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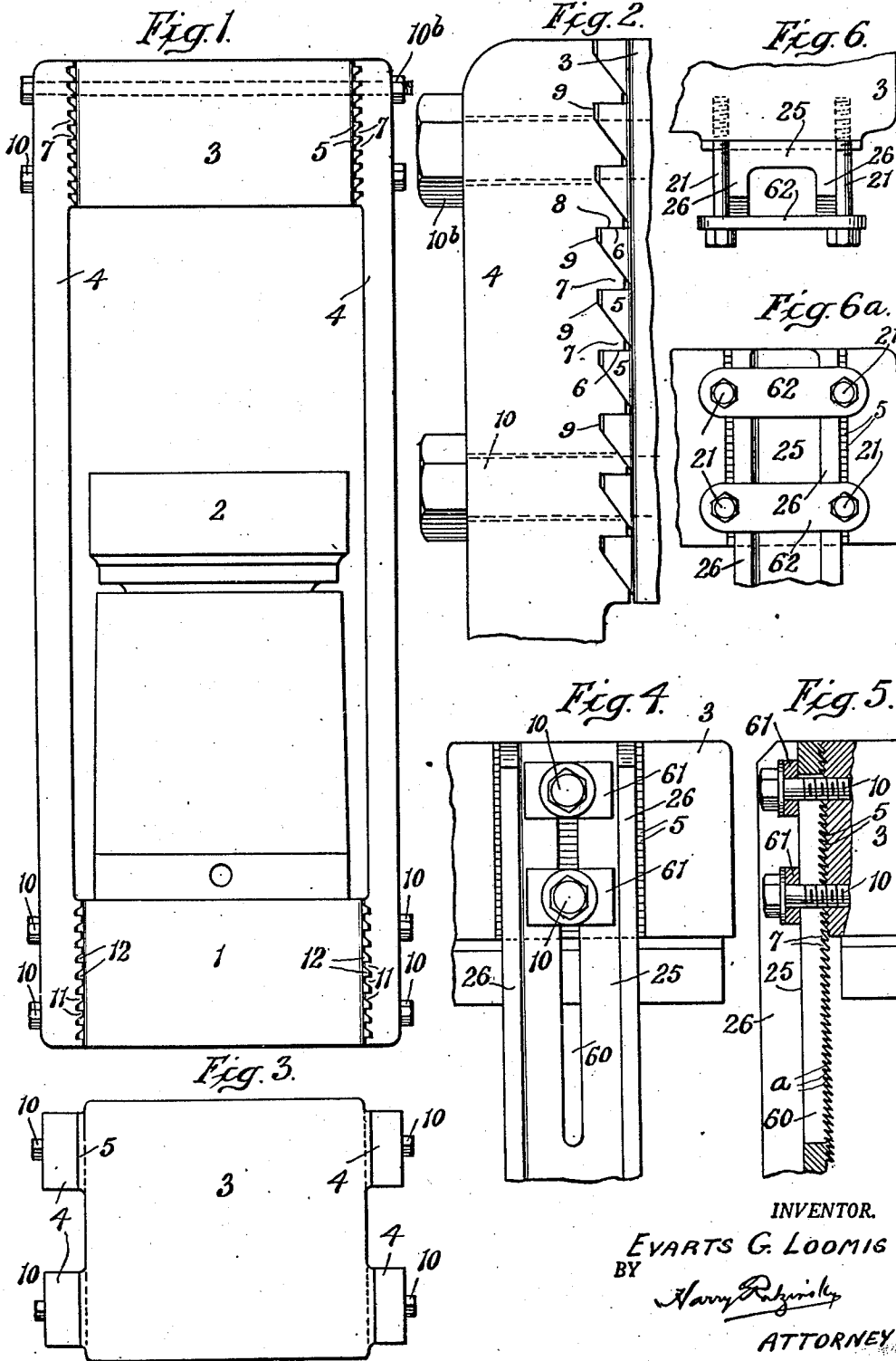
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2,417,697

PRESS

Filed March 29, 1944

2 Sheets-Sheet 1



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Fig. 7.

