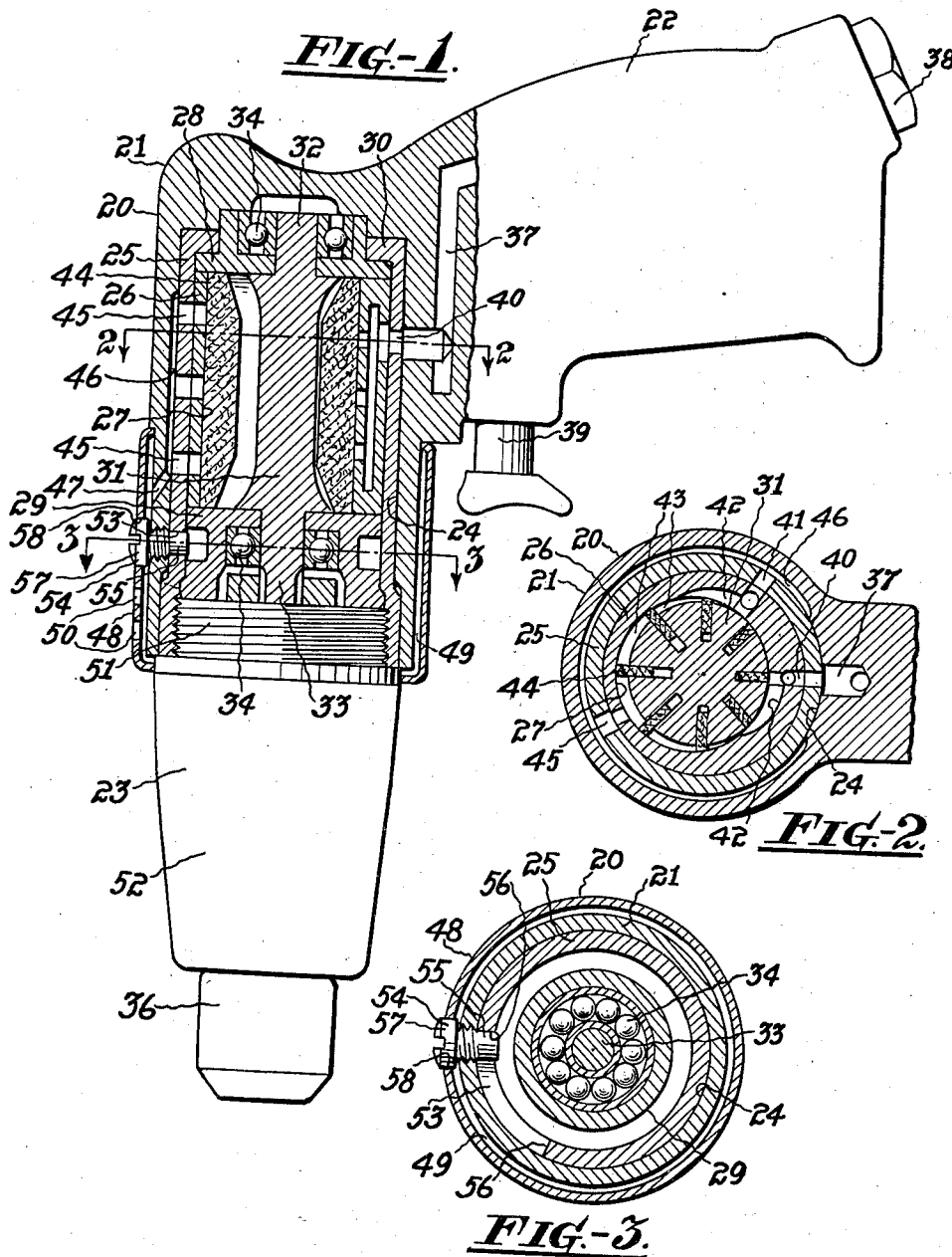


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FLUID ACTUATED TOOL
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FLUID ACTUATED TOOL

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This invention relates to fluid actuated tools, and more particularly to a controlling device for fluid actuated tools of the rotary type, as for example portable drilling and reaming machines.

