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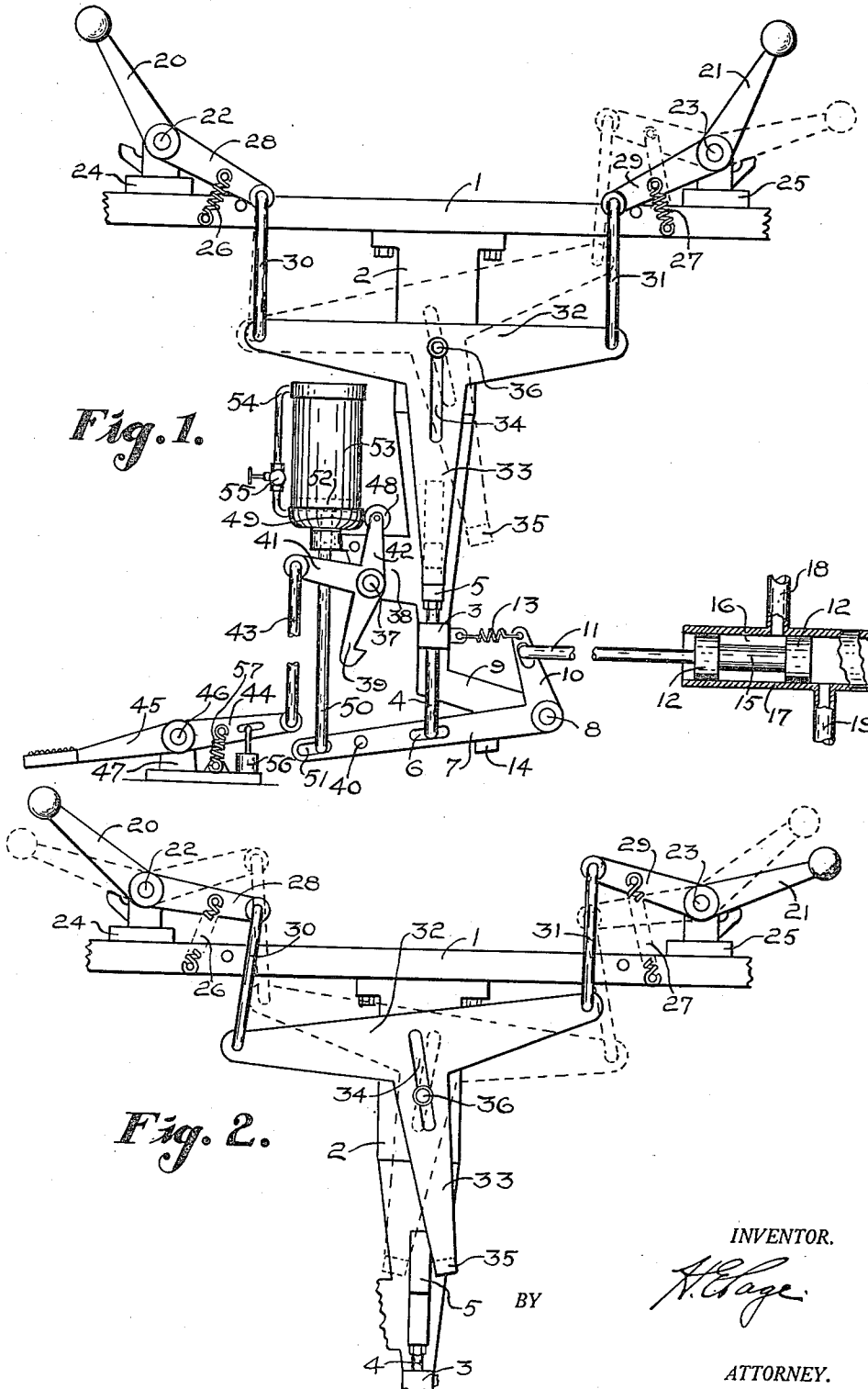
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2,046,531

