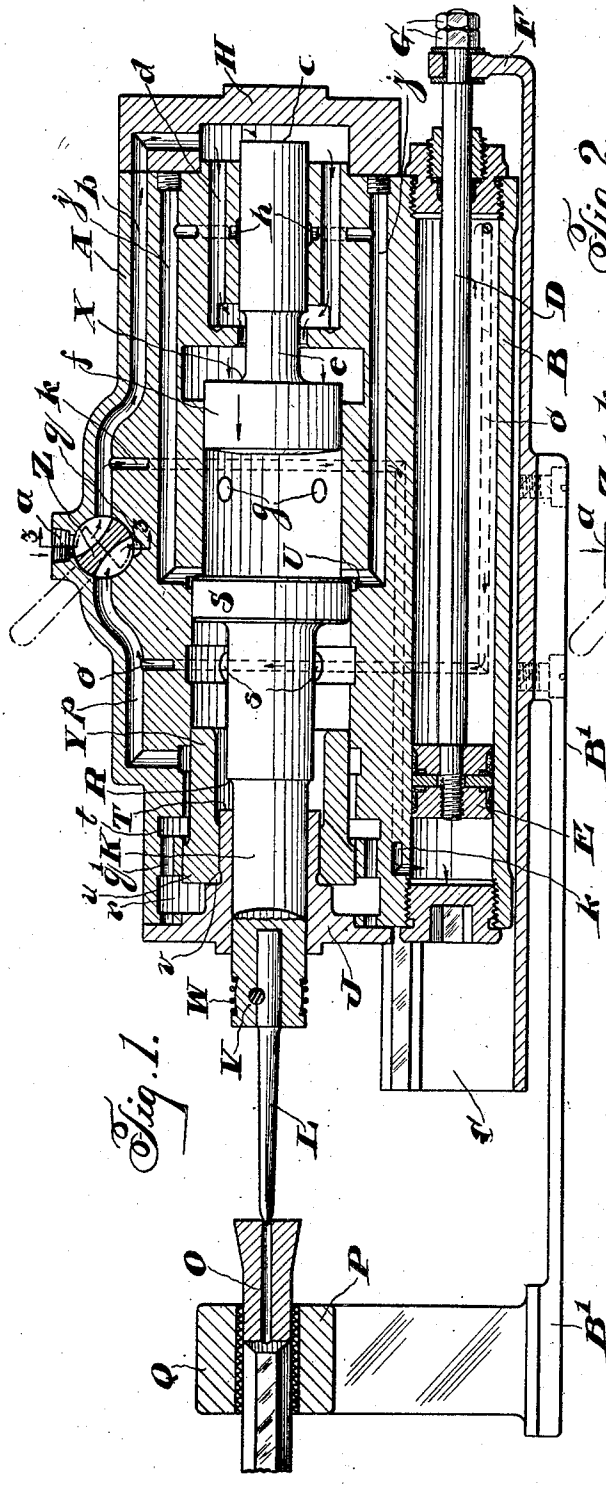


Fig. 1.

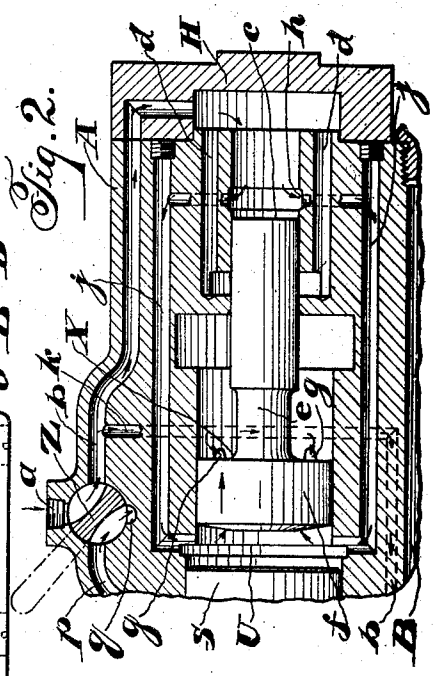


Fig. 2.

