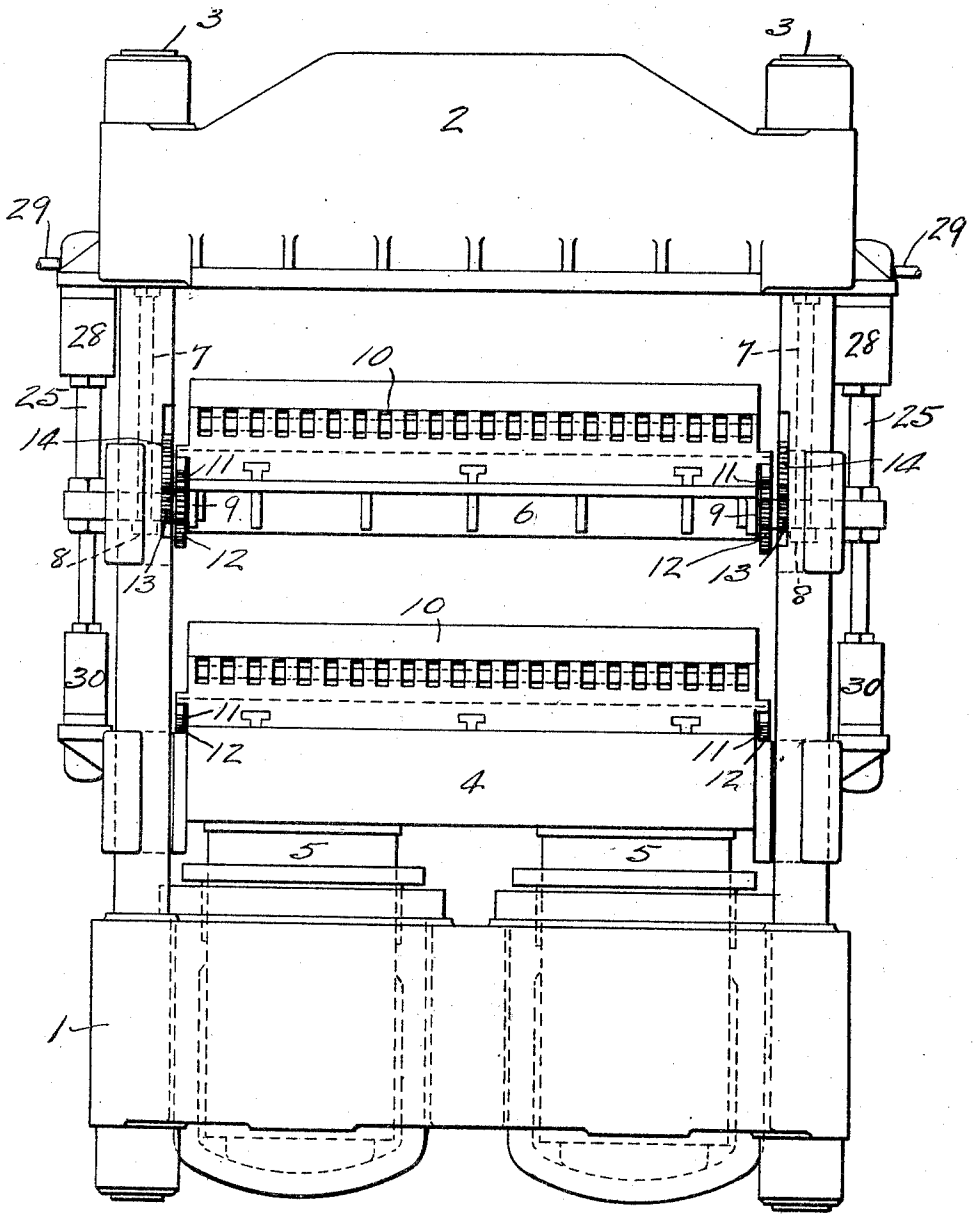
April 14, 1931. T. F. STACY 1,800,849

FLUID OPERATED PRESS

Filed Aug. 23, 1928 3 Sheets-Sheet 1

Fig. 1.



