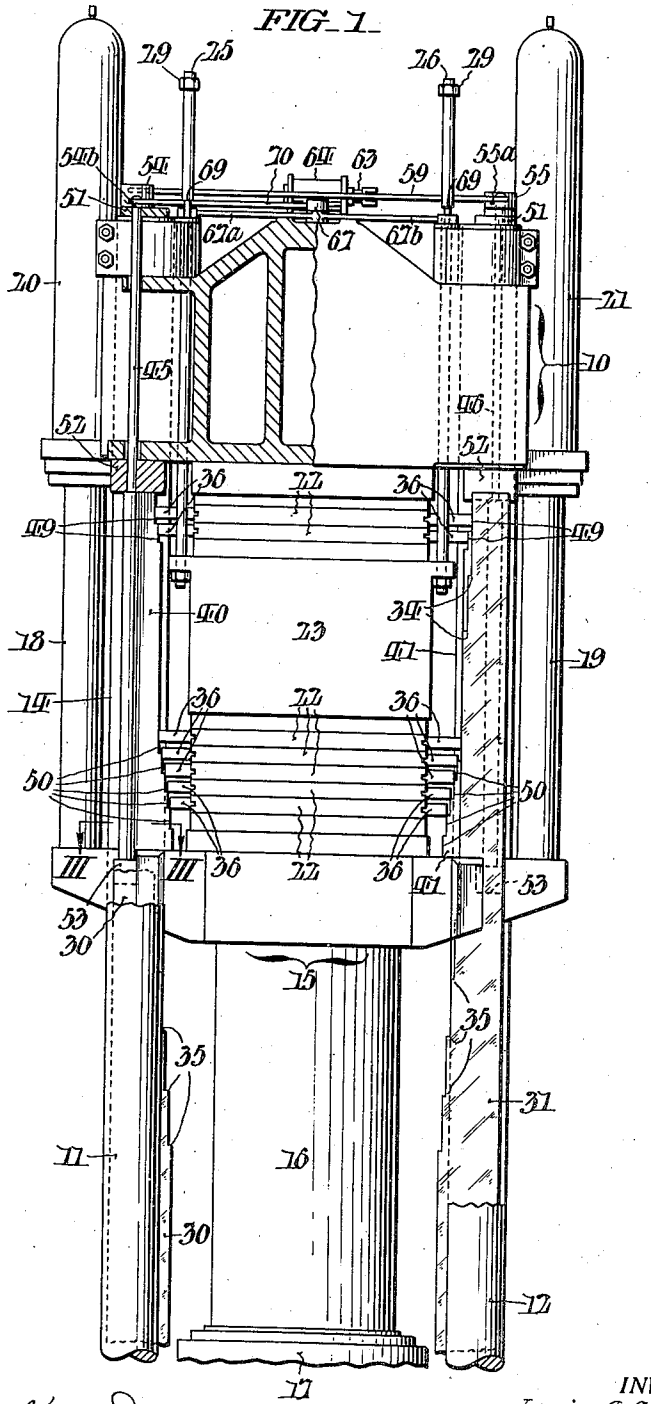
Jan. 10, 1950 L. A. CAMEROTA 2,494,162

MULTIPLATEN PRESS

Filed June 16, 1948 4 Sheets-Sheet 1

FIG. 1.



WITNESSES

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FIG. 1.

