Sept. 22, 1936. E. W. ROUCH 2,055,390

FLUID PRESSURE PRODUCING DEVICE

Original Filed Jan. 14, 1933 2 Sheets-Sheet 1

FIG. 1

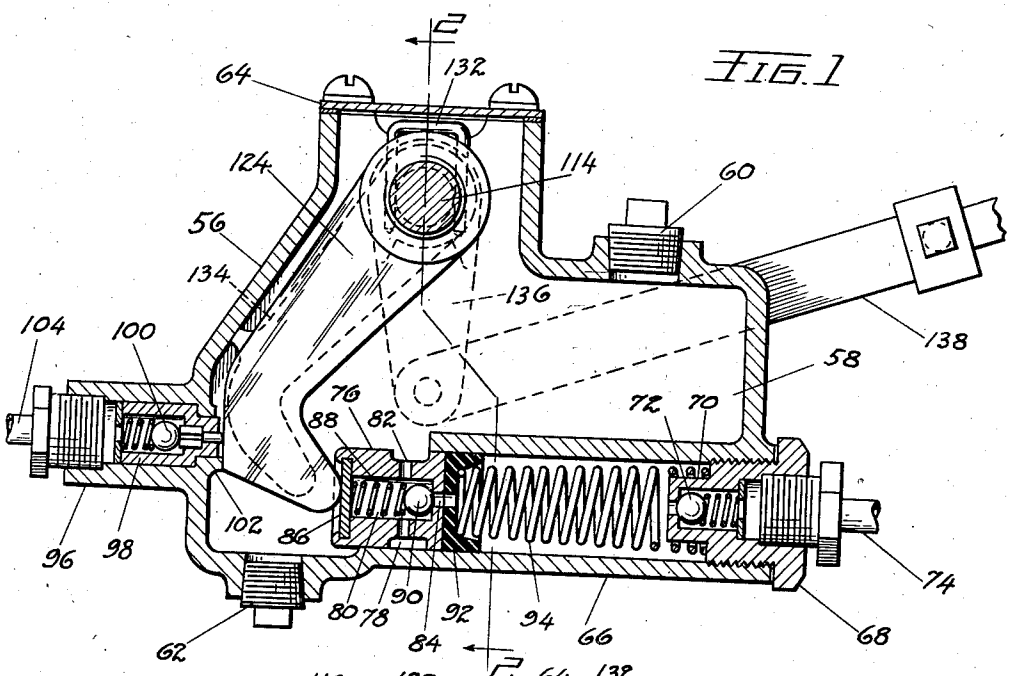
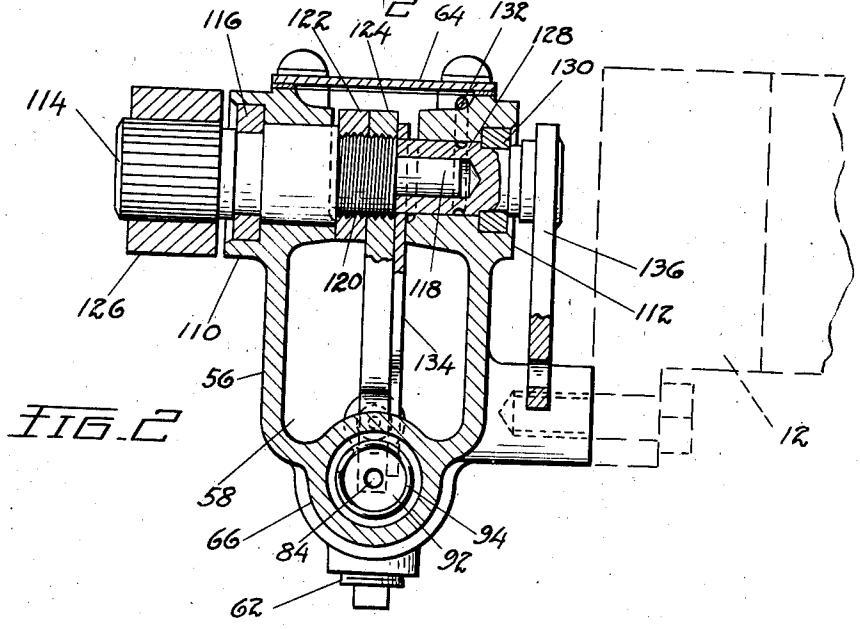


