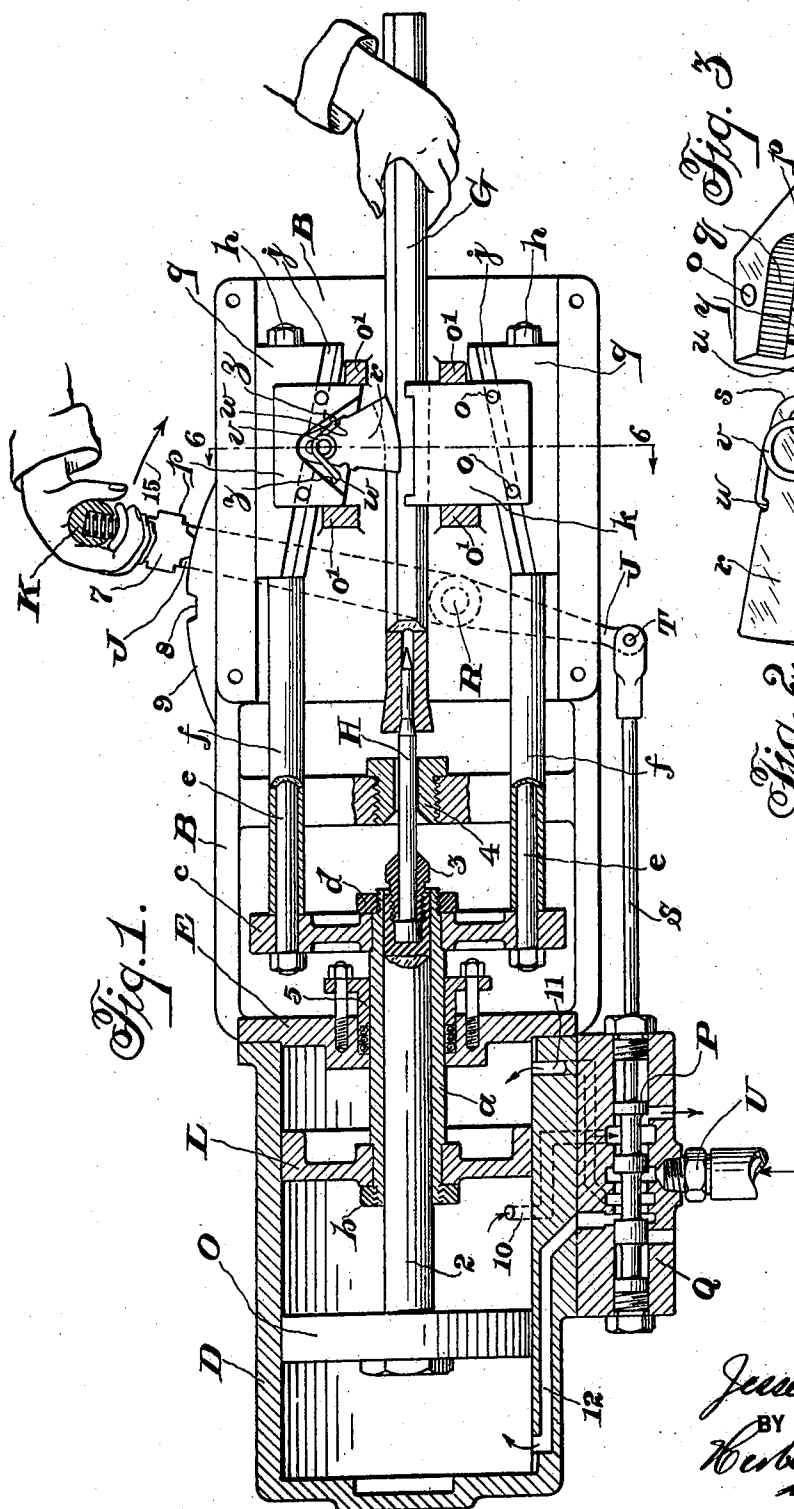
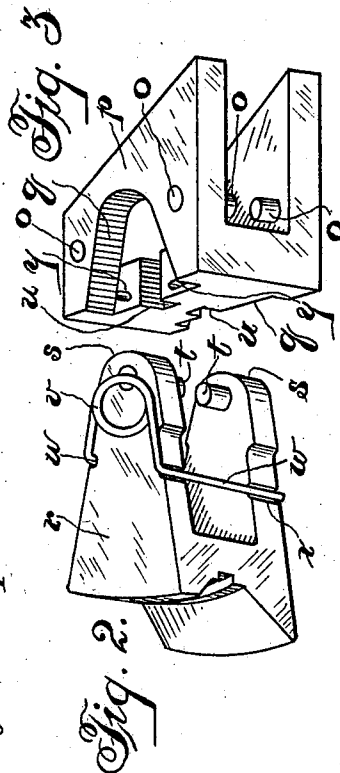


