

March 10, 1942.

C. G. MUENCH

2,275,982

PRESS

Filed Aug. 5, 1938

2 Sheets-Sheet 1

Fig. 1

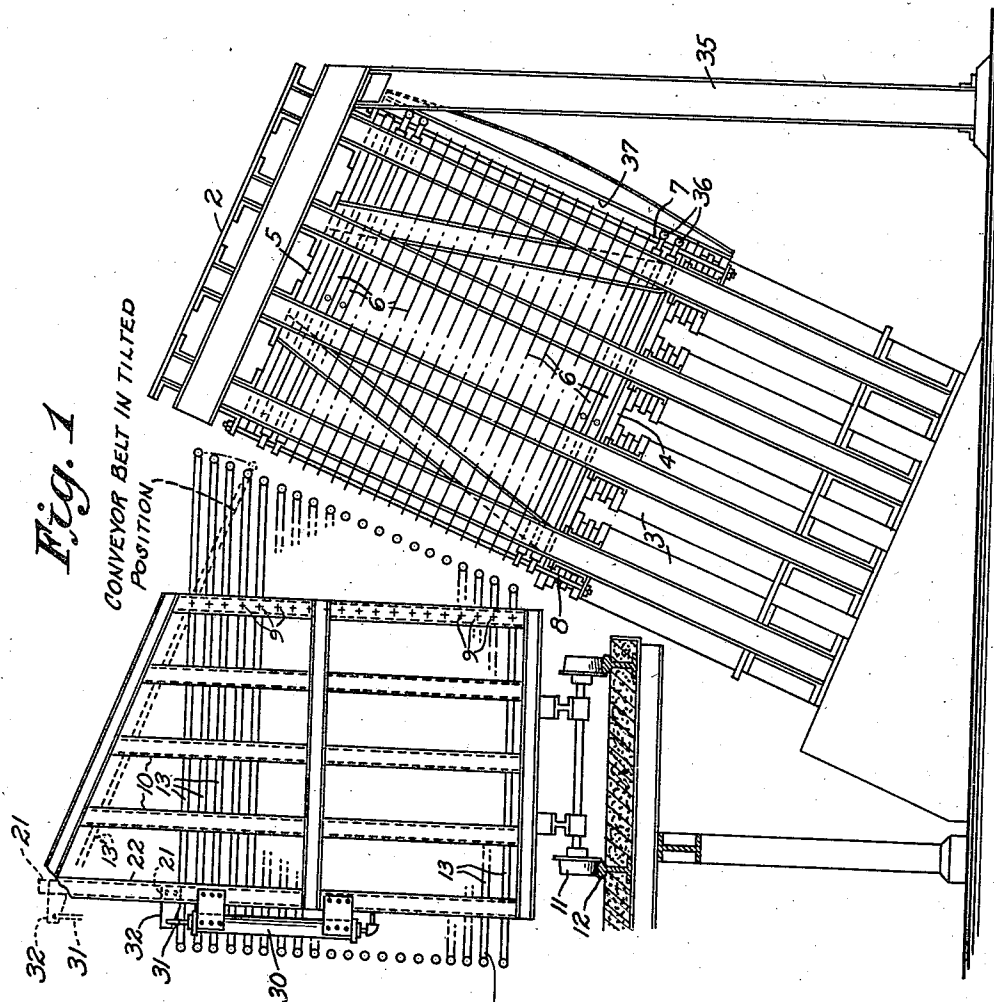
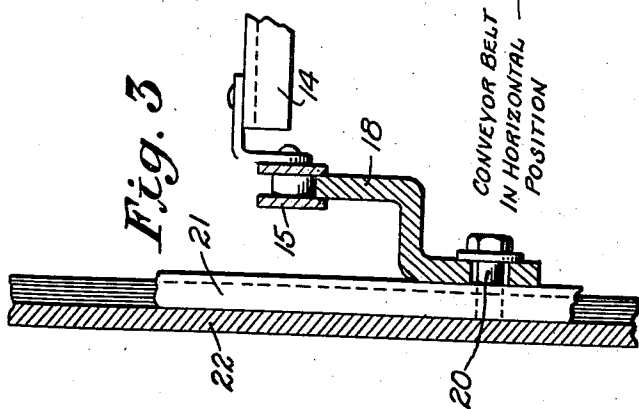


