

Feb. 19, 1952

A. F. MOORE

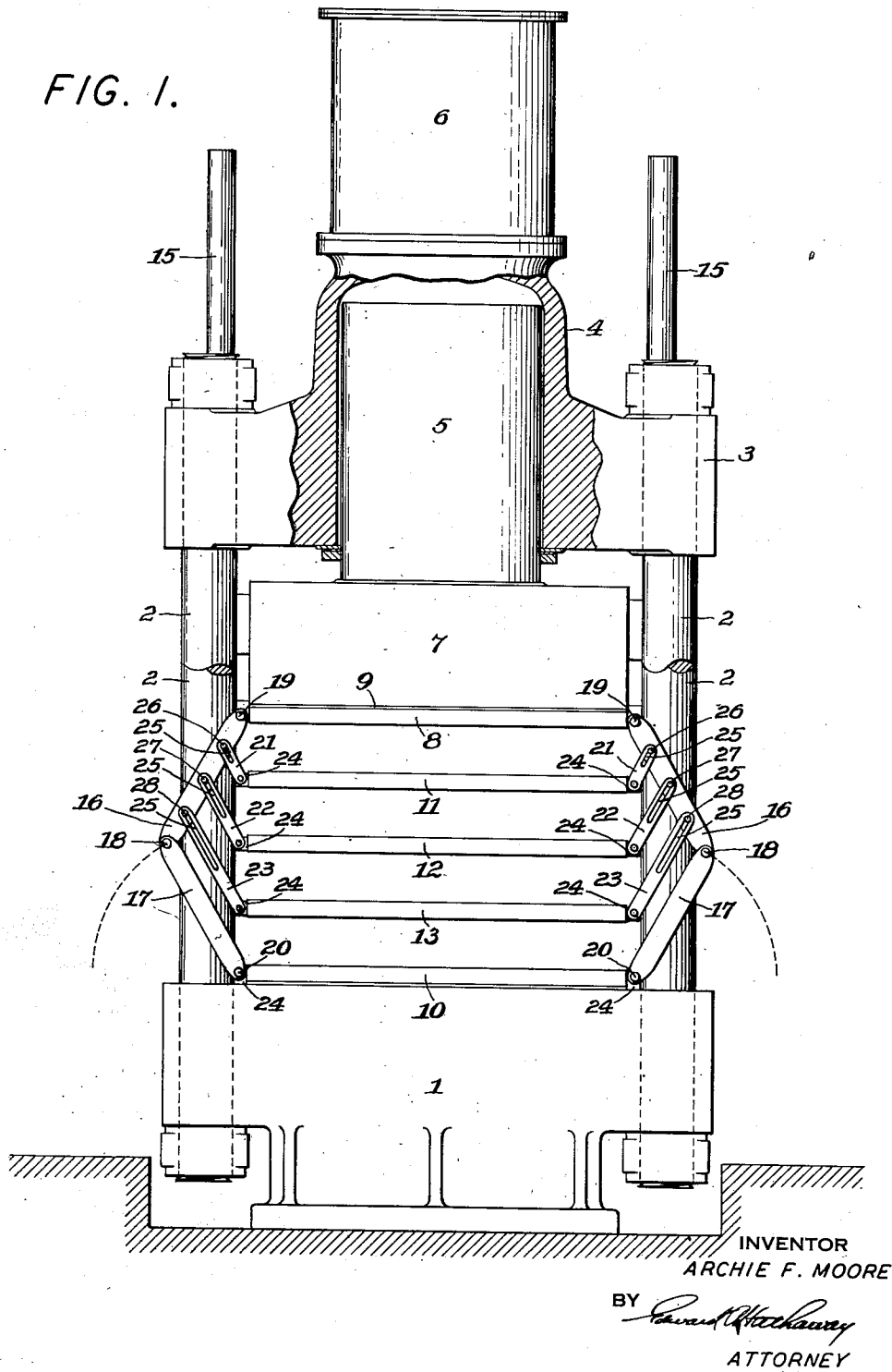
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PLATEN SPACING MEANS FOR PRESSES

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3 Sheets-Sheet 1

FIG. 1.