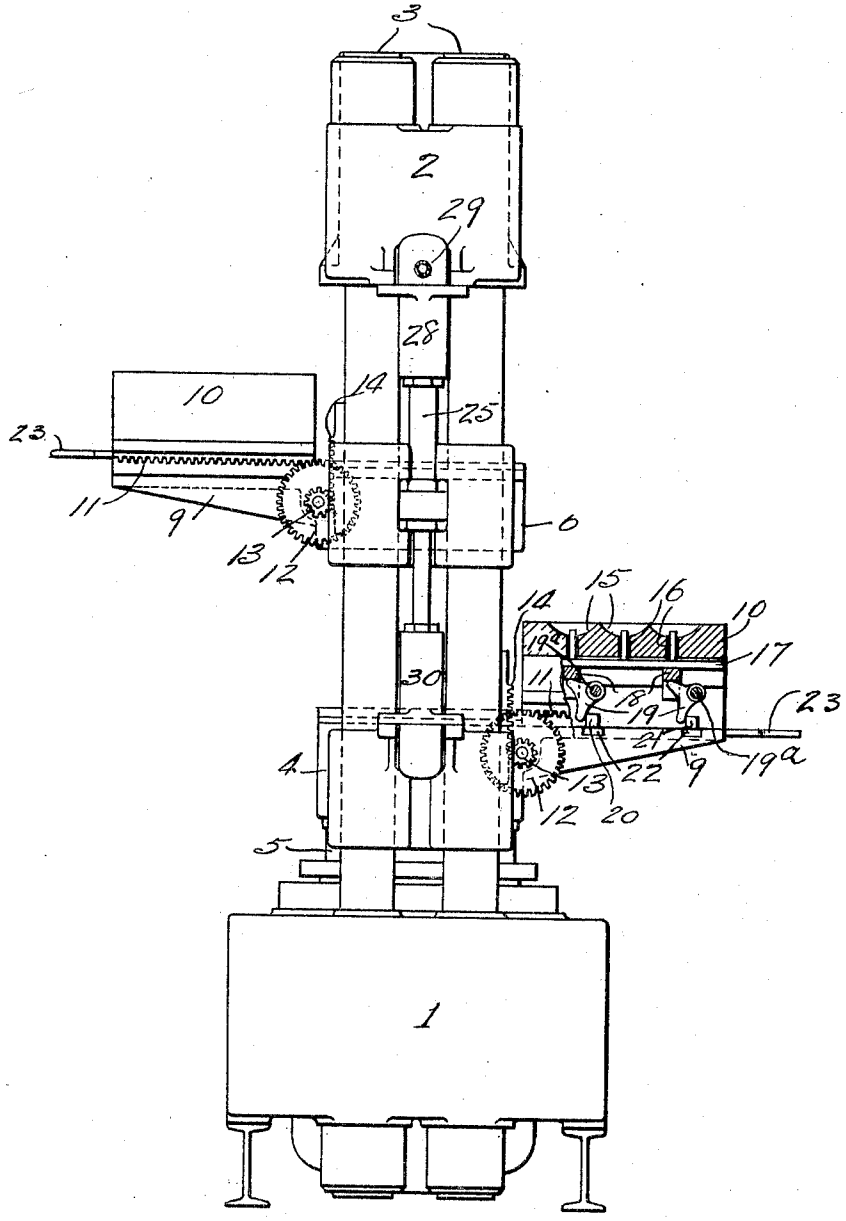
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FLUID OPERATED PRESS

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Fig. 2.



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Fig. 3.

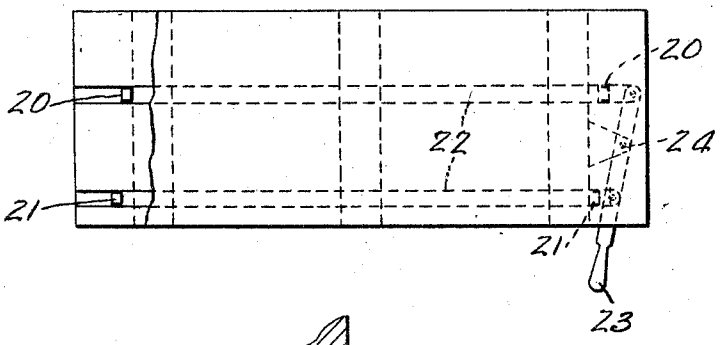
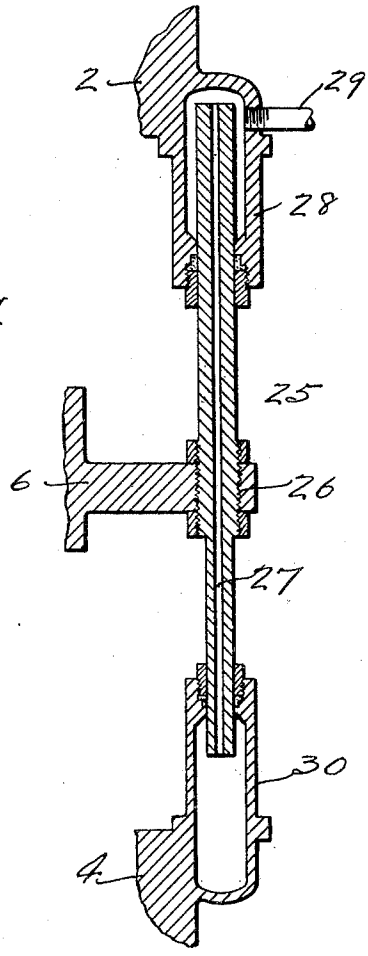


