L. G. WESTON.

MACHINE FOR JOINING LEATHER PIECES EDGEWISE AND OTHERWISE OPERATING UPON THE EDGES OF MATERIAL IN SHEET FORM.

APPLICATION FILED FEB. 4, 1909.

960,471. Patented June 7, 1910.

3 SHEETS—SHEET 1.

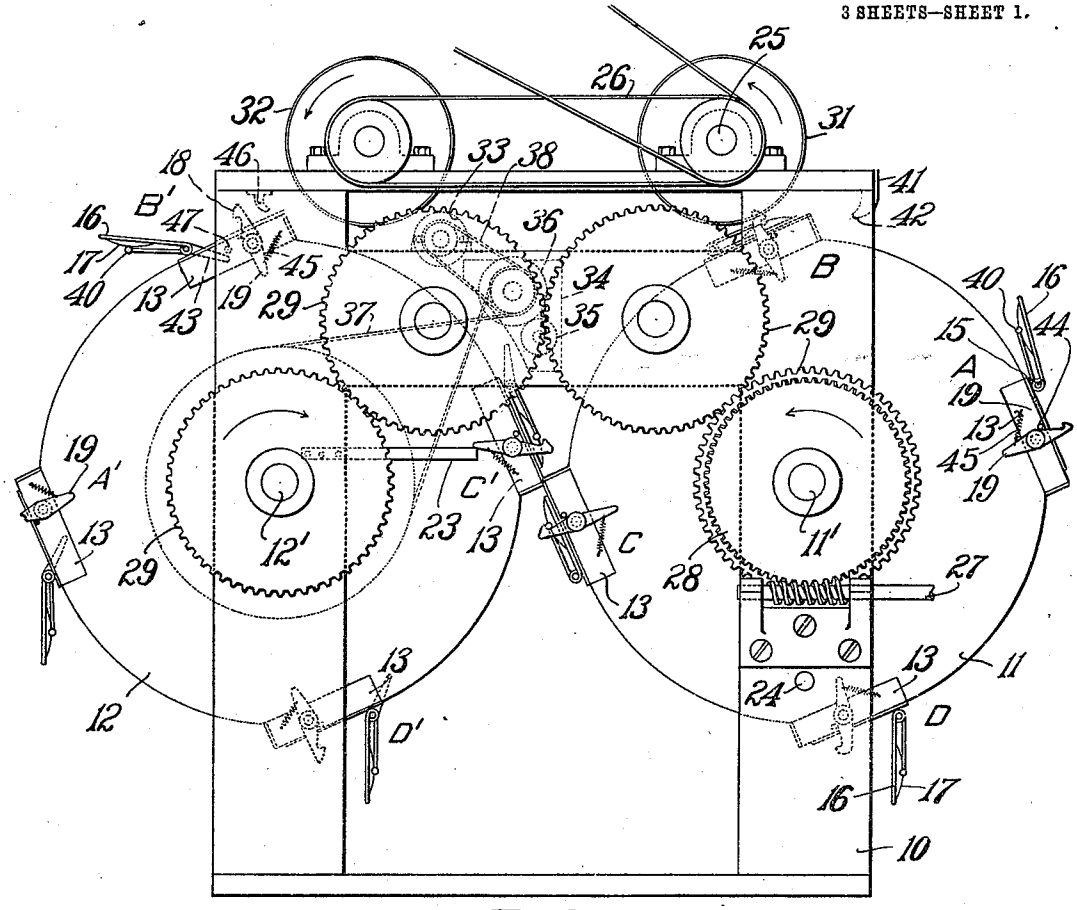

FIG. 1.

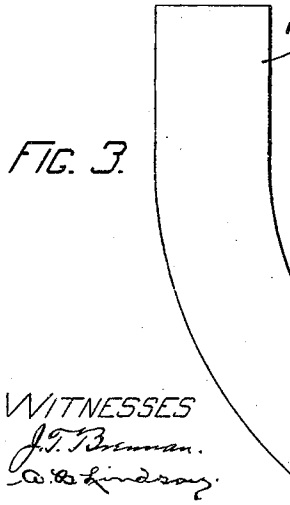

FIG. 3.

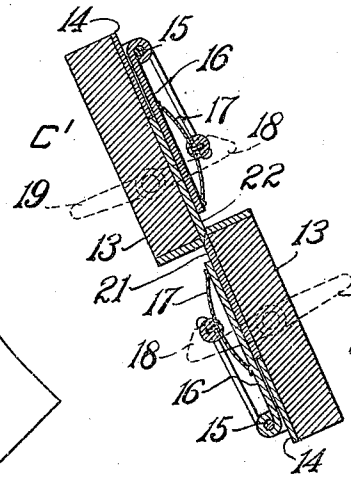

FIG. 7.

