Sept. 9, 1958 D. DOHM, JR 2,850,966

PRESS

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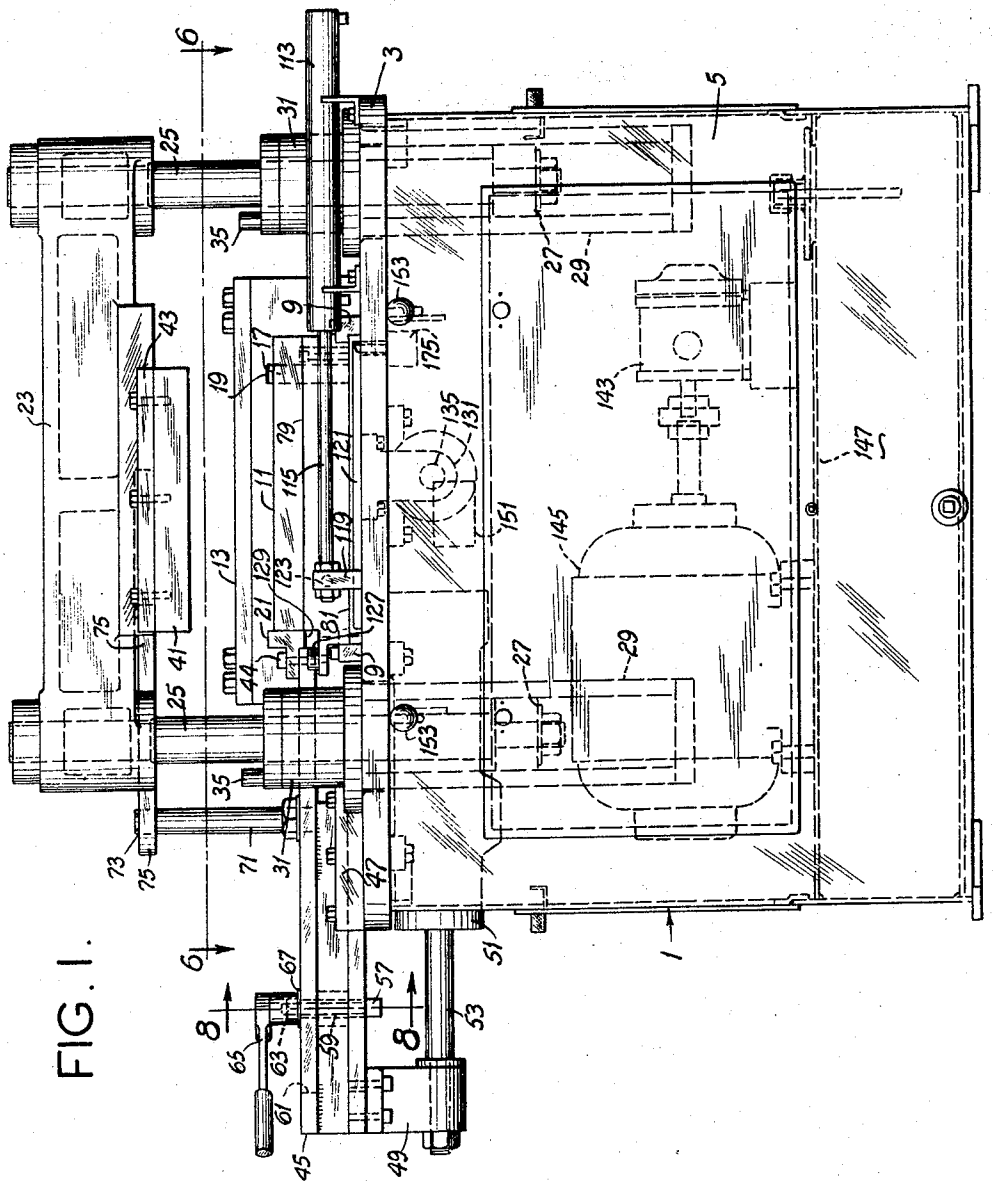


FIG. 1.

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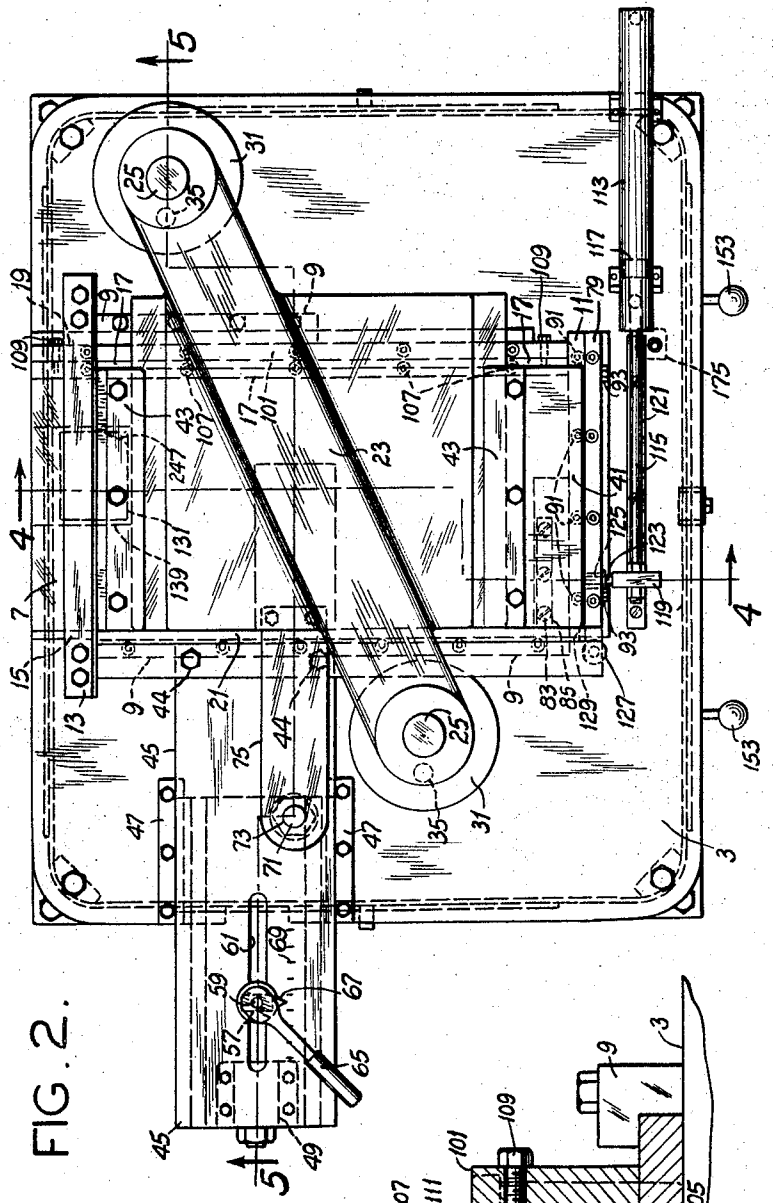


FIG. 2.

FIG. 9.

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FIG. 3.