One object of the invention is to enable the direction of rotation of the rotative elements of the machine to be readily controlled in a simplified manner and with a minimum of effort.

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

In the drawing accompanying this specification and in which similar reference numerals refer to similar parts,

Figure 1 is a side elevation, partly broken away, of a fluid actuated rotary tool constructed in accordance with the practice of the invention, and

Figures 2 and 3 are transverse views taken through Figure 1 on the lines 2—2 and 3—3 respectively.

Referring more particularly to the drawing, the tool designated, in general, by 20 comprises a casing 21 having a laterally extending grip portion 22 at its rearward end, and a front head 23 at its forward end arranged coaxially with the casing 21.

Within the casing is a bore 24 to accommodate a cylinder 25 that contains a bushing 26 the interior of which constitutes a chamber 27 that is closed at its rearward and front ends by heads 28 and 29, respectively. The heads 28 and 29 are disposed slidably in the cylinder 25, and at the rearward end of the cylinder is an introverted flange 30 to serve as a seat for the outer end of the head 28.

Arranged within the chamber 27 is a rotor 31 having trunnions 32 and 33 at its rear and front ends, respectively, extending through the heads 28 and 29 and into antifriction bearings 34 in said heads. The front trunnion 33 may be connected, in any well-known manner, to transmission mechanism (not shown) in the front head for rotating a tool chuck 36 at the front end of said front head.

The rotor 31 is actuated by pressure fluid conveyed to the chamber 27 through the grip member 22 which has a supply passage 37 therein and a bushing 38 threaded into the outer end of the supply passage for connection with a supply conduit (not shown). The supply passage may be controlled by suitable valve mechanism only the operating plunger or trigger 39 of which is shown.

The rotor 31 is intended for reverse operation and pressure fluid for actuating it is introduced into the chamber 27 selectively on the opposite

sides of and adjacent the point of minimum clearance between the rotor and the wall of the chamber 27 through the inlet passages 40 and 41 in the cylinder 25 and the bushing 26. The outlet ends of the inlet passages open into enlarged cavities 42 in the inner surface of the bushing 26 to assure the delivery of an ample supply of pressure fluid to the cells 43 between the protruding ends of vanes 44 slidable radially in the rotor 31.

In the sides of the bushing 26 and the cylinder 25 opposite the point of minimum clearance between the rotor and the bushing are exhaust ports 45 through which exhaust fluid may pass from the chamber 27 into an exhaust chamber 46 in the inner surface of the casing 21. Exhaust ports 47 in the wall of the casing convey such exhaust fluid from the chamber 46 to the atmosphere.

As a preferred arrangement, a muffler 48, in the form of a sleeve, is disposed about the front end of the casing to receive the exhaust fluid issuing from the exhaust ports 47. The ends of the muffler are crimped inwardly to engage the peripheral portions of the tool and thereby hold the sleeve portion of the muffler in spaced relation with respect to the casing to define a chamber 49 into which the exhaust fluid flows from the ports 47, and in the peripheral wall of the muffler are ports 50 to afford communication between the chamber 49 and the atmosphere.

In the form of the invention illustrated, the direction of rotation of the rotor 31 is controlled by rotating the cylinder 25 within the casing to bring one or the other of the inlet passages 40 and 41 into communication with the supply passage 37. To this end the front head 23 is interlockingly connected to the cylinder 25 as, for example, by threading an extension 51 on the rearward end of the front head into the front end of the cylinder. The extension 51 seats with its rearward end against the front end of the head 29 for clamping said head, the bushing 26 and the head 28 in fixed positions within the cylinder 25. These elements may be additionally secured with respect to each other and with respect to the cylinder in any suitable manner, if desired.

