April 6, 1926. 1,579,994

J. T. ATKINSON ET AL

STEAM VENEER DRIER

Filed May 22, 1925 3 Sheets-Sheet 1

Fig. 1.

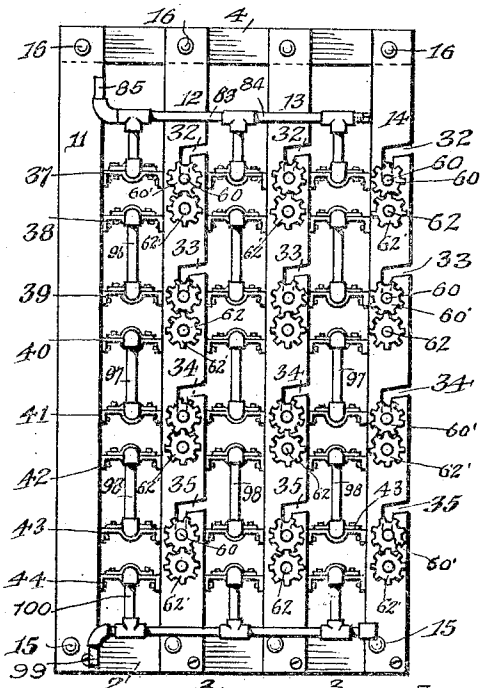
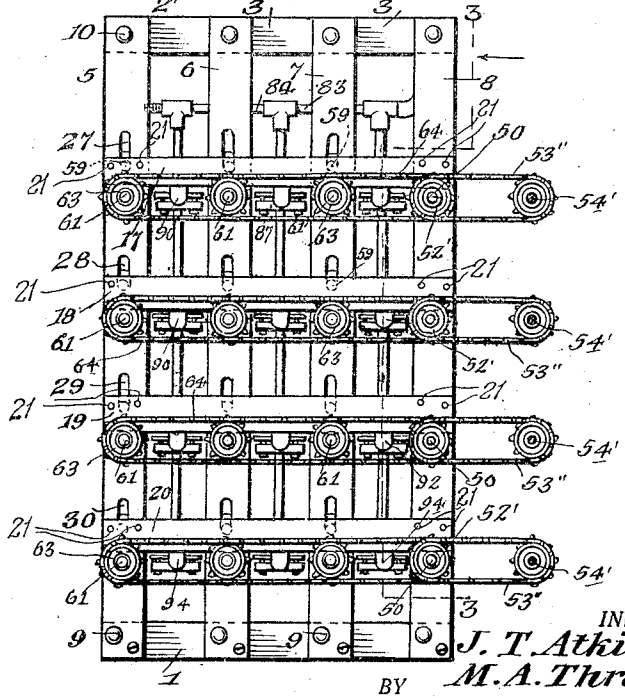


Fig. 2.



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Filed May 22. 1925 3 Sheets-Sheet 2

Fig. 3.