Fig. 3



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2.Sheets-Sheet 2

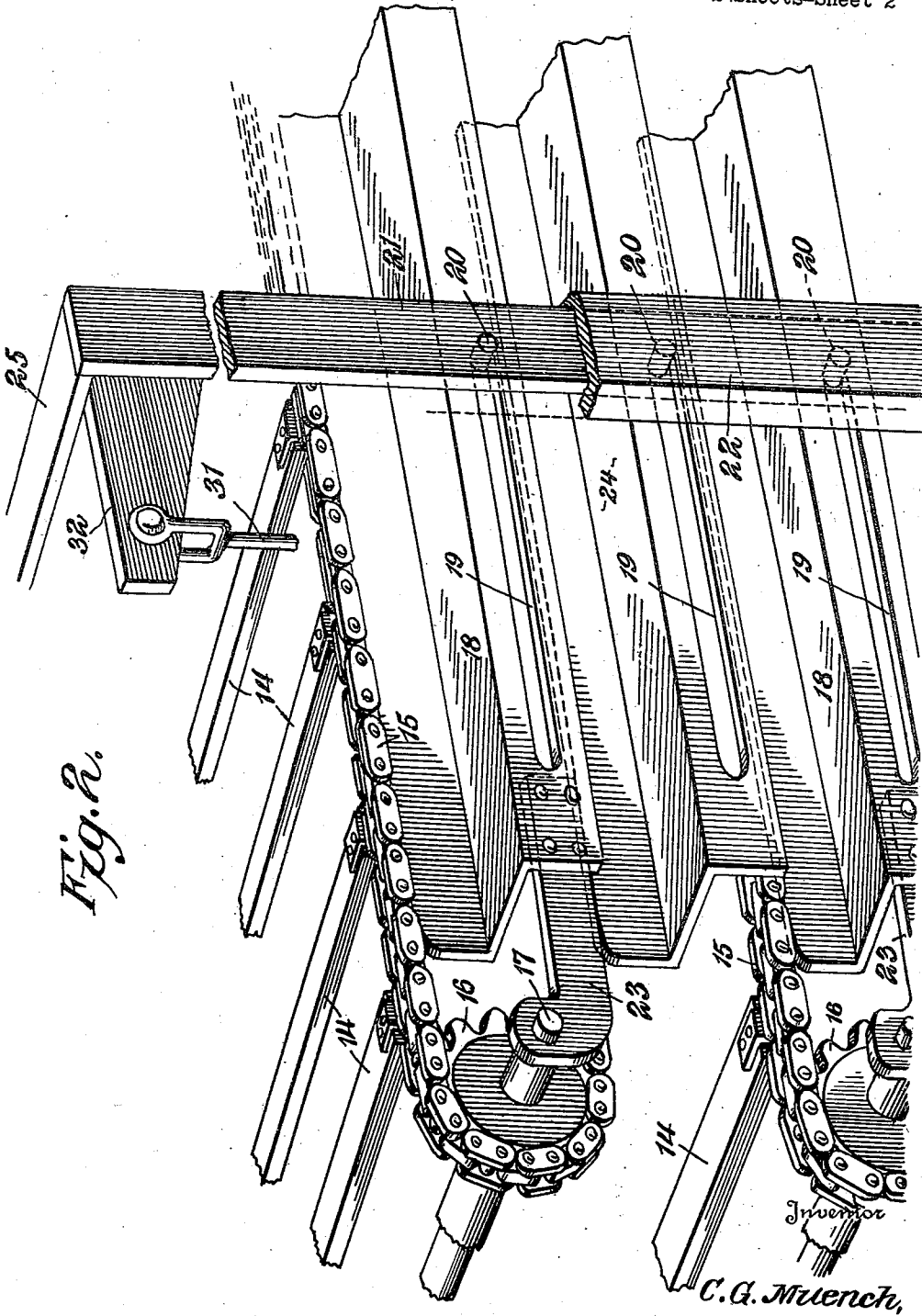


Fig. 2.