TWO-HAND CONTROL DEVICE

Original Filed May 9, 1933

2 Sheets-Sheet 1



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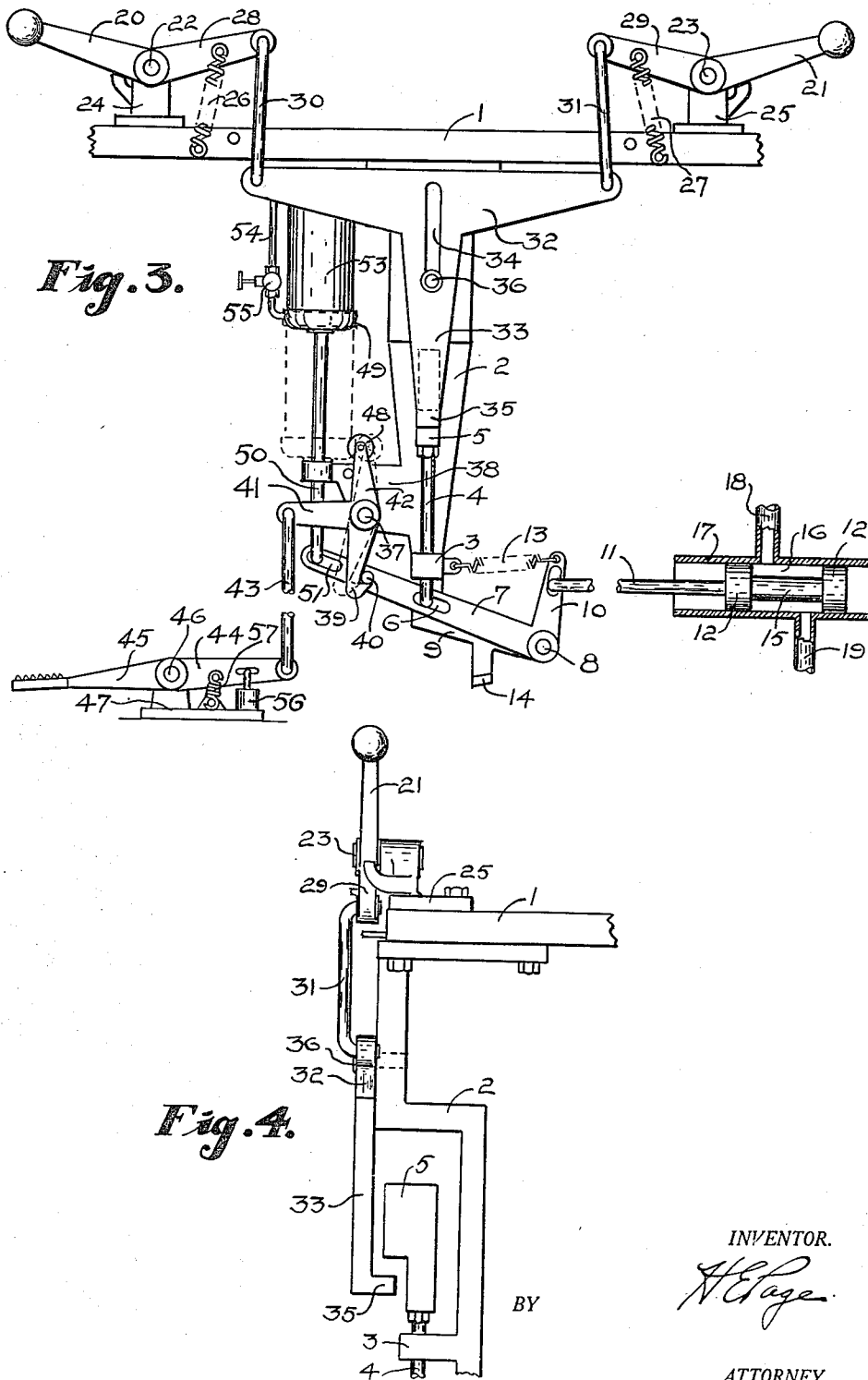
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TWO-HAND CONTROL DEVICE

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8 Claims. (Cl. 192—131)

This invention relates to a two hand control for keeping both hands of the operator occupied in order to prevent injury while operating a pressing machine.

One of the objects is to provide means to prevent the operation of the two hand control if either of the two operating handles has been previously tied down or secured in a depressed position in any manner so as to make it impossible to operate the machine controlled by this device with only one hand, thus preventing possible injury to the operator.