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SHANK AND BIT PUNCH.
APPLICATION FILED SEPT. 15, 1920.

1,395,702.

Patented Nov. 1, 1921.

2 SHEETS—SHEET 1.



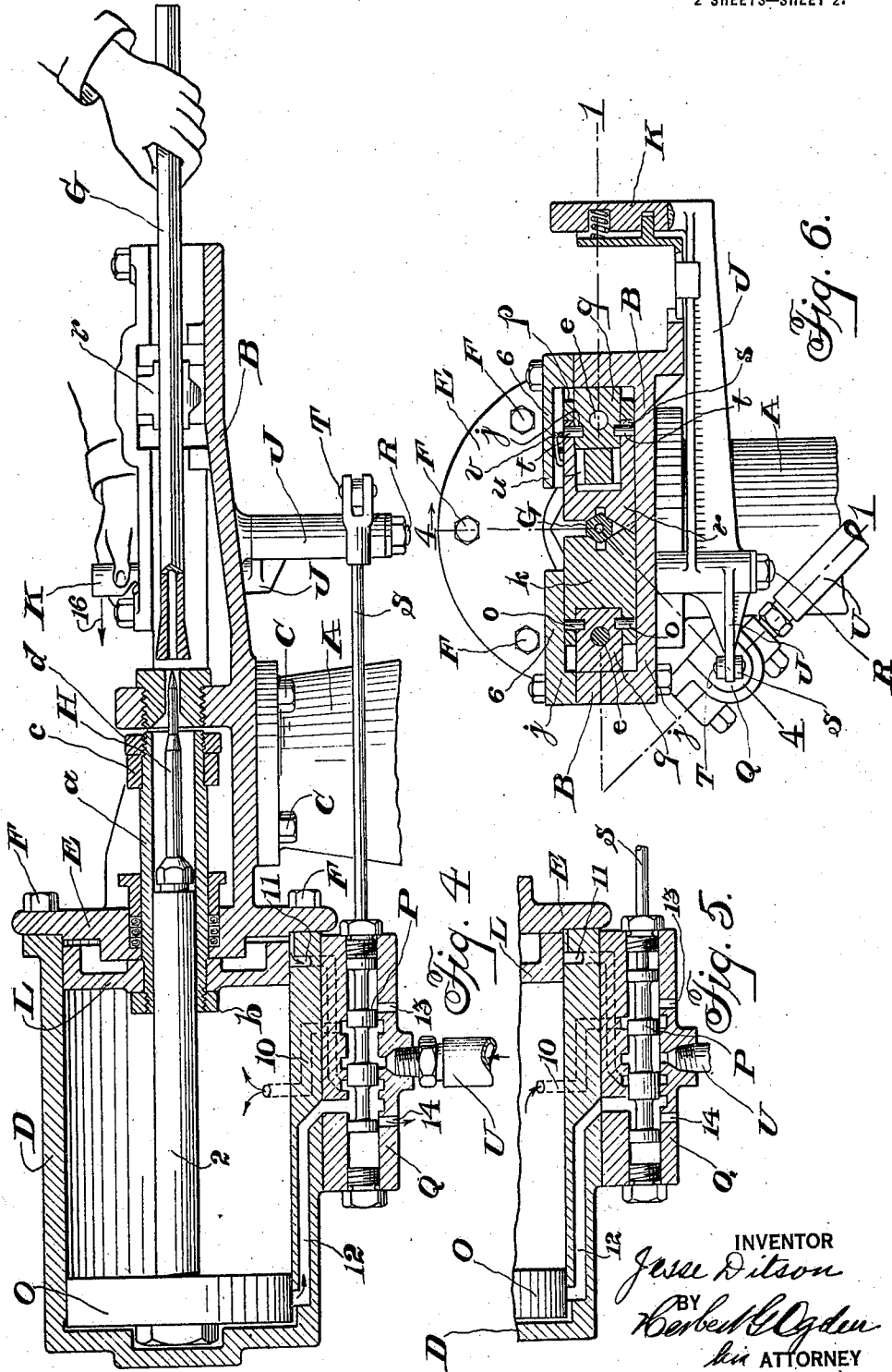
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UNITED STATES PATENT OFFICE.