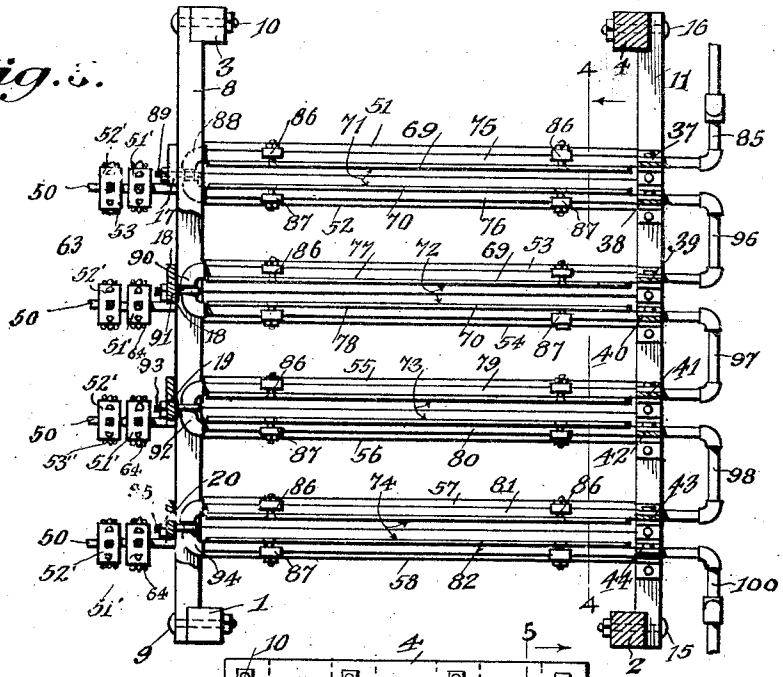
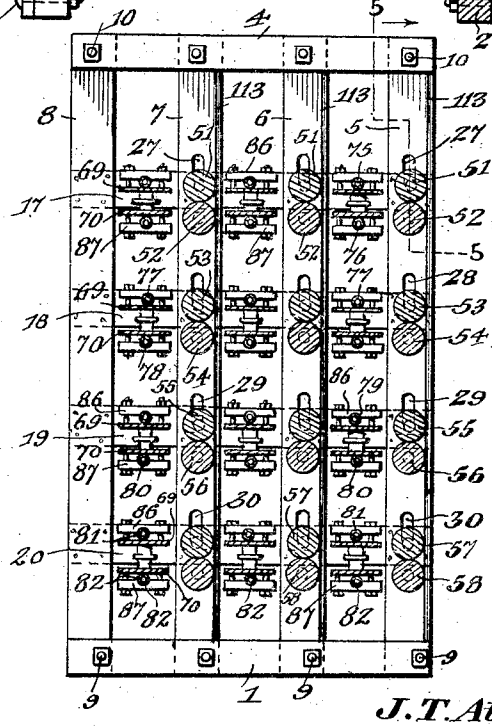


Fig. 4.



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Fig. 5.

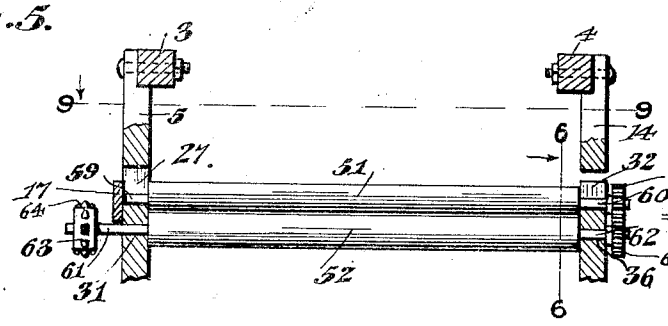


Fig. 6.

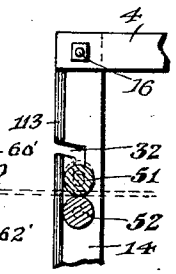


Fig. 7.

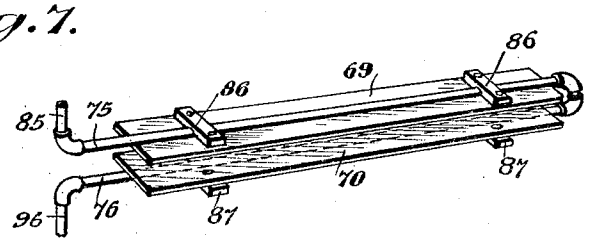


Fig. 8.

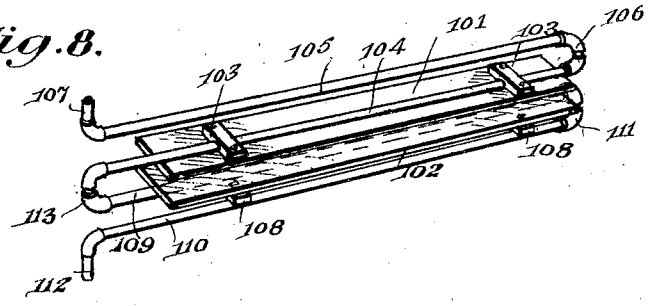
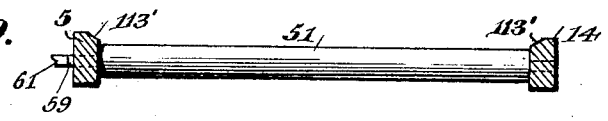


Fig. 9.



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UNITED STATES PATENT OFFICE.

JOSEPH T. ATKINSON AND MILTON A. THRASHER, OF COTTON PLANT, ARKANSAS.

STEAM VENEER DRIER.

Application filed May 22, 1925. Serial No. 32,083.

