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CONTROL DEVICE FOR HYDRAULIC PRESSES

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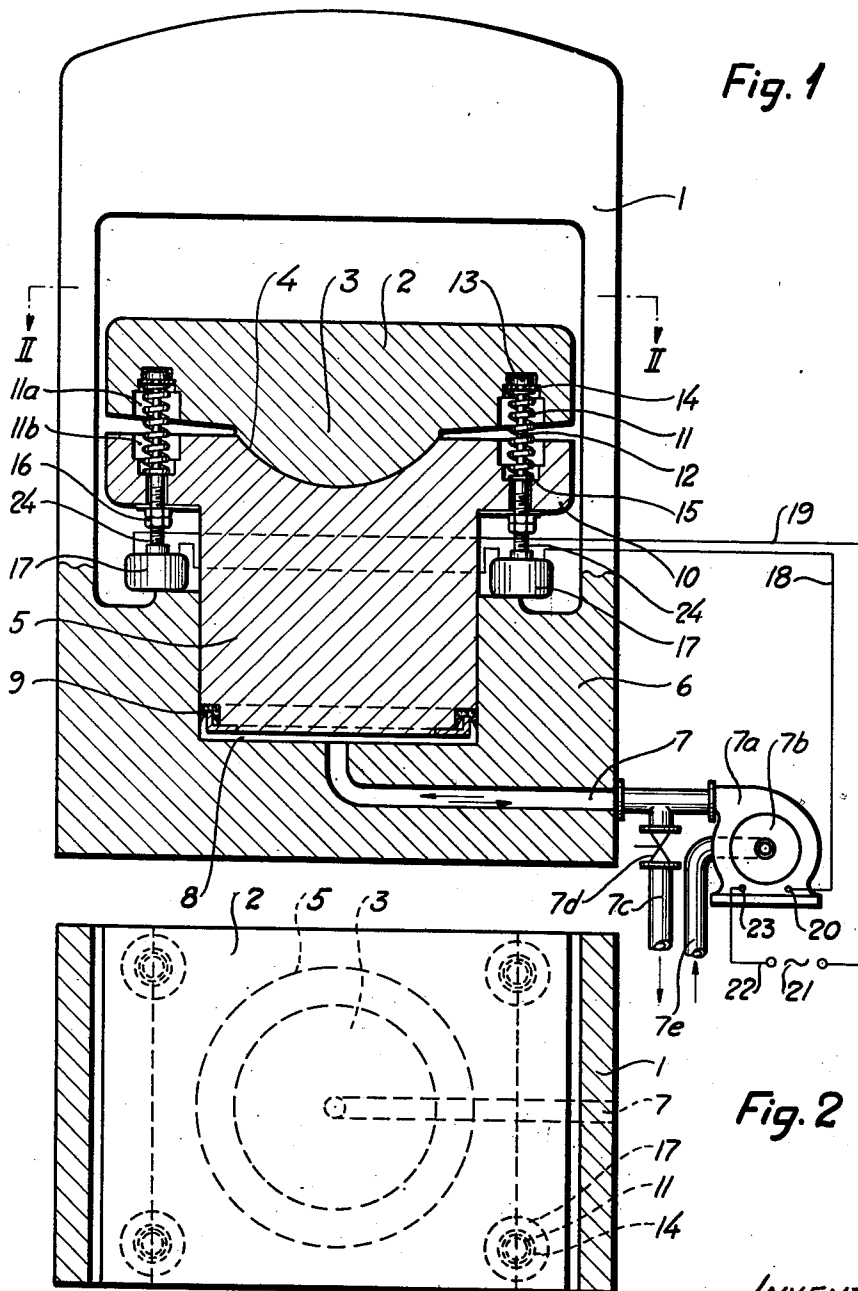


Fig. 2

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CONTROL DEVICE FOR HYDRAULIC PRESSES

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The present invention relates to platens for hydraulic presses, particularly presses of the type operating at a high pressure and requiring a great accuracy as to the correct engagement between the usually large press platens, a stationary one and a movable one, and the article to be pressed therebetween. More specifically the invention may be adapted to presses for stamping matrices.

The movable press platen can be caused to press in an oblique position, i. e. a position in which it is not parallel with the stationary platen, for example, by an article of any kind being located at the margin of the platen, whereby in case of high pressures the accuracy of the pressing operation can be entirely jeopardized, if there is no protection against the consequence of the nonuniform pressing. An object of the invention is to provide means, by which said disadvantages may be avoided and by which a correct self-adjustment of the movable platen relatively to the stationary one can be obtained.