Another object is to provide means for preventing operation of the machine controlled by this device if either hand is removed from the control handles at any time during the entire operating cycle of the two hand control.

A further object is to provide means for automatically resetting the two hand control device to its original position from any position that it may have been placed in by the operator so that at all times it will be ready for immediate operation.

Another object is to provide means for automatically opening the pressing machine controlled by this device at a predetermined time.

Other objects and uses relating to specific parts of the device will be brought out in the following description.

In the drawings:—

Figure 1 is a front elevation in which the full lines indicate the device in neutral position and the dotted lines indicate the position with the right hand operating handle depressed.

Figure 2 is a similar view in which the full lines indicate the position resulting from first depressing the right hand operating handle and then depressing the left hand operating handle, and the dotted lines show the position resulting from first depressing the left hand operating handle and then depressing the right hand operating handle.

Figure 3 is a similar view in which is shown the position resulting from depressing both operating handles simultaneously.

Figure 4 is a side elevation indicating the device in a neutral position similar to that shown by the full lines in Figure 1.

As illustrated, the base 1 is any suitable portion of the machine which is controlled by this device and on which is mounted the bracket 2 said bracket having a projection 3 located at its lower end in which is movably mounted the rod 4, Figure 4.

The upper end of the rod 4 is provided with

an overlying projection or shoulder 5, Figure 4.

The lower end of the rod 4 engages with the slot 6 in the arm 7 of a bell crank lever, said lever being pivotally mounted at 8 on the projection 9 of the bracket 2, the other arm 10 is connected by the rod 11 to the reciprocally movable piston 12 of a fluid pressure controlling valve, Figure 1.

A retracting spring 13 is attached to the upper end of the arm 10 and acts to yieldingly hold the bell crank lever in the position as shown with the arm 7 against the stop 14, Figure 1.

The center portion of the piston 12 of the fluid pressure controlling valve has a smaller diameter as shown at 15 thus allowing a space 16 to exist between the smaller diameter 15 of the piston 12 and the walls of the cylinder 17, Figure 1.

A fluid supply conduit 18 enters the cylinder wall 17 at a point approximately in the center as shown which allows fluid under pressure to flow into the space 16, and another conduit 19, one end of which is connected to a fluid pressure motor that operates the press, enters the cylinder wall 17 at a point near the rear end of the cylinder, said end being open to the atmosphere, Figure 1.

It is now evident that under the conditions as shown in Figure 1, the fluid under pressure that is in the space 16 is confined in this space and cannot escape, however if the projection 5, Figure 4, is moved upwardly this motion is transmitted through the rod 4, Figure 1, and the bell crank arms 7 and 10 and the rod 11 to the piston 12 and causes said piston to move against the action of the retracting spring 13 toward the rear of the cylinder 17 until it assumes the position as shown in Figure 3.

The space 16 containing the fluid under pressure has now been moved until it is connected with the opening in the conduit 19, as shown in Figure 3, and the fluid can now flow through said conduit to the fluid pressure motor of the press and cause same to operate.

As soon as operating pressure is removed from the shoulder 5 then the retracting spring 13 causes a reversal of the above motion and the piston 12 again assumes the position as shown in Figure 1 in which it will be noted that the conduit 19 is now connected directly to the atmosphere through the rear end of the cylinder 17 and therefore any fluid under pressure which was trapped in the conduit 19 and also the fluid pressure motor, can now escape and said motor is free to assume its original position which is usually accomplished by retracting springs on 55

the press, thus a reciprocal movement of the piston 12 alternately connects the conduit 19 with fluid under pressure and then to the atmosphere which in turn causes the fluid pressure motor to alternately close the press and then allow same to open thus producing the normal power cycle of the press.

A pair of hand operated members as levers 20 and 21 are pivotally mounted at 22 and 23 respectively on the brackets 24 and 25 mounted on the base 1 and said hand levers are yieldingly held up by the springs 26 and 27 in their inoperative positions as shown by the full lines in Figure 1.

Each of the hand levers 20 and 21 is provided with crank arms 28 and 29, said crank arms being connected by the links 30 and 31 to the ends of the horizontally extending lever 32, said lever having a central pendant arm 33 and a central vertically elongated slot 34, Figure 1.