Fig. 4.



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UNITED STATES PATENT OFFICE

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FLUID-OPERATED PRESS

Application filed August 23, 1928. Serial No. 301,488.

This invention relates to presses, and particularly to molding presses in which various articles may be subjected to heavy pressures, as in a hydraulic press. Such presses may be advantageously used in the molding of various articles from plastic compounds, such as in the manufacture of hard rubber or bakelite articles.

An object of this invention is to improve and simplify presses of this type.

A further object of the invention is to provide an improved press in which the pressing tables may, upon retraction of the movable members of the press, be shifted into positions more easily accessible to the operator; and with which the pressing tables will be automatically shifted into pressing positions upon operation of said press in the usual manner.

Another object of the invention is to provide an improved molding press, with which the molded article may be made easily accessible for removal at the completion of each pressing operation; with which the loading of the press is more easily and conveniently made; and with which the operation of unloading and emptying the pressing tables after each operation may be accelerated.

A further object of the invention is to provide an improved press with a maximum capacity for the floor area occupied by it, and with which the advance or retraction of a number of different but cooperating platens may be obtained in a simple and rapid manner, and at a minimum of operating cost.

A further object of the invention is to provide an improved press which will accomplish each or any of the above objects, and which will be relatively simple, compact, durable, practical, and inexpensive in construction, and efficient and economical in operation.

Various other objects and advantages will be apparent from the following description of an embodiment of the invention, and the novel features will be particularly pointed out hereinafter in connection with the appended claims.

In the accompanying drawings:

Fig. 1 is a front elevation of a press constructed in accordance with this invention;

Fig. 2 is a side elevation of the same, with certain parts broken away to illustrate other parts otherwise hidden thereby;

Fig. 3 is a plan of a portion of a platen and illustrating certain details of the knockout mechanism; and

Fig. 4 is a sectional elevation of one of the pullback rams.

In the illustrated embodiment of the invention, which, by way of example, is of the type having two pressing platens or tables cooperating with a single fixed head, the press includes a frame having a base 1 and a fixed head 2 suitably and rigidly connected by strain rods 3. A main or primary platen 4 is mounted for sliding movement, such as on the strain rods, towards and from the fixed head, and may be operated toward the fixed head by one or more rams 5.

An intermediate or floating platen 6 is also mounted on the strain rods for sliding movement towards and from the head 2, and when the primary platen 4 engages with the intermediate platen 6, the two platens will move together into contact with the fixed head 2. When the primary platen 4 is retracted, the intermediate platen 6 will move with the primary platen 4 until platen 6 reaches its normal position, and thereafter the primary platen 4 will continue its return to initial position alone.

Rods 7 (Fig. 1) carried by the head 2 pass through apertures in the intermediate platen 6, and terminate in enlarged heads 8 which engage with the intermediate platen and limit its descent or movement of retraction from the fixed head 2. The platen 6 slides over the rods 7 during its movement towards or from the fixed head 2.

Each platen has a lateral extension 9 which carries suitable guides or ways for supporting a pressing table 10 for sliding movement thereon, laterally of the travel of the platens, into and out of pressing positions in alignment with the fixed head 2. Each table 10 is provided at each end with a rack 11 extending in the direction of travel of the table, and these racks 11 mesh with gear wheels 12 ro-

tatably mounted on the extensions 9 at each end thereof.

Each gear 12 is fixed to and rotates with a pinion 13, and each pinion 13 meshes with the teeth of cooperating racks 14 which are carried by the frame of the press, such as upon the strain rods, so that the pinions will operate along the racks 14 during movement of the platens into and out of pressing positions.

The platens are shown in their completely retracted positions in Figs. 1 and 2. At this time the tables 10 will be positioned at the sides of the press, that is forwardly or rearwardly thereof, so as to be easily accessible for loading or unloading of the molds, and the pinions 13 will be in mesh with the lower ends of racks 14.