JESSE DITSON, OF LITTLETON, COLORADO, ASSIGNOR TO INGERSOLL-RAND COMPANY,
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SHANK AND BIT PUNCH.

1,395,702.

Specification of Letters Patent.

Patented Nov. 1, 1921.

Application filed September 15, 1920. Serial No. 410,546.

To all whom it may concern:

Be it known that I, JESSE DITSON, a citizen of the United States, and a resident of Littleton, Arapahoe county, State of Colorado, have invented certain new and useful Improvements in Shank and Bit Punches, of which the following is a specification.

This invention relates to a shank and bit punch, for punching the shanks and bits of hollow drill steels and more particularly for use in clearing out and shaping the bore at the end of the shank or in the bit especially during the sharpening operations.

The primary objects of the invention are to enable the pin or punch to be actuated rapidly and conveniently by means of an operating handle controlling the pinning out mechanism, which handle also controls the gripping jaws for holding the drill steel or other article to be punched.

Another object of the invention is to control the operation of two reciprocating pistons in one cylinder by a single valve controlled from the operating handle, one piston being the clamping piston and the other the pinning piston, with operative connections between said piston and the clamping jaws and the pin or punch.

To all of these ends the invention is shown in one of its preferred forms in the accompanying drawings, in which—

Figure 1 is a top plan view of the machine partly in horizontal section on the line 1—1 of Fig. 6, with the clamping jaw covers removed. For the purpose of this view the valve chest and valve are shown diagrammatically as if they were at the side of the cylinder in a horizontal plane instead of underneath the cylinder as actually constructed and shown in Figs. 4 and 6,

Fig. 2 is a detail perspective view of the clamping dog,

Fig. 3 is a detail perspective view of the clamping dog carriage,

Fig. 4 is a longitudinal sectional elevation through the machine on the line 4—4 of Fig. 6 looking in the direction of the arrows,

Fig. 5 is a detail longitudinal sectional view of the valve chest and valve, with the valve in a different position from that shown in Fig. 4, and

Fig. 6 is a transverse sectional elevation through the clamping frame and clamping jaws on the line 6—6 of Fig. 1, looking in the direction of the arrows.

Referring to the drawings, upon the base A is mounted a clamping frame B suitably secured thereto as by means of the cap screws C. A cylinder D is suitably secured to the head E of the clamping frame as by means of the cylinder head cap screws F. A drill steel G, is adapted to be inserted between suitable clamping members on the clamping frame and automatically clamped in position while the pin H is automatically thrust forward for the punching operation and withdrawn, under control of the valve lever J having a suitable handle K.

The clamping operation is effected by means of the clamping piston L in the cylinder D and suitable operative connections, and the punching and pinning out operations are effected by means of the pinning piston O with suitable operative connections. The reciprocating movements of the clamping and pinning pistons L and O are controlled by a suitable valve P in the valve chest Q suitably mounted adjacent the cylinder D and preferably beneath the same, as shown in Figs. 4 and 6, although for clearness and to avoid multiplication of figures, the section through the valve chest in Fig. 1 is assumed to be taken as if the valve chest was swung upward into a horizontal plane at the side of the cylinder.

