F. KUKKUCK.

FEED MECHANISM FOR DRYING APPARATUS.

APPLICATION FILED SEPT. 13, 1906.

1,081,238.

Patented Dec. 9, 1913.

2 SHEETS—SHEET 1.

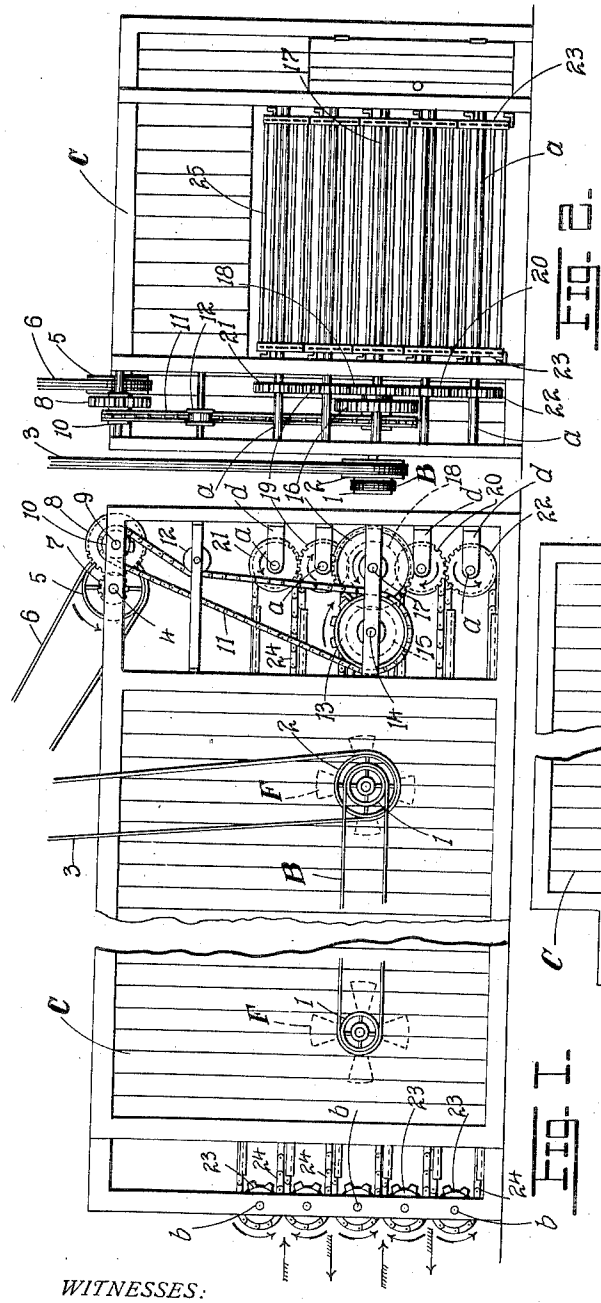

Fig. 1.

Fig. 2.

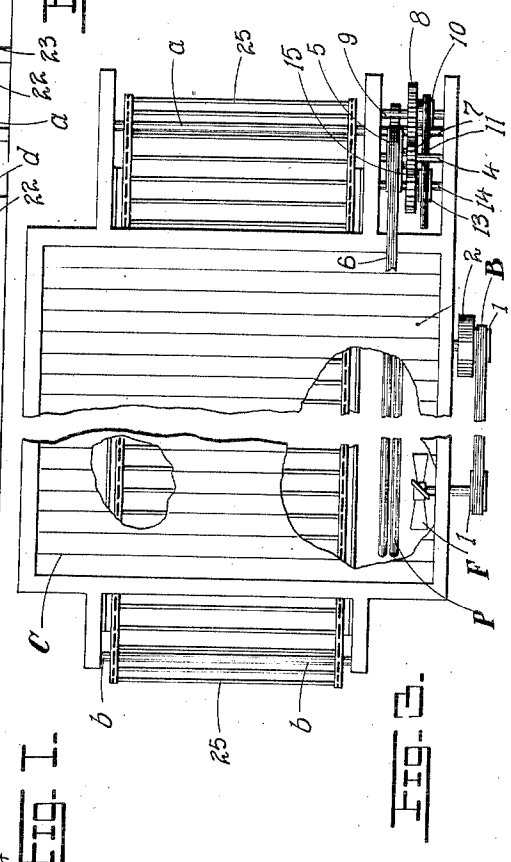

Fig. 3.

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2 SHEETS—SHEET 2.

Fig. 6.

