Jan. 6, 1959 B. ZALOZECKY 2,867,002

PRESS ATTACHMENT

Filed Jan. 30, 1957 3 Sheets-Sheet 1

Fig 1

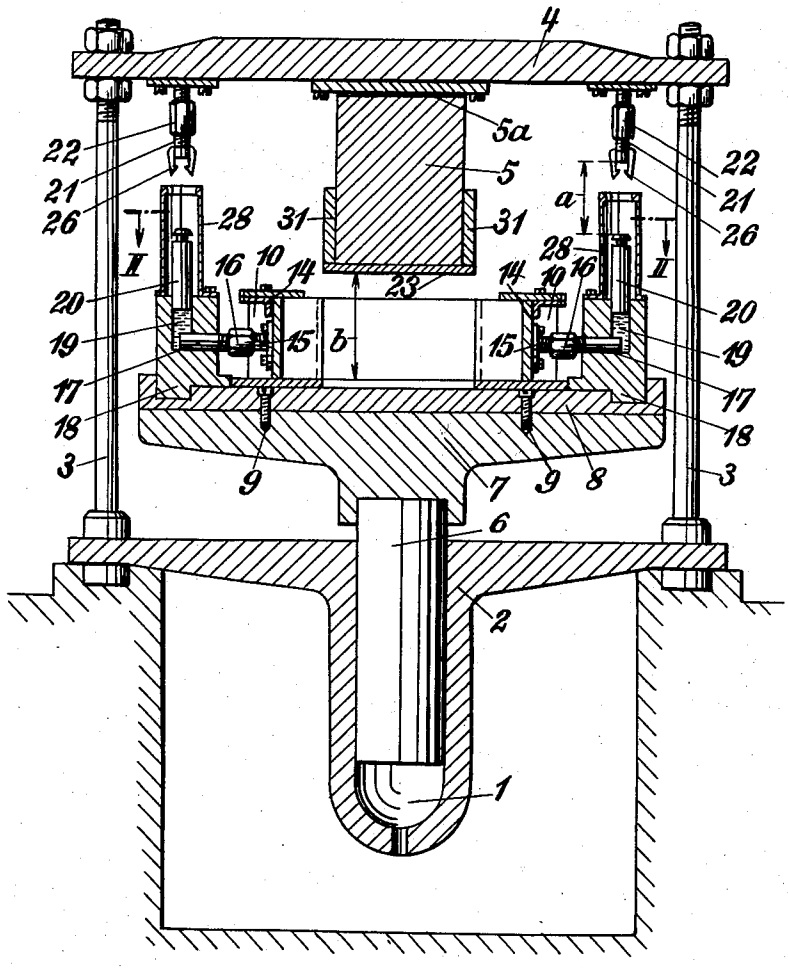

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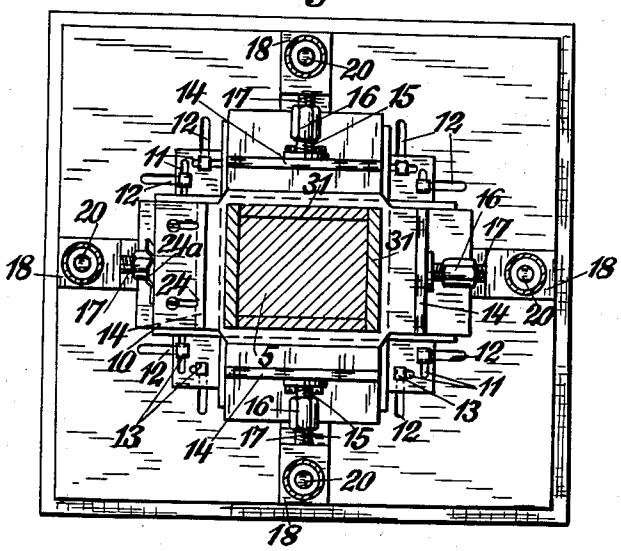
Fig. 2



