

Jan. 8, 1963

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3,071,805

METHOD AND MEANS FOR PRODUCING WOOD-COMPOSITION PANELS

Filed Dec. 29, 1958

3 Sheets-Sheet 1

FIG. 1a

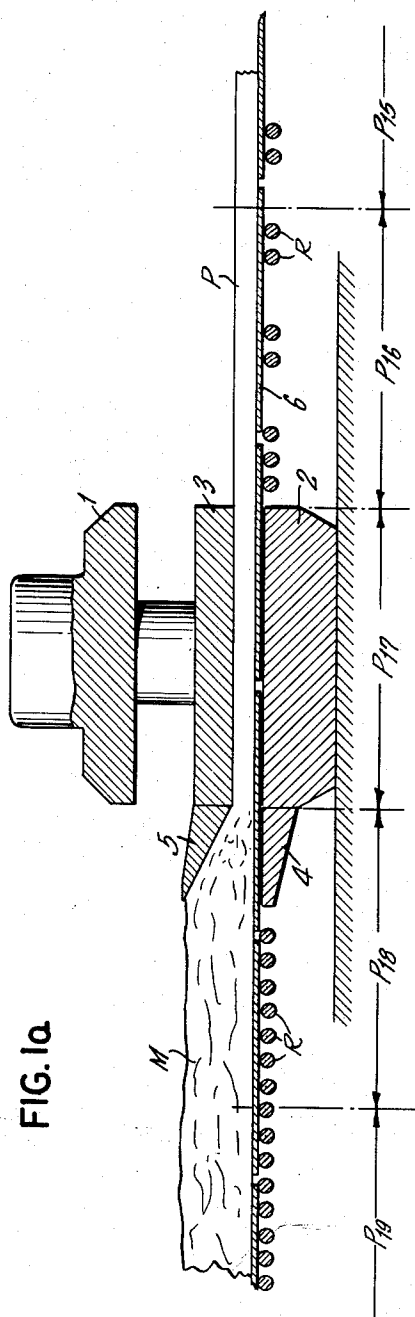
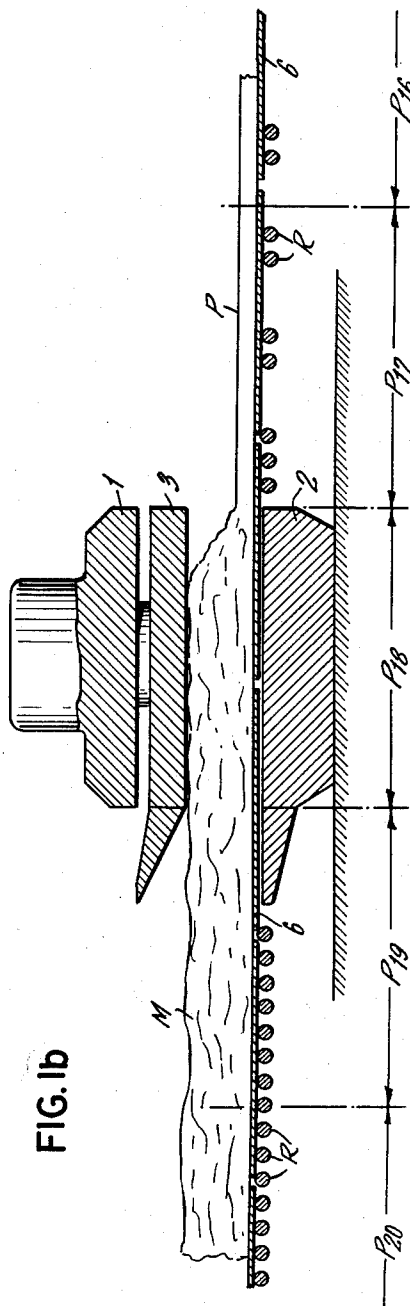