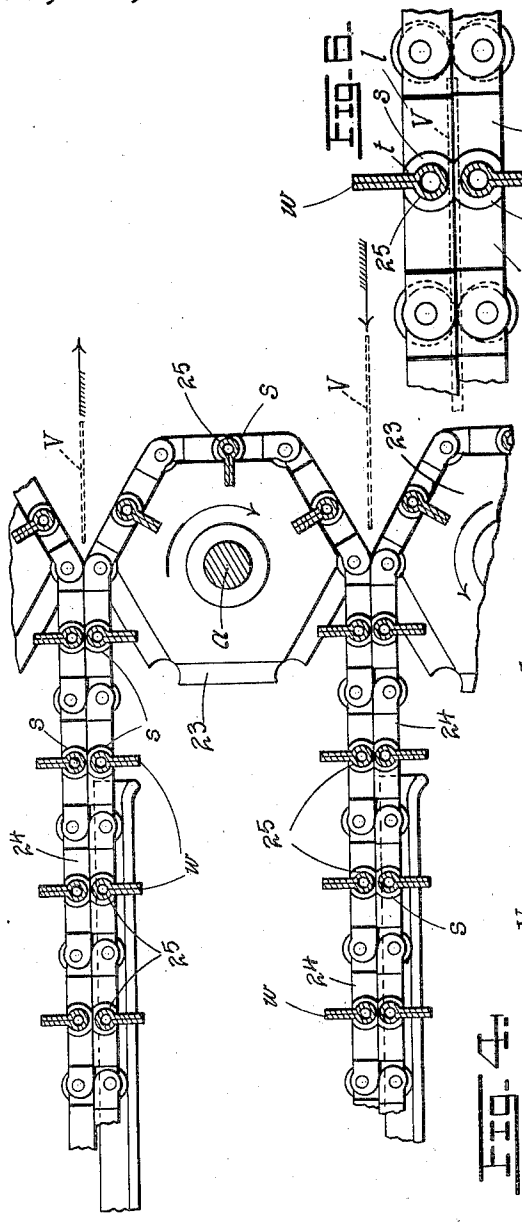

Fig. 5.

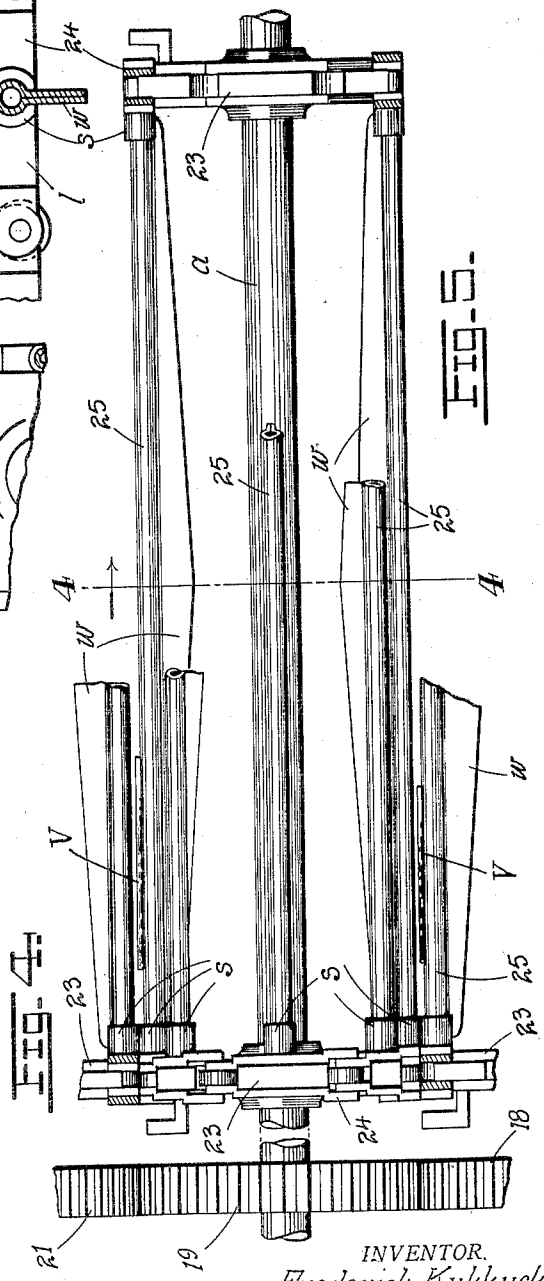

Fig. 4.

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FEED MECHANISM FOR DRYING APPARATUS.

1,081,238. Specification of Letters Patent. Patented Dec. 9, 1913.