The valve lever J may be pivoted on the stud R underneath the clamping frame B and the valve rod S may be pivoted at T to the outer end of the valve lever or any other suitable operative means may be employed for actuating the controlling valve P. Fluid under pressure is admitted to the valve chest Q at the inlet connection U and as the valve P is moved from one position to another, the clamping, punching and pinning out operations are automatically carried out in the required order.

In the construction of the machine different forms of clamping mechanism may be devised, but I have found that the devices shown in the drawings operate satisfactorily and well. The clamping piston L is secured to one end of a hollow piston rod *a* as by means of the nut *b*, and a clamping cross head *c* is secured to the other end of said piston rod, as by means of the nut *d*. The clamping cross head *c* is provided with cross head rods *e* suitably secured thereto having cross head rod spacers *f* in the form of sleeves or tubes arranged over the rods and

clamping wedges *g* are secured to the outer ends of the rods *e* between the spacers and the nuts *h*. The clamping wedges *g* are provided with diagonal outwardly converging grooves *j* in top and bottom, which cooperate with clamping members for clamping and unclamping the drill steel *G* as the clamping piston *L* reciprocates in the cylinder *D*. As the clamping piston *L* moves forward, or to the right as the figures are viewed, the steel is unclamped and this position is shown in Fig. 4. Inward movement of the clamping piston *L* clamps the jaws or clamping members as indicated in Fig. 1.

A clamping jaw *k*, as shown, embraces one wedge *g* and is provided with pins *o* at top and bottom lying in the grooves *j* in the wedge so that a transverse movement is imparted to the jaw *k* in accordance with the longitudinal movement of the wedge. The clamping jaw is guided as shown by the guides *o'*.

A clamping dog carriage *p* embraces the other wedge *g* and is provided with pins *o* at top and bottom lying in the grooves *j* in said wedge so that a transverse movement is imparted to said clamping dog carriage in accordance with the longitudinal movement of the wedge. The clamping dog carriage is also guided by the guides *o'*. The clamping dog carriage *p* is recessed at top and bottom at *q* to receive the clamping dog *r* having rounded bearing portions *s* upon which the clamping dog rocks in the bottom of the recesses *q* in the clamping dog carriage *p*. The dog *r* is provided with guide pins *t* which enter the recesses *u* in the clamping dog carriage and lie in the grooves *j* in the wedge *g* so that the clamping dog is held in the carriage. Coiled springs *v* are provided with downward extensions *w* embracing the dog and lying in guide grooves *x* in the dog and passing through elongated holes *y* in the clamping dog carriage so that the extensions *w* of the springs may have a slight play in the holes *y*. The springs *v* tend to center the dog and return it to normal central position in the clamping dog carriage after the dog has rocked in either direction. When a drill steel *G* is clamped between the clamping jaw *k* and the dog *r* in position for the punching operation, any tendency of the drill steel to move away from the punching pin out of the clamping members, will cause the dog to grip the steel more firmly.

The pinning piston *O* is provided with the piston rod 2 passing through the hollow clamping piston rod *a* and provided with the pin punch *H* at its outer end, suitably and removably secured thereto as by means of the pin clamping nut 3. The pin *H* is preferably guided in the pin guide 4 carried on the clamping frame in any suitable manner and the pin *H* is pushed forward and

pulled back by movement of the pinning piston *O*. The clamping piston is provided with a stuffing box gland 5 of any suitable construction and the clamping members for the drill steel may be provided with suitable jaw covers 6.

