March 30, 1926. 1,578,841

L. G. MERRITT

PROGRESSIVE PLATE DRIER

Filed July 15, 1921 5 Sheets-Sheet 1

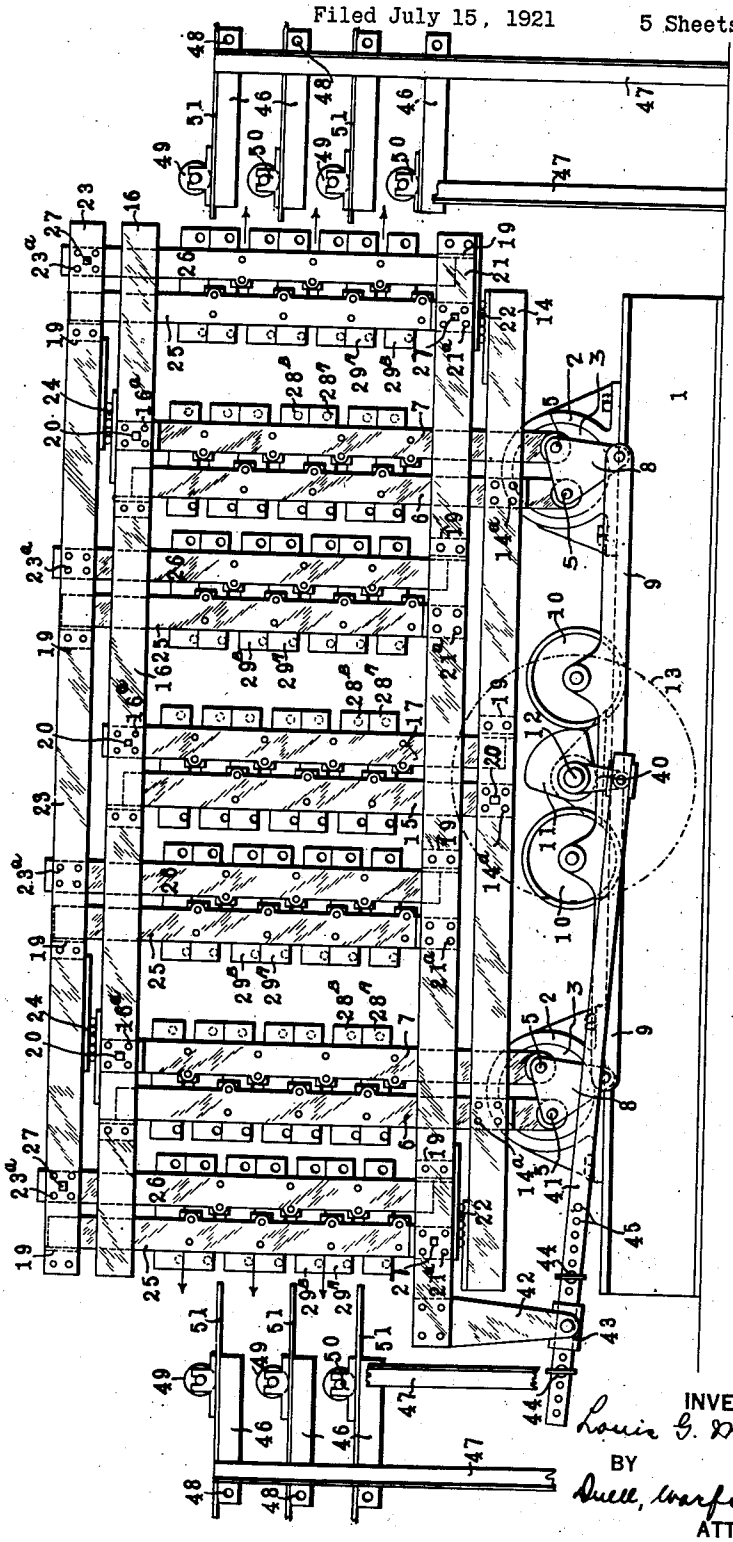


Fig. 1

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PROGRESSIVE PLATE DRIER

Filed July 15, 1921 5 Sheets-Sheet 2

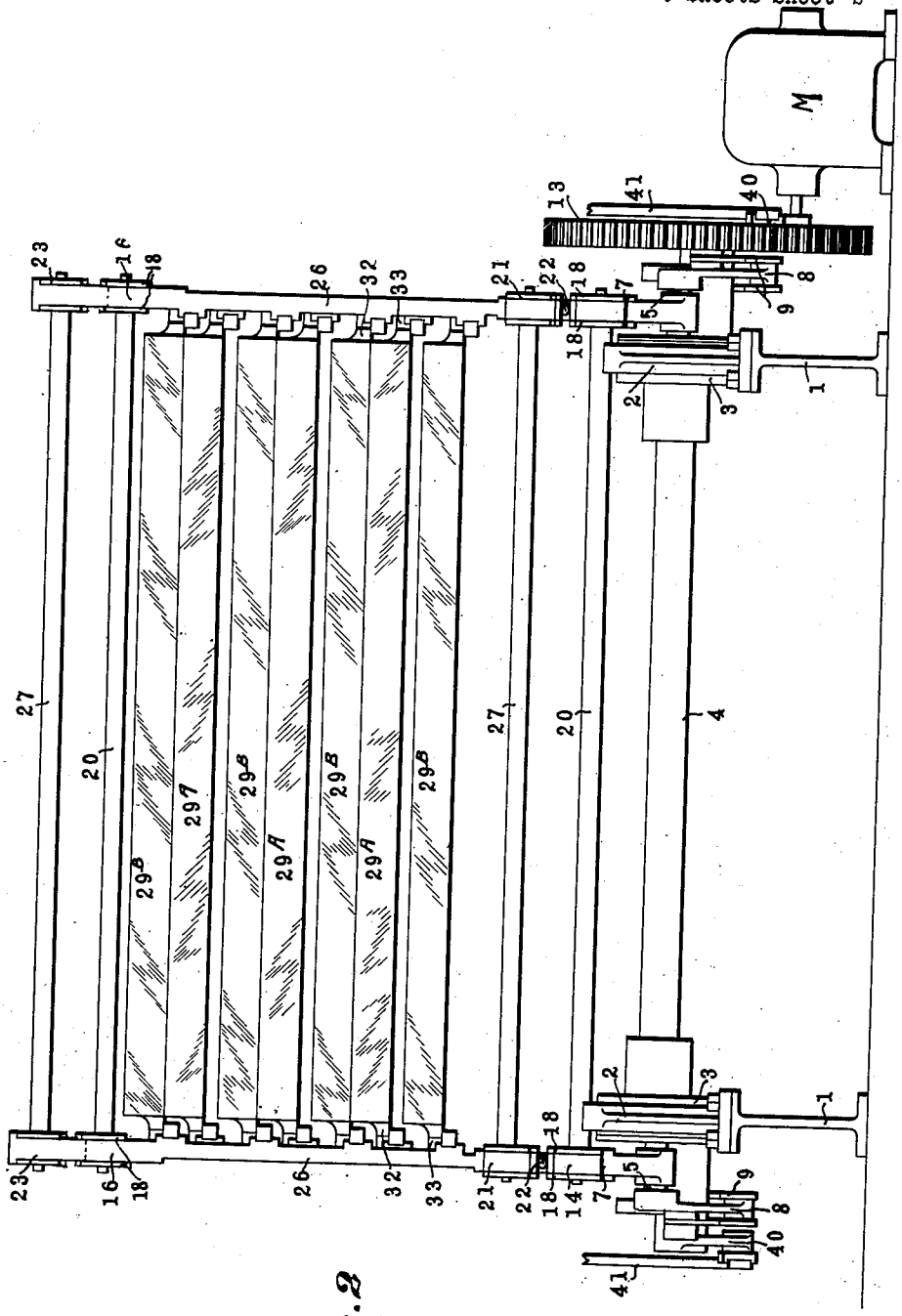


Fig. 2

