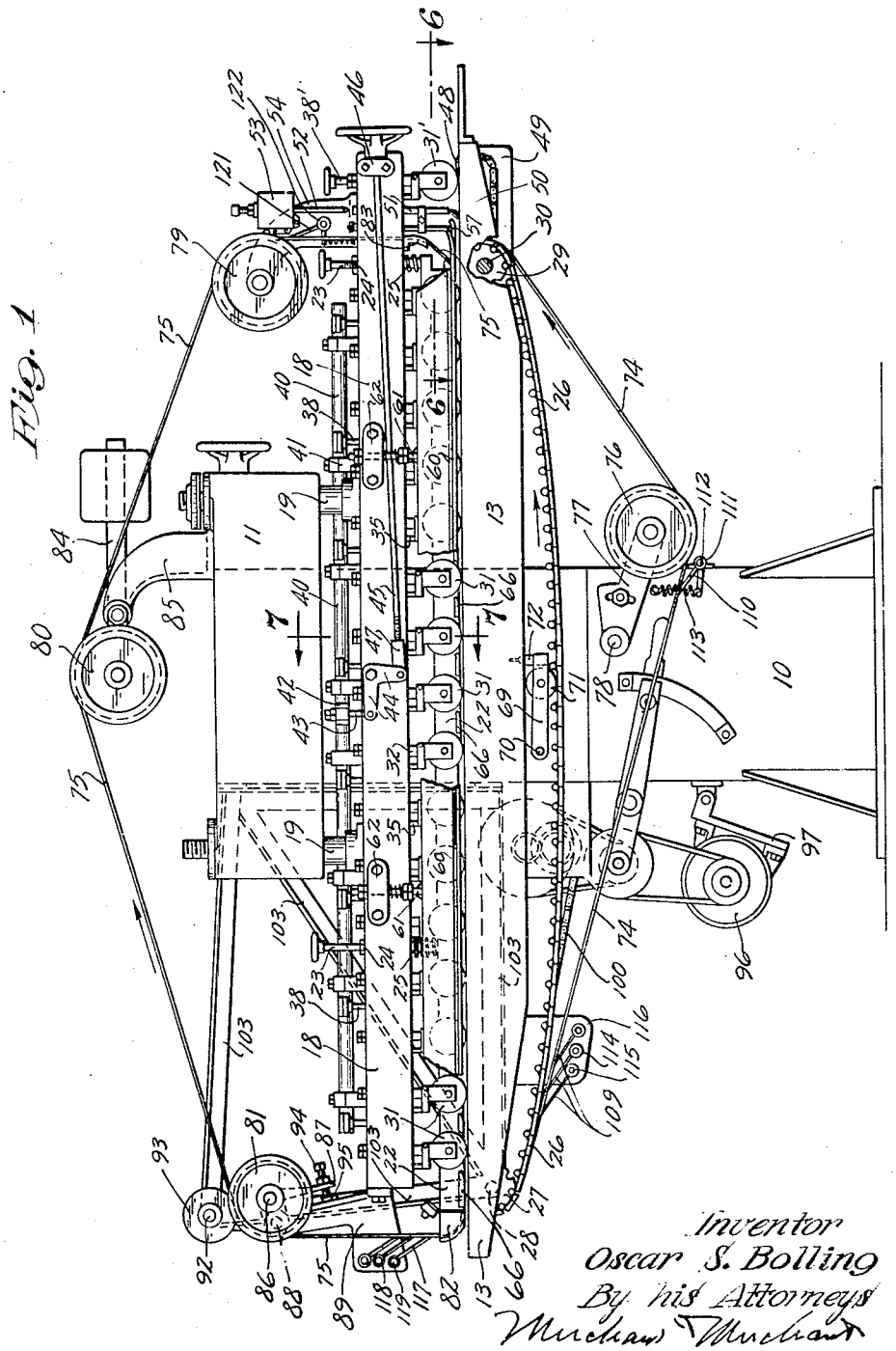
April 10, 1945. O. S. BOLLING 2,373,376

EDGE GLUING MACHINE

Filed Feb. 20, 1942 4 Sheets-Sheet 1

Fig. 1



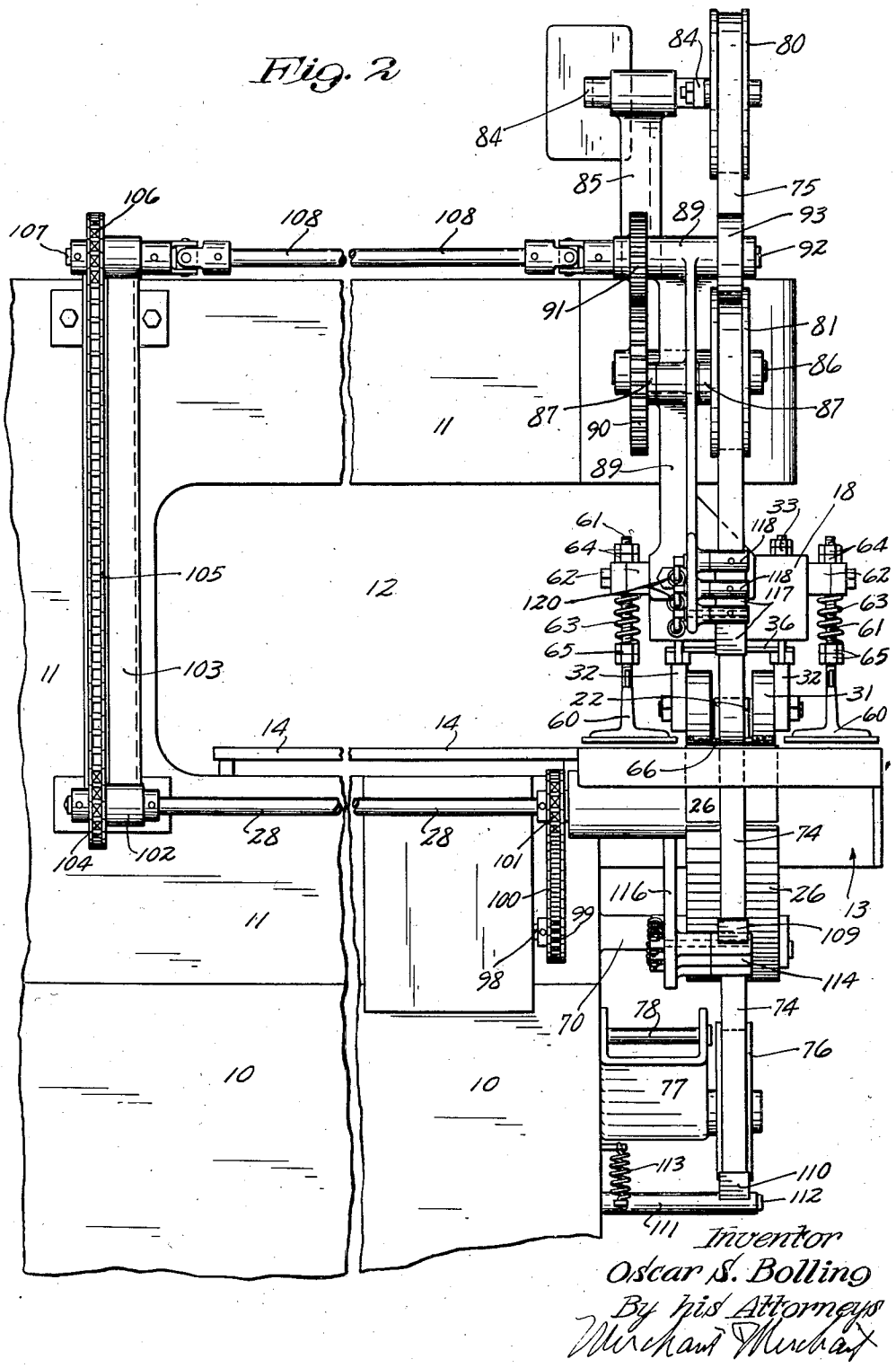
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EDGE GLUING MACHINE

Filed Feb. 20, 1942 4 Sheets-Sheet 2

Fig. 2



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Filed Feb. 20, 1942 4 Sheets-Sheet 3