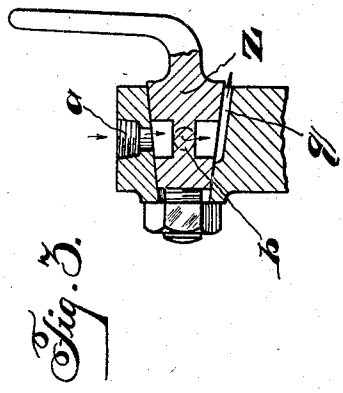


Fig. 3.

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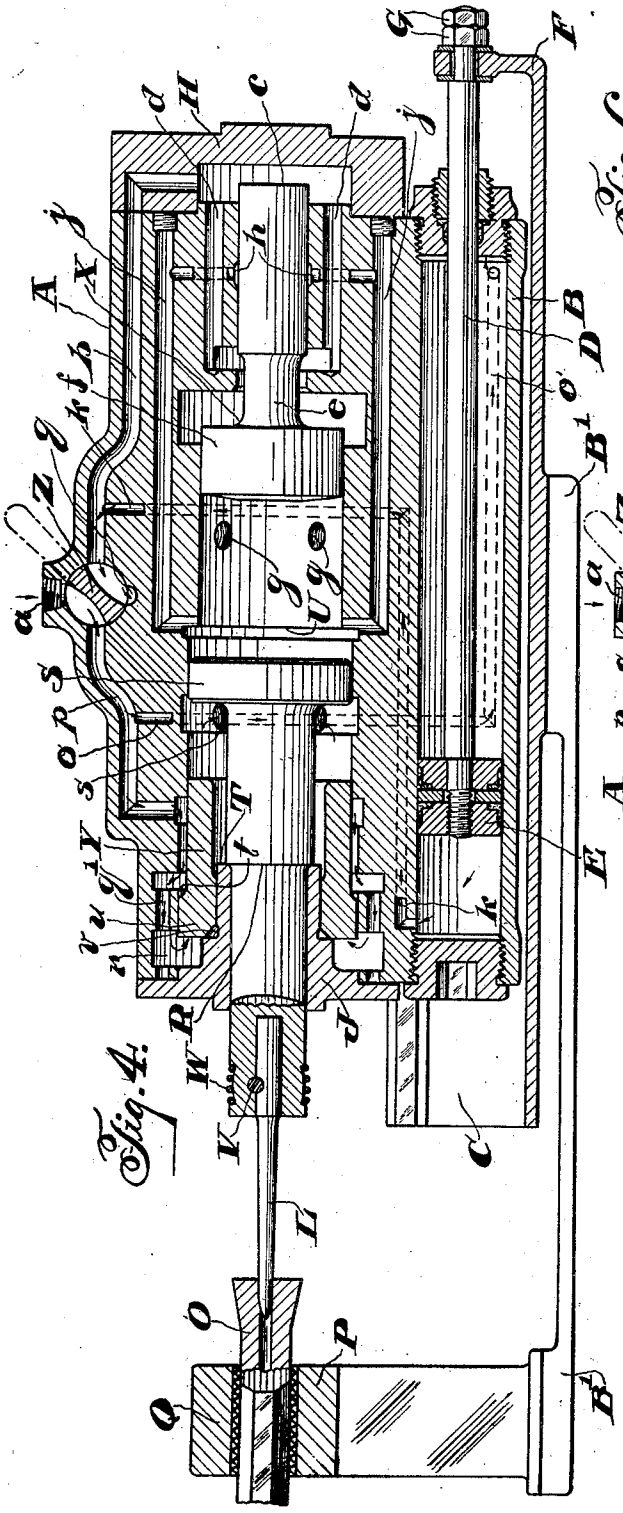


Fig. 4.

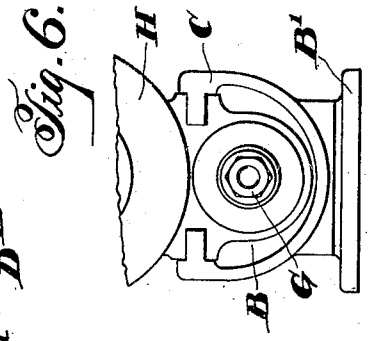


Fig. 6.