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PROGRESSIVE PLATE DRIER

Filed July 15, 1921 5 Sheets-Sheet 3

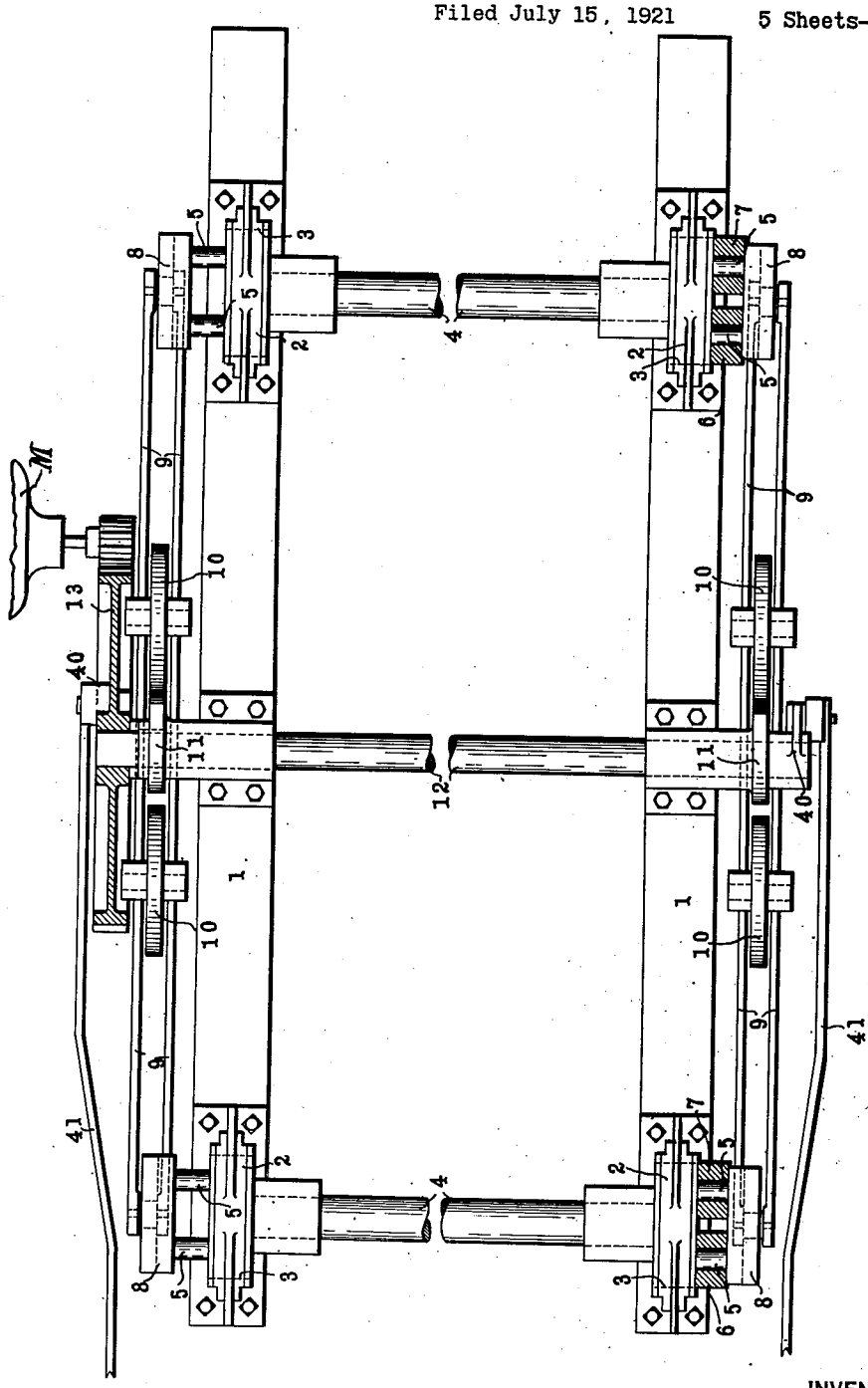


Fig. 3

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PROGRESSIVE PLATE DRIER

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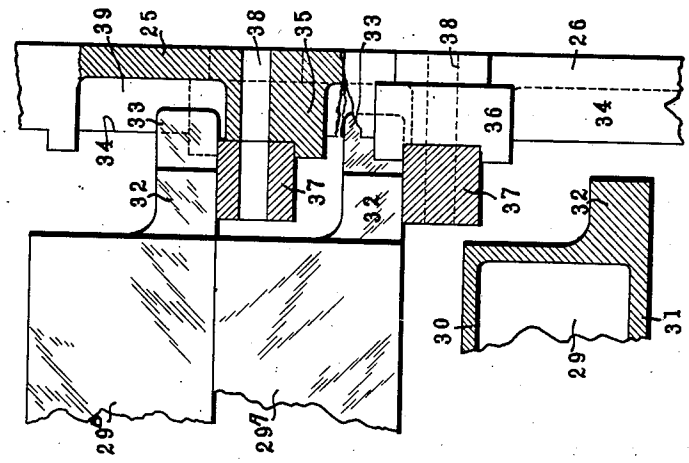


