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G. ORTEL
MACHINE FOR BUTT JOINING THE LONGITUDINAL EDGES
OF THIN FLAT WORKPIECES

3,547,735

Filed March 24, 1967

3 Sheets-Sheet 1

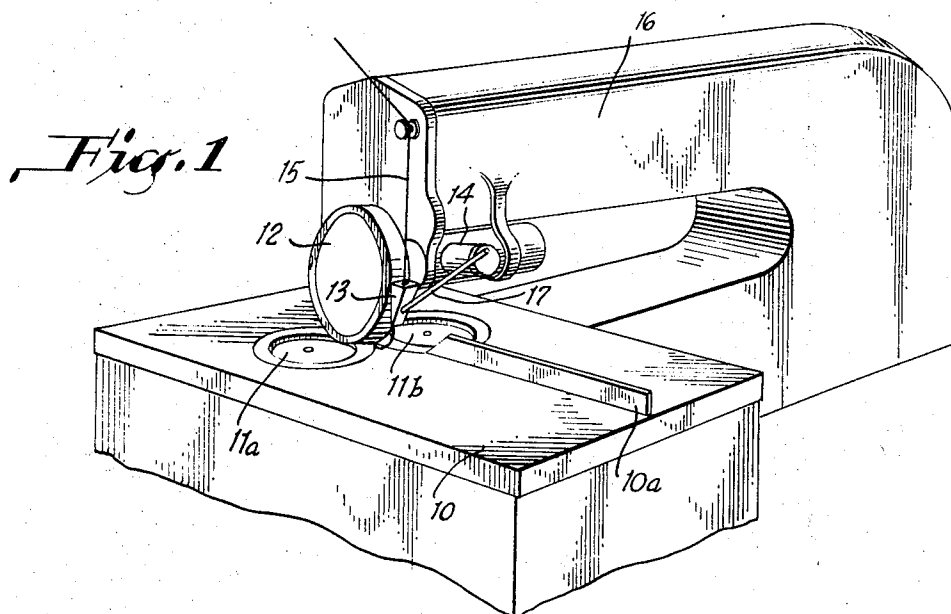


Fig. 2

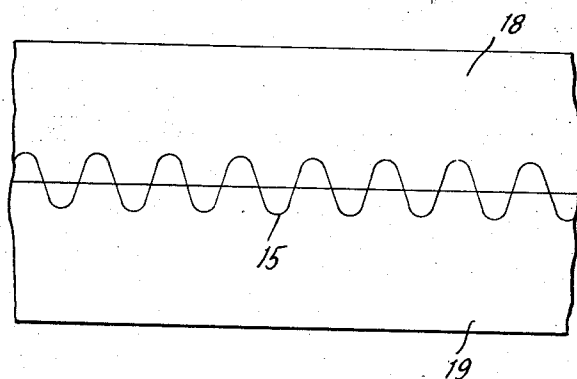
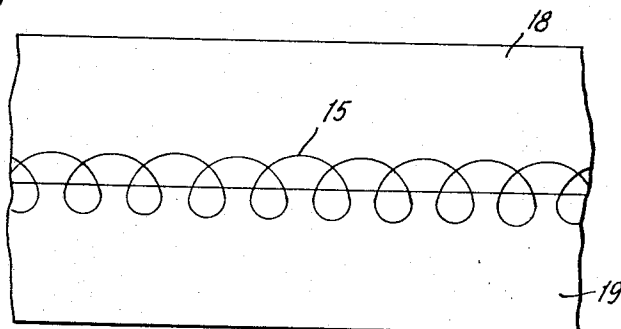


