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PRESS WITH FLOATING CONNECTION BETWEEN AUXILIARY RAMS AND PRESS PLATEN

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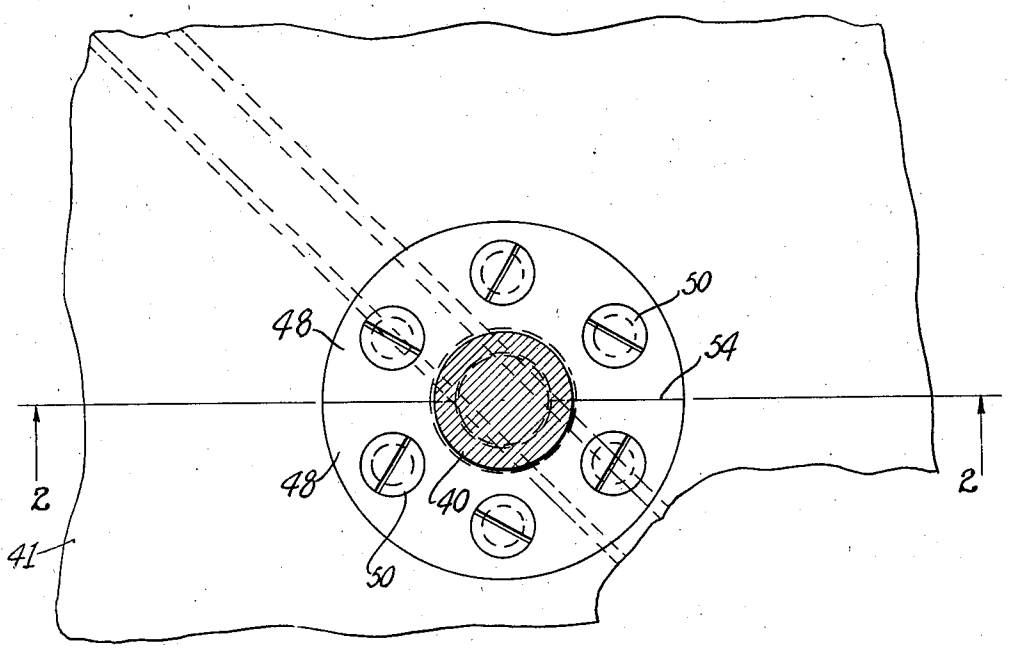


Fig. 1

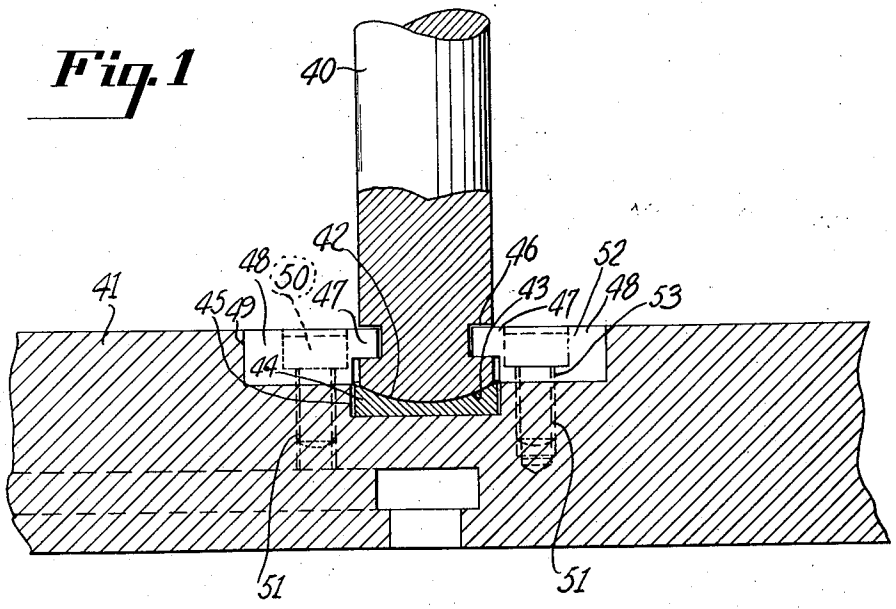


Fig. 2

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PRESS WITH FLOATING CONNECTION BETWEEN AUXILIARY RAMS AND PRESS PLATEN

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2 Claims. (Cl. 287—21)

This invention relates to hydraulic machinery, and in particular, to structures for connecting the plungers of hydraulic motors to adjacent parts.

One object of this invention is to provide means for connecting the plunger of a hydraulic motor to a platen, or other member, in such a manner that the plunger is free to adjust itself relatively to the platen without causing a strain or misalignment.

Another object is to provide a connection between a hydraulic plunger and a platen, or other member, wherein the plunger is provided with a rounded head engaging an oppositely rounded socket in the member to which the plunger is attached, separate means being provided for self-alignningly attaching the plunger to the member.