Fig. 5

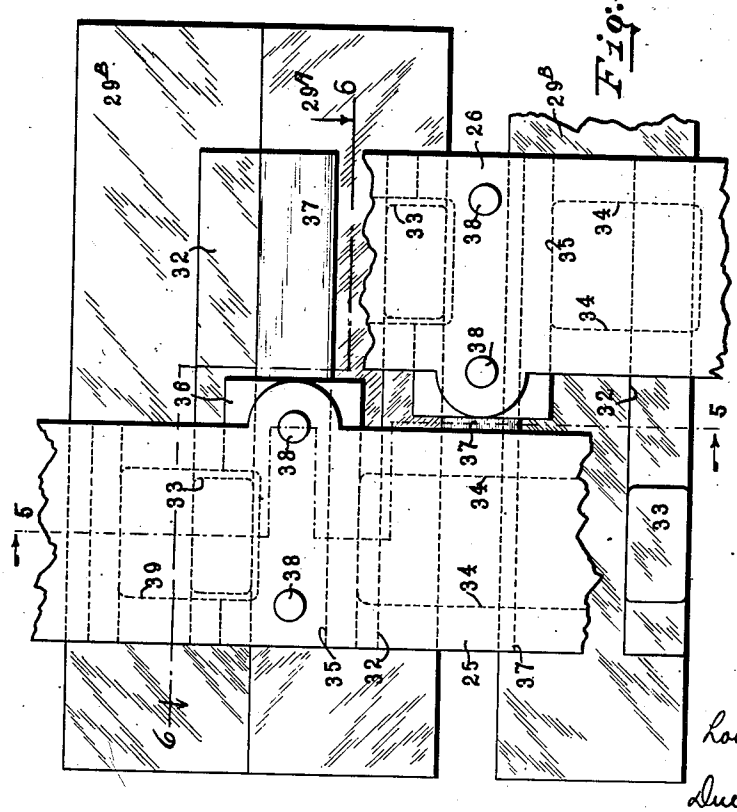


Fig. 4

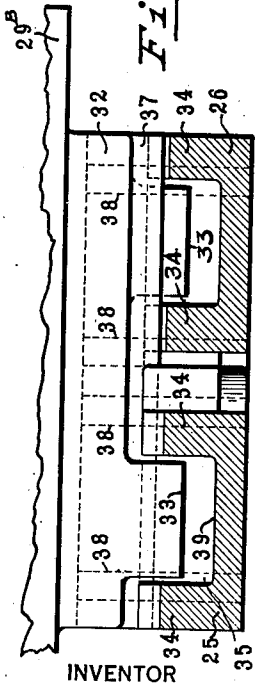


Fig. 6

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PROGRESSIVE PLATE DRIER

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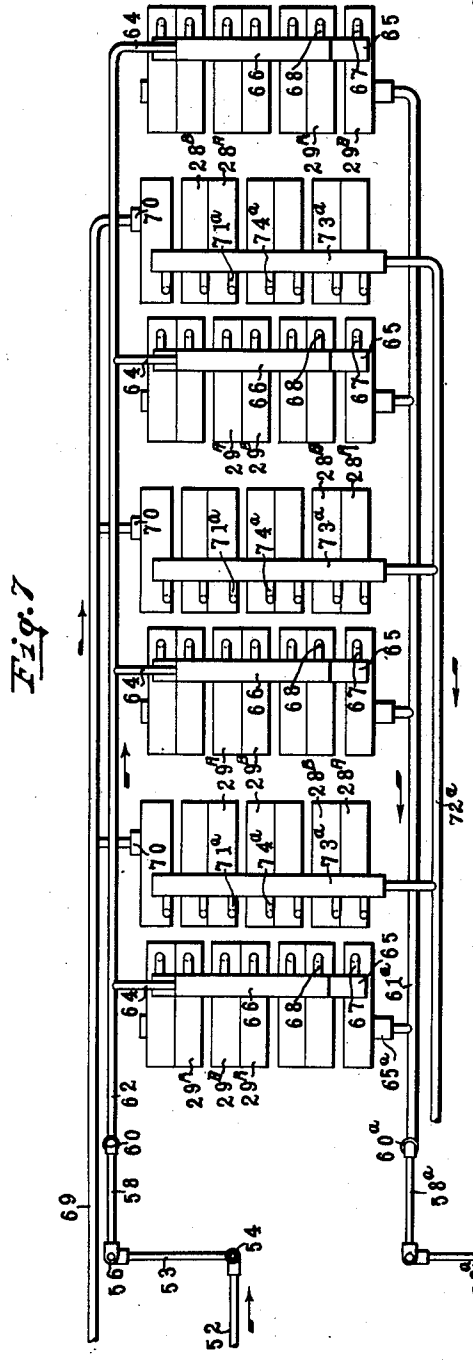


Fig. 7

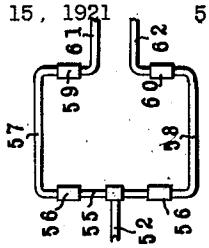


Fig. 9

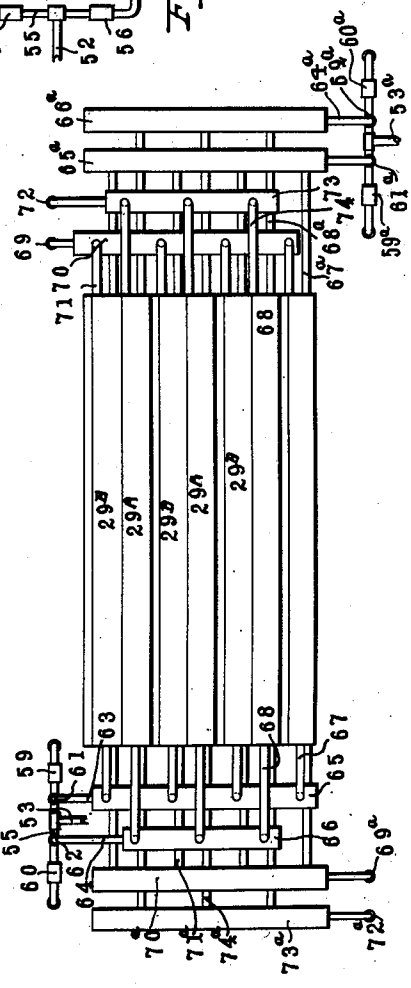


Fig. 8

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Patented Mar. 30, 1926. 1,578,841

UNITED STATES PATENT OFFICE.

LOUIS G. MERRITT, OF LOCKPORT, NEW YORK.

PROGRESSIVE PLATE DRIER.

Application filed July 15, 1921. Serial No. 484,903.

To all whom it may concern:

Be it known that I, LOUIS G. MERRITT, a citizen of the United States, residing at Lockport, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Progressive Plate Driers, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a drying apparatus, and in some of its details more particularly to a drying apparatus adapted for drying veneer, or the like, though it is also adapted for drying various other materials.

It is an object of the invention to provide improved drying apparatus in which the material subjected to treatment is progressively and automatically advanced therein.

Another object is to provide an improved drying apparatus for automatically feeding the material to and from the same.

Another object is to provide an improved drying apparatus of the class mentioned, in which the process of drying is automatically and continuously carried on, the treated material advancing progressively from entry in an undried state to ejection when it is fully dried.

Another object is to provide a simple improved operating mechanism for operating the parts of a plate drier of the class mentioned.

Another object is to provide an improved drying apparatus for subjecting the treated material to a preliminary heat treatment prior to its entry between the drying platens of the apparatus.

Another object is to provide a drier of improved construction, functioning to automatically and progressively feed the material treated and effectually prevent warping and splitting thereof, while, at the same time, hastening the drying process.

Another object is to provide an improved system of piping for conducting the heating medium to and away from the platens of a drying machine, which is simple and functions advantageously in use.

Other objects will be in part obvious in connection with the following detailed description of an illustrative embodiment of the invention, and will be in part obvious in connection therewith.

In the accompanying drawings in which an illustrative but preferred embodiment of the invention is shown,

Figure 1 is a side elevation of a drying machine (with the piping for the heating medium removed in the interest of clearness) which is constructed in accordance with this invention;

Figure 2 is an end elevation thereof looking at the right end of Figure 1, the veneer supporting tables and the piping for the heating medium being removed.

Figure 3 is an enlarged horizontal sectional view showing a plan of the operating mechanism for the drying platens.

Figure 4 is a fragmentary enlarged side elevation showing details of post construction and means for supporting the platens thereby.

Figure 5 is a sectional view taken on the broken line 5—5 of Figure 4.

Figure 6 is a horizontal section of Figure 4 taken approximately on the line 6—6 looking downwardly.

Figure 7 is a partially diagrammatic view showing the pipe connections for conducting steam to the various platens.

Figure 8 is an end elevation looking at the right of Figure 7, and

Figure 9 is a fragmentary diagrammatic plan view of the swing joint for the piping.