The valve lever *J* may conveniently be provided with a suitable spring pressed pawl or stop 7 adapted to be grasped by the fingers of the operator's hand and when this pawl or stop 7 is in the central notch 8 of the segment 9, the power is off and the parts are in the position as indicated in Fig. 4 with the clamping piston *L* and the pinning piston *O* at opposite ends of the cylinder *D* so that the clamping members are open and the pin is withdrawn. The controlling valve *P* is in the neutral position indicated in Fig. 5 and after having permitted the fluid under pressure from the inlet *U* to pass through the passage 10 to the cylinder *D* between the pistons *L* and *O*, forcing them to the ends of their travel, has opened the passage 10 to exhaust through the valve chest and through the atmospheric port 13. Pressure has been exhausted from the ends of the cylinder through the passages 11 and 12 through the valve chest to the atmospheric port 14, the valve having passed through the position indicated in Fig. 4 in reaching neutral position.

As the valve lever *J* is moved forwardly in the direction of the arrow 15 in Fig. 1, the valve *P* passes from neutral position to the position indicated in Fig. 1, and in so doing, motive fluid is first admitted to the front end of the cylinder *D* in front of the clamping piston *L*, through the passage 11, and pressure is exhausted from behind the piston through the passage 10, so that as the piston moves backward, the clamping members are actuated in the manner hereinbefore described to clamp the drill steel *G*. As the valve continues to move rearwardly, the passage 12 to the rear end of the cylinder behind the pinning piston *O* is next uncovered, while the passage 10 remains open to exhaust and the pinning piston *O* moves forwardly to push the pin into the drill steel.

For the reverse movement of the valve to withdraw the pin and unclamp the drill steel, the valve lever *J* is moved rearwardly past the neutral position in the direction indicated by the arrow 16 in Fig. 4, which moves the valve to its forward position as indicated in said figure, in which case the passage 12 behind the pinning piston *O*, is first opened to exhaust and pressure is admitted in front of the pinning piston to drive it rearwardly and pull out the pin *H*. Continued forward movement of the valve then opens the passage 11 in front of the clamping piston *L* to exhaust so that the clamping piston is driven forward to release the clamped members from the drill steel.

The valve lever J and valve P may then be returned to neutral position while the machine is not in operation.

I claim:

- 5 1. In a shank and bit punch, the combination of clamping members for clamping the article to be punched, a cylinder, a clamping piston and a pinning piston reciprocating in said cylinder, operative connections between the clamping piston and the said clamping members, a pin connected to be operated by the pinning piston and means for controlling the supply of motive fluid to said cylinder for operating said pistons.
- 15 2. In a shank and bit punch, the combination of clamping members, a cylinder, a clamping piston and a pinning piston reciprocating in said cylinder, operative connections between the said clamping members and the clamping piston for actuating said members, a pin connected to be actuated by the pinning piston and controlling means for the motive fluid supply of said cylinder whereby said clamping piston and said pinning piston are operated successively to clamp the article to be punched before the pin is operated, and to withdraw the pin before the clamping members are released.
- 25 3. In a shank and bit punch, the combination of means for clamping an article to be punched, a pin for punching said article, a cylinder, a clamping piston and a pinning piston reciprocating in said cylinder and
- 30

means for controlling the operation of said pistons to clamp the article before punching and to withdraw the pin before unclamping the article. 35

4. In a shank and bit punch, the combination of clamping means for the article to be punched, a pin, a cylinder, a clamping piston and a pinning piston in said cylinder, a valve controlling the supply and exhaust of motive fluid to said cylinder in front of and behind each of said pistons and means for actuating said valve. 40 45

5. In a shank and bit punch, the combination of a clamping frame, clamping members mounted thereon, said clamping members comprising longitudinally movable clamping wedges, a laterally movable jaw mounted on one of said wedges, a laterally movable clamping dog carriage mounted on the other wedge, a clamping dog connected to said clamping dog carriage, a cylinder mounted on said clamping frame, a clamping piston in said cylinder, operative connections between said clamping piston and the said wedges, a pinning piston in said cylinder and a pin actuated thereby, and means for controlling the supply and exhaust of motive fluid to said cylinder for actuating said pistons. 50 55 60

In testimony whereof I have signed this specification.

JESSE DITSON.