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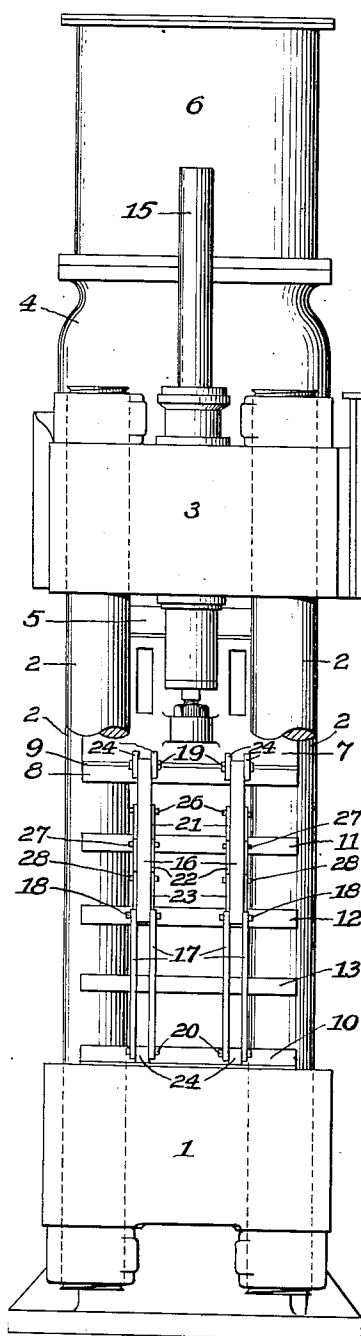


FIG. 2.

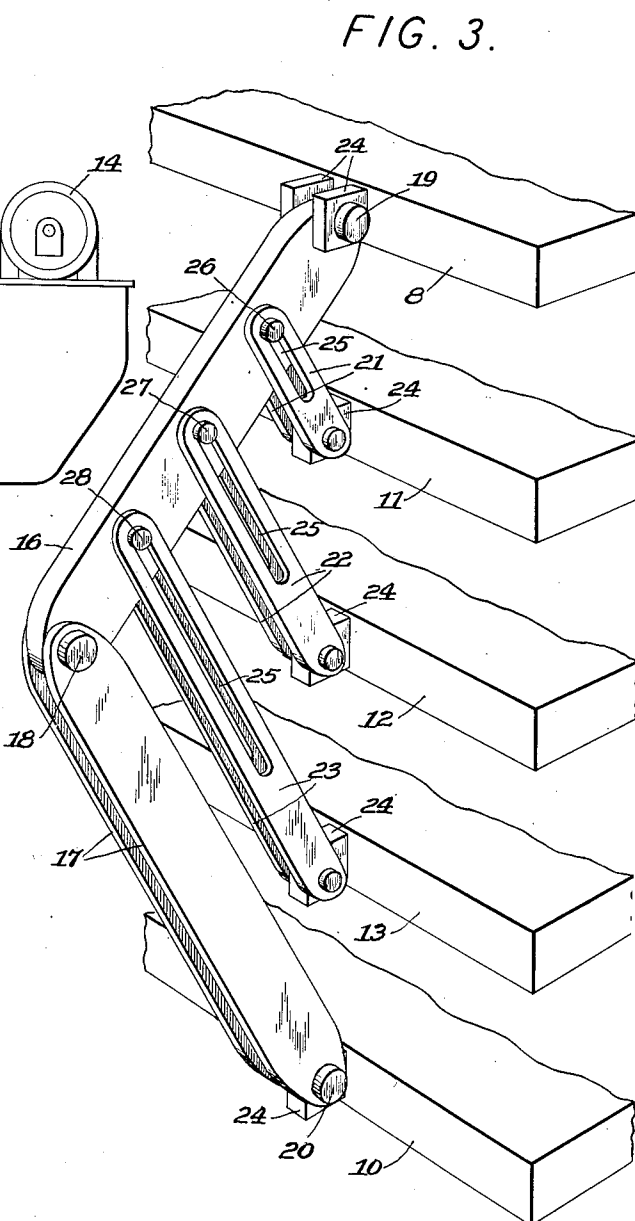


FIG. 3.