Fig. 3



INVENTOR.
Gerhard Ortel

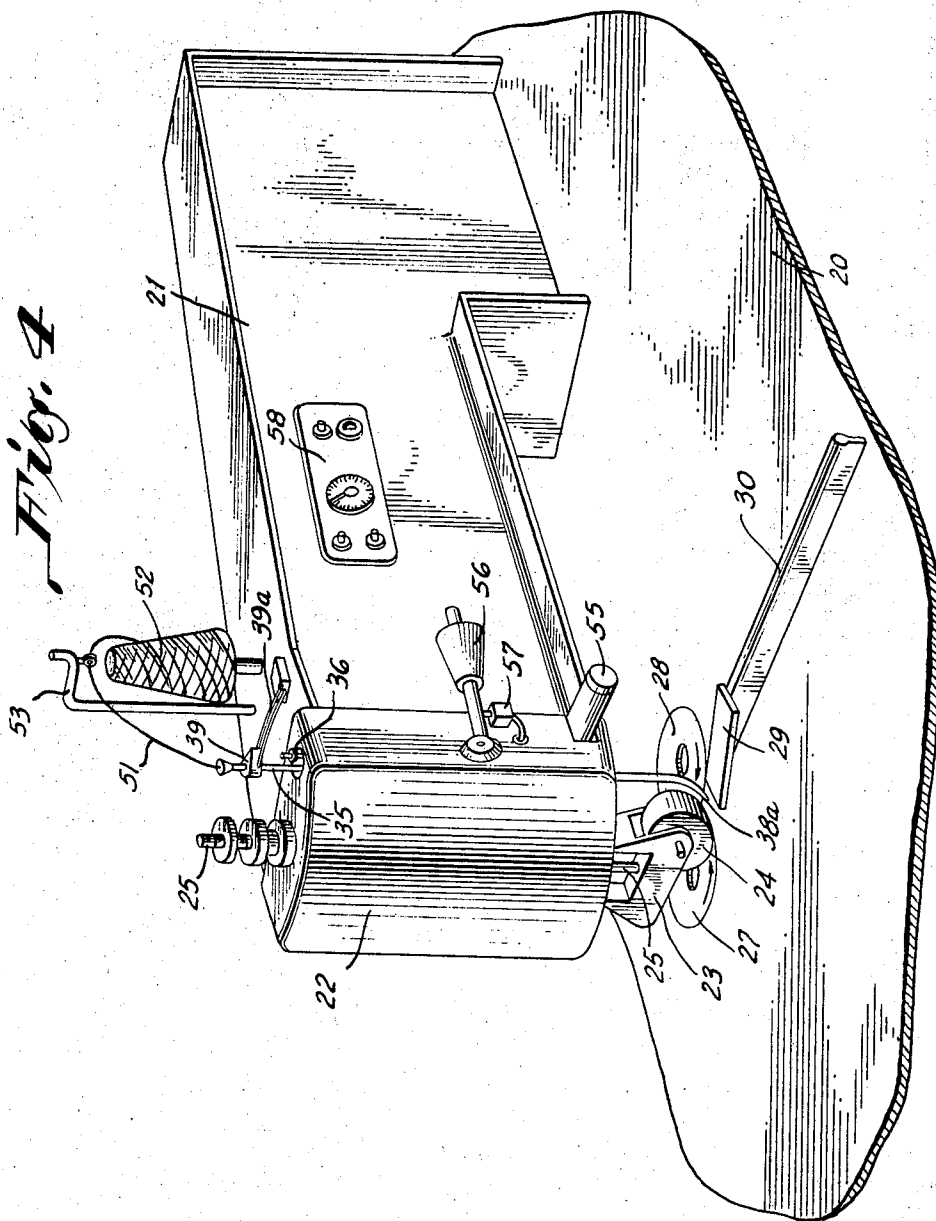
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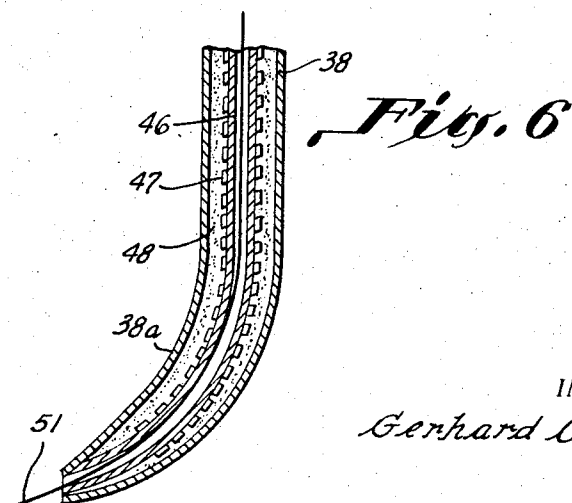
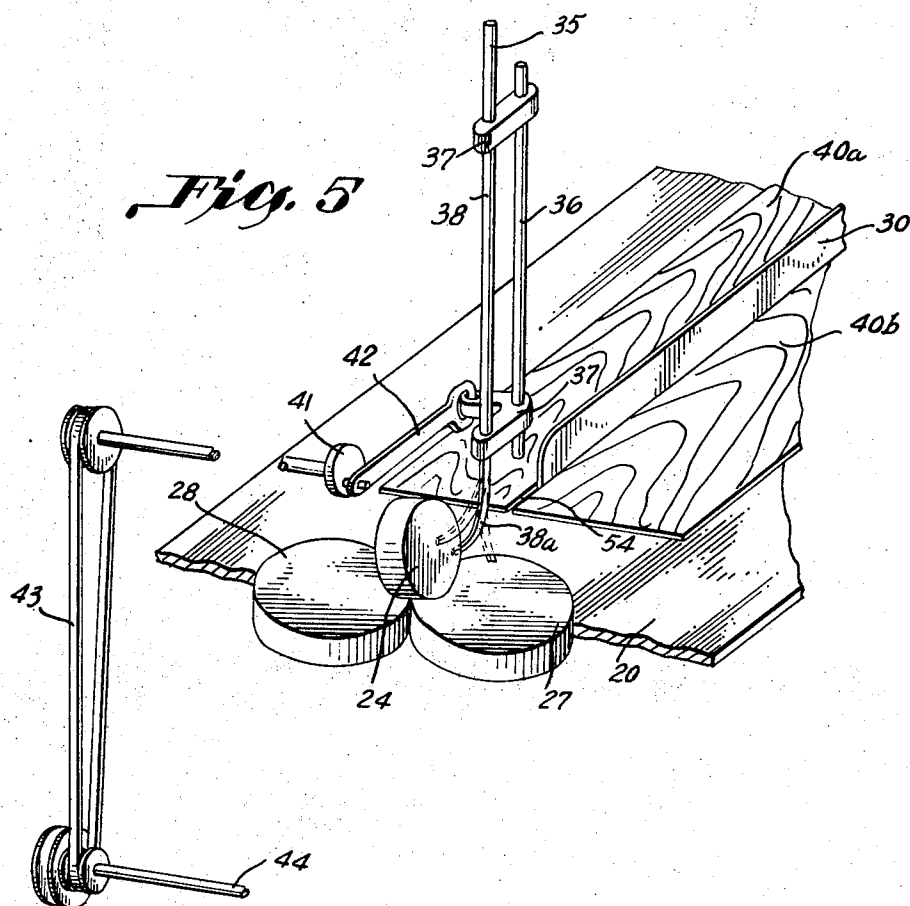
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Gerhard Ortel