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PRESS

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This invention relates to presses and has for its object to provide a mechanism cheap to manufacture and more efficient in operation than those hereof proposed.

With these and other objects in view the invention resides in the novel details of construction and combinations of parts as will be disclosed more fully hereinafter and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification and in which like numerals designate like parts in all the views—

Fig. 1 is a side elevational view partly in section illustrating a press made in accordance with this invention and having associated therewith means for loading the press with the material to be pressed;

Fig. 2 is a partial perspective view of a portion of the loading means to better illustrate its construction; and

Fig. 3 is a detail sectional view of a portion of the mechanism illustrated in Fig. 2.

Presses have heretofore been proposed consisting of a plurality of heated platens disposed one above the other for simultaneously pressing and/or drying a relatively large plurality of sheets of material in one operation, thereby saving considerable time but, insofar as known, such presses have required either considerable time to load and unload the sheets of material, or have required additional structure and operating mechanism therefor to mechanically load and unload the press, thereby adding cost to the pressing operation. The purpose of this invention is to provide a mechanism which will simultaneously press a plurality of sheets of material and to load and unload the press with a minimum of cost and labor.

This invention is applicable to a variety of materials in sheet formation but is particularly adapted for use in connection with sheets of fibrous material such as fiber board or other similar composition building boards of appreciable size (i. e. of the order of 4' x 12'), operating upon such boards after they have been felted and while they still contain an appreciable quantity of moisture. In such condition, the boards are extremely yieldable and subject to rupture or fiber displacement unless they are maintained in substantially planar formation until after they have been dried and pressed wherefore, preferably, they should be handled with considerable care, and it has been found by experience that the best mode of handling is by supporting such wet boards on substantially flat mechanical con-

veyors. Particularly, such boards should not be subjected to flexing or bending while in their wet condition, for to bend such a board would impair or disrupt the interlocking characteristics of the fibers of the board and thereby weaken the board so as to greatly reduce if not entirely negative its value for the purpose for which it is intended. The present invention is well adapted to handle such wet boards and to load them into a press while maintaining the full interlocked characteristics of the fibers thereof, and the press is particularly designed to receive, press, and expel such boards in a manner more efficient than any heretofore known.

Broadly, the invention covers cutting a continuously moving web of interlaced or interlocked fiber stock to produce individual sheets of approximately 4' x 12' size, placing such boards one above the other in a portable loading rack which can be moved from the web-forming machine to the press, providing a press with a vertical series of heated platens which though parallel to each other are inclined to the horizontal, and providing means on the loading rack for elevating the boards thereon to the inclination of the press platens so that the boards may be transferred into the press without bending or flexing the boards, as a result of which, and after the boards have been pressed, the boards may be slid from the inclined platens of the opened press without the necessity of conveyors therefor.

In the drawings a press is generally indicated by the numeral 2 and comprises suitable rigid framework, a plurality of pistons generally indicated by the numeral 3 for hydraulic or other operation, a lower header 4 rigidly attached to the upper ends of said pistons and having an upper pressing surface disposed in a plane considerably inclined to the horizontal, and an upper header 5 rigidly supported by the framework and having a lower pressing surface disposed parallel to the lower header 4. All of the pistons are so designed as to be capable not only of simultaneous operation during the opening and closing of the press, but also capable of maintaining the pressing surface of the lower header in a plane having a substantially constant angle of inclination to a horizontal plane.

A series of platens generally identified by the numeral 6 is provided, each platen heated in any suitable manner either by electricity or other medium, each platen slidably mounted at its opposite ends on guide members such as the rods 7 and 8 rigidly carried by the frame of the press, said platens interconnected in any suitable man-

ner as well understood in this art so that they will separate from each other during the opening operation of the press so that the boards may be positioned between said platens, and so that they will move toward each other during the closing operation of the press in order to subject the positioned boards to pressure, said platens at all times being maintained substantially parallel to the inclined pressing surfaces of the upper and lower headers. In Fig. 1 the platens have been indicated in their opened position ready to receive boards from the loading rack.

