July 12, 1949. A. BORZYM 2,475,693

POWER PRESS

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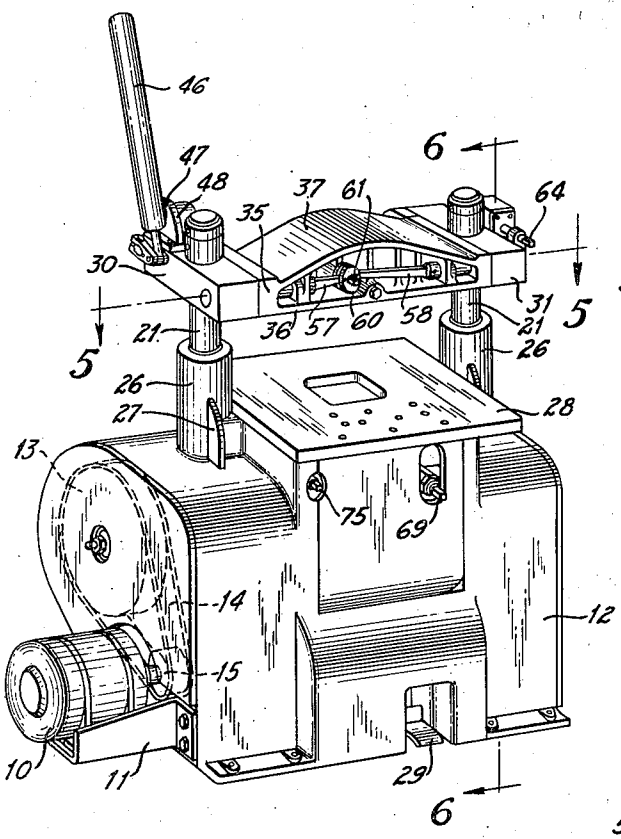

Fig. 1.

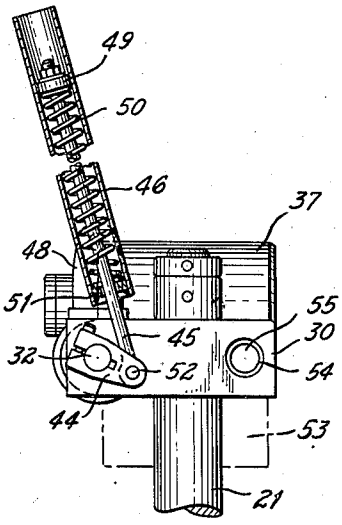

Fig. 2.

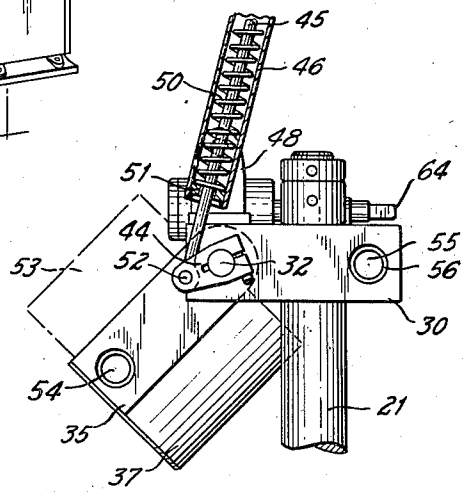

Fig. 3.

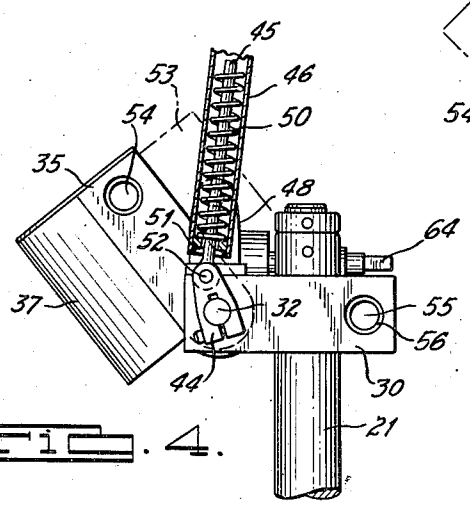

Fig. 4.