Upon an advance of the primary platen 4, the pinions 13 and gear wheels 12 carried thereby will move vertically, and since the racks 14 with which the pinions 13 mesh are relatively stationary, the pinions 13 and gear wheels 12 will be rotated and will, through the racks 11, shift the table 10 laterally into a position between the two platens.

This movement is completed before the pressing table engages the intermediate platen, and after this lateral movement into pressing position is completed, the pinion 13 will leave the end of the rack 14, so as to stop further lateral movement of the sliding table during continued travel of the platen 4. Thereafter the table 10 will engage with the intermediate platen 6, and the platen 6 will move with the platen 4.

As soon as the platen 6 begins to move, its pinions 13 and gear wheels 12 will be operated by the other rack bars 14 to propel the other sliding pressure table 10 laterally into a position between the intermediate platen and the fixed head 2. When this other table 10 has been shifted into alignment with the fixed head 2 by the upward travel of the platen 6, further movement of this other table will be stopped by the disengagement of the pinions 13 from the racks 14 as described in connection with the platen 4, and thereafter both platens and tables will move together and against the fixed head 2.

The articles carried by the tables will then be subjected to the desired pressure, and the pressure maintained for any desired length of time. When the pressing operation has been completed, the two platens may be retracted or caused to descend together. As this descent proceeds, the pinions 13 of the platen 6 will reengage with the racks 14, and thereafter continued descent of the platen 6 will cause operation of the pinions 13 and gear wheels 12 thereof to shift the pressure table 10 of that platen laterally to one side of the press, as shown in Fig. 2.

When the table has been completely shifted to one side, the heads 8 of the studs 7 will stop further descent of the platen 6, and thereafter the platen 4 will continue its descent or retraction alone. After a short further descent, the pinions 13 of the platen 4 will reach and reengage with the lower racks 14 and the gear wheels 12 and 13 of the platen 4 will be operated in a reverse direction to shift the lower pressure table 10 to one side of the press into the position shown in Fig. 2.

When the press is utilized for molding articles into different shapes, each of the tables 10 may carry suitable cavities 15 in which the plastic material is placed, and to eject the molded articles from such cavities ejector pins 16 will pass downwardly through the molds from the cavities and rest upon or be carried by cross bars 17.

The cross bars 17 in turn may rest upon a plurality of rods or bars 18 extending crosswise thereof, and these bars 18 at their ends may be suitably mounted upon similar levers 19. These levers may be bell cranks with arms depending therefrom in different paths of movement during travel of the table on the platen. The levers 19 at opposite ends of each bar 18 may be connected for concomitant operation by a rod 19*a*.

Pins 20 and 21 are provided in the paths of travel of the depending arms of the bell cranks 19 for engagement therewith when the table approaches its outward limit of movement, as shown in Fig. 2. Hence, during this last increment of outward movement of the sliding table, the bell cranks 19 will be engaged and rocked by the pins 20 and 21 in a direction to elevate the bars 18. The bars 18 in turn elevate the cross bars 17, which in turn also elevate the ejector rods 16.

To permit release of the ejector means, so that the ejector rods 16 can fall without moving the table, the abutment pins 20 and 21 are mounted on sliding bars or rods 22 which are connected to a lever 23 pivoted at 24. By operating the lever 23, the pins 20 and 21 can be shifted out of the paths of the bell cranks and thereupon the bell cranks will be immediately released, and the ejector means may immediately return to initial position.

The devices for retracting the platens 4 and 6 may be provided at each end thereof, and each may comprise a piston 25 threaded intermediate of its ends through an opening 26 in the intermediate platen 6, so that the rod projects from the platen 6 in both directions of platen travel. The two ends of the piston 25 are connected by a bore 27, and the areas of the opposite ends of this piston are of different sizes, the larger end being uppermost, as shown in Fig. 4.

The larger or upper end reciprocates in a cylinder 28 fixed on a frame of the press, and a pipe 29 is connected to this cylinder

for supplying thereto an operating fluid under pressure. The lower or smaller end of the piston 27 reciprocates in a cylinder 30 which is secured to the lower platen 4 and has no fluid connection thereto except through the bore 27.

After a pressing operation, and when it is desired to retract the platens, the pressure in the rams 5 is released, and a fluid under pressure admitted to the cylinder 28 through pipe 29. The fluid so admitted will pass through the bore 27 into the cylinder 30. The pressure in the cylinder 28 will force the piston 25 downwardly, and the pressure in the cylinder 30 will force the platen 4 downwardly.

