To all whom it may concern:

Be it known that I, ABRIN ELKENDOFF, a citizen of the United States, residing at Madison, county of Dane, State of Wisconsin, have invented a certain new and useful Improvement in Machines for Gluing Strips Edge to Edge, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

The object of the present invention is to produce a simple and novel machine for quickly and effectively gluing together, edge to edge, two strips such as, for example, thin strips of wood veneer.

In joining two thin strips of wood veneer together, edge to edge, it is necessary to hold the edges to be joined in registration with each other and to exert pressure so as to force the meeting surfaces into intimate contact with each other. Furthermore, when a waterproof product is desired the blood albumen glue which is preferably employed for this purpose requires heat as well as pressure to set the same. In pressing the strips together there will usually be a surplus of glue which is squeezed out of the joint and, in prior machines of which I am aware, collects on the working parts so that the machine must be frequently cleaned in order to insure good results.

Viewed in one of its aspects, my invention may be said to have for its object to produce a simple and novel machine in which a perfect glued joint between the edges of two thin strips may be secured by means of heat and pressure; which will bring the meeting surfaces into registration with each other and insure a good union at all points regardless of slight departures from straight lines in the edges of the strips; and which may easily be kept free from accumulations of surplus glue and, if desired, be cleaned while in operation.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of my invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1 is a side elevation of a machine arranged in accordance with my invention;

Fig. 2 is an elevation of the front end of the machine;

Fig. 3 is a section taken approximately on line 3—3 of Fig. 1; and

Fig. 4 is a top plan view of one of the groups of pressure-producing rolls, two strips to be glued being shown passing through them.

Referring to the drawings, 1 represents a long hollow metal bar having a flat polished upper face, the bar being preferably made of brass. Lying directly above the member 1 is a complementary member, 2, which may conveniently take the form of a long sheet metal box rectangular in cross section, having a steam pipe, 3, extending longitudinally through the same and being filled with a body of comminuted conducting material, 4, around the pipe, iron filings being a satisfactory material for use as a filler. Steam is admitted to the interior of the member 1 and into the steam pipe, 3, from a suitable conduit or pipe, 5, whose connection, 6, with the steam pipe is such that the latter may be moved up and down at will. From the top of the member 2 project a plurality of posts or stems, 7, upon which may be strung washer-like weights, 8, to increase the weight of the member 2 uniformly or otherwise, as may be desired. The upper run of an endless band, 9, preferably of metal such as brass, lies upon the member 1 and extends from end to end of the latter. The lower run of a similar endless band, 10, extends underneath the member 2 and thus lies upon the upper run of the band, 9. The members 1 and 2 and the bands are made comparatively narrow because they need engage with the work only in proximity to the joint.

At one end of the machine are a pair of horizontal feed rolls, 11, whose line of contact lies in the plane of contact between the two bands. These feed rolls are driven in any suitable manner. In the arrangement shown, they are connected together by gearing, 12, power being applied in any suitable way to the shaft, 13, of one of the rolls.

At intervals along the machine are pressure rolls adapted to engage the parts of
the work projecting laterally from between the members 1 and 2 and press them toward the longitudinal center of the machine, that is toward each other. These pressure rolls are conveniently arranged in groups of four, each group comprising two upper rolls, 14, lying on opposite sides of the members 1 and 2 and close to the latter, together with two lower rolls, 15, each lying just below and cooperating with one of the members 14. The pressure rolls are so disposed that their axes are not quite parallel with the axes of the feed rolls, the axes of all of the pressure rolls on each side of the machine being parallel with each other but making an angle slightly greater than ninety degrees with the longitudinal axis of the machine, and the two sets of pairs of rolls being symmetrically disposed relatively to the longitudinal axis of the machine; the larger angle between the axes of the two pairs of each group being toward the front of the machine.

The result of this construction is that when two strips of veneer, such as indicated at A and B in Figs. 3 and 4, are fed between the endless bands by the feed rolls, glue having first been applied to the edges to be joined, the marginal portions of the strips will be flattened and brought into registration with each other by the members 1 and 2 and the bands, and the protruding portions of the strips will be gripped between the pressure rolls; the movement of the strips causing the pressure rolls to rotate and exert a distinct pressure on each of the strips in the lateral direction toward the longitudinal center of the machine. Thus the effects of the pressure rolls on the strip, A, as viewed in Fig. 4, is to force this strip toward the right while the pressure rolls acting on the strip B tend to force it toward the left. The surfaces to be glued together are therefore accurately aligned and pressed into intimate contact with each other while at the same time the heat from the steam chests 1 and 2 penetrates the joint, permitting the glue to set under the influence of heat and pressure. The inner faces of the flexible endless bands are thoroughly oiled so as to maintain a film of oil between each band and the corresponding steam chest. Consequently, as the work passes through the machine, the friction between the work and the bands is much greater than between the latter and the steam chests, so that the band moves along with the work. Any glue that escapes out of the joints adheres to the bands instead of to the steam chests and, by wiping the bands manually at some point or points where their working faces are exposed, they may be kept clean without making it necessary to stop the machine for the purpose of removing accumulations of glue.