Referring now to the drawings for a detailed description of the illustrative embodiment, spaced I-beams 1 are adapted to provide a base upon which the drying machine proper is to be supported through journal boxes 2 bolted to the upper flanges of the beams. A plurality of these journal boxes are spaced along each of the I-beams at opposite sides of the base, and bearings 3 are supported for rotation in the journal boxes opposing bearings being connected by shafts 4 as shown in Figure 3. Pins 5 protrude from said bearings at opposite sides of the center thereof, and the lower ends of vertically arranged posts 6 and 7, hereinafter referred to as platen posts, are pivoted to said pins for support thereby. Spaced outwardly from each bearing is a crank plate 8 connected to both pins 5 and having

a downwardly extending arm pivotally connected to a pitman 9. One of these pitmen is provided at each side of the machine, as shown in Figure 3, each being connected at opposite extremities thereof to the crank plates 8. Each pitman bar is provided with spaced rollers 10 rotatively attached thereto and disposed to co-operate with the cam 11 mounted there-between. The cam 11 is mounted on a transversely disposed shaft 12 supported on the base I-beams 1. These cams are provided at spaced portions of the shaft 12 for driving the pitmen at both sides of the machine through engagement with the rollers 10. The shaft is connected for continuous rotation to a motor M through gearing 13 for imparting continuous reciprocating motion to the platen posts 6 and 7.

The platen posts 6 are rigidly connected near their lower extremities to a longitudinal stringer or girder 14, as at 14^a, and an intermediate platen post 15 is also rigidly connected to said stringer, the three posts 6 and 15 extending upwardly in parallel relationship from the stringer. Spaced upwardly from the stringer 14 and parallel thereto is a second longitudinally extending stringer or girder 16 to which the platen posts 7 and an intermediate platen post 17 are rigidly secured as at 16^a. It will be seen that the platen posts connected to the upper and lower stringers are arranged in pairs spaced along the machine, a post secured to the upper stringer and a post secured to the lower stringer constituting a pair. The upper ends of the posts secured to the lower stringer slidably engage the upper stringer and are guided and supported thereby, and the lower ends of the posts secured to the upper stringer are similarly slidably engaged by the lower stringer. In this relation it will be noted that each of the longitudinal stringers comprise a pair of spaced longitudinal side-plates 18 and spacing blocks 19 there-between, the blocks being arranged adjacent the ends of the posts to act as guides therefor.

It will be noted that the construction just described comprising the upper and lower girders 16 and 14, and the platen posts connected thereto constitute a platen side frame which is duplicated at the opposite side of the machine. The opposite side frames are also cross-connected by framing members 20, uniting them into a unitary frame, thus providing what will be hereinafter generically referred to as a platen frame.

A lower longitudinal stringer or girder 21 parallels the lower girder 14 and is supported thereon for longitudinal movement relatively thereto by spaced bearings 22, preferably of the ball or roller type. An upper longitudinal girder 23 similarly parallels the girder 16 and is supported thereon for longitudinal movement by spaced bearings 24 similar to bearings 22. The construction of girders 21 and 23 is similar to that of girders 14 and 16, and platen posts 25 are rigidly secured to the lower girder 21 as by bolts or rivets, shown at 21^a. The posts 25 extend upwardly between the side plates 18 of the girder 16, and are slidably received at their upper extremities and guided between the side-plates of the girder 23, engaging the spacing blocks 19 in a manner similar to the slidable engagement of the platen posts 6 above described.

Platen posts 26 are also rigidly secured to the upper girder 23 as at 23^a, extending downwardly therefrom in parallel relation to the respective platen posts 25, and adjacent thereto forming pairs of supporting platen posts, the individual posts of each pair being rigidly connected to the respective girders at one extremity and slidably engaging the opposite girder at the opposite extremity, as previously described in the case of girders 14 and 16. As in the former case also the upper and lower girders 23 and 21, with the platen posts connected thereto, constitute oppositely disposed platen side frames which are cross-connected as by upper and lower crossties 27, to form a second unitary platen frame, hereinafter referred to as the traveling platen frame. This traveling frame is arranged in co-operative relationship with, and is movable relatively to, the first mentioned platen frame, the latter being hereinafter referred to as the stationary platen frame.

The platens are thus seen to be arranged in a series of vertical groups which for convenience will be designated as batteries, the platens in each battery being arranged in interleaved relation. The alternate platens in each battery are spaced apart by a distance greater than the widths of an individual platen, the alternate platens being thereby assembled as groups within the battery which are to be moved relatively to one another.

The batteries themselves are also arranged for relative movement. To this end the platen posts of alternate batteries are fixed to the girders respectively of the stationary and travelling platen frames.

In the drawings one set of alternate batteries is shown as supported by the stationary frame comprising upper and lower girders or stringers 14 and 16, the stringer 14 carrying platen posts 6 which reciprocate the group of platens designated 28^B, while the stringer 16 carries and actuates the platen posts 7 which support the group of platens designated 28^A. The remaining alternate batteries are supported from the travelling platen frame, which carries the platen

posts 25 and 26. This travelling platen frame comprises the upper and lower stringers 21 and 23, the stringer 21 carrying the platen posts 25 and reciprocating the group of platens designated 29^B, the platen posts 26 being carried by the stringer 23 and supporting the group of platens 29^A. The travelling platen frame is moved in a timed relation synchronously with the reciprocations of the platen groups, there being a travelling battery carried by the travelling frame at each end of the drying machine, thus making an odd number of total batteries in the machine. It is thus seen that, by timing the movement of the travelling platen frame in proper synchronism with the reciprocation of the platens which opens and closes the spaces between the platen groups A and B in any battery, there is provided means for intermittently gripping and then advancing the material between the platens. The drier is thus operated in recurrent cycles, while the travelling batteries at the ends of the machine provide means at the two ends for automatically feeding sheet material such as veneer in relatively reversed directions into the drying machine, as will be pointed out hereinafter more in detail.

The platens of each battery are spaced far enough apart from each other to provide veneer receiving spaces between adjacent platens. As there are two series of alternately arranged platens, it will be obvious that there are also two series of veneer receiving spaces in each battery, one series of spaces lying between the upper surfaces of the platens of the A-series and the lower surfaces of the platens of the B-series, while the second series of spaces lies between the lower surfaces of the platens of the A-series and the upper surfaces of the platens of the B-series. As shown particularly in Figure 1, the veneer spaces of the traveling batteries lie in horizontal alignment with corresponding veneer receiving spaces of the stationary batteries. In this manner there are provided two series of horizontally disposed veneer spaces or courses extending throughout the length of the machine. One series of veneer spaces in each battery is adapted to be open for receiving veneer therein, while the other series is closed so the platens contact with both upper and lower surfaces of the veneer, as will be understood.

All the platens are of similar construction, each being of box-like form, having upper and lower parallel walls 30 and 31 presenting upper and lower external faces adapted to contact with the veneer or other material which is to be subjected to drying treatment. Lateral walls cooperate with walls 30 and 31 (Fig. 5) to provide an internal compartment for the reception of steam or other heating medium. Each platen is preferably of metallic construction, having an elongated integral lug 32 extending from each end thereof, and a guiding lug or extension 33 projecting therefrom near one extremity, as particularly shown in Figures 4, 5 and 6.

