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S. W. BATH

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HYDRAULIC TAILSTOCK

Filed April 7, 1927

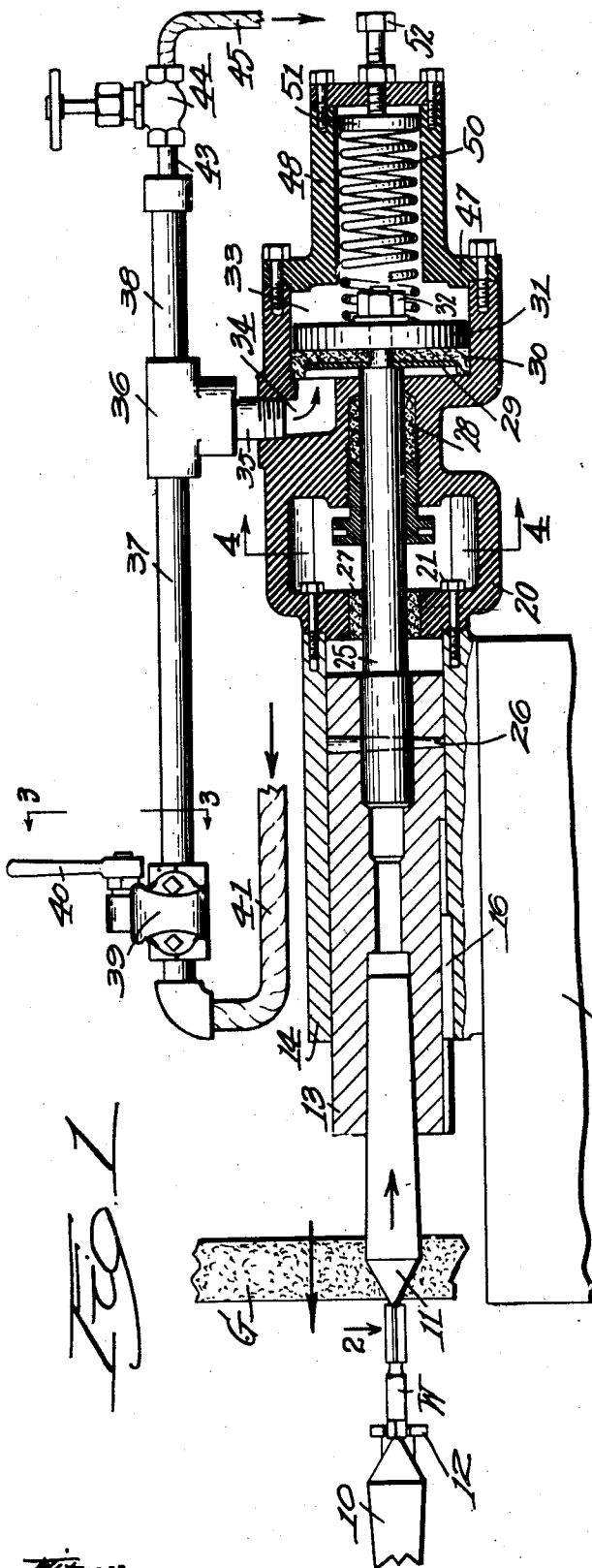


FIG. 1

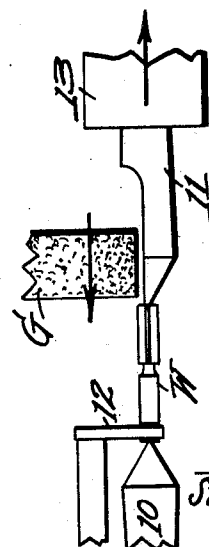
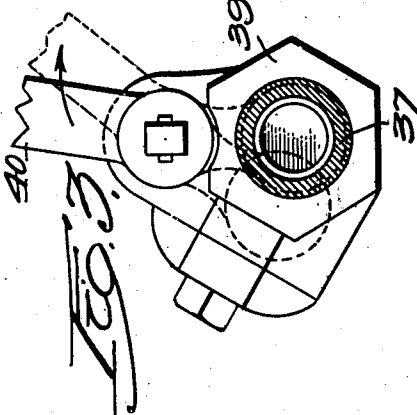
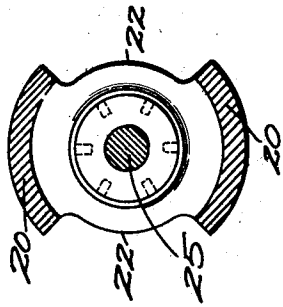


FIG. 5

Inventor:
Stanley W. Bath
By Attorneys.

Verthegen, Fay & Hawley

Witness
C. W. Munn

UNITED STATES PATENT OFFICE.

STANLEY W. BATH, OF WORCESTER, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO JOHN BATH, OF WORCESTER, MASSACHUSETTS.

HYDRAULIC TAILSTOCK.

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This invention relates to means for operating the tail center of a grinding machine or other similar machine tool. In such machines, particularly when used for duplicate work, it is very important to reduce the time and effort of changing the work to the lowest limit, so that production may be correspondingly increased.

It is the general object of my invention to provide operating means of the hydraulic type, and more specifically to provide hydraulic mechanism which may be entirely controlled by a single valve.

With this general object in view, I preferably provide a construction in which a restricted exhaust passage is utilized, and I also preferably provide a spring for moving the tail center in one direction, the center being moved in the opposite direction by hydraulic pressure.