The angle of inclination of the platens to the horizontal may be made as desired and therefore the nature of the material to be pressed may be taken into consideration in arriving at the angle of inclination desired for that material. The angle of inclination therefore should be substantially the angle of repose of the sheets which are to be pressed. In the manufacture of felted fibrous material into what is known on the market as hard board, it has been found that an angle of 22° from the horizontal is a practical and efficient angle of inclination. In such manufacture of hard board, the fibrous stock is felted into a web having a thickness of three-quarters of an inch to one inch but such web contains a considerable amount of moisture at the time that it is cut into the 4'x12' sheets, and the press is designed to exert a pressure on said sheets which will reduce such thickness to one of the order of one-quarter of an inch, the heat of the platens driving out the moisture content and so compressing the fibers of the sheets as to result in an extremely dense substantially homogeneous and firmly interlocked sheet of hard board, the moisture readily escaping from the press due to the inclination of the platens thereof. Therefore it is to be understood that whereas 22° has been found a very advantageous angle of inclination of the platens of the press in connection with the manufacture of hard board, other angles of inclination may be found more suitable in connection with the manufacture of other pressed sheet material, the governing factor being that for any material the angle of inclination should be substantially the angle of repose of the pressed sheet.

The loading rack comprises preferably an open framework generally identified by the numeral 10 mounted upon wheels 11 which may run upon the track rails such as 12 whereby the rack may be transported from the the web-forming machine (not shown) to the press. Said framework carries a series of superposed conveyors indicated at 13 each conveyor to receive and to expel a board to be dried and/or pressed in the press, each conveyor preferably being endless and passing over wheels, cogs, pinions or other suitable rotatable drive members disposed at the opposite ends of the conveyor, one end portion of each conveyor having pivotal relation as at 9 with the framework of the loading rack, but the opposite end of each conveyor adapted to be elevated and lowered to change the position of the conveyor from a substantially horizontal plane to the inclined plane of the press platens, and vice versa.

In Fig. 2 a conveyor has been indicated as comprising a series of slats or bars 14 arranged in parallelism to each other and having their opposite ends attached to links of chains such as 15 passing around a sprocket such as 16 mounted upon a shaft 17, said slats for receiving thereon relatively dry sheet material or boards. Obvi-

ously other types of conveyors could be provided, and for relatively wet sheets or boards either closely spaced slats could be used or an endless screen or other foraminous member, the governing factors of such conveyor being ability to handle the sheets or boards without damage, flexibility to turn about the sprockets, and sufficient rigidity to support the boards thereon.

A guide member 18, indicated in the drawings as a Z-bar, supports each conveyor, the upper stretch of the conveyor chain 15 preferably supported by and slidingly riding upon the upper edge of said guide. One end of said guide is pivoted to the corner post of the loading rack on the side next to the press, said guide at its opposite end being provided with an elongated slot 19 receiving therein a stud 20 rigidly carried by a lifting bar 21 vertically slidable in a channel 22 constituting the corner post of the loading rack on the side thereof away from the press whereby, when the lifting bar is moved in a vertical direction its stud will elevate and/or lower the slotted end of the Z-bar to cause corresponding movement of the conveyor through the required angle of inclination above-mentioned. The slotted end of the Z-bar or guide member carries the conveyor shaft 17 as through the instrumentality of the bracket 23. This bracket or other similar support may be duplicated at the opposite or pivoted end of the Z-bar for carrying the other shaft of the conveyor. If sag of the lower stretch of the conveyor chain is not desired, said stretch may be similarly supported on another Z-bar 24 which could be a substantial duplicate, as to construction and mounting, of the Z-bar 18. It will be understood that the lifting bar 21 is duplicated at the other corner of the loading rack on the side thereof away from the press, and the upper ends of the two lifting bars may be interconnected as by the cross piece 25, and that there will be a duplication of the Z-bar 18 for the opposite side chain of each conveyor.

Any suitable means may be provided for moving the lifting bars in a vertical direction but in Fig. 1 there has been indicated a hydraulic cylinder 30 rigidly secured to the corner posts such as 22 of the loading rack, said cylinder having a piston therein for actuating the rod 31 whose free end is pivotally connected to a bracket 32 rigidly carried by the lifting bar such as 21, said cylinder being provided with any suitable means for connecting it to a source of fluid pressure for actuating the piston therein.