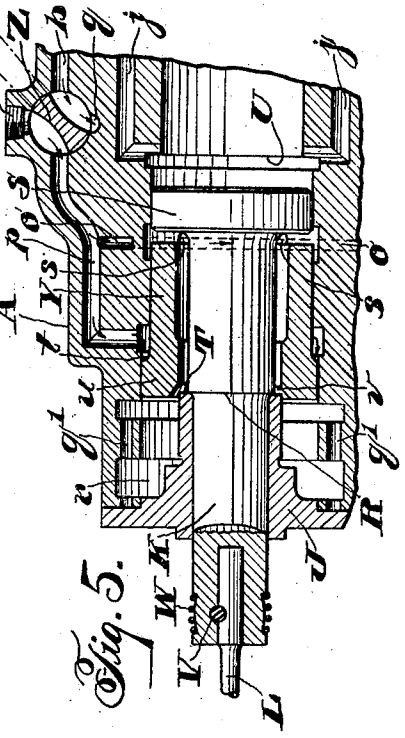


Fig. 5.

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UNITED STATES PATENT OFFICE.

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SHANK AND BIT PUNCH.

Application filed June 24, 1925. Serial No. 39,210.

This invention relates to shank and bit punches, but more particularly to a machine of the hammer type for hammering the pin into and out of the drill steel.

The objects of the invention are to enable the pin to be driven into the drill steel by blows from one hammer in one direction and driven out of the drill steel by blows from another hammer in the opposite direction, both of said hammers being contained in one cylinder. When one hammer is in operation, the other remains idle and vice versa.

The invention is shown in one of its preferred forms in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional elevation of the machine.

Figure 2 is a similar detail view showing the operation of one hammer,

Figure 3 is a detail longitudinal sectional elevation taken through the throttle valve on the line 3—3 of Figure 1 looking in the direction of the arrows,

Figure 4 is a view similar to Figure 1 showing the operation of the other hammer,

Figure 5 is a detail view similar to Figure 4 showing the operation of the forward hammer, and

Figure 6 is a detail end elevation showing the mounting of the feed cylinder.

Referring to the drawings, a hammer cylinder A in this instance is provided with a feed cylinder B slidably mounted in the shell C secured to the base B′. The piston rod D of the feed piston E may be secured to the post F of the shell C by means of the nuts G so that the whole machine may be fed forward and backward by alternately supplying pressure fluid from the ends of the feed cylinder.

The hammer cylinder A is provided with a back head H and a front head J and an anvil block K is mounted in the hammer cylinder and guided in the front head J. The pin L is carried by the anvil block and is adapted to enter the drill steel O held in any suitable manner as by the clamps P and Q which may be formed on the usual drill sharpener, if desired. The anvil block K is provided with the shoulder R and the head S and is limited in its forward movement relative to the cylinder by the inner end T of the front head J and in its rearward movement by the internal shoulder U in the main portion of the cylinder. The pin L is held in the anvil block in any suitable manner as by means of the key V and retaining spring clip W.

The hammer cylinder is provided with two hammer pistons, one piston X for driving the pin into the drill steel and the other hammer piston Y for driving the pin out of the drill steel. These two pistons X and Y may be of any suitable construction but in this instance the piston X is shown of the usual differential valveless type and the piston Y is preferably in the form of a sleeve piston encircling the anvil block.

Pressure fluid for both the hammer cylinder and the feed cylinder is controlled by the throttle valve Z and pressure fluid enters the inlet *a* and in the position of the valve shown in Figure 1 passes through the passage *b* to the rear end of the hammer cylinder thus maintaining constant pressure on the rear end *c* of the hammer piston X when the hammer is inoperation. When the hammer piston X is in its rearward position, as in Figure 1, pressure fluid passes through the passage *d* and around the neck *e* of the piston to the rearward surface of the piston head *f* so that the piston is driven forward and air exhausts from the forward end of the piston through the exhaust ports *g*. With the anvil block K in its rearward position, as indicated in Figure 1, the head S of the anvil block is in the path of the piston X which strikes a blow upon the anvil block to drive the pin into the drill steel. In Figure 2, the piston X is shown about to return on its rearward stroke in which position the rearward end *c* of the piston has uncovered the ports *h* connecting with the passages *j* leading to the forward end of the piston so that the piston is driven rearwardly and this cycle of operation is repeated in order to impart repeated hammer blows to the anvil block in a forward direction.