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MACHINE FOR BUTT JOINING THE LONGITUDINAL EDGES OF THIN, FLAT WORKPIECES

Gerhard Ortel, 10 Torfweg, Rietberg,

Westphalia, Germany

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Aug. 1, 1963. This application Mar. 24, 1967, Ser.

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U.S. Cl. 156—440

18 Claims

ABSTRACT OF THE DISCLOSURE

A machine for joining longitudinal joints of flat, thin workpieces such as veneers, or the like is provided. The machine includes a feeding device to move the veneers through the machine. A pressure roller is located above the feeding device to press a connecting thread onto the veneers that are fed through the machine. A thread feeding device is mounted on a swing arm located in front of the pressure roller to supply thread to the pressure roller for applying across the joint of the abutting veneers moving through the machine.

BACKGROUND OF THE INVENTION

This invention relates to a machine for joining the longitudinal joints of flat, thin workpieces such as veneers, sheets of paper or the like, comprising a feeding device for the workpieces passing through the machine and a pressure roller or the like arranged above the feeding device for pressing a gummed connecting means onto the veneers and is a continuation-in-part of my copending application Ser. No. 299,223, filed Aug. 1, 1963, now U.S. Pat. No. 3,326,736, and embodies improvements in the art thereover.

PURPOSE OF INVENTION

It is an object of the present invention to provide a machine for gluing together flat workpieces which works only with one connecting thread extending on both sides of the abutting joint edges. Apart from a good and strong connection this machine also ensures a high efficiency while avoiding the hitherto known disadvantages.

It is another object of the invention to provide a machine for reliably joining the longitudinal joints of two flat workpieces such as veneers or the like, wherein the provision of a swivel lever with a guiding device permits a thin gummed connecting thread to be applied, said connecting thread being alternately placed onto the marginal regions of both abutting workpieces and firmly pressed and stuck thereon by a following pressure roller.

