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ADJUSTABLE BEARING GUIDE FOR LINEALLY MOVABLE SHAFTS

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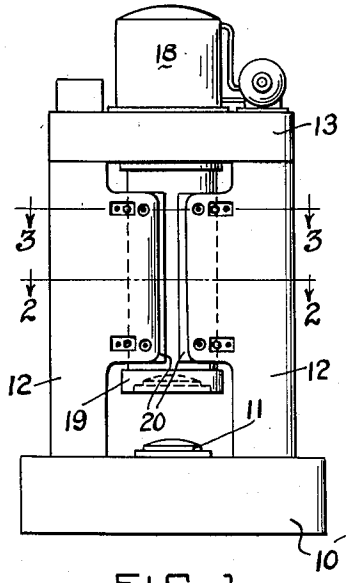


FIG. 1.

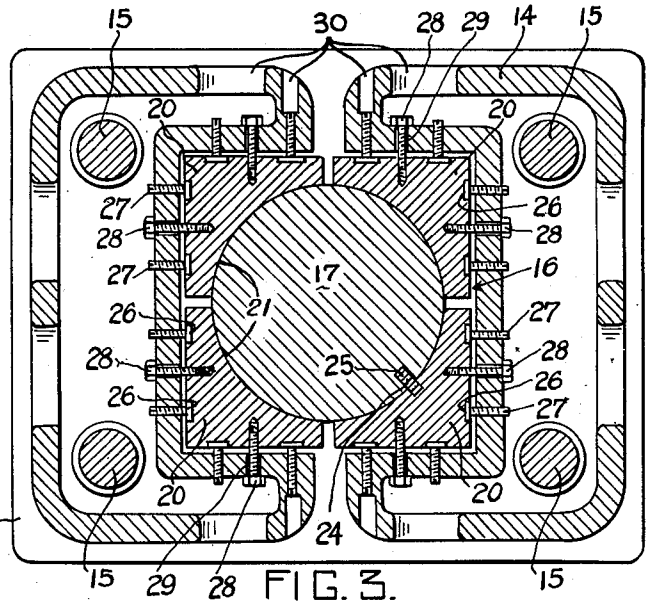


FIG. 3.

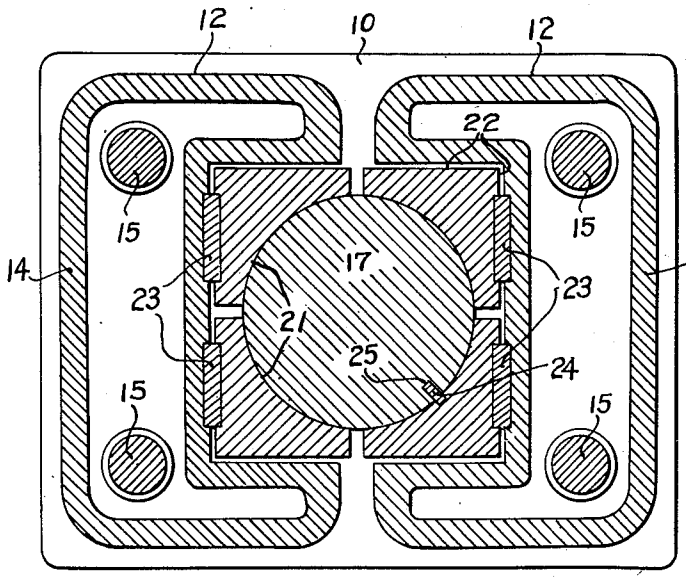


FIG. 2.

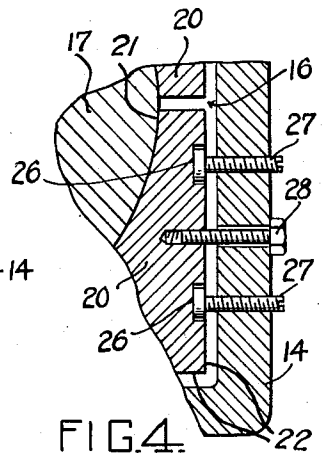


FIG. 4.

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ADJUSTABLE BEARING GUIDE FOR LINEALLY MOVABLE SHAFTS

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2 Claims. (Cl. 308—4)

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The present invention relates to shaft-guiding means, and while not being so limited, has particular reference to an improved bearing guide for the reciprocating rams of hydraulic presses.