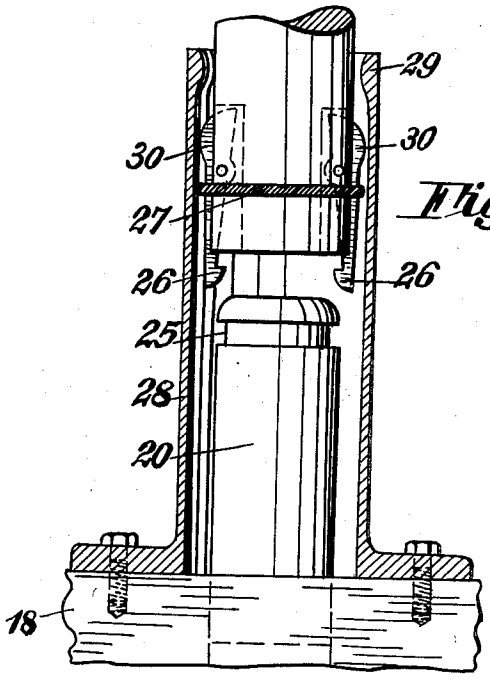


Fig. 3

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Fig.4

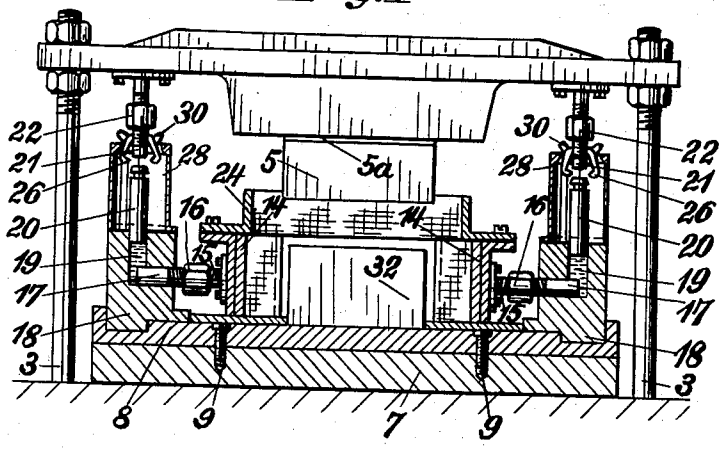
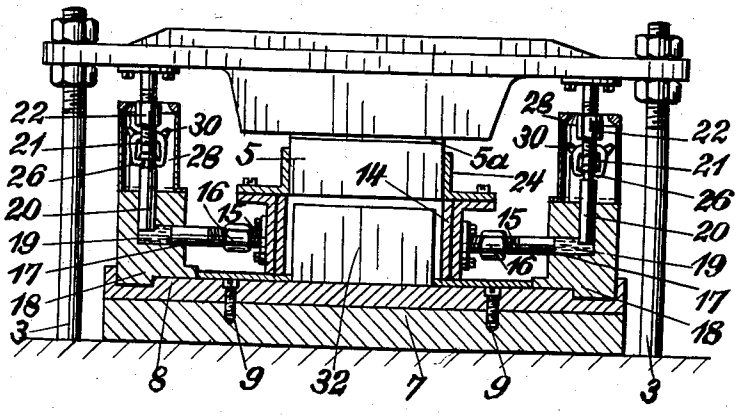


Fig.5



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2,867,002

PRESS ATTACHMENT

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Application January 30, 1957, Serial No. 637,194

Claims priority, application Austria February 1, 1956

10 Claims. (Cl. 18—16)

Presses for the manufacture of hollow bodies of molding material, e. g. of a fine-grained or granulated substance, are known, in which the press platen together with the lower die is moved upwardly from below against the ram rigidly affixed to a cross-head and in which several press jaws are simultaneously moved in the plane of the platen from all sides against the ram in dependence on the movement of the platen in order to place the material to be molded under uniform pressure from all sides. Other presses are known in which the platen is stationary and the ram is moved downwardly.