Still another object of the invention resides in the advantageous heating of the adhesive provided around the connecting thread, said heating being effected within the guiding device while the thread is passing through so that the thread with the soft adhesive can be placed in a favorable manner onto the workpieces to be joined and subsequently pressed thereon by the pressure roller in a simple and reliable manner.

BRIEF DESCRIPTION OF DRAWINGS

Several embodiments of the invention will now be described by way of example and with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of a machine for joining the longitudinal joints of veneers or the like comprising feed disks mounted in a worktable and an upper pressure roller preceded by a thread guiding device;

FIG. 2 is a top plan view of two veneers or the like joined by a thread laid in serpentine form;

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FIG. 3 is a top plan view of two veneers or the like joined by a thread laid in the form of loops;

FIG. 4 is a perspective view of another embodiment of a machine for joining the longitudinal joints of veneers or the like;

FIG. 5 is a perspective view of an arrangement for guiding the thread and of the drive of the machine; and

FIG. 6 is a longitudinal section through the swivel arm of the guide and heating tube and the heating device.

DESCRIPTION OF SPECIFIC EMBODIMENTS

Referring to FIG. 1, in a worktable 10 of a machine for joining and/or gluing together the longitudinal joints of flat workpieces such as veneers or the like two plate disks 11a and 11b are arranged to rotate in opposite directions and press together the edges of the veneers (not shown) passing through the machine so as to form a tight joint. A guide rail 10a ensures that the run-through direction of the veneers is straight-lined. Above these plate disks 11a and 11b a pressure roller 12, mounted on a head 16 of the machine, is freely rotatable and heated in such a manner that its outer rolling surface has a temperature of for example 100° to 250° C.

This pressure roller 12 is preceded by a guiding device 13 for a thread 15 or the like, for example in the form of a funnel or eye mounted in front of the rotatable rolling surface of the pressure roller 12. An eccentric drive 14 or the like mounted on the machine head 16 is provided with a push rod 17 which is coupled at its free end with the guiding device 13, thus forming a swivel arm for moving the guiding device 13 to and fro transversely of the run-through direction of the veneers. The thread 15 which is fed from above from a reel or the like (not shown) passes through the guiding device 13 and, by the movement thereof, is placed in serpentine form on the two veneers 18 and 19 (cf., FIG. 2) lying closely against each other. This thread 15 which preferably is a multifiber thread, for example a glass silk thread or the like, is previously wetted or coated with an adhesive so that afterwards in an almost dry or completely dry state it adheres to the surface of the veneers 18 and 19 passing through the machine by simply rolling it on said surface with the aid of the heated pressure roller 12. Thus the thread 15 firmly sticks to the veneers 18 and 19.

The adhesives which come chiefly into question are known as contact or synthetic adhesives which need not be moistened directly before they are brought into contact with the veneers but adhere to the wood on being subjected to pressure and heat without however penetrating the wood. The resiliently mounted pressure roller 12 can easily adapt itself to veneers of different thicknesses, the lower plate disks 11a and 11b compensating for any slight differences between the two veneers by lever compensation or the like so that the multifiber thread 15 is spread as flat as possible and stuck on the veneers. The shape of the serpentine lines is determined by the speed at which the veneers pass through the machine and the number of strokes of the eccentric drive 14.

A thread 15 stuck in this manner holds the joined veneers 18 and 19 tightly together. It can be stuck either on the back of the veneers or on the front side thereof from which it can be ground off quickly.

FIGS. 2 and 3 show two different ways in which the thread can be placed on the veneers. The curves or loops of the thread engage the neighboring veneers 18 and 19, fitted tightly together for example every 5 to 20 mms., and extend over the edge zones thereof in the form of a wavy line, loops, in zigzag shape or the like.

A machine of modified construction for sticking together longitudinal joints of flat workpieces such as veneers or the like (cf., FIGS. 4 and 5) has a worktable 20 above which a lateral upright 21 extends which carries

a machine head 22 in the region where the work is carried out. Mounted in a support 23 at the underside of the head 22 of the machine is a freely rotatable pressure roller 24 which together with the support 23 is adjustable in height by means of a retaining rod 25 and hand-wheels 26 or the like which can be screwed on the retaining rod 25 and bear against the machine head 22.