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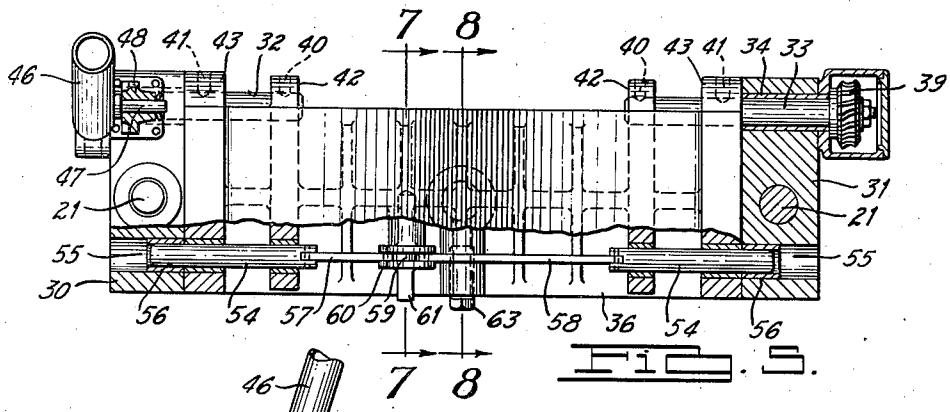

Fig. 5.

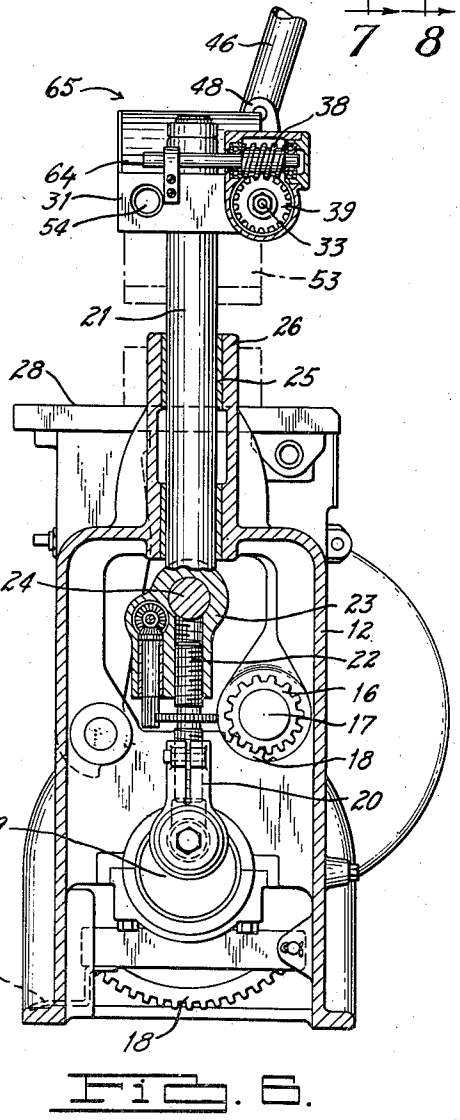

Fig. 6.

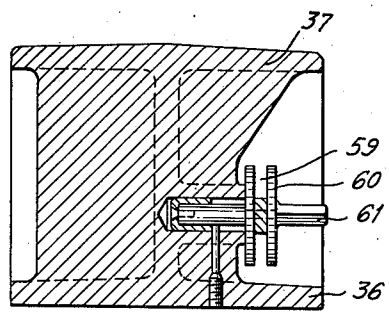

Fig. 7.

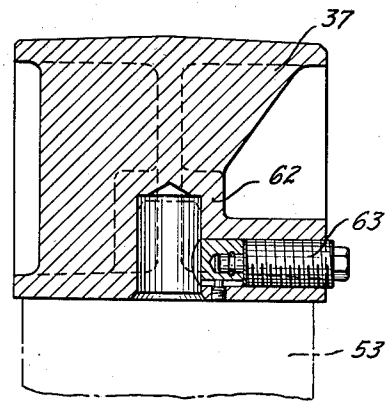

Fig. 8.

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Patented July 12, 1949

2,475,693

UNITED STATES PATENT OFFICE

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POWER PRESS

Alexander Borzym, Dearborn, Mich.

Application January 16, 1947, Serial No. 722,426

6 Claims. (Cl. 76—4)

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My improvement pertains to power presses including a bolster plate held at a fixed level, and a reciprocally movable ram.

The purpose of my invention is to provide in the ram a mid-section which is designed to carry a die or a punch on its under surface, and which may be swung outwardly till its under surface is turned upwardly. This in order that any work to be done, say, on the die to improve it or to adjust its location, may be done on the supporting mid-section without the necessity of removing the die from the press. The feature results in great convenience and a great saving of time and effort.

A further object of my invention is to provide means for counterbalancing the weight of the mid-section as it is swung outwardly thus making the task comparatively easy.

Another object of my improvement is to provide novel and effective means for locking the movable portion of the ram in its operative position against displacement thereof.