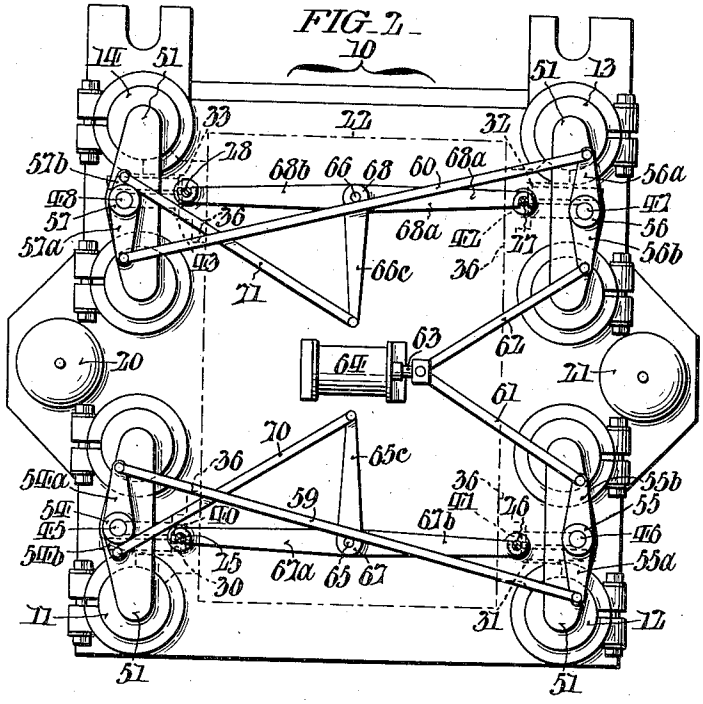


FIG. 3.

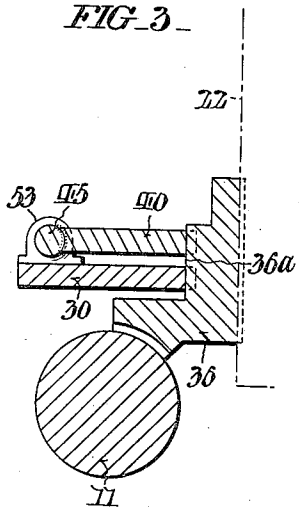


FIG. 6.

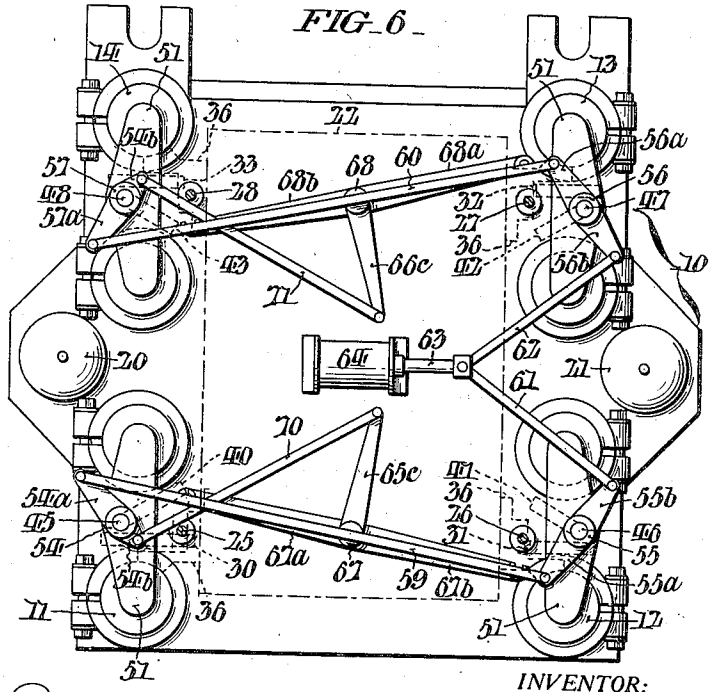
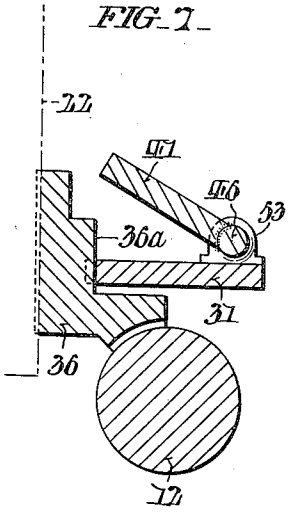


FIG. 7.



