

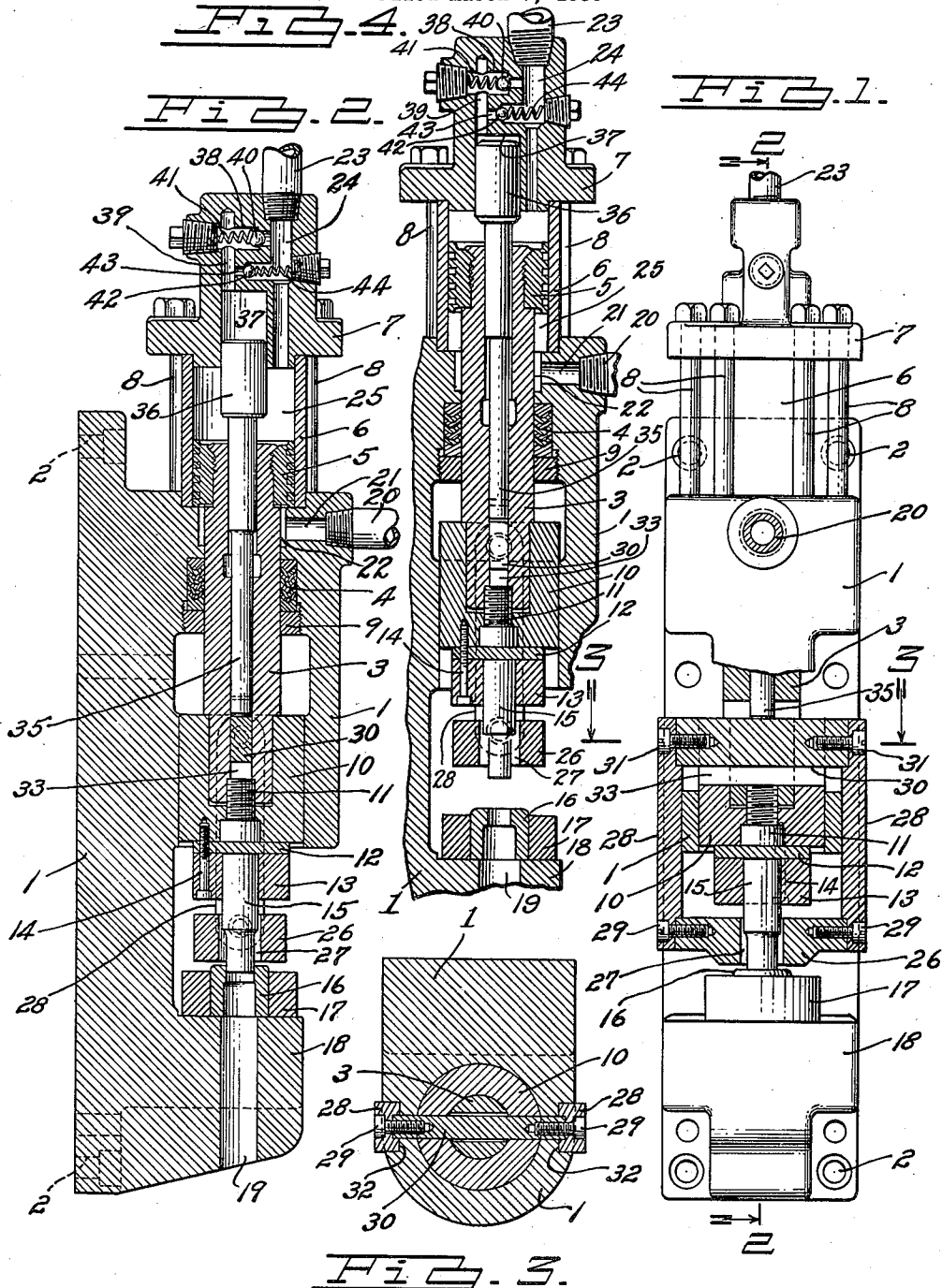
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HYDRAULIC HOLD-DOWN STRIPPER

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HYDRAULIC HOLD-DOWN STRIPPER

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This invention relates to hydraulic strippers for punches and the object of the invention is to provide a means for hydraulically operating a punch and for hydraulically stripping the punch after each punching operation.

One of the particular objects of the invention is to strip the metal from the punch after the metal has been punched to prevent the metal from traveling with the punch and this stripping action must be positive to insure that the metal is stripped from the punch subsequently to each operation and prior to the succeeding operation.

Another object of the invention is to provide a stripping mechanism which is hydraulically operated and movable relative to the punch.