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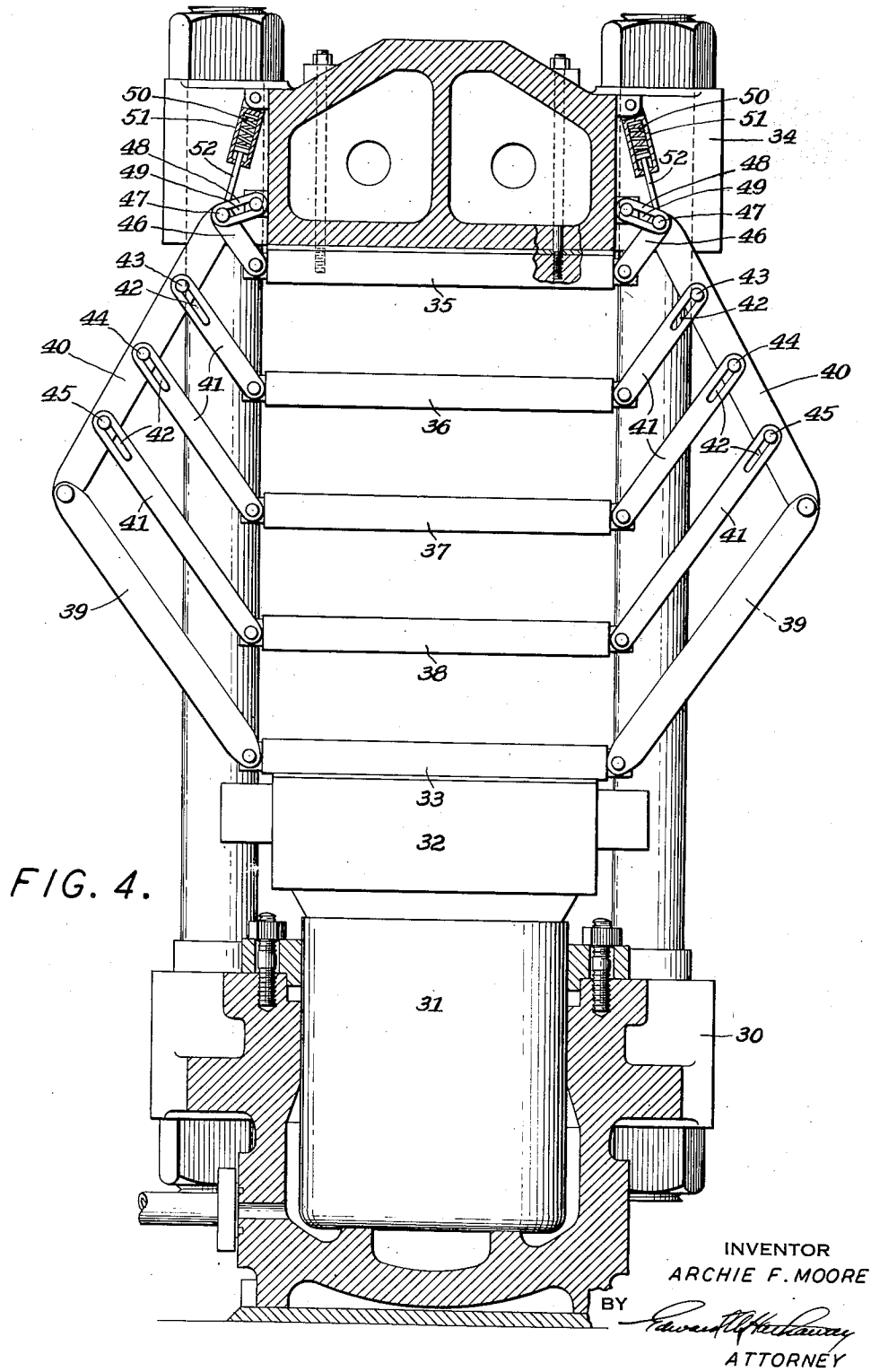
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UNITED STATES PATENT OFFICE