FIG. 2



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FIG. 3

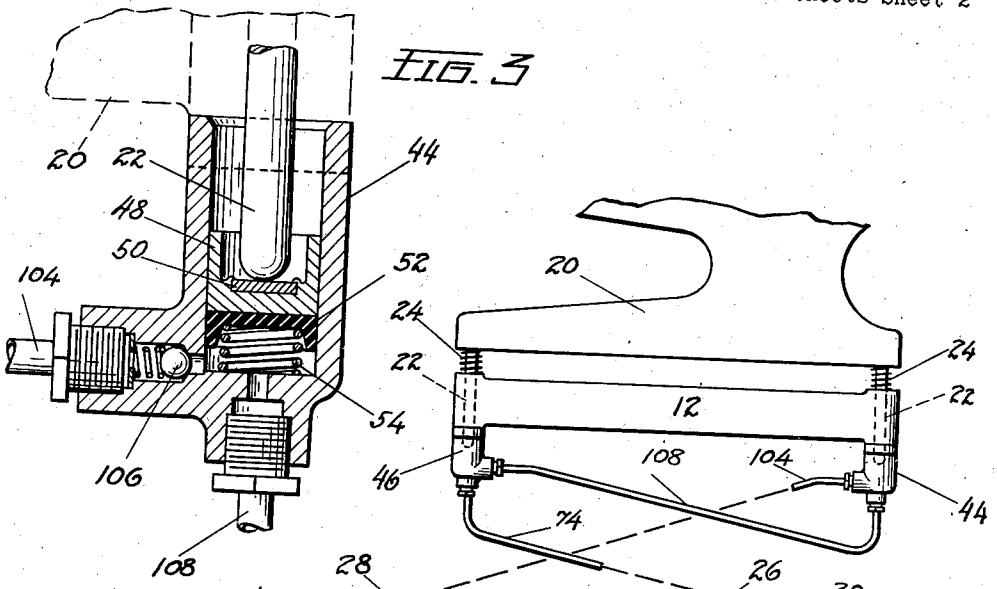
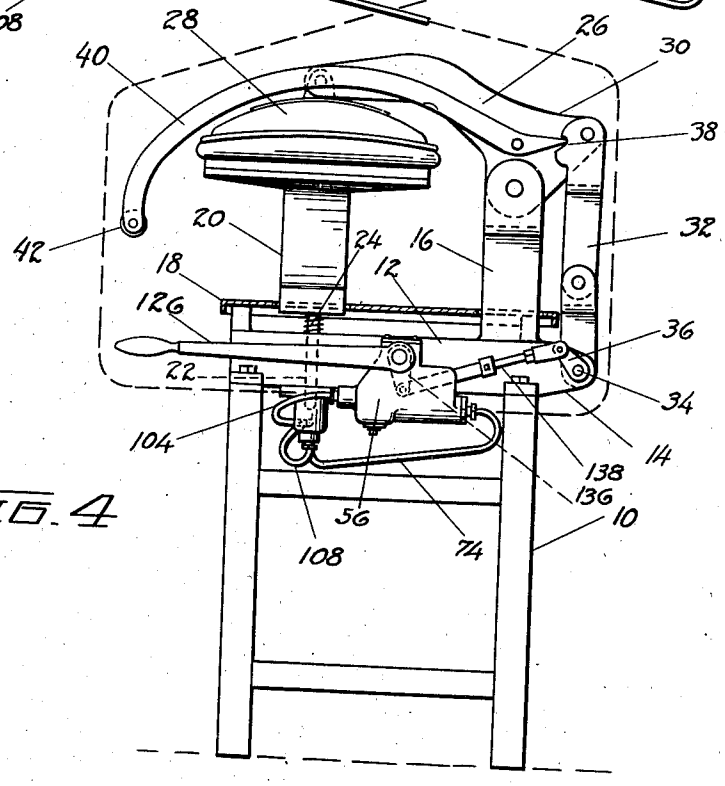


FIG. 4



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2,055,390

FLUID PRESSURE PRODUCING DEVICE

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Original application January 14, 1933, Serial No. 651,761. Divided and this application November 2, 1933, Serial No. 696,447

3 Claims. (Cl. 103—207)

This invention relates to fluid pressure producing devices.

Broadly the invention comprehends a fluid pressure producing device, having duplex actuating means.

In the illustrated embodiment of the invention an ironing machine has relatively movable ironing elements, one manually movable into operative position, and the other movable by fluid pressure actuated motors to create an ironing pressure between the elements. A fluid pressure producing device actuates the motors. This device has two actuating means, one actuates by movement of one of the ironing elements to operate the compression device to create an initial pressure in the motors, and the other operable manually to increase the pressure in the motors so that an ironing pressure may be created between the ironing elements.

Another object of the invention is to provide a pressure producing device for a fluid pressure system including duplex actuating means, one operable for creating an initial pressure in the system, and the other operable to increase the pressure in the system.

A feature of the invention is a fluid pressure producing device including a reservoir, a cylinder therein, a piston in the cylinder, and duplex means for actuating the piston.