In operation of this mechanism, the loading rack with its conveyors in their horizontal planes will be loaded with cut boards to be pressed, a board resting on each conveyor, and then the rack will be trundled to the press and positioned with respect thereto so that the conveyors will register with the opened press platens. Then fluid pressure will be passed simultaneously into the duplicate cylinders 30 to operate the pistons therein and, through the duplicate rods 31, raise the duplicate lifting bars 21 which in turn will elevate the ends of the rack conveyors remote from the press. When these conveyors have been raised to assume the angle of inclination equal to that of the press platens, then the conveyors are actuated to expel the boards into the press. The pistons of the press are then operated in the usual manner to close the press and the heated platens will dry the boards, the time and pressure of the press being controlled or regulated to accomplish the results desired, after which the press is opened thereby separating the

platens and permitting the discharge of the pressed and dried boards.

The press may or may not be supplied with conveyors for the material to be pressed. If it has conveyors they will be operated in conjunction with the conveyors of the loading rack during the charging of the press, preferably simultaneously therewith and in unison so that all boards will move at the same time; and during discharge the press conveyors may be operated similarly in unison, or sequentially if desired to remove one board at a time. The press conveyors preferably should consist of screens, foraminous material, or any suitable non-absorbent material providing a surface which will tend to prevent slippage thereover of the boards both before and after pressing, since movement of the conveyors will create movement of the boards.

It is preferred, however, to avoid the added expense of the press conveyors and, by providing and maintaining the platens at the hereinbefore mentioned angle of inclination, equal if not better results are attained. The boards will slide from the loading rack into the press, and will slide out of the press after pressing, if the angle of inclination is made in accordance with the nature and characteristics of the material being pressed. The absence of the press conveyors makes possible smooth or "ironed" surfaces on both sides of each board. However, it may be found desirable to modify the sliding action into and/or out of the press. This could be accomplished in several ways by mechanical expedients among which might be mentioned unequal separation of the press platens so that a "pinch" effect would result in each sliding board being stopped during charging of the press before the advancing edge of the board had passed through the press; or on the other hand two cross bars could be associated with each platen which bars would be separated from each other by the length of the press one bar serving as a stop to limit the movement of the unpressed board into the press and the other bar serving to start the pressed board out of the press each bar being suitably controlled as to its operation without interfering with the other bar and both bars adapted for non-interference with the closing and pressing operation of the platens.

In Fig. 1 the axis of each press piston is rectangular with respect to the plane of the press platens, and the entire press is inclined from the vertical in an amount equal to the angle of inclination heretofore mentioned, wherefore a bracing member 35 is provided to resist the pressures incident to the inclination of the press. Obviously, however, presses of other angularly could be provided, though maintaining the required inclination of the press platens. The inclined press shown is preferred in order that the pressure exerted by the pistons may be applied at right angles to the platen surfaces and therefore to the boards being pressed. Each press platen should have a minimum of binding action on the guide rods therefor, and hence it may be found practical to provide each platen with rollers such as 36 at their lowermost corners, which rollers will ride upon a flat surface 37 of duplicate beams rigidly carried by the framework of the press.

The conveyors of the loading rack are shown of such lengths as to permit their ends adjacent the press to ever be in close proximity to the platens of the press so as to provide a minimum

separation distance therefrom, or gap, during the transfer of the boards to the press. Further, the elevation of the track 12 is such that when the conveyors are tilted through the complete angle of inclination (as indicated by the dotted line showing 13') they will be in planar registration with the inclined and opened platens of the press.