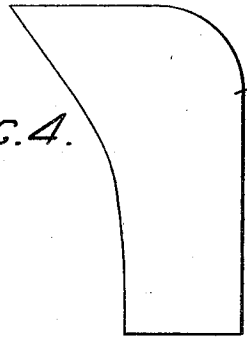

FIG. 4.

WITNESSES

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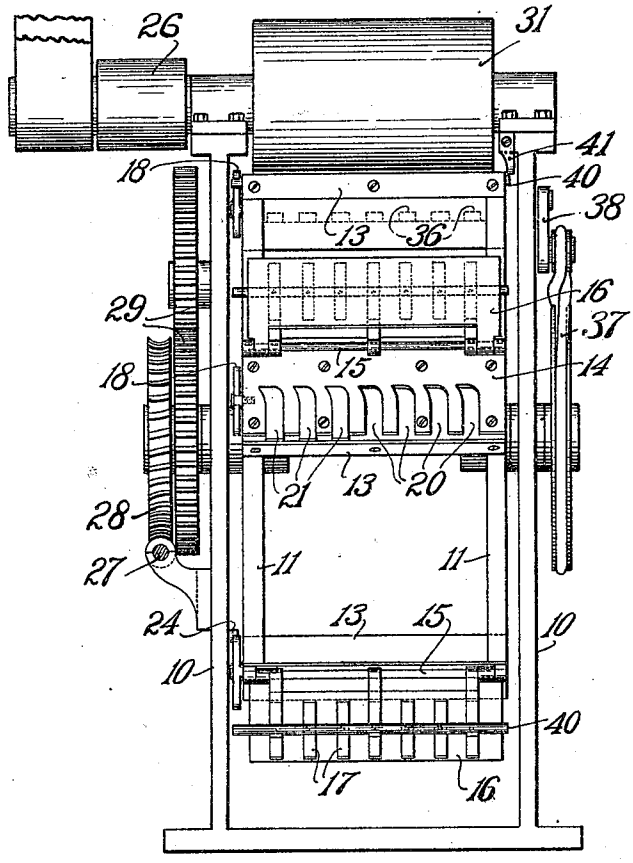

FIG. 2.

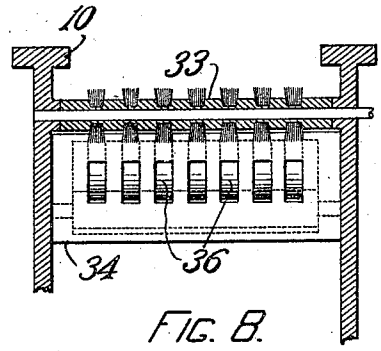

FIG. 8.

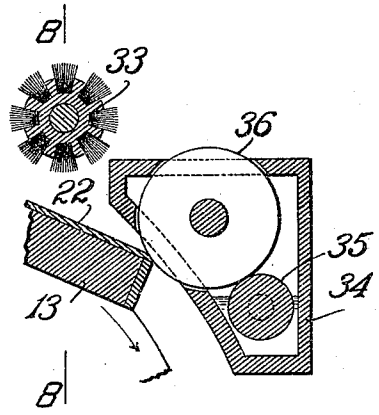

FIG. 6.

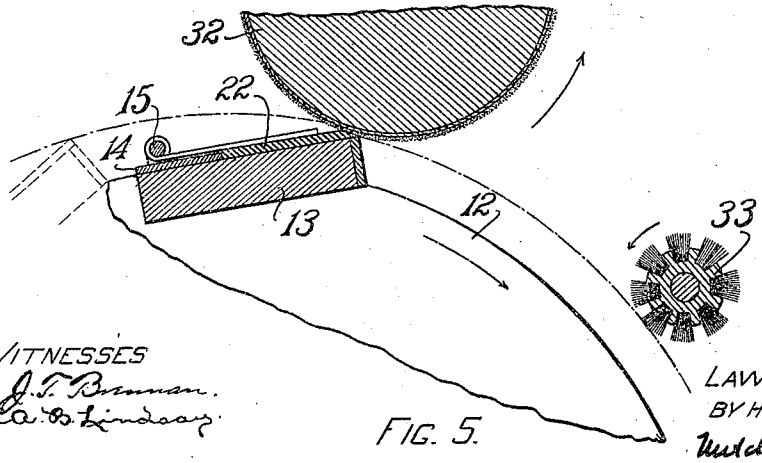

FIG. 5.