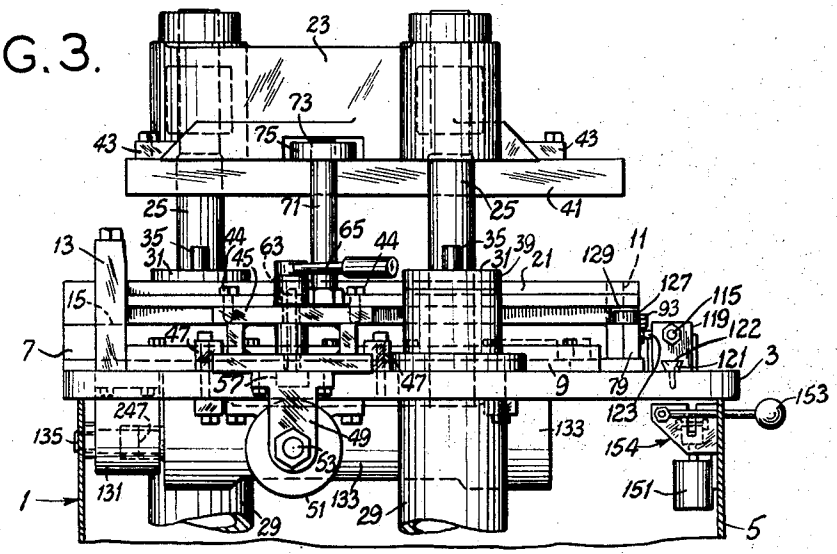
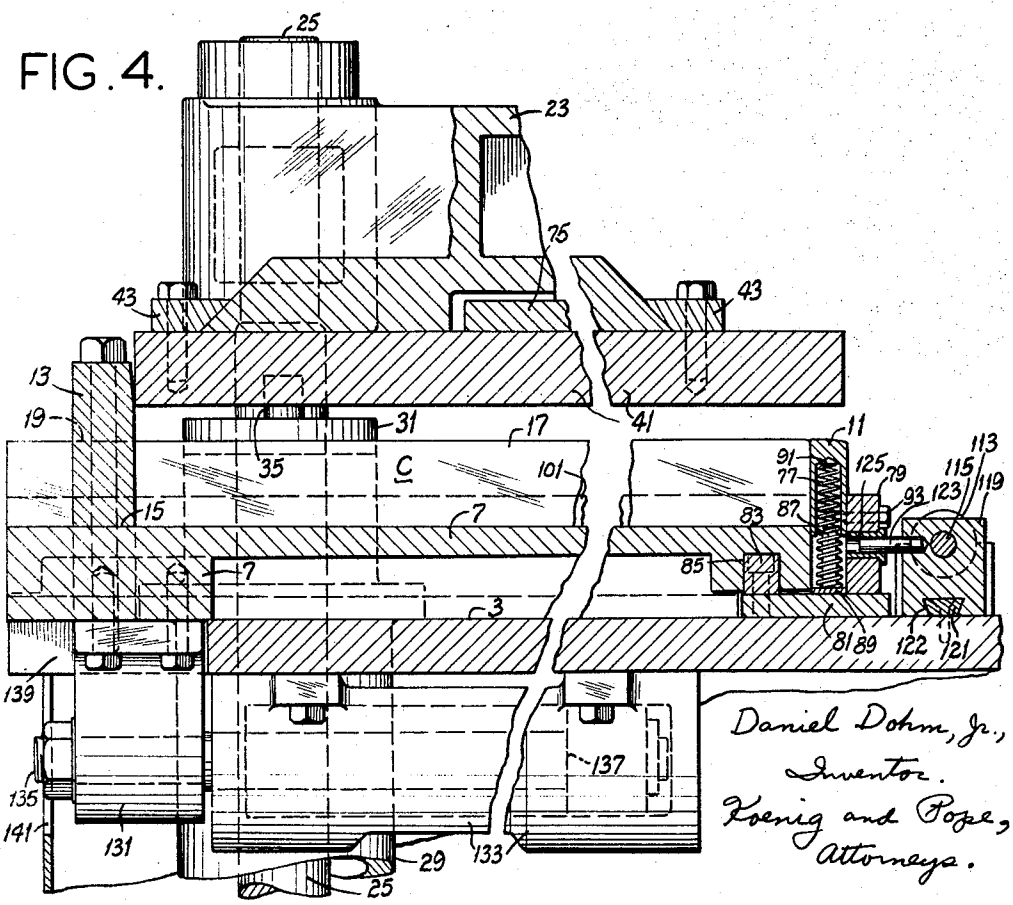


FIG. 4.



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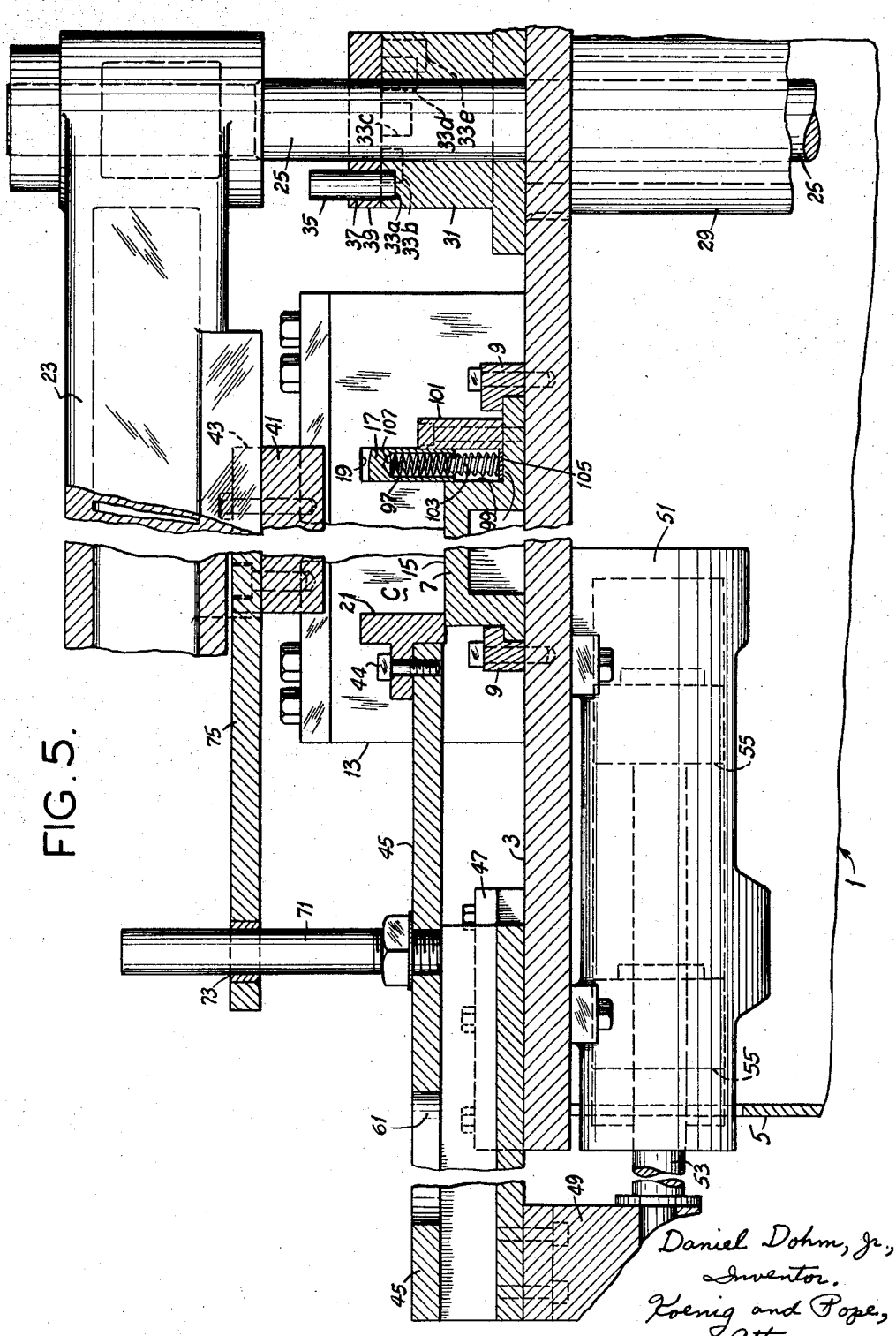


FIG. 5.

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FIG. 6.