At the lower end of the pendant arm 33 is a laterally projecting offset shoulder 35 adapted to engage, provided said shoulder is raised vertically, with the shoulder 5, Figure 4.

A fulcrum pin 36 is passed through the slot 34 in the lever 32 and secured to the bracket 2, Figures 1 and 4, and the slot and pin connection between the lever 32 and the bracket 2 permits a vertical rocking movement and vertical rectilinear movement of the lever 32 for a purpose presently described.

A bell crank lever is pivotally mounted at 37 to the projection 38 of the bracket 2, said bell crank lever having a downwardly extending latch 39 adapted to engage with the pin 40 located in the arm 7, Figures 1 and 3.

This bell crank lever is provided with two additional crank arms 41 and 42, one of which, as 41, is connected by the link 43 to the horizontally projecting arm 44 of the foot operated pedal 45, said pedal being pivotally mounted at 46 on the bracket 47 and having attached to the arm 44 a retracting spring 57 and a dash pot 56 adapted to retard the downward motion of said arm for a purpose presently described, Figures 1 and 3, and the other arm, as 42, having a roller 48 pivotally mounted at its upper end, said roller adapted to engage with the rounded surface of the dash pot cylinder head 49, Figure 1.

A piston rod 50 is reciprocally mounted at the end of the projection 38 of the bracket 2 the lower end of the rod 50 engaging with the slot 51 in the end of the arm 7 and the upper end of said rod is connected to the piston 52, said piston being reciprocally mounted in the dash pot cylinder 53 which may be filled with any suitable fluid, Figure 1.

The piston 52 is equipped with suitable check-valve means which allow said piston to travel downwardly without restriction through the fluid contained in the cylinder 53 but which tend to prevent any relative upward movement of the piston 52 by trapping the fluid above said piston.

The cylinder 53 rests against the projection 38 but is not rigidly attached to said projection and is provided with a by-passing release 54 controlled by a relief valve 55 to regulate the flow of fluid from the upper end of said cylinder to its lower end, Figure 1.

It will now be observed that if one of the hand levers, as 20, is allowed to remain in its neutral position and the other, as 21, is depressed until it rests against a suitable stop as shown by the dotted lines in Figure 1, this will

raise the arm 29 and the link 31 and cause the lever 32 to swing from the position as shown by the full lines to the position as shown by the dotted lines in Figure 1, due to the slot and pin connection previously described.

It is now clear that when the lever 32 swings to the position as shown by the dotted lines in Figure 1 the shoulder 35 is thrown out of vertical alignment with the shoulder 5 located at the end of the rod 4 and therefore these shoulders cannot engage thereby preventing the operation of the piston 12 by failure to lift the rod 4, Figures 1 and 4.

It will now also be noted that if one of the hand levers, as 21, has been tied down or secured in any manner in a depressed position the lever 32 will assume the position as shown by the dotted lines in Figure 1 and if the hand lever 20 is now depressed then the lever 32 will be moved from the position as indicated by the dotted lines in Figure 1 to a point where the side of the shoulder 35 will strike against the side of the shoulder 5 preventing any further movement of the device and the position will then be as shown by the full lines in Figure 2, making it impossible for the shoulders 35 and 5 to engage in the proper manner and thereby preventing the operation of the piston 12 by failure to lift the rod 4.

From the foregoing it will also be apparent that if the hand lever 21 is allowed to remain in its neutral position as shown by the full lines in Figure 1 and the hand lever 20 is first depressed then the lever 32 will swing in the opposite direction from that shown by the dotted lines in Figure 1 and the device will be inoperative as previously explained.

Furthermore, if the hand lever 20 is first depressed or secured in any manner and then the hand lever 21 is depressed, the device will assume a position as shown by the dotted lines in Figure 2 and the shoulder 35 will strike against the other side of the shoulder 5 and the device will be inoperative.

Therefore this two hand control device cannot be converted into a one hand control by first securing either of the hand levers 20 or 21 in a depressed position and then attempting to operate the press with one of the hand levers.