Fig. 3

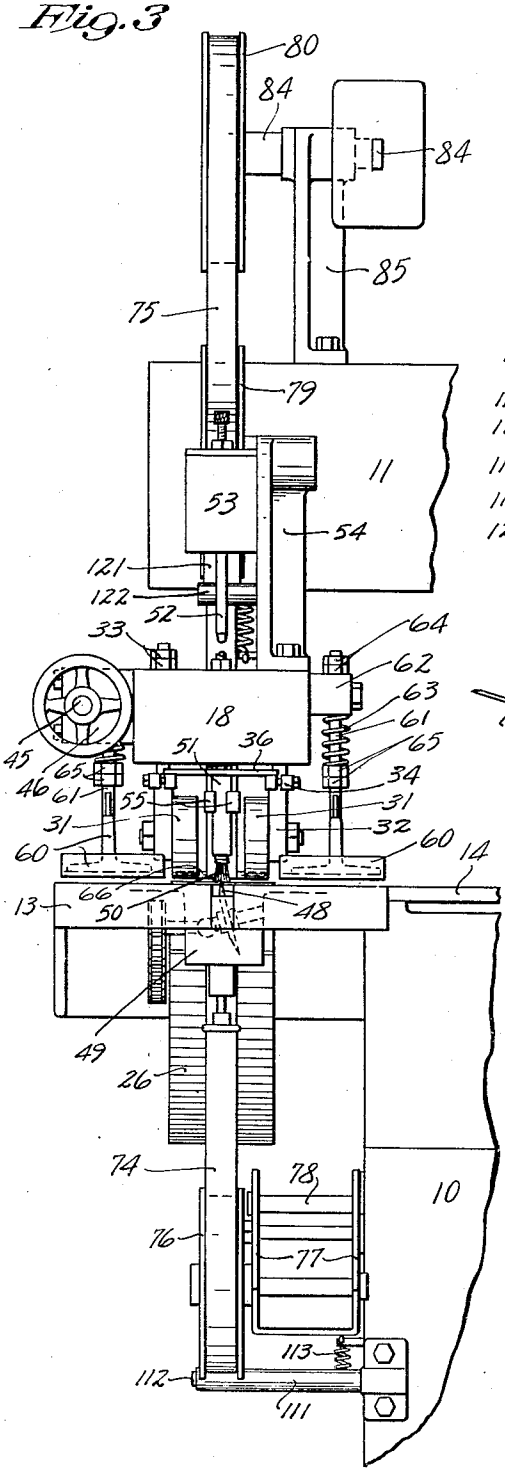


Fig. 4

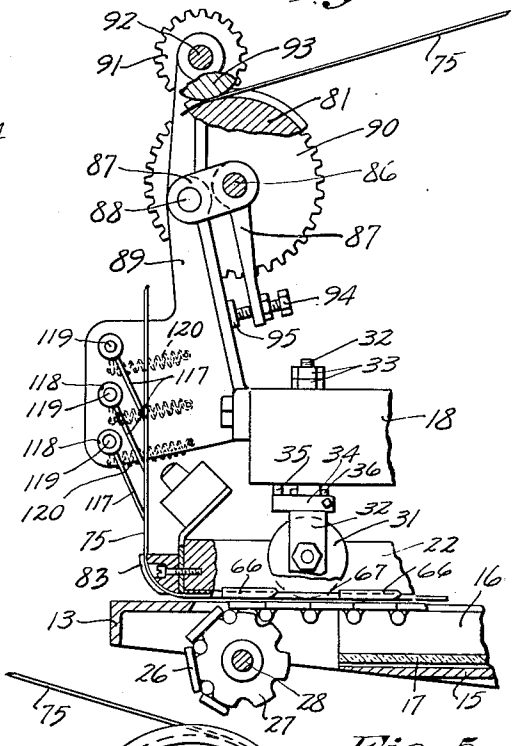
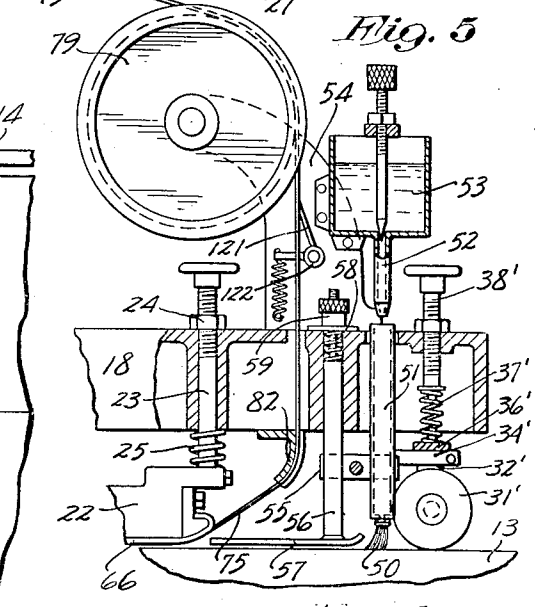


