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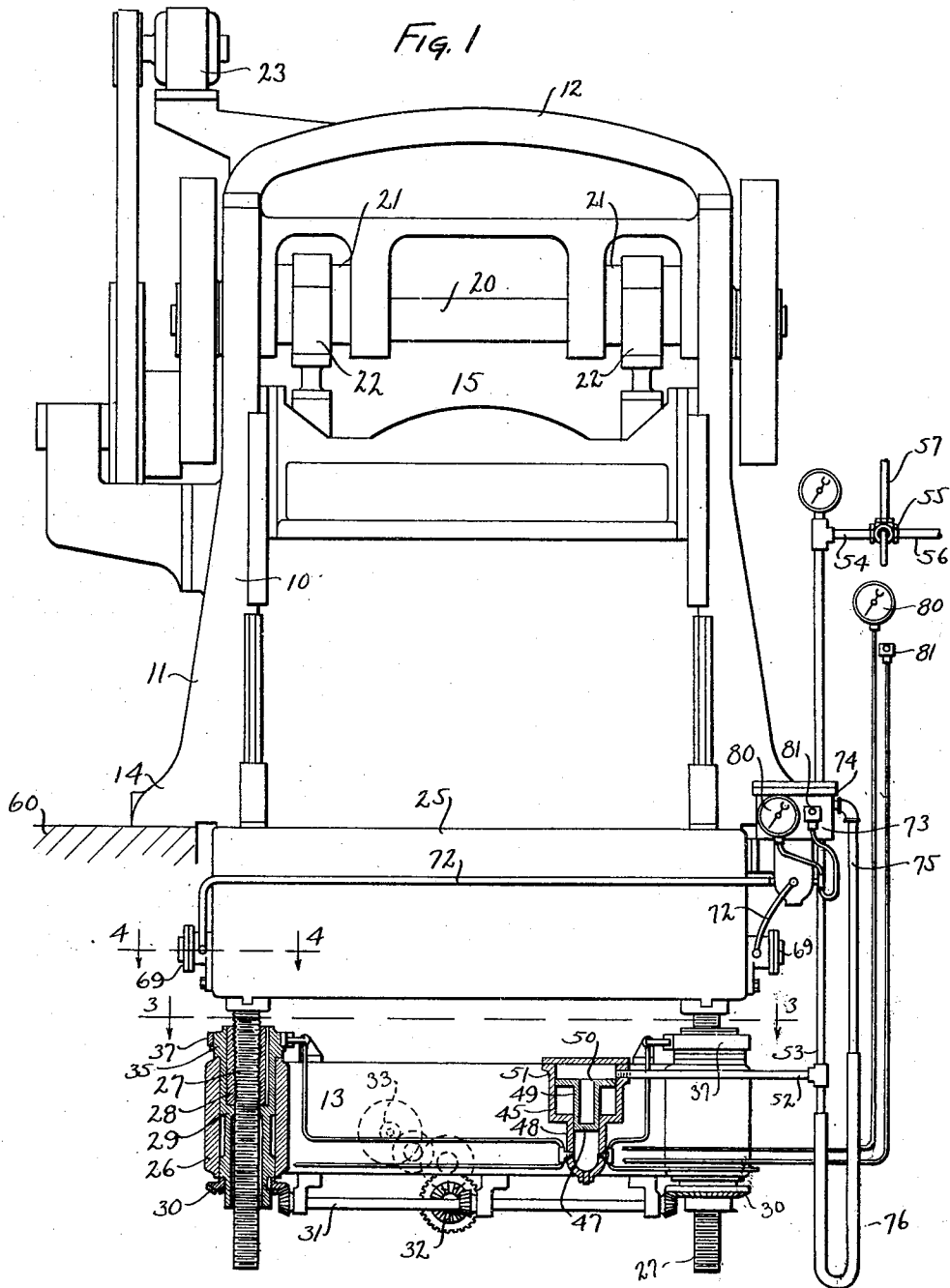
A. A. BYERLEIN