In all these presses, driving means, consisting of pivoted levers, eccentrics or control cams, or hydraulic cylinders disposed in the direction of movement of the press jaws, are provided for moving the press jaws and are incorporated in the overall construction of the press; these driving means form part of the press and are so complicated in most cases that their assembly and maintenance require considerable additional labor.

The invention is based on the suggestion to eliminate that disadvantage in that a simple press, which is either provided with a stationary ram and an upwardly movable platen, or with a movable ram and a stationary platen, is constructed with an attachment whereby press jaws having each the size of a side wall of the molding can be moved simultaneously against the ram by the upwardly movable platen or the lowerable ram.

According to the invention that suggestion is realized in that a stationary block having two interconnected bores disposed at right angles to each other is associated with each press jaw and a piston is liquid-tightly guided in each of said bores; the horizontal one of these pistons is firmly connected to the press jaw associated therewith whereas the upwardly extending, vertically displaceable piston serves as a driving piston and is adapted to be automatically coupled to a control device for the last part of the stroke of the platen or ram, which control device is attached to the cross-head of the press and engages the driving piston in the pushing and pulling directions; said control devices push the driving pistons forwardly into the bores to pressurize the liquid in the bores and at the beginning of the lowering movement retract the driving pistons for pressure relief.

Such an attachment can be mounted in the case of need on any mechanical or hydraulic press and can be removed therefrom because it consists of a few elements, which are combined as a unit and require only little labor for manufacture and maintenance while ensuring a perfect and quick operation in the molding of difficultly moldable material which is unable to rise. Cornered and round hollow bodies can be quickly and perfectly made with such an attachment.

An embodiment of the press attachment according to the invention is shown diagramatically and by way of example in the drawing. Fig. 1 shows a hydraulic press having a vertically movable platen together with the attachment in a partly sectional elevation. Fig. 2 is a top plan view of the press platen and attachment with the ram shown in cross-section. Fig. 3 shows a driving piston of one of the blocks in conjunction with a stationary stop in the end position before the upward movement of the platen. Figs. 4 and 5 are sectional elevations showing a press having a vertically movable ram before and after the pressing stroke.

The press consists of a base 2, which comprises the press cylinder 1 and carries by means of columns 3 a cross-head 4, to which the depending ram 5 is affixed. The press cylinder contains the pressure piston 6, which carries the platen 7 at its upper end. The platen 7 carries the attachment, which has a separate baseplate 8, which can be rigidly and detachably connected to the platen 7, e. g., by means of screws 9. Depending on the shape of the molding, which consists, e. g., of a round or four-cornered, open-topped container, and which is to be made from difficultly moldable material, e. g. of a fine-grained granulated substance, the baseplate 8 carries four guide blocks 10, which have the shape of right-angled stops and are adjustable towards or away from the center of the ram and can be locked in position by fixing screws 13 adjustable in slots 11 of the block and slots 12 of the baseplate 8. Thus the guide blocks 10 can be adjusted to the desired volume of the molding. The corners of the guide blocks 10 are preferably ground at an obtuse angle to leave between themselves and the edge of the ram a hollow space for the material of the molding. These four guide blocks 10 form with their outside surfaces the slideway for the press jaws 14, which are used to shape the walls of the molding and whose size corresponds to that of a side wall of the molding; these press jaws 14 are slidable parallel to themselves between the guide blocks 10 on the baseplate 8 in the direction toward the ram 5.