Fig. 5



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Fig. 6

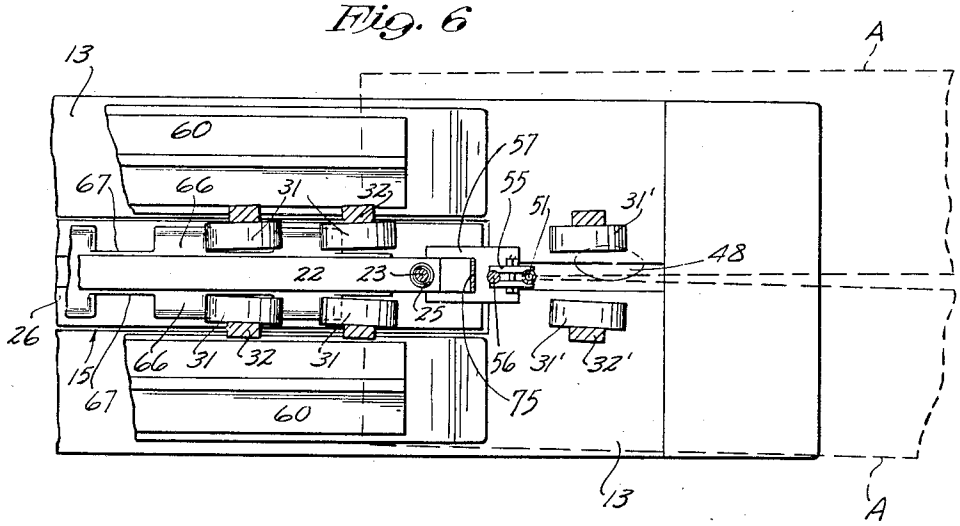
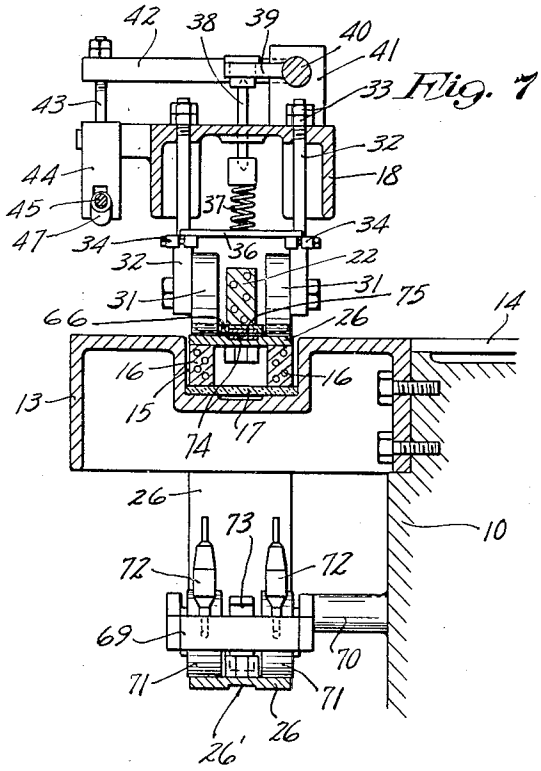


Fig. 7



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2,373,376

UNITED STATES PATENT OFFICE

2,373,376

EDGE GLUING MACHINE

Oscar S. Bolling, Minneapolis, Minn., assignor to Mereen-Johnson Machine Company, Minneapolis, Minn., a corporation of Minnesota

Application February 20, 1942, Serial No. 431,741

8 Claims. (Cl. 144—279)

My present invention provides an improved edge gluing machine especially designed and particularly adapted for applying glue to the edges of veneer strips and progressively forcing the glue-coated edges together and thereafter holding the same pressed together while the glue is hardening.

In the assembling and gluing of the strips, it is important that the glue-setting action should take place rapidly, and hence, in addition to the glue applying device or means, I provide a device for adding to the glue a hardener or catalyst, immediately after the glue has been applied to the edges of the veneer strips. By means of pressure rolls set on diverging angles, the edges of the veneer strips are forced together and held in tight contact under proper pressure during the glue-setting action.

In the act of pressing together the glue applied edges of the strips, surplus glue will be forced from between the edges. In edge gluing machines hitherto designed, the surplus glue would drop on and adhere to working parts of the machine and tend to gum up the machine and make removal of the surplus dried glue from the machine elements a difficult matter. Of course, accumulated dried glue on the machine parts makes good work impossible. My present invention involves a highly important improvement on such prior machines and involves the use of one or more endless tapes which function to receive the surplus glue and carry the same from the machine. These tapes, because of the function they perform, I herein designate as "wiper tapes." They are made of thin and very flexible sheet metal tapes or ribbons that will receive the surplus glue that is squeezed from the glue joint and carry the same out of the machine. The glue will very quickly harden on these metal tapes but will have very slight cohesion thereto, will quickly dry and become so brittle that it may be easily removed by scrapers or the like and, in fact, will largely be cracked loose from the tapes by the act of abruptly bending the tapes.

These tapes are co-operatively arranged to work in connection with an endless feed belt, pressure devices and other co-operating elements, all as will hereinafter more fully appear.