1,768,504

PRESS

Filed Nov. 8, 1928

2 Sheets-Sheet 1



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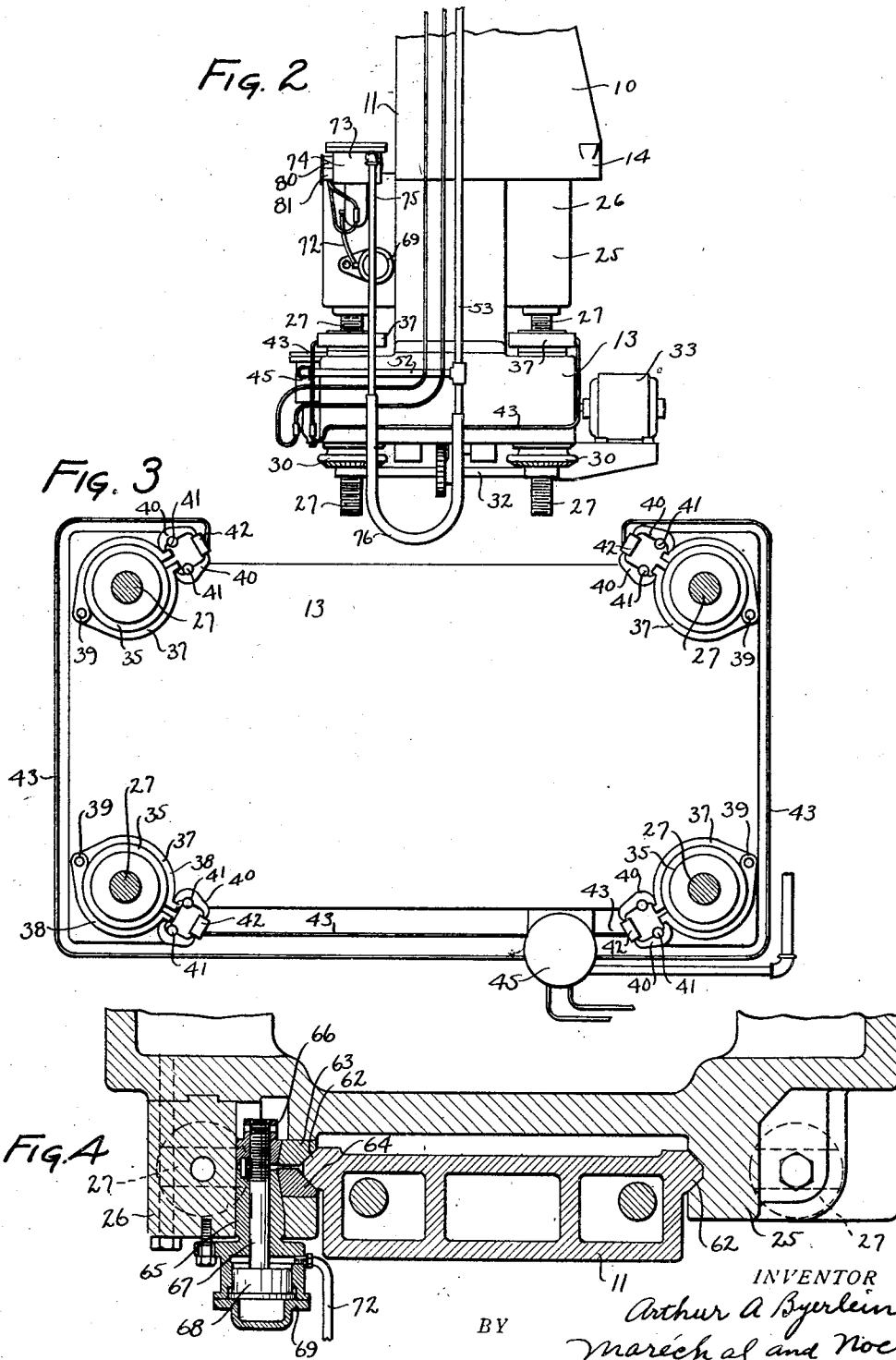
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UNITED STATES PATENT OFFICE

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PRESS

Application filed November 8, 1928. Serial No. 318,041.

This invention relates to presses, and more particularly to presses adapted for the working of sheet metal or the like.

One of the principal objects of this invention is the provision of a press having an adjustable bed which is hydraulically locked in any desired position of adjustment.

