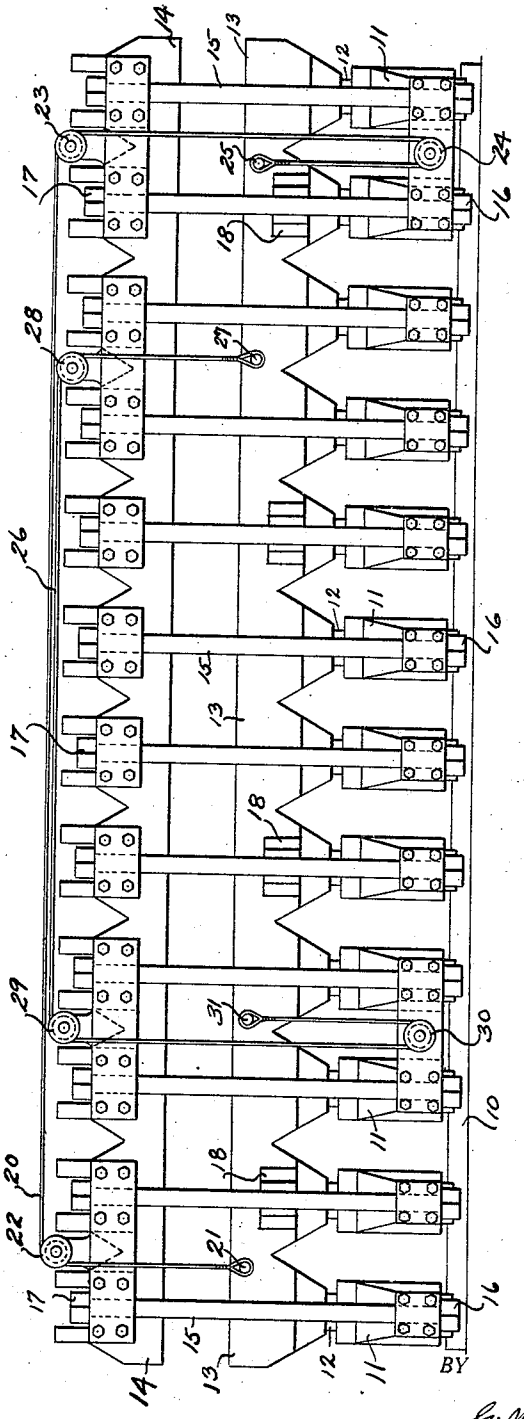
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H. T. SHRIVER

HYDRAULIC PRESS

Filed June 11, 1920



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HYDRAULIC PRESS.

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To all whom it may concern:

Be it known that I, HARRY T. SHRIVER, a citizen of the United States, residing at Llewellyn Park, West Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Hydraulic Presses, of which the following is a specification.

My present invention relates to hydraulic presses, and particularly to such presses which have a very long platen which is raised by a plurality of hydraulic pressure-operated plungers.

One of the objects of my invention is to provide an arrangement by which the sticking or binding of the platen either on its guides or on the hydraulic plungers will be prevented.

With this and other objects in view, my invention consists of the arrangements and constructions hereinafter described and more specifically pointed out in the appended claims.

The drawing shows a side elevation of one form of hydraulic press to which one form of my invention has been applied.

On a support 10 is mounted a plurality of hydraulic cylinders 11 in each of which is mounted the usual plunger 12, each cylinder 11 having the necessary piping and connections so that hydraulic pressure may be applied below the plunger 12 to lift it, in the form shown all the cylinders being connected to the same source of pressure. Supported by the plungers 12 is a platen 13 which, as shown, is very long and has in the form illustrated twelve plungers spaced along it.

Above the platen 13 is a fixed head 14 toward which the platen 13 is lifted to exert pressure on any material placed between the platen 13 and the head 14. The reaction from such a pressure is taken up by rods 15 held by nuts 16 and 17. It will be understood that the platen 13 and the head 14 may be of any desired width and that there may be as many rows of hydraulic cylinders across the press as may be desired, and that the rods 15 will be repeated on the opposite sides of the press.