The improved machine also involves other co-operating combinations which will also hereinafter more fully appear.

This improved machine, while especially designed for use in assembling thin veneer strips, may be used to assemble thicker wooden strips which, when glued together, will make a substantially self-sustaining sheet such as used in making cores or base structures to be veneered.

A commercial form of the improved machine is illustrated in the accompanying drawings wherein like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a side elevation showing the improved machine;

Fig. 2 is an end elevation of the machine with some parts broken away looking at the machine in a direction from the left toward the right in respect to Fig. 1;

Fig. 3 is a fragmentary view of the machine looking at the parts shown in a direction from the right toward the left in respect to Fig. 1;

Fig. 4 is a fragmentary view of parts shown at the left hand end of the machine illustrated in Fig. 1, some parts being sectioned and some parts being broken away;

Fig. 5 is a fragmentary view of the parts shown at the right hand end of the machine illustrated in Fig. 1, some parts being sectioned and some parts being broken away;

Fig. 6 is a plan view of the right hand end portion of the machine various parts being sectioned on the line 6—6 of Fig. 1 and some parts being broken away; and

Fig. 7 is a transverse vertical section taken on the line 7—7 of Fig. 1.

All of the parts of the machine are supported directly or indirectly from a securely anchored pedestal 10 that is provided with a rigidly secured approximately C-shaped head 11 that forms a wide clearance passage 12. A horizontally extended feed table 13 is rigidly secured to the pedestal 10 underlying the extended arm of the head 11. The upper surface of this feed table 13, as best shown in Fig. 2, is provided preferably with a horizontal projection or supplemental plate 14 that lies flush with the top of the table and is securely supported on the lower arm of said head. Feed table 13 is formed with a longitudinal channel 15 in which are located electrically heated rails 16 that rest on an insulating plate 17.

Spaced above and extended horizontally over the feed table is a shoe-supporting beam 18 which is rigidly supported from the upper arm of the head 11 by hanger posts 19, see particularly Fig. 1, that are made vertically adjustable by suitable means.

Located directly above the channel 15 of the feed table 13 and extending parallel therewith is an elongated heated shoe 22 that is supported from the shoe-supporting beam 18 and is made

vertically adjustable by suitable means such as hanger bolts 23 that work through said beam, see particularly Fig. 5. Nuts 24 working on the threaded upper ends of hanger bolts 23 limit the downward movements of said bolts, and hence, of the shoe 22, and coiled springs 25 on the lower ends of said bolts yieldingly press the shoe 22 downward as far as permitted by adjustment of the hanger bolts.

In Fig. 6 veneer strips, the edges of which are to be glued together, are indicated by dotted lines marked A and are there shown in close but slightly converging relation on the feed table positioned to be fed forward, that is, from the right toward the left on Figs. 1 and 6. To feed the veneer strips with their adjacent edges longitudinally along and centrally over the hot rails 16, there is provided an endless feed belt 26 which is made up of hingedly connected flat links very much like tractor tread chains. The upper portion of this feed chain 26 is arranged to run over the feed table and over the rails 16 and by reference particularly to Fig. 7, it will be noted that the belts or links of this chain run directly on the rails 16 and afford a complete solid support for the abutting edges of the strips A.

At the delivery end of the feed table this feed chain runs over a sprocket wheel 27 on a shaft 28, see particularly Figs. 1 and 4, that is journaled in suitable bearings on the feed table and which is power-driven through connections to be hereinafter noted. At the receiving end of the machine, to wit: at the right hand end, as shown in Fig. 1, the feed chain runs over an idle guide sprocket 29 on a shaft 30 journaled in suitable bearings on the feed table.

As the veneer strips are carried forward by the feed belt, they are forced under pressure rolls 31 set in forwardly converging pairs so that they progressively force together the edges of the strips. These pressure rolls 31, in this particular machine, are shown as journaled to the lower ends of plungers 32, see particularly Fig. 7, that extend upward through the beam 18 and are made vertically adjustable by stop nuts 33. Mounted on the plungers 32 are split clamping collars 34 that are shown as provided with extended arms having upstanding pins 35 that work vertically in holes formed in the beam 18, see particularly Figs. 1, 4 and 7. Adjustments of the collars 34 on the plungers 32 will determine the extent of angularity of the rolls 31. The laterally spaced or companion plungers 32 are spanned by a transverse pressure bar 36 that rests on the split collars 34 and are subject to coiled springs 37, the tension of which can be varied by suitable means which, as shown, involves a pressure pin 38 mounted to move vertically through the beam 18 and, in turn, subject to the arm 39 of a rock-shaft 40 journaled in a bearing 41 on the beam 18. The rock-shaft 40 carries a number of the arms 39 and is provided with a tension arm 42, the free end of which is adapted to be set under varying tension by means of a connecting rod 43 that is pivoted to one end of a bell-crank 44 intermediately mounted on the beam 18, see particularly Figs. 1 and 7.

