June 15, 1943. P. E. FLOWERS 2,321,741

GUIDING MEANS FOR PRESS PLATENS

Filed April 12, 1941

FIG. 1

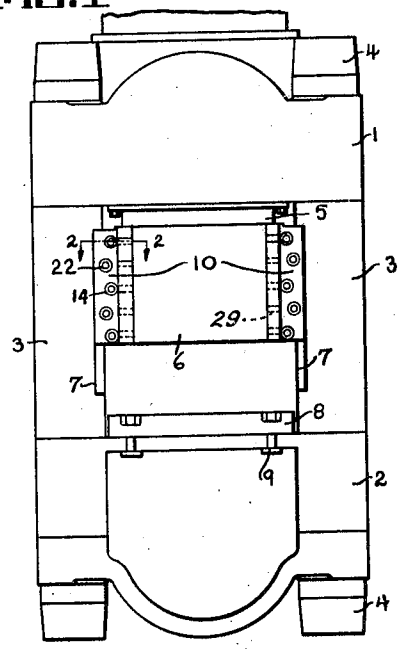


FIG. 3

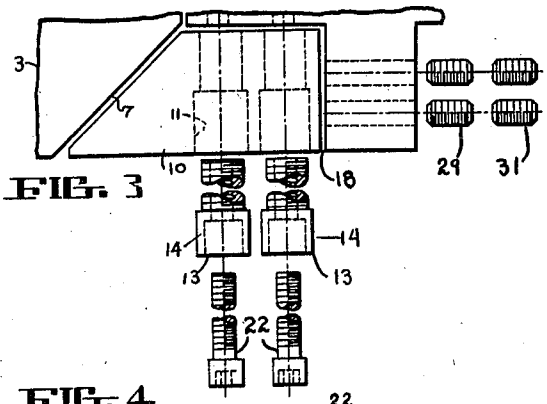


FIG. 4

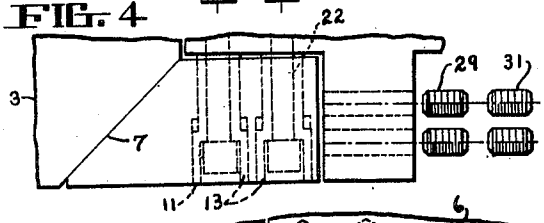


FIG. 5

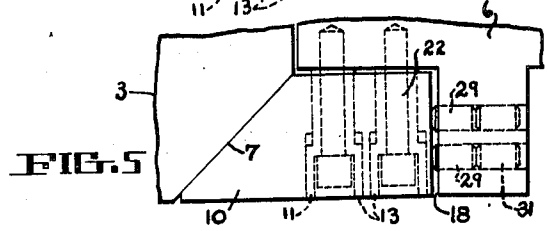
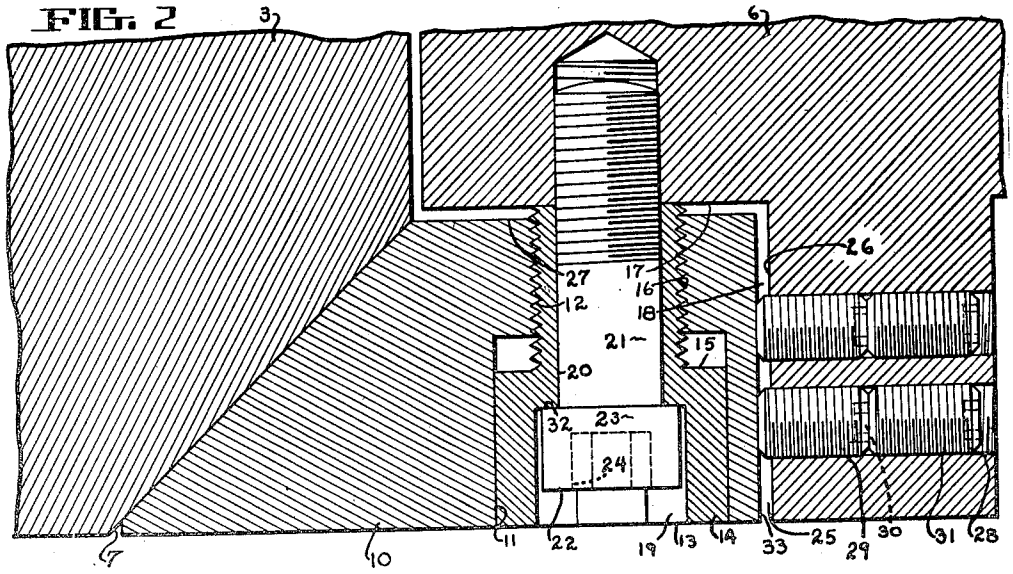


FIG. 2



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GUIDING MEANS FOR PRESS PLATENS

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7 Claims. (Cl. 308—3)

This invention relates to presses and, in particular, to means for guiding the platen of a press during its reciprocating movements.