Each of the press jaws 14 has a screw bolt 15, which projects at right angles from the jaw and on which a cap nut 16 can be screwed, which is firmly connected to a piston 17. The screw bolt 15 is axially adjustable relative to the press jaw 14 and can be fixed in position. The baseplate 8 carries blocks 18 in a number equal to that of the press jaws 14. These blocks 18 are rigidly connected to the baseplate and have two bores 19 extending at right angles to each other and forming together a single pressure space, which is filled with a liquid, e. g. with lubricating oil. The piston 17 of each press jaw is a liquid-tight fit in the horizontal bore of each block 18 whereas a driving piston 20 is a liquid-tight fit in the vertical bore and extends to some extent above the block 18. That driving piston cooperates with a stop bolt 21, which is rigidly attached to the cross-head 4 and is also adjustable in height by means of an adjusting nut 22. The driving piston 20 and the appertaining stationary stop 21 are coaxially disposed and in the initial position of the platen 7 their end faces are a distance *a* apart from each other; that distance *a* is somewhat smaller than the distance *b* from the end face 23 of the ram to the surface of the baseplate 8. The driving piston 20 has near its to an annular groove 25 (Fig. 3) and the stop 21 is provided with two pawls 26, which protrude from its end face and are pivoted on pins and held in their catching position by an annular spring 27. Upon engagement between the end faces of the stop 21 and of the driving piston 20 these pawls 26 fall into the annular groove 25 of the driving piston to hold the latter against the stop 21. Each block 18 comprises also an automatic release for the driving piston 20. That release consists of a sleeve 28, which concentrically surrounds the driving piston 20 and whose lower end is affixed to the block 18, whereas its other end has a radially inwardly directed edge bead 29, which during the lowering of the platen 7, i. e., after the molding has been shaped, strikes at a predetermined release time against extensions

30 of the pawls 26, whereby the latter are simultaneously moved out of their engaging position and the driving piston 20 is automatically disconnected from the stop 21.

Moreover, slides 24 are mounted on the press jaw 14 and displaceable parallel to themselves at right angles to the ram 5. These slides are horizontally movably disposed on the press jaws 14, e. g., with the aid of elongated slots and several screws extending therethrough, and each slide can be maintained in a forward position by a leaf spring attached to the guide block 10 and engaging the rear edge of the slide 24. These slides 24 serve to close the mold cavity at the top, at the upper edge of the press jaws, so that the compressed material is confined also at the top. As the press jaws 14 are pushed forward the slides 24 will engage the ram 5 first and will be urged back by the latter against the action of the leaf springs 24*a* (Fig. 2) during the continued advance of the press jaws 14.

This attachment has the following mode of operation: It may be assumed that the molding material which consists of difficulty moldable material, e. g. a fine-grained or granulated substance, lies already on the baseplate 8 and fills only part of the space enclosed by the press jaws 14 and the guide blocks 10. The platen 7 is lifted, e. g., by hydraulic means so that the ram 5 dips gradually into the molding material to force the same partly against the press jaws 14. Now the cavity surrounding the ram 5 is completely filled with molding material. When the platen 7 has reached the elevation set by means of the stops 21 all driving pistons 20 engage the stationary stops 21 and immediately pressurize the liquid which is contained in the block 18. That liquid transmits this pressure through the intermediary of the pistons 17 to the press jaws 14, which at a predetermined time begin to advance simultaneously and uniformly towards the ram 5 penetrating from above into the molding material, whereby the latter is compressed and shaped simultaneously from all sides. The slides 24 confine the mold cavity at the top and provide a perfect closure of the mold. At the end of the press stroke the drying of the molding is accelerated by means of high-frequency current so that it can be performed in a period amounting to between some seconds and a few minutes, depending on the thickness of the molding. For this purpose the ram 5 is electrically insulated from the cross-head 4 by an insulating layer 5*a* and is connected to one electrical conductor, whereas the platen 7 is connected for a short period to the second high-frequency conductor.

After the molding has been dried and hardened the platen 7 is lowered. At the beginning of that lowering movement the driving pistons 20 are held in place by the pawls 26, whereby the press jaws 14 are immediately relieved from pressure. As the lowering of the platen 7 continues the pressure is further reduced in the space 19 of the blocks 18 and causes the pistons 17 and the press jaws 14 to move away from the molding, whereupon the bead 29 effects release of pistons 20, 25 by pawls 26. The molding is withdrawn automatically by the slides 24 from the exposed ram 5. These slides move away from the ram 5 only after the press jaws 14 have performed a return movement corresponding to the length of their elongated slots.