The platen posts are all of substantially the same construction, details thereof being shown in Figures 4, 5, and 6. As shown each post comprises a cast member, generally channel-shaped in cross section, with inwardly disposed flanges 34. At intervals along the post transverse webs 35 extend between the said flanges and therebeyond at one side, as indicated at 36. The purpose of this web is to provide a seat for a wooden supporting abutment 37 bolted thereto, as at 38, and disposed to contact with the corresponding platen lug for supporting the platen. As shown in Figures 4 and 6, the abutment 37 extends beyond the post at one side thereof, being preferably co-extensive with the lug 32 to provide a suitable support for the platen. The wooden abutments provide cushion supports for the platens, avoiding noise and wear of the parts in operation, and are durable and satisfactory in use. Above and below the webs 35 recesses or pockets 39 are provided for receiving the guiding extensions 33 of the platens for guiding the latter in vertical operating movement thereof.

For moving the traveling platen frame longitudinally on the bearings 22 and 24, operating connections to opposite extremities of the shaft 12 are provided. Each of these connections includes a crank 40 fixed on the shaft 12 and a pitman 41 connected thereto at one end thereof, and at its opposite end to a downwardly extending arm 42, secured to an extension of the lower girder of the traveling frame. Each of these pitman connections is adjustable and arranged to provide a greater or less degree of lost motion so the shaft 12 may move through a considerable angle to impart relative movement to the platens of each battery without imparting simultaneous traveling movement to the traveling platen frame. This connection comprises a sleeve 43 pivoted to the arm 42 and having seats at opposite ends thereof for engaging lugs or pins 44 extending transversely through openings 45 in the pitman 41. Several of these openings suitably spaced apart are formed in the pitman to provide adjustability of the connection.

For supporting the veneer preparatory to feeding the same into the drier, supporting means at each end thereof are provided. These supporting means comprise a plurality of spaced tables or platens 46 mounted in stationary position on posts 47 adjacent either end of the drier. These tables are preferably of hollow metallic construction

similar to the platens 28 and 29 and are adapted to receive steam or other heating medium as through openings 48, to which suitable piping may be connected. These feeding tables are superposed and spaced to co-operate with the veneer spaces of the adjacent platen units. Each feeding table is provided with an idler roller 49 loosely mounted in bearing brackets 50 and is adapted to engage the veneer shown at 51 in Figure 1, to support the same in position for feeding into the machine. By this construction arrangement is made for pre-heating the veneer prior to entry into the drier proper. This is a desirable feature in warming up green veneer to hasten the drying process, but it is particularly advantageous when the machine is employed as a re-drier. In this case the veneer may be warped and brittle when brought to the machine, and this pre-heating treatment causes the moisture therein to vaporize, rendering the veneer more flexible and pliable prior to being flattened out between the platens of the drier. This prevents splitting and checking in the flattening process, and is a particularly advantageous feature where the machine is used as a re-drier.

It will be understood that steam or other heating medium for conveying heat to the platens and to the feeding tables will be supplied by suitable piping. A convenient arrangement for conveying steam to the platens of the drier is shown in Figures 7, 8 and 9. As there shown, the piping for the traveling battery comprises a feed pipe 52 connected through a swing joint connection to two systems of piping, one leading to one series of platens of each battery and the other system leading to the other series of platens thereof. The swing joint comprises a vertically arranged pipe 53 connected by a pivot joint 54 at one end with the supply pipe 52 and at the opposite end by a T-connection to a horizontally arranged cross pipe 55 (Fig. 9). The pipe 55 is connected at opposite ends by sleeve connections 56 to horizontally arranged pipe sections 57 and 58, the latter being connected by sleeves 59 and 60 to the pipe sections 61 and 62 respectively of the respective piping systems. These sleeve connections provide for axial rotation of the connected pipe sections providing flexible connections therebetween. The pipes 61 and 62 are connected by pipe sections 63 and 64 respectively (Fig. 8), with headers or manifolds 65 and 66. The header 65 is connected by a series of pipes 67 to the B-platens, and the header 66 is similarly connected by a series of pipes 68 with the A-platens. This swing joint provides means for permitting a lateral traveling movement of the batteries, as well as for the relative vertical movement of the two series of platens in each battery, without any resultant stress or twisting upon the piping or connections.

A drain or exhaust system of piping for the traveling platens similar to that for supplying steam thereto is also provided. This exhaust system is arranged at the opposite side of the drying machine from the supply system, as shown in Figures 7 and 8; and the piping and connections, including the swing joint, are similar to those of the supply system. Corresponding elements of the drainage system of piping are indicated in the drawing by the same reference numerals as in the supply system, with the index or exponent "a" added in each case, and the arrangement will be understood by those skilled in the art without further detailed description.

The piping for the stationary batteries comprises a feed pipe 69 leading to headers or manifolds 70 which communicate by a series of pipes 71 with the B-series of platens. Another feed pipe 72 is connected with headers or manifolds 73 which communicate by a series of pipes 74 with the platens of the A-series. This piping connection provides for the relative up and down movements of the platens of the stationary batteries.

The arrangement of the exhaust or drain piping for the stationary batteries is similar to that of the feed piping and will be understood without detailed description thereof. This exhaust piping is shown at the lower side of Figure 7 and at the left of Figure 8, and corresponding parts thereof are indicated by the same reference numerals as in the case of the feed piping but with the index or exponent "a" added in each case.

The operation of the drier above described is as follows:

The steam is admitted to the platens of the machine and to the platens of the feeding tables, shown at 46. When these platens are sufficiently heated, veneer as indicated at 51 is fed from the table platens 46 into the drier. Considering now the platens in the position shown in Fig. 1, it is seen that the three sheets of veneer shown on the feeding table on the left-hand side of Fig. 1 are advanced beyond the edge of the table so that when the drier is started from the position here shown, the rotation of the crank 40 in a clockwise direction through an angle of 90° displaces the left-hand movable battery of platens so as to receive the veneer 51 in the open spaces between the platen groups A and B. The rotation of the crank 40 through another 90° does not immediately displace the movable battery of platens from the position adjacent the feeding table on account of the lost motion connection between the pitman 41 and the sleeve 43. The rotation of the crank 40 through this second angle of 90°,

however, is accompanied by a movement of the cam 11 against the left-hand roller 10, which operates to swing the rockers 8 and thereby reciprocate the platen supporting posts together with the connected girders or stringers. As a consequence, the open spaces between the platen groups A and B are closed upon the veneer 51, and the former closed spaces are opened i. e., the space between the lowermost platen 29^B and that of the next lowermost platen 29^A is closed upon the strip of veneer 51 while the space between the next to lowermost platen 29^A and the platen 29^B next above is opened, etc. This change of position of the platen groups A and B takes place simultaneously in each battery, as indicated above.

As the crank continues to rotate, it turns through a third angle of 90° and effects the displacement of the battery groups from the extreme left-hand position back into the position shown in Fig. 1, since the lost motion between the pitman 41 and the sleeve 43 is by this time taken up. The veneer 51, by this latter displacement of the movable batteries, is drawn from under the rollers 49 having been gripped and thereby advanced into the drier. The continued rotation of the crank 40 through a fourth angle of 90° completes a cycle and brings the crank back to the position shown in Fig. 1. During this fourth quarter of the cycle no displacement of the movable batteries takes place, but the cam 11 has been moved during this quarter of a cycle into contact with the right-hand roller 10, whereby the rockers 8 are again rocked to the position shown in Fig. 1, thereby reciprocating the platen posts and simultaneously opening the spaces between the platens which had been closed, and closing those which had been opened, the parts thereby being brought back to the position shown in full lines in Fig. 1.