It is customary to provide a press with a head and a bed interconnected by strain rods and spaced from each other by spacing members on which the press platen is guided by means of gibs respectively secured to the corners of the platen.

In order to provide a large bearing surface, the working corner of each gib and the adjacent edge of the spacing member are chamfered, usually at 45 degrees, so that the diagonally cut surface of the gib is adapted to slide over the abutting diagonal surface of the adjacent spacing member.

The gibs are usually bolted to each side of the platen and, therefore, form a U-shaped recess along two opposite edges of the platen which embrace the projecting U-shaped portions of the spacing members.

The platen and the gibs secured thereto reciprocate continuously during the operation of the press, and the wear between the working surface of each gib and the adjacent spacing member is usually taken up by adjusting a combined positioning and locking screw arrangement. The positioning screw properly spaces the gib and platen from the guiding surface of the adjacent spacing member, while the locking screw locks the structure in the adjusted position.

This arrangement which has been highly satisfactory, however, required relatively heavy adjusting and locking screws, particularly for heavy presses, in order to be able to take up the relatively high shear and bending stresses exerted upon the adjusting and locking screws.

Accordingly, it is an object of the invention to provide an improved structure which will allow accurate adjustment of the gibs, while bringing about a reduction in the shear and bending stresses exerted upon the structure.

It is another object of the invention to provide improved means for connecting the guiding gibs to the press platen and maintaining the guiding surfaces in proper contact along the corresponding guiding surfaces on the press frame.

Still another object consists in the provision of an improved structure comprising adjusting means preferably accessible from the outside of the press for adjustably supporting the gibs to reduce the shear and bending stresses exerted upon the screws connecting the gibs to the platen.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawing, in which:

Figure 1 represents an elevational view of a hydraulic press provided with the improved gib securing means according to the invention.

Figure 2 is an enlarged fragmentary section along the line 2—2 of Figure 1.

Figures 3 to 5 illustrate various steps in assembling the structure according to the invention.

Referring to the drawing, the reference numeral 1 designates the head of the press connected with the press bed 2 by means of strain rods (not shown) passing through the spacing members 3 and connecting the press head and press bed by means of nuts 4. The head 1 carries any suitable form of hydraulic cylinder (not shown) in which is reciprocably mounted a ram 5 operable by pressure fluid supplied to said cylinder by any convenient fluid pressure source. Connected to the lower end of the ram 5 is the press platen 6, which slides upwardly and downwardly between the spacing members 3 on the guiding surfaces 7 thereof, and on its downward or working stroke contacts with a die 8, which is secured to the bed of the press by means of bolts 9.

During the operation, a sheet of metal is placed on the die member 8 and subjected to pressure by the platen 6, which either forms or cuts the metal to any desired shape depending on the configuration of the press platen. The downward and upward movements of the platen 6 are controlled either automatically by an automatic control of the supply of fluid to the hydraulic cylinder in the press head or may be controlled by the operator of the press. In order to enable accurate shaping or cutting operation of the press, the platen is to be properly guided on the spacing members 3. To this end the guiding surfaces 7 on the spacing members 3 are beveled or chamfered at approximately 45 degrees, as shown in Figures 2 to 5. The platen 6 has a recess at each corner portion thereof for receiving a gib 10, which is bolted to the platen. The gibs are usually made of case-hardened steel and are of rectangular configuration with a beveled surface corresponding to the guiding surfaces 7 on the spacing members 3.

The bolts 22, by means of which the gibs are secured to the platen 6, are shown more clearly in Figure 2. As will be seen therefrom, the gib is provided with a large countersunk opening 11 which terminates in a threaded portion of

smaller diameter as indicated at 12. This opening receives a large screw member, generally designated 13, having a round head 14 with a shoulder 15 and terminates in a threaded portion 16, which normally rests against the flat surface 17 of the recess 18 in the platen 6. The head of the screw is provided with a hexagonal opening 19 to allow insertion of a key or wrench for adjustment of the screw member 13.