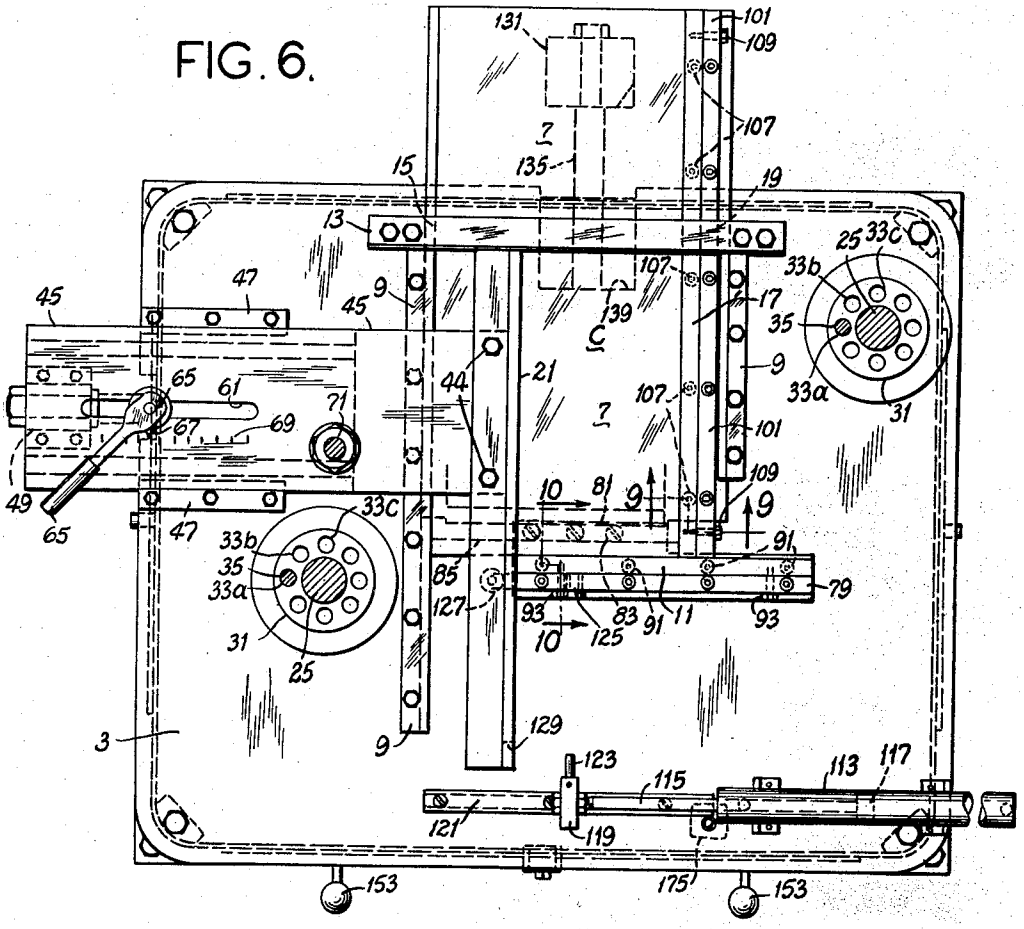
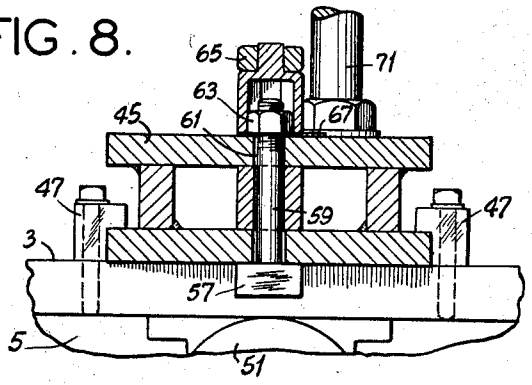


FIG. 8.



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FIG. 7.

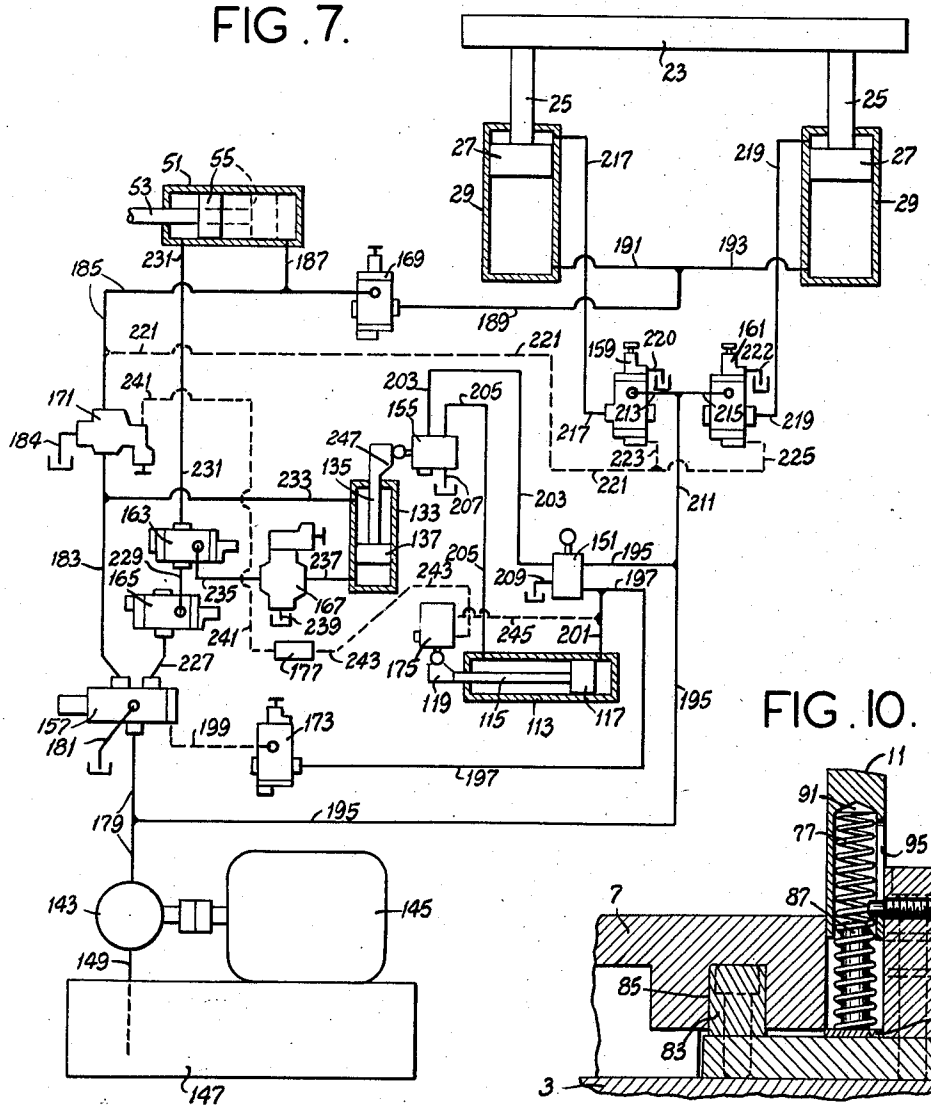


FIG. 10.

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United States Patent Office

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PRESS

Daniel Dohm, Jr., University City, Mo., assignor to Dohm and Nelke, Inc., St. Louis, Mo., a corporation of Missouri

Application December 12, 1955, Serial No. 552,615

16 Claims. (Cl. 100—232)

This invention relates to presses, and more particularly to a press for compressing a slab of bacon to flatten it to be of uniform thickness and to square its ends, whereby uniform slices may be obtained and waste is eliminated.