To all whom it may concern:

Be it known that we, JOSEPH T. ATKINSON and MILTON A. THRASHER, citizens of the United States, residing at Cotton Plant, in the county of Woodruff and State of Arkansas, have invented certain new and useful Improvements in Steam Veneer Driers, of which the following is a specification.

This invention relates to a drier designed primarily for drying and straightening strips of wood veneer and other thin pieces of lumber, but it is to be understood that a drier, in accordance with this invention, can be employed for any purposes for which it is found applicable, and the invention has for its object to provide, in a manner as hereinafter set forth, an efficient, durable and economical drier into which the wet pieces of veneer or thin lumber or other material may be fed at one end, and from which the same pieces, dried and straightened and ready to be piled, are discharged at the other end.

A further object of the invention is to provide, in a manner as hereinafter set forth, a drier having means for conducting a heating medium, such as steam, for drying purposes, in a direction crosswise with respect to both faces of the strip of wood veneer or other thin lumber without liability of damage to the latter by leakage from the conducting means for the heating medium.

A further object of the invention is to provide, in a manner as hereinafter set forth, a drier for the purpose referred to including shield elements between which the veneer passes, and which act to prevent the bursting, cracking, bending or warping of the veneer as it passes through the drier and under such conditions preventing choking up of the drier during the operation of drying.

A further object of the invention is to provide, in a manner as hereinafter set forth, a drier provided with spaced pairs of shield elements and conveying means arranged forwardly and rearwardly with respect to each pair of shields for expeditiously conveying the veneer between the shields.

A further object of the invention is to provide, in a manner as hereinafter set forth, a drier including spaced pairs of conveying elements, each pair consisting of a pair of superposed conveying rolls and with the upper rolls of each pair capable of being removed when occasion requires.

A further object of the invention is to provide, in a manner as hereinafter set forth, a drier formed with superposed sets of pairs of veneer conveying elements, each pair arranged in superposed relation and with the pairs of each set arranged in spaced relation and further with means for simultaneously driving the lower element of each of the pairs of elements to expedite the simultaneous passage of a plurality of superposed veneers through the machine for drying them.

Further objects of the invention are to provide, in a manner as hereinafter set forth, a drier which is comparatively simple in its construction and arrangement, strong, durable, thoroughly efficient and convenient in its use, readily set up, and comparatively inexpensive to manufacture.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts, as hereinafter more specifically described and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:—

Figure 1 is a side view of a driver or a drier unit, in accordance with this invention.

Figure 2 is a view looking towards the other side of a drier or drier unit, in accordance with this invention.

Figure 3 is a section on line 3—3, Figure 2.

Figure 4 is a section on line 4—4, Figure 3.

Figure 5 is a section on line 5—5, Figure 4.

Figure 6 is a section on line 6—6, Figure 5.

Figure 7 is a perspective view of a pair of opposed shield elements and a fragmentary portion of the heat conducting means associated with said pair of elements.

Figure 8 is a view similar to Figure 7 of

a modified form of heat conducting means.

Figure 9 is a section on line 9—9, Figure 5.

A drier for the purpose set forth and in accordance with this invention, can consist solely of a unit as disclosed in Figures 1 and 2, or a plurality of such units arranged one rearwardly of the other and coupled together. The drier or unit as shown in Figures 1 and 2 can consist of four or more superposed sets of pairs of conveying elements. The number of pairs of conveying elements of each set can be three or more and with each pair of superposed conveying elements there is associated a pair of superposed shield elements, each carrying on its outer face a heat conducting means. By way of example, the drier is illustrated as consisting of four superposed sets of pairs of conveying elements and four sets of pairs of shield elements with their associated heat conducting means, but as before stated, the sets referred to can be increased if desired.

A drier, in accordance with this invention, comprises a skeleton body portion formed of a pair of opposed spaced base members or bars 1, 2, and a pair of opposed spaced top members or bars 3, 4. The members 1 to 4 inclusive are of the desired length and seated on the top and bearing against the outer side of the member 1 is a series of spaced side members or bar 5, 6, 7 and 8. The members or bars 5 to 8 inclusive abut against the lower face of and against the outer side of the member or bar 3. The hold-fast devices 9 are employed for securing the lower ends of the bars or members 5 to 8 to the member or bar 1, and hold-fast devices 10 are employed for securing the upper ends of the members or bars 5 to 8 inclusive to the member or bar 3. Mounted on the top of the bar 2 and engaging the outer side thereof, is a series of spaced side members or bars 11, 12, 13 and 14, and which abut against the lower face and outer side of the bar or member 4. Hold-fast devices 15 are employed for securing the lower ends of the members or bars 11 to 14 inclusive to the member or bar 2, and hold-fast devices 16 are employed for securing the upper ends of the bars or members 11 to 14 inclusive to the bar or member 4.