The construction so far described is old, and further detailed description thereof will be unnecessary.

It has been found that in the operation of such a press it frequently occurs that, because of the failure of the hydraulic plungers at one end to lift that end of the platen as soon as the opposite end begins to lift, there is a cramping and binding of the platen either on the guides 18 which are fastened to the platen and slide on the rods 15, or, in some cases, the plungers themselves may stick and bind because of the tilting of the platen. The lifting at one end before the others may arise from any one of a number of causes, such as the imperfect operation of the packing of the plungers or the like. When such sticking occurs it has been the practice heretofore to release the pressure to allow the platen to drop to its initial position and start it up again, this being repeated until through some combination of circumstances the two ends of the platen will rise together.

I have overcome this difficulty by providing a means by which the two ends of the platen are compelled to rise together, irrespective of any differences which may exist in the operation of the plungers at either end of the platen. As one form of apparatus for this purpose I have shown a device indicated in the drawing, in which cables are connected to opposite ends of the platen in such a manner that the lifting of one end will necessarily cause the other end to lift also. The cable 20 is fastened at 21 to one end of the platen 13 and passes over a pulley 22 supported on a housing connected to the head 14. From this pulley 22 the cable 20 passes over a pulley 23 and from thence over a pulley 24, connected to the support for the hydraulic cylinders. From the pulley 24 the cable passes to a fastening member 25 which attaches it to the opposite end of the platen 13. Similarly, a cable 26 is attached at 27 to one end of the platen and passes over pulleys 28 and 29 on the head 14 and over a pulley 30 on the hydraulic cylinder support 10 and is attached to the opposite end of the platen at 31. It will be understood that this cable connection is repeated on the opposite side of the press.

It will be seen that, by reason of the connection shown, as soon as one end of the platen starts to rise there will be a pressure exerted on the corresponding cable to cause a lifting pressure on the opposite end of the platen, so that there can be no tilting of the platen to cause a binding on the guides or plungers. It will also be understood that my arrangement answers its purpose if it

exerts only a comparatively small lifting pressure, because the lifting force on each of the hydraulic cylinders is substantially the same, and the only differences which are necessary to be taken up are such as may arise through defects in plunger packings and the like, which defects are minimized, if not entirely overcome, provided the hydraulic plunger is kept perfectly vertical, and is not given a side pressure such as would arise if one end of the long platen should rise before the other.

The possibility of the platen tipping may also arise through the carrying of greater weights on one end of the platen than on the other, such, for instance, as mechanism for drawing materials along the surface of the platen 13, which mechanism may all be located at one end of the platen. Such a weight would tend, of course, to unbalance the platen and my equalizing device will compensate for such unbalancing.

It will also be understood that by "cables," I mean any flexible member, such as a chain, steel cable or the like, which will not stretch materially under the tension to which it may be subjected.

Obviously, the equalizing device will be effective if it connects portions of the platen on either side of the center of balance. For the best effects, however, it is desirable that the connections be placed well toward the respective ends of the platen, so that a slight tilting of the platen will be immediately effective to raise the opposite end. In the appended claims, when I refer to the ends of the platen, it will be understood that I mean any of the portions on one side of the center, and not necessarily the extremities of the platen.

I claim:

1. In a hydraulic press, a long platen, a plurality of fluid-actuated plungers spaced apart and beneath said platen and adapted to lift it, and an equalizing device independent of the plunger pressure supply controlling devices connected to said platen and constructed and arranged to cause the top of the platen to remain parallel to its initial position as it is raised by said plungers, irrespective of differences in the operation of said plungers.

2. In a hydraulic press, a long platen, a plurality of fluid-actuated plungers spaced apart and beneath said platen and adapted to lift it, and an equalizing device independent of the plunger pressure supply controlling devices connected to opposite ends of said platen and constructed and arranged to cause the top of the platen to remain parallel to its initial position as it is raised by said plungers, irrespective of differences in the operation of said plungers.