Among the several objects of the invention may be noted the provision of an improved press of the class described adapted for heightwise, lateral and endwise compression of a slab with control over the heightwise and lateral compression for determination of the thickness and width of the formed slab; the provision of a press of this class which is capable of easy rapid adjustment to form slabs of different thicknesses and different widths; the provision of a press of this class wherein the construction is such as to allow for easy cleaning; the provision of a press of this class which, while having a relatively short heightwise stroke, is adapted for ease of access for insertion of a slab to be formed and for removal of a formed slab; the provision of a press of this class in which there is provided a smoothing action on the slab, in addition to the heightwise, lateral and endwise compression; and the provision of a press of this class which is safe and reliable in operation. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

Fig. 1 is a front elevation of a press of this invention;

Fig. 2 is a top plan view of the press;

Fig. 3 is a fragmentary side elevation of the left side of the press as viewed in Fig. 1;

Fig. 4 is an enlarged vertical cross section taken on line 4—4 of Fig. 2, with parts broken away;

Fig. 5 is an enlarged vertical section taken on line 5—5 of Fig. 2, with parts broken away;

Fig. 6 is a horizontal section taken on line 6—6 of Fig. 1, and showing parts in a moved position;

Fig. 7 is a diagrammatic view showing the hydraulic circuit of the press;

Fig. 8 is an enlarged vertical section taken on line 8—8 of Fig. 1;

Fig. 9 is an enlarged vertical section taken on line 9—9 of Fig. 6; and,

Fig. 10 is an enlarged vertical section taken on line 10—10 of Fig. 6.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings, a press of this invention is shown to comprise a bed generally designated 1 which comprises a top plate 3 on a cabinet structure 5. At 7 is indicated a bottom platen which is mounted to slide on the top plate 3 in a front-to-rear direction, being guided by gibs 9 fastened to the top plate 3. At 11 is indicated a depressible end platen which is associated with the

bottom platen at its forward end for front-to-rear movement with the bottom platen, but which is free to slide laterally with respect to the bottom platen. At 13 is indicated an end abutment which is fixed on the top plate 3 at the rear edge of the top plate, and which is notched out as indicated at 15 to accommodate the bottom platen and allow the latter to slide thereunder. The forward end platen 11 is movable rearward with the bottom platen 7 from the endwise retracted position shown in Figs. 2 and 4 to a position such as shown in Fig. 6 for endwise compression of a slab of bacon between the platen 11 and the fixed rearward end abutment 13. At 17 is indicated a depressible side abutment which is carried by the bottom platen for front-to-rear movement with the bottom platen and which is fixed against lateral movement relative to the bottom platen. The fixed rearward end abutment 13 is notched out as indicated at 19 to allow for sliding movement of the side abutment 17 with the bottom platen 7. At 21 is indicated a pressure-applying side platen which extends parallel to the first-mentioned side platen 17 and which is mounted for movement from the sidewise retracted position shown in Figs. 2 and 5 toward the side abutment 17 across the upper face of the bottom platen 7 to a position such as shown in Fig. 6 for lateral compression of the slab. The abutments 13 and 17 and the side platen 21 define a molding chamber C having the platen 7 for its bottom.

At 23 is indicated a press head mounted for vertical movement toward and away from the top plate 3 of the press and located above the plate 3. This head 23 is fixed on the upper ends of a pair of piston rods 25 which extend from pistons 27 in a pair of hydraulic cylinders 29. These hydraulic cylinders extend vertically downward from the top plate 3 within the cabinet 5. One cylinder is located on the left side of the bottom platen 7 somewhat forward of the lateral center line of the top plate 3 and the other is located on the right side of the bottom platen toward the rear of the top plate so that the plane of the cylinders and the piston rods is angled as shown best in Fig. 2. This locates the center of the head 23 generally in vertical alignment with the center of a slab to be formed.

The piston rods 25 extend upward from the top plate 3 through cylindric guides 31 fastened to the top plate. For adjustably limiting the downward travel of the head 23, each of the guides 31 has a series of vertical holes 33*a*, 33*b*, 33*c*, etc., therein of different depths, these holes all being of the same diameter and each being adapted to receive a pin 35. This pin is vertically slidable in a hole 37 in a ring 39 rotary on the respective piston rod 25 and bearing on the upper end of the respective guide 31. By lifting the pin 35 out of any one of the holes 33*a*, 33*b*, etc. that it may be in, and rotating the ring 39, the pin may be dropped into another one of the holes 33*a*, 33*b*, etc. to change the elevation of the upper end of the pin. The pins 35 serve as stops for limiting the downward travel of the head, and by varying the elevation of the upper ends of the pins as described, the lower limit of the travel of the head may be varied. The head 23 carries a top platen 41 mounted for sliding movement in transverse direction on the bottom of the head by means of gibs 43.

The side platen 21, as shown best in Fig. 5, consists of a bar of T-section disposed with the stem of the T horizontal. This is fastened by screws 44 to a slide 45 which is guided for sliding movement laterally on the top plate 3 by means of gibs 47. The slide 45 extends beyond the left side of the top plate, and has a block 49 fastened to its bottom at its outer end. The slide 45 and the side platen 21 are movable in and out by means of a hydraulic cylinder 51 mounted under the top plate 3

within the cabinet and having a piston rod 53 extending from its piston 55 to a connection with the block 49.

The inward travel of the slide 45 and hence of the side platen 21 is limited by means of a stop 57 (shown in Figs. 1 and 8, but omitted in Fig. 5) engageable with the left edge of the top plate 3, with provision being made for adjustment of the stop to vary the inward travel of the slide and the side platen 21. For this purpose, the stop 57 is carried at the lower end of rod 59 which extends vertically through a slot 61 in the slide. A nut 63 is threaded on the upper end of the rod 59 and a ratchet handle 65 is provided for tightening and loosening the nut. The arrangement is such that by loosening the nut, the rod and stop may be moved to various positions lengthwise of the slide in the slot to vary the distance which the slide is permitted to travel before the stop engages the left edge of the top plate 3. Within the limits determined by the length of the slot 61 there is an infinite range of adjustment. A pointer 67 is shown on the threaded rod for cooperation with a scale indicated at 69 on the slide for indicating the adjustment. A post or stud 71 extends upward from the slide to a sliding connection at 73 with a plate 75 which extends from the top platen 41. The sliding connection at 73 permits the necessary vertical movement of the plate 75 along with the top platen 41.

The depressible forward end platen 11 is mounted for vertical movement with respect to the bottom platen 7 and biased upward to a raised position by springs 77. As shown best in Fig. 10, the forward end platen 11 is vertically slidable between the doorward edge of the bottom platen 7 and a vertical plate 79 which is fixed to a horizontal plate 81 slidable on the top plate 3. The plate 81 is guided for movement transversely of the top plate 3 by being provided with a key 83 slidable in a groove 85 in the bottom platen 7. The springs 77 are centered on pins 87 carried by a strip 89 lying loosely on the plate 81 between the forward edge of the bottom platen and the plate 79, and are accommodated in spring recesses 91 in the forward end platen 11. The latter is keyed to the plate 79, while being free to slide vertically, by means of screws 93 threaded in 79 and extending into vertical grooves 95 in the forward face of platen 11.

The depressible side abutment 17 is also mounted for vertical movement with respect to the bottom platen, and is biased upward to a raised position by springs 97. As shown best in Fig. 9, the bottom platen 7 has a step 99 along its right hand edge, and the side abutment 17 is vertically slidable between the vertical side of the step and a vertical plate 101 affixed to the horizontal portion of the step. The springs 97 are centered on pins 103 carried by a strip 105 lying loosely on the horizontal portion of the step between the vertical side of the step and the plate 101, and are accommodated in spring recesses 107 in the side platen 17. The latter is keyed to the bottom platen for movement therewith while being free to slide vertically by means of screws 109 threaded in the plate 101 and extending into vertical grooves 111 in the platen 17.

The press further comprises means for retracting the depressible forward end platen 11 to the right beyond the right side abutment 17 for ease of access to the slab-receiving molding chamber defined by the abutments and the platens. As shown, this means includes a hydraulic cylinder 113 mounted on the top plate 3 extending laterally with respect to the plate 3 adjacent to its forward edge. The piston rod 115 of this cylinder is shown as extending from the piston 117 thereof to a connection with a block 119 guided for transverse sliding movement on the top plate 3 by means of a dovetailed key 121 fixed on 3 and received in a keyway 122 in the block. This block 119 carries a rearwardly extending pin 123. The plate 79 has an opening 125 adapted for slidable reception of the pin when the block 119 is in the advanced position shown in Fig. 1 and when the plate 79 and the forward end platen 11 are in their extreme left-hand and forwardmost position shown in Figs. 2 and 4. The plate 79 carries a roller 127 for engagement behind the left side platen 21 as the forward end platen moves rearward with the bottom platen away from its forward position. A notch 129 is provided in the left side platen 21 at its forward end for passage of the roller 127 in order to allow for side retraction of the forward end platen 11.