Secured to the outer face of the members or bars 5 to 8 inclusive, is a series of spaced brace members 17, 18, 19 and 20. The said brace members are secured in position by the hold-fast devices 21. The brace members on said side of the body portion of the drier are arranged equidistant apart with respect to each other.

The side member or bar 8 opposes the side member or bar 11 and each is imperforate throughout, with the exception of at the ends thereof for the passage of the hold-fast devices 9, 10, 5 and 16. The side member or bar 7 opposes the side member or bar 12. The side member or bar 6 opposes the side member or bar 13, and the side member or bar 5 opposes the side member or bar 14. Each of the side members or bars 5, 6 and 7 is formed with four superposed spaced substantially elongated oval-shaped slots indicated at 27, 28, 29 and 30, and the said slots are spaced equidistant from each other. Arranged below each of said slots, but in close proximity thereto is a circular opening 31. Each of the side members or bars 12, 13 and 14 is formed with four bayonet-shaped slots, indicated at 32, 33, 34 and 35 and which are spaced equidistant from each other and preferably open at the rear edge of the side member or bar. The vertical legs of the slots 32 to 35 inclusive are arranged in alignment with the slots 27 to 30 inclusive. Each of the side members 12 to 14 inclusive, below the vertical leg of each bayonet-shaped slot formed therein, is provided with a circular opening 36, arranged in close proximity to the lower end of said vertical leg.

Arranged between the side members or bars 11 to 14 inclusive, as well as being secured to the opposed edges of said bars are spaced coupling elements 37. Arranged between the side bars 11 to 14 both inclusive, as well as being secured to the opposed edges of said side bars, and spaced from and below the coupling elements 37, are coupling elements 38, and arranged between the said side bars, as well as being secured to the opposed edges of said bars and spaced from and below the coupling elements 38, are coupling elements 39. Arranged between the side bars 11 to 14 inclusive, as well as being secured to the opposed edges of said bars and spaced from and arranged below the coupling elements 39, are coupling elements 40, and arranged between the said bars and secured to the opposed edges thereof, as well as spaced from and below the coupling elements 40, are coupling elements 41. Arranged below and spaced from the coupling elements 41 and further between the side bars, as well as being secured to the edges thereof, are coupling elements 42, and positioned below the coupling elements 42 and secured to the opposed edges of the side bars are coupling elements 43. Arranged between the side bars 11 to 14 inclusive and below the coupling elements 43, as well as being secured to the opposed edges of said bars, are coupling elements 44.

Supported by the side bar 8, is a series of superposed spaced shafts 50, as shown four in number and each of which carries a driven cog pinion 51′ and a driven sprocket 52′ operated by a chain drive 53 from a driving shaft 54′.

Supported by the side members or bars 5, 6, 7, 12, 13 and 14 are the superposed sets

of pairs of conveying elements. As illustrated four sets are employed, and the conveying elements of each of the pairs of each set are arranged in superposed relation. The conveying elements of each pair of one set are indicated at 51, 52, of another set at 53, 54, of another set at 55, 56 and of the other set at 57, 58. One pair of conveying elements of each of the sets is supported by the side bars 7 and 12. One pair of each of the conveying elements of each of the sets is supported by the side bars 6 and 13, and one pair of each of the conveying elements of each of the sets is supported by the side bars 5 and 14. The upper conveying element of each pair of each of the sets is provided with a pair of oppositely extending spindles 59, 60, more clearly shown in Figure 5, and the spindle 59 is mounted in the vertical leg of a bayonet-shaped slot, and the spindle 60 extends through an oval-shaped slot and is provided with a pinion 60′. This arrangement provides for the removing of the upper conveying element of a pair when occasion requires and when the pinion 60′ is taken off. Each of the conveying elements of each pair is in the form of a roll and the lower conveying element of each pair is provided with a pair of oppositely extending spindles 61, 62 and with the former of greater length than the latter. The spindle 62 extends through an opening 36 and is provided with a pinion 62′ which meshes with a pinion 60′. The spindle 61 extends through an opening 31 and projects a substantial distance from a side member or bar and is provided with a sprocket pinion 63.