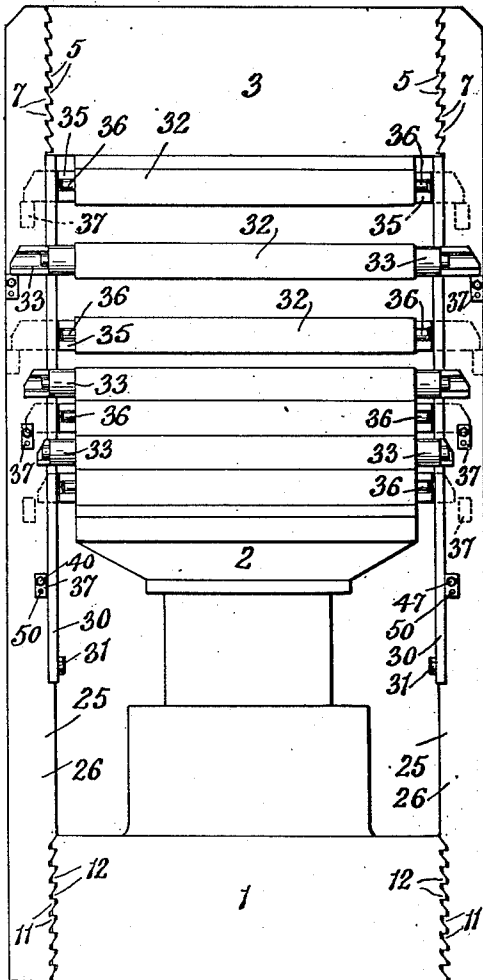


Fig. 8.

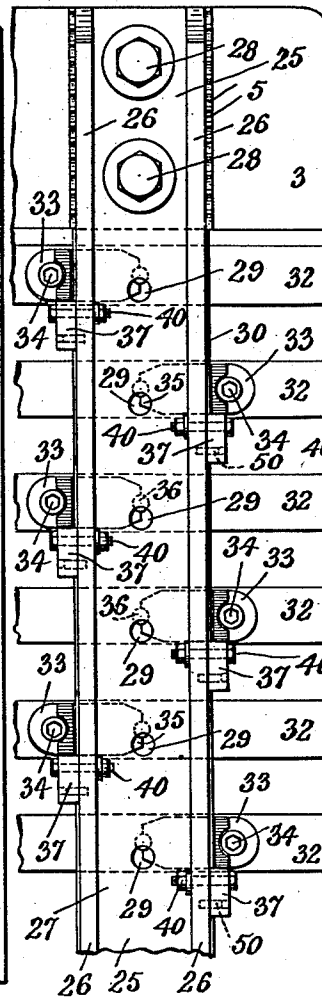


Fig. 9.

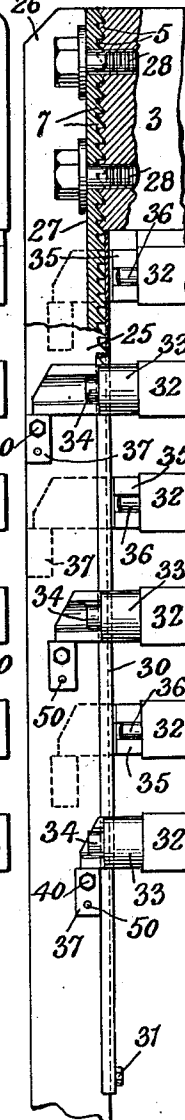


Fig. 10.

