Aug. 20, 1935. E. W. ROUCH 2,011,689

HYDRAULICALLY ACTUATED IRONING MACHINE

Filed Jan. 14, 1933 2 Sheets-Sheet 1

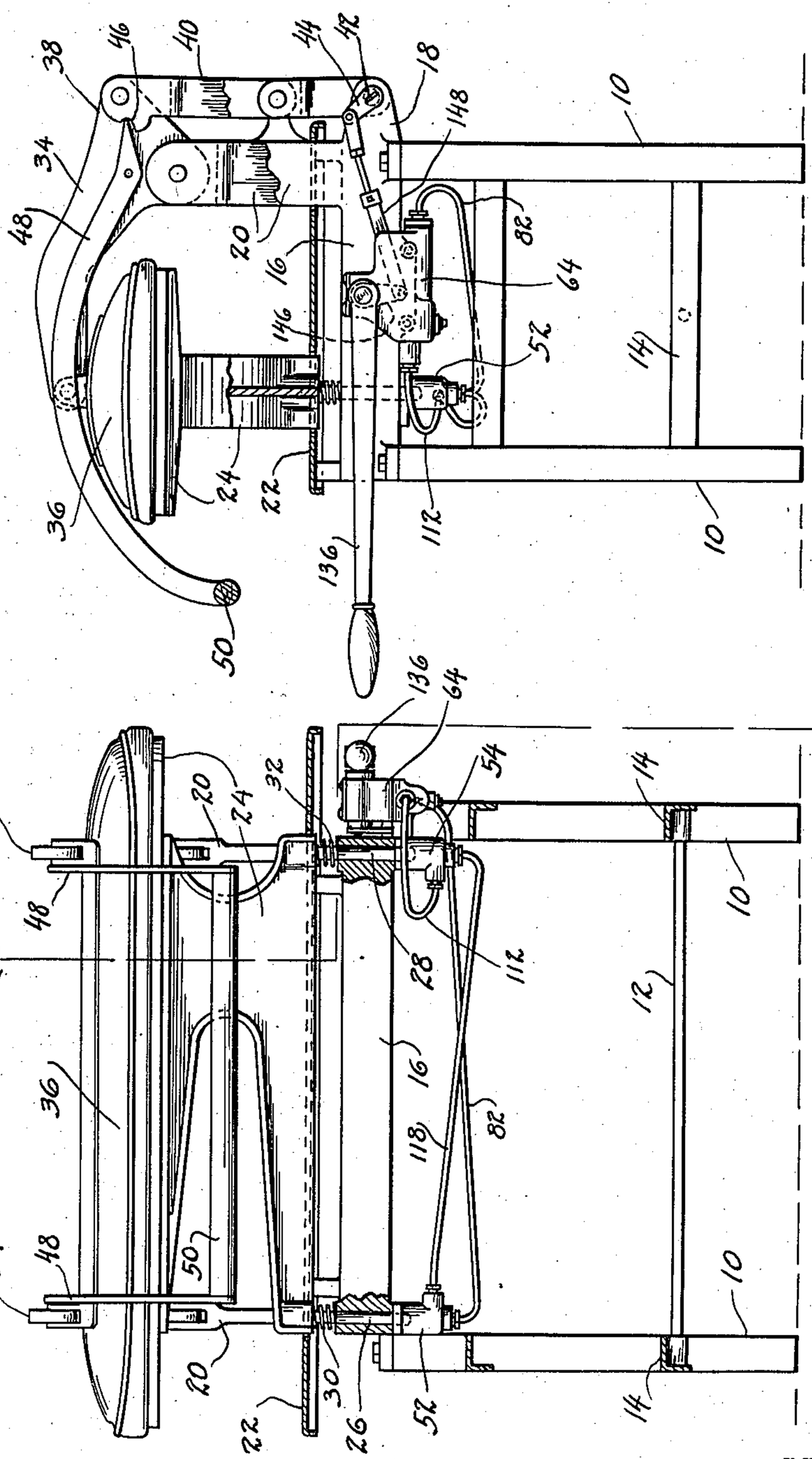

Fig. 2

Fig. 1

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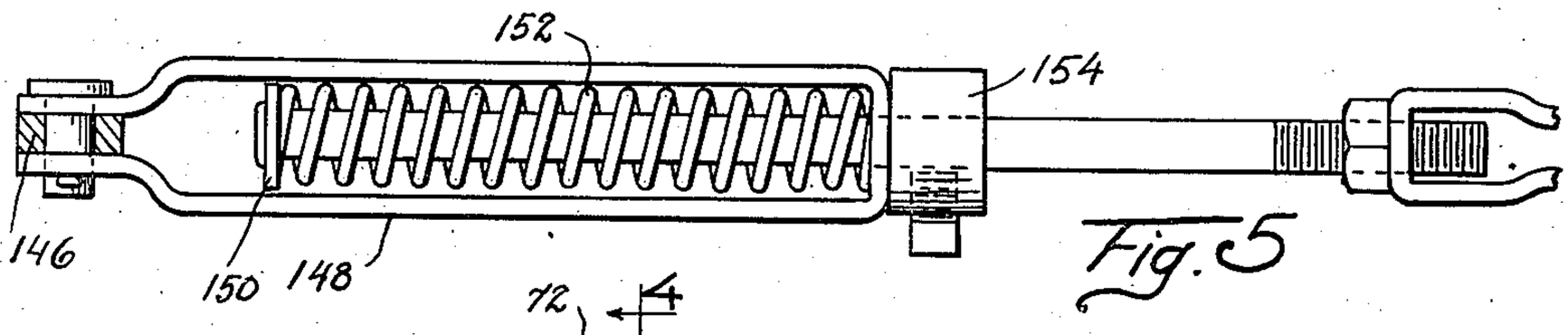