Because of the difference in areas of the two ends of the piston 25, there will be a greater pressure forcing the platen 6 downwardly than there will be forcing the lower platen downwardly, and consequently the two platens will move together until the platen 6 is stopped by heads 8 of studs 7, with a pressure between them during this movement proportional to the difference in areas of the two ends of the piston 25. Thereafter the lower platen 4 will descend alone, and the platen 6 will be held against the heads 8 of studs 7 by the fluid pressure.

It will be noted that the platens 4 and 6 and the fixed head 2 together act as relatively movable pressure members, and that the pressure tables are mechanically moved by the relative movement of these pressure members.

While the invention has been described as embodied in a press having two platens, it will be understood that one of these platens, such as the intermediate or floating platen, may be omitted and a simple press with only one platen utilized, but in such case, the sliding table for that platen will operate as described herein for the platen 4, except that the movable platen will then cooperate directly with the head 2.

It will be obvious that various changes in the details which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

I claim:

1. A press comprising a frame, a movable platen, a relatively fixed cooperating platen, a table mounted on the movable platen for lateral movement into and out of pressing position on that platen, and means cooperating with said frame and movable platen and operable by relative movement between them for shifting said table laterally on the movable platen into pressing position during relative approach of said platens, and for shifting it out of pressing position during separation of said platens.

2. A press comprising a frame and pressing members having relative movements toward and from one another in the pressing operation, a pressure table carried by one of said members for lateral movement into and out of pressing position between said members, and means operable by relative movement between said members for shifting said table into and out of pressing position.

3. A press comprising a frame, pressing members carried by said frame, one of said members being movable toward and from the other in the pressing operation, a table carried by said movable member for independent movement thereon laterally into and out of pressing position between said members, and means connecting said frame and table for shifting said table laterally into pressing position during advance of said movable member in a pressing operation, and for shifting said table laterally out of pressing position during retraction of said movable member.

4. A press comprising a frame, relatively moving pressing members carried by said frame, a table mounted on one of said members for lateral movement into and out of pressing position between said members, and a mechanical devcie interconnected between said frame and the movable member for operating said table into and out of pressing position upon relative movement between said members.

5. A press comprising a frame, a pressing head, a platen movable toward and from said head, a table carried by said platen and shiftable thereon laterally into and out of pressing position, a mechanical device carried partially by said platen and connected to said table and frame for shifting said table into pressing position upon a movement of said platen toward said head and for retracting said table laterally out of pressing position upon retraction of said platen.

6. A press comprising a frame, pressing members having relative movement toward and from one another in the pressing operation, a mold carried by one of said members for lateral movement into and out of pressing position between said members in a direction laterally of said relative movement, knockout means for said mold carried thereby and including a controlling element, and means carried by said one of said members and engaging with said controlling element automatically upon movement of said mold in said lateral direction out of pressing position for causing a positive operation of said knockout means.

7. A press comprising a frame, pressing members having relative movement toward and from one another in the pressing operation, a mold carried by one of said members for movement laterally of said relative movement into and out of pressing position between said members, knockout means for

said mold carried thereby and including a controlling element, means carried by said one of said members and engaging with said controlling element automatically upon said lateral movement of said mold out of pressing position for causing an operation of said knockout means and means for shifting said engaging means to free said knockout means.

8. A press comprising a frame having a relatively fixed head, a platen movable toward and from said head, a table carried by said platen for lateral movement thereon into and out of pressing position between said platen and head, a rack bar carried by said frame, a pinion carried by said platen and meshing with said rack bar during a portion of the travel of said platen toward said head, and means operated by said pinion for advancing said table into pressing position upon said platen during the advance of said platen towards said head, and for retracting said table upon retraction of said platen.

9. A press comprising a frame having a relatively fixed head, a platen movable toward and from said head, a table carried by said platen and slidable thereon laterally into and out of pressing position between said platen and head, a rack carried by said table, a gear device carried by said platen and meshing with said rack, a rack carried by said frame and engaging with said gear device whereby upon advance of said platen towards said head, said table will be shifted into pressing position and upon retraction of said platen, said table will be shifted out of pressing position.

10. A press comprising a frame having a relatively fixed head, a platen movable toward and from said head, a table carried by said platen and slidable thereon laterally into and out of pressing position between said platen and head, a rack carried by said table, a gear device carried by said platen and meshing with said rack, a rack carried by said frame and engaging with said gear device, whereby upon advance of said platen towards said head, said table will be shifted into pressing position and upon retraction of said platen, said table will be shifted out of pressing position, said rack on said frame terminating at such a point that said gear device becomes disengaged therefrom before said platen completes its movement in a pressing direction.