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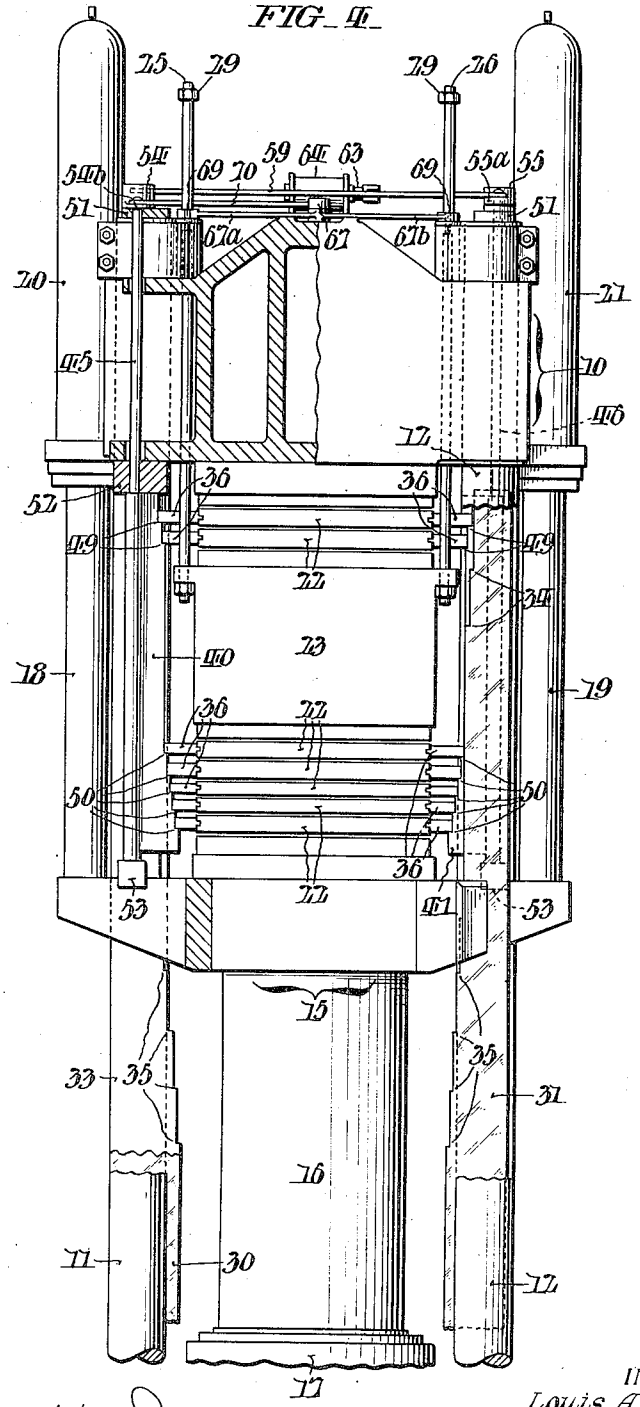
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FIG. 4.