Fig. 5

Fig. 3

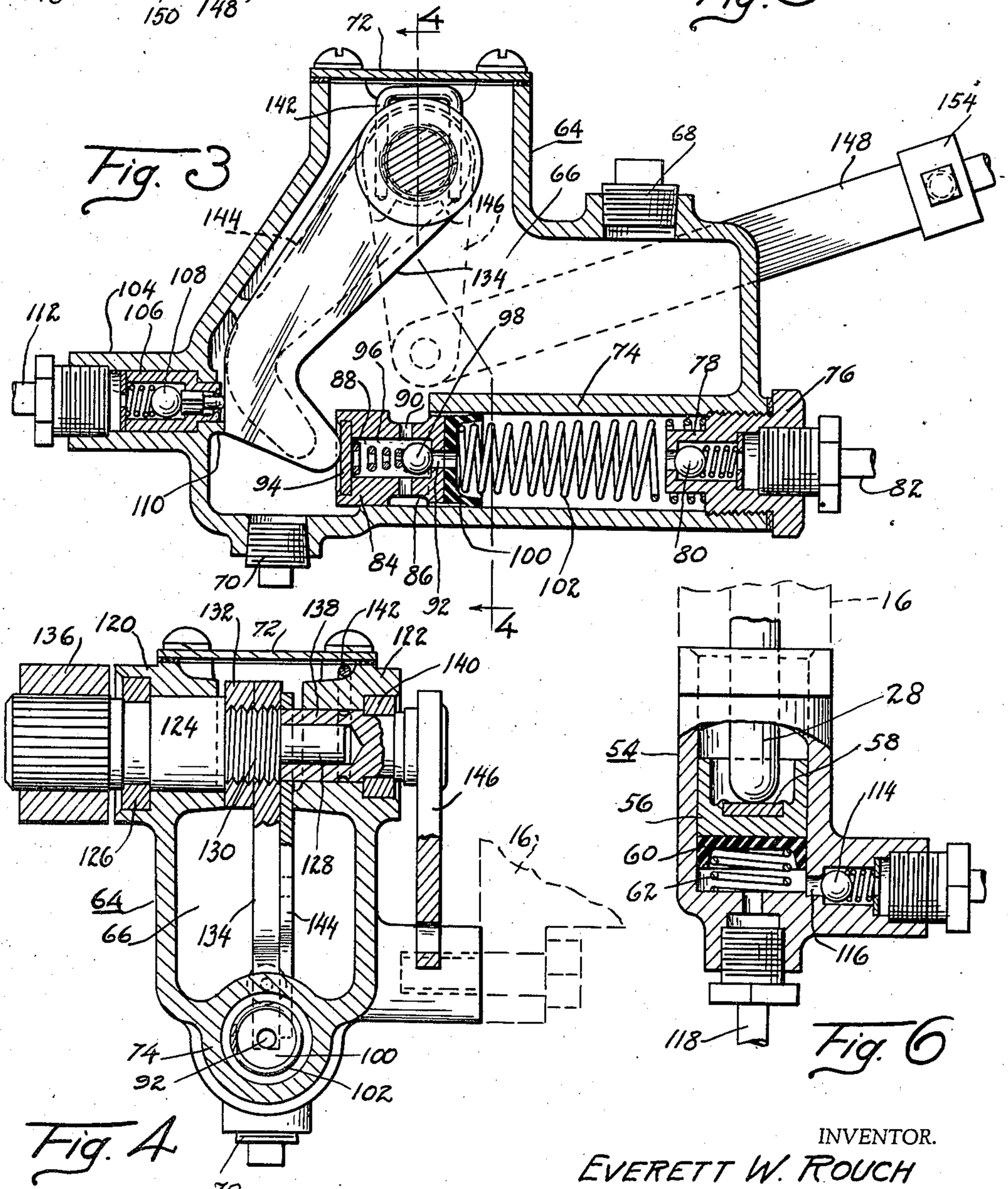

Fig. 4

Fig. 6

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HYDRAULICALLY ACTUATED IRONING MACHINE

Everett W. Rouch, Detroit, Mich., assignor to Hydraulic Brake Company, Detroit, Mich., a corporation of California

Application January 14, 1933, Serial No. 651,761

10 Claims. (Cl. 68—9)

This invention relates to ironing machines and more particularly to hydraulically actuated ironing machines.

Broadly the invention comprehends an ironing machine including a buck and a head, means for moving the head into and from operative position including means for locking the head in operative position, and means for moving the buck toward the head including expansible means and fluid compression means for supplying fluid under pressure to the expansible means. The invention also includes means for actuating the fluid compression means by movement of the head from operative position for creating an initial pressure in the expansible means.

In the illustrated embodiment of the invention there is shown a fluid compression means or master cylinder arranged within a reservoir and duplex means for actuating the piston of the compression means, one for automatically actuating the piston and the other for manually actuating the piston.

An object of the invention is to provide a hydraulically actuated ironing machine.

Another object of the invention is to provide a hydraulically actuated ironing machine automatically adjustable to compensate for variations in the thickness of fabrics upon which work is to be performed.

Another object of the invention is to provide a hydraulically actuating ironing machine including expansible means and fluid compression means, the latter automatically actuated to create an initial pressure in the former.

A feature of the invention is a fluid compression device including a reservoir, a cylinder arranged therein, a piston in the cylinder, and duplex means for actuating the piston, one for automatically actuating the piston and the other for manually 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 front elevation of an ironing machine embodying the invention.

Figure 2 is an end elevation of the ironing machine.

Figure 3 is a vertical sectional view of a fluid compression device.

Figure 4 is a cross-sectional view of the fluid compression device substantially on line 4—4, Figure 3.

Figure 5 is an enlarged detail view of the linkage connecting the fluid compression device to a toggle; and

Figure 6 is a sectional view of one of the expansible means.