A further object of the invention is to provide means, by which the pressing operation may be immediately interrupted at an initiation to an oblique position of the movable platen as a consequence of an uneven load, whereby the platen is prevented from pressing in an oblique position.

A still further object of the invention is to provide means permitting universal adjustment of the movable press platen relatively to the press plunger and to provide spring means of such a nature as to tend to keep the platen in a position correct for the pressing operation.

The invention will be more particularly described hereinafter and illustrated by way of example in the accompanying drawing in which:

Fig. 1 is a front elevation of the press, the lower parts being shown in a vertical section, and

Fig. 2 is a horizontal section along the line II—II in Fig. 1 and illustrates a top view of the movable platen.

In the drawing, 1 designates the press platen mounted stationary in the frame of the press, 2 being the movable platen having a spherical bearing 3 seated and universally movable in a corresponding spherical seat 4 in the press plunger 5, which is vertically reciprocable in the press cylinder or frame 6. A pressure conduit 7 extends from a pump such as a screw pump or gear pump 7a driven by an electric motor 7b to the press chamber 8, a packing 9 being conventionally mounted between the walls of the chamber 8 and the plunger 5. An outlet branch 7c comprising an operating valve 7d extends from the conduit 7, and the pump has an inlet pipe 7e. Four heli-

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cal springs 11 are mounted between the platen 2, which is square in the present case, and a correspondingly square portion 10 made integral with the press plunger 5. The springs are located in the proximity of the corners of the platen as shown in the drawing, i. e. at a considerable distance from the centre of the table, whereby the springs are made very sensibly responsive to a possible movement of the platen to an oblique position, i. e. to deviations of the platens from their correct parallel position. Each spring 11 is seated in recesses 11a, 11b in the platen 2 and in the portion 10 projecting from the press plunger. Each spring 11 is mounted on a bolt 12 having a head 13 engaging the top of a ring 14, which forms an upper support for the spring, the lower end of which is seated on a shoulder 15 in the bottom of the recess 11b. Screwed up on the lower screw-threaded end of the bolt 12 to engagement with the bottom of the portion 10 are nuts 16 by which the prestrain of the spring, as mentioned above, may be adjusted. Below each bolt 12 is a switch 17 supported by the cylinder 6 or frame and coupled in the circuit of operation of the press. There are four switches 17 (indicated by block diagrams in Fig. 1) coupled in series by leads 18, 19 the former of which is connected to one terminal 20 of the motor 7b and the latter to one terminal of a source of current 21, a further lead 22 connecting the other motor terminal 23 to the other terminal of the source of current 21. The switch has an operating portion 24 adapted to be actuated by the bolt and being located in alignment therewith in the proximity of the end thereof.

In operation the pump 7a delivers pressure medium such as oil to conduit 7 and chamber 8, valve 7d being closed. The plunger 5 rises and moves the press platen 2 toward the press platen 1, thereby compressing the work. Should the press platen 2 tilt, one or more of the bolts 12 will be displaced, and as a result the corresponding switch or switches are actuated to cause an interruption of the circuit controlling motor 7b. After such circuit interruption and following the stop of the pressing operation the press chamber 8 is emptied from pressure liquid by opening valve 7d, whereupon the springs 11 will be able to restore the platen 2 to a position which is correct for the future pressing operation.

The detailed construction of the device may of course be changed without departing from the principles of the invention.

What I claim is:

1. A control device for a hydraulic press com-

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prising a press plunger, a press platen cooperating with the plunger to contact centrally with the plunger, said plunger and platen having a central spherical bearing whereby the plunger and platen will have relative tilting movement, a plurality of switches arranged non-centrally relative to the press plunger and platen, means to supply hydraulic pressure fluid to the plunger which is in electrical connection with the switches so that when the press platen tilts relative to the plunger one of the switches will be operative relative to said means to thereby interrupt the flow of pressure fluid to the plunger; and a bolt surrounded by a pre-strained spring for each switch with the bolt contacting the press platen and the switch, said spring being interposed between the platen and plunger.

2. A control device for a hydraulic press comprising a press plunger, a press platen cooperating with the plunger to contact centrally with the plunger; said plunger and platen having a central spherical bearing whereby the plunger and platen will have relative tilting movement, a plurality of switches arranged non-centrally relative to the press plunger and platen, means to

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supply hydraulic pressure fluid to the plunger which is in electrical connection with the switches so that when the press platen tilts relative to the plunger one of the switches will be operative relative to said means to thereby interrupt the flow of pressure fluid to the plunger, and a bolt surrounded by a spring for each switch with the spring pre-strained between the press platen and the plunger, the bolt being interposed between the switch and the platen, said plunger being substantially rectangular with a switch provided in each corner.

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