WITNESSES

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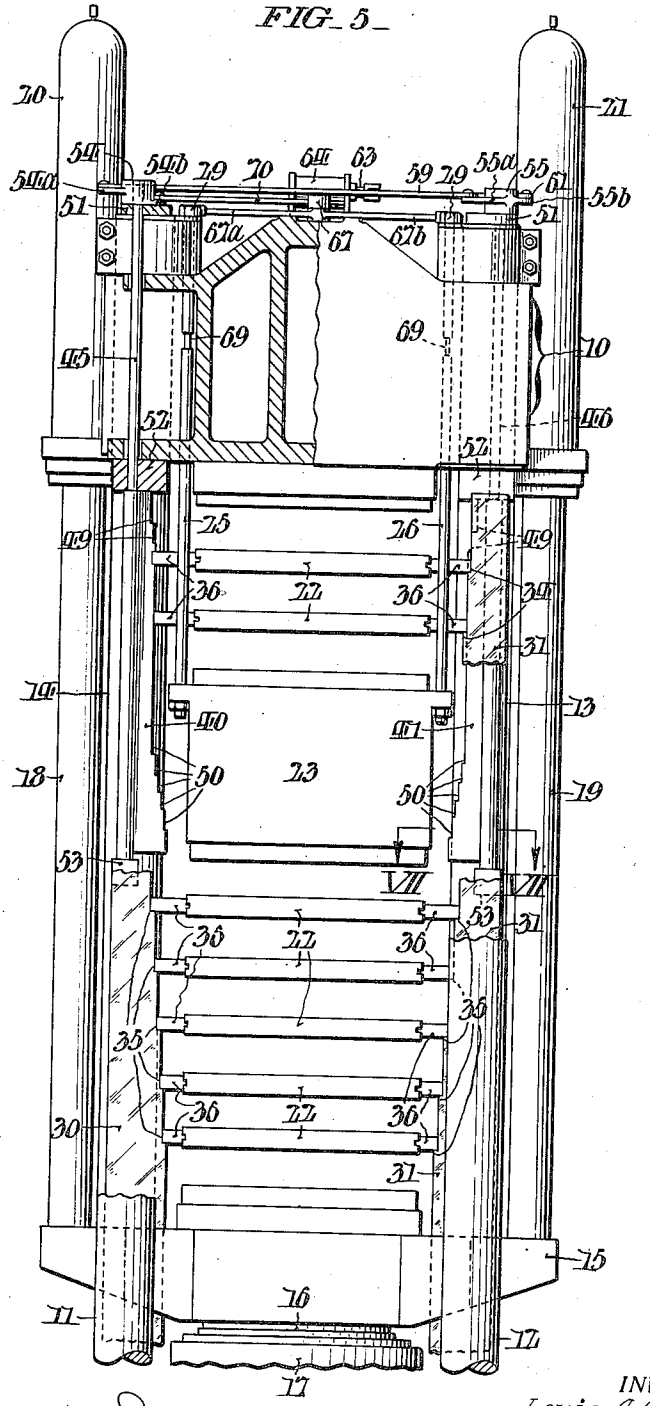
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FIG. 5



WITNESSES

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2,494,162

UNITED STATES PATENT OFFICE

2,494,162

MULTIPLATEN PRESS

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Application June 16, 1948, Serial No. 33,319

12 Claims. (Cl. 18—16)

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This invention relates to multi-platen presses. More specifically, it is concerned with hydraulically actuated multi-platen presses of the type disclosed in U. S. Patent No. 2,420,813 granted to me on May 27, 1947, designed for operation upon plastics or other semi-molten materials in sheet form, the hot compressing of which is attended by emission of gases and/or vapors. Unless these gases and/or vapors are released occasionally during the pressing, the surfaces of the finished sheets are apt to become pock-marked or wrinkled and hence will lack the desired smoothness. In order to relieve the gases or vapors in multi-platen presses as heretofore ordinarily constructed, it was necessary to fully open them. The required repetitions of operation entailed the loss of considerable time with consequent detraction from the efficiency of the presses.

The chief aim of my present invention is to overcome the above mentioned drawbacks, i. e. to make possible the relief of the gases or vapors without requiring complete opening of the presses. This desideratum is attained, as hereinafter more fully set forth, through the provision of an auxiliary means which, upon slight opening of the presses, will determine spacing of the platens one from another by a relatively small but sufficient amount to allow ready escape of the gases and/or vapors with assurance of the attainment of a perfect smooth finish in the product.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings wherein—

Fig. 1 is a view, in front elevation, of a multi-platen press conveniently embodying my invention, and showing the press closed with portions thereof broken out and others in section.

Fig. 2 shows the closed press in top plan.

Fig. 3 is a fragmentary detail view in horizontal section taken as indicated by the angled arrows III—III in Fig. 1.

Fig. 4 is a view corresponding to Fig. 1 but showing the press partly open for gas and/or vapor release.

Figs. 5, 6 and 7 are views like Figs. 1, 2 and 3 showing the press fully opened for loading or unloading.