Referring to the drawings for more specific details of the invention, 10 represents corresponding upright members connected by side members 12 and end members 14, the whole providing a rigid support. The support has bolted or otherwise secured thereto a frame 16 having spaced rearward extended lugs 18 and spaced upward extended members 20.

Suitably secured to the frame is a top 22 slotted to receive the base of a buck 24. The base of the buck has suitably secured thereto pins 26 and 28 extending through openings in the frame, and sleeved on the pins 26 and 28, between the base of the buck and the frame, are springs 30 and 32 for yieldingly supporting the buck.

Pivotally connected to the upward extended members 20 are corresponding arms 34 and pivotally connected to these arms is a head 36 adaptable for cooperation with the buck 24. The arms 34 have rearward extended lugs 38 connected by toggles 40 to a shaft 42 rotatably supported on the lugs 18 on the frame 16, and keyed or otherwise secured to the shaft is an arm 44.

The toggles 40 have notches 46 adjacent their pivotal connections to the lugs 38. These notches receive rearward extended ends of corresponding levers 48 pivoted to the arms 34, and the forward ends of the levers 48 are connected by a rod which provides a suitable handle 50.

By raising the handle 50 the head may be elevated from its operative position so that work may be placed on the buck. After placing the work upon the buck, the handle 50 is lowered to move the head into operative position where it is locked against displacement by the toggle 40.

The actuating means includes corresponding expansible elements or fluid pressure motors 52 and 54. These motors are identical except that the motor 54 has a port controlled by a valve to be hereinafter described. These motors are suitably attached to the frame. The motor 52 receives the pin 26 and the motor 54 receives the pin 28. As shown, each motor has a reciprocable piston 56 and each piston has a case-hardened insert 58 providing a seat for the pin 26 or 28 respectively. Each of the pistons also has a leakproof cup 60 held against the head of the piston by a spring 62 interposed between the cup and the head of the motor cylinder.

A fluid compression device 64 is secured to the frame 16. This device includes a reservoir 66

having a filling opening closed by a plug 68, a drain opening closed by a plug 70 and a cover plate 72. The reservoir has formed therein a cylinder 74 in the outer end of which is threaded a head 76. The head 76 has formed thereon a nipple 78 extending concentrically within the cylinder, and the nipple has therein a check valve 80 connected by a pipe line or conduit 82 to a port in the head of the cylinder 52.

A piston 84 is positioned for reciprocation in the cylinder 74. The piston fits the cylinder with a small clearance sufficient to by-pass fluid or liquid on the return or retraction stroke of the piston. If preferred, the piston may be provided with a plurality of small openings arranged in spaced relation near the circumference thereof. However, in actual practice it has been found that satisfactory result is obtained by fitting the piston with a small clearance. The body of the piston has a circumferential groove 86, an axial bore 88 and radial ports 90 providing communication between the axial bore and the groove. The piston also has an axial port 92 in its head providing a communication between the axial bore and the cylinder. The open end of the axial bore 88 is closed by a case-hardened insert 94, and a spring 96 seated on the insert urges a ball valve 98 to close the port 92. A collapsible leakproof cup 100 is on the head of the piston and a spring 102 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.

The reservoir has formed on its wall a sleeve 104 communicating with the reservoir and the sleeve has therein a valve cage 106 in which is positioned a check valve 108, controlling a port providing a communication between the sleeve and the reservoir, and formed on the wall of the reservoir within the reservoir is a stop 110 the purpose of which will hereinafter appear. The sleeve 104 is connected by a pipe line or conduit 112 to a check valve 114 controlling a port 116 in the wall of the cylinder 54, and the head of the cylinder 54 has a port connected as by a pipe line or conduit 118 to a port in the wall of the cylinder 52.