The continued rotation of the crank 40 causes the continued recurrence of the cycle. It will be seen that the rotation of the crank through the last quarter of the cycle causes a release of the veneer 51, whereas the rotation of the crank through the second quarter of the cycle causes a gripping of the veneer 51, and that during the first quarter of the cycle there is a displacement of the movable battery at the left-hand end toward the feeding table, in order to grip the veneer, so that during the third quarter it may be drawn forward into the drier. The repetition of this cycle causes the movable battery to approach again the feeding table on the left, re-grip the veneer, and again draw it forward. Each such drawing results in advancing the end of the veneer 51 a step at a time into the open spaces in the first stationary battery of platens on the left. When the movable battery opens so as to release the veneer, the end of the veneer in the open spaces in the stationary battery is simultaneously gripped by it. Thus, it is seen that in the course of each cycle a further advance of the veneer into the drier takes place.

The veneer is fed to the drier from the table on the right substantially at the same time the veneer is fed from the table on the left. When the traveling battery on the left is drawing veneer from under the rollers 49, thereby advancing it into the drier, the battery of platens on the right is also approaching the feeding table on the right in order to grip the veneer which is pushed out from under the rollers 49 on the right in a manner similar to that shown for the table on the left. There is thus a phase difference of a half cycle between the instant of feeding on the right and the instant of feeding on the left.

The veneer is thus gripped and advanced into the drier at both ends of the drier, the veneer thus fed progressing through the machine in relatively opposite directions. The veneer fed from the left-hand table advances through the machine progressively but intermittently from battery to battery with each recurrent cycle, and emerges on the right, as indicated by the arrows and rests or moves upon the rollers 49. Similarly, the veneer which is fed from the table on the right advances through the machine and emerges as indicated by the arrows on the left and likewise rests or moves upon rollers 49. There is thus a continual advance through the machine, veneer being fed in and removed regularly at both ends. As shown in the drawings, there are seven spaced interleaved platens in each battery. As a result, there are three courses of veneer moving in each direction, but the right-hand table is shown with four rollers 49. Since the uppermost roller is on a level with the tops of the batteries, as a consequence it cannot support veneer emerging from the drier on the right. This involves the placing of a fourth roller on the right, under which no veneer is fed.

Thus it will be seen that the traveling batteries, and particularly those on the ends of the machine, operate as a feeding means. These traveling batteries of course function in addition so as to apply heat and pressure to the veneer, but it will be obvious that a gripping action accompanied by a lateral displacement is all that is necessary to perform the feeding function, and can be accomplished by any means having this action wholly independently of the drying function.

As will be evident, the parts will be so proportioned and the speed of the operating mechanism so regulated as to subject the material to the desired drying effect in each of the courses through the machine. It will also be obvious that the period of treatment

may be timed or varied by adjustment of the lost motion driving connection 43, 44 to vary the distance of travel of the traveling platens.

During the upward movement of one series of platens, say the A-series in Figure 1, it will be seen that the veneer carried on the upper surfaces thereof in one series of veneer spaces will soon contact with the lower surfaces of the descending B platens, picking up the latter from their supporting abutments 37 on the posts, so the weight thereof is carried on the veneer for an interval of time, applying heat and pressure thereto. This action aids in the drying process and prevents warping of the veneer. The subsequent reversal of the platens releases the pressure and opens the spaces permitting the air to circulate therein. Continued operation in this manner gives rise to the so-called "breathing" effect, air being drawn into the veneer spaces during the opening movement thereof, and the air and vapor from the veneer being expelled when the spaces are closing. This intermittent release of pressure on the veneer also permits shrinkage to take place without cracking or checking, which might take place in case the pressure were continued for any great interval of time when the heat is being applied. It will also be seen that the air has a chance to circulate around the stretch of veneer between adjacent batteries, giving the vapor opportunity to escape from the heated sheets of veneer. This action also aids in promoting a satisfactory drying of the material being treated.

As many batteries of platens will be provided as are necessary to properly treat the material, but it will be understood that the terminal batteries must be connected for traveling movement to the traveling frame in order to accomplish the automatic feeding to the drier of the material at both ends thereof. In case an exceptionally long drier is required to subject the material to a comparatively long period of treatment, two driers similar to that shown in Figure 1, with slight modifications, may be connected to operate as a single unit.

The above description has been made with particular reference to drying veneer, but it will be understood that the drier is not limited to this use, but may be employed for drying other sheet material.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a drier, in combination, means operating in recurrent cycles for intermittently subjecting sheet material to a drying action, and means for gripping and progressively advancing said material in the drier.

2. In a drier, in combination, means operating in recurrent cycles for intermittently subjecting sheet material to a drying action, and means for automatically feeding the material into the drier.

3. In a drier, in combination, means operating in recurrent cycles for intermittently subjecting sheet material to a drying action, means automatically feeding the material into the drier and means for progressively advancing said material in the drier.

4. In a drier, in combination, means operating in recurrent cycles for intermittently subjecting sheet material to the application of both heat and pressure, and means for gripping and progressively advancing said material in the drier.

5. In a drier, in combination, means adapted to be operated in cycles for intermittently subjecting sheet material to a drying action, means for automatically actuating said drying means, and means for progressively advancing the treated material through the drier arranged to be operated at intervals synchronized with the drying cycle.

6. In a drier, in combination, means adapted to be operated in cycles for intermittently subjecting sheet material to a drying action, means for automatically actuating said drying means, and means for automatically gripping and feeding material to be treated into said drying means.

7. In a drier, in combination, means adapted to be operated in cycles for intermittently subjecting sheet material to a drying action, means for automatically actuating said drying means, and means for automatically gripping and feeding material to be treated into said drying means at two ends in relatively reversed directions.

8. In a drier, in combination, means adapted to be operated in cycles for intermittently subjecting sheet material to a drying action, means for automatically actuating said drying means, means for intermittently advancing the material through the drier arranged to be operated at intervals synchronized with the drying cycle, and means for automatically gripping and feeding material to be treated into said drying

means at two ends in relatively reversed directions.

9. In a drier, in combination, a plurality of platens mounted in spaced interleaved relation, means for moving particular platens thereof as a group toward and from the remaining platens, and means for automatically actuating the first mentioned means in recurrent cycles.

10. In a drier, in combination, a plurality of platens mounted in spaced interleaved relation, means for imparting motion having two degrees of freedom to the alternate platens in groups towards and from the platens of the other group, and means for automatically actuating the first said means in recurrent cycles.

11. In a drier, in combination, a plurality of platens mounted in spaced interleaved relation, means for moving relatively the alternate platens in groups toward and from the platens of the other group, and movable means for gripping and feeding sheet material to said groups at both sides.

12. In a drier, in combination, a plurality of groups of spaced interleaved platens, means for reciprocating the alternate platens in a group toward and from the remaining platens, and means for simultaneously advancing and retracting alternate groups with respect to the remaining groups.

13. In a drier, in combination, a plurality of groups of spaced interleaved platens, means for reciprocating alternate platens in a group toward and from the remaining platens, and means for simultaneously advancing and retracting in cycles synchronously timed with respect to said reciprocating motion the alternate groups with respect to each other.

14. In a drier, in combination, relatively movable groups of platens, a portion of said groups being arranged to have motion of one degree of freedom, the remaining portion having motion of two degrees of freedom, and means for imparting reciprocating motion to the platens having one degree of freedom and means for imparting a reciprocating and a periodic to and fro motion to the platens having two degrees of freedom.

15. In a drier, in combination, relatively movable platen supporting frames, a plurality of platens carried by each of said frames in spaced interleaved relation, said frames being arranged to reciprocate alternate platens toward and from each other, and means for imparting motion respectively to move the frames relatively and to reciprocate the platens in recurrent cycles.