The usual hydraulic press comprises a stationary press bed, an elevated press head which carries a suitable hydraulic fluid actuated reciprocating ram, and a plurality of strain rods or stationary frame members extending between the press head and bed to absorb separation forces imparted to the press head and bed during the operation of the reciprocating ram. In the usual manner, the reciprocating ram carries at its lower end a press platen cooperative with a stationary die supported on the press bed. Generally, the press platen is guided in its reciprocating movement by means of a plurality of corner gibs which are slidably connected with the strain rods or spaced stationary frame members of the press disposed on opposite sides of the press platen and ram. It will be understood that in press operations it is absolutely necessary that the press platen and press ram follow a straight line travel in order that the complemental surfaces of the press platen and die may be brought into exact alignment during the pressing stroke to impart the desired configuration to a workpiece. Due to the relatively extreme forces and the size and weight of the elements of the ordinary press, considerable difficulty has been encountered with the ordinary type of gib guide due to its inability to compensate for the normal wear encountered during prolonged press usage. Further, it has been found that in press assemblies wherein the outer corners of the press platen are provided with gib guides engaging the associated strain rods or vertical stanchions of the press, it is difficult to eliminate the normal tendency of the press platen to wobble laterally during reciprocating movement, due to the relative spacing between the axis of the ram and the axes of the gib guides disposed at the extremities of the press platen.

Accordingly, it is the primary object of the present invention to provide an improved bearing guide for the reciprocating ram of a hydraulic press by which the ram itself is guided in its reciprocating movement, and wherein the bearing guide is carried in association with the stationary strain rods or frame members of the hydraulic press.

It is another object of the present invention to provide a bearing guide for lineally movable shafts which comprises an outer stationary frame defining a substantially rectangular opening

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through which a shaft may freely pass, a plurality of separate bearing blocks or gibs positioned within the rectangular opening of the frame and formed with arcuately concaved bearing surfaces defining complemental segments of a cylindrical shaft-receiving opening, and a plurality of screw-threaded members connected between the frame and the separate bearing blocks and adjustable to vary the effective size of the circular opening defined by said blocks, whereby to compensate for the normal wear of the bearing blocks and thereby prevent undesired radial displacement of an associated shaft during its longitudinal movement.

For a further and more detailed understanding of the present invention and the various additional objects and advantages realized therefrom, reference is made to the following description and the accompanying drawings, wherein:

Fig. 1 is a side elevational view of a hydraulic press utilizing the present improved bearing guide;

Fig. 2 is a horizontal sectional view taken through the bearing guide along the line 2—2 of Fig. 1;

Fig. 3 is a similar view taken along the line 3—3 of Fig. 1 and showing in detail the adjusting screws for the individual gibs of the present bearing guide.

Fig. 4 is an enlarged fragmentary horizontal sectional view illustrating in detail the gib-adjusting means of the present bearing guide.

Referring now to the drawings, the numeral 10 designates the stationary bed of a hydraulic press upon which is mounted a stationary male die member 11. Arising vertically on either side of the bed 10 is a pair of relatively spaced stationary frame members 12 which support at their upper ends the head 13 of the press. Preferably, as shown in detail in Figs. 2 and 3, the stationary frame members 12 of the press are each formed to constitute an outer shell casing 14 through which extend a pair of solid strain rods 15 which, in the usual manner, are bolted, or otherwise suitably secured, at their respective ends to the bed and head of the press to absorb strain forces imparted during pressing operations. The casing 14 surrounding the strain rods 15 is likewise suitably rigidly secured both to the strain rods 15 and to the bed and head elements of the press to prevent relative movement of the over-all stationary frame members 12. As will be seen particularly from Figs. 2 and 3 of the drawings, each casing 14 is formed intermediate its ends with inwardly directed bosses which are

bent to form a relatively wide rectangular channeled recess 16, with the individual recesses of each casing being opposed so as to define a substantially rectangular chamber surrounding the intermediate portion of the reciprocating plunger or ram 17 of the press. In the usual manner, the head 13 of the press supports the main hydraulic cylinder 18 into which fluid pressure is introduced to reciprocate the ram 17. Also, the head 13 supports the various valves, pumps, reservoirs, and other control apparatus necessary to the actuation of the press ram. The ram 17 of the press carries at its lower end a press platen 19 which, in the present instance, carries a female die which cooperates with the stationary die 11 to impart to a workpiece the desired configuration upon a pressing stroke of the ram 17. To guide the ram and the platen 19 in their vertical travel, there are positioned within the rectangular opening defined by the recesses 16 formed in the stationary frame members 14 of the press, four separate bearing blocks 20 which are formed on their inner surfaces with arcuately concaved bearing surfaces 21. Each of the bearing blocks 20 is formed with right angularly disposed outer side walls 22 which are arranged to fit within the corner regions of the recesses 16 formed in the stationary frame members 14. As shown in Fig. 2 of the drawings, each of the bearing blocks 20 is keyed, as at 23, to the inner wall of the frame member to prevent relative movement of the bearing blocks in the direction of movement of the ram 17, or, in other words, to prevent movement of the blocks relative to the stationary frame members 12 in response to movement of the ram 17. Further, rotational movement of the ram 17 is prevented by means of a longitudinally disposed key 24 extending radially inwardly from one of the blocks 20 into a channeled groove 25 formed in the outer surface of the ram 17.