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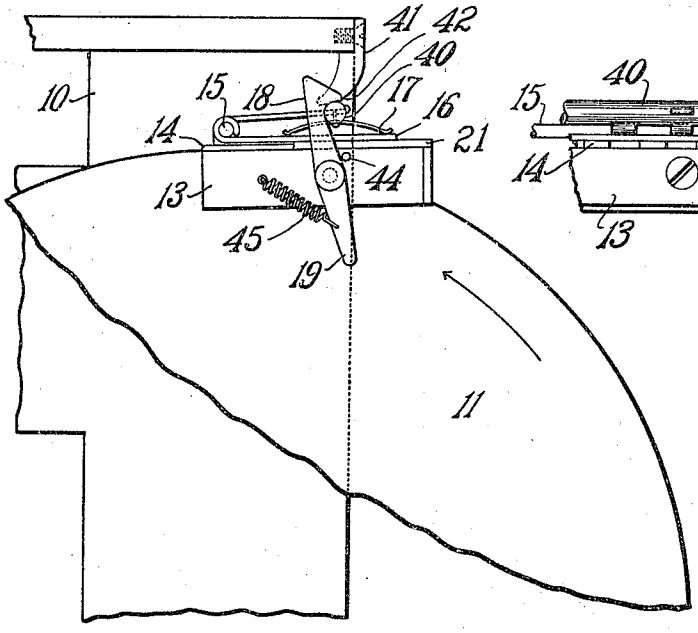

FIG. 9.

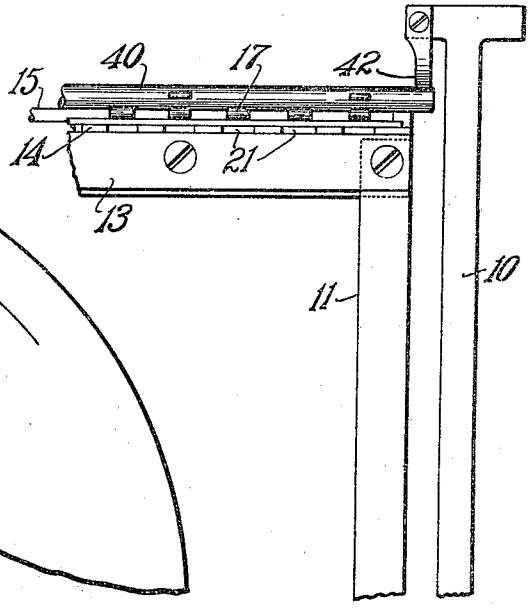

FIG. 10.

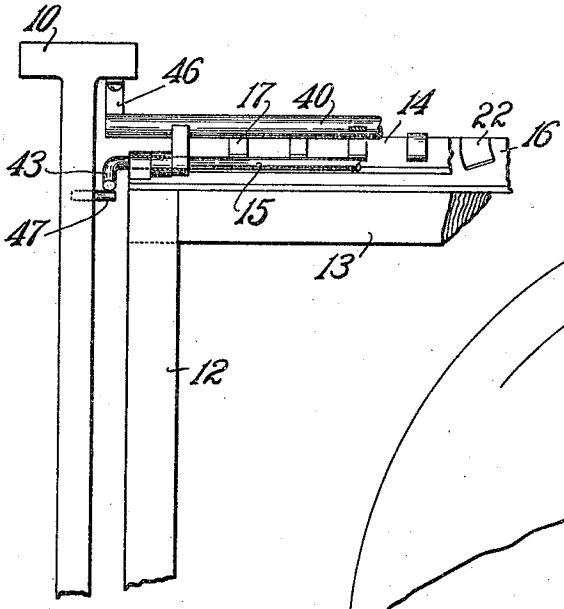

FIG. 11.

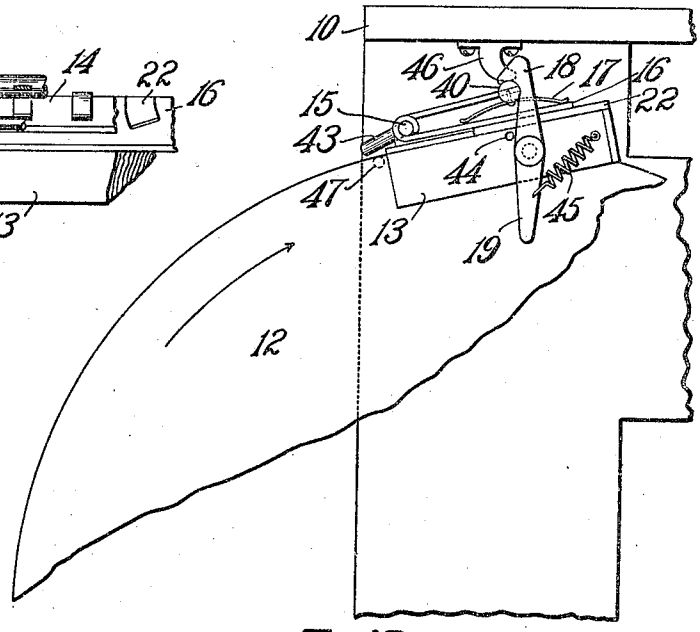

FIG. 12.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR JOINING LEATHER PIECES EDGEWISE AND OTHERWISE OPERATING UPON THE EDGES OF MATERIAL IN SHEET FORM.