The wall of the reservoir has formed thereon adjacent the cover plate oppositely disposed bosses 120 and 122. A shaft 124 is rotatably mounted in the boss 120. This shaft has a circumferential groove in which is positioned a packing ring 126 seated on a shoulder in the boss. The inner end of the shaft has a reduced portion 128 and a threaded portion 130. The threaded portion has thereon a nut 132 for retaining the shaft against displacement and an arm 134 for actuating the piston 84. The arm 134 normally engages the stop 110 and when in this position maintains the valve 108 in open position and the free end of the arm 134 engages and retains the piston 84 in the cylinder 74. The outer end of the shaft is serrated and secured on the serrations is an operating handle 136.

A shaft 138 is rotatably mounted in the boss 122. The inner end of this shaft is axially bored to receive the reduced portion 128 on the shaft 124. The shaft 138 has a circumferential groove in which is positioned a packing ring 140 seated on a shoulder in the boss 122. The shaft 138 also has a circumferential groove for the reception of a clip 142 for securing the shaft against displacement. The inner end of the shaft 138 has suitably secured thereto a lever 144 for actuating the piston 84, and the outer end of the shaft 138 has secured thereto an arm 146 connected by a link 148 to the arm 44 on the shaft 42. The link 148 includes a yielding connection 150 comprising a spring 152 interposed to carry the load, and a stop 154 for adjusting the tension on the spring. The above described compression device is not claimed in the present application as it forms the subject matter of my divisional application, Serial Number 696,447, filed November 2, 1933.

Assuming that the fluid pressure system is filled with suitable liquid or fluid, upon moving the handle 50 to elevate the head 36 so that work may be placed on the buck 24, the toggles 40 are tripped by the levers 48. As the head is moved to the elevated position, the shaft 42 is slightly rotated through the toggles 40, and hence the arm 44 secured to the shaft 42 is moved through an angle. This movement of the arm 44 is transmitted to the arm 146 through the linkage connecting the arm 44 to the arm 146. When the head is in raised position the center of gravity of the head is beyond the center of the pivotal connection of the arm 34 (supporting the head) to the upright 20 and the arm 34 abuts the upright 20 thus retaining the head in elevated position.

Movement of the arm 146 rotates the shaft 138 resulting in moving the arm 144 through an angle. The arm 144 engages and moves the piston 84 to displace the fluid in the cylinder 74 through check valve 80 (which prevents retrograde movement of the fluid), and from thence through the pipe line or conduit 82 connecting the valve 80 to the cylinder 52 into cylinder 52, through cylinder 52 through pipe line 118, connecting the cylinder 52 to the cylinder 54 and into cylinder 54, pressure on the fluid in the cylinders 52 and 54 and their connections being retained by the spring loaded valve 114. It is, of course, to be understood that the pressure in the cylinders 52 and 54 and their connections is equal only to the load on the valve 114. This pressure in the cylinders 52 and 54 takes up any lost motion between the pistons 56 of the respective cylinders 52 and 54 and the pins 26 and 28 on the base of the buck.

In manipulating the handle 50 to lower the head 36 into operative position, the toggles 40 straighten, and retain this position to lock the head against displacement. Now, upon manipulating the handle 136 to actuate the piston 84, the arm 134 moves from the stop 110 and releases the valve 108, whereupon the valve 108 closes, and this movement of the arm 134 applies force to the piston 84 to move the piston in the cylinder 74 and displace the fluid therein through valve 80 (which prevents retrograde movement of the fluid), thence through the pipe line 82 connecting the valve 80 to the cylinder 52, into the cylinder 52, through the cylinder 52 and pipe line 118 connecting cylinder 52 to cylinder 54, into the cylinder 54, and through the cylinder 54, the valve 114 and pipe line or conduit 112 against the valve 108, resulting in moving the buck to engage the head with sufficient pressure between the buck and the head to efficiently press the fabric therebetween.