Since the ram 5 as well as the press jaws 14 can be replaced or can be provided with mountings 31 of different thickness, as desired, that attachment enables considerable variations with respect to the size, shape and decoration of the hollow body to be molded.

The same attachment can be used with like success on presses having a stationary platen and a vertically movable ram. An example is shown in Figs. 4 and 5. It comprises a rigid platen 7 provided with the attachment which has been described hereinbefore, comprising the baseplate 8, the guide blocks 10, the press jaws 14, the blocks 18 and the driving pistons 20. In the cavity confined by the press jaws 14, a core member 32 is disposed, the size and shape of which determine the cavity of the hollow body to be molded. Instead of a ram, a vertically movable press plate 5 is provided, whose pressing surface corresponds in size and shape to the bottom surface of the hollow body to be made. The cover slides 24 are also provided on the press jaws, with screws extending through elongated slots, and have the same function as in the first embodiment. However, in this case the slides are of angular shape and engage the press plate with one leg of the angle.

The press operation is the same as described hereinbefore because together with the press plate the control stops 21 are moved to engage the driving pistons 20 so that all press jaws are simultaneously moved against the core member.

This attachment has the advantage that the core member 32 as well as the press jaws 14 may be provided with grooves or rebates or ornament or similar decoration desired on the finished hollow body. In this case high-frequency drying is also possible and mountings may be employed to vary the size and form.

I claim:

1. A molding press comprising, in combination, a first press member and a second press member, one press member being movable in one direction toward and away from the other press member between a retracted position and an advanced operative position; a set of lateral press jaws mounted on said first press member, each press jaw being movable in a direction transverse to said one direction between an outer retracted position and an inner advanced position, said press members and said press jaws defining in said advanced positions a pressure space for molding an article of granulated material; a set of stationary cylinder blocks on said first press member, each cylinder block being associated with one of said press jaws, each cylinder block being formed with a closed cavity adapted to contain an operating liquid and including a first cylinder portion extending in direction of said transverse movement of the associated press jaw and a second cylinder portion extending in said one direction; a set of press pistons respectively located in said first cylinder portions and connected to said press jaws, and a set of drive pistons respectively located in said second cylinder portions; a set of coupling means mounted on said second press member and respectively associated with said drive pistons for coupling said second press member to said drive pistons in an intermediate position of said one press member during advance movement of the same so that during further advance movement of said one press member, said drive pistons and said cylinder blocks move relative to each other in said one direction and effect inward movement of said press pistons and thereby movements of said press jaws from said outer retracted positions to said inner advanced positions, and whereby during the return movement of said one press member from said advanced position, said drive pistons and cylinder blocks move relative to each other to effect withdrawal of said press pistons and said press jaws to said retracted positions; and releasing means on said first press member for engaging and releasing said coupling means in another intermediate position of said one press member when said press jaws arrive in said retracted positions of the same.

2. A molding press comprising, in combination, a first press member and a second press member, one press member being movable in one direction toward and away from the other press member between a retracted position and an advanced operative position; a set of lateral press jaws mounted on said first press member, each press jaw being movable in a direction transverse to said one direction between an outer retracted position and an inner advanced position, said press members and said press jaws defining in said advanced positions a pressure space for molding an article of granulated material; a set of stationary cylinder blocks on said first press mem-