The bottom platen 7 has a block 131 fastened to its bottom at its rearward end. It is movable endwise in front-to-rear direction by a hydraulic cylinder 133 mounted under the top plate 3 within the cabinet and having a piston rod 135 extending from its piston 137 to a connection with the block 131. When the piston 137 is retracted to the forward end of the cylinder 133, the bottom platen 7 is retracted to its retracted forward position illustrated in Figs. 2 and 4. In this position of the bottom platen, the block 131 is received in a notch 139 in the rearward edge of the top plate 3. The cabinet has an opening 141 for passage of the block 131.

The hydraulic cylinders referred to above are connected in a hydraulic circuit as shown in Fig. 7 supplied with oil under pressure by a pump 143 driven by a motor 145. The pump and motor, together with a sump 147 for oil, are housed in the cabinet. A supply line 149 is shown leading from the sump to the pump inlet. At 151 is indicated an operator-controlled on-off starter valve. This is adapted for mechanical operation by means of a pair of knobs 153 (see Figs. 1 and 2) which extend outward from the front of the cabinet, a linkage indicated generally at 154 in Fig. 3 being provided within the cabinet which for purposes of safety requires operation of both knobs to operate the valve. Details of the linkage are not shown since they are not material to this invention. Valve 151 may be a solenoid valve in which case a pair of push-button switches may be provided for operating it. At 155 is indicated a valve controlled by the bottom platen which functions to control the cylinder 113 for retracting the forward end platen at the end of a cycle as will be made clear. At 157 is indicated a pilot pressure controlled four-way main control valve. At 159 and 161 are indicated a pair of pilot pressure controlled sequence and check valves whose function is to admit oil into the head cylinders 29 for downward movement of the head and then to lock oil in the cylinders during the remainder of a pressing operation to prevent the head from lifting. At 165 is indicated a sequence and check valve for controlling the downward pressure on the head. At 163 is indicated a sequence and check valve for controlling the pressure on the side cylinder 51. At 167 is indicated a relief valve for controlling the pressure on the cylinder 133. At 169 is indicated a counterbalance valve for holding up the head at all times, even when the motor 145 is off. This is set to provide only enough pressure to hold the head up. At 171 is indicated a pilot pressure controlled relief valve. At 173 is indicated a sequence and check valve for insuring full movement of piston 117 of the cylinder 113 before the start of downward motion of the head 23. At 175 is indicated an on-off valve controlled in response to position of the forward end platen for maintaining full pressure for the opening phase of the cycle of the press and for unloading the pump at the end of the cycle. At 177 is indicated a check valve for preventing valve 171 from building up excessive pressure.

A line 179 connects the pump outlet and the inlet of the four-way main control valve 157. A return from the four-way main control valve to the sump is indicated at 181. A line 183 connects one transfer port of the valve 157 to the valve 171. A return line from the valve 171 to the sump is indicated at 184. A line 185 connects valve 171 and the valve 169. A line 187 connects the line 185 to the inner end of the side cylinder 51. A line 189 extends from valve 169 to branch lines 191 and

193 connected to the lower ends of the head cylinders 29. A line 195 connects the line 179 to the starter valve 151. A line 197 connects the starter valve to the valve 173. A line 199 connects the valve 173 and the main valve 157. A line 201 connects the line 197 and the right end of the cylinder 113. A line 203 connects the starter valve 151 and the valve 155. A line 205 connects the valve 155 and the left end of the cylinder 113. A return line from the valve 155 to the sump is indicated at 207. A return line from the valve 151 to the sump is indicated at 209. A line 211 connects the line 195 and branch lines 213 and 215 connected to the valves 159 and 161.

Lines 217 and 219 connect the valves 159 and 161 to the upper ends of the head cylinders 29. Return lines from valves 159 and 161 to the sump are indicated at 220 and 222. A line 221 is connected into the line 185 and connected to the valves 159 and 161 by lines 223 and 225. Line 227 connects a second transfer port of the main valve 157 to the valve 165. A line 229 connects the valve 165 and the valve 163. A line 231 connects the valve 163 and the left end of the side cylinder 51. A line 233 connects the line 183 and the rear end of cylinder 133. A line 235 connects the valve 163 and the valve 167. A line 237 connects the valve 167 and the forward end of cylinder 133. The valve 167 has a return to the sump indicated at 239. A line 241 connects the valve 171 and the valve 177. A line 243 connects the valve 177 and the valve 175. A line 245 connects the valve 175 and the line 201.

The valve 151, when in "off" position, connects line 195 to line 203 and line 197 to the return 209 to the sump. When in "on" position, it connects line 195 to line 197 and connects line 203 to return 209. The valve 155, when in "off" position, blocks line 203 and connects line 205 to the return 207 to the sump. When in "on" position, it connects line 203 to line 205 and blocks the return 207. The valve 157, in the absence of pilot pressure in line 199 on the right end of 157 as shown in Fig. 7, connects line 179 to line 183 and connects line 227 to the return 181 to the sump. When pilot pressure is supplied to the right end of the valve 157 via line 199, it is set to supply pressure from line 179 to line 227 and to connect line 183 to the return 181. The valves 159 and 161, in the absence of pilot pressure in lines 223 and 225 permits flow from line 213 to 217 and from 215 to 219 but not in reverse direction. When pilot pressure is applied via line 221, 223, and 225, they are set to open valves 159 and 161 and permit flow from lines 217 and 219 to 213 and 215.

The valve 167 opens upon development of excessive pressure in lines 235 and 237 to by-pass the excess back to the sump via return 239. When line 241 is vented, the valve 171 is set to connect line 183 to the return 184 to the sump, and it then functions to unload the pump 143. When line 241 is blocked, valve 171 is then set to connect line 183 and line 185 and functions as a relief valve. The valve 175, when "off," blocks both lines 243 and 245. When "on," it connects line 243 to line 245.

The valve 175 is operable by the block 119, the latter holding the valve in "on" position when the piston 117 of cylinder 113 is fully retracted to the right. The valve 155 is operable by a cam 247 on the block 131 at the rearward end of the piston rod 135. This cam holds the valve 155 on "on" position when the piston 137 is retracted to the forward end of the cylinder 133, i. e., when the bottom platen 7 is in its retracted forward position. Prior to instigation of a cycle of the press, the piston 117 of cylinder 113 occupies its retracted position so that the valve 175 is in "on" position. The piston 137 of cylinder 133 is in retracted position so that the cam 247 holds the valve 155 in "on" position. The piston 55 of the side cylinder 51 is in its retracted position toward the left end of the cylinder and the side platen 21 is in its retracted (outer) position. The head 23 is up. The valves 151 and 157 are both in "off" position. Line 241 is open through the valve 177, the line 243 and the valve 175 (which is "on") to the line 245, which in turn is vented through the line 201, part of line 197 and valve 151 (which is "off") to the return 209 to the sump. Under these circumstances, i. e., line 241 vented, the valve 171 is set in its position for connecting line 183 to the return 184 to the sump, and the pump 143 is unloaded via line 179, valve 157 (which is "off"), line 183, the valve 171 and return 184.

When the starter valve 151 is moved to its "on" position, the line 195 is connected to line 197 and thence to line 201, and line 203 becomes connected to the return 209. The venting of line 241 thereupon ceases, and the valve 171 is set to its position in which it connects lines 183 and 185 and blocks the return 184. This permits pressure to build up in the hydraulic circuit. Pressure is thereupon supplied through lines 195, 197 and 201 to the right end of the cylinder 113. The left end of the cylinder 113 is vented via line 205, valve 155 (which is "on"), line 203 and return 209. Pressure from line 201 moves the piston of cylinder 113 to the left to close the forward end platen 11 as the first step in the sequence of operations. Pressure in line 197, acting through valve 173 and line 199, sets the main control valve 157 in its "on" position.