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PLATEN SPACING MEANS FOR PRESSES

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5 Claims. (Cl. 100—50)

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This invention relates generally to multiple opening platen presses for curing sheet-like material by pressure and heat, and relates more particularly to improved means for equalizing the curing periods for the material between different platens.

In the proper curing of some kinds of materials in a press of this type, it is desirable that all pieces of material be subjected to the same curing period. This curing period may be considered to be the elapsed time that adjacent platens are closed upon a piece of material between them. As is well understood in the art, in the conventional multiple opening platen press, the platen openings are successively closed so that, for example, the opening which is first closed will remain closed a longer time than the last closed opening. This varied closure time is because the platens close only in sequence, subjecting the material in the different openings to different curing periods. While various schemes and devices for equalizing the curing periods for all openings have heretofore been proposed or used, such as, for example, linkage arrangements employing the principle of the pantograph or lazy tongs, they have been found to be unsatisfactory in some applications in that they involve a large number of levers, links, and pivot pins, are expensive to manufacture and maintain, and frequently do not provide for instances where one or more pieces of material may be of different thicknesses.

An object of my invention is to provide improved linkage means, for equalizing the curing period of all press openings, that is simple in construction and positive in operation, that requires a relatively small number of parts, is less expensive to manufacture and maintain, and that will function even though appreciable irregularities occur in the thickness of the material between the platens.

Other objects and advantages will be apparent to those skilled in the art from the following description of the accompanying drawings in which:

Fig. 1 is a diagrammatic front elevational view of a platen press having a downwardly moving ram, with the front tension columns and other parts broken away for the sake of clarity, to which my novel linkage means are shown applied;

Fig. 2 is a side elevational view of such press with the two nearer tension columns broken away;

Fig. 3 is an enlarged perspective of one of my

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linkage arrangements, showing its pivotal connections to the platens of the press; and

Fig. 4 is a modification of my linkage means applied to a multiple opening platen press having an upwardly moving ram, the crosshead and other parts being shown in section for the sake of clarity.

In the particular embodiment of the invention which is disclosed herein merely for the purpose of illustrating one specific form among possible others that the invention might take in practice, I show in Figs. 1 and 2 a conventional multiple opening platen press, in open position, having a downwardly moving ram, although my improved linkage arrangements are also applicable for an upwardly moving ram, as shown in the modification of Fig. 4. The press of Figs. 1 and 2 consists primarily of a base 1 connected by four usual vertical tension columns 2 to a conventional crosshead 3 which carries a hydraulic cylinder 4 and a vertically movable main ram 5. A usual filling tank 6 and ram control valves (not shown) are employed in the opening and closing of the platens. A moving platen 7 and an upper hot platen 8, separated from each other by a layer of heat insulating material 9, are secured to ram 5 while a lower similarly insulated platen 10 is secured to stationary base 1. Usual intermediate platens 11, 12 and 13 may be guided by any conventional guide means (not shown). A pump 14, Fig. 2, provides pressure for the main ram 5 to compress the material between the platens and for operating usual pullback rams 15 all in a manner well understood in the art.