Other objects and features of the invention will appear from the following description taken in connection with the drawings forming a part of this specification, and in which,—

Figure 1 is a vertical sectional view of a fluid pressure producing device embodying the invention;

Figure 2 is a cross-sectional view of the device substantially on line 2—2, Figure 1;

Figure 3 is a sectional view of one of the fluid pressure actuated motors, and

Figure 4 is a schematic view of an ironing machine illustrating the invention as applied.

Referring to the drawings for more specific details of the invention, 10 represents a table or a support. The support has thereon a frame 12 provided with spaced rearwardly extended lugs 14 and spaced uprights 16.

The frame has thereon a top 18 slotted to receive the base of a buck 20. The base of the buck has secured thereto pins 22 which extend through openings in the frame, and sleeved on the pins 22 between the base of the buck and the frame are springs 24 for yieldingly supporting the buck.

Pivoted to the uprights 16 are corresponding arms 26, and pivotally connected to the arms is a head 28 adaptable for cooperation with the buck 20. The arms 26 have rearwardly extended lugs 30 connected by toggles 32 to a shaft 34 rotatably supported on the lugs 14 on the frame, and suitably secured to the shaft is an arm 36.

The toggles 32 have notches 38 adjacent their pivotal connections to the lugs 30. These notches receive the rearwardly extended ends of corresponding levers 40 pivotally mounted on the arms 26, and the forward ends of the levers 40 are connected by a rod providing a suitable handle 42.

By raising the handle 42 the head 28 may be elevated from the position shown so that work may be placed on the buck. After placing the work upon the buck, the handle is manipulated to move the head into operative position, where it is locked against displacement by the toggle 32.

The actuating means includes corresponding fluid pressure actuated motors including cylinders 44 and 46. These cylinders are arranged and suitably attached to the frame for the reception of the pins 22 depending from the base of the buck 20. Each cylinder has therein a reciprocable piston 48 in the back of which is a case-hardened insert 50 providing seats for the pins 22, and a leak-proof cup 52 is held on the head of the piston by a spring 54 interposed between the cup and the head of the cylinder.

A fluid pressure producing device 56 is secured to the frame 14. This device includes a reservoir 58 having a filling opening closed as by a plug 60, a drain opening closed as by a plug 62 and a cover plate 64. The reservoir has formed in the bottom thereof a cylinder 66 and in the outer end of the cylinder is a head 68 having formed thereon a nipple 70 extending concentrically within the cylinder. The nipple has therein a check valve 72 connected by a pipe line or conduit 74 to a port in the head of the cylinder 46.

A reciprocable piston 76 in the cylinder 66 has a body portion which fits the cylinder with a small clearance. The piston has a circumferential groove 78 communicating with the reservoir, an axial bore 80, and radial ports 82, providing communication between the axial bore and the groove. The piston also has a port 84 in its head providing a communication between the axial bore and the cylinder. The open end of the axial bore 80 is closed by a case-hardened insert 86, and a spring 88 seated on the insert urges a ball valve 90 to close the port 84. A leak-proof cup 92 is on the head of the piston, and a spring 94 interposed between the cup and the head of the cylinder serves to retain the cup

in position as well as to return the piston to its normal position.

Formed on the wall of and communicating with the reservoir is a sleeve 96, and a valve cage 98 in the sleeve has therein a check valve 100 controlling the communication, and formed on the wall of the reservoir within the reservoir is a stop 102, the purpose of which will hereinafter appear.

The sleeve 96 is connected by a pipe line or conduit 104 to a check valve 106 controlling a port in the wall of the cylinder 44. The head of this cylinder has a port connected as by a pipe line or conduit 108 to a port in the cylinder 46.

Formed on the wall of the reservoir are oppositely disposed bosses 110 and 112. A shaft 114 is rotatably mounted in the boss 110. This shaft has a circumferential groove in which is positioned a packing ring 116 seated on a shoulder in the boss. The inner end of the shaft has a reduced portion 118 and a threaded portion 120. The threaded portion has thereon a nut 122 for retaining the shaft against displacement, and an arm 124 for actuating the piston. The arm 124 normally engages the stop 102 and when in this position maintains the valve 100 in open position, and the free end of the arm 124 engages and retains the piston in the cylinder 66. The outer end of the shaft is serrated and secured on the serrations is an operating handle 126.

A shaft 128 is rotatably mounted in the boss 112. The inner end of this shaft is axially bored to receive the reduced portion 118 on the shaft 114. The shaft 128 has a circumferential groove in which is positioned a packing ring 130 seated on a shoulder in the boss 112. The shaft 128 also has a circumferential groove for the reception of a lock ring 132 for securing the shaft against displacement. The inner end of the shaft 128 has suitably secured thereto a lever 134 for actuating the piston, and the outer end of this shaft has secured thereto an arm 136 connected by a link 138 to the arm 36 on the shaft 34.