16. In a drier, in combination, a plurality of batteries disposed side by side, each battery comprising a plurality of platens, means for operating said platens to intermittently apply pressure to the material therebetween, and means for operating certain of the batteries to progressively advance the material during the drying process.

17. In a drier, in combination, relatively movable platen supports, a plurality of platens mounted thereon in spaced interleaved groups, means for periodically moving said groups bodily so that the interleaved platens have a limited to and fro motion and means actuated in synchronism therewith for gripping and feeding sheet material thereto.

18. In a drier, in combination, a pair of relatively movable platen supports, a plurality of platens respectively supported alternately from said supports in spaced interleaved relation, means for reciprocating said supports, and means for gripping and progressively advancing sheet material between the platens.

19. In a drier, in combination, a pair of relatively movable platen supports, a plurality of platens disposed in spaced interleaved relation, said supports being arranged to support alternate platens, means for reciprocating said supports so that adjacent platen surfaces are moved toward and from engaging position, and means for synchronously gripping and advancing sheet material between the platens in relatively reversed directions.

20. In a drier, in combination, a plurality of platen supports arranged in relatively reciprocating pairs, a portion of said pairs being movable relatively to the remaining pairs, a plurality of platens comprising a battery mounted in spaced interleaved relation on each pair of supports, the platens in each battery being respectively supported alternately by the supports in each pair, means for reciprocating simultaneously the supports of each pair, and means arranged to be actuated in synchronism with said reciprocating means for bodily moving said movable portion of said pairs to effect progressive advance of sheet material through the drier.

21. In a drier, in combination, a plurality of platen supports arranged in relatively reciprocating pairs, a portion of said pairs being movable relatively to the remaining pairs, a plurality of platens comprising a battery mounted in spaced interleaved relation on each pair of supports, the platens in each battery being respectively supported alternately by the supports in each pair, means for simultaneously reciprocating the supports of each pair, and means for displacing the movable portion of said pairs.

22. In a drier, in combination, a plurality of platen supports arranged in relatively reciprocating pairs, a portion of said pairs being movable relatively to the remaining pairs, a plurality of platens comprising a battery mounted in spaced interleaved re-

lation on each pair of supports, the platens in each battery being respectively supported alternately by the supports in each pair, means for simultaneously reciprocating the supports of each pair, and means for displacing the movable portion of said pairs in cyclic relation to the reciprocations imparted whereby sheet material is successively gripped and advanced through the drier.

23. In a drier, in combination, a plurality of platen supports arranged in relatively reciprocating pairs, alternate pairs being movable relatively to the remaining pairs, a plurality of platens comprising a battery mounted in spaced interleaved relation on each pair of supports, the platens in each battery being respectively supported alternately by the supports in each pair, means for simultaneously reciprocating the supports, and means for moving the movable batteries as a group toward and from the remaining batteries in cyclic relation to the reciprocations imparted.

24. In a drier, in combination, an odd number of pairs of platen supports, a plurality of stringers for uniting alternate pairs so as to move in a group relatively to the remaining pairs, a plurality of platens comprising a battery mounted in spaced interleaved relation on each pair of supports, the platens in each battery being respectively supported alternately by the supports in each pair, power means for relatively reciprocating the supports in each pair simultaneously, said power means having a connection for imparting a to and fro movement to the movable group of batteries in cyclic relation to the reciprocations imparted whereby the material to be treated is successively gripped and advanced through the batteries of platens.

25. In a drier, in combination, a plurality of juxtaposed batteries each including a plurality of drying plates, means for mounting one of said batteries in stationary position, means for mounting batteries for lateral travel, one at either side of said stationary battery, and means for operating the said laterally traveling batteries for feeding the treated material to the drier.

26. In a drier, in combination, a plurality of juxtaposed batteries each having superposed platens, means for mounting one of said batteries in stationary position, means for mounting a battery for lateral travel at either side of said one battery, means for supporting the material to be treated adjacent said laterally traveling batteries, and means whereby the platens of said traveling batteries grip the material to feed the same into the drier.

27. In a drier, in combination, a plurality of juxtaposed relatively laterally movable platen batteries, the platens of each battery being arranged to provide veneer receiving spaces between the same, the spaces in the adjacent batteries aligning to provide continuous courses throughout the drier, and means to effect relative movement of said batteries for progressively advancing the material under treatment.

28. In a drier, in combination, a plurality of juxtaposed platen batteries, said batteries being arranged for relative lateral movement and each comprising a plurality of platens arranged in spaced interleaved relations, said batteries being arranged to have the intervening spaces in alignment and thereby provide continuous courses through the drier, and means for relatively reciprocating alternate platens in each battery, the aligned spaces in alternate batteries being arranged to be open while the alternate spaces in the remaining batteries are closed.

29. In a drier, in combination, a plurality of juxtaposed platen batteries, said batteries being arranged for relative lateral movement and each comprising a plurality of platens arranged in spaced interleaved relation, said batteries being arranged to have the intervening spaces in alignment and thereby provide continuous courses through the drier, means for relatively reciprocating alternate platens in each battery, the aligned spaces in alternate batteries being arranged to be open while the alternate spaces in the remaining batteries are closed, and means for imparting a lateral to and fro movement to the movable batteries in timed relation to the reciprocations imparted.

30. A drying machine for sheet material, including spaced sheet-treating batteries, and movable means between the same for passing sheets of material from one battery to the other.

31. In a drier, in combination, a plurality of platen frames, means for supporting one of said frames for movement on another of said frames, superposed platens carried by said frames respectively, and means for imparting relative vertical movement to said platens.

32. In a drier, in combination, a plurality of platen frames including longitudinal stringers disposed adjacently in pairs, bearings between adjacent stringers of each pair for supporting one of said frames for movement relative to another, and spaced interleaved platens carried by each of said frames and arranged in groups forming adjacent batteries the intervening spaces being aligned to provide veneer receiving spaces.

33. In a drier, in combination, a plurality of platen frames including longitudinal stringers disposed adjacently in pairs, bearings between adjacent stringers of each pair for supporting one of said frames for movement relative to another, spaced interleaved platens carried by each of said frames and arranged in groups forming adjacent bat-

teries the intervening spaces being aligned to provide veneer receiving spaces, and means for moving the platens of one battery together, while at the same time moving corresponding platens of the adjacent battery apart.

34. In a drier, in combination, a plurality of platen frames including longitudinal stringers disposed adjacent in pairs, bearings between adjacent stringers of each pair for supporting one of said frames for movement relative to another, spaced interleaved platens carried by each of said frames and arranged in groups forming adjacent batteries the intervening spaces being aligned to provide veneer receiving spaces, means for imparting relative vertical movement to the alternate platens in each battery, and means for moving one of said batteries relative to another.

35. In a drier, in combination, a plurality of platen frames including longitudinal stringers disposed adjacently in pairs, bearings between adjacent stringers of each pair for supporting one of said frames for movement relative to another, and spaced interleaved platens carried by each of said frames and arranged in groups forming adjacent batteries the intervening spaces being aligned to provide veneer receiving spaces, means for imparting relative vertical movement to the alternate platens in each battery, means for moving one of said batteries relative to another, and means co-operating with said relatively moving battery for automatically feeding veneer into the drier.