FIG. 1b



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FIG. 2

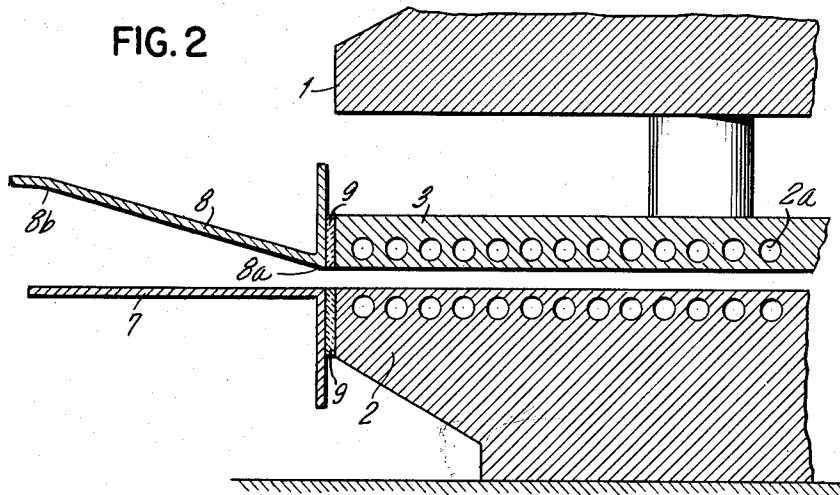


FIG. 3

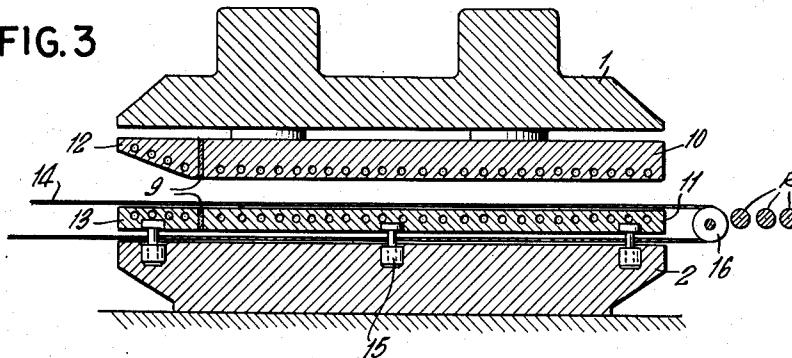
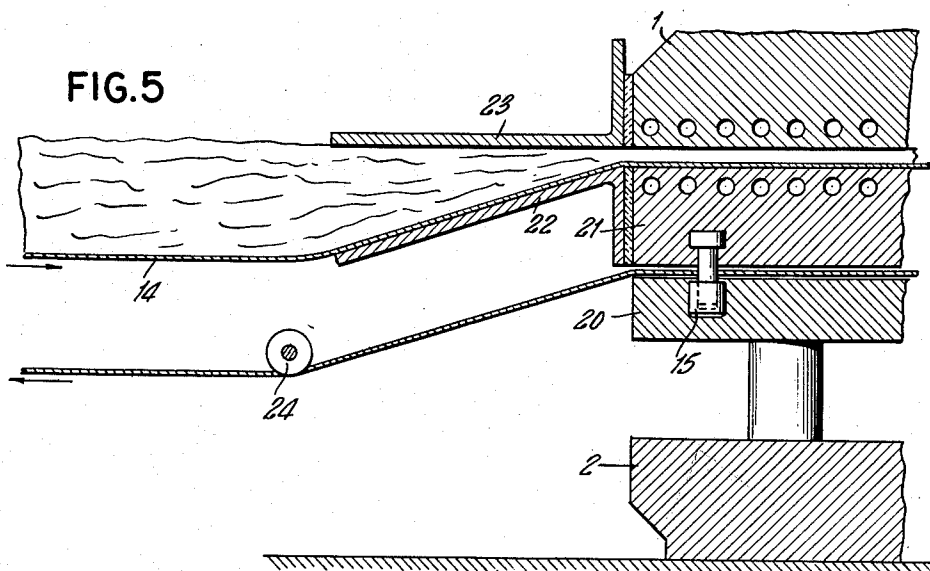


FIG. 5



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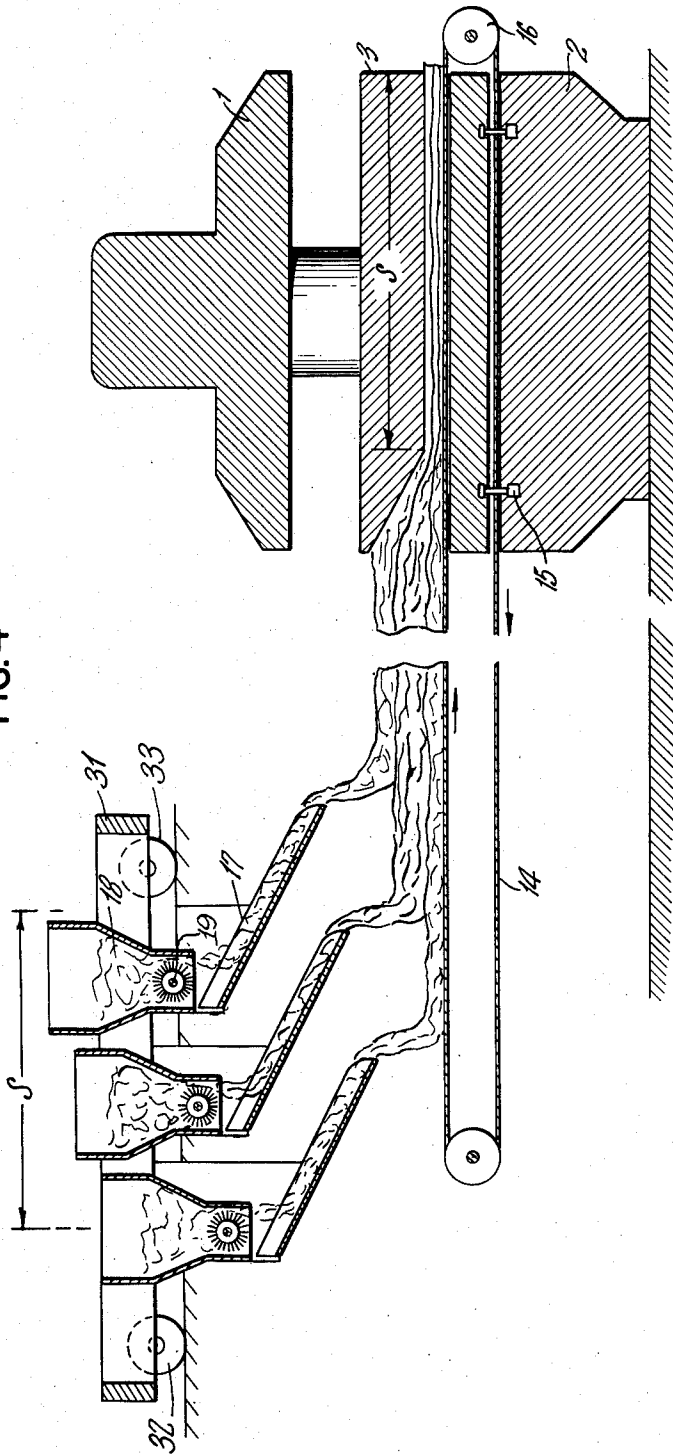
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METHOD AND MEANS FOR PRODUCING WOOD-COMPOSITION PANELS

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FIG. 4



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3,071,805

METHOD AND MEANS FOR PRODUCING WOOD-COMPOSITION PANELS

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7 Claims. (Cl. 18—4)

My invention relates to methods and means for producing pressed composition panels from a mat of binder-carrying wood particles or similar comminuted or fibrous stock.