The parts which I have heretofore described may be assembled upon any suitable frame structure which will hold them in proper relation to each other. In the arrangement shown, there is a base, 16, from which rise standards, 17, on which the lower pressure rolls, 15, and the member 1 are supported. There is also an upper horizontal beam, 18, parallel with the members 1 and 2 and supported from the base by suitable frame members, 19. The upper pressure rollers, 14, are journaled in downwardly-opening bearings, 20, in the lower ends of pedestals, 21, projecting downwardly from the upper beam. Suitable guides may be provided for the endless bands. Thus, in the arrangement shown, there are guide wheels, 22 and 23, at the ends of the members 1 and 2 respectively; similar guide wheels, 24, at the ends of the base for receiving and guiding the depending portion of the lower band; and still another set of wheels or guides, 25, at the ends of the strip member, 18, of the frame, these latter wheels or guides engaging and directing the upper portions of the upper endless band. All these features are, however, mere details of design, the principle of my invention being embodied in what may be termed the yieldable heating and clamping elements and the means associated therewith for exerting lateral pressure on two strips being fed through the heating and clamping means.

While I have illustrated and described with particularity only a single preferred form of my invention, I do not desire to be limited to the exact structural details thus illustrated and described; but intend to cover all forms and arrangements which come within the terms employed in the definitions of my invention constituting the appended claims.

I claim:

1. In a machine of the character described, two parallel work-engage members one of which bears yieldingly toward the other and adapted to engage opposite faces of two strips lying edge to edge between them, means independent of said members for feeding such strips between the latter, and means at opposite sides of said members for engaging the said strips and pressing them laterally toward each other.

2. In a machine of the character described, two parallel heated work-engage members one of which bears yieldingly toward the other, said members being adapted to engage the opposite faces of two strips lying edge to edge between them, means independent of said members for feeding such strips between said members, and means at opposite sides of said members for engaging the said strips and pressing them laterally toward each other.

3. In a machine of the character described,
two parallel elongated members lying one above the other and one bearing yieldingly toward the other, two endless flexible strips of metal each loosely surrounding one of said members, the lower strip having its upper run lying upon the lower of said members, and the upper strip having its lower run lying upon and extending in the same direction as the upper run of the lower strip.

4. In a machine of the character described, two stationary elongated parallel members lying one above the other and one bearing yieldingly toward the other, two endless interlaced thin bands of metal each loosely surrounding one of said members, the lower band having its upper run lying upon the lower of said members and extending lengthwise thereof, the upper band having its lower run lying upon and extending in the same direction as the upper run of the lower band, and means for feeding work between said bands.

5. In a machine of the character described, two elongated parallel members lying one above the other and one bearing yieldingly toward the other, the faces of said members which are directed toward each other being smooth and continuous, two endless bands each loosely surrounding one of said members, the lower band having its upper run lying upon the lower of said members and extending in the direction of the length of the latter, and the upper band having its lower run lying upon and extending in the same direction as the upper run of the lower band.

6. In a machine of the character described, two elongated parallel members lying one above the other and one bearing yieldingly toward the other, the faces of said members which are directed toward each other being smooth and continuous, two endless bands each loosely surrounding one of said members, the lower band having its upper run lying upon the lower of said members and extending in the direction of the length of the latter, and the upper band having its lower run lying upon and extending in the same direction as the upper run of the lower band, and means independent of said members and said bands for feeding work between said bands.

7. In a machine of the character described, two long narrow steam chests lying one above the other and held against lengthwise movements, one of said chests bearing yieldingly toward the other, feed rolls for feeding two strips engaging with each other at their edges between said steam chests, pressure rolls lying beside said chests in position to engage the projecting portion of one of said strips and to be rotated thereby, said pressure rolls having their axes arranged at a slight angle to the feed rolls in the direction to exert a lateral pressure on the strip engaged thereby and force it toward the other strip.

8. In a machine of the character described, two long narrow steam chests lying one above the other and held against lengthwise movements, one of said chests bearing yieldingly toward the other, feed rolls for feeding two strips engaging with each other at their edges between said steam chests, pressure rolls lying beside said chests in position to engage the projecting portion of one of said strips and to be rotated thereby, said pressure rolls having their axes arranged at a slight angle to the feed rolls in the direction to exert a lateral pressure on the strip engaged thereby and force it toward the other strip.

9. In a machine of the character described, two long narrow steam chests lying one above the other and held against lengthwise movements, one of said chests bearing yieldingly toward the other, two endless flat strips of metal each loosely surrounding one of the chests, one of said strips having its upper run extending lengthwise across the top of the lower chest and the other strip having its lower run extending lengthwise below the bottom of the upper chest, the parts being so constructed and arranged that there will be less friction between each strip and the corresponding chest than between the strips and work passing through the machine between said strips, and means for feeding work to be glued between those portions of the strips lying between the chests.

10. In a machine of the character described, a long narrow rigid stationary steam chest having a smooth upper surface, a second long narrow steam chest lying above the stationary chest and adapted to rest thereon when the machine is empty, the bottom of said second chest being flexible, and means for feeding strips to be glued between said chests.

11. In combination, a long narrow stationary steam chest having a smooth upper surface, a second long narrow smooth-bottomed steam chest lying above and parallel with the first chest, the second chest being movable in the vertical direction and being adapted to be supported by the lower steam chest when the machine is empty, flexible narrow endless metal bands loosely surrounding said steam chests, one of said bands having its upper run lying on top of the lower chest and extending lengthwise thereof, the other band having its lower run extending lengthwise underneath the upper chest, and means for feeding sheets to be glued between those portions of the bands lying between the steam chests.

In testimony whereof, I sign this specification.

ARMIN ELMENDORF.