Pressure is thereupon supplied from line 195 through lines 211, 213 and 215, valves 159 and 161, and lines 217 and 219 to the upper ends of the head cylinders 29. The lower ends of the head cylinders 29 are vented via lines 191 and 193, line 189, valve 169, line 185, valve 171, line 183, main valve 157 and return 181. Pressure is supplied from line 179 via the valve 157, line 227, valve 165, line 229, valve 163 and line 231 to the outer end of the side cylinder 51, and from valve 163 through line 235, valve 167 and line 237 to the forward end of the bottom platen cylinder 133. The right end of the side cylinder 51 is vented via connection 187 to line 185. The rearward end of cylinder 133 is vented via connection 233 to line 183. The result is that the head 23 is moved downward, the side cylinder 51 acts to move the side platen 21 inward, and the cylinder 133 acts to move the bottom platen 7 rearward. The sequence valves 159, 161, hold down head 23 during working stroke and valves 163, 165 and 173 provide for downward movement of the head 23 first (after closure of the forward end platen 11), then inward movement of the side platen 21, and then rearward movement of the bottom platen 7.

When the forward end platen is closed, the block 119 moves off the operating member of the valve 175, whereupon this valve moves to its "off" position. This results in blockage of line 243 at valve 175 to prevent venting of line 241 thereby to maintain the valve 171 in its position for connecting lines 183 and 185 and blocking the return 184. When the bottom platen 7 moves rearward, the cam 247 rides off the operating member of valve 155. This results in the valve 155 moving to its "off" position in which line 203 is blocked at valve 155 and line 205 is connected to return 207.

Upon release of the starter valve 151, connection of line 197 to return 209 and of line 195 to line 203 is re-established. The pilot line 199 for the main valve 157 is thereupon vented via the valve 173, line 197, valve 151 and return 209. This resets the main valve 157 to its "off" position. Under these circumstances, line 227 is connected to return 181, and line 183 is connected to line 179 so that pressure is supplied from line 179 to line 183. Pressure is thereupon supplied from the line 183 via the line 233 to the rearward end of the bottom platen cylinder 133. The forward end of the cylinder 133 is vented via line 237, valve 167, line 235, valve 163, line 229, valve 165, line 227, valve 157 and return 181. Pressure is supplied from line 183 to the right end of the side cylinder 51 via valve 171, line 185 and line 187. The outer end of the side cylinder 51 is vented via line 231,

valve 163, line 229, valve 165, line 227, valve 157 and return 181. Pressure is supplied to the lower ends of the head cylinders 29 from line 185 (which receives pressure from line 183) via valve 169, line 189 and lines 191 and 193. Pressure is also supplied from line 185 through line 221 and lines 223 and 225 to the lower ends of the valves 159 and 161, whereupon these valves become set for permitting venting of the upper ends of head cylinders 29 through lines 217 and 219, the valves 159 and 161 to lines 213 and 215. The results is that cylinders 29 act to move the head 23 upward, the side cylinder 51 acts to move the side platen 21 outward to its retracted position, and the bottom platen cylinder 133 acts to move the bottom platen 7 forward to its retracted positions. These movements occur generally simultaneously.

As the bottom platen approaches its retracted position, the cam 247 moves the valve 155 to its "on" position, thereby connecting line 203 to line 205 and blocking the return 207. Pressure is thereupon supplied from line 195 through valve 151 (now "off"), line 203, valve 155 and line 205 to the left end of the cylinder 113. The right end of the cylinder 113 is vented via line 201, part of line 197, valve 151 and return 209. Accordingly, the piston of cylinder 113 is retracted, thereby to open the forward end platen 11. As the piston of cylinder 113 approaches its retracted position, the block 119 moves the valve 175 to its "on" position. This results in connection of line 243 to line 245, which in turn is vented via line 201, part of line 197, valve 151 and return 209. The result is that line 241 is vented, and valve 171 is reset to its original position in which it unloads the pump via the return 184. Thus, the elements are returned to their initial positions which they occupied prior to the instigation of a cycle of the press.

Operation is as follows:

The press is set for the desired slab thickness by appropriate adjustment of the pins 35 which limit the downward travel of the head 23. It is set for the desired slab width by appropriate adjustment of the stop 57 which limits the inward travel of the side platen 21. There is no positive control on the extent of rearward movement of the bottom platen 7 other than the extent to which the slab is compressed endwise.

With the forward end platen 11 open, with the head 23 up, and with the bottom platen 7 and side platen 21 retracted, the operator places a slab of bacon to be compressed on the bottom platen 7 between the side platen 21 and the side abutment 17. It will be observed that the molding chamber C defined by these elements is open at the front, since the forward end platen is in retracted position to the right of the chamber. This makes for ease of access for insertion of the slab. Then the operator operates the knobs 153 to operate the starter valve 151. This results in operation of the press through a pressure stroke involving first the movement of the forward end platen 11 from its open to its closed position in which it extends across the front end of the slab, followed by downward movement of the head 23 and the top platen 41, inward movement of the side platen 21, and then rearward movement of the bottom platen 7. The closing movement of the forward end platen 11 is effected by reason of the connection of the pin 123 on the block 119 with the forward end platen, the pin extending into the opening 125 in the plate 79 associated with the forward end platen.

As the head 23 and the top platen 41 move downward, the top platen 41 clears the rearward end abutment 13 and the side platen 21 (the latter still being retracted) and engages the depressible forward end platen 11 and the depressible side abutment 17. It pushes 11 and 17 down against the bias of springs 77 and 97, engages the top of the slab, and acts to compress the slab heightwise to the extent determined by the setting of the pins 35. The side platen 21, moving inward after the head has been lowered, compresses the slab laterally to the extent determined by the setting of the stop 57. As the side platen 21 moves inward, it pushes the forward end platen 11 to the right against the pressure in the right end of the cylinder 113. It also acts to move the top platen 41 to the right across the top surface of the slab, thereby effecting a sidewise smoothing action on the top surface of the slab.

Following the above, the bottom platen 7 is moved rearward, carrying with it the forward end platen 11 and the side abutment 17. This effects endwise compression of the slab and a lengthwise smoothing action on the bottom of the slab. As the forward end platen 11 moves rearward with the bottom platen 7, the plate 79 associated with the forward end platen moves away from its connection with the pin 123 to free the forward end platen 11 from the pin.

The operator holds the starter valve 151 closed until the slab has been sufficiently compressed endwise. This is usually apparent from the sounds emitted by the press. Then he releases the knobs 153 to allow the valve 151 to open. When the valve 151 opens, the head 23 is raised, the side platen 21 is moved outward to its retracted position, and the bottom platen 7 is moved forward to its retracted position. As the bottom platen is moving forward, the forward end platen 11 is being moved to the left by the engagement of the side platen 21 with the roller 127 and when the side platen is fully retracted, the forward end platen is in a position wherein the opening 125 in the plate 79 registers with the pin 123. Then, as the forward end platen is moved forward with the bottom platen 7, the pin 123 enters the opening 125. Following this, when the bottom platen approaches its fully retracted position the valve 155 is operated as above described to effect operation of the cylinder 113 to retract the forward end platen 11 to its open position to the right. When the forward end platen is retracted, valve 175 is operated to reset valve 171 to unload the pump. This completes the cycle of the press, and with the forward end platen 11 in its retracted position to the right, the molding chamber C is open at the front for easy removal of the compressed slab and easy insertion of the next slab to be compressed.

As shown, screws are used for fastening parts together to permit them to be readily disassembled for cleaning. For example, the screws 44 which fasten the side platen 21 to the slide 45 may be readily removed for disassembling the side platen from the slide for cleaning. The forward end platen 11 may be readily removed by threading the screws 93 out of the grooves 95, thereby permitting the forward end platen to slide out from between the plate 79 and the forward end of bottom plate 7. The springs 77 and the strip 89 carrying the centering pins 87 may then be readily removed. Similarly, the side abutment 17 may be readily removed by threading the screws 109 out of the grooves 111, whereupon the side abutment may slide out from between the plate 101 and the vertical side of the step 99. Then the springs 97 and the strip 105 carrying the pins 103 may be readily removed.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A press comprising a fixed bed, a unitary bottom platen slidable endwise on the bed, means for moving the bottom platen rearward from a forward retracted position and forward back to retracted position, a depressible side abutment movable endwise with the bottom platen, a rearward end abutment fixed to the bed extending laterally across the bottom platen and the depressible side abutment, a depressible forward end platen extending laterally with respect to the bottom platen movable with the bottom platen as it moves rearward and forward and also

movable laterally relative to the bottom platen across the forward end of the depressible side abutment, a side platen parallel to the side abutment mounted for movement toward and away from the side abutment across the bottom platen, means for moving the side platen inward from an outer retracted position and outward back to retracted position, said side platen being engageable with the forward end platen to move it laterally, a vertically movable head above the bottom platen, and means for moving the head toward and away from the bottom platen.