On the other hand, when both of the hand levers 20 and 21 are depressed simultaneously from their normal inoperative positions as shown by the full lines in Figure 1 to their operative positions as shown in Figure 3 it would effect an upward bodily movement of the lever 32 and thereby cause the shoulder 35 to engage with the shoulder 5 on the rod 4 and carry said shoulder upward vertically, Figure 3.

This vertical movement of the shoulder 5 is transmitted through the rod 4 and the bell crank arms 7 and 10 and the rod 11 to the piston 12 of a fluid pressure controlling valve thus causing the press to close as previously described.

It will now be observed that during the upward bodily movement of the lever 32 caused by simultaneously depressing the hand levers 20 and 21 if operating pressure is released from either of said hand levers, as for example handle 20, then the retracting spring 26 will return said handle to its neutral position, causing the arm 28 to swing downwardly and this motion will be transmitted through the link 30 to the lever 32 causing said lever to swing from the position as shown in Figure 3 to the position shown by the dotted lines in Figure 1 and the shoulder 35 will swing to one side and be thrown out of vertical

alignment with the shoulder 5 disengaging from said shoulder and allowing shoulder 5 to move downwardly from the position as shown in Figure 3 to the position shown in Figure 1 due to the action of the retracting spring 13, thus stopping the fluid pressure supply to the fluid pressure motor of the press and allowing said press to open as previously explained.

If, instead of the handle 20 being released, the handle 21 is released during the upward bodily movement just described, then the lever 32 will swing in the opposite direction throwing the shoulder 35 out of vertical alignment with the shoulder 5 and the lever 32 will assume the position as shown by the dotted lines in Figure 2, thus also causing the press to open.

Therefore, this device keeps both hands of the operator occupied at all times and under all conditions and the retracting springs 26 and 27 will return the lever 32 to the original neutral position shown by the full lines in Figure 1 from any position that it is possible for the operator to have placed said lever, thus always maintaining the device in a position ready for immediate operation by the operator.

The lever 32 is thus a coupling member between the manuals or handles 20 and 21 and the operating shoulder 5 for the control member or valve of the machine and the lever 32 is T shaped with the head of the T forming an equalizing lever to the ends of which the manuals are connected by the links 30 and 31 and the leg of which is in operative relation with the shoulder 5, Figures 1, 2, 3, and 4.

Due to the pin and slot connection 36 and 34, the lever 32 has a rectilinear movement when both of the manuals 20 and 21 are operated together or nearly so, and a shifting pivotal movement when either manual is operated independently; and this pivotal movement shifts the lever 32 out of operative relation with the shoulder 5, Figures 1 and 2.

Therefore the links 30 and 31 are connected to, and the shoulder 5 coacts with, the lever 32 at the angles of a theoretical triangular formation with the links 30 and 31 connected to the triangle at the base angles and the shoulder 5 in operative relation with the apex, Figure 1.

When both of the handles 20 and 21 are depressed simultaneously the upward movement of the rod 4 will be transmitted through the arm 7 to the piston rod 50 causing said rod to rise vertically, Figures 1 and 2.

In the broader aspect of this invention, the valve 15 is a power control member or an element for controlling the flow of power to a power operated device; the handles 20, 21 are operating means or members; the links 30, 31, lever 32, rod 4, bell crank 7 and valve rod 11 constitute an exemplification of connections between the operating means and the power control member 15, so that upon operation of the hand operated means 20, 21, the control device or member 15 is actuated; and 40 constitutes latch means operable to hold the control member 15 in its operated position. The dash-pot 56 constitutes broadly means for delaying the movement of the latch means into its latching position, until the manuals 20, 21 have been held operated a predetermined time period. Also, in a less broad aspect of the invention, the rod 4 with its shoulder 5 constitutes one element of coupling means between the manuals 20, 21 and the control member or valve 15. The lever 32 constitutes a second element of the coupling means and the links