Each of the bearing blocks 20, on its outer sides, is formed with circular recesses 26 which receive the inner headed ends of relatively spaced set screws 27. The set screws 27 are carried in screw-threaded openings formed in the casing 14 and are provided at their outer ends with screwdriver-receiving slots by which the set screws may be rotated to urge the individual blocks 20 to move radially inwardly with respect to the ram 17. The recesses 26 formed in the outer walls of the blocks are relatively larger than the heads of the set screws to permit compound radial movement of the blocks when the separate set screws disposed in right angular relation to one another are tightened to crowd the blocks into tight engagement with the ram 17. There is also provided in association with each set of set screws 27 an adjustable cap screw 28 which extends through a slotted opening 29 formed in the wall of the casing 14 and threadedly engages the block 20. Each block is provided with two cap screws disposed in right angular relation to each other and between the two set screws 27. The action of the cap screws 28 is opposed to that of the set screws 27 in that tightening of the cap screws 28 serves to draw the individual blocks 20 radially outwardly with respect to the ram 17 in opposition to the action of the set screws 27 which forces the blocks inwardly. In this manner, when it is desired to tighten the blocks 20 against the periphery of the ram 17, the cap screws 28 are loosened prior to the adjustment of the set screws 27 which, in turn, are tightened inwardly of the blocks an even amount to displace the blocks 20 radially toward the ram until a tight fit is obtained between the bearing surface 21 of the blocks and the segment of the outer periphery of the ram engaged by the blocks, at which time the cap screws 28 are tightened to draw the blocks into tight engagement with the headed ends of the set screws 27 and thereby to lock the blocks in their adjusted positions.

Access to the individual set screws 27 and cap screws 28 may be had by way of slotted openings 30 formed in the outer wall of the casing 14 in registration with the ends of the set screws and cap screws. Thus, the individual blocks 20 may be adjusted with facility without in any way disassembling the component parts of the press, whereby to assure a close fit between the bearing surfaces 21 of the individual blocks and the outer periphery of the ram 17. It will be understood that tight clamping forces between the blocks and the outer surface of the ram are undesirable, yet at the same time, the outer peripheral surface of the ram 17 should be closely engaged by the bearing surfaces 21 of the blocks in order to prevent lateral displacement or wobbling of the ram 17 in its upward or downward movement during press operations.

Bearing guides formed in accordance with the present invention provide generally increased bearing surfaces between the stationary and movable members of the press, while at the same time permitting accurate adjustment and compensation for wear within the bearing blocks or gibs. Further, due to the fact that the present bearing guide is arranged to guide the reciprocating ram of the press, rather than the relatively wide platen of the press as is the usual case, the moment arm between the axis of the ram and the bearing surface of the guide is greatly decreased, thereby minimizing the wear upon the individual gibs of the guide.

I claim:

1. In a bearing guide for a linearly movable cylindrical shaft; a stationary frame defining a chamber of rectangular cross-sectional configuration about an intermediate portion of the shaft; a plurality of bearing gibs carried by said frame within said chamber for limited radial movement with respect to the shaft, each of said gibs being formed with an arcuately concaved bearing face for close fitting engagement with a segment of the outer surface of the shaft and a pair of right angular side walls disposed in adjacent relation to a corner region of said chamber; set screw means threadedly carried in said frame and engaging the separate side walls of each of said gibs, said set screw means being adjustable to move said gibs from the corner regions of said chamber radially inwardly toward the shaft; and locking means for holding said gibs in radially adjusted positions with respect to said shaft comprising screw-threaded members rotatably carried in said frame and threadedly engaged with each of said gibs at each of the side walls thereof and adjustable to draw said gibs radially outwardly with respect to said shaft and toward the corner regions of said chamber and into tight engagement with said set screw means.

2. In a hydraulic press; a hydraulically actuated reciprocating ram; a pair of relatively spaced stationary frame members disposed on opposite sides of said ram and spaced therefrom, said frame members defining a shaft-receiving

chamber of generally rectangular cross-sectional configuraiton; a plurality of guide blocks carried by said frame members in each corner of said chamber and having bearing surfaces thereon conforming to a segment of the outer periphery of said ram, each of said blocks being keyed to one of said frame members to prevent movement of said blocks relative to said frame members in directions parallel to the axis of said ram, but permitting limited movement of said blocks radially inwardly toward said ram and being formed with right angular side walls adjacent said frame members; a plurality of set screws threadedly carried by each of said frame members and abutting each of the side walls of said blocks and adjustable to move said blocks radially inwardly toward said ram to bring the bearing surfaces of said blocks into close conformity with the outer

periphery of said ram; and a plurality of locking screws threaded into each of the side walls of said blocks and adjustable to move said blocks radially outwardly with respect to said ram and thereby to tension said blocks against said set screws.

MURRAY C. TRIBBETT.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
421,856	Case	Feb. 18, 1890
675,241	Pederson	May 28, 1901
1,122,409	Mumford	Dec. 29, 1914
2,337,984	Flowers	Dec. 28, 1943
2,342,946	Le Tourneau	Feb. 29, 1944