The conveying elements of a set are simultaneously operated by an independent endless chain 64 engaging with the sprocket pinions 63 carried by the spindles 61 of a set and driven by the pinions 51′ on a shaft 50. The shafts 54′ are operated by a prime mover, not shown, and said shafts 50 can be simultaneously or independently operated so that the sets can be simultaneously or independently operated.

Arranged within the body portion is a series of superposed sets of pairs of combined shield and guide elements, each of the elements of each pair consisting of a rectangular metallic plate. The plates of each pair are arranged in superposed spaced relation and the plates of each pair are indicated at 69, 70, see Figure 7. The superposed sets of combined shield and guide elements are indicated generally by the reference characters 71, 72, 73, and 74, see Figure 3. The number of sets corresponds to the number of sets of pairs of conveying elements. Each pair of combined shield and guide elements is arranged forwardly and rearwardly of a pair of conveying elements.

With reference to Figure 7, the plates 69 and 70 of each set are suspended in spaced relation with respect to each other through the medium of a pair of steam conducting pipes, and with reference to Figure 3 the pairs of steam conducting pipes associated with the set 71 are indicated at 75, 76, with the set 72 at 77, 78, with the set 73 at 79, 80 and with the set 74 at 81, 82. The steam conducting pipes heat the plates 69 and 70 so that as the veneer passes between said plates and is transported through the medium of the conveying elements, the veneer will be dried and at the same time guided in its passage between the plates. The steam conducting pipes are arranged against the upper face of the upper plate and against the lower face of the lower plate. A steam supply line leading from a suitable source is indicated at 83 and which has one end normally closed, as at 84, but such closure can be removed so that the line can be connected to the heating medium conductors of an adjacent unit. Leading from the line 83 to each pipe 75 is a branch pipe 85 for supplying steam to the latter. The upper steam conducting pipes are secured to the upper plate 69 by a pair of coupling members 86, and the lower steam conducting pipes are secured to the lower plate 70 by a pair of coupling members 87, see Figure 7. The upper and lower steam conducting pipes are of greater length than the upper and lower plates 69 and 70 and said pipes project from each end of said plates.

Each of the pipes 75 is connected to a pipe 76 by an elbow coupling 88, which is anchored, as at 89 to one end of the body portion. Each of the pipes 77 is connected to a pipe 78 by an elbow coupling 90, anchored as at 91 to one end of the body portion. Each of the pipes 79 is connected to a pipe 80 by an elbow coupling 92, anchored as at 93 to one end of the body portion, and each of the pipes 81 is connected to a pipe 82 by an elbow coupling 94, anchored, as at 95, to one end of the body portion. The elbow couplings are arranged between the side members or bars 5, 6, 7 and 8. The anchoring means for the elbow couplings are connected to the brace members 17, 18, 19 and 20.

The steam conducting pipes project outwardly between the side members or bars 11, 12, 13 and 14 and with the projecting ends of the pipes 75 communicate the branch pipes 85. The projecting ends of the pipes 76 are connected to the projecting ends of the pipes 77 by vertically disposed branch pipes 96. The projecting ends of the pipes 78 are connected to the projecting ends of the pipes 79 by vertical branch pipes 97. The projecting ends of the pipes 80 are connected to the projecting ends of the pipes 81 by vertical branch pipes 98, and projecting ends of the pipes 82 are connected to a discharge pipe 99, by vertical branch pipes 100. The

arrangement of the steam supply line with respect to the steam conducting pipes and the arrangement of these latter with respect to the elbow couplings and vertical branch pipes, and the arrangement of the vertical branch pipes 100 with respect to the discharge pipe 99 provides for a circulation of the steam as well as for the discharge of the condensates.

The pipes 75 are secured to the coupling elements 37, the pipes 76 to the coupling elements 38, the pipes 77 to the coupling elements 39, the pipes 78 to the coupling elements 40, pipes 79 to the coupling elements 41, the pipes 80 to the coupling elements 42, the pipes 81 to the coupling elements 43, and the pipes 82 to the coupling elements 44. The anchoring means for the elbow couplings and the coupling elements provide means for not only supporting the pairs of steam conducting pipes in spaced relation, but also for securing said pipes to the body portion of the drier.