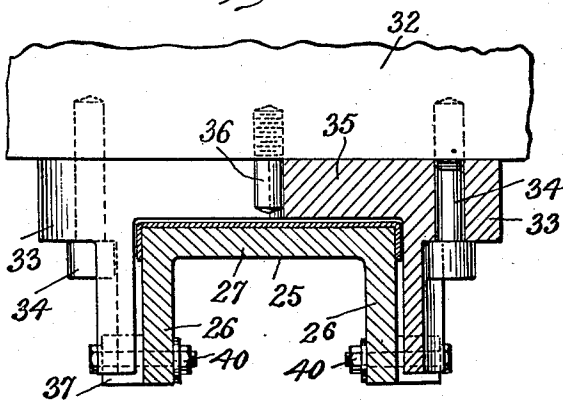
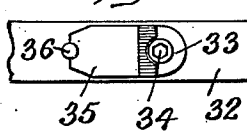


Fig. 11.



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2 Claims. (Cl. 100—70)

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This invention relates to hydraulic or power press frames, and the primary object of the invention is to provide means by which the two ends of the press, between which a ram, screw, toggle, or other means exerts pressure, may be securely held in fixed relation between tie bars, which may be vertical, horizontal or at an angle, to more effectively resist the pressure applied between them.

In most presses of present day construction, the head of the press, against which the pressure is exerted, is usually held by a number of vertically or horizontally disposed rods provided with shoulders by which the head is held, and against which the head is clamped by means of nuts adjustably received upon threaded ends on the rods. The repeated pressure and relief against the head eventually loosens one or more of the nuts, causing play or looseness, and finally results in a rod cracking and requiring replacement, which, in the construction above described, requires dismantling of a considerable number of parts of the press and the re-assembly thereof.

The present invention therefore contemplates the provision of means by which the head and pressure-applying support, or either or both of these or corresponding elements of the press, may be effectively held in relative position to withstand the pressure and often the vibration imposed upon them during the normal use of the press. The invention contemplates the provision of means by which the strains imposed upon these parts will be distributed uniformly over a considerable area, thereby lessening the strain at a particular point and greatly minimizing the possibility of breakage.

Another feature of the invention resides in supporting the head and pressure-application portions between vertical or horizontal tie bars of rectangular or channel shape in cross-section, and providing a face of the cross web of each of these tie bars with teeth or serrations to interfit with those on the two end pieces of the press frame; in means by which the head and pressure member may be adjusted to regulate the distance of compressing movement by the ram; in means by which the tie bars may be employed for the guidance and support of the platens in a multiplaten press, and in numerous other features to be more fully pointed out hereafter.

In the accompanying drawings, wherein several embodiments of the invention are shown:

Fig. 1 is a front view of a press constructed in accordance with one embodiment of the invention;

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Fig. 2 is a front view, showing the interengaging teeth on a head and tie bar;

Fig. 3 is an end view of the press.

Fig. 4 is a side view, showing and end of a tie bar attached to the head of a press.

Fig. 5 is a view to show a section of an end of a slotted, serrated tie bar, as bolted to the surface of a head;

Fig. 6 is an end view, and Fig. 6a a side view of another means for clamping a tie bar to a cross member or head in which there is no drilling or slotting of the tie bar;

Fig. 7 is a front view of a press of modified construction, showing platen-supporting means;

Fig. 8 is a side view of one of the stanchions and parts of the head and platens of a vertical press;

Fig. 9 is a front view, with parts in section, of one of the stanchions, a part of the head and parts of the platens and the supporting means therefor;

Fig. 10 is a sectional view through one of the stanchions and the platen-supporting means; and

Fig. 11 shows one of the platen lugs.

With reference to the structure shown in Figs. 1 to 3, inclusive, 1 indicates the base or bottom of a vertical press of this type from which rises a hydraulically operated ram 2, adapted to exert pressure on any article or element interposed between it and the head 3 of the press. It is therefore apparent that the head 3, receiving the pressure of the ram 2, must be firmly anchored in the supports, consisting of two, three, four or sometimes more uprights or stanchions 4.