Wood particle boards are made, as a rule, by subjecting a loosely textured or felted mat of binder-impregnated wood particles, or similar fibrous stock, to compression in a panel press which reduces the mat to a fraction of its original thickness before the binding agent is solidified by hardening or curing. As a rule the mats are formed or cut in accordance with the desired size of the panels, this size being substantially equal to that of the press platens. In cases where the mat of binder-coated particle material is fed toward the press in continuous operation and in the form of a continuous sheet, the sheet is subdivided by transverse cutting, if necessary after pre-compressing the mat, and the severed individual pieces, corresponding in length to that of the press, are then shoved into the press or are stacked between the platens of a multi-platen press.

In order to take advantage of continuous mat formation in the subsequent steps of the manufacturing process, it has been proposed to substitute the discontinuously operating panel presses by continuous pressing devices. Such devices comprise individual press assemblies which travel in the mat feeding direction along with the mat while exerting pressure thereupon. While travelling, the press assemblies must remain connected with a heat source by supply and exit conduits. This requires complicated travelling components and accessories which involve a considerable amount of maintenance and repair. Hence the great amount of investment and maintenance is far from economical, particularly in manufacturing plants of relatively small or medium size. Another disadvantage of such continuously operating presses is the failure of the resulting products to meet the exacting requirements often desired with respect to uniformity of thickness and strictly planar surfaces.

It is an object of the invention to provide a method and means which afford producing a continuous panel sheet from binder-carrying wood particle material or similar fibrous stock with a better uniformity of the panel properties than obtainable with the above-mentioned known continuously operating presses.

Another object of the invention is to afford producing a continuous panel sheet without the necessity for complicated and expensive pressing devices that must travel together with the mat to be pressed, and without the need for cutting the mat transversely into pieces of fixed length before passing these pieces into the press.

A further object of my invention is to provide composition-board manufacturing means, particularly suitable for plants of small or medium size, which affords using one and the same mat-forming and panel-pressing equipment for the production of panels of any desired size or length not determined or limited by the size of the platen press being used.

To achieve these objects, and in accordance with a feature of my invention, I pass a previously formed mat or fleece of binder-carrying particle stock through a reciprocating panel press in intermittent steps of travel corresponding to the length of the press in the mat travel

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direction, temporarily stopping the advance of the continuous mat between consecutive steps of travel. I further intermittently press the consecutive and contiguous mat portions that are located in the press at a time during the respective stopping periods. Thus the mat, consecutively and incrementally compressed and hardened in the reciprocating press, emerges from the press as a finished and endless panel sheet. However, it is essential to my invention that, during the operations just described, I form in the mat a transition zone at the location where the mat portion next to be pressed arrives at the pressing area. In the transition zone the felted mat merges with the pressed and hardened portion and the original thickness of the mat tapers gradually down to the reduced thickness of the finished panel.

According to another feature of the invention, the transition zone, extending transversely across the mat and having wedge-shape in the longitudinal mat direction, is formed during each closing of the reciprocating platen press by means of lip members that form part of the press itself or are firmly attached to the coating press members so as to pre-shape and condense the stock material in the wedge-shaped transition zone as the press closes for compressing and solidifying the preceding mat portion.

According to one of the more specific features of my invention, the above-mentioned lip members for providing the transition zone consist of a horizontal lower member of sheet metal of sufficient thickness and sufficiently braced if needed, which extends along the supporting table of the platen press at the entering side of the mat, and of another member of sheet metal of sufficient thickness and, if necessary, sufficiently braced, which is firmly mounted on the vertically reciprocable platen of the press thus extending above the lower sheet-metal lip member. The upper sheet metal member has its active lip surface extended from the platen in an upwardly inclined direction and hence forms together with the lower lip member a pre-shaping device of generally wedge-shaped cross-section.

According to another feature of my invention, the above-described method is performed with the aid of a press originally designed for the purpose of forming the transition zone and thus more efficient than a conventional press with subsequently attached lip members, of the type described above. The improved press is provided with an extended table of sufficient strength to form a lower lip member integral with the table structure, and is further provided with an upper press platen of greater height than conventional and thus sufficiently resistant to bending under the increased and unilateral loading imposed upon the press when performing the method of the invention, the upper lip member for forming the transition zone being an integral part of the press platen.

The above-described lip members, attached to the press or forming integral parts thereof, are preferably given a length in the mat travelling direction greater than the thickness of the mat to be pressed. Preferably, the length of the lip members is twice to three times the thickness of the mat. This provides in the transition zone a sufficiently gradual transition from the thickness of the pressed final panel material to the approximately five to seven times greater thickness of the mat.

According to still another feature of the invention a heat insulating insert is provided between each lip member and the press component with which the lip member is joined. Such insulating inserts are favorable if the bonding agents contained in the particle mass are to be hardened by application of heat, such as is the case when the bonding agents consist of thermosetting resinous material. When using adhesive substances that are particu-

larly sensitive to temperature, provision may be made for cooling the lip members.