My improved equalizing means comprises two main links 16 and 17 preferably, though not necessarily, of the same length, pivotally connected to each other at 18 and to the upper and lower platens as at 19 and 20. The intermediate platens 11, 12 and 13 are pivotally connected to link 16 by successively shorter hanger links 21, 22 and 23, parallel to main link 17. Suitable lugs 24 are formed on the platens for the pivot pins of the various links. The links 17, 21, 22 and 23 are preferably formed of two pieces. The hanger links are provided at their outer ends with longitudinal slots 25 of suitable length and are held in sliding and pivotal engagement with upper main link 16 by equally spaced pins 26, 27 and 28. When the press is in any position other than the fully closed position, these supporting pins, through hanger links, carry the weight of the intermediate platens, while at the same time permitting pivotal action between upper main

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link 16 and the hanger links. The hanger links are of such lengths as to cause the vertical distance between platens to be equal with the exception, however, that the vertical distance between upper platen 8 and intermediate platen 11 may be made a trifle greater than the other openings. This larger opening is to insure movement of main links 16 and 17 in the event that the piece of material inserted in the uppermost opening is a trifle thicker than that of the other pieces of material. To relieve upper platen 8 of the weight of the linkages and of the intermediate platens, upper main link 16 may, instead of being pivoted to upper platen 8, be pivoted to moving platen 7. Also, hanger links 21, 22 and 23, instead of being made parallel with lower main link 17, may be placed parallel with upper main link 16, in which case the weight of the platens would put the hanger links in a state of compression rather than tension.

While I have described only one linkage assembly for the sake of clarity, it is to be understood that, in order that the platens may have stability and be retained in a horizontal plane while being lowered and raised, additional linkage assemblies similar in all respects to the one described are intended to be connected to the platens at various points. For instance, two such linkage arrangements may be connected to each end or to each side of the platen.

Operation.—Assuming, for example, that the distance between adjacent platens, when open, is four inches, platen 13 need travel only this distance to come into contact with the material resting on stationary platen 10 but platen 12 must travel a distance of eight inches before reaching the material resting on platen 13. Thus each successive platen above must travel the accumulated distances between the platens below so that in the assumed example upper platen 8 is required to travel sixteen inches before reaching platen 11. My improved combination effectively accomplishes this because the upper ends of links 16 move at the speed of main ram 5, while the lower ends move downwardly at a much slower rate. The upper ends of the hanger links move downwardly at intermediate rates proportional to the distance of their pivots from the upper platen, these distances being such that all platens close substantially simultaneously, provided, of course, the material is all of uniform thickness. In the event, however, that any piece of material is thicker than the others, the platen immediately above such thicker material will come into contact with it and be stopped before the other platens make contact with the materials beneath them. Upper main links 16, however, are enabled to continue their downward movement due to slots 25 in the hanger links attached to said platen above the thicker piece of material permitting the supporting pins associated therewith to ride downwardly in the slots until the movement of the linkage is stopped by the simultaneous contacting of the material in the other platens. After the curing period is over, pullback rams 15 cause all linkage assemblies to function in reverse order to lift the platens simultaneously and thus end all curing periods equally. In the case where one piece of material is thicker than the others, there would be a momentary delay before the platen immediately above such material was lifted therefrom. This delay would be only until the supporting pins in slots 25 of the hanger links of said platen had travelled

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upwardly to the end of the slots whereupon such platen would rise with the others.