ber, each cylinder block being associated with one of said press jaws, each cylinder block being formed with a closed cavity adapted to contain an operating liquid and including a first cylinder portion extending in direction of said transverse movement of the associated press jaw and a second cylinder portion extending in said one direction; a set of press pistons respectively located in said first cylinder portions and connected to said press jaws, and a set of drive pistons respectively located in said second cylinder portions, each of said drive pistons having a recess; a set of coupling means mounted on said second press member and respectively associated with said drive pistons for coupling said second press member to said drive pistons in an intermediate position of said one press member during advance movement of the same so that during further advance movement of said one press member, said drive pistons and said cylinder blocks move relative to each other in said one direction and effect inward movement of said press pistons and thereby movements of said press jaws from said outer retracted positions to said inner advanced positions, and whereby during the return movement of said one press member from said advanced position, said drive pistons and cylinder blocks move relative to each other to effect withdrawal of said press pistons and said press jaws to said retracted positions, each of said coupling means including a member fixedly secured to said second press member and abutting on the end of the associated drive piston in said intermediate position of said one press member, and spring loaded catch means engaging said recess in the respective associated drive piston in said intermediate position of said one press member; and stationary releasing means on said first press member, and including a cam means engaging said catch means in another intermediate position of said one press member for moving said catch means to a releasing position releasing the associated drive pistons when said press jaws arrive in said retracted positions of the same.

3. A molding press comprising, in combination, a stationary press ram; a press member movable in vertical direction toward and away from said press ram between a retracted position and an advanced operative position; a set of lateral press jaws mounted on said press member, each press jaw being supported for horizontal movement between an outer retracted position and an inner advanced position, said press ram, movable press member and said press jaws defining in said advanced positions a pressure space for molding an article of granulated material; a set of cylinder blocks secured to said movable press member, each cylinder block being associated with one of said press jaws and located outwardly of the same, each cylinder block being formed with a cavity adapted to contain an operating liquid and including a vertical cylinder portion, and a horizontal cylinder portion extending in the transverse direction of movement of the associated press jaw; a set of press pistons respectively located in said horizontal cylinder portions and connected to said press jaws, and a set of drive pistons located in said vertical cylinder portions; a set of coupling means fixedly secured to said press ram respectively aligned in vertical direction with said drive pistons for coupling said press ram to said drive pistons in an intermediate position of said press member during advance movement of the same so that during the last part of the advance movement of said press member, said drive pistons are moved into said vertical cylinder portions and effect inward movement of said press pistons and thereby movements of said press jaws from said outer retracted positions to said inner advanced positions, and whereby during the first part of the return movement of said press member from said advanced position, said drive pistons are retracted and effect withdrawal of said press pistons and of said press jaws to said retracted positions; and a set of stationary releasing means secured to said cylinder blocks and engaging said coupling means in another intermediate position of said press member during return movement of the same for releasing said coupling means when said press jaws arrive in said retracted positions of the same.

4. A molding press, comprising, in combination, a stationary press ram; a press member movable in vertical direction toward and away from said press ram between a retracted position and an advanced operative position; a set of lateral press jaws mounted on said press member, each press jaw being supported for horizontal movement between an outer retracted position and an inner advanced position, said press ram, movable press member, and said press jaws defining in said advanced positions a pressure space for molding an article of granulated material; a set of cylinder blocks secured to said movable press member, each cylinder block being associated with one of said press jaws and located outwardly of the same, each cylinder block being formed with a cavity adapted to contain an operating liquid and including a vertical cylinder portion, and a horizontal cylinder portion extending in the transverse direction of movement of the associated press jaw; a set of press pistons respectively located in said horizontal cylinder portions and connected to said press jaws, and a set of drive pistons located in said vertical cylinder portions, each of said drive pistons having an upper portion projecting out of said vertical cylinder portion and being formed with an annular recess; a set of coupling means fixedly secured to said press ram respectively aligned in vertical direction with said drive pistons for coupling said press ram to said drive pistons in an intermediate position of said press member during advance movement of the same so that during the last part of the advance movement of said press member, said drive pistons are moved into said vertical cylinder portions and effect inward movement of said press pistons and thereby movements of said press jaws from said outer retracted positions to said inner advanced positions, and whereby during the first part of the return movement of said press member from said advanced position, said drive pistons are retracted and effect withdrawal of said press pistons and of said press jaws to said retracted positions, each of said coupling means including spring-loaded catch means engaging said annular recess in the associated drive piston in said intermediate position for coupling to said drive pistons to said press ram; and a set of stationary releasing means secured to said cylinder blocks, each releasing means including a sleeve secured to one of said cylinder blocks and surrounding said catch means in said intermediate position, each sleeve having an annular bead engaging said catch means in another further retracted intermediate position of said press member for releasing said catch means from said associated recess when said press jaws arrive in said retracted positions of the same.