The press, herein illustrated by way of example, is generally like that of the patent above referred to in that it has an upper compression head 10 which is substantially rectangular in plan and stationarily supported by four columns 11, 12, 13 and 14 from a rigid base structure (not shown). Suitably guided for up and down travel

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between the columns 11—14 is a lower compression head 15 which is secured to the top of the plunger 16 of a vertical axis ram cylinder 17 formed either integrally with or rigidly connected to the aforementioned base structure. Extending upward from the movable head 15, centrally of its opposite ends, are the piston rods 18 and 19 of the usual pull back cylinders 20 and 21 which are affixed to the stationary head. The press is provided with multiple platens 22 which, in the present instance, are subdivided into two superposed groups, one such group being arranged between the stationary head 10 and a sub platen 23 which is considerably thicker (deeper) than the regular platens, and the other group between said sub platen and the movable head 15. As shown, rods 25, 26, 27 and 28 extend upward from the respective corners of the sub platen 23 through guide holes in the fixed head 10, said rods being individually fitted at the top with nuts 29 for a purpose later on explained. Adjacent the inner sides of the four columns 11—14 are uprightly-disposed stop bars 30, 31, 32 and 33 whereof the inner edges are formed at 34 and 35 with stepped shoulders which are evenly but relatively widely spaced, and which, by cooperation with lateral projections 36a of different lengths on guide brackets 36 at the corners of the platens 22 respectively above and below the sub platen 23 intercept said platens 22 when the press is fully opened for loading or unloading as in Fig. 5. In this connection it will be noted that the descent of the sub platen 23 is limited by encounter of the stop nuts 29 on the suspension rods 25, 26, 27 and 28 with the top of the stationary head 10 when the press is fully opened. It is to be understood that the heads 10 and 15 and the sub platen 23 are internally heated by suitable means (not shown) well known in the art.

In order to obviate the necessity for completely opening the press for de-gassing purposes, I have provided an auxiliary means which, upon slight opening of the press, will intercept the platens and serve to hold them separated by a distance which, although small, is ample to permit free escape of gases and/or vapors given off the slabs during hot pressing. This auxiliary intercepting means comprises four retractable stop elements likewise in the form of flat bars 40, 41, 42 and 43 which are respectively associated with the fixed bars 30, 31, 32 and 33 and individually secured to vertical shafts 45, 46, 47 and 48. As shown, the auxiliary stop bars 40—43 are like the fixed bars 30—33 but considerably shorter and provided at 49 and 50 with groups of stepped shoulders

separated by a much shorter interval than those of said fixed bars. The upper ends of the shafts 45—48 of the auxiliary stop bars are rotatively engaged in bearing members 51 and 52 respectively at the top and bottom of the stationary head 10, and the lower ends in bearings 53 secured to the corresponding fixed stop bars 30—33. Respectively secured to the extreme upper ends of the shafts 45—48 are levers 54—57. Oppositely directed arms 54*a* and 55*a* of levers 54 and 55 are connected by a diagonal link 59 and oppositely directed arms 56*a* and 57*a* of the levers 56 and 57 by a diagonal link 60. The other arms 55*b* and 56*b* of levers 55 and 56 are coupled by means of links 61 and 62 with the piston rod 63 of a pressure fluid actuating cylinder 64 mounted centrally of the top of the stationary head 10. Fulcrumed on studs 65 and 66 upstanding from the stationary head 10 are levers 67 and 68 of which the oppositely extending aligned arms 67*a*, 67*b* and 68*a*, 68*b* are laterally notched at their ends for capacity to engage beneath circumferential shoulders 69 on the suspension rods 25—28 of the sub platen 23. The center arms 65*c*, 66*c* of the levers 65, 66 are connected by links 70 and 71 with the short arms 54*b* and 57*b* of the levers 54 and 57 on shafts 45 and 48.