The heating of the press components for forming the planar panel surfaces is effected in the conventional manner, for example, by means of steam, hot liquid electric resistance heating or high-frequency heating. As mentioned, presses originally designed for the purposes of the invention have relatively high platen or table members. The relatively great height of these components affords a convenient possibility of accommodating the heating means. For example, aside from the pipes or ducts for supplying steam or hot liquid, a device for high-frequency heating may be built into one or more of these components for applying high-frequency heating after passing each individual mat portion into the press for the purpose of rapidly heating the material initially by high-frequency current together with the continuous supply of heat effected by the fluid medium passing through the pipes.

The felted mat of particle material, consisting of one layer or of several layers of different particle materials can be produced in the conventional manner by distributing the particle stock manually or by mechanical spreaders or fully automatically. The mat may be deposited upon a number of successive caul sheets closely following each other and preferably bordered longitudinally by side boards. The forming of the mat of particle stock is preferably effected at the height of the supporting table of the press so that the loaded caul sheets can be shoved into the press on a roller conveyor in a substantially gapless sequence. However, the mat may also be deposited upon an endless belt of sheet-steel, likewise bordered on both longitudinal sides by confining walls or boards.

For cooperation with such a steel belt, it has been found particularly useful, according to another feature of my invention to provide the press with a heatable, rigid carrier plate which is placed upon the supporting table of the press and is automatically lifted a few millimeters with each opening of the press, the plate being as long as the vertically reciprocable press platen including its lip member. According to a more specific feature of the invention, the upper run of the conveyor belt passes from the mat forming station over the top of the plate and thence over a guide roller to the lower run which extends between the supporting table of the press and the plate back to the forming station. The conveyor belt is moved stepwise each time a portion of the mat is being conveyed into the open press while the carrier plate is lifted from the supporting table. The supporting table need not be heated when using such a conveyor assembly.

The above-mentioned and other objects, advantages and features of the invention will be apparent from, and will be set forth in the following description in conjunction with the embodiments of the invention illustrated by way of example on the accompanying drawings in which:

FIGS. 1a and 1b show two different stages of the fabricating method according to the invention with reference to a hydraulic platen press illustrated by a longitudinal section in open and closed position respectively.

FIG. 2 shows in longitudinal section the front portion of another panel press made applicable for the purposes of the invention by the attachment of suitable lip members to a press otherwise of conventional design, this press being intended for use with caul sheets in the same manner as the press according to FIGS. 1a and 1b.

FIG. 3 is a sectional, lateral view of a press originally designed in accordance with the invention and equipped with a mat-carrying conveyor belt of steel, the lip members for forming the transitional zone being parts of the press structure itself.

FIG. 4 shows in vertical cross-section another press according to the invention in combination with an automatic mat-forming station.

FIG. 5 is a vertical sectional view of the front portion of still another press according to the invention in combination with a mat-forming conveyor equipped with an endless steel belt passing through the press.

The same reference characters are used in the various illustrations for denoting functionally similar components respectively.

In FIG. 1 the rigid and stationary upper traverse of a single-panel press is denoted by 1 and the likewise stationary table structure of the machine by 2. The table 2 forms one of the platens for the panel pressing operation. The other platen 3 is vertically reciprocable with respect to the traverse 1 and is operated hydraulically in the conventional manner.

A rigid lip member 4 is firmly joined with the table structure 2 at the mat-entrance side thereof and extends across the entire width of the press and hence also across the width of the panel to be produced. The upper, active surface of lip member 4 is planar and horizontal so as to form an extension of the top plane of table 2. Another transverse lip member 5 of rigid construction is firmly joined with the platen 3 to reciprocate together therewith. The lower surface of lip 5 is substantially planar and extends from the horizontal platen surface in an inclined direction upwardly away from the platen up to a height which, when the press is closed (FIG. 1a), is at least on a level with the top surface of the mat M to be pressed, the length of the lip members in the mat-travel direction being greater than the thickness of the mat prior to pressing.

The mat M consists of wood shavings or other wood-particle stock coated or impregnated with a thermosetting binder such as urea formaldehyde resin or phenol formaldehyde resin. It is supplied to the press on a number of caul sheets 6 of aluminum or steel. The caul sheets 6 are placed upon a conveyor path formed by a number of rollers such as those denoted by R. The cauls follow each other in a substantially uninterrupted sequence leaving only negligible gaps between each other.

The finished endless panel sheet leaving the press is denoted by P. The mat M having relatively large thickness, forms a coherent structure with the finished panel sheet P emerging from the press, and the lips 4 and 5 act during the pressing operation to form a transitional zone in the mat in which the mat is pre-shaped to a tapering cross-section and hence is given a gradually increasing density toward the mat-panel portion located between table 2 and platen 3.

The caul sheets 6 are conveyed toward and through the press intermittently in the rhythm of the reciprocating operation of the press. Each time the press is open, as shown in FIG. 1b, a mat portion equal in length to the active length of the press platen in the mat travel direction is forwarded into the press. Thereafter, the caul sheets remain at rest until the mat portion within the press is compressed according to FIG. 1a and is cured to form a solidified finished panel portion. Thereafter, the caul sheets are moved another portion forward, and so forth.