In the preferred form shown in the drawing, the center is advanced toward the work by spring pressure and is withdrawn hydraulically, but this arrangement is not always essential and may be reversed if desired.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings in which

Fig. 1 is a sectional front elevation of a tail stock embodying my improvements;

Fig. 2 is a partial plan view of certain parts;

Fig. 3 is a detail sectional view, taken along the line 3—3 in Fig. 1; and

Fig. 4 is a sectional elevation, taken along the line 4—4 in Fig. 1.

Referring to the drawings, I have shown portions of a grinding machine in which the work W is supported on a head center 10 and a tail center 11. The work is shown as being in the form of a tap blank and is rotated by a dog or driver 12.

A grinding wheel G is mounted for relative movement axially of the work, and the tail center 11 is cut away on the back side, as shown in Fig. 2, so that the wheel may be entirely withdrawn from the work after the grinding operation is completed. The tail center 11 is mounted in a sleeve or support 13, slidable in a bearing portion 14 of

the usual tail stock 15. The sleeve 13 is held from angular movement in the bearing 14 by suitable means such as a key 16.

All of these parts are substantially of the usual construction and my invention relates more specifically to improved means for advancing and withdrawing the sleeve 13 and the tail center 11.

A frame or casing 20 is secured to the rear end of the bearing portion 14 by bolts 21. Access to the bolts 21 is obtained by cutting away the sides of the frame 20, as indicated at 22 in Fig. 4.

A piston rod 25 is axially mounted in the sleeve 13 and is secured therein by a cross pin 26. The rod 25 extends through an intermediate bearing 27 and a stuffing box 28, both mounted in the frame 20. A piston is fixed to the rear end of the rod 25, said piston comprising a washer 29, a yielding packing 30, and a piston head 31, said parts being secured to the end of the piston rod by a clamping nut 32.

The piston is movable axially in a chamber 33 in the frame 20, said chamber being provided with an inlet passage 34 connected by a pipe 35 and T 36 to a supply pipe 37 and an exhaust pipe 38. A quick-opening gate valve 39 is provided in the supply pipe 37, the valve being opened and closed manually by a handle 40. Oil or other fluid under pressure is supplied through a flexible connection 41 to the valve 39. The details of construction of the valve 39 are clearly shown in Fig. 3.

The exhaust pipe 38 is preferably connected to a pipe 43 of reduced section, having an exhaust valve 44 mounted thereon and connected to a flexible drain pipe 45.

The outer wall of the piston chamber or cylinder 33 is formed by a cap 47 bolted to the end of the frame 20 and having a recessed hub or projection 48 which receives a coil spring 50 which is seated between the piston head 31 and a washer or plate 51 engaged by an adjusting screw 52. The spring 50 is adapted to press the tail center 11 yieldingly toward the work, and the pressure of the spring may be varied and adjusted as desired by means of the screw 52.

Having described the construction of my improved tail stock and its operating mechanism I will now describe the method of using the same. In normal operation, the exhaust

valve 44 is opened an amount sufficient to provide a restricted exhaust passage and this passage is left continuously open. When the operator wishes to withdraw the tail center, he opens the gate valve 39, thus admitting an excess amount of oil or fluid under pressure to the pipe 37. A certain amount of this oil escapes through the exhaust pipe 38 and the valve 44, but the excess oil acts on the piston to quickly withdraw the tail center from the work.

The work thus released drops automatically into a suitable pan or receiver and the operator immediately replaces the finished article with a new piece of work to be ground. He then closes the valve 39, and the spring 50 returns the tail center 11 to operative position, at the same time forcing the excess oil out of the cylinder through the exhaust pipe 38 and through the restricted opening in the valve 44.

The operator is thus able to withdraw and thereafter advance the tail center by merely opening and closing the quick-acting valve 39, an operation which can be very easily performed. Moreover, the tail center 11 is always forced against the work with a definite and predetermined spring pressure. As the oil is taken from and returned to the supply tank of the machine, an abundant supply of oil is always available, and no perceptible loss is incurred in this method of operation, even if the valve 44 does remain partially open while the pressure is being applied to the piston to withdraw the tail center.

This construction avoids the use of three-way valves or other complicated mechanism and is found very reliable and convenient in operation.

Having thus described my invention and the advantages thereof I do not wish to be limited to the details herein disclosed other-

wise than as set forth in the claims, but what I claim is:—

1. In a machine tool, a tail stock, a tail center slidably mounted therein, a spring effective to move said tail center in one direction, a cylinder and piston associated with said tail center to move the same in the opposite direction, means to supply oil under pressure to said cylinder, a valve controlling said fluid supply, and a continuously open restricted exhaust passage for said cylinder through which said cylinder is drained when said control valve is closed.

2. In a machine tool, a tail stock, a tail center slidably mounted therein, a spring effective to move said tail center in one direction, a cylinder and piston associated with said tail center to move the same in the opposite direction, means to supply oil under pressure to said cylinder, a valve controlling said fluid supply, an exhaust connection for said cylinder which is continuously open during normal operation, and means to adjustably restrict the opening in said exhaust connection.

3. In a machine tool, a tail stock, a tail center slidably mounted therein, a spring effective to move said tail center in one direction, a cylinder and piston associated with said tail center to move the same in the opposite direction, means to supply oil under pressure to said cylinder, a quick-acting valve controlling said fluid supply, an exhaust connection for said cylinder which is continuously open during normal operation, and a manually adjustable valve in said exhaust connection by which the rate of return movement of said center to operative position may be varied and controlled.

In testimony whereof I have hereunto affixed my signature.

STANLEY W. BATH.