2. A press comprising a fixed bed, a unitary bottom platen slidable endwise on the bed, means for moving the bottom platen rearward from a forward retracted position and forward back to retracted position, a depressible side abutment movable endwise with the bottom platen, a rearward end abutment fixed to the bed extending laterally across the bottom platen and the depressible side abutment, a depressible forward end platen extending laterally with respect to the bottom platen movable with the bottom platen as it moves rearward and forward and also movable laterally relative to the bottom platen across the forward end of the depressible side abutment, a side platen parallel to the side abutment mounted for movement toward and away from the side abutment across the bottom platen, the rearward end of said side platen sliding on the forward face of the rearward end abutment, means for moving the side platen inward from an outer retracted position and outward back to retracted position, said side platen being engageable with the forward end platen to move it laterally, a vertically movable head above the bottom platen, means for moving the head toward and away from the bottom platen, and a top platen carried by the head engageable with the depressible side abutment and the depressible forward end platen on lowering the head and movable laterally by said side platen.

3. A press comprising a fixed bed, a unitary bottom platen slidable endwise on the bed, means for moving the bottom platen rearward from a forward retracted position and forward back to retracted position, a depressible side abutment movable endwise with the bottom platen, a rearward end abutment fixed to the bed extending laterally across the bottom platen and the depressible side abutment, a depressible forward end platen extending laterally with respect to the bottom platen movable with the bottom platen as it moves rearward and forward and also movable laterally relative to the bottom platen across the forward end of the depressible side abutment, a side platen parallel to the side abutment mounted for movement toward and away from the side abutment across the bottom platen, the rearward end of said side platen sliding on the forward face of the rearward end abutment, means for moving the side platen inward from an outer retracted position and outward back to retracted position, means for adjustably limiting the inward travel of the side platen, said side platen being engageable with the forward end platen to move it laterally, a vertically movable head above the bottom platen, means for moving the head toward and away from the bottom platen, means for adjustably limiting the downward travel of the head, a top platen carried by the head engageable with the depressible side abutment and the depressible forward end platen on lowering the head, and means connecting the top and side platens in such manner that the top platen is movable laterally by the side platen while being free for vertical movement with the head.

4. A press comprising a fixed bed, a unitary bottom platen slidable endwise on the bed, means for moving the bottom platen rearward from a forward retracted position and forward back to retracted position, a side abutment movable endwise with the bottom platen, said side abutment being mounted for vertical movement relative to the bottom platen, spring means biasing said side abutment upward to a raised position, a rearward end abutment fixed to the bed extending laterally across the bottom platen and the side abutment, a forward end platen extending laterally with respect to the bottom platen movable with the bottom platen as it moves rearward and forward and also movable laterally relative to the bottom platen across the forward end of the side abutment, said forward end platen being mounted for vertical movement relative to the bottom platen, spring means biasing said forward end platen upward to a raised position, a side platen parallel to the side abutment mounted for movement toward and away from the side abutment across the bottom platen, means for moving the side platen inward from an outer retracted position and outward back to retracted position, said side platen being engageable with the forward end platen to move it laterally, a vertically movable head above the bottom platen, and means for moving the head toward and away from the bottom platen.

5. A press comprising a fixed bed, a unitary bottom platen slidable endwise on the bed, means for moving the bottom platen rearward from a forward retracted position and forward back to retracted position, a side abutment movable endwise with the bottom platen, said side abutment being mounted for vertical movement relative to the bottom platen, spring means biasing said side abutment upward to a raised position, a rearward end abutment fixed to the bed extending laterally across the bottom platen and the depressible side abutment, a forward end platen extending laterally with respect to the bottom platen movable with the bottom platen as it moves rearward and forward and also movable laterally relative to the bottom platen across the forward end of the side abutment, said forward end platen being mounted for vertical movement relative to the bottom platen, spring means biasing said forward end platen upward to a raised position, a side platen parallel to the side abutment mounted for movement toward and away from the side abutment across the bottom platen, the rearward end of said side platen sliding on the forward face of the rearward end abutment, means for moving the side platen inward from an outer retracted position and outward back to retracted position, said side platen being engageable with the forward end platen to move it laterally, a vertically movable head above the bottom platen, means for moving the head toward and away from the bottom platen, and a top platen carried by the head engageable with the side abutment and the forward end platen on lowering the head and movable laterally by said side platen.

6. A press comprising a fixed bed, a unitary bottom platen slidably endwise on the bed, means for moving the bottom platen rearward from a forward retracted position and forward back to retracted position, a side abutment movable endwise with the bottom platen, said side abutment being mounted for vertical movement relative to the bottom platen, spring means biasing said side abutment upward to a raised position, a rearward end abutment fixed to the bed extending laterally across the bottom platen and the side abutment, a forward end platen extending laterally with respect to the bottom platen movable with the bottom platen as it moves rearward and forward and also movable laterally relative to the bottom platen across the forward end of the side abutment, said forward end platen being mounted for vertical movement relative to the bottom platen, spring means biasing said forward end platen upward to a raised position, a side platen parallel to the side abutment mounted for movement toward and away from the side abutment across the bottom platen, the rearward end of said side platen sliding on the forward face of the rearward end abutment, means for moving the side platen inward from an outer retracted position and outward back to retracted position, means for adjustably limiting the inward travel of the side platen, said side platen being engageable with the forward end platen to move

it laterally, a vertically movable head above the bottom platen, means for moving the head toward and away from the bottom platen, means for adjustably limiting the downward travel of the head, a top platen carried by the head engageable with the side abutment and the forward end platen on lowering the head, and means connecting the top and side platens in such manner that the top platen is movable laterally by the side platen while being free for vertical movement with the head.

7. A press comprising a fixed bed, a unitary bottom platen slidable endwise on the bed, means including a hydraulic cylinder for moving the bottom platen rearward from a forward retracted position and forward back to retracted position, a depressible side abutment movable endwise with the bottom platen, a rearward end abutment fixed to the bed extending laterally across the bottom platen and the depressible side abutment, a depressible forward end platen extending laterally with respect to the bottom platen movable with the bottom platen as it moves rearward and forward and also movable laterally relative to the bottom platen across the forward end of the depressible side abutment, a side platen parallel to the side abutment mounted for movement toward and away from the side abutment across the bottom platen, the rearward end of said side platen sliding on the forward face of the rearward end abutment, means including a hydraulic cylinder for moving the side platen inward from an outer retracted position and outward back to retracted position, means for adjustably limiting the inward travel of the side platen, said side platen being engageable with the forward end platen to move it laterally, a vertically movable head above the bottom platen, means including a pair of hydraulic cylinders for moving the head toward and away from the bottom platen, means for adjustably limiting the downward travel of the head, a top platen carried by the head engageable with the depressible side abutment and the depressible forward end platen on lowering the head, and means connecting the top and side platens in such manner that the top platen is movable laterally by the side platen while being free for vertical movement with the head, said cylinders being connected in a hydraulic circuit comprising a starter valve and means operable after the operation of the valve for effecting downward movement of the head, inward movement of the side platen, and rearward movement of the bottom platen, in that order, and operable on releasing the valve to effect upward movement of the head, outward movement of the side platen, and forward movement of the bottom platen.