30, 31 connections between the second element and each of the manuals. The second element or lever 32 is normally engaged with the element or rod 4 through the inter-engagement of the shoulders 5 and 35 provided respectively on the element 4 and the arm 33 of the element 32, this element or lever 32 being shiftable by the individual operation of either of the manuals to carry the shoulder 35 laterally in one direction or the other into and out of interlocking or coupling engagement with the shoulder 5, so that substantial simultaneous operation of both hand levers is required to hold the shoulder 35 engaged with or in juxtaposition to the shoulder 5. Thus, the lever 32 and rod 4 constitute two elements of a coupling means between the manuals 20, 21 and the control member or valve 15, the lever 32 being an element which is normally engaged with the other coupling element 4 and movable by the individual operation of either manual out of coupling engagement with the element 4 or the projection 5 thereof, upon the operation of either manual individually, and the lever 32 also constitutes a shiftable element normally arranged in central position where it permits, upon operation of both manuals simultaneously, the flow of power by the opening of the control device or valve 15 to the motor of a motor actuated device, and which is shiftable laterally in one direction or the other from its central or normal position, upon the operation of either manual individually and hence in a position to prevent the operation of the valve 15 or the flow of power to a motor device. It is held from shifting when both manuals are actuated substantially simultaneously. The links 30, 31 are one exemplification of means between the manuals 20, 21 and an element shiftable laterally in opposite directions from normal or central position in one direction or the other upon individual operation of one or the other of the manuals.

The vertical motion of the piston rod 50 and the piston 52 tends to compress the fluid which is between the piston 52 and the upper head of the cylinder 53, thus producing a pressure or force against the upper head of the cylinder 53 which causes said cylinder to move upward bodily as it is carried along with the movement of the piston 52 from the position as shown by the full lines in Figure 1 to the position as shown by the full lines in Figure 3.

When the cylinder 53 moves upwardly the rounded surface of the lower cylinder head 49 moves away from the roller 48 located at the upper end of the arm 42 of a bell crank lever thus allowing said bell crank lever to rock in a counterclockwise direction about the pin 37 from the position as indicated by full lines in Figure 1 to the position as shown by the full lines in Figure 3 due to the action of the retracting spring 57 acting through the arm 44, the link 43 and the arm 41.

This movement allows the latch 39 to engage with the pin 40 and thus holds the valve mechanism in the position as shown by the full lines in Figure 3 and allows the hands of the operator to be removed from the handles 20 and 21 and yet maintain the press in a closed position.

As previously explained, the dash pot 56 is adapted to retard the downward motion of the arm 44 and this delays the action of the latch 39 as it swings over to engage the pin 40 and this delay keeps the hands of the operator engaged in holding down the handles 20 and 21 and provides a time lag which allows the press to

close before it is possible for the hands of the operator to be removed from said handles and thus prevents possible injury due to the operator first quickly depressing the handles 20 and 21 and, providing the action of the latch 39 was not delayed and immediately engaged with the pin 40, then quickly thrusting either or both hands between the pressing surfaces of the press before it had time to close, Figures 1 and 3.

- 10 After the device has been locked in the position as shown by the full lines in Figure 3 and the hands have been removed from the handles 20 and 21 and the cylinder 53 has been raised to the position, as shown also by the full lines in Figure 3, then, as heretofore explained, the pressure caused by the weight of the cylinder 53 which exists in the fluid trapped between the piston and the top of said cylinder gradually forces this fluid through the by-pass 54 thereby allowing the cylinder 53 to drop vertically from the position as shown by the full lines to that shown by the dotted lines in Figure 3.

As the cylinder 53 reaches the bottom of its stroke the rounded surface of the lower cylinder head 49 engages with the roller 48, thus rocking the arm 42 about the pin 37 in a clockwise direction, thereby causing the latch 39 to swing away from the pin 40 as indicated by the dotted lines in Figure 3.

- 30 When the latch 39 releases the pin 40 then the retracting spring 13 will rotate the bell crank lever consisting of the arms 7 and 10 in a counterclockwise direction about the pin 8 thus moving the fluid pressure control valve piston 12 from the position as shown by the full lines in Figure 3 to that shown by the full lines in Figure 1, thereby opening the press as previously explained.

In this manner a time element is secured by means of which it is possible to control the time during which the press will remain closed and this time element may be varied by the by-pass valve 54.