Adjustments of the bell-crank 44 will simultaneously adjust the tension of the several pairs of converging pressure rolls. Such adjustments of the bell-crank may be accomplished in any suitable way by mounting a rod 45 in a bearing 46 on the beam 18, connecting said rod to the depending arm of said bell-crank and providing said rod with a turn button 47 or the like.

While the edges of the veneer strips are being forced together, but before they have been engaged, the glue must be applied to the abutting edges, and this may be and preferably is accomplished in a well-known way by means of a beveled and obliquely set rotary glue-applying wheel 48 shown only in Figs. 3 and 6, such as that fully disclosed in the patent to Victor Johnson and Charles Johnson No. 782,342 of date February 14, 1905, and which roller would work in a glue pot 49, such as that more fully shown in the said prior patent.

In practice it has been found sufficient to apply the liquid glue to the edge only of the strips, and hence, the single roller is sufficient for this purpose.

Immediately after the glue has been applied to the strip a hardening fluid is applied thereto by means of a brush 50 positioned to spread the hardening liquid over the glue applied edge to accelerate the setting action of the glue at a point just in advance of the pressing of the edges of the strips together. This brush 50 is shown at the open lower end of a containing tube 51 carried by the beam 18 and arranged to receive the liquid hardener from the nipple 52 of a suitable container 53 shown as supported by a bracket 54 on the beam 18.

A tubular container 51 is shown as adjustably but rigidly secured, by means of a split clamp 55, to the leg 56 of a pressure plate 57. This leg 56 is mounted for vertical movements in the beam 18 and is yieldingly pressed downward by a coiled spring 58, see particularly Fig. 5. Extreme downward movements of the leg 56 and its pressure plate 57 is limited by a stop nut 59 that works on the threaded upper end of the leg 56.

In addition to the obliquely set pressure rolls 31, there is shown an additional but similar initial pair of pressure rollers 31' and co-operating supports therefor, which latter are very similar to the supports described in connection with said rollers 31 and are indicated by the same characters with the prime marks added thereto.

Located one on each side of the centrally located or main shoe 22 are long hold-down strips 60 that operate as auxiliary shoes to keep the veneer strips A pressed down upon the feed table 13, see particularly Figs. 1, 2 and 3. These hold-down strips or auxiliary shoes 60 are shown as provided with upwardly extended stems 61 that work through lugs 62 on the sides of the supporting beam 18. Coiled springs 63 on the said stems yieldingly press the auxiliary shoes 60 downwardly, as far as they are permitted to go, by stop nuts 64 on the threaded upper ends of said stems. The downward pressure put upon the strips 60 may be varied by adjustment of nuts 65 on said stems.

Secured to the shoe 22 and overlying the abutting edges of the veneer strips is a thin sheet metal hold-down plate 66 which, as best shown in Fig. 6, is notched at 67 to permit the pressure rolls 31 to directly engage and downwardly press upon the veneer strips A.

In Fig. 1 and particularly in Fig. 7, I have shown a chain lubricator which involves a U-shaped arm or bracket 69 pivoted to the pedestal 10 at 70 and provided with a pair of rollers 71 that receive grease from supply cups 72 and applies the same to the feed chain. In this device the roller 71 is shown as bifurcated and provided on its connecting shaft with a sprocket 73 that runs in contact with the lugs of the feed

chain 26 and causes the lubricating rolls to positively rotate.

In this preferred embodiment of the invention I employ two so-called "wiping tapes," to wit: a lower tape and an upper tape. The lower endless tape is indicated by the numeral 74 and the upper tape is indicated by the numeral 75. Both of these tapes, as above stated, are preferably very thin and very flexible metal ribbons, preferably of spring steel. The horizontal upper portion of the lower tape 74 runs flush with the upper operative portion of the feed chain 26 and fits grooves or notches 26' that have sufficient frictional contact with the feed chain to cause this lower strip to travel with the operative portion of said feed chin. The notches 26' are probably best shown in Fig. 7. This endless tape 74, at the receiving and delivery ends of the machine, runs over and with the feed chain over the sprockets 27 and 29; but said tape 74, in the arrangement shown, runs under and in contact with a tightening pulley 76 journaled on the extended end of an adjustable supporting arm 77 that is pivotally connected to the pedestal at 78.