The screw member 13 has an opening 20 therethrough for receiving the shank 21 of a screw generally designated 22, the head of which is of slightly smaller diameter than the distance between the opposite flat surfaces of the hexagonal opening 19 in the screw member 13. The head 23 of the smaller screw 22 is also preferably provided with a countersunk opening 24 of hexagonal configuration likewise for receiving a key or wrench to allow adjustment thereof.

As will be noted from Figure 2, the axes of the screws 13 and 22 coincide, and the position of these axes with respect to the gib and the platen and the distance between these axes and the inner edge of the platen 6 are such as to leave a small space indicated at 25 between the gib 10 and the side 26 of the recess 18. It will furthermore be noted that the screw 13 has been tightened and, therefore, bears against the surface 17 of the platen, leaving a space between the surface 17 and the adjacent surface 27 of the gib.

To prevent forces exerted during the pressing operation from bending the screws 22 or to shear the screws 22 along the surface 17, it was, heretofore, necessary to provide screws of corresponding dimensions. According to the present invention the press platen 6 is provided, opposite each screw 22, with one or more threaded bores 28, in which is adjustably mounted a supporting screw 29 provided with a slot 30 to allow adjustment thereof, while a locking screw 31, similar to the supporting screw 29, is provided for locking the supporting screw 29 in its desired position.

As will be seen from Figure 1 of the drawing, the plane passing through the axes of two adjacent supporting screws 29 also passes through the axis of the adjacent screw 22. Consequently, any bending forces exerted by the gib 10 on the screw 22 supporting the latter will immediately be taken up by the supporting screw 29, instead of, as heretofore, acting on the screw 22. Therefore, smaller screws 22 may be used for connecting the gibs to the platen, while simultaneously the wear of the gibs is materially reduced, due to the fact that the supporting screws 29 tend to continuously hold the guiding surfaces of the gibs 10 in proper contact with the corresponding guiding surfaces of the spacing members 3.

The assembly and adjustment of the improved structure according to the invention may be carried out as follows:

Referring to Figure 3, the screws 13 are first inserted into the threaded portion 12 of the gibs 10, whereupon the gibs 10 are inserted into the recess 18 of the platen 6. Then the screws 22 are passed through the screws 13 and threaded into the corresponding portion of the platen 6. The gibs 10 are thereupon properly positioned by rotation of the screws 13 so that the guiding surfaces of the gibs 10 are in proper engagement with corresponding guiding surfaces of the spacing members 3. When the gibs 10 are so adjusted, the screw 22, the head of which was previously spaced from the shoulder 32 of the screw 13, is tightened so that its head abuts the shoulder 32, thereby locking the positioning screw 13 in its adjusted position. The required spacing between the surface 27 of the gib 10 and the surface 17 of the platen 6 is usually determined by the amount of friction exercised at the guiding surface 7.

After the adjustment just described has been completed, the supporting screws 29 are inserted and adjusted so as to abut the surface 33 of the gibs 10. After proper adjustment of the supporting screws 29, the locking screws 31 are inserted into the bores 28 and tightened so as to abut the supporting screws 29. As will be seen from the above, forces directed transverse to the longitudinal axes of the screws 13 and 22 will now be taken up by the supporting screws 29, thereby preventing shearing and bending stresses on the screws 29.

While the combined adjusting and locking screw structure may be arranged as units in a single vertical line extending down the middle of each gib 10, it is preferable to stagger these structures over the entire width as well as over the entire length of each gib. Due to the fact that the screw 13 serves as a spacing member and bears against the platen, any one of these screws can also constitute a fulcrum about which the gib can be swung depending on the relative positions of the remaining screws 13. Consequently, the beveled edge of the gib is adapted to be swung outwardly and inwardly due to the fulcrum effects of any line of bolts in order to introduce still further variations of adjustment and greater accuracy in the sliding fit between the gib and the spacing member, as is shown, for instance, in Figure 5. However, independent of the position of the gib 10, the supporting screws 29 can be adjusted so as to properly take up the forces in the gib acting transverse to the longitudinal axes of the screws 13 and 22.