With reference to Figure 8, two pairs of steam conducting pipes are employed for heating each pair of combined shield and guide elements and in Figure 8, 101 and 102 indicate the metallic rectangular plates forming the pair of combined shield and guide elements. Secured to the upper face of the plate 101, by a pair of coupling members 103 is one of a pair of superposed parallel steam conducting pipes 104, 105, connected at one end by an elbow coupling 106. The other end of the pipe 105 has communicating therewith a branch pipe 107, which leads from an upper steam conducting pipe. Secured to the lower face of the plate 102, by a pair of coupling members 108, is one of a pair of superposed parallel steam conducting pipes 109, 110. The pipes 109, 110 are connected together at one end by an elbow coupling 111. The pipe 110, at its other end, is provided with a depending branch 112 which leads to an upper steam conducting pipe. The pipe 104 is connected to the pipe 109 by an elbow coupling 113. The couplings 106 and 111 are anchored to the body portion of the machine and the pipes 104, 105, 109 and 110 are secured to the coupling elements which are arranged between the side members or bars 11 to 14 of the body portion.

The bars 5 and 14, see Figure 9, are bevelled lengthwise, as indicated at 113′ to overcome sharp inner corners on said bars to prevent the veneer from hanging during the travel thereof.

The condensed steam is constantly drained from the steam conducting pipe 75 to the discharge pipe 99 from where it is conducted off.

The parts of the drier are detachably connected together so that it can be readily dismantled when desired.

The pairs of combined shield and guide elements prevent the veneer from bucking and choking the machine when the veneer is conveyed through the drier by the pairs of conveying elements. The arrangement shown in Figure 7 is employed when the amount of heat necessary to dry the veneer is not so great, but when a greater amount of heat is desired, the arrangement shown in Figure 8 is employed.

Owing to the manner of setting up the steam conducting pipes leakage is prevented on the veneer during the travel thereof through the drier. Owing to the manner in which the steam conducting pipes are set up, if one bursts it can be conveniently removed and a new one substituted without dismantling the entire heat conducting system.

The number of pairs of conveying elements of each set can be increased or diminished and the number of pairs of combined shield and guide elements of each set will correspond to the number of pairs of conveying elements of each set and the showing of but three pairs of conveying elements is had merely by way of example, as it is obvious the length of the drier can be as desired by increasing the number of pairs of conveying elements of a set and when increased the number of pairs of steam conducting pipes will be correspondingly increased. It is also obvious that the number of sets of pairs of conveying elements, as well as the sets of pairs of combined shield and guide elements can be increased or diminished from that as shown.

The steam supply line 83 can be provided with a valve controlling means as is obvious.

As before stated, the upper conveying roller or element of each pair can be conveniently removed from the body portion of the machine when occasion requires, and as illustrated the pairs of conveying elements are journalled in the side members or bars of the machine.

The plates 69 and 70 are firmly fastened to the steam conducting pipes and between each pair of plates the veneer passes. The upper plates 69 are arranged just behind an upper conveying roller in advance and in front of an upper conveying roller in the rear, and the same arrangement of the lower plate 70 is had with respect to the lower conveying rollers or elements, and the foregoing arrangement is continued throughout the drier and the plates 69 and 70 act to prevent the bursting, cracking, bending or warping of the veneer as it passes through the drier, and under such conditions prevents any possibility of the drier from choking up to overcome retardation with respect to the passage of the veneer.

It is thought that the many advantages of a drier, in accordance with this invention, for use for veneer and the like, can be

readily understood, and although the preferred embodiment of the invention is as illustrated and described, yet it is to be understood that changes in the details of construction can be had which will fall within the scope of the invention as claimed.

What we claim is:—

1. A drier comprising a plurality of superposed sets of opposed pairs of material conveying rolls, the rolls of each pair arranged in superposed relation, a plurality of superposed sets of opposed pairs of combined shield and guide elements for the material, the elements of each pair arranged in superposed relation and positioned between two pair of conveying rolls of each set, and upper and lower spaced steam conducting pipes connected to and arranged exteriorly of each pair of elements for suspending them in spaced relation and further for heating them to set up a drying action on the conveyed material.