It will therefore be seen from the foregoing description that, by this invention, there is provided a press adapted to press and dry sheet material of various kinds, as for example wet felted fiber, which press comprises a series of superposed and relatively vertically movable platens between which the sheets are to be pressed, together with means for heating the platens, and means for mounting and maintaining the platens in substantial parallelism with each other but at an angle to the horizontal, which angle is equal substantially to the angle of repose of the sheets being pressed, said angle being as found most suitable for the material being pressed. By "angle of repose" is meant that angle to the horizontal occupied by the sheets to require a minimum of force to start sliding or gravitational movement of the sheets. The press is provided with means for opening and closing the press through bodily movement of the platens while maintaining their angle of inclination, said means including a reciprocable piston acting directly upon the bottom inclined platen. Lastly, there is additionally provided means for loading the sheets into the press, which loading means has normally horizontal supports for receiving the sheets thereon, with said supports tiltable to elevate the received sheets into inclined planes registrably corresponding to the planes of the platens.

It is obvious that those skilled in the art may vary the details of construction and arrangements of parts without departing from the spirit of this invention and therefore it is desired not to be limited to the exact foregoing disclosure except as may be required by the claims.

What is claimed is:

1. A press adapted to press and dry sheet material, comprising a series of superposed platens between which sheets are pressed, means comprising guide rods for maintaining said platens in substantial parallelism with each other but at an angle to the horizontal, which angle is equal substantially to the angle of repose of the sheets being pressed, whereby the sheet material is admitted to and discharged from the press, and thrust means comprising members normal to the platens for taking the thrust of the inclined platens.

2. The combination with a press adapted to press and dry sheet material and having a series of inclined superposed flat members between which sheets are pressed, of loading means comprising a plurality of vertically spaced normally substantially horizontal supports, said supports being complementary with respect to the series of inclined superposed flat press members, each support for receiving a sheet thereon, means for tilting said supports simultaneously to the inclination of the superposed flat press members, and means for discharging the sheets from the tilted loading means into the spaces between said flat press members between which the sheets are pressed.

3. A press adapted to press and dry sheet material, comprising upper and lower heated platens between which sheets are pressed, means com-

prising guide rods mounting and maintaining said platens in substantial parallelism with each other but at an angle to the horizontal, means serving to move one of said platens toward and away from the other platen whereby the sheet material is admitted to and discharged from the press, and thrust receiving means separate from the said guide rods and disposed to receive the side thrust of the platens resulting from the inclination of the platens.

4. In a press adapted to press sheet material, the combination with a series of spaced inclined superposed platens between which sheets are pressed and guides mounting and maintaining said platens in substantial parallelism with one another, of thrust means separate from said guide means and disposed to take the side thrust of the series of inclined superposed platens, said thrust means taking the side thrust due to the inclination of the platens and comprising an inclined thrust receiving member, normal to the platens, mounted on the press, and a complementing thrust transmitting member secured to each platen and abutting against a surface of the inclined thrust receiving member.

5. A press adapted to press and dry sheet material, comprising a series of superposed flat members between which sheets are pressed, guiding means for maintaining said members in substantial parallelism with each other but at an angle of approximately 22° to the horizontal, and separate thrust means independent from said guiding means comprising members normal to the flat superposed pressing members for taking the side thrust of the inclined superposed flat pressing members.

6. In an apparatus of the character described, a multiple opening platen press for pressing

5 sheets comprising a series of superposed platens, means for supporting said platens in substantial parallelism with each other but at an angle to the horizontal, means for opening and closing the press through bodily movement of said platens while in their inclined positions, means for loading a series of sheets simultaneously into the press, said loading means comprising a series of normally horizontal superposed supports, each support to receive a sheet thereon, means for 10 tilting the series of supports simultaneously into inclined planes substantially corresponding to the planes of the platens, and means for simultaneously discharging all of the sheets from their tilted supports onto the series of superposed press platens.

7. In an apparatus of the character described, a press for pressing sheets of felted fiber comprising a series of superposed platens, means for supporting said platens in substantial parallelism with each other but at an angle to the horizontal, means for opening and closing the press through bodily movement of said platens in their inclined position, means for loading a plurality of sheets 25 simultaneously into the press, said loading means comprising a plurality of vertically spaced normally horizontal supports complementary to the series of superposed platens, each support for receiving a sheet thereon, each of said supports pivotally mounted adjacent one end thereof, means simultaneously operable adjacent the other 30 end of each of said supports for tilting said supports in unison into inclined planes corresponding to the planes of the press platens, and means for discharging the sheets from the tilted supports into the spaces between the press platens. 35

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