11. A press comprising a frame, pressing members having relative movement toward and from one another in a pressing operation, a mold mounted on one of said members for lateral movement into and out of pressing position between said members, means for operating said mold laterally automatically upon relative movement of said members, ejecting means carried by said mold and having a controlling arm, and a pin carried by said member upon which said mold moves and disposed in the path of movement of said arm with said mold, whereby as said mold moves out of pressing position, said arm will engage and operate said pin and thereby operate said ejecting means.

12. A press comprising a frame, pressing members having relative movement toward and from one another in a pressing operation, a mold mounted on one of said members for lateral movement into and out of pressing position between said members, means for operating said mold laterally automatically upon relative movement of said members, ejecting means carried by said mold and having a controlling arm, a pin carried by said member upon which said mold moves and disposed in the path of movement of said arm with said mold, whereby as said mold moves out of pressing position, said arm will engage and operate said pin and thereby operate said ejecting means and means for shifting said pin into and out of the path of said arm independently of the position of said mold, whereby said ejecting means may be released independently of the movement of said mold into and out of pressing position.

13. A press comprising a frame having a fixed head, a movable platen, an intermediate platen, both platens being separately movable toward and from said head, means for retracting both platens from said head, means for limiting retraction of said intermediate platen to permit further retraction of said movable platen, a pair of tables mounted for movement into and out of pressing positions, one between said platen and another between said intermediate platen and said head, and mechanical means operated by movements of said platens for shifting said tables into and out of pressing position, whereby upon advance of rack platen towards said head, its table will be first shifted into pressing position, and upon retraction of said platens, said tables will be shifted out of pressing positions.

14. A press comprising a frame having a head, a primary movable platen, an intermediate platen, both platens being guided by said frame toward and from said head, a pressing table carried by each platen and shiftable thereon laterally into pressing position thereon, a mechanical device carried by each platen and cooperating with said frame and the table carried by that platen for causing movement of said table into and out of pressing position upon advancement and retraction of that platen.

15. A press comprising a frame, pressing members carried thereby and having relative movement toward and from one another in a pressing operation, a pressing table carried by one of said members for movement laterally into and out of pressing position, mold knockout means carried by said table and including controlling arms projecting there-

from and movable in different paths during the lateral movement of said table, and abutment pins carried by the member that mounts said table and located in the paths of said arms, whereby during movement of said table out of pressing position, said arms will be engaged and operated by said pins concomitantly to cause operation of said ejecting means.

16. A press comprising a frame, pressing members carried thereby and having relative movement toward and from one another in a pressing operation, a pressing table carried by one of said members for movement laterally into and out of pressing position, mold knockout means carried by said table and including controlling arms projecting therefrom and movable in different paths during the lateral movement of said table, abutment pins carried by the member that mounts said table and located in the paths of said arms, whereby during movement of said table out of pressing position, said arms will be engaged and operated by said pins concomitantly to cause operation of said ejecting means and means for shifting said pins out of the paths of said arms independently of the position of said table.

17. A press comprising a frame having a head, a primary platen movable toward and from said head, means for moving said platen towards said head, an intermediate platen also movable towards and from said head and interposed in the path of movement of said primary platen for engagement thereby and movement therewith, a piston carried intermediate of its ends by said intermediate platen and having its end towards the primary platen of less area than the opposite end, a cylinder carried by said frame and in which said opposite end of the piston reciprocates, a second cylinder in which the small end of the piston reciprocates, carried by the primary platen, means for admitting fluid under the same pressure to said cylinders, and means for limiting movement of the intermediate platen by said piston beyond a position intermediate the limits of travel of the primary platen.

18. A press comprising a frame having a head, a primary platen movable toward and from said head, means for moving said platen towards said head, an intermediate platen also movable towards and from said head and interposed in the path of movement of said primary platen for engagement thereby and movement therewith, a piston carried intermediate of its ends by said intermediate platen and having its end towards the primary platen of less area than the opposite end, a cylinder carried by said frame and in which said opposite end of the piston reciprocates, a second cylinder in which the small end of the piston reciprocates, carried by the primary platen, said piston having a passage from end to end, means for admitting fluid under pressure to one of said cylinders, and means for limiting movement of the intermediate platen by said piston beyond a position intermediate the limits of travel of the primary platen.

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