According to FIG. 1a, the endless sheet of panel material P issuing from the press is finished in the panel portions denoted by P15 and P16, and it will be understood that panels of any desired length may be cut from this finished length of panel material. The portion P16 was the last one to issue from the press. The portion P17 is just being pressed and cured in the press. Due to the closing of the press, the front zone of the next-adjacent portion P18 is located between the lip members 4 and 5 which form a transitional zone extending from the poured full height of the mat M down to the thickness of the finished panel sheet.

After completed pressing and curing of portion P17, this portion leaves the press and the next portion P18 enters into the open press, this stage being shown in FIG. 1b. As mentioned, the length of each entering portion,

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including the transition zone, corresponds to the active length of the press table 2 or platen 3 exclusive of the lip members 4 and 5. The caul sheets 6, which during their travel over the conveyor rollers R are preferably joined with each other by clamps or other means to avoid appreciable gaps, can be given any length best suited for inserting and removing the caul sheets from the equipment, this length being not necessarily identical with the length of the press.

The press illustrated in FIG. 2 is basically of conventional design but is converted in accordance with the invention to be suitable for the above-described method. The press comprises a stationary supporting table 2 provided with channels 2a for steam, hot water or other heating medium. The press platen 3, also provided with such channels, is mounted on hydraulic plungers vertically reciprocable with respect to the upper traverse 1 of the press. Two lip members 7 and 8 of sheet metal are firmly secured to table 2 and platen 3 respectively. In cases where, as shown in FIG. 2, the table and the platen are heatable, an insulating layer 9 is preferably located between each lip member and the respective press component. The lip members 7 and 8 are preferably braced by ribs or webs (not shown) extending in the longitudinal direction with respect to the travel of the mat material. They are otherwise designed in accordance with the press described above with reference to FIGS. 1a and 1b. That is, the top surface of lip member 7 is planar and forms an extension on the horizontal top surface of the supporting table 2, whereas the active surface of lip member 8 extends from the planar surface of platen 3 in an upwardly inclined direction.

According to another feature of the invention, also exemplified by the press shown in FIG. 2 but applicable generally, the horizontal pressing surface of the reciprocable press member, such as the platen 3 in FIG. 2, merges with the upwardly inclined surface of the lip member with a slight transitional curvature as shown at 8a and the upper portion of the latter surface near the free edge of the lip member may also be curved slightly toward the horizontal direction as shown at 8b. Even if all these preferential features are embodied in the device, the transitional parts of the press, dimensioned for example for a mat of approximately 150 mm. height and a final panel of 25 mm. thickness, require a length of only about 400 to 450 mm. which is practically insignificant in comparison with the average length of such panel presses. Despite the considerable difference in thickness between the pressed and un-pressed material, the device secures a gentle processing of the material in the transition zone and in the mat zone adjacent thereto; and such operation is also afforded in cases where the mat is composed of long and intimately woven shavings or if any other delicate, inter-felted particles, or of different particles in respectively different layers of the mat. Thus, the method and device according to the invention are readily applicable with the processes and expedients particularly needed for the manufacture of high-quality composition panels. This has been confirmed by comparatively testing the strength and other physical properties of specimens cut from the finished wood-composition panel in ranges previously forming a transition zone, and specimens cut from mat locations remote from the transition zones.

The panel molding press illustrated in FIG. 3 is originally designed for performing the method according to the invention. That is, the lip members for providing the wedge-shaped transition zone are integral parts of the press itself. FIG. 3 further exemplifies, generally with reference to a press with a vertically reciprocable upper platen, the provision of an endless belt of steel which connects the press with the mat-forming station.

Placed upon the supporting table structure 2 of the press is a carrier plate composed of two parts 11 and 13. The carrier plate is supported on table structure 2 by

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means of air bolsters 15, springs or other means which lift the carrier plate a few millimeters when the press opens. The upper run of the steel belt 14 extends over the horizontal top surface of the carrier plate, it being understood that the width of the steel belt is substantially equal to that of the press and the panel sheet to be formed. After passing through a direction-reversing roller 16 at the rear of the press, the belt 14 extends between carrier plate 11 and table structure 2 toward the forming station where the mat of particles is deposited upon the upper run of the belt. Only when the press is opened, with platen 10 in the illustrated, raised position can the belt 14, then freely located between table 2 and carrier plate 11 perform its travelling motion for the purpose of removing the pressed panel portion and inserting a new mat portion. As explained above, each advancing motion of the belt 14 corresponds to the length of the press in the belt travelling direction, exclusive of the lip members.

All actively pressing components of the press, including the platen 10 with its lip member 12 and the carrier plate 11 with its lip member 13, can readily be given a thickness and strength not applicable to otherwise comparable multiple-platen presses, and since further the lip members 12, 13 as well as the planar pressing components 10 and 11 are located within the space between the fixed abutments formed by the table structure and the traverse structure 1, such presses can be given an extremely high accuracy of construction and operation even if the press has relatively great length in the belt travelling direction, so that the products produced on such a press exhibit excellent accuracy and uniformity with respect to thickness and planar surfaces. Depending upon the size and the length of the press, it may be equipped with a single hydraulic cylinder and pressure piston or with two or more such cylinders and pistons, the latter design being exemplified in FIG. 3.

A press whose lip members are incorporated into the press structure proper between the lower and upper traverses, is also applicable for mat material fed to the press on a series of individual caul sheets. In the latter case, the carrier plate 11 with its lip portion 13 is not required. Instead, the table structure 2 may be subdivided into a main portion and a lip portion both separated by an insulating layer as is shown for the carrier plate at 9. With such a subdivision and insulation, the main portion of the press is made heatable, for example, by passing steam or heated liquid through the channels, whereas the lip portion is not heated and, if desired, may be supplied with coolant through its channels.