36. In a veneer drier, in combination, platens arranged in adjacent batteries to provide opposing veneer receiving spaces between the adjacent platens of each battery, thereby providing continuous courses for the veneer, and means for operating said platens to progressively advance the veneer in adjacent courses respectively in different directions.

37. In a veneer drier, in combination, a plurality of platen frames, platens carried by each of said frames and arranged in batteries, each adjacent one of those of the other frame to provide opposing veneer receiving spaces, thereby providing continuous courses through the drier for the veneer, means for operating said platens to intermittently grip the veneer, and means for operating one of said batteries to progressively advance the veneer in the drier.

38. In a drier, in combination, a plurality of relatively movable platen frames each having upper and lower stringers, platen supports carried by said stringers, said supports being adapted to support a plurality of spaced interleaved platens disposed so that alternate platens are carried respectively by different supports on the same frame, and means for imparting relative movement to the stringers of each frame whereby adjacent platen surfaces are moved toward and from each other.

39. In a drier, in combination, a plurality of relatively movable platen frames each having upper and lower stringers, a plurality of platen supports carried by each of said stringers and arranged in pairs, each pair of said supports being adapted to support a plurality of spaced interleaved platens as a battery and disposed so that the platens in each battery are respectively alternately supported thereby, means for simultaneously imparting relative movement to each pair of supports and means for imparting relative movement to one of said frames with respect to the other in timed relation to the relative movement imparted to said pairs.

40. In a drier, in combination, a plurality of platens having veneer receiving spaces therebetween, operating means for moving said platens toward and away from each other, said means including a longitudinally reciprocable bar at each side of the platens having spaced lugs thereon, crank plates pivotally connected at opposite ends of said bars, and a transverse shaft having spaced cams thereon adapted to engage said lugs successively for imparting movement to said platens.

41. In a drier, in combination, a plurality of platen frames each having a platen unit secured thereto and means for imparting intermittently longitudinally to and fro movement to one of said frames.

42. In a drier, in combination, a plurality of platen frames each having a platen unit secured thereto, a rotatable shaft, and a lost motion connection between said shaft and one of said frames for transmitting intermittently reciprocating motion to said frame.

43. In a drier, in combination, a plurality of platens, supporting frames for said platens provided with relatively movable portions arranged to impart a vertical movement to said platens and a lateral travelling movement to a selected group thereof, a transverse rotatable shaft having actuated members operatively connected to said frame portions, said members being relatively angularly displaced with respect to said shaft whereby the shaft's rotations produce frame movement in regular cyclic sequence.

44. In a drier, in combination, a plurality of platen frames, adjacent platen units carried respectively by said frames and means for supporting one of said frames for relative movement with respect to another thereof whereby the units may approach or recede.

45. In a drier, in combination, a plurality of platen frames, adjacent platen units car-

ried respectively by said frames, means for supporting one of said frames for relative movement on another thereof whereby the units may approach or recede, means for imparting relative movement between adjacent platens of each unit to alternately grip and release the material therebetween, and means for imparting relative movement to said relatively movable frame to cause relative movement between adjacent platen units.

46. In a drier, in combination, a platen frame having upper and lower stringers, adjacent platens alternate ones of which being operatively connected to different ones of said stringers respectively, and means to impart movement to both of said stringers to move adjacent platens toward or away from each other.

47. In a drier, in combination, a platen frame having upper and lower stringers, a pair of platen posts, each of said posts being rigidly connected to one of said stringers and loosely engaging the other said stringer, and the stringer loosely engaged by one post being rigidly connected to the other.

48. In a drier, in combination, a platen frame having upper and lower stringers, a pair of platen posts, groups of spaced interleaved platens arranged to have alternate ones supported respectively by each of said posts, each of said posts being rigidly connected to one of said stringers and loosely engaging the other said stringer, and means to impart relative movement to the stringers of each frame to impart relative movement to adjacent platens.

49. In a drier, in combination, a platen frame having upper and lower stringers, a second platen frame having upper and lower stringers adjacent respectively to the upper and lower stringers of said first mentioned platen frame and supported thereby.

50. In a drier, in combination, a platen frame having upper and lower stringers, a second platen frame having upper and lower stringers adjacent respectively to the upper and lower stringers of said first mentioned platen frame, pairs of posts carried by the stringers of said platen frames respectively, and platens carried by said posts.

51. In a drier, in combination, a platen frame having upper and lower stringers, a second platen frame having upper and lower stringers adjacent respectively to the upper and lower stringers of said first mentioned platen frame, and means for imparting relative movement to one platen frame with respect to the other.

52. In a drier, in combination, a stationary and a traveling frame, each adapted to support drying means, said frames having relatively reciprocating portions, and means on said traveling frame arranged to grip sheet material with each reciprocation and to advance the same with the travel of the frame.

53. In a drier, in combination, a platen post for use in driers having spaced flanges and a web extending between said flanges and therebeyond, for providing a seat for a supporting abutment.

54. In a drier, in combination, a platen, a post for supporting said platen and having flanges directed towards the platen and an abutment secured to said post and adapted to engage said platen.

55. In a drier, in combination, a platen, a post for supporting said platen and having flanges directed towards the platen, an abutment secured to said post and adapted to engage said platen, and a guiding lug on said platen co-operating with said flanges.

56. In a drier, in combination, a platen having a supporting lug thereon, a flanged post, an abutment secured to said post adapted to contact freely with said supporting lug to support said platen, said abutment extending beyond one side of said post to form a stable support for said platen.

57. In a drier, in combination, a platen having a supporting lug thereon, a flanged post, an abutment secured to said post adapted to contact freely with said supporting lug to support said platen, said abutment extending beyond one side of said post to form a stable support for said platen, and a guiding lug on said platen cooperating with said post.

58. In a drier, in combination, a pair of adjacent posts, an abutment secured to each of said posts and overlapping the other post, and a platen freely supported on each of said abutments.

59. In a drier, in combination, superposed platens movable to provide spaces therebetween for the reception of the material under treatment, a support for the material adjacent said platens, guiding means for the material mounted on said support, and means for operating said platens to automatically feed the material from said support into one of said spaces and to feed the material from another space above said material support.

60. In a drier, in combination, a group of interleaved platens in which alternate platens are spaced apart a distance greater than the width of an individual platen whereby the material to be treated may be inserted, a table comprising a plurality of superposed heated supports for supporting the material prior to entry into the space between adjacent platens and adapted to subject the material to a preliminary heat treatment, and means for automatically

feeding the material from said table into said space.

61. In a drier, in combination, a pair of adjacent posts, an abutment secured to each of said posts and overlapping the other post, a platen freely supported on each of said abutments, and a guiding lug on each of said platens co-operating with one of said posts.

62. In a drier, in combination, relatively movable groups of platens adapted to be heated by a heating medium, a portion of said groups being arranged to have motion of one degree of freedom, the remaining portion having motion of two degrees of freedom, and piping adapted to supply the heating medium to said platens, said piping being arranged in sections to supply the platen groups, and articulated respectively to have the same degrees of freedom of motion as the associated platen group.

63. In a drier, in combination, relatively movable platen supporting frames, a plurality of platens adapted to be heated by a heating medium carried by each of said frames in spaced interleaved relation, said frames being arranged to reciprocate alternate platens toward and from each other, means for imparting motion respectively to move the frames relatively and to reciprocate the platens and piping adapted to supply the heating medium to said platens, said piping having connections articulated to follow respectively the motion of the two frames.

In testimony whereof I affix my signature.

LOUIS G. MERRITT.