Another object is to provide a floating connection for connecting a hydraulic plunger to a platen, blank holder or the like, wherein the plunger is provided with a rounded head engaging a rounded depression in a wear plate inserted in the platen, the plunger having an annular groove loosely engaged by a split ring or analogous means for adjustably holding the plunger into engagement with the wear plate, and providing self-alignment therebetween.

In the drawing:

Figure 1 is a fragmentary plan view of the improved connection between a hydraulic plunger and the platen of a press;

Figure 2 is a sectional view taken along line 2—2 in Figure 1.

In general, the invention consists of a self-aligning connection between a hydraulic plunger and the member to which it is attached. This member may be, for example, the platen of a press or a blank holder thereof. The plunger connection in some installations may be employed for connecting the auxiliary or push-back plungers to the main platen, and in other installations may serve as the connection between the blank-holding plungers and the blank holder. In either case the connection is made by means of a rounded head upon the plunger, and a correspondingly rounded depression in the platen, or preferably in a wear plate inserted in the platen. Means, such as a bolt or a split ring, is provided for holding the plunger in engagement with the rounded depression, yet permitting a certain amount of self-alignment as to prevent misalignment and strain.

Hitherto, the auxiliary or pull-back plungers of hydraulic presses have been rigidly connected to the platen of the press. The blank-holding plungers have likewise been rigidly connected to the blank holders of hydraulic presses. When such a rigid connection is made, however, any slight misalignment or irregular movement of the platen, either in assembly or in operation, has tended to cause the plungers to bind in their cylinders. This has frequently occurred when the plunger has tipped slightly from uneven loading. The present invention permits a certain amount of flexibility or self-alignment between the plungers and the platen or blank holder, in order to prevent such binding and consequent wear.

The form of connection shown in Figures 1 and 2 is concerned with a hydraulic plunger 40, which for purposes of example, is considered to be a blank holder plunger. This is connected to the blank holder 41 by the modified connection of this invention. To this end the plunger 40 is provided with a rounded end 42, which engages the corresponding rounded depression 43 in a wear plate 44 inserted within an enlarged hole 45 in the blank holder 41. In order to secure the plunger 40 to the blank holder 41 the former is provided with an annular groove 46, engaged by the inner portions 47 of split ring halves 48. The ring halves 48 are secured within a socket 49 by means of the set screws 50, threaded in the holes 51 in the blank holder 41, and having their heads countersunk into sockets 52, terminating in the holes 53 in the ring halves 48. When thus secured to the blank holder 41 the ring halves 48 meet along the line 54 (Figure 1).

If, during the operation of the press, the blank holder 41 or platen should be unequally loaded so there is a tendency for them to become distorted relatively to each other, the rounded ends 42 of the blank holder plungers 40 will move in the rounded depressions 43 of the wear plates 44, and the latter will likewise move within their holes 45 so as to realign the mechanism and prevent binding of the plungers 40 against the sides of their cylinders. By the construction shown, the plungers are given a measure of self-alignment whereby the wear upon the plungers or cylinders is greatly reduced and binding prevented. This binding has been a serious problem in previous presses, wherein the plungers were rigidly connected to their platens, blank holders or other members.

The self-aligning connection of this invention is suitable also for the attachment of the main plunger to the platen, especially a double-acting plunger. Where a double-acting main plunger is employed, a serious hazard exists if the platen

is not securely fastened to the plunger, or is liable to break under strain. If the platen should break loose from the plunger while in the raised position, the danger exists that the operator might be crushed by the falling of the heavy platen. If, therefore, strain is placed upon either the plunger or the platen during operation, the fatigue stresses set up therein create a hazardous condition which, if allowed to persist, may cause breakage and consequent falling of the platen. By the use of the self-aligning floating connection of the present invention, however, the possibility of such strains assuming serious proportions is eliminated.

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 as new and desire to secure by Letters Patent, is:

1. In combination, a circular plunger having a rounded end formed by a radius considerably greater than the radius of said plunger and an annular channel in said plunger spaced from said rounded end a distance less than the radius of said plunger, said channel having parallel sides, a member for attachment to said plunger, a wear plate having a rounded portion for engaging the rounded end of said plunger, a retaining element having a flat annular portion sufficiently thick to engage both sides of said channel when the plunger is tiltably moved from a normal position with respect to the retaining element, and means for securing said retaining element to said member whereby to hold said plunger and said wear plate in limited self-aligning engagement relatively to each other and to said member.

2. In combination, a plunger with a rounded end less than a hemisphere in extent, and an annular channel therein adjacent said rounded end, said channel having parallel sides, a member for attachment to said plunger having a recess therein, a wear plate of smaller size than said recess with a substantial clearance space therebetween mounted therein with a rounded portion in engagement with the rounded end of said plunger, a retaining element having an annular portion engaging both sides of said channel when the plunger is tiltably moved from a normal position with respect to the retaining element for interconnecting said plunger with said member and for holding the end of said plunger in engagement with said wear plate and member, and means for securing said retaining element to said member.

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