960,471. Specification of Letters Patent. **Patented June 7, 1910.**

Application filed February 4, 1909. Serial No. 476,139.

To all whom it may concern:

Be it known that I, LAWRENCE GREENMAN WESTON, a citizen of the United States, residing at Brockton, in the county of Plymouth and State of Massachusetts, have invented new and useful Improvements in Machines for Joining Leather Pieces Edgewise and Otherwise Operating Upon the Edges of Material in Sheet Form, of which the following is a specification.

This invention relates to apparatus for operating upon the edges of leather or other material in sheet form.

The particular object of the apparatus shown to illustrate the invention is the joining together of two pieces edgewise. This involves several incidental operations upon the edges, such as shaping the edges to fit each other, depositing adhesive matter thereon, bringing the edges of the two pieces together, and applying pressure in a manner suitable to effect a union of the edges, all being done automatically.

It is the purpose of this apparatus to effect the shaping of the edges and their approach to each other at such an angle and with such accuracy and uniformity and with pressure in such direction that two sheets which originally may have irregular and unmated edges are joined edgewise into one continuous sheet with a smooth joint.

While the drawings and the specification disclose apparatus for performing this complete operation, the apparatus or parts of it may be used for only a portion of the whole operation, or may be put to other uses, and the scope of the patent is therefore to be interpreted accordingly, having due reference to the claims, and not limited to the particular structure or operations here described or illustrated.

The invention is here illustrated as it may be applied in a machine for joining two pieces of leather into one for making facings or linings for shoes. Hitherto these operations have been performed mainly by hand. It has been necessary, first to shape the edges of the two pieces which are to be joined together so that they will fit each other, then to apply paste, then to assemble them together, then to apply suitable pressure for the paste to set. Each of these operations requires the attention of an operator who must have some degree of skill and who can attend to but one operation and one pair of pieces at a time.

By the improvement hereinafter described labor is required only to place the unprepared pieces in the machine, which requires little skill. The machine performs all of the above described operations; and not only that, but performs them upon a considerable number of pieces simultaneously, and is so far as I am aware the first machine of this character ever invented. The structure of the machine for doing this is described hereinafter, reference being made to the accompanying drawings. in which—

Figure 1 is a side elevation of a machine embodying the invention; Fig. 2 is an end elevation of the same; Figs. 3 and 4 show the shapes of leather, full size, on which this particular embodiment of the invention is designed to operate; Fig. 5 is a section of a detail enlarged, in side elevation showing the skiving machine mechanism in operation; Fig. 6 is a section of another detail, likewise enlarged, in side elevation showing the gluing or pasting mechanism in operation; Fig. 7 is a section of still another detail, likewise enlarged, in side elevation showing the uniting of the two pieces of leather; Fig. 8 is a section of a portion of the machine on line 8—8 of Fig. 6, the section being parallel to the axes of rotation, and showing the brush and paste mechanism, the part 13 which is seen in Fig. 6 being omitted for clearness; Fig. 9 represents on enlarged scale a detail of construction and operation at the upper right hand corner of Fig. 1, in side elevation, with the front standard of the frame removed; Fig. 10 is an end elevation of a portion of the same, viewed from the right; Fig. 11 is an end elevation of a corresponding detail at the opposite end of the machine, viewed from the left; and Fig. 12 is a side elevation of the same and other parts at the upper left hand corner of Fig. 1, viewed with the front standard of the frame removed.

In its main features the machine presents a frame 10 carrying two co-acting drums 11 and 12 respectively, set with their axes parallel to each other. On the cylindrical faces of these the sheet-like pieces which are to be joined are carried in pockets. Each pocket on one drum holds a number of the sheets, each with an edge exposed; and each

corresponding pocket on the other drum holds a similar number of the pieces to which they are to be joined. As here illustrated those on the second drum are of different shape from those on the first. The action of the machine carries the two corresponding pockets and their contents together. As the exposed edge of each leather piece lies at the circumference of the cylinder generated by its rotation, it is exposed to contact with the edge of a similarly placed piece on the other drum. On the way to the point of junction the exposed edges of pieces of one sort undergo a skiving operation, and the exposed edges of pieces of the other sort undergo a skiving operation followed by a cleaning and afterward a pasting operation. When the junction of the prepared edges of the pieces is effected, as represented in Fig. 7 and in the middle of Fig. 1, by tangential contact of the two in the course of their travel in their respective circular paths of motion, the two pieces are compressed together by pressure perpendicular to the plane of junction; and then the pieces in one set are released from their pocket, and, adhering to the other pieces to which they have just been joined, are carried on with them and at a suitable point are discharged from the machine completely joined.