With the valve Z in the position indicated in Figure 1, pressure fluid is passing through the passage *k* to the forward end of the feed cylinder B to feed the machine forwardly while the pin is being driven into the drill steel, and air is being exhausted from the rearward end of the feed cylinder through the passage *o* leading to the passage *p* into the hammer cylinder which connects with the valve Z and

through the port q leading to atmosphere.

In order to drive the pin out of the drill steel, the valve Z is moved to the position indicated in Figures 4 and 5 in which case pressure fluid is cut off from the rearward end of the hammer cylinder and the hammer piston X and pressure fluid is supplied from the inlet a through the passage p and ports q' to the chamber r at the forward end of the hammer cylinder and in front of the enlarged head of the piston Y to drive said piston rearwardly and impart blows of impact to the opposite side of the anvil block head S. The air behind the piston Y exhausts through the exhaust ports s as the piston Y moves rearwardly. After the piston Y has delivered its rearward blow upon the head S of the anvil block as indicated in Figure 5, the piston is driven forward again by presssure fluid acting upon the shoulder t of the enlarged head u of the piston and air in the chamber r in front of the piston will at first exhaust through the opening v and between the piston and anvil block to the exhaust ports s. After the opening v is closed in the forward movement of the piston, there will be a certain amount of compression in front of the piston to cushion the blow and prevent damage to the front head J. This cycle of operation is rapidly repeated in order to drive the pin out of the drill steel. While the pin is being driven out of the drill steel, pressure fluid is being supplied from the passage p through the passage o to the rearward end of the feed cylinder B to retract the machine and air in the front end of the feed cylinder B is exhausted through the passage k to the exhaust port q controlled by the valve Z. The retracting or return movement of the hammer cylinder, due to the pressure fluid feed, has moved the anvil block forwardly in the hammer cylinder to the position indicated in Figures 4 and 5 so that the head S of the anvil block has been moved into the path of the sleeve piston Y to enable the operation described of driving the pin out of the drill steel to be carried out.

I claim:

1. In a shank and bit punch for drill steels, the combination of means for holding the drill steel, a hammer cylinder, a pin adapted to enter the drill steel, two independent fluid actuated reciprocating hammers in the cylinder, one for driving the pin into the drill steel and the other for driving the pin out of the drill steel, and means for controlling the operation of both hammers.

2. In a shank and bit punch for drill steels, the combination of means for holding the drill steel, a hammer cylinder, an anvil block mounted in said cylinder, a pin carried by said anvil block and adapted to enter the drill steel, and two independent fluid actuated reciprocating hammers in the cylinder selectively operable for delivering blows of impact to the anvil block in opposite directions, to drive the pin into and out of the drill steel.

3. In a shank and bit punch for drill steels, the combination of means for holding the drill steel, a hammer cylinder, and three relatively movable impact members in the cylinder, one carrying a pin adapted to enter the drill steel, and pressure fluid means for selectively actuating the other two members to drive the pin into and out of the drill steel.

4. In a shank and bit punch for drill steels, the combination of means for holding the drill steel, a hammer cylinder, a pin adapted to enter the drill steel, two independently fluid actuated reciprocating hammers in the cylinder, one for driving the pin into the drill steel and the other for driving the pin out of the drill steel, and means for moving the anvil block into the path of one hammer or the other according to the direction in which the pin is to be driven, and means to operate said pistons selectively.

5. In a shank and bit punch for drill steels, the combination of means for holding the drill steel, a hammer cylinder, a pin adapted to enter the drill steel, two independent fluid actuated reciprocating hammers in the cylinder one for driving the pin into the drill steel and the other for driving the pin out of the drill steel, means for selectively controlling the operation of both hammers, and fluid actuated means for feeding the hammer cylinder to and from the drill steel.

In testimony whereof I have signed this specification.

JESSE DITSON