Operation

For loading or unloading the press is fully opened as in Fig. 5 with the platens 22 of the two groups respectively resting on the steps 34 and 35 of the fixed stop bars 30—33 and well spaced for reception of the unit sheets which are to be compressed, the auxiliary stop bars 40—43 being at this time retracted out of the way of the projections 36 on said platens as instanced in Fig. 7, with the stop nuts 29 on the rods 25—28 holding the sub platen 23 suspended widely spaced from the immediately adjacent platens 22, as also shown in Fig. 5. After being loaded, the press is closed, as in Fig. 1, through rise of the movable head 15 as pressure fluid is admitted to the ram cylinder 17. As a result, the sheets on the platens are subjected to compression in the usual and known way. Immediately after closing of the press as just explained, the cylinder 64 is actuated, and by consequent inward movement of its piston rod 63, partial anti-clockwise rotations are induced in the shafts 45—48 through the medium of the aforedescribed linkage connections. As a consequence, the auxiliary stop bars 40—43 are simultaneously swung from the angular retracted positions of Figs. 5 and 7 to the active positions of Figs. 2, 3, and 4 in parallel relation to the fixed stop bars 30—33, with their steps 49 and 50 in the path of the projections 36 on the platens 22. By virtue of their connection through the links 59 and 60 to the levers 54—57 on the shafts 45—48, the levers 67 and 68 are swung at the same time from the position in Fig. 6, to the position in Fig. 2 to engage the notched ends of their arms 67*a*, 67*b* and 68*a*, 68*b* with the suspension rods 25—28 at a level beneath the circumferential shoulders 69 on the latter. The press is thereupon opened occasionally to the extent necessary for interception of the platens 22 by the closely spaced steps 49 and 50 of the wings 40—43, to allow escape of the vapors and/or gases driven off from the sheets by the action of the heat. During these easements, the drop of the sub platen 23 is limited through engagement of the stop shoulders 69 on the suspension rods 25—28 with the arms 67*a*, 67*b* and 68*a*, 68*b*, of the levers 67 and 68 as in Fig. 4. When the sheets have been compressed to the desired extent, the cylinder 64 is again actuated, this time to force its piston rod 63 outwardly, whereby, through the aforesaid linkage, the shafts 45—48 are simultaneously turned clockwise to retract the auxiliary stop bars 40—43, and the levers 67 and 68 swung for withdrawal of their arms 67*a*, 67*b* and 68*a* and 68*b* from beneath the shoulders 69 of the suspension rods 25—28, the position of the parts being thereby changed from the showing in Fig. 2 back to the showing in Fig. 6. Finally, the pressure fluid is permitted to exhaust from the ram cylinder 17 whereby the movable head 15 is lowered until the press is fully open as in Fig. 5, for unloading of the finished sheets and the substitution in place of the latter of a fresh group for pressing.

Having thus described my invention, I claim:

1. In a press of the character described, multiple platens for supporting individual units of the material to be compressed, arranged in superposed relation between a stationary upper compression head and an opposing movable lower compression head; means for holding the platens definitely spaced by a relatively large interval when the press is fully opened for loading or unloading; and normally retracted auxiliary means movable into the path of the platens to hold them definitely spaced but by a smaller interval sufficient for the ready escape of gases and/or vapors from the material upon partial opening of the press.

2. In a press of the character described, multiple platens for supporting individual units of the material which is to be compressed, arranged in superposed relation between a stationary upper compression head and an opposing movable lower compression head; lateral projections of different lengths on the platens; fixedly upright stop elements with steps spaced by a relatively large interval to cooperate with lateral projections of different lengths on the platens in supporting the platens when the press is fully opened for loading or unloading; retractable auxiliary upright stop elements with more closely spaced steps for engaging the projections in one position of said auxiliary stop elements to hold the platens separated by a smaller interval sufficient for release of gases and/or vapors from the material upon partial opening of the press.

3. The invention according to claim 2, further comprising means for simultaneously moving the auxiliary stop elements into and out of the path of the lateral projections on the platens.

4. The invention according to claim 2, wherein the fixed stop elements are in the form of flat bars with the steps at their inner edges; wherein the auxiliary stop elements are likewise in the form of flat bars with their steps at their inner edges; and wherein the auxiliary bars are individually connected to vertical axis shafts so as to be swingable into and out of the paths of the lateral projections on the platens.