3. In a hydraulic press, a long platen, a plurality of fluid-actuated plungers spaced apart and beneath said platen and adapted to lift it, and an equalizing device, connecting opposite portions of said platen on either side of the center of balance and constructed and arranged to cause the top of the platen to remain parallel to its initial position as it is raised by said plungers.

4. In a hydraulic press, a long platen, a plurality of fluid-actuated plungers spaced apart and beneath said platen and adapted to lift it, guides for said platen, and an equalizing device, comprising a member connecting the opposite ends of said platen and constructed and arranged to equalize the motion given to said platen by the several plungers, whereby binding of the guides will be prevented, irrespective of differences in the operation of said plungers.

5. In a hydraulic press, a long platen, a plurality of fluid-actuated plungers spaced apart and beneath said platen and adapted to lift it, guides for said platen, and an equalizing device, comprising a member connecting opposite portions of said platen on either side of the center of balance, and constructed and arranged to cause the top of the platen to remain parallel to its initial position as it is raised by the plungers.

6. In a hydraulic press, a long platen, a plurality of fluid-actuated plungers spaced apart and beneath said platen and adapted to lift it, a support for said plungers, a head towards which the platen is lifted and an equalizing device, comprising a pair of cables connecting opposite ends of said platen, and pulleys for said cables, constructed and arranged to cause the opposite ends of said platen to rise together, irrespective of differences in the operation of said plungers.

7. In a hydraulic press, a long platen, a plurality of fluid-actuated plungers spaced apart and beneath said platen and adapted to lift it, a support for said plungers, a head towards which the platen is lifted and an equalizing device, comprising a pair of cables on either side of said platen, each having its opposite ends connected to said platen, and pulleys for said cables, constructed and arranged to cause the opposite ends of said platen to rise together, irrespective of differences in the operation of said plungers.

8. In a hydraulic press, a long platen, a plurality of fluid-actuated plungers spaced apart and beneath said platen and adapted to lift it, a support for said plungers, a head towards which the platen is lifted and an equalizing device, comprising a pair of cables on either side of said platen, each having its opposite ends connected to said platen, and pulleys over which said cables pass, each cable passing over a pulley at each end of said head and a pulley on said support at one end of said platen.

9. In a hydraulic press, a long platen, a plurality of fluid-actuated plungers spaced apart and adapted to actuate said platen, and an equalizing device independent of the plunger pressure supply controlling devices connected to said platen, and constructed and arranged to cause the platen to remain parallel to its initial position as it is raised by said plungers, irrespective of differences in the operation of said plungers.

10. In a hydraulic press, a long platen, a plurality of fluid-actuated plungers spaced apart and adapted to actuate said platen, and an equalizing device independent of the plunger pressure supply controlling devices connected to opposite ends of said platen and constructed and arranged to cause the platen to remain parallel to its initial position as it is raised by said plungers, irrespective of differences in the operation of said plungers.

11. In a hydraulic press, a long platen, a plurality of fluid-actuated plungers spaced apart, and adapted to actuate said platen, and an equalizing device, connecting opposite portions of said platen on either side of the center of balance and constructed and arranged to cause the platen to remain parallel to its initial position as it is raised by said plungers.

12. In a hydraulic press, a long platen, a plurality of fluid-actuated plungers spaced apart and adapted to actuate said platen guides for said platen, and an equalizing device, comprising a member connecting the opposite ends of said platen and constructed and arranged to equalize the motion given to said platen by the several plungers, whereby binding of the guides will be prevented, irrespective of differences in the operation of said plungers.

13. In a hydraulic press, a long platen, a plurality of fluid-actuated plungers spaced apart and adapted to actuate said platen guides for said platen, and an equalizing device, comprising a member connecting opposite portions of said platen on either side of the center of balance, and constructed and arranged to cause the platen to remain parallel to its initial position as it is raised by the plungers.

HARRY T. SHRIVER.