I shall now described my improvement with reference to the accompanying drawings in which:

Figure 1, is a perspective view of a press equipped with the ram as improved by me;

Figures 2, 3 and 4, show a detail of construction of the press in different operative position;

Figure 5, is a sectional view of the ram on line 5—5 of Figure 1;

Figure 6, is a vertical sectional view of the press on line 6—6 of Figure 1;

Figure 7, is a sectional view of the ram on line 7—7 of Figure 5;

Figure 8, is a sectional view of the ram on line 8—8 of Figure 5.

Similar numerals refer to similar parts throughout the several views.

First I shall describe my press generally. It includes a motor 10 bolted in place within a cradle 11 mounted on the side of housing 12 of the press, which housing constitutes a part of the frame-work thereof. The motor drives a fly wheel 13 by means of belt 14 from a pulley 15. A pinion 16 mounted on shaft 17 which supports the fly wheel, is meshed with a gear wheel 18, which in turn, drives a crank shaft 19. Two crank rods 20, one at each end of the crank shaft, support by intermediate means, columns 21. The intermediate means include, for each crank rod, a jack 22, threaded at one end into an axial socket in the respective rod, and at the other end threaded into a boss 23, directly below the respective column 21. The columns

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which at the lower end are joined by a cross member 24, slides vertically in bearings 25 within cylindrical guides 26 which rise upwardly from the body of the frame-work and are reinforced by radial webs 27. It is on these columns that the ram, generally indicated by numeral 65 is mounted.

In operation of the press when the dies carried by the ram and the bolster plate, respectively, have been affixed in place, the columns actuated by the crank shaft, first carry the ram downwardly towards the bolster plate 28, and then back upwardly, away from the plate. I wish to add that the press is set operating by means of a pedal 29 serving to release a clutch, the details of which are not shown herein.

As my invention relates primarily to the ram, I shall now fully describe the details of the structure employed by me. The ram includes two end blocks 30 and 31 respectively, each of which has an aperture mid-way its length to fit over the top end of the respective column. Hinged to the rear ends of the blocks by means of pintles 32 and 33, journalled in bearing 34 in the end blocks 30 and 31, respectively, is a mid-section 35. This consists of platform 36 forming the base of said mid-section, and a domed top 37. Being hinged as indicated, said mid-section may be swung outwardly in an arc so that what is normally the underside of said section, is turned upwardly. A swing of this kind encompassing 180° or more is shown in Figure 3.

Mechanical means to accomplish this end include a worm 38 operating upon a gear wheel 39, which is axially seated on, and keyed to pintle 33, shown in Figure 5. The worm may be driven by manual means such as a crank which may be applied to the end 64 of its shaft. Set screws 40 and 41 within the hinge members 42 and 43, and bearing radially against the pintles 32 and 33, respectively cause said mid-portion of the ram to rotate in unison with said pintles.

In conjunction with the worm 38 and the gear wheel 39, I am employing a spring counterbalance to offset the weight of said hinged mid-portion of said head. Keyed to the pintle 32 at its outer end as shown in Figure 2, is a short crank 44. A rod 45 pivotally connected to the outer end of the crank extends upwardly into a tube 46 which itself is swivelled at 47 upon a bracket 48 rising from the upper surface of block 30. The rod carries at its upper end a piston 49. A spring 50 coiled around the lever is confined and normally compressed between the piston and an annular plug 51 at the bottom of the

tube. When the pivoted portion **35** of the ram is being swung out, the spring, tending to expand, supplies its stored energy thus aiding in tilting the mid-portion upwardly. When the rod **45** at its connection at **52** will have passed the point directly above the center of pintle **52**, the leverage of the weight of the movable portion **35** will be counteracted by the spring which will now be gradually compressed. This stage is shown in Figure 4. Figure 3 shows the position of the crank and said mid-section **35** when the swinging out movement has been completed and when the spring is again fully compressed. Now again the spring tending to expand is capable of supplying its stored energy for the return swing of the hinged portion of the ram till the rod **45** at its connection at **52** to crank **44** has passed the point above the center of pintle **32**, on its way down. From this point the spring will serve to counteract portion **35** on its swing down to its normal position as shown in Figure 1. The die carried by said portion is shown in Figures 2 to 4 by numeral **53**.

In order that the pivoted portion of the ram may be locked in place, I'm employing locking pins **54** which are adapted to slide into horizontally disposed sockets **55** within blocks **30** and **31** respectively. The sockets are provided with suitable bushings **56**. The locking pins are actuated by rods **57** and **58** respectively, as each rod is attached at one end to the bolt. At the other end it is pivotally affixed in an off center position, within an annular groove **59** in the rim of wheel **60**. The wheel keyed to a horizontal axle may be rotated by means of a suitable wrench fitting over an end stud **61**.