Application filed September 13, 1906. Serial No. 334,448.

To all whom it may concern:

Be it known that I, FREDERICK KUKKUCK, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Feed Mechanism for Drying Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in feed-mechanism or conveyers for drying apparatus; and it consists in the novel construction and arrangement of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a side elevation of the drying chamber showing a portion of the mechanism exposed; Fig. 2 is an end elevation of the same; Fig. 3 is a top plan thereof broken at the middle; Fig. 4 is an enlarged longitudinal vertical section on the line 4—4 of Fig. 5, of a series of juxtaposed conveyers, the arrows showing the direction of insertion of the stock or veneer to be dried, and the direction of its discharge respectively; Fig. 5 is an end elevation of Fig. 4, with parts broken away; and Fig. 6 is a sectional detail, enlarged, showing construction of the chain link and truss-tube coupled thereto.

The present invention finds special application in the drying of sheets of veneer, and its object is to support the veneer in its passage through the drying chamber in such manner that the sheets will have perfect freedom of movement while contracting or shrinking under the action of the heat to which they are subject during the drying operation.

A further object is to produce a conveyer which shall be strong, and yet simple in details.

The advantages of the invention will be better apparent from a detailed description thereof which is as follows:

Referring to the drawings, C, represents a drying chamber of any conventional design, being provided with a coil of steam pipe P on one side (or any equivalent source of heat), the heated air being properly distributed throughout the chamber by the action of the fans F whose shafts are coupled by a belt B on the outside of the casing the belt passing over suitable pulleys 1, 1, as shown. The shaft of one of the fans carries a pulley 2 from which leads a belt 3 to any suitable source of power or counter-shaft (not shown). At one corner of the drying chamber is mounted a shaft 4 provided with a belt pulley 5 from which leads a belt 6 to any source of driving power (not shown) said shaft carrying a pinion 7 which meshes with a gear wheel 8 on a parallel shaft 9, the latter shaft carrying a sprocket pinion 10. From the pinion 10 leads a sprocket chain 11, one lap thereof passing over an idler 12, the lower end of the chain passing over a sprocket wheel 13 mounted on a shaft 14. This shaft carries a pinion 15 which meshes with a gear wheel 16 on the shaft 17, the latter carrying a pinion 18 which in turn meshes with a pinion 19 above, and a pinion 20 below. The pinion 19 in turn meshes with a pinion 21, and the pinion 20 meshes with a pinion 22. The several pinions 19, 20, 21, 22 are mounted on the ends of the front shafts *a* of the endless conveyers presently to be referred to, the shafts *b* constituting the opposite shafts of the said conveyers. The shafts *a* (which together with shaft 17, are the drive shafts) are of course longer than the shafts *b*, being extended to accommodate the pinions carried by them as already described. The shafts *a* are mounted in brackets *d* as shown with the exception of the center shaft 17 carrying the pinion 18. The opposite ends of the respective conveyer shafts have mounted thereon the sprocket wheels 23 over which pass the sprocket chains 24; and since there are four pairs of shafts *a*, *b*, and one pair 17^b, it follows that there will be five endless or chain conveyers (Fig. 1).

The gearing above described imparts motion to the conveyers in the direction fully indicated by the plain arrows in Fig. 1, that is to say the adjacent laps of one contiguous pair of conveyers will travel in one direction, while the adjacent laps of the next succeeding contiguous pair will travel in the opposite direction, as fully indicated by the feathered arrows in Fig. 1. This results of course from the fact that one lap of each chain travels in the opposite direction from its opposite lap. The stock or articles to be dried are inserted between the adjacent laps of contiguous pairs of convey-

ers, making it possible to feed the green veneer from both ends of the drying chamber, and deliver it dried at both ends. This is in fact done in practice.