Another object of the invention is the provision of a press having an adjustable bed to which are fixed screws extending downwardly from the bed below the floor line, means being provided for simultaneously raising and lowering the several screws and for locking the adjusting mechanism when the bed is at the proper elevation.

Other objects and advantages of the invention will be apparent from the following description and from the accompanying drawings.

In the drawings in which like characters of reference designate like parts throughout the various views,

Fig. 1 is a front elevation of a press constructed in accordance with the present invention, part of the elevating mechanism being shown in section;

Fig. 2 is a side elevation of the lower portion of the press shown in Fig. 1;

Fig. 3 is a horizontal section on the line 3—3 of Fig. 1 showing a part of the hydraulic locking system for the press bed; and

Fig. 4 is a section on the line 4—4 of Fig. 1 at one end of the press.

As illustrating one embodiment of the invention there is shown in the drawing a press adapted for the working of sheet metal or the like, having a frame or stationary part designated generally 10 and embodying side frame members 11, top arch member 12 and lower base member 13, these members being rigidly held together in fixed positions by suitable tie rods or bolts, not shown. The uprights 11 which preferably have outstanding ledges 14 adapted to rest on suitable foundation work substantially near the floor line are provided with guides for the reception of a slide member or plunger 15 which is adapted to reciprocate up and down therein. Additional blank-holding slides, well known in the art may of course be employed

if desired. The slide member 15 is actuated by suitable driving mechanism which, as herein shown, includes a drive shaft 20 rotatably mounted in the frame, cranks 21 formed on the drive shaft, and connecting rods 22 pivotally connected at one end with the cranks 21 and at the other ends to the slide 15. Any suitable driving means for the drive or crank shaft 20 may be used, an electric motor 23 being illustrated as an actuating means for the crank shaft.

As is usual with presses of the character described, the metal to be worked is placed below the slide member or plunger 15 on a suitable bottom die and is operated upon by a die carried by the plunger. The lower face of the slide member 15 is therefore so constructed that an upper die or punch may be secured thereto for movement with the slide member. The lower die member is fixed to a press bed 25. This press bed, instead of being fixed with respect to the frame, is vertically guided in the frame and adapted to be set or locked in various positions of adjustment so that ring risers need not be employed between the bottom die and the press bed when dies of various sizes or depths are used.

The press bed 25 is provided with supporting brackets 26 symmetrically fixed thereto, preferably one at each corner of the press bed. These supporting brackets each carry an adjusting member shown in the form of a heavy screw 27 which projects preferably downwardly a considerable distance from the bottom of the supporting bracket, and which is preferably fixed to the bracket against rotational or other movement. Engaging with each of the adjusting members or screws 27 is a threaded nut 28 which is keyed or otherwise fixed to a rotatable adjusting member 29 carried by the lower portion of the press frame. The threaded nut 28 is therefore rotatably mounted in the press frame and restrained against endwise movement therein. Fixed to the lower end of each rotatable adjusting member 29 is an actuating part, shown in the form of a bevel gear 30, the various gears 30 being driven from cross shafts 31 which are both connected to a common drive

shaft 32 actuated through a suitable gearing and shafting from an electric motor 33. When the electric motor, which is manually controlled to effect the adjustment of the press bed, is energized, the shafts 31 are
 5 equally rotated to rotate the adjusting nuts 28 simultaneously and similarly, with the result that the adjusting members or screws 27 are raised or lowered with respect to the press frame. The electric motor 33 is preferably
 10 reversible so that both raising and lowering movements of the press bed can be accomplished.