The mat-forming station is preferably located at some distance from the press in order to permit checking the formed mat before it enters into the press. Such spacing between mat-forming station and press also provides for buffer action between the mat forming operation on the one hand, and the pressing and hardening operation on the other hand, relative to the periods of time required for these respective operations. In general, it is advisable to adapt the periods of time required for the pressing operation and for the building-up of the mat to each other. When using semi-automatic or full-automatic mat-forming devices, such devices are preferably so mounted as to be displaceable along the travelling direction of the conveyor belt or caul-sheet assembly, the amount of displacement of the devices being substantially equal to the longitudinal length of the individual steps of mat travel. In such case, the mat-forming devices are advanced forward together with the mat whenever a portion of the mat is being conveyed into the press, preferably so that the mat-forming activity of the device is not interrupted. During the pressing and curing period of the mat portion located in the press, the automatic or semi-automatic forming devices travel back to their starting point while being active to build up or extend the length

of the mat by an amount of stock material equal to that previously conveyed into the press.

The plant, schematically illustrated in FIG. 4, comprises a plant of the type described above, equipped with automatic mat-forming equipment for producing a three-layer panel. The forming conveyor is shown as an endless steel belt 14, although it will be understood that it may also be constituted by a sequence of individual caul sheets which are placed upon a roller conveyor at a point ahead of the forming station and which, after passing with the finished panel product through the panel press, are to be separated from each other and returned back to the entering point ahead of the forming station.

In the forming station, the conveyor is supplied with binder-impregnated wood-particle stock through inclined shaker troughs 17 which receive the stock material from respective small storage bins 18. The troughs 17 and bins 18 form together a structural unit which, during the stepwise forward travel of the forming conveyor, move together therewith a distance S corresponding to the active length of the panel press. The troughs 17 and bins 18 are shown mounted on a carriage 32 whose wheels 32, 33 run on a suitable rail structure. Each of the small bins 18 tapers downwardly to a slot extending transverse to the conveyor belt above one of the troughs 17 whose width also corresponds to that of the forming conveyor. Each of the bins 18 accommodates the quantity of stock required for building up the mat along the above-mentioned distance S.

During forward travel of the bin-and-trough assembly, the bins are filled with the required quantity of stock at any location suitable for this purpose. When the conveyor is stopped during the period of time required for the panel press to press and cure the product, the bin assembly travels back to the starting position while gradually depositing the three-layer mat upon the conveyor.

Pin rollers 19 are located in the discharge slots of the respective bins 18. By adjusting the rotational speed of the rollers 19, or any other dosage controlling devices used for this purpose, the amount of stock deposition per time unit can be adapted to the pressing and curing period, the travel speed of the bin assembly during the mat-forming return motion being adjusted or controlled accordingly. In this manner, the building-up of the mat can be made to continue without interruption, including the short intervals of time in which the conveyor 14, as well as the bin assembly, is advanced toward the press. It will be recognized from the example described, that the method and devices according to the invention afford securing the desired uniformity of all properties throughout the finished endless panel even in cases where the stock material must be processed rather delicately or where particular expedients are required in the formation of the mat in order to obtain the desired texture or surface appearance, this being often the case with mats and panels composed of several layers and comprising special surface zones. By virtue of the above-mentioned control and regulation of the particle dispensation, a reliably uniform single-layer or multiple-layer mat can also be produced in the event of variations in the proper hardening or curing periods as may occur or become necessary when entering new charges of adhesive binder into the manufacturing process.

If desired, the invention can be applied in conjunction with an existing platen press of the type having a vertically reciprocable supporting table to cooperate with a stationary counter-pressure platen connected with the fixed upper traverse of the press. For this purpose, and according to another feature of my invention, the press may be provided with a plate which is placed upon the supporting table and which is automatically slightly lifted when the press is being opened. The additional plate is provided at the entrance side of the press with the transitional lip member whose active surface is inclined from the plane of the plate downwardly, whereas the stationary

platen is provided with an extension piece or lip member extending in the horizontal direction. The mat of felted particles whose entire height in this case is located beneath the pressing plane of the pressure receiving platen, is shoved into the press on a steel belt which during closing of the press is lifted by the amount of upward travel of the supporting table and carrier plate. Consequently, after closing of the loaded press, the steel belt being somewhat slack assumes a slightly S-shaped configuration in the transition zone. In this manner, a particularly good uniformity of the transition from the height of the mat down to the thickness of the finished panel is obtained. The guide roller for reversing the travel direction of the steel belt is preferably journaled on the carrier plate. This plate is preferably made approximately as thick as the non-compressed particle mat if no roller is provided on the front side of the supporting table for guiding the returning portion of the steel belt in downwardly inclined direction. This press, too, is so mounted that the upper run of the steel belt enters horizontally into the open press. It is preferable to provide this equipment with a tensioning device for the steel belt which automatically equalizes the belt tension during opening and closing of the press.

FIG. 5 illustrates an example of converting a panel press of the type having a vertically reciprocable supporting table in the manner explained above. The table 20 is moved upwardly by hydraulic plunger action from the lower traverse structure 2 toward the fixed upper platen 1. The illustration relates to the use of a forming conveyor formed by an endless belt 14 which connects the press with the forming station generally in the manner shown in FIG. 4. For use with such a conveyor, the supporting table 20 of the press is provided with a carrier plate 21, which, under the effect of springs 15 or equivalent means, is automatically lifted a slight amount away from the supporting table 20 during opening of the press. The conveyor belt 14 passes along the top surface of the carrier plate 21 and returns to the forming station through the interspace between table 20 and carrier plate 21 when the press is in open condition, this taking place in the manner explained with reference to FIG. 3.