The important feature of the present invention resides in the detailed construction of the conveyer which is best illustrated in the large views of Figs. 4, 5, and 6. The link 1 of each chain has a centrally formed boss or socket *s* disposed on its inner face, the socket having formed thereon a peripheral slot *t* on the side of the inner longitudinal edge of the link, said slot communicating with the chamber of the socket. Disposed between the opposite sockets of the pair of sprocket chains constituting a given conveyer is a transverse spacing member or tube 25 made of sheet metal, said tube being split longitudinally. The split is bounded by the triangular ribs or arches *w* which serve as trusses or stiffening members for the tube, the opposite tapering ends of the ribs being inserted into the split sides of the sockets as shown. The chains are of the roller link variety, the pins upon which the rollers are mounted being arranged off center, that is to say, nearer to one edge of the link member than to the other, as shown in Fig. 6, and the roller being thus mounted, projects beyond one edge only of the link. The opposite edge of the link is flat to receive the corresponding edge of the link of an adjacent conveyer resting thereon. It will be seen that the peripheral wall of each tube is thus removed from the peripheral walls of its supporting sockets, a fraction of an inch (corresponding to the thickness of the socket wall); and when the laps of two contiguous pair of conveyers (between which the veneer is fed) are brought into position for feeding, the transverse tubes 25 of two such contiguous conveyers will be spaced apart a distance equal to twice the thickness of the wall of the socket (Fig. 5). In other words, the plane of travel of the outer peripheral surfaces of the combined series of tubes constituting the supports for the veneer sheets, is within the plane of travel of the outer peripheral surfaces of the sockets formed on the chains, so that if the thickness of the socket wall is one-eighth of an inch, the tubes of any pair of contiguous conveyers will be spaced one quarter of an inch. In fact I have found that even less space is sufficient to allow perfect freedom of movement to the thin veneer sheet as the same is shrinking or contracting during the drying process. The lower set of the two series of tubes between which the veneer is advanced serve to support the veneer, while the upper set are practically out of contact, and are not brought into requisition until they pass along the upper lap of the conveyer to which they belong, when they serve to support the veneer sheets introduced from the opposite end of the drying chamber. The truss ribs or stiffeners *w* prevent sagging of the tubes 25, so that the veneer sheets are supported evenly during the drying operation. The speed of travel of the conveyers is slow and sheets of green veneer V introduced at either end will come out perfectly dry at the opposite end with only a single passage through the chamber.

It will be seen from the foregoing description of my preferred form of conveyer that the latter being composed of link chains, sheet metal tubes, truss rods, etc., is of considerable weight, and I have found that such conveyers weighing approximately thirty pounds to the running foot may be usefully employed, although of course I do not limit myself to the use of conveyers of this particular weight. The object in employing a conveyer of substantial weight is not only to secure the requisite strength and wearing capacity, but also to render said conveyer capable of restraining the warping of all characters and thicknesses of veneers including those having the greatest tendency to warp or curl. It is the provision of the space between the opposed tubes of adjacent conveyers which permits the use of a conveyer of sufficient weight to restrain the warping of thick, tough veneers, without causing splitting of the tender thin veneers when dried in the same drier. As the thicker veneers do not require relief from the weight of the upper conveyer a single machine is, as will be seen, capable of drying veneers of varying characters and thicknesses.

Having described my invention what I claim is:

1. In a feed mechanism, an endless conveyer comprising a pair of link chains, sockets formed on the adjacent inner surfaces of the links having peripheral slots on the side toward the inner edges of the links, longitudinally split spacing tubes inserted into the sockets, the splits having bounding arch ribs tapering toward the end of the tubes, the ends of the ribs being passed through the slotted portions of the sockets, the peripheral lines of the sockets being substantially flush with the upper edges of the links.

2. In a machine for drying sheet material, feed mechanism comprising a pair of juxtaposed endless conveyers having series of transverse ribs or bars, the ribs of the lower run of the upper conveyer coöperating with the ribs of the upper run of the lower conveyer to confine between them the material to be dried, with means secured to the outer edges of the conveyers for spacing said coöperating ribs a fixed distance apart.

3. The combination in a veneer drying machine, of endless conveyers arranged one

above another, the contiguous runs of said conveyers co-acting to confine between them the veneer to be dried, with spacing means for maintaining said contiguous runs apart a greater distance than the thickness of the veneer and in parallel relation, whereby freedom of movement of the veneer will be permitted, but warping restricted.

4. The combination in a drier for drying sheet material, of endless conveyers disposed one above another, the contiguous runs of said conveyers co-acting to confine between them the material to be dried, with spacing means for maintaining the body portions of said contiguous runs apart a greater distance than the thickness of said sheet material and in parallel relation, whereby freedom of movement of said material will be permitted, but warping restricted.

5. The combination in a drying apparatus, of two endless conveyers one mounted above another, each consisting of linked members at each side and body portions supported by the linked members, the linked members of the lower run of the upper conveyer resting directly upon the link members of the upper run of the lower conveyer, the body portion of the conveyers being spaced apart.

6. The combination in a drying apparatus, of two endless conveyers, one mounted above another, each consisting of link members at each side and transverse bars or tubes supported by the link members, the link members of the lower run of the upper conveyer resting directly upon the link members of the upper run of the lower conveyer, the transverse bars or tubes of the conveyers being spaced apart.