5. A molding press as set forth in claim 4 and including guide blocks having surfaces defining guide ways for said press jaws, said guide blocks being detachably secured to said movable press member.

6. A molding press as set forth in claim 4 wherein said coupling means each include a member fixedly secured to said press ram and abutting on the upper end of the associated drive piston in said intermediate position of said press member, and wherein said catch means include a plurality of hook-shaped pawls pivotally mounted on said last mentioned member, and an annular spring surrounding and engaging said pawls.

7. A molding press as set forth in claim 1 and including a set of slides slidably mounted on said press jaws, respectively; spring means urging said slides in inward direction, and lost-motion means connecting said press jaws with the associated slides for retracting the same, said slides being adapted to engage the edge of a molded object during retraction of said press member.

8. A molding press as set forth in claim 1 wherein said second press member is movable and constitutes said movable press member.

9. A molding press comprising, in combination, a first press member and a second press member, one press member being movable in one direction toward nad away from the other press member between a retracted position and an advanced operative position; a set of lateral press jaws mounted on said first press member, each press jaw being movable in a direction transverse to said one direction between an outer retracted position and an inner advanced position, said press members and said press jaws defining in said advanced positions a pressure space for molding an article of granulated material; hydraulic operating means mounted on said first press member and being connected to said press jaws for actuating the same; and coupling means mounted on said second press member and engaging said hydraulic operating means in an intermediate position of said one press member during advance movement of the same for actuating said hydraulic operating means so that during further advance movement of said one press member said press jaws are moved from said outer retracted positions to said inner advanced positions and whereby during the return movement of said one press member from said advanced position said press jaws are moved to said retracted positions; and a set of stationary releasing means on said first press member for engaging and releasing said coupling means in another intermediate position of said one press member when said press jaws arrive in said retracted positions of the same.

10. A molding press comprising, in combination, a stationary press ram; a press member movable in vertical direction toward and away from said press ram between a retracted position and an advanced operative position; a set of lateral press jaws mounted on said press member, each press jaw being supported for horizontal movement between an outer retracted position and an inner advanced position, said press ram, movable press member, and said press jaws defining in said advanced positions a pressure space for molding an article of granulated material, said press ram being surrounded by said press jaws in said advanced position of said movable

press member and having a free end spaced a short distance from said movable press member in said advanced position of the same; a set of cylinder blocks secured to said movable press member, each cylinder block being associated with one of said press jaws and located outwardly of the same, each cylinder block being formed with a cavity adapted to contain an operating liquid and including a vertical cylinder portion, and a horizontal cylinder portion extending in the transverse direction of movement of the associated press jaw; a set of press pistons respectively located in said horizontal cylinder portions and connected to said press jaws, and a set of drive pistons located in said vertical cylinder portions; a set of coupling means fixedly secured to said press ram respectively aligned in vertical direction with said drive pistons for coupling said press ram to said drive pistons in an intermediate position of said press member during advance movement of the same so that during the last part of the advance movement of said press member, said drive pistons are moved into said vertical cylinder portions and effect inward movement of said press pistons and thereby movements of said press jaws from said outer retracted positions to said inner advanced positions, and whereby during the first part of the return movement of said press member from said advanced position, said drive pistons are retracted and effect withdrawal of said press pistons and of said press jaws to said retracted positions; and a set of releasing means secured to said cylinder blocks and engaging said coupling means in another intermediate position of said press member during return movement of the same for releasing said coupling means when said press jaws arrive in said retracted positions of the same.

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