As represented in the drawings the drums 11 and 12 are mounted respectively on shafts 11′ and 12′. Each consists merely of two end disks a suitable distance apart on its shaft 11′ or 12′, such disks being joined at their circumferences by cross-bars or plates 13 which form the bases of the pockets for holding the pieces of material. The machine illustrated is adapted to join the upper end of a piece of leather 21, of the shape and size indicated in Fig. 3, to the lower end of a piece of leather 22 of the shape and size indicated in Fig. 4. The pockets on both drums are similar in principle of design, but each has sockets 20 shaped according to the shape of the pieces it is to hold, one of the shapes being seen clearly in Fig. 2 where three of the pieces 21 are seen in place therein. The pockets are formed as follows: Outside of each bar 13 is a plate of metal 14 in which holes are cut of suitable shape to receive the pieces of leather. By laying the plate 14 on plate 13 these holes constitute a series of sockets 20 seen clearly in Fig. 2 in which the pieces 21 or 22 may be laid. Hinged on plate 13 at 15 is a cover plate 16 adapted to cover and hold the pieces of leather when placed in their respective sockets. This cover plate is seen open in Fig. 2. When closed it is held down by a spring 17, the spring in turn being held by a latch 18 having a tail piece 19. The plates 13 are set so that the corner next to the skiving and gluing and compressing operations project beyond the drum and other rotating parts enough to allow space for the hinge and other projecting parts of the cover plate to rotate with the drum (when latched) without colliding with the skiving apparatus or the opposite drum. The cover piece is shown open in Fig. 1 in the positions A and D and closed and latched at B and C. The drums 11 and 12 rotate in the direction shown by their respective arrows. The sockets on each drum are open ended so that leather pieces therein project a little beyond the cover plate 16, as seen in Figs. 1, 5 and 7, although it should be understood that when the leather is originally placed in a socket, its end is not beveled as shown in these figures but is square or otherwise as may happen, as is indicated in dotted lines in Fig. 5. The part thus projecting is supported by the under plate 13. The pockets are arranged so that the exposed ends of leather on the drum 11 are in the rear of the movement of the pocket when the drum rotates, while on drum 12 they are in the advance of the movement of the pocket.

The pockets are carefully set so that the rear edge of one pocket will register with the advance edge of the corresponding pocket on the other drum, as clearly shown in Figs. 1 and 7, at the points where these drums are nearest together. The plates 13 overlap each other slightly at such point of registering, the surfaces of the two co-acting plates 13 (one on each drum) being parallel to each other at the instant they thus come together. These points of registering together are obviously on the plane passing through the axes of the drums. The distance between axes of the drums is carefully fixed so that when these two parts register together, they will come together with pressure suitable to effect the adhesion of one piece of leather to the other. The distance between centers of the drums is therefore determined by the distance of the respective skiving mechanisms from the drum axis, as hereinafter described.

The latches 18 are adapted to be tripped automatically. The tail pieces 19 of latches on drum 12 encounter a lug 23 when they reach the position C′ which releases them and allows the spring cover to fly open, thus releasing the leather pieces held thereby. The tail pieces 19 of latches on drum 11 encounter a lug 24, which is a pin on the frame of the machine, at the desired point for delivery of the finished product. This pin releases these latches; the covers fly open, and the joined pieces held on drum 11 are thus discharged.

The skiving mechanism consists of a drum of sand paper, corundum or other abrasive material. There are two skiving mechanisms marked respectively 31 and 32. These are set so that as the pockets travel

around on the surface of the drum the projecting ends of the leather pieces encounter the skiver and are abraded away. This operation is represented in Fig. 5, which also shows in dotted lines a pocket and leather piece approaching the skiving roll, the dot and dash line being the path of the tip of the leather up to the skiving roll and of the finishing surface after passing the skiving roll. By this means the leather pieces acquire beveled ends which, as a practical matter, are so near to being plane surfaces that they unite to each other as if they were plane surfaces. The skiving mechanism 31 operates on the tail end of the leather pieces and in direction opposite to their motion; and it therefore tends to draw the leather away from the mechanism 17 which holds it. The skiving mechanism 32 operates upon the advance ends of the pieces. It is therefore rotated in the direction of their motion and at faster surface speed and consequently operates with a pull upon the advance ends of the leather pieces; and thus it likewise cooperates with the holding mechanism of the pieces 17.