Assuming that the fluid pressure system is filled with suitable liquid or fluid, upon moving the handle 42 to elevate the head 28 so that work may be placed on the buck 20, the toggles 32 are tripped by the levers 40. As the head is moved to the elevated position, the shaft 34 is slightly rotated through the toggles 32, and hence the arm 36 secured to the shaft 34 is moved through an angle. This movement of the arm 36 is transmitted to the arm 136 through link 138.

Movement of the arm 136 rotates the shaft 128, resulting in moving the lever 134 through an angle. The lever 134 engages and moves the piston 76 to displace the fluid in the cylinder 66 through valve 72, which prevents retrograde movement of the fluid, and from thence through the pipe line or conduit 74 connecting the valve to the cylinder 46, into and through cylinder 46 and pipe line 108 connecting the cylinder 44 to the cylinder 46 into cylinder 44, pressure on the fluid in the cylinders 44 and 46 and their connections being retained by the spring loaded valve 106.

It is, of course, to be understood that the pressure in the cylinders 44 and 46 and their connections is equal only to the load on the valve 106. Thus the pressure in the cylinders 44 and 46 takes up any lost motion between the pistons 48 of the respective cylinders 44 and 46 and the pins 22 on the buck.

In manipulating the handle 42 to lower the head 28 into operative position, the toggles 32 straighten, and retain this position to lock the head against displacement. Now, upon manipulating the handle 126 to actuate the piston 76, the arm 124 moves from the stop 102 and releases the valve 100, whereupon this valve closes, and this movement of the arm 124 applies force to the piston 76 to move the piston in the cylinder 66 and displaces the fluid therein through valve 72, which prevents retrograde movement of the fluid, thence through the pipe line 74 connecting the valve 72 to the cylinder 46 into and through the cylinder 46 and pipe line 108 connecting cylinder 46 to cylinder 44, into and through cylinder 44, past the valve 106, and through pipe line or conduit 104 against the valve 100, resulting in moving the buck to engage the head with sufficient pressure between the buck and the head to efficiently perform the desired result.

When the piston 76 is moved to displace the fluid in the cylinder 66, pressure is received on the valve 90 and the cup 92, and when a predetermined maximum pressure is reached the valve 90 trips to relieve the pressure, and the excess fluid in the cylinder 66 returns through the piston and past the body thereof to the reservoir.

As the piston 76 moves to its retracted position, the valve 72 closes and retains the fluid in the system under pressure. This pressure is partly relieved when the arm 124 returns to its normal position on the stop 102 and trips the valve 100 so that excess fluid in the system may be returned to the reservoir. When a predetermined pressure in the system is reached, the spring-pressed valve 106 closes. The buck 20 is then returned to its normal position by the springs 24, and this movement of the buck relieves the pressure on the pistons 48, resulting in complete release of pressure in the system.

This application is a division of my co-pending application Serial No. 651,761, filed January 14, 1933, which is now Patent No. 2,011,689, and is made in accordance with requirements of the United States Patent Office under the provision of Rule 42.

Although this invention has been described in connection with certain specific embodiments, the principles involved are susceptible of numerous other applications that will readily occur to persons skilled in the art. The invention is therefore, to be limited only as indicated by the scope of the appended claims.

I claim:

1. A fluid pressure producing device comprising a reservoir, a cylinder in the bottom thereof having one end extending through the wall of the reservoir, a head on the extended end of the cylinder, a piston reciprocable in the cylinder, a leak-proof cup on the head of the piston, a spring interposed between the cup and the head of the cylinder, said piston having ports providing communications between the reservoir and the cylinder, a valved outlet for the cylinder a relief valve in the piston controlling the ports, shafts journaled in the wall of the reservoir having telescopic inner end sections, and an actuator secured to each shaft within the reservoir for independently actuating the piston.

2. A fluid pressure producing device comprising a reservoir, a cylinder in the bottom thereof having one end extended through the wall of the reservoir, a head on the extended end of the cylinder, an outlet valve in the head, a piston

reciprocable in the cylinder having ports providing communications between the reservoir and the cylinder, a relief valve in the piston controlling the ports, a leak-proof cup on the head of the piston, a spring interposed between the cup and the head of the cylinder, shafts journaled in opposite relation to the wall of the cylinder with the inner end of one of the shafts journaled on the adverse end of the other shaft, an actuator secured to each shaft within the reservoir for independently actuating the piston, and operating levers secured to the respective shafts exterior of the reservoir.

3. A fluid pressure producing device comprising a reservoir, a cylinder in the bottom thereof having one end extending through the wall of the reservoir, a valved inlet and outlet for the cylinder, a piston reciprocable in the cylinder, a spring urging the piston in one direction, shafts each having a single bearing in the wall of the reservoir and having telescopic inner end sections whereby each shaft cooperates with the other to effect an additional bearing and an actuator secured to each shaft within the reservoir for independently actuating the piston in the other direction.

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