2. A drier comprising a set of opposed pairs of conveying rolls, the rolls of each pair arranged in superposed relation, a set of opposed pairs of combined shield and guide elements for the material, the elements of each pair arranged in superposed relation, each pair of elements arranged between two pair of conveying rolls, and spaced steam conducting pipes extending lengthwise of and connected with the outer faces of each pair of elements for suspending them in superposed spaced relation and further for heating them to set up a drying action on the material.

3. A drier comprising a superposed set of opposed pairs of conveying rolls, the rolls of each pair arranged in superposed relation, a set of opposed pairs of combined shield and guide elements for the material, the elements of each pair arranged in superposed relation, each pair of elements arranged between two pair of conveying rolls, upper and lower spaced steam conducting pipes connected to and arranged exteriorly of each pair of elements for suspending them in superposed spaced relation and further for heating them to set up a drying action on the material, and supports for said rolls, said supports provided with means to permit of the removal of the upper roll of each pair of rolls.

4. A drier comprising a set of opposed pairs of conveying rolls, the rolls of each pair arranged in superposed relation, a set of opposed pairs of combined shield and guide elements for the material, the elements of each pair arranged in superposed relation, each pair of elements arranged between two pair of conveying rolls, spaced steam conducting pipes extending lengthwise of and connected with the outer faces of each pair of elements for suspending them in superposed spaced relation and further for heating them to set up a drying action on the material, and means common to and engaging with the lower rolls of said pairs of rolls for simultaneously operating them.

5. A drier comprising a set of opposed pairs of conveying rolls, the rolls of each pair arranged in superposed relation, a set of opposed pairs of combined shield and guide elements for the material, the elements of each pair arranged in superposed relation, each pair of elements arranged between two pair of conveying rolls, spaced steam conducting pipes extending lengthwise of and connected with the outer faces of each pair of elements for suspending them in superposed spaced relation and further for heating them to set up a drying action on the material, supports for said rolls, said supports provided with means to permit of the removal of the upper roll of each pair of rolls, and means common to and engaging with the lower rolls of said pairs of rolls for simultaneously operating them.

6. A drier comprising a plurality of superposed sets of opposed pairs of material conveying rolls, the rolls of each pair arranged in superposed relation, a plurality of superposed sets of opposed pairs of combined shield and guide elements for the material, the elements of each pair arranged in superposed relation and positioned between two pair of conveying rolls of each set, upper and lower spaced steam conducting pipes connected to and arranged exteriorly of each pair of elements for suspending them in spaced relation and further for heating them to set up a drying action on the conveyed material, and means common to and engaging with the lower rolls of said pairs of rolls for simultaneously operating them.

7. In a drier a plurality of opposed and spaced pairs of rectangular plates comprising means for shielding and guiding the material operated upon and further capable of being heated for drying such material, heat conducting means secured to the plates of each pair for supporting them in spaced superposed relation and further for heating the same, and means arranged forwardly and rearwardly with respect to each pair of plates for conveying the material to be operated on through the said pairs of plates.

8. In a drier a plurality of opposed and spaced pairs of rectangular plates comprising means for shielding and guiding the material operated upon and further capable of being heated for drying such material, heat conducting means secured to the plates of each pair for supporting them in spaced superposed relation and further for heating the same, and superposed pairs of conveying rolls arranged forwardly and rearwardly with respect to each pair of plates for conveying the material operated on through each pair of plates.

9. In a drier a plurality of opposed and spaced pairs of rectangular plates comprising means for shielding and guiding the material operated upon and further capable of being heated for drying such material, heat conducting means secured to the plates of each pair of supporting them in spaced superposed relation and further for heating the same, superposed pairs of conveying rolls arranged forwardly and rearwardly with respect to each pair of plates, for conveying the material operated on through each pair of plates, and means for simultaneously operating the rolls of each pair for conveying the material.

10. In a drier a plurality of opposed and spaced pairs of rectangular plates comprising means for shielding and guiding the material operated upon and further capable of being heated for drying such material, heat conducting means secured to the plates of each pair for supporting them in spaced superposed relation and further for heating the same, superposed pairs of conveying rolls arranged forwardly and rearwardly with respect to each pair of plates for conveying the material operated on through each pair of plates, means for simultaneously operating the rolls of each pair for conveying the material, and supports for said rolls, said supports provided with means to permit of the removal of the upper roll of each pair.

In testimony whereof, we affix our signatures hereto.

JOSEPH T. ATKINSON.
MILTON A. THRASHER.