The head 3, which may be of suitable shape and construction, is provided on its side faces with a plurality of teeth 5, the shape of which is most clearly seen in Fig. 2. It will be therein seen that the teeth, of serrated or "saw-tooth" form, are all of substantially the same pitch and depth, and that each tooth is provided with a rectangularly disposed surface 6, or else slightly angularly undercut, as shown at *a* in Fig. 5. Provided on the face of each of the stanchions 4 at the upper end thereof, is a set of teeth 7 complementary to those shown at 5, and thus arranged to mesh or interfit with the teeth 5 on the head of the press. It will be noted that the teeth 7 on the stanchion are directed oppositely to the teeth 5, so that the teeth 7 on the stanchions each have a shoulder 8 under which the horizontal surface 6 of each of the teeth 5 is located, and the pressure imposed against the head by the ram is distributed over the teeth,

It will be also observed that with the bolt holes in the stanchions having clearance, and the meshed teeth being slightly spaced, as at 9, this spacing permits, with the angular surfaces, the take-up of any play in fitting, or at any time, by tightening of the bolts 10b or cap screws 10. Said bolts or screws extend through clearance holes in the stanchions, and pass through or thread into the head 3 and hold the teeth on the head and stanchions in mesh.

The means for holding the head 3 in place as just described may also be utilized for the securement of the base 1 between the stanchions, except that in the case of the base, the teeth are reversed to resist downward stress as distinguished from the resistance of upward stress, as in the case of the head. It will be noted from Fig. 1 that the lower portion of each stanchion has its face provided with the teeth 11 in engagement with the teeth 12 on the base, as explained in respect to the head, except that the teeth on the base and bottom portion of the stanchions extend oppositely to those on the head and top part of the stanchions, as will be clearly apparent from Fig. 1.

In Figs. 4 and 5 is shown an embodiment wherein the interfitting teeth 5 and 7 are of finer pitch than those shown in Fig. 1, and, in addition, the teeth are undercut in the manner disclosed at a in Fig. 5. The utilization of fine teeth results in certain definite advantages, since it uniformly distributes the stress between the two elements on the greater number of teeth in engagement; moreover, it reduces the leverage strain on the metal of the teeth owing to the teeth being shallower; it also allows greater tensile strength and rigidity to the stanchions with given over-all sectional dimensions.

When an increased number of fine teeth are employed, as above described, in respect to the structure of Figs. 4 and 5, the adjustment of the head or press element 3 may be facilitated by the employment of the elongated slots 60 in the cross web 27 of the channel-bar or rectangular beam type of stanchion or tie bar. With this arrangement, the bolts 10, extending through clamping blocks 61, thread into the head 3 and permit easy raising and lowering of it as well as precise placement.

In Figs. 6 and 6a, a modification of the bolting means is shown, wherein drilling or slotting of the tie bars or stanchions is avoided by means of the cross bars 62 which bridge the side flanges of the tie bar or stanchion. The bolts 21 extending through the bars 62 and threaded into the head 3 hold the teeth 5 and 7 in intermesh.

In Figs. 7 to 11, inclusive, is shown another embodiment of the invention, including a novel platen supporting and guiding means. In this embodiment of the invention, the tie bars, shown at 25, each consist of a channel beam, or other rectangular beam, preferably substantially U-shape in cross section, such as shown in Figs. 4 to 6a, inclusive. Each beam thus has two parallel side flanges 26 integrally connected by the cross web 27. The face of the cross web of each tie bar is formed with a number of "saw-tooth" serrations 7, and the head of the press is provided with the teeth 5 which interfit with those shown at 7 in the manner described in respect to the structure of Figs. 1 to 3. It will be noted that the teeth 7 on each of the tie bars 25 extends for a considerable distance inwardly from the top of the tie bar, so that the head can be relocated at the desired position by engaging the

teeth on the head with a selected number of the teeth 7 on the tie bar. The head or cross member is secured to the tie bars by means of the screws or bolts 28, and to permit positioning of the head at various points along the length of the stanchions, the stanchions are provided with the spaced screw holes 29 to receive the screws or bolts 28 and hold the head or cross member at any selected position on the tie bars. To allow closer and varied adjustment, instead of a plurality of holes 29, a single elongated slot, or a plurality of slots extending in the tie bar cross web 27, may be employed to permit the passage of the bolts or screws 28, as shown in Figs. 4 and 5.