- 40 If it is desired to open the press immediately without waiting for the stroke of the cylinder 53 to be completed, this can be accomplished at the will of the operator by depressing the foot operated pedal 45 which will cause the arm 44 to raise the link 43 and this motion will be transmitted through the arm 41 to the latch 39 and cause said latch to swing away from the pin 40 releasing said pin and permitting the retracting spring 13 to move the pressure controlling valve piston 12 from the position as shown in Figure 3 to the position shown in Figure 1, thus allowing the press to open as explained previously.

I claim:

1. In a two hand control device, a pair of manuals, a control member for a motive power, an operating member connected thereto, a coupling member normally in operative relation with the operating member whereby movement of the coupling member operates the operating member, the coupling member being mounted to shift out of operative relation with the operating member at an angle to the former movement, and independent connections between the manuals and the coupling member and operating to shift the coupling member out of operative relation with the operating member when either manual only is operated, and to hold the coupling member in such operative relation when both manuals are operated and thereby actuate the operating member to operate the control member.

2. In a two hand control device, a pair of manuals, a control member for a motive power, an

operating member connected thereto, a coupling member having means normally in operative relation with the operating member whereby movement of the coupling member operates the operating member, the coupling member being mounted to shift out of operative relation with the operating member at an angle to the former movement and independent connections between the manuals and the coupling member and operating to shift the coupling member out of operative relation with the operating member when either manual only is operated, and to hold the coupling member in such operative relation when both manuals are operated and thereby actuate the operating member to operate the control member, said coupling member being a three-arm lever with the ends of its arms arranged at the angles of a theoretical triangle with the engagement means at the apex of the triangle and said connections connected to the ends of the base of the triangle and said lever being mounted to have pivotal movement when either manual is operated and a rectilinear movement when both are operated.

3. In a two hand control device, a pair of manuals, a control member for a motive power, an operating member connected thereto, a coupling member having means normally in operative relation with the operating member whereby movement of the coupling member operates the operating member, the coupling member being mounted to shift out of operative relation with the operating member at an angle to the former movement and independent connections between the manuals and the coupling member and operating to shift the coupling member out of operative relation with the operating member when either manual only is operated, and to hold the coupling member in such operative relation when both manuals are operated and thereby actuate the operating member to operate the control member, said coupling member being an equalizing lever normally in operative relation with the operating member and having a rectilinear movement when both manuals are operated and a pivotal movement when either manual is operated, said pivotal movement shifting the lever out of operative relation with the operating member.

4. In a two hand control device, a combination of a power control member, a pair of hand operated members, one for each hand, coupling means between the hand operated members and the control member, said coupling means including an element and connections between it and the control member, a second element and connections between it and each of the hand operated members, the second element being normally engaged with the first element and movable by the individual operation of either of the hand operated members out of coupling engagement with the first element whereby substantially simultaneous operation of both hand operated members is required to maintain the coupling engagement between said elements.

5. In a two hand control device, the combination of a power control member, a pair of hand operated members, one for each hand, a coupling including two elements, one being connected to the power control member and the other being connected to the hand operated members, the second element being normally coupled to the first element and comprising a lever pivoted between its ends and movable in one direction or the other on its pivot by the individual operation of either of the hand operated members and being

also movable radially relatively to its pivotal axis upon simultaneous operation of the hand operated members.

5 6. In a manually operated control device, the combination of a power control member, an operating member, and connections between the operating member and the control member, whereby upon the actuation of the operating member, the control member is actuated, of latch means oper-
10 able to hold the control member in its operated position, and means for delaying the movement of the latch means into its latching position, after the operating member has been operated to its
15 held in its operated position for a predetermined time period by the operator.

7. A control mechanism for machines having an opening and closing movement, manual means for controlling the closing of the machine, a latch
20 for holding the machine closed, a second latch mechanism comprising a latch member, auto-

matic means tending to engage the latch member and timed means for controlling the releasing of the latch member.

8. In a two hand control device for controlling the flow of power to a motor device, a pair of
5 individually operable hand operated members, one for each hand, a shiftable element normally arranged in central position to permit the flow
10 of power to the motor device upon the actuation of both hand members substantially simultaneously and shiftable laterally in one direction or
15 the other from central or normal position to prevent the flow of power to the motor device, upon the operation of either hand member individually
20 and means between the hand members and said element operable upon the individual actuation of either hand member to cause said element to be shifted in one direction or the other out of central position.

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