8. A press as set forth in claim 7 wherein the means for adjustably limiting the inward travel of the side platen comprises a stop movable with the side platen and mounted for movement relative to the side platen to different positions of adjustment, said stop being engageable with the bed on inward travel of the side platen.

9. A press comprising a bed, a bottom platen slidable endwise on the bed, means including a hydraulic cylinder for moving the bottom platen rearward from a forward retracted position and forward back to retracted position, a depressible side abutment movable endwise with the bottom platen, a rearward end abutment fixed to the bed extending laterally across the bottom platen and the depressible side abutment, a depressible forward end platen extending laterally with respect to the bottom platen movable with the bottom platen as it moves rearward and forward and also movable laterally relative to the bottom platen across the forward end of the depressible side abutment, a side platen parallel to the side abutment mounted for movement toward and away from the side abutment across the bottom platen, the rearward end of said side platen sliding on the forward face of the rearward end abutment, means including a hydraulic cylinder for moving the side platen inward from an outer retracted position and outward back to retracted position, means for adjustably limiting the inward travel of the side platen, said side platen being engageable with the forward end platen to move it laterally, a vertically movable head above the bed, means including a hydraulic cylinder for moving the head toward and away from the bed, means for adjustably limiting the downward travel of the head, a top platen carried by the head engageable with the depressible side abutment and the depressible forward end platen on lowering the head, means connecting the top and side platens in such manner that the top platen is movable laterally by the side platen while being free for vertical movement with the head, means including a hydraulic cylinder operable when the bottom platen is retracted for moving the forward end platen laterally outward to a retracted position for opening the front of the chamber defined by the side platen, the side abutment and the rearward end abutment, and for returning the forward end platen to a closed position at the front of said chamber, said cylinders being connected in a hydraulic circuit comprising a starter valve and means operable after the operating of the valve for effecting movement of the forward end platen from its retracted to its closed position, downward movement of the head, inward movement of the side platen, and rearward movement of the bottom platen, in that order, and operable on releasing the valve to effect upward movement of the head, outward movement of the side platen, forward movement of the botom platen, and then movement of the forward end platen from its closed to its retracted position.

10. A press as set forth in claim 9 wherein the means for moving the forward end platen is connectable to the forward end platen when the bottom platen is retracted and disconnectable from the forward end platen when the bottom platen moves rearward.

11. A press as set forth in claim 9, wherein the means for moving the forward end platen includes a coupling member movable laterally in front of the forward end platen and engageable with the forward end platen when the bottom platen is retracted.

12. A press as set forth in claim 9 wherein the hydraulic circuit includes a pump for supplying fluid under pressure, and further includes means responsive to movement of the forward end platen to retracted position for unloading the pump.

13. A press comprising a bed, a bottom platen slidable endwise on the bed, means for moving the bottom platen rearward from a forward retracted position and forward back to retracted position, a depressible side abutment movable endwise with the bottom platen, a rearward end abutment fixed to the bed extending laterally across the bottom platen and the depressible side abutment, a depressible forward end platen extending laterally with respect to the bottom platen movable with the bottom platen as it moves rearward and forward and also movable laterally relative to the bottom platen across the forward end of the depressible side abutment, a side platen parallel to the side abutment mounted for movement toward and away from the side abutment across the bottom platen, means for moving the side platen inward from an outer retracted position and outward back to retracted position, said side platen being engageable with the forward end platen to move it laterally, a vertically movable head above the bed, means for moving the head toward and away from the bed, and means operable when the bottom platen is retracted for moving the forward end platen laterally outward to a retracted position for opening the front of chamber defined by the side platen, the side abutment and the rearward end abutment, and for returning the forward end platen to a closed position at the front of said chamber.

14. A press comprising a bed, a bottom platen slidable endwise on the bed, means for moving the bottom platen rearward from a forward retracted position and forward back to retracted position, a depressible side abutment movable endwise with the bottom platen, a rearward end

abutment fixed to the bed extending laterally across the bottom platen and the depressible side abutment, a depressible forward end platent extending laterally with respect to the bottom platen movable with the bottom platen as it moves rearward and forward and also movable laterally relative to the bottom platen across the forward end of the depressible side abutment, a side platen parallel to the side abutment mounted for movement toward and away from the side abutment aross the bottom platen, the rearward end of said side platen sliding on the forward face of the rearward end abutment, means for moving the side platen inward from an outer retracted position and outward back to retracted position, said side platen being engageable with the forward end platen to move it laterally, a vertically movable head above the bed, means for moving the head toward and away from the bed, a top platen carried by the head engageable with the depressible side abutment and the depressible forward end platen on lowering the head and movable laterally by said side platen, and means connectable to the forward end platen when the bottom platen is retracted and disconnectable from the forward end platen when the bottom platen moves rearward and operable when the bottom platen is retracted for moving the forward end platen laterally outward to a retracted position for opening the front of chamber defined by the side platen, the side abutment and the rearward end abutment, and for returning the forward end platen to a closed position at the front of said chamber

15. A press comprising a bed, a bottom platen slidable endwise on the bed, means for moving the bottom platen rearward from a forward retracted position and forward back to retracted position, a depressible side abutment movable endwise with the bottom platen, a rearward end abutment fixed to the bed extending laterally across the bottom platen and the depressible side abutment, a depressible forward end platen extending laterally with respect to the bottom platen movable with the bottom platen as it moves rearward and forward and also movable laterally relative to the bottom platen across the forward end of the depressible side abutment, a side platen parallel to the side abutment mounted for movement toward and away from the side abutment across the bottom platen, the rearward end of said side platen sliding on the forward face of the rearward end abutment, means for moving the side platen inward from an outer retracted position and outward back to retracted position, means for adjustably limiting the inward travel of the side platen, said side platen being engageable with the forward end platen to move it laterally, a vertically movable head above the bed, means for moving the head toward and away from the bed, means for adjustably limiting the downward travel of the head, a top platen carried by the head engageable with the depressible side abutment and the depressible forward end platen on lowering the head, means connecting the top and side platens in such manner that the top platen is movable laterally by the side platen while being free for vertical movement with the head, and means operable when the bottom platen is retracted for moving the forward end platen laterally outward to a retracted position for opening the front of chamber defined by the side platen, the side abutment and the rearward end abutment, and for returning the forward end platen to a closed position at the front of said chamber, said means for moving the forward end platen including a coupling member movable laterally in front of the forward end platen and being engageable with the forward end platen when the bottom platen is retracted.

16. A press comprising a bed, a bottom platen slidable endwise on the bed, means for moving the bottom platen rearward from a forward retracted position and forward back to retracted position, a side abutment movable endwise with the bottom platen, said side abutment being mounted for vertical movement relative to the bottom platen, spring means biasing said side abutment upward to a raised position, a rearward end abutment fixed to the bed extending laterally across the bottom platen and the side abutment, a forward end platen extending laterally with respect to the bottom platen movable with the bottom platen as it moves rearward and forward and also movable laterally relative to the bottom platen across the forward end of the side abutment, said forward end platen being mounted for vertical movement relative to the bottom platen, spring means biasing said forward end platen upward to a raised position, a side platen parallel to the side abutment mounted for movement toward and away from the side abutment across the bottom platen, the rearward end of said side platen sliding on the forward face of the rearward end abutment, means for moving the side platen inward from an outer retracted position and outward back to retracted position, means for adjustably limiting the inward travel of the side platen, said side platen being engageable with the forward end platen to move it laterally, a vertically movable head above the bed, means for moving the head toward and away from the bed, means for adjustably limiting the downward travel of the head, a top platen carried by the head engageable with the side abutment and the forward end platen on lowering the head, means connecting the top and side platens in such manner that the top platen is movable laterally by the side platen while being free for vertical movement with the head, and means operable when the bottom platen is retracted for moving the forward end platen laterally outward to a retracted position for opening the front of chamber defined by the side platen, the side abutment and the rearward end abutment, and for returning the forward end platen to a closed position at the front of said chamber, said means for moving the forward end platen including a coupling member slidable laterally in front of the forward end platen and adapted for disengageable sliding connection with the forward end platen when the bottom platen is retracted.

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