To protect and cover the exposed and unused portions of the teeth 7 on the tie bars, a cover member or guard 30 may be provided, the same extending over the unused teeth and being secured thereto by screws, one of which is shown at 31.

As shown in Figs. 7 to 11, inclusive, on a vertical press, the channelled stanchions or any other rectangular form, as shown in Figs. 1, 2 and 3, may provide means for supporting and guiding one or more plates between the pressure member and the fixed cross member of the press. Each platen 32 has side edges provided with one or more lugs 33, secured by a bolt 34 to the platen, the lug having a notched part 35 engaging a locating pin 36 projecting from the platen. Bolted to the sides 26 of the stanchions 25 are the platen supports or stop pieces 37 on which the lugs 33 rest to hold the several platens in the required spaced relationship when the ram is in its lowered position. Each stop piece 37 is held in place by a bolt 40, and has a locating pin 50 to insure its proper placement on the stanchion. It will be observed that the lugs on the several platens are alternated, as clearly seen in Fig. 8, and each platen is guided in its vertical movement by the several lugs 33 operative along the side flanges 26 of the stanchions or tie bars.

With the arrangement illustrated, the head and/or pressure applicator of the press is securely held in place against repeated stress in operation. The design is such that the replacement of a tie bar or a cross member is quickly and easily performed. For example, to replace a stanchion in a vertical hydraulic press, the ram may be raised to support the head, or in a multi-opening, all of the platens and the head, and the hydraulic valve, are then kept closed to retain the ram in its elevated position. Thereupon, the screws (10, 10b, 21 or 28) which attach the stanchion to the head and base are removed, or, as in Fig. 6, simply loosened sufficiently, and a new stanchion quickly fitted into position. Similarly, the head may be shifted by simply loosening the bolts if the stanchions are slotted or clamped, but removed if in holes, utilizing the hydraulic pressure or other simple means to position the head at the new desired location, and then the bolts or screws 28 are inserted through proper holes (or merely tightened if elongated slots or clamps are used instead of the holes 29).

Numerous other advantages following from the several constructions described will be apparent to those skilled in the art, and therefore, while a number of embodiments have been described, the invention is not to be limited thereto but is broad enough to cover all structures coming within the scope of the annexed claims.

What I claim is:

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1. In a press of the character described, a press cross head having its opposite side faces provided with a plurality of angular teeth, each of said teeth being provided with a substantially rectangular face, one or more tie bars on each of the sides of the head, threaded means holding the tie bars and cross head together, each of said tie bars being substantially U-shaped in cross section and having its cross web provided with teeth in mesh with those on the cross head, each of the teeth on the tie bars having a rectangularly disposed shoulder taking over a rectangular surface on a tooth on the cross head, and means by which the setting of the cross head with respect to the toothed surfaces of the tie bars may be adjusted.

2. In a press of the character described, a pair of tie bars, at least one of said tie bars consisting of a channel-beam having a face of its cross-web provided near its opposite ends with a plurality of angular teeth, the teeth at one end each having a rectangularly disposed shoulder, the teeth at the opposite end each having a rectangularly disposed surface, a cross head extending between the tie bars, said cross head having a face provided with teeth to fit those at one end of the toothed tie bar, the teeth on the cross head each having a rectangularly disposed surface to fit

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below one of the shoulders on the teeth in one of the groups of teeth on the tie bar, and a member opposed to the cross head having a face provided with teeth adapted to fit those in the second group on the tie bar, the teeth on the member opposed to the cross head being each provided with a shoulder for engagement over the rectangular surfaces of the teeth in the second group of teeth on the tie bar.

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