The upper endless tape 75 runs under the notched hold-down strip 66, runs over guide pulleys 79, 80 and 81, and is caused to pass through or against slightly curved guide brackets or lugs 82 and 83. The guide lug 82 is shown as rigidly secured to and depending from the beam 18, while the curved guide lug or bracket 83 is secured to one end of the shoe 22. The guide pulley 79 is loosely journaled to the bracket 54 which, as before noted, is rigidly secured on top of the beam 18.

The guide pulley 80 is shown as journaled to one end of a weighted lever 84 that is intermediately pivoted to a bracket 85 on the top of the pedestal head 11. The pulley 81 operates as a driving pulley to frictionally drive the upper wiper tape 75 in the direction of the arrow marked adjacent thereto on Fig. 1. This pulley 81, as best shown in Figs. 1, 2 and 4, is carried by a shaft 86 journaled in the elbow of a bell-crank lever 87, the short arm of which is pivoted at 88 to a quite heavy bracket 89 which, in turn, is rigidly secured to one end of the beam 18. Shaft 86, at one end, is provided with a spur gear 90 that engages a smaller spur gear or pinion 91 on a short shaft 92 which is journaled in the extreme upper end of bracket 89 and provided with a friction wheel or drum 93 that presses the tape 75 into frictional contact with the wheel or pulley 81. The frictional driving tension on the tape 75 can be varied by adjustment of a screw 94 applied to the depending end of the arm of bell-crank 87. A resilient block or pad 95 is preferably interposed between the end of screw 94 and the bracket 89.

Power for driving all of the moving parts of the machine may be afforded by any suitable means such as an electric motor 96 supported from the pedestal 10 by a pivoted bracket 97. For the purpose of this case it may be sufficient to state that through suitable driving connections of any kind, power will be transmitted to a shaft 98, see particularly Fig. 2, equipped with a sprocket wheel 99 which, through a sprocket chain 100 shown in Figs. 1 and 2, drives a sprocket 101 on the shaft 28. Shaft 28, it will be remembered, carries the feed chain driving sprocket 27. As shown in Fig. 2, this shaft 28 is a long shaft, the extended end of which is journaled in a bearing 102 of a skeleton-like bracket 103, see particularly Figs. 1 and 2, that is rigidly secured to the head of the pedestal 10 and extends toward the delivery end of the machine and is located in a position laterally offset from the feed belt. At its extended end, shaft 28 has a sprocket 104 over which runs a sprocket chain 105. Chain 105 runs over an upper sprocket 106 on one end of a stub shaft 107 journaled in the upper portion of frame-like bracket 103. Stub shaft 107 is connected to stub shaft 92, above described through a knuckle-jointed shaft 108.

To positively remove the dried glue from the tapes 74 and 75, blade-like scrapers are employed. For scraping action on the lower tape 74, I have shown a set of scraper blades 109 and an additional scraper blade 110, shown best in Figs. 1 and 2. Scraper blade 110 is shown as carried by a sleeve 111 mounted on a fixed stud 112 projecting from the pedestal. By an anchor spring 113, blade 110 is frictionally but closely pressed against the tape 74. The scraper blades 109 may be supported and spring-pressed in any suitable way but are preferably mounted like the scraper 110 on sleeves 114 that are mounted on studs 115 of a bearing flange 116 depending from the feed table.

Suitable scrapers for the upper wiping tape 75 are best illustrated in Figs. 1, 4 and 5, and in the particular structure illustrated for such purpose, there is employed primary scrapers 117 carried by sleeves 118 secured on stub shafts 119 extended through and journaled in a flange of bracket 89 and at their extended ends subject to springs 120 that keep the scraper blades pressed against the upwardly moving portion of the upper tape 75. Beyond the pulley 79 there is preferably another scraper 121 carried by a spring-pressed sleeve 122 that is suitably pivoted to the bracket 54.

Operation

The operation of the machine has probably been made quite clear from the description already made, but may, nevertheless, be advantageously summarized as follows: The link like feed belt 26 and the co-operating portions of the wiping tapes or ribbons 74 and 75 will, by the driving connections illustrated and described, be driven in a direction to feed the veneer strips over the feed table in a direction from the right toward the left in respect to Fig. 1; and the operative portions of the said elements 26, 74 and 75 will, as already stated, be driven at the same travelling or lineal speed.