When converting an existing manufacturing plant, any particular local conditions or other desiderata can be taken into account by providing the presses with an upper lip member whose active surface is upwardly inclined and a lower lip member whose corresponding surface is downwardly inclined. The insertion of the mat into such presses is effected preferably in the same manner as described with reference to FIG. 5, concerning a panel press with a vertically reciprocating table.

As a rule, the press is always so installed that the conveyor belt will run horizontally and in planar condition into the press when the latter is open. Consequently, during closing of the illustrated press, the conveyor belt 14 is raised in the press an amount corresponding approximately to the deposited height of the original mat. For that reason, the lip member 22 attached to the carrier plate 21 has its top surface extending from the horizontal press surface of the carrier plate in a downwardly inclined direction, whereas the corresponding surface of the upper lip member 23 attached to the traverse 1 extends horizontally and forms an extension of the pressing surface of the traverse or upper platen. Since during closing of such a press, the lower run of the conveyor belt is also lifted, a guide roller 24 is provided at some distance from the press. Further guide rollers may be provided on the front side of the supporting table 20 or carrier plate 21, if desired. Such further rollers are desirable, for example, in cases where the height of the carrier plate differs considerably from the deposited height of the particle mat. However, aside from any ordinary supporting rollers (not illustrated) for the belt, no rollers

of special functions are needed in the upper run of the belt.

During closing of the press the counter pressure of the material between the two lip members 22 and 23 causes the belt to be firmly pressed against the surface of lip member 22. At the right-hand end of the wedge-shaped transition zone the belt merges along a slightly curved and relatively elongated path with the horizontal plane of the carrier plate 21. The shape of this transitional curve can be controlled, if desired, by regulating the belt tension with the aid of a conventional belt tensioning device as usually employed for endless belt conveyors. In plants according to the invention the periods of time required for feeding material into the open press are not appreciable in comparison with the hardening and curing periods of the material located in the press. Therefore, the presses designed and used according to the invention exhibit the same output per time unit as the above-mentioned known continuously operating presses of the same length. The presses inherently designed for the purposes of the invention and comprising a press table and a single platen both integral with the respective transverse lip members for pre-pressing the transition zone, can be given a much greater length in the mat travelling direction than is applicable and usual with multi-platen presses. Since such a single-panel press can readily be given a design of extreme accuracy, the wood composition panels produced on such a press are superior to those obtainable from multi-platen presses and continuous-sheet forming presses of the known type. That is, the panels made on such presses according to the invention have a remarkably slight tolerance with respect to departures from the desired thickness. They also exhibit uniformly good planar surfaces. For that reason, it is not necessary to subject the pressed panels to the otherwise often necessary machining by means of thickness-reducing planing tools for locally removing or reducing the exterior layers formed of high-quality shavings or other special material. As a result, any damage to the product due to subsequent fabrication, as well as excessive amounts of waste, are avoided or greatly minimized.

Presses originally designed for the purposes of the invention can readily be used for, or adapted to, the requirements of manufacturing plants of great daily output capacity, such as 50 tons per day or more. However, the invention is also applicable in a relatively simple manner by converting existing plants of lower output capacity. To this end, it often suffices to provide an existing platen press of conventional design with the additional lip members needed for forming the transitional zone of the mat-panel sheet, and to adapt the mat-forming equipment and conveyors to the working rhythm of the platen press. In comparison with the use of the much more costly multi-platen presses, a panel producing plant made or converted in accordance with the invention eliminates the expenditure and space requirement of the pre-pressing devices, the transverse cutting devices, as well as the feeding and discharging devices required for the individual stories of the multi-platen press. As mentioned, the invention also affords the advantage of cutting panels of any desired length or size from the endless flow of panel material coming from the press.

I claim:

1. Apparatus for producing an endless panel sheet from a mat of binder-carrying wood particles, comprising an intermittently operating panel press having a lower table member and an upper platen member of which one is vertically reciprocable relative to the other between respective open and closed position for molding a portion of the mat at a time to a panel of a thickness dependent upon the vertical spacing between said two press members when the press is in closed position, a vertically movable carrier plate mounted on top of said table member, lifting means engaging said plate for moving it upwardly

away from said table member a given distance when said platen member moves to open position, said platen member and said plate having at the entrance side of the press respective lips forming together a wedge-shaped space tapering from the free lip edges down to said panel thickness when the press is closed, mat-forming means comprising an endless conveyor belt for supporting the mat, said belt having an upper run extending along the top of said carrier plate and having a lower run extending between said plate and said table member, said upper run being in contact with and guided by the lower one of said lip members and having a mat-supporting top surface extending continuously from a mat-forming location ahead of said press to a location rearwardly of said press, and particle dispensing means disposed above said conveyor surface for depositing thereupon a continuous mat to be conveyed to said press, said lower run being controllable by said plate so that said belt can move in the conveying direction only when said plate is lifted.