In the worktable 20 below the pressure roller 24 two plate disks 27 and 28 are arranged to rotate in opposite directions and press together the veneers 40a and 40b passing through the machine so as to form a tight joint. The two plate disks 27 and 28 are preceded by a guide rail 30 of very small wall thickness which is fixedly connected to the worktable 20 and extends on the central axis between the two plate disks 27 and 28. This guide rail in the region facing the plate disks 27 and 28 is firmly connected with a holding down device 29 which is in the form of a resilient pressure plate such as a leaf spring or the like so that this pressure plate can be vertically moved.

The guide rail 30 serves to accurately position the veneers 40a and 40b in their directions of movement. The veneers are pulled along the guide rail 30 by the plate disks 27 and 28, held in the same plane by the holding down device 29 without tilting or overlapping each other and pressed together by the plate disks 27 and 28 so as to form a tight joint.

Passing through the head 22 of the machine in longitudinal direction thereof is a guiding device 35 which extends in front of the pressure roller 24 and comprises a guide and heating tube 38 which is mounted in such a manner that it is pivotable about a vertical pivot axle 36 by means of swivel levers 37. At its lower end this guide and heating tube 38 is bent towards the pressure roller 24 so as to form a swivel arm 38a.

The upper funnel-shaped supply end of the guide and heating tube 38 is provided with a connecting piece 39 into which lead-in wires 39a connected with the electrical equipment of the machine and coming out of the upright 21 end.

As shown in FIG. 6, the guide and heating tube 38 is provided with a central convection tube 46 extending on the longitudinal axis of the guide and heating tube 38 and consisting of a material having good heat radiating properties, such as quartz or the like. On the one hand, this convection tube 46 serves as a guide for the connecting thread 51 passing therethrough and, on the other hand, it transfers the absorbed heat to the connecting thread 51 which is provided with an adhesive. This convection tube 46 is flush with the lower bent and narrowed swivel arm 38a of the guide and heating tube 38.

Over its entire length the convection tube 46 is surrounded by a heating coil 47 or the like to which the lead-in wires 39a are connected and which, when in a heated state, transfers its heat energy to the convection tube 46. The space between the heating coil 47 which may be a heating wire, heating band or the like and the guide and heating tube 38 is filled with an insulating material 48 which serves to secure the heating coil 47 in position and prevents the heating coil 47 from getting into contact with the guide and heating tube 38.

This thread guiding device 35 is advantageously provided with the guide and heating tube 38 which, on the one hand, guides the connecting thread 51 in a favorable manner and, on the other hand, heats the thread in a simple way so that the adhesive around the connecting thread 51 becomes soft to a certain degree.

By means of the swivel levers 37 the guide and heating tube 38 swings around the vertical pivot axle 36 in such a manner that the swing path of the swivel arm 38a extends transversely of the run-through direction of the veneers 40a and 40b, thereby moving the swivel arm to and fro. The swinging movement of the guide and heating tube 38 is effected by an eccentric drive 41 having a push rod 42 which is preferably linked to the lower

angular swivel lever 37. This eccentric drive 41 is synchronized with a drive shaft 44 of the plate disks 27 and 28 through the intermediary of an interposed driving machinery 43.

The connecting thread 51 is preferably in the form of a multifiber thread, for example a glass silk thread, and, prior to winding it onto a reel 52 or the like, it is wetted or coated with an adhesive. This connecting thread 51 is fed from the reel 52 rotatably mounted on the upright 21 over a feed rod 53 through the guide and heating tube 38 of the guiding device 35 and gets at the lower bent swivel arm 38a into the region of the veneers 40a and 40b and the pressure roller 24. By means of the heating device the guide and heating tube 38 is subjected to heating, the heat being transferred to the connecting thread 51 passing through the guide and heating tube, thereby heating the thread and softening the adhesive. While the two veneers 40a and 40b are running through the machine the bent swivel arm 38a of the guide and heating tube 38 swings to and fro in a certain region above a butt joint 54 of the flat workpieces such as the veneers 40a and 40b and thereby places the connecting thread 51 in a certain form, e.g., in the form of a wavy line serpentine line, loops, in zigzag shape or the like, onto the veneers 40a and 40b and the following pressure roller 24 presses the heated connecting thread 51 with the softened adhesive firmly onto the veneers 40a and 40b. The connecting thread 51 ensures a good and safe connection without considerable protrusions. The extent of the swinging movement as well as the accurate adjustment of the thread guiding device in the region of the butt joint (centrality) can be determined by means of an adjusting screw 55 on the machine head 22.