After passing the skiving mechanism 32 the pockets of drum 12 pass adjacent to a rotary brush 33 which also travels faster than the surface of the drum 12. This cleans the surface of the leather pieces which have just been skived. The outlines of this brush are seen in Fig. 1 indicating its position; and Fig. 8 is a vertical section through the axis of the brush showing its structure and general arrangement. It is represented as divided into sections, one for each piece of leather, but obviously a different arrangement might be made if preferred. The pieces on drum 12 next pass under influence of paste distributing mechanism shown in Figs. 1 and 6. As here represented this comprises a pan 34 in the bottom of which is paste or other suitable adhesive and a roller 35. A larger roller 36 which acts as a distributing roller rolls upon the latter, and carries paste on its surface to the leather pieces 22 as they move past it on the drum. The working surface of this distributing roll consists of a series of ridges which protrude through openings in the side of the pan, there being one ridge to correspond to the position of each socket having a leather piece on the drum.

Further rotation of drum 12 carries the leather pieces through the plane joining the axes of drums 11 and 12. The pockets on drum 11 are set so that its pieces pass this plane and their skived rear ends reach the plane simultaneously with skived advance ends of pieces on drum 12. The distance between the axes of these drums 11, 12, may be equal to the sum of the distances from the axes to their respective skiving mechanisms; or it may, preferably, be a trifle less than that sum, so that when the skived ends of pieces on the two drums come in contact, they shall be pressed together with a positive pressure, the slight compression thus imparted being absorbed by compression of the leather pieces between their respective supporting plates 13, 13. It will be noted that the plane of junction between the two leather pieces is perpendicular to the plane passing through the axes of the drums, although it is oblique to the general direction of each piece of leather. This appears clearly in Fig. 7. As the pressure caused by the nearness of the axes to each other, just described, acts in the plane between these axes, such pressure is perpendicular to the plane of junction and therefore this pressure may be considerable, forcing the paste well into the pores of the leather with little tendency of the joined surfaces to slip over each other. Thus the pieces in a pocket on one drum are joined to their corresponding pieces in a pocket on the other drum. As soon as the junction has been effected, the rotation of drum 12 causes its latch 18 to be released by engagement with the lug as above described. Fig. 1 shows it in the act of being so released. From this point the pieces of leather which were in the pocket on drum 12 trail after the pieces on drum 11 to which they are joined until the position D is reached where the pieces on drum 11 are released as above described and the whole pocketful of joined pieces is discharged from the machine.

Any suitable driving mechanism may be employed to actuate the above described mechanism. That here shown consists of a driving shaft 25 on which is mounted one of the skiving drums 31, and from which a belt 26 drives the other skiving drum 32. Another source of power, which is here represented as a shaft 27 having a worm engaged in a gear 28, drives one of the drums, 11, the motion of which is communicated to the other drum, 12, through a train of gears marked 29. The paste distributing roll 36 is represented as driven somewhat faster than the circumferential speed of the drum 12, by means of cross belt 37. The brush 33 is represented as driven by belt 38 from the same system.

The invention also embodies means for closing lids 16 automatically upon their sockets, thus relieving the operator of that duty and at the same time acting as a safety means to prevent the lids from running into the skiving mechanism if the operator should fail to close them. This mechanism is illustrated on a large scale in Figs. 9, 10, 11 and 12.

For closing the pockets on drum 11, a projection 41, 42 is provided on the frame of the machine at the rear, adapted to engage the projecting end of rod 40, which is the rod

holding the springs 17 which press down on lid 16. This rod is mounted on arms hinged at 15. Its front end projects outside of the drum and is adapted to engage the latch 18 on the drum; and its other end projects to the rear and is adapted to engage the stationary piece 41, 42, on the frame of the machine. At position A the lid is open and the sockets are exposed for the operator to fill them. When the rotation of drum 11 carries the lid near to the skiving roll 31, the rear end of rod 40 engages the face 41 of the projection, and continued rotation of the drum, causes the rod, springs and lid, thus arrested, to turn over on the hinge so that they lie in nearly closed position. Further rotation of drum 11 carries the end of rod 40 under the cam like portion 42 of the projection, as shown in Figs. 9 and 10, which wipes the rod down so that latch 18 snaps over the front end of said rod, fastening the lid closed upon the pocket. To coöperate in this, a spring 45 is applied to the latch, drawing it normally toward its latched position; a stop pin 44 is provided to limit its movement; and the head of the latch is beveled so that when the rod 40 is depressed by cam 42 it rides down upon the beveled top of the latch, the spring yielding until the rod is low enough for the latch to snap back over it. By reason of the hinge being in the rear of the motion of drum 12 a slightly different arrangement is there employed. The covers of pockets on this drum have levers 43 which project from each hinge on the side opposite from the cover, projecting forward when the cover is open, adapted to engage a pin 47 on the frame of the machine as the drum rotates through position B′, and thus to close the lid. In Fig. 1 these parts are shown about to be engaged together, and in Figs. 11 and 12 they are shown just after their engagement has thrown the lid over into closed position and the lid has been wiped down by cam projection 46, which corresponds to cam 42, so that the rod 40 has snapped under latch 18. The latches 18 on this drum 12 are provided with springs 45 and stop pins 44 as above described for drum 11.