Another object of the invention is to provide a stripper which is first moved into contact with the metal to hold it on the die after which the punch is moved through the metal into the die and is drawn back into the stripper to strip the metal from the punch before the stripper is moved away from the metal.

A further object of the invention is to provide a mechanism for accomplishing these objects hydraulically.

Another object of the invention is to provide a piston whereby the punch may be moved in either direction hydraulically and a stripper operating rod connected to a second piston movable with or in relation to the first piston to produce the relative motion of the stripper in relation to the punch movement.

These objects and the several novel features of the invention are hereinafter more fully described and claimed and the preferred form of construction by which these objects are attained is shown in the accompanying drawing in which—

Fig. 1 is an elevation partly in section of a punch and stripper constructed in accordance with my invention.

Fig. 2 is a longitudinal section through the punch and stripper taken on line 2—2 of Fig. 1 showing the same in the "down" position.

Fig. 3 is a transverse section through the device taken on line 3—3 of Fig. 1.

Fig. 4 is a section showing the stripper and punch in the "up" position.

The device comprises a body member 1 having bolt holes 2 whereby the device may be attached to a vertical support. This body 1 is provided with a member 3 reciprocable longitudinally therein and a packing 4 is provided about the member 3 to prevent leakage of the hydraulic medium. The member 3 at the upper end is secured to a piston 5 which is reciprocable in a cylinder 6 and this cylinder 6 is secured between the body member 1 and the head 7 by the bolts 8 shown in Figs. 1 and 2. The packing 4 is held in place by a member 9 which is threaded into the body 1 after the packing has been positioned

above the member 3 and at the lower end of the member 3 is a member 10 which is secured to the member 3 by the screw 11 shown in Figs. 1 and 2. This member 10 is cylindrical in form and fits within a cylindrical bore in the body 1. A backing plate 12 is provided at the lower end of the member 10 and a punch holder 13 is secured to the backing plate 12 and the member 10 by the screws 14. A punch 15 is secured in the member 13 and the lower end thereof is arranged to fit into a die 16 which is held in a die block 17 secured to the extending portion 18 of the body 1 and this extending portion 18 is provided with an aperture 19 through which the punched out pieces may fall.

A pressure conduit 20 is connected to the body 1 and leads through a channel 21 to an annular chamber 22 about the member 3 so that when the hydraulic medium under pressure passes through the pressure conduit 20 and into the chamber 22 it will raise the piston 5 in the cylinder 6 to lift the punch 15 out of the die 16. At the upper end of its stroke this piston engages the head 7. For the downward or punching movement, a conduit 23 is connected to the head 7 and the hydraulic medium may flow through this conduit 23 and through the conduit 24 in the head into the cylindrical chamber 25 to move the piston 5 downwardly. This piston 5 moves the member 3 downwardly and the member 10 which is attached thereto and also moves the punch 15 into the die 16. Consequently, by directing the hydraulic medium under pressure through the conduits 20 and 23 the punch may be raised or lowered as desired.

The stripper comprises a member 26 having an opening 27 therein about the punch and this stripper is provided with a pair of side arms 28 attached thereto by the screws 29 shown in Figs. 1 and 3. At the upper ends, these arms 28 are attached to a cross bar 30 by the screws 31 and this cross bar extends through slots provided therefor in the body 1 and members 10 and 3 as will be understood from Figs. 1, 2 and 3. Also, the arms 28 ride in ways 32 provided therefor in opposite sides of the body 1 as will be understood from Fig. 3. The slot for the cross bar 30 is of greater depth than the bar as will be understood from Figs. 1 and 2 leaving a space 33 in which the cross bar 30 is movable in relation to the members 10 and 3.

Upward movement of the bar 30 is provided by the rod or plunger 35 which engages the bar 30 as shown in Figs. 1 and 2. This rod 35 extends through the member 3 and at the upper end is provided with a piston 36 thereon fitting the cylinder 37 in the head 7. In order to allow flow of hydraulic medium into the cylinder 37, a conduit 38 is provided connecting the conduit 39 which leads into the cylinder 37. This conduit