As the diverging edges of the veneer strips A are fed forward, slightly beyond the initial pressure rollers 31', the glue, by means of the wheel 48, will be applied to the edge of one of the strips; and immediately following this glue-applying action, the brush 50 will apply the glue hardening material to the edge of one or both of the veneer strips. Under the action of the slightly coverging pressure rolls 31, the edges of the veneer strips will be crowded tightly together and held tightly together during the glue hardening action which takes place within the machine and while the strips are being fed over the table. Under this continued forward movement the veneer strips will be engaged and pressed downward by the rollers 31 which work through the notches or openings in the hold-down plate or strip 66 and the strips, during such action, will be fed under the said hold-down plate or strip. Under the above described forward movement of the veneer strips the drying of the glue will be ac-

celerated by the heat applied from the rails 16 and shoes 22.

Under pressure produced by the rollers surplus glue will be squeezed from the glue joint and will be smeared onto or taken up by the operative portions of the endless tapes 74 and 75 and the glue caught by these tapes will quickly harden thereon and become very brittle. As the tapes 74 and 75 make abrupt turns at the delivery end of the machine, the former, in passing over the sprocket 27, and the latter passing through the curved elbow guide 62, the hardened glue will be cracked and loosened and much thereof will fall from the tapes but the scrapers 109 and 117 will insure further removal of the glue so that the hardened and removed glue will drop outside of the machine and may be caught by a suitable receptacle or receptacles, not shown. In Fig. 1, and other views described, if any hardened glue still remains on the tapes 74 and 75 after passing the scrapers 109 and 117, it will be removed by the additional scrapers 113 and 121.

Means has already been fully described whereby the shoe 22, with its applied hold-down plate 66, may be properly adjusted for the proper spacing and positioning of the parts; and also means has been described whereby the pressure on the rolls 31 may be readily varied and adjusted. Of course the said shoe 22 and plate 66 will require vertical adjustments to correspond to the thickness of the wooden strips that are to be edge glued.

The opening 12 in the U-shaped head 11 affords a wide space so that the edge gluing action may be continued by the successive application of strips to the veneer sheet; and the table extension 14 affords means for supporting a quite wide sheet made up of glued strips.

The hold-down strips act as sort of auxiliary shoes for holding down the extended portions of the veneer strips while their inner edges are being glued together.

The machine described is a complete self-contained machine, all of the parts of which are assembled on a common support or pedestal, and hence, capable of being set up and transported as a complete device with all of the parts in operative order.

What I claim is:

1. In a strip gluing machine, a feed table, an endless feed belt and cooperative means arranged to work over said table and to feed strips into edgewise joining relation, means for applying glue at a place between the approaching edges of the strips, and an endless flexible wiper tape movable with said feed belt along the joint line between the strips and adapted to receive surplus glue and carry the same out of the machine, said feed belt being made up of joined links and said tape being a thin metallic strip, said links having grooves in which said tape is seated in its operative movement with said feed belt.

2. In a strip gluing machine, a feed table, an endless feed belt and cooperative means arranged to work over said table and to feed strips into edgewise joining relation, means for applying glue at a place between the approaching edges of the strips, and an endless flexible wiper tape movable with said feed belt along the joint line between the strips and adapted to receive surplus glue and carry the same out of the machine, said feed belt being power-driven and said tape being frictionally carried therewith.

3. In a strip gluing machine, a feed table, an endless feed belt and cooperative means arranged to work over said table and to feed strips into edgewise joining relation, means for applying glue at a place between the approaching edges of the strips, and an endless flexible wiper tape movable with said feed belt along the joint line between the strips and adapted to receive surplus glue and carry the same out of the machine, said feed belt being made up of metallic links, and in further combination with electrically heated rails countersunk into said feed table and arranged to directly support the metallic links of said belt while they are operative to support the strips and to directly apply heat to the glue joints of the strips.

4. In a strip gluing machine, an endless feed belt and cooperative means arranged to feed strips into edgewise joining relation, means for applying glue at a place between the approaching edges of the strips, and an endless flexible tape movable with said belt along the joint line between the strips and adapted to receive surplus glue and carry the same out of the machine, said belt being power-driven and said tape being frictionally carried therewith.

5. In a strip gluing machine, means arranged to feed edge glued strips into edgewise joining relation and moving the same through the machine in the direction of the joint line between the strips, said means including an endless link feed belt and an endless flexible tape running over the link feed belt along the joint line between the strips and adapted to receive surplus glue and carry the same out of the machine, said feed belt being power-driven and said tape being frictionally carried therewith.

6. The structure defined in claim 4 in which there is a second flexible tape movable with the belt.

7. The structure defined in claim 5 in which there is a second flexible tape movable with the belt.

8. The structure defined in claim 5 in which the said feed belt is made up of joined links and said feed tape is a thin metallic strip, said links having grooves in which said tape is seated in operative movement with the feed belt.

OSCAR S. BOLLING.