When the piston 84 is moved to displace the fluid in the cylinder 74, the pressure is received on the valve 98 and the cup 100, and when a predetermined maximum pressure is reached the valve 98 trips to relieve the pressure and the excess fluid in the cylinder 74 returns through the piston and past the body thereof to the reservoir.

As the piston 84 moves to its retracted position, the valve 80 closes and retains the fluid in the system under pressure. This pressure is partly relieved when the head is raised and the arm 134 returns to its normal position on the stop 110 and trips the valve 108 so that some of the excess fluid in the system may be returned to the reservoir. When a predetermined low pressure in the system is reached, the spring-pressed valve 114 closes. The buck 24 is returned to its normal raised position by the springs 30 and 32 when the valve 108 is tripped and this movement of the buck relieves the pressure on the pistons 56 resulting in further release of pressure in the system.

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.

Having thus described the various features of the invention, what I claim as new and desire to secure by Letters Patent is:

1. An ironing machine comprising a pair of relatively movable ironing elements, expansible means for creating an ironing pressure between the elements, compression means for supplying fluid under pressure to the expansible means and means for creating an initial pressure in the compression means operable by movement of one of the ironing elements.

2. An ironing machine comprising a head, means for locking the head in operative position, a movable buck adaptable for cooperation with the head, expansible means for moving the buck to create an ironing pressure between the head and the buck, and a compression means for supplying fluid under pressure to the expansible means including means operable by movement of the head from operative position for creating an initial pressure in the expansible means.

3. An ironing machine comprising a head, means for locking the head in a rigid position, a movable buck cooperating with the head, expansible means for moving the buck to create an ironing pressure between the head and the buck, a compression means for supplying fluid under pressure to the expansible means, means operated by movement of the head for actuating the compression means to create an initial pressure in the expansible means, and manually operative means for actuating the compression means.

4. An ironing machine comprising a movable head, means for locking the head in operative position, a movable buck cooperating with the head, expansible means for moving the buck toward the head, a compression means for supplying fluid under pressure to the expansible means, means for actuating the compression means operable by movement of the head from the buck, and manually operated means for actuating the compression means.

5. An ironing machine comprising relatively movable ironing elements, hydraulic means including a compressor, expansible elements connected to the compressor and to one of the ironing elements for actuating the same, manually operated means for actuating the compressor, manually operated means for actuating the other ironing element and means for actuating the compressor operable by the manual means for actuating the ironing element.

6. An ironing machine comprising relatively movable ironing elements, expansible elements for actuating one of the ironing elements, a compressor for actuating the expansible elements, manually operated means for actuating the compressor, and means for actuating the compressor operable by movement of the other ironing element.

7. An ironing machine comprising a head, a buck adaptable for cooperation therewith, members supporting the head for movement into and from operative position, fluid pressure motors for moving the buck, a fluid compressor for actuating the motors, and linkage connecting the compressor to the members supporting the head for actuating the compressor upon movement of the head from operative position.

8. An ironing machine comprising a head, a buck adaptable for cooperation therewith, members supporting the head for movement into and from operative position, manually operable means for moving the members, fluid pressure motors for moving the buck, a fluid compressor for actuating the motors, manually operable means for actuating the compressor, and linkage connecting the compressor to the members for actuating the compressor upon movement of the head from operative position.

9. An ironing machine comprising a head, a buck adaptable for cooperation therewith, members supporting the head for movement into and from operative position including a handle for moving the members, fluid pressure motors for moving the buck, a fluid compressor for actuating the motors, a lever for actuating the compressor, and linkage connecting the compressor to the members for actuating the compressor upon movement of the head from operative position.

10. An ironing machine comprising a head, a buck adaptable for cooperation therewith, arms supporting the head for movement into and from operative position, toggles for locking the head in operative position, fluid pressure motors for moving the buck, a fluid compressor for actuating the motors, a hand operated lever for actuating the compressor, and linkage connecting the compressor to the toggles for actuating the compressor upon movement of the head from operative position.

EVERETT W. ROUCH.