Fig. 4 shows a modification of my linkage arrangement as applied to a conventional upwardly moving ram type press, although this modification is also applicable to a press having a downwardly moving ram, the object of the modification being to provide for cases where the variation in thickness of materials may be greater than the variation in materials suitable for use with the preferred form of linkage. In this modification the press has a hydraulic cylinder 30, a ram 31, to which is secured a moving platen 32 and a lower heating platen 33, a crosshead 34, an upper stationary platen 35, and intermediate platens 36, 37 and 38. Lower main links 39 are pivoted to lower platen 33 and to upper main links 40. Hanger links 41, having slots 42, connect the intermediate platens with main links 40 at 43, 44 and 45, as in the preferred form. Instead of pivoting links 40 directly to upper platen 35, however, I interpose adjustable links 46, pivoting one end to upper platen 35, the other to main links 40 by pins 47. I also pivot one end of retaining links 48, having slots 49, to crosshead 34 and attach the other end to main links 40 by disposing pin 47 through slot 49. To exert a stabilizing pressure against each assembly, I provide a compression spring 50 within a casing 51 pivotally connected to the crosshead, the force of the spring being exerted through a rod 52. As ram 31, moving platen 32, and lower platen 33 move upwardly to close the press, lower ends of upper main links 40 rotate outwardly and upwardly, raising intermediate platens 36, 37 and 38 through hanger links 41. Due to the different speeds at which supporting pins 43, 44 and 45 travel, as explained in the preferred form, the platens move upwardly at different speeds, depending on the distances they must travel to have the pieces of material resting thereon come into simultaneous engagement with the platens above. Material of greater thickness placed in any of the three lower openings are taken care of by slots 42 of hanger links 41, that is, the thicker material engages the platen immediately above it sooner than the material of uniform thickness engages the platens immediately above it and as main links 40 continue to rise the thicker material assumes the weight of the platen above it, causing the hanger links pivoted thereto to move upwardly relative to main links 40, and disengaging the upper end of slots 42 from the supporting pins inserted therein. When thicker material is placed in the uppermost opening preventing upward movement of platen 36 toward fixed upper platen 35, the pivotal points of upper main links 40 shift from pivot pins 47 to supporting pins 43, and pivot pins 47, against the relatively weaker force of compression spring 50, ride through slots 49 of retaining links 48 which, being pivoted, accommodate themselves to the direction of movement of pivot pins 47. In such manner are main links 40 permitted to continue their upward movement to lift intermediate platens 37 and 38, even though intermediate platen 36 has ceased to move owing to the presence of the thicker material in the uppermost opening.

While I have shown and described, in both preferred and modified forms, a multiple platen press having five platens, it is of course to be understood that my linkage arrangements may be readily applied to a platen press having a larger or

smaller number of platens. In the event that the presses, of either modification, are to be operated when only partially filled, i. e., some of the openings are not to be filled, then it is desirable to start loading the press from the bottom opening on up. This will insure complete closure without damage to the mechanism.

From the disclosure herein, it is seen that I have provided simple, reliable and efficient linkage means for simultaneously closing and opening the platens of a multiple opening platen press of the types described, whereby no piece of material between the various platens is given a greater curing period than the other pieces of material and whereby irregularities in the thicknesses of material are compensated for in a novel and simple manner.

It will, of course, be understood by those skilled in the art that various changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. In a multiple opening platen press having a stationary and a moving platen with an intermediate platen, comprising, in combination, main links pivotally connected at one of their ends to the stationary and movable platens and at their other ends to each other, and hanger links pivotally connected to the intermediate platen and to one of the main links at a point proportionately spaced between the pivotal connections at each end of such main link so that all of the platens close substantially simultaneously.

2. The combination as defined in claim 1 further characterized in that the end of each hanger link opposite the end pivoted to a platen is provided with a slot in which a pivot pin secured to a main link may move to provide a sliding and pivotal connection between the hanger link and said main link.

3. The combination, as defined in claim 1, further characterized in that the press has a plurality of intermediate platens and hanger links for each of the same, and the hanger links are of graduated lengths and disposed in substantially parallel relationship with one of the main links.

4. A mechanism for simultaneously opening and closing the platens of a multiple opening platen press having a stationary element, a movable element, means for vertically moving the same, an upper platen secured to one of said elements and a lower platen secured to the other of said elements, and a plurality of intermediate platens, comprising, in combination, upper and lower main links pivotally connected together, the lower main links also being pivoted to the lower platen, hanger links pivotally connected to the intermediate platens and to the upper main link, adjustable links pivotally connected to the stationary element and to the upper main link, and slotted retaining links pivotally and slidably connected to the stationary element and to the upper main link.

5. The combination, as defined in claim 4, further characterized in that one of the main links and the links connected thereto are yieldingly held by a spring to provide stabilization to the linkage assemblies.

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