5. The invention according to claim 2, wherein the fixed stop elements are in the form of flat bars with the steps at their inner edges; wherein the auxiliary stop elements are likewise in the form of flat bars with their steps at their inner edges; wherein the auxiliary bars are individually connected to vertical axis shafts so as to be swingable into and out of the paths of the lateral projections on the platens; and further comprising mechanism for simultaneously actuating the shafts to move the auxiliary stop elements into and out of active position.

6. The invention according to claim 2, wherein

the fixed stop elements are in the form of flat bars with the steps at their inner edges; wherein the auxiliary stop elements are likewise in the form of flat bars with the steps at their inner edges; wherein the auxiliary bars are individually connected to vertical axis shafts so as to be swingable into and out of the paths of the lateral projections on the platens, and further including actuating mechanism comprising oppositely-directed lever arms respectively on said shafts, link means connecting said arms, and a reversible power means connected to another lever arm on one of said shafts.

7. The invention according to claim 2, wherein there are four fixed stop elements each in the form of a flat bar with the steps at its inner edge to cooperate with lateral projections of different lengths at the corners of the platens; wherein there are also four auxiliary stop elements each likewise in the form of a flat bar with the steps at its inner edge; and wherein the auxiliary bars are individually connected to vertical axis shafts so as to be swingable into and out of the paths of the lateral projections on the platens.

8. The invention according to claim 2, wherein there are four fixed stop elements each in the form of flat bars with the notches at its inner edge to cooperate with lateral projections of different lengths at the corners of the platens; wherein there are also four auxiliary stop elements each likewise in the form of a flat bar with the notches at its inner edge; wherein the auxiliary bars are individually connected to vertical axis shafts so as to be swingable into and out of the paths of the lateral projection on the platens; and further including mechanism for simultaneously actuating the shafts to move the auxiliary stop elements into and out of active position, said mechanism comprising oppositely directed lever arms on the respective shafts, a link connecting the arms respectively on two of the shafts, a link similarly connecting the arms respectively on the two other shafts; and reversible power means connected to other arms one on each of the two shafts coupled as aforesaid by the links.

9. The invention according to claim 2, wherein the platens are subdivided into two groups with a sub-platen arranged between said groups; and further including stop means for supporting the sub-platen in corresponding widely spaced relation to the immediately adjacent platens when the press is fully opened for loading and unloading; and auxiliary means for supporting the sub-platen in corresponding close spacing relative to said adjacent platens when the press is partially opened for gas and/or vapor release.

10. The invention according to claim 2, wherein the platens are subdivided into two groups with a sub-platen arranged between said groups; and further including suspension rods extending up from the sub-platen through the stationary upper head and having stop nuts at their upper ends for engaging the top of said head in limiting the descent of said sub-platen to position it in corresponding wide spaced relation to the immediately adjacent platens when the press is fully opened for loading and unloading; and retractable auxiliary means for limiting the descent of the sub-platen for its support in corresponding close spacing relative to said adjacent platens when the press is partially opened for gas and/or vapor release.

11. The invention according to claim 2, wherein the platens are subdivided into two groups with a sub-platen arranged between said groups; and further including suspension rods extending up from the sub-platen through the stationary upper head and having stop nuts at their upper ends for engaging the top of said head to limit the descent of said sub-platen and thereby position it in corresponding wide spaced relation to the immediately adjacent platens when the press is fully opened for loading and unloading; and a lever fulcrumed on the top of the stationary head having laterally notched arms adapted to be swung beneath peripheral shoulders on the suspension rods to limit the descent of the sub-platen for its support in corresponding close spacing relative to said adjacent platens when the press is partially opened for gas and/or vapor release.

12. The invention according to claim 2, wherein the platens are subdivided into two groups with a sub-platen arranged between said groups; and further including stop means for supporting the sub-platen in corresponding widely spaced relation to the immediately adjacent platens when the press is fully opened for loading and unloading, auxiliary means for supporting the sub-platen in corresponding close spacing relative to said adjacent platens when the press is partially opened for gas and/or vapor release, and mechanism for simultaneously moving the auxiliary stop elements for the regular platens and the auxiliary stop means for the sub-platen into and out of operative position.

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