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GUIDE FOR THE SLIDE OF A VERTICAL PRESS
Michel Doudet, Chatillon-sous-Bagneux, France, assignor
to Presses et Matériels Hydrauliques Morane-Somua,
Paris, France, a French company

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4 Claims

ABSTRACT OF THE DISCLOSURE

A guide for the ram slide of a vertical press whose frame is formed by the press base and crown interconnected by uprights or columns having slide-guiding elements, wherein the ram slide comprises a tool-carrying cross-member guided in known manner on the press frame upright or columns; the cross-member is connected to two vertical beams symmetrical of one another in respect to the central vertical plane of the working passage of the press; and the beams extend through the press frame element towards which the slide makes its operative movement, in guides in the latter element.

This invention relates to a guide for the slide of a vertical press.

The invention is of use in hydraulic and mechanical arch, column and upright presses. The ram slide of such presses is usually guided along stationary elements contrived on the press frame, for instance, on the uprights in the case of the press having uprights, and at the top of the uprights in the case of a downstroke press. Consequently, in all cases in which the punch or ram or other tool is required to operate on an axis not coincident with the press axis, the slide experiences a tilting torque tending to cause relatively substantial bending of the uprights or other elements along which the slide is guided. These distortions upset satisfactory operation of the press, apply local overloads to the stationary guides and to the guide elements rigidly secured to the slide, and upset the parallelism of the platens.

It is an object of this invention to obviate the effects on a press frame of the bending forces arising from the working axis being offset from the press axis.

According to the invention, the ram slide comprises a tool-carrying cross-member guided in known manner on the press frame upright or columns; the cross-member is connected to two vertical beams symmetrical of one another in respect to the central vertical plane of the working passage of the press; and the beams extend through the press frame element (base or crown) towards which the slide makes its operative movement in vertical guides in the latter element, the guiding surfaces being perpendicular to the central plane of the working passage of the press.

An embodiment of a ram slide guide in accordance with the invention for a down-stroke hydraulic press is described hereinafter by way of example and shown in the accompanying drawings wherein:

FIGURE 1 is a view in elevation and in half-section on the plane I—I of FIGURE 2, perpendicular to the central plane of the working passage of the press;

FIGURE 2 is a half-section on the line II—II of FIGURE 1 through the top cross-member of the slide;

FIGURE 3 is an elevation of the press looking in the direction of the arrow III in FIGURE 1; and

FIGURE 4 is a half-section on the line IV—IV of FIGURE 3 through the press bolster.

The press shown comprises four uprights 1 which connect a top cross-member 2 of a press frame to a bolster

3. At the top the uprights 1 have stationary beds 4 having slideways 5 for guiding shoes 6 rigidly secured to a ram slide 7. The same is connected to piston 8 of a single-acting hydraulic actuator 9 and to the pistons 10 of two hydraulic actuators 11 for the approach and re-ascent movements of the slide 7. Bolster 3 bears a stationary platen 12, and a moving platen 13 is secured to slide 7.

When the axis of the force applied by slide 7 to the workpieces is not coincident with the axis of the actuator 9 but is offset therefrom in the direction of workpiece movement e.g. by a distance d (FIGURE 3), the slide 7 experiences a torque which is transmitted to the uprights 1, with the result that the same experience a bending moment in the direction indicated by the arrow F, and therefore distort in a manner shown in very exaggerated form in chain-dotted lines in FIGURE 3. The result of such distortion, as a result of a corresponding offset f of the axis of actuator 9, is to cause a growing increase in the bending moment applied to the uprights. Also, the guide elements 5, 6 experience considerable local pressures.

According to the invention, distortion of the uprights is obviated or reduced considerably by transfer of the initial bending moment to the slide 7. To this end, the same takes the form of a frame comprising a top cross-member 7a, which is connected to the actuators 9, 11, and a bottom cross-member 7b; the two cross-members 7a, 7b are interconnected by two beams 7c which extend through two apertures 3a (FIGURE 4) in the bolster 3. The two beams 7c, which are symmetrical of one another in respect of the central plane X—X of the working passage of the press, each have an I-section of high-section modulus in the plane parallel to the plane X—X. The bottom part of each of the two beams 7c has guide shoes 6a, which cooperate with slideways 5a rigidly secured to the bolster 3.

The bottom cross-member 7b can be fitted by location and bolting, to the bottom ends of the beams 7c, or can be integral therewith. In the latter case, the frame-like unitary slide is positioned in the press before the bolster 3 is secured to the floor and to the uprights, by the bolster 3 being tilted; in this case the lateral partitions 3b of the apertures 3a either are omitted or are releasable, as shown in chain-dotted line in FIGURE 4.

Clearly, in a ram slide thus embodied and guided at the bottom in the press bolster, the beams 7c absorb much, if not all, of the bending moment arising from the working axis being offset from the press axis.

The frame-like ram slide, although described in the foregoing with reference to a down-stroke press, is equally of use in an up-stroke press, in which case the beams 7c are guided in the top cross-member of the press.

Of course, the guiding as hereinbefore described can vary in constructional details or be adapted to different kinds of press without departure from the scope of the invention.

I claim:

1. A guide for the ram slide of a vertical press, a press base, a press crown, columns connecting the base and crown, a frame formed by the press base and crown connected by the columns, first vertical slide guiding elements on the columns, a tool carrying first cross member for the ram slide mounted on said first guiding elements on the press frame columns, two vertical beams symmetrical with one another in respect to the central vertical plane of the working passage of the press connected to the first cross member, the beams extending through the press base or crown in the direction toward which the slide makes its operative movement, second vertical guiding elements in said base or crown for the vertical beams, said second guiding elements having surfaces in said base

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or crown for the vertical beams being perpendicular to the central plane of the working passage of the press, and a second cross member connecting the two vertical beams of the slide at their ends remote from the tool carrying first cross member.

2. A guide as described in claim 1, the two vertical beams of the slide having a high section modulus in a plane parallel to the central vertical plane of the working passage of the press.

3. A guide as described in claim 2, the two cross members of the slide and the two vertical beams forming a unitary rectangular frame.

4. A guide as described in claim 2, the tool carrying cross member of the slide being integral with the two vertical beams and the second cross member being secured to the beams.

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BILLY J. WILHITE, Primary Examiner

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