With reference to Figure 5, it will for instance, be seen that the inner supporting screw 29 slightly protrudes beyond the end of the outer supporting screw 29 to effect the proper support of the gib.

The structure according to the invention, therefore, permits an extremely fine and gradual adjustment so that the same pressure may be brought to bear throughout the entire beveled guiding surfaces of the gibs which contact the corresponding guiding surfaces of the spacing members so that the guiding effect of the gibs is exercised not only equally by all of the spacing members, but also equally throughout each beveled surface of each spacing member.

It will be understood that I desire to comprehend within my invention such modifications as come within the scope of the claims and the invention.

Having thus fully described my invention, what I claim a new and desire to secure by Letters Patent, is:

1. In combination, a reciprocatory element and a guiding gib therefor, guiding means for slidable engagement with said gib, combined locating and locking means for locating said gib and locking the same to said reciprocatory element without impeding relative sliding movement between said gib and said guiding means, and supporting means independent of said combined locating and locking means and adjustably mounted in said element at an angle to said combined locating and locking means and abutting said gib for taking up bending and shearing forces exerted upon said locating and locking means.

2. In combination, a reciprocatory element

and a guiding gib therefor, guiding means for guiding said gib, a locating screw associated with said reciprocable element for locating said gib with regard to said guiding means and said element, a bolt passing through said gib and threadedly engaging said element for connecting said gib thereto after it has been properly located, and a supporting member independent of said locating screw and adjustably mounted in said element for abutment with said gib to take up bending and shearing forces exerted upon said bolt and said locating screw, the line of action of said supporting member being at an angle to the line of action of said bolt.

3. In combination, the platen of a press and a guiding gib, said gib comprising a beveled plate adapted to engage a beveled guideway on the press, a screw structure passing through said gib and engaging said platen for adjustably spacing said gib from and connecting the same to said platen, and screw means supported by said platen and abutting said gib to take up forces acting transverse to the longitudinal axis of said screw structure during relative movement of said gibs and said guideway.

4. In combination, the platen of a press and a guiding gib therefor with a beveled surface adapted to engage a correspondingly shaped guiding surface on the press, a bolt passing through said gib and being adjustably mounted in said platen for connecting said gib thereto without preventing movement of said gibs relative to said guiding surface, a locating member surrounding said bolt for locating said gib relative to said platen, and an adjustable member mounted in said platen and having its longitudinal axis arranged at an angle to that of said bolt, said member being adapted to abut said gib for taking up bending stresses exerted on said bolt.

5. In combination, the platen of a press and a guiding gib therefor having a guiding surface adapted to engage a correspondingly shaped guiding surface on the press, a bolt passing through said gib and threadedly engaging said platen for connecting the gib thereto, without preventing movement of said gib relative to said guiding surface on said press, an adjusting screw associated with said bolt for locating said gib with respect to said platen, and a supporting screw independent of said adjusting screw and adjustably mounted in said platen for abutting said gib to take up bending and shearing forces exerted upon said bolt, the longitudinal axes of said supporting screw being located in a plane passing through the longitudinal axis of said bolt.

6. In combination, the platen of a press and a guiding gib therefor comprising a beveled plate adapted to engage a beveled guideway on the press, a plurality of combined spacing and locking members arranged in staggered relation over the length and width of said plate and engaging said platen for spacing said gib from and connecting the same to said platen, a plurality of pairs of supporting screws adjustably mounted in said platen and abutting said gib, each of said pairs of screws having the plane through the longitudinal axes of said screws passing through the longitudinal axis of one of said combined spacing and locking members, and means for locking said supporting screws in their adjusted positions.

7. In combination, a reciprocatory element and a guiding gib therefor arranged in a rectangularly shaped recess in said element, said gib having a beveled guiding surface and also being provided with two flat surfaces substantially rectangular to each other and facing correspondingly shaped surfaces in said recess, guiding means for slidable engagement with said beveled guiding surface of said gib, one of said flat surfaces being located opposite said beveled surface, while the second of said flat surfaces interconnects the first mentioned flat surface with said beveled surface, combined spacing and connecting means passing through said second flat surface and engaging said element for spacing said gib from and connecting it to said element respectively, and abutting means adjustably mounted in said element and abutting said first mentioned flat surface for taking up forces acting transverse to the line of action of said spacing and connecting means during relative sliding movement of said gibs and said guiding means.

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