In using the machine an operator feeds pieces of leather into the pockets at position A while the drum is rotating, until all of the sockets of each pocket are filled. The same is done with the pockets on the other drum as they rise from position A′. The machine automatically closes and latches the lids 16. Pieces of leather in both pockets then undergo the abrading and skiving process at the positions B, B′; thence they go on to the positions C, C′, where they register together and are joined under pressure, one of them having in the meantime been cleaned and received a charge of paste. Thence the joined pieces pass on drum 11 to the place of their discharge at position D. Both pockets are then ready to receive a fresh charge as they pass through positions A and A′ again.

In the drawing four pockets are represented on each drum. It will be understood however, that the machine may have more or less pockets; and each pocket may have more or less sockets than the number here shown. Consequently, the capacity of the machine is limited only by the speed with which operators are able to put pieces of leather into place in the sockets.

In the holder for the leather pieces the socket plate 14 serves the useful function of holding each leather from twisting sidewise, and in fact, it places and keeps it in the precise position to register exactly with its corresponding piece on the other drum, so that the operator need give no thought to this except to see that each piece is fitted into its socket. Socket plates having recesses of other shapes may be substituted, according to the work to be done. By making the socket plates a little thinner than the stock on which the machine is to operate, a grip is secured upon the stock between the cover and the base plate. By changing the angle at which base plates 13 are set, the angle of the beveled edges of the stock will be changed to give a longer or shorter joint. The action of the skiving means cuts the stock, where its edge is exposed at the circumference of its rotation, so that its edge is an element of a cylindrical surface, but the element is so short that it may be treated as a plane surface; and this surface is perpendicular to the radius from the exposed edge to the axis about which it is rotating. By setting both of two co-acting plates 13 on drums 11 and 12 at the same angle to the radii of their exposed edges these plates will be parallel at the instant when the exposed edges are tangent, because their radii at that instant form one plane from axis to axis; and the piece of material held flat on one will lie in the same plane with the piece of material held flat on the other. At this instant, although each edge is in continuous rotation about its axis, the two edges are practically at rest with respect to each other, and at this instant their mutual adhesion is effected without stopping the rotation.

I claim:

1. In apparatus of the class described, a rotating element and means to hold a sheet of material thereon with an edge exposed at the circumference of its rotation, the holder having a base set at an angle to the radius of the exposed edge; a plate on said base having a recess fitting said sheet of material and forming a socket therefor; and a cover adapted to fit thereon, embracing the socket plate between itself and the base.

2. The combination of a rotating element

and means to hold material thereon, comprising a base having an edge exposed at the circumference of its rotation and set at an angle to the radius of said edge, said edge being parallel to the axis of rotation and said base being adapted to receive a multiplicity of sheets side by side on its face; in combination with a plate fitting on said base having a multiplicity of recesses side by side conforming individually in shape to the shape of sheets of material and adapted to form sockets therefor, and open toward the circumference of rotation whereby material held thereby may project over said exposed edge of the base; and a cylindrical rotating roll adjacent, having its axis parallel to the said axis of rotation and adapted to act upon said exposed edges of material.

3. In apparatus of the class described, a rotating element and means to hold a sheet of material thereon with an edge exposed at the circumference of its rotation, the holder comprising a base set at an angle to the radius of the exposed edge, a cover hinged to the base, and a spring latch adapted to fasten it thereto, in combination with a stationary part of the apparatus adapted to engage and swing the cover about its hinge and a cam adapted to force the cover into latched position.

4. In apparatus of the class described, the combination of two holders each being adapted to hold a sheet of material with its edge exposed; means to move the two holders toward and from approximate contact with each other, and means to guide them, whereby the said exposed edges of sheets thus held register together when the holders are together.