2. Apparatus for producing a panel sheet from a mat of binder-carrying wood particles, comprising an intermittently operating panel press having two members of which one is reciprocable relative to the other to compress a portion of the mat at a time down to panel thickness, said two press members having respective press surfaces and having respective lip surfaces extending away from said press surfaces at the mat-entering side thereof, said lip surfaces forming together a wedge-shaped transition space tapering from the mat thickness down to the panel thickness as defined by the mutual spacing of said two press members when the press is closed, conveyor means defining a horizontal and continuously planar conveying path through said press and said transition space, mat forming means located above said path in front of said press for depositing particle mass upon said conveyor means to form the mat to be pressed, said conveyor means having start-stop control means for temporarily stopping said conveyor means as long as said press is closed, said mat forming means being displaceable forward and back along said path over a distance substantially equal to the active length of said press in the horizontal conveying direction, said forming means being operative to dispense wood particles during forward and return travel along said distance for building up a portion of the mat corresponding in length to the one being pressed at a time, whereby a solidified panel of unlimited length is incrementally issued from said press.

3. In the method of producing wood-particle panels by depositing binder-impregnated dry wood particles from dispensing means onto conveying means to form a mat and passing the mat on the conveying means through a reciprocating platen press, the steps of horizontally reciprocating the dispensing means in forward and return motion along the conveying path a distance corresponding substantially to the active length of the press and dispensing substantially dry wood particles at least during said return motion, advancing the mat as a continuous body through the press in consecutive steps of travel, each step corresponding substantially to said active length of the press, and temporarily stopping the mat between said steps of travel, performing said forward motion of said dispensing means simultaneously with said forward step of mat travel and said return motion during the stopping period of the mat, intermittently pressing consecutive and contiguous mat portions located in the press during the respective stopping periods, said pressed mat portions forming a single integral sheet of uniform cross section throughout, and forming in the mat at the entrance of the press a transition zone in which the mat merges with the next-adjacent pressed portion and the original thickness of the mat tapers down to the reduced thickness of said pressed portion, whereby a solidified panel sheet of unlimited length is caused to issue from the press.

4. The method of producing wood-particle panels which comprises passing a continuous mat of binder-

carrying dry wood particles through a reciprocating platen press in consecutive steps of travel each corresponding substantially to the active length of the press in the mat travel direction, temporarily stopping the mat between said steps of travel, depositing substantially dry wood particles during the travel and stopping periods of the mat and thereby continuously extending the mat at the rate of press operation, intermittently pressing consecutive and contiguous mat portions located in the press during the respective stopping periods, said pressed mat portions forming a single integral sheet of uniform cross section throughout, and forming in the mat at the entrance of the press a transition zone in which the mat merges with the next-adjacent pressed portion and the original thickness of the mat tapers down to the reduced thickness of said pressed portion, whereby a solidified panel sheet of unlimited length is caused to issue from the press.

5. Apparatus for producing a panel sheet of unlimited length from a mat of binder-carrying wood particles, comprising an intermittently operating panel press having two press members of which one is vertically reciprocable relative to the other to compress a portion of the mat at a time down to panel thickness, said two press members having respective horizontal planar press surfaces of substantially the same size and having respective lip portions extending away from said press surfaces at the mat-entering side thereof, said lip portions forming together a wedge-shaped transitional space tapering from the mat thickness down to the panel thickness as defined by the mutual spacing of said two planar press surfaces when the press is closed, conveyor means having a horizontal planar conveyor surface extending continuously and without transverse subdivision from a location ahead of said press through said transitional space and between said press members to a location behind said press, the length of said continuously planar surface ahead of said press being a multiple of that of said press in the conveying direction to permit depositing the mat thereupon, wood-particle dispensing means mounted above said surface ahead of said press and reciprocable along said conveyor toward and away from said press for depositing particles upon said conveyor surface to form the mat during the operating cycle of said press, and the length of said continuously planar conveyor surface behind said press being a multiple of the press length in said direction to permit intermittently issuing from the press a continuous mat of greater length than said press length.

6. Apparatus for producing a panel sheet from a mat of binder-carrying wood particles, comprising an intermittently reciprocating single-panel press having two press members with respective horizontal planar pressing surfaces vertically movable relative to one another from open to closed position during repetitive operating cycles of

which each includes an active stroke and a return stroke for compressing during the active stroke a portion of the mat down to panel thickness, conveyor means having a horizontal planar conveyor surface for receiving mat-forming particles and having an advancing travel toward said press for passing the mat into the press, and conveyor control means connected with said press for stopping said conveyor in dependence upon said relative press-member motion to said closed position so that said advancing travel of said conveyor is intermittent and limited each time to a distance corresponding to the length of said press members, particle dispensing means above said conveyor for depositing the mat on said conveyor surface, said dispensing means being reciprocable toward and away from said press a distance substantially also corresponding to said length and having a reciprocating cycle according to the operating cycle of said press.

7. Apparatus for producing a panel sheet from a mat of binder-carrying wood particles, comprising an intermittently reciprocating single-panel press having two press members with respective horizontal planar pressing surfaces vertically movable relative to one another from open to closed position during repetitive active and return strokes respectively for compressing during the active stroke a portion of the mat down to panel thickness, an endless belt conveyor having a horizontal conveying surface and extending through said panel press for supplying mat-forming particles thereto, conveyor start-stop control means connected with said press for stopping said conveyor when said press members are in said closed position so that the advance of said conveyor is stepwise and limited to periods in which said press members are away from said closed position, particle dispensing means above said conveyor for depositing the mat on said conveyor surface, said dispensing means being reciprocable from a starting position toward said press a distance substantially corresponding to the step length of conveyor advance and having a return travel stroke during the stopping period of said conveyor.

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