38 is normally closed by a spring pressed ball 40 which is held against its seat by a light spring 41 so that as the conduit 23 and cylinder 25 are filled with the hydraulic medium under pressure from the pressure conduit 23 the hydraulic medium under pressure will unseat the ball 40 and allow the hydraulic medium to pass through the conduits 38 and 39 to fill the cylindrical chamber 37. Thus, when oil enters the conduit 24 under pressure, it fills the cylindrical chambers 37 and 25 thus applying pressure to the pistons 5 and 36 to move the same downwardly simultaneously, the piston 36 moving slightly faster than the piston 5 and causing the stripper 26 to engage the metal being punched just before or at about the time the punch engages the metal. The stripper and bar 30 are thus stopped against movement and the punch continues to move by reason of continued movement of the piston 5. As the flow of the hydraulic medium is reversed and caused to flow through the pressure conduit 20, it will move the piston 5 upwardly thus raising the punch out of the die but, due to the fact that the hydraulic medium is trapped in the chamber 37 while the hydraulic medium in the chamber 25 has a free outlet through the conduit 24, the upward movement of the stripper is prevented until the pressure in the chamber 37 becomes sufficient to overcome the stiff spring 44 which holds the check valve 42 in position to close the aperture 43.

This spring is preferably of sufficient stiffness so that the valve 42 is not opened until the bar 30 is picked up by the members forming the bottom of the slot 33 as the punch is moving upwardly. As this bar is picked up by upward movement of the punch and members 3 and 10, the pressure in the chamber 37 becomes sufficient to unseat the ball check 42 and allow the hydraulic medium from the chamber 37 to pass into the conduit 24 which at that time is acting as the outlet conduit. By this arrangement after the punching operation the punch is first withdrawn from the die and up into the stripper and as the pressure is maintained on the stripper to hold it against the work by the hydraulic pressure in the chamber 37 the metal is held while the punch is withdrawn from the metal and after the punch has been withdrawn sufficiently to allow the bottom of the slot 33 to engage the bar 30 the stripper is then carried up with the punch but the punch at that time has receded into the stripper. Also, it is to be noted that on the downward movement the punch end is receded within the stripper so that the stripper first engages the metal to be punched. The punch is then forced through the metal and drawn back through the metal into the stripper before the pressure of the stripper on the work is released.

From the foregoing description it becomes evident that the device is very simple and efficient in operation, will automatically strip the metal from the punch after each punching operation, will maintain a pressure on the metal during the punching operation and provides a device which accomplishes the objects described.

Having thus fully described my invention, its utility and mode of operation, what I claim and desire to secure by Letters Patent of the United States is—

1. In a stripper for hydraulically operated punches, a body, a member movable longitudinally

in either direction therein, a punch secured to the lower end of said member, a piston secured to the upper end thereof, hydraulically operated means for moving the piston longitudinally in either direction, a stripper fitting about the punch and having a cross bar extending through member, the slot in said member for the cross bar being of greater depth than the cross bar whereby upon movement of the piston in one direction the cross bar and stripper are lifted as the end of the slot engages the cross bar, a second piston having a stem engaging the cross bar, means for moving the pistons in one direction together and means yieldably resisting movement of the second piston in the opposite direction by the cross bar.

2. A hydraulic stripper for punches comprising a piston for moving the punch longitudinally in either direction, a stripper slidable in relation to the punch, a second piston having a stem movable through the first piston and engaging the stripper, hydraulic means for moving the first piston in either direction, hydraulic means for moving the second piston in one direction, means carried by the first piston for moving the second piston on movement of the first piston in one direction and hydraulic means resisting said movement of the second piston.

3. A hydraulic stripper for punches comprising a piston for moving the punch longitudinally in either direction, a stripper slidable in relation to the punch, a second piston having a stem movable through the first piston and engaging the stripper, hydraulic means for moving both pistons in one direction, means for moving the second piston by movement of the first piston in one direction and means preventing movement of the second piston until the first piston has traveled through a portion of its stroke.

4. In a hydraulic stripper for hydraulically operated punches, a piston movable longitudinally in either direction by a hydraulic medium under pressure, a punch secured to move with said piston, a second piston movable in one direction by a hydraulic medium under pressure, a stripper connected to move with the second piston and means for moving the second piston in the opposite direction by movement of the first piston, said means being limited to a predetermined extent so that the stripper is moved after the punch has begun its movement.

5. A hydraulic stripper for punches comprising a piston connected to the punch and movable longitudinally in either direction by hydraulic pressure, a stripper fitting about the punch and movable longitudinally in relation to the punch, a second piston, a stem on the second piston movable through the first piston and engaging the stripper, the arrangement being such that upon movement of the first piston in relation to the second piston the punch is moved in relation to the stripper.

6. In a stripper for hydraulically operated punches in which the punch is raised and lowered by hydraulic pressure, a stripper through which the punch is operated, hydraulically operated means for moving the stripper in one direction ahead of the punch and means connected with the punch for moving the stripper by movement of the punch in the opposite direction, said means operating after the punch has started its movement.

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