7. The combination in a conveyer chain, of a series of links connected by pins arranged off center, said links being flat on one edge, a series of wheels mounted on the pins and projecting beyond the other edge of the links, and a boss projecting from one side of each link, said boss having a socket formed therein.

8. The combination in a veneer drying machine of an endless conveyer arranged to carry the veneer through the machine, a second endless conveyer arranged above said carrying conveyer and co-acting therewith to confine the veneer and restrain the same from undue warping or curling, said second conveyer having sufficient weight to resist the warping tendency of various thicknesses and characters of veneers, and means for spacing the contiguous runs of said conveyers a slight distance apart whereby the thin veneers will be relieved of the weight of the upper conveyer and the splitting of said thin veneers thereby avoided.

9. The combination in a veneer drying machine of an endless slatted conveyer arranged to carry the veneer through the machine, a second endless slatted conveyer arranged above said carrying conveyer and co-acting therewith to confine the veneer and restrain the same from undue warping or curling, said second conveyer having sufficient weight to resist the warping tendency of various thicknesses and characters of veneers, and means for spacing the contiguous runs of said conveyers a slight distance apart whereby the thin veneers will be relieved of the weight of the upper conveyer and the splitting of said thin veneers thereby avoided.

10. A feed mechanism comprising a pair of juxtaposed conveyers, and having transverse rib formations between which the articles may be confined, and means disposed along the length of the conveyers for keeping the adjacent laps of said conveyers spaced permanently apart, substantially as set forth.

11. A feed mechanism comprising a pair of juxtaposed conveyers, and having transverse rib formations between which the articles may be confined, and means disposed at the sides of the conveyers for keeping the adjacent laps of said conveyers spaced permanently apart, substantially as set forth.

12. A feed mechanism comprising a pair of juxtaposed conveyers, and having transverse rib formations between which the articles may be confined, and spacing devices at the sides of, and between the conveyers for keeping the adjacent laps of said conveyers spaced permanently apart, substantially as set forth.

13. A feed mechanism comprising a pair of juxtaposed conveyers having transverse ribs or bars spaced suitable distances apart, the material treated being inserted between the adjacent laps of the conveyers and confined between the aforesaid transverse formations, and means at opposite ends of the transverse formations for permanently keeping the adjacent laps of said conveyers spaced a suitable distance apart, substantially as set forth.

14. A feed mechanism comprising a pair of juxtaposed conveyers having transverse ribs or bars spaced suitable distances apart, the material treated being inserted between the adjacent laps of the conveyers and confined between the aforesaid transverse formations, and means disposed along the sides of the conveyers for permanently keeping the adjacent laps of said conveyers spaced a suitable distance apart, substantially as set forth.

15. A feed mechanism comprising a pair of juxtaposed endless conveyers having transverse ribs or slats spaced suitable dis-

tances apart, a rib or slat on one conveyer acting in opposed relation to a rib or slat on the adjacent conveyer, the material treated being inserted between the successive pair of opposed slats of the respective conveyers, and means disposed on the conveyers for permanently keeping the members of the several pairs of opposed slats a suitable distance apart, substantially as set forth.

16. A feed mechanism comprising a pair of juxtaposed endless conveyers having transverse ribs or slats spaced suitable distances apart, a rib or slat on one conveyer acting in opposed relation to a rib or slat on the adjacent conveyer, the material treated being inserted between the successive pair of opposed slats of the respective conveyers, and means disposed on the sides of the conveyers for permanently keeping the members of the several pairs of opposed slats a suitable distance apart, substantially as set forth.

17. A feed mechanism comprising a pair of juxtaposed transversely slatted conveyers contacting along the sides, the slatted portions forming the available carrying surfaces of the conveyers between said sides and being permanently spaced a suitable distance apart during such contact, substantially as set forth.

18. A feed mechanism comprising a pair of juxtaposed endless conveyers having transverse ribs or slats spaced suitable distances apart and forming the available carrying surfaces for said conveyers, the sides of the opposing laps of the conveyers being in contact and the slats being mounted to effect a permanent separation between the opposed surfaces of the adjacent laps during such lateral contact of the conveyers, substantially as set forth.

19. A feed mechanism comprising a pair of transversely slatted sections traveling conjointly and in juxtaposition and closed on the sides, the transverse formations of the respective sections being permanently spaced apart, substantially as set forth.

In testimony whereof I affix my signature, in presence of two witnesses.

FREDERICK KUKKUCK.

Witnesses:
EMIL STAREK,
MARY D. WHITCOMB.