When the press bed 25 has been adjusted to the desired height in the frame, before the
 15 press is put into effective operation, the press bed is firmly fixed in its adjusted position. The means by which the press bed is fixed or locked in its adjusted position comprises a
 20 fluid pressure locking system. The upper end of each of the rotatable adjusting members 29 projects above the lower portion of the press frame 13, as shown, where it is preferably integrally provided with a section 35 of en-
 25 larged diameter, the sections 35 providing locking drums or disks which are engageable by locking bands 37. The locking bands, as shown in Fig. 3 comprise locking sections 38 pivotally connected at 39 which are adapted to be tightened frictionally against a lock-
 30 ing drum by levers 40 pivotally connected at 41 on the lower frame member 13. The levers 40 are adapted to be simultaneously actuated by fluid pressure through a suitable
 35 piston or the like contained in the hydraulic cylinder 42. Each of these cylinders is supplied with liquid such as is customarily used in hydraulic brake systems by means of con-
 40 duits 43 which extend to a master cylinder 45. The various conduits 43 which lead to the four hydraulic locking devices shown in Fig. 3 connect to the lower portion of the master cylinder 45 so that the operating
 45 liquid of the hydraulic system may be applied under equal pressure to the various locking cylinders to securely fix the various nuts 28 against movement and thus fix the press bed 25 in its adjusted position. Preferably the cylinder 45 embodies a piston 47 oper-
 50 ating in a lower cylinder 48, this piston being connected by rod 49 to a large piston 50 operating in a large cylinder 51. Air or other fluid from a pressure tank or the like may be supplied under the proper pressure to the
 55 space above the large piston 51, when desired, through pipes 52, 53 and 54 leading to a manually operable control device 55. This control device preferably is a three-way valve so that communication may be established
 60 through the supply pipe 56 to the pipe 54, also providing means for connecting the pipe 54 to the exhaust pipe 57 and providing for closing the end of the pipe 54 against communication with either the pipe 56 or 57.

65 When communication is established between

the supply pipe 56 and pipe 54 and the air or other fluid under pressure is supplied to the top of the cylinder 51, due to the differential sizes of the pistons 50 and 47 the liquid be-
 70 low the piston 47 may be placed under high pressure to effectively actuate the locking means at the four corners of the press. The control valve 55 is preferably located above the floor line 60 where it is conveniently ac-
 75 cessible, and even though the mechanical actuating mechanism which effects the raising or lowering of the press bed is located considerably below the floor line in large size presses such as those referred to, the press
 80 bed may be set at its proper height in the frame without removing the floor boards or mechanically effecting laborious or inconvenient adjusting operations.

To take the strain and forces to a large extent at least, from the actuating nuts and screws which effect the raising or lowering
 85 of the press bed, when the machine is in operation, the press bed is locked securely directly to the press frame this locking means being mechanically independent of the locking means for the adjusting nuts. This locking means, as disclosed in my prior
 90 application for United States Letters Patent for Press, Serial No. 281,550, filed May 29, 1928, preferably comprises a wedging arrangement by which the press bed can be wedged and held against the guides in which the bed is adjustable. As shown in Fig. 4 the frame uprights 11 are each provided
 95 with front and rear guide surfaces 62 preferably of substantial V-shape. The rear guide surfaces cooperate with complementary guide portions provided in the press bed 25. The forward fixed guide surfaces each
 100 cooperates with a pair of gibs 63 and 64 provided in a recessed portion in each of the forward supporting brackets 26. The gibs 63 and 64 each have rear surfaces extending from each other in rearwardly diverging
 105 relationship in a manner complementary to the shape of the fixed guide surface 62 of the frame. The gibs are adapted to be wedged tightly against the fixed guide surfaces 62 and against the bed at the supporting
 110 brackets to hold the bed rigidly against the frame uprights independently of the rotatable adjusting members of the press bed. To accomplish this each of the front supporting brackets 26 is provided with a gib
 115 clamp collar 65 of cylindrical cross-section where it fits loosely in a cylindrical hole in the bracket nut adjacent the recessed portion containing the gibs. At the rear of each gib clamp collar is a generally cylindrical gib clamp head 66 to which is fixed a stud 67.
 120 Both the gib clamp collar 65 and the gib clamp head 66 are provided with tapered or wedge surfaces engaging the forward diverging wedge surfaces on the gibs so that when an outward pull is exerted on the stud 67,
 125 130