The front head 23 is suitably shaped, exteriorly, to constitute a grip member 52 that may be grasped to assist in guiding the tool with respect to the work and also for imparting rotative movement thereto and thus to the cylinder 25 and bushing 26, for bringing the inlet passages 40 and 41 into registry with the supply passage 37.

Suitable means are provided for limiting the extent of rotative movement of the cylinder within the casing and also for retaining the cylinder against endwise movement with respect to the casing. To this end the portion of the cylinder wall adjacent the head 29 is provided with an arcuate slot 53, and a screw 54 is threaded into the casing 21 to extend with a cylindrical end portion 55 into the slot with a slide fit on the side walls thereof for holding the cylinder against endwise movement. The slot 53 is of such length and so positioned within the cylinder that its end surfaces 56 will, when engaging the end 55, limit the degree of rotative movement of the cylinder relatively to the casing and thereby assure registry of the inlet passages with the supply passage 37.

The screw 54 has a slotted head 57 that seats against the outer surface of the casing 21 and lies within an aperture 58 in the muffler 48 to hold said muffler in the correct assembled position upon the casing 21.

In the operation of the device, the tool is guided and held to the work by gripping the members 22 and 52. Pressure fluid is then supplied to the chamber 27 for driving the rotor 31 by pressing the trigger 39. The rotor will then continue to rotate in a given direction as long as an inlet passage, 40 or 41, remains in registry with the supply passage 37. This position of an inlet passage with respect to the supply passage is assured by positioning the cylinder, rotatively, within the casing 21 in such wise that an end surface of the slot 53 seats against the end 55 of the screw 54, in the manner shown in Figure 3 of the drawing.

Whenever it is intended to drive the rotor in the opposite direction the cylinder 25 is rotated, by means of the grip member 52, from the position shown in Figure 2 of the drawing to place the opposite end surface of the slot 53 into engagement with the end 55 of the screw. This movement of the cylinder will carry one inlet passage, that designated 40 in the example shown out of registry with the supply passage 37 and bring the inlet passage 41 into registry with the supply passage. The rotor 31 will then rotate in the opposite direction, and in the new posi-

tion of the cylinder the inlet passage 40 will open into the exhaust chamber 46 so that any pressure fluid remaining in the cells 43, as they approach the point of minimum clearance between the rotor and the wall of the chamber 27, may exhaust to the atmosphere.

I claim:

1. A fluid actuated rotary tool, comprising a casing having a bore and a supply passage opening into the bore, a cylinder rotatable in the casing having inlet passages spaced apart circumferentially, a fluid actuated rotor in the cylinder, and a front head at the end of the casing interlockingly connected to the cylinder and serving as a grip member for rotating the cylinder within the casing to bring the inlet passages selectively into registry with the supply passage.

2. A fluid actuated rotary tool, comprising a casing having a bore and a supply passage opening into the bore, a cylinder rotatable in the bore having inlet passages spaced circumferentially with respect to each other, a fluid actuated rotor in the cylinder, a front head threadedly connected to the cylinder extending forwardly of the casing to serve as a grip member for rotating the cylinder within the casing to bring the inlet passages selectively into registry with the supply passage, and means for preventing endwise movement of the cylinder and the front head with respect to the casing.

3. A fluid actuated rotary tool, comprising a casing having a bore and a supply passage opening into the bore, a cylinder rotatable in the bore having inlet passages spaced circumferentially with respect to each other, a fluid actuated rotor in the cylinder, a front head threadedly connected to the cylinder extending forwardly of the casing to serve as a grip member for rotating the cylinder within the casing to bring the inlet passages selectively into registry with the supply passage, there being a slot in the cylinder, and means in the casing extending into the slot to cooperate with the ends thereof for limiting rotary movement of the cylinder within the casing and to cooperate with the side of said slot for preventing endwise movement of the cylinder with respect to the casing.

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