To complete my description, I wish to add, that Fig. 8 shows the conventional arrangement by means of which punches or dies may be held within the head of the press. The arrangement includes a hole in a boss **62** and a screw **63**.

Having thus described by improvement, what I wish to claim is as follows:

1. In a press of the kind described comprising a framework a stationary, horizontally disposed bolster plate, and a vertically movable ram for reciprocal engagement with said bolster plate, a die supporting mid-section in said ram, hinged on laterally extending pintles, disposed in bearings within the marginal side members of said ram, movable bolts parallel to the pintles for lateral extension into sockets within said marginal side members, means for manual operation of the bolts, and worm gear means acting upon one of the pintles to swing the mid-portion upwardly and outwardly from its normal position till its under side faces substantially upwardly.

2. In a press of the kind described comprising a frame-work a stationary, horizontally disposed bolster plate, and a vertically movable ram, supported above the bolster plate for vertical reciprocal engagement with said bolster plate, a die supporting mid-section in said ram hinged at the rear on lateral pintles, journalled in marginal blocks of the ram, movable bolts disposed within said mid-section parallel to the pintles, centrally located crank means to shift the bolts into sockets within the marginal blocks to hold the mid-section in a normally horizontal position, and worm gear means acting upon one of the pintles to swing the mid-portion upwardly and outwardly from its normal position till its underside faces substantially upwardly.

3. In a press of the kind described a vertically movable ram, including in combination two side blocks, a die supporting mid-section hinged at the rear on laterally extending pintles, journalled in said blocks, bolts disposed within the mid-section, parallel to the pintles and axially disposed with respect to each other, a centrally located wheel, mid-way the inner ends of the bolts, the wheel having two diametrically opposed off-center connecting pins, a connecting rod extending from each pin to the end of the respective bolt, means to rotate the wheel manually to shift the bolts out or into the sockets in the stationary blocks and worm gear means acting upon one of the pintles to swing the mid-portion upwardly and outwardly from its normal position till its underside faces substantially upwardly.

4. In a press of the kind described a vertically movable ram, including two side blocks, a die-supporting mid-section, hinged at the rear on lateral pintles journalled in said blocks, movable bolts disposed within the mid-section parallel to the pintles, manually operable means to slide the bolts laterally into sockets within the marginal blocks to hold the mid-section in a normally horizontal position, worm gear means acting upon one of the pintles to swing the mid-portion upwardly and outwardly from its normal position till its under side faces substantially upwardly a crank keyed to the outer end of one of said pintles and positioned outwardly of a respective end block, a substantially vertical tube swiveled at its lower end on said block above the pintle therein, the tube having a bottom with a central aperture therein, a rod pivotally connected to the outer end of said crank and extending into the tube through said aperture, said rod terminating with a sliding head within said tube, a coiled spring upon said rod, the spring bearing at one end against said head and at the other end against the bottom of the tube, said spring means being normally compressed when the mid-section is in a horizontal position but lending its stored energy to counterbalance the weight of the mid-section during its swinging operation.

5. In a press of the kind described a vertically movable ram, including two side blocks, a die-supporting mid-section, hinged at the rear on lateral pintles journalled in said blocks, movable bolts disposed within the mid-section parallel to the pintles, manually operable means to slide the bolts laterally into sockets within the marginal blocks to hold the mid-section in a normally horizontal position, worm gear means acting upon one of the pintles to swing the mid-portion upwardly and outwardly from its normal position till its under side faces substantially upwardly, crank means on one of the pintles, a rod extending therefrom and connected to a coil spring mounted by intermediate means on one of the blocks, said spring being normally compressed when the die supporting section is in its normal position to lend its stored energy to swing said section upwardly.

6. In a press of the kind described a vertically movable ram including two side blocks, a die-supporting member hinged at the rear on lateral pintles journalled in said blocks, movable bolts disposed within said member parallel to the pintles, manually operable means to slide the bolts laterally into sockets within the blocks to hold said member in a normally horizontal position, means to swing said member upwardly and outwardly from its normal position till its under side is turned upwardly, crank means affixed to said member, a tube swivelled on one of the blocks, a rod slidingly seated within the tube and having a

head at its upper end while its other end is connected to the crank, and a coiled spring confined between the said piston and the bottom of the tube, the spring being compressed while the member is in its horizontal operative position, to lend its energy while the member is being swung up.

ALEXANDER BORZYM.

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