the gibs 63 and 64 are forced tightly against the fixed guide surfaces and against the adjacent portion of the bed supporting bracket, all of these parts thus being held tightly and rigidly in fixed position with relation to one another. The outer end of the stud 67 is provided with a piston 68 operating in a cylinder 69. Fluid under pressure may be supplied to the two cylinders 69 on the inner sides of the pistons 68 to hydraulically lock the wedging arrangement and hold the press bed securely against the frame through fluid conduits 72 which lead to the master cylinder 73. This master cylinder is similar in construction to the master cylinder 45 previously described so that air or other fluid under pressure may be supplied to the upper portion of the large cylinder 74 through the air pipe 75 which is connected by the flexible hose 76 to pipe 53. When the control valve 55 is actuated to establish communication between the air pressure supply and the pipe 54, the master cylinders 73 and 45 will be simultaneously energized so as to wedge the press bed against the frame at the same time the rotatable adjusting members are locked in position. The press bed will thus be fixed so that it will take the immense strains and forces imposed on it when metal is being stamped or punched without permitting any lost motion or freedom of movement of the press bed. The master cylinder 73 equalizes the locking force on each side of the press bed where the latter is wedged directly against the frame of the press, and the master cylinder 45 equalizes the pressure of the supplies to the four locking arrangements for the adjusting screws so that the press bed is held and locked symmetrically in a manner to prevent the likelihood or unbalanced forces or strains anywhere in the press during operating conditions.

As shown in Fig. 1 the lower side of each master cylinder is connected to a fluid pressure gauge 80 which indicates the large pressure on the hydraulic side of the fluid pressure system, and a small filler tank or cylinder 81 containing reserve liquid for the replenishment of leaks and losses is also provided for each master cylinder.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. In a press, a frame, a slide movable in said frame, operating means for said slide, a bed adjustably mounted on said frame for a range of height adjustment, means for raising and lowering said bed, and a fluid pressure locking system for locking said bed

fixed in any desired position of adjustment.

2. In a press, a frame, a slide movable in said frame, operating means for said slide, a bed adjustably mounted on said frame for a range of height adjustment, means for raising and lowering said bed, and a fluid pressure locking system for locking said raising and lowering means in various positions of the press bed.

3. In a press, a frame, a slide movable in said frame, operating means for said slide, a bed adjustably mounted on said frame for a range of height adjustment, threaded means for raising and lowering said bed, and a fluid pressure system for holding said threaded means in adjusted positions and holding said bed to the frame.

4. In a press, a frame, a slide movable in said frame, operating means therefor, a bed adjustably mounted on said frame, operating means located below said bed and below the floor line for raising and lowering said bed, a fluid pressure locking system for locking said bed fixed in desired positions of adjustment, and a single control member located above the floor line for controlling the locking and unlocking of said locking system.

5. In a press, a frame, a slide movable in said frame, operating means therefor, a bed adjustably mounted on said frame, a plurality of adjusting screws fixed on said bed and projecting downwardly therefrom, adjusting nuts rotatably mounted on said frame below said bed and in threaded engagement with said screws, means for rotating said nuts to vary the elevation of the bed, and means for locking said nuts against rotation to hold the bed fixed in desired positions of adjustment.

6. In a press, a frame, a slide movable in said frame, operating means therefor, a bed adjustably mounted on said frame, a plurality of adjusting screws fixed on said bed and projecting downwardly therefrom, adjusting nuts rotatably mounted on said frame below said bed and in threaded engagement with said screws, means for rotating said nuts to vary the elevation of the bed, means for locking said nuts against rotation to hold the bed fixed in various desired positions of adjustment, and a hydraulic system for locking said bed directly to said frame.

7. In a press, a frame, a slide movable in said frame, operating means therefor, a bed adjustably mounted on said frame, a plurality of adjusting screws fixed on said bed and projecting downwardly therefrom, adjusting nuts rotatably mounted on said frame below said bed and in threaded engagement with said screws, mechanism for rotating said nuts to vary the elevation of the bed, means for locking said nuts against rotation to hold the bed fixed in desired positions of adjustment, means for locking said bed di-

rectly to said frame, a fluid pressure system for simultaneously energizing and deenergizing both said last named means, and a single control valve for controlling said fluid pressure system.

5 8. In a press, a frame, a movable slide mounted in said frame, operating means therefor, a bed adjustably mounted on said frame for a range of height adjustment, threaded operating means at each corner of
10 the bed for raising and lowering said bed, threaded members engaging said threaded operating means, means for simultaneously operating said threaded members, fluid pressure means for simultaneously holding or re-
15 leasing said threaded members, holding means for holding said bed directly to said frame, fluid pressure means for said holding means, and a control valve for simultaneously controlling said fluid pressure means.

20 In testimony whereof I hereto affix my signature.

ARTHUR A. BYERLEIN.

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