The entire machine head 22 including the guiding device 35 and the pressure roller 24 is mounted on the upright 21 so as to be vertically adjustable relative to the latter. This vertical adjustment to different thicknesses of the veneers is effected by means of a lever system, for example an eccentric lever 56 or the like on the machine head 22, a controlling device such as a pilot lamp 57 or the like indicating the accurate vertical adjustment.

The fine adjustment to the thickness of the veneers is ensured by the vertically adjustable pressure roller 24. Moreover, this vertical adjustability of the pressure roller 24 compensates for any unevenness within the veneers 40a and 40b.

A switchboard 58 attached to the upright 21 includes adjustment devices and pilot lamps or the like and constitutes the main installation for switching the machine on and off.

The machine as proposed by the invention is of simple construction, easy to handle and favorably of small size.

The great advantage of the invention resides in achieving high run-through speeds for the veneers to be glued together while achieving at the same time a very strong connection. Moreover, the machine as proposed by the invention involves considerably less costs of labor and material than the machines hitherto known.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

I claim:

1. A machine for joining the longitudinal joints of flat, thin workpieces such as veneers or the like, comprising a feeding device for the veneers, a pressure roller arranged above said feeding device for pressing a connecting thread onto the veneers, a swing arm arranged in front of said pressure roller and capable of swinging

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across the joint of the abutting veneers, and a thread feeding device carried by said swing arm guiding the thread to said pressure roller.

2. A machine for joining the longitudinal joints of flat, thin workpieces such as veneers or the like, comprising a feeding device for the veneers arranged to pass through the machine, a pressure roller arranged above said feeding device for pressing a gummed multifiber connecting thread onto the veneers, a swing arm arranged in front of said pressure roller and capable of swinging across the joint of the abutting workpieces, a thread feeding device carried by said swing arm guiding the gummed multifiber connecting thread to said pressure roller, and an eccentric drive for moving said thread feeding device, said thread feeding device being at least partly constructed as a heating tube.

3. A machine according to claim 2, wherein the thread feeding device is in the form of a funnel.

4. A machine according to claim 2, wherein the thread feeding device is in the form of an eye.

5. A machine according to claim 2, wherein superposed swivel levers are provided for moving the guide and heating tube with a lower swivel arm about a vertical axis of rotation.

6. A machine according to claim 5, wherein the guide and heating tube is in parallel with and somewhat spaced apart from the axis of rotation.

7. A machine according to claim 6, wherein an angularly shaped swivel lever is hinged to a push rod of the eccentric drive.

8. A machine according to claim 7, wherein the swinging movement of the swivel lever is adjustable.

9. A machine according to claim 8, wherein the guide and heating tube is provided with a central convection tube serving as a heating device and consisting of a heat radiating material, a heating means is in contact with said convection tube and an insulating material is provided between said heating means and the guide and heating tube, thereby holding the heating means in position.

10. A machine according to claim 9, wherein the heat radiating material consists of quartz.

11. A machine according to claim 9, wherein the heating means comprises a heating coil.

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12. A machine according to claim 9, wherein the heating means comprises a heating wire.

13. A machine according to claim 9, wherein the heating means comprises a heating band.

14. A machine according to claim 9, wherein electrical lead-in wires for the convection tube are connected to an upper funnel-shaped end region of the guide and heating tube, which end region projects from the machine head.

15. A machine according to claim 14, wherein the machine head is provided with the pressure roller and the feeding device for the connecting thread and mounted on an upright of the machine so as to be vertically adjustable.

16. A machine according to claim 15, wherein the machine head is provided with a controlling device in the region of lever rods permitting of the vertical adjustment, said controlling device serving for precisely indicating the vertical adjustment.

17. A machine according to claim 16, wherein the lever rods are constructed as an eccentric lever having a counterweight.

18. A machine according to claim 17, wherein a worktable is provided and a driving machinery is arranged below the worktable, said driving machinery synchronously driving the feeding device for the veneers and the eccentric drive for the swivel arm.

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HAROLD ANSHER, Primary Examiner

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144—318; 156—298, 304, 545