5. In apparatus of the class described, the combination of two rotating elements each having a holder adapted to support a sheet of material with an edge exposed at the circumference of its rotation; the circumferences of the rotation of said edges being approximately tangential; and mechanism connecting the two elements whereby the said holders register together periodically during the rotation.

6. In apparatus of the class described the combination of two elements rotating with their circumferences of rotation approximately tangential; means to hold on each a sheet of material with an edge exposed at its said circumference, the sheet being held at an angle to the radius of said exposed edge; and means whereby said exposed edges register together.

7. In apparatus of the class described the combination of two elements rotating with their circumferences of rotation approximately tangential; means to hold on each a sheet of material with an edge exposed at its said circumference, the sheet being held at an angle to the radius of said exposed edge; and means whereby said exposed edges register together; said holders each comprising a base adapted to support the material, the two bases being set at similar angles to the radii of said exposed edges, the forward part of one and the rear part of the other regstering together, whereby the exposed edges of material supported thereon register together at the point of tangency of the two circumferences of rotation.

8. In apparatus of the class described two rotating holders each adapted to hold a sheet of material with an edge exposed circumferentially and registering in tangential contact with the edge of the other, in combination with a latch fastening one of the holders closed and means to release the latch when said contact is effected.

9. In apparatus of the class described two rotating holders each adapted to hold a sheet of material with an edge exposed circumferentially and registering in tangential contact with the edge of the other.

10. In apparatus of the class described, two rotating holders for material in sheet form, each having a base with edge exposed at the circumference of its rotation, the base being at an angle to the radius of its exposed edge, and the circumferences of rotation of the exposed edges being approximately tangential, the said edges approximately registering together.

11. In apparatus of the class described two rotating holders for material in sheet form, each having a base with edge exposed at the circumference of its rotation, the base being at an angle to the radius of its exposed edge, in combination with skiving means adjacent, adapted to engage and act upon any material projecting farther from the axis of rotation than said exposed edge of the base, the axes of the two holders being a slightly less distance apart than the sum of the radii of the exposed edges of the base, thereby causing compression of the material on the two base plates when brought together.

12. In apparatus of the class described, two rotating holders for material in sheet form, comprising bases with edges exposed at the circumferences of their rotations, each being set at an angle to the radius of its exposed edge; in combination with a cover for each, hinged to the inner part of the holder and adapted to clasp material in sheet form against the base; the exposed edges registering together in approximately tangential contact; one plate and its hinge being in advance and the other plate and its hinge in the rear of its registering edge.

13. In apparatus of the class described, two continuously rotating drums having holders for sheets of material, adapted to hold one edge of each sheet exposed in position for registering with an edge of a sheet

on the other drum; and means whereby the drums revolve synchronously with their circumferences of rotation in approximately tangential contact.

14. In apparatus of the class described, rotating holders for material in sheet form adapted to register together with their edges in approximately tangential contact, comprising bases and plates thereon having sockets conforming in shape to the pieces of material and adapted to hold material therein with one edge exposed at the circumference of rotation, the plates being set at an angle to the radius of such exposed edge.

15. The combination of two rotating elements having means for holding sheets of material with edges exposed at the circumference of rotation, the holders on the two elements being adapted to register together in approximate tangential contact, in combination with skiving mechanism for each at the radial distance of its contact with the other, and means for depositing adhesive on one arranged between its skiving means and its point of contact with the other.

16. In apparatus of the class described, the combination of two rotating elements each having a holder adapted to support a sheet of material with an edge exposed at the circumference of its rotation; the circumferences of the rotation of said edges being approximately tangential; means for depositing adhesive matter on one of them, and mechanism connecting the two elements whereby the said holders register together periodically during the rotation.

17. In apparatus of the class described, the combination of two rotating elements each having a holder adapted to support a sheet of material with an edge exposed at the circumference of its rotation; the circumferences of the rotation of said edges being approximately tangential; means for depositing adhesive matter on one of them, and mechanism connecting the two elements whereby the said holders register together periodically during the rotation and means to release the material from one of said holders at the time of such registration together.

18. In apparatus of the class described, two rotating holders for material in sheet form, each having a base with edge exposed at the circumference of its rotation, the base being at an angle to the radius of its exposed edge, and the circumferences of rotation of the exposed edges being approximately tangential, the said edges approximately registering together, in combination with skiving means adjacent to engage and act upon any material projecting farther from the axis of rotation than said exposed edge of the base plate, means depositing adhesive material on one of the skived edges, and means releasing the material from one of the holders at the time of said tangential registration of edges.

Signed by me at Boston, this 15th day of January, 1909.

LAWRENCE GREENMAN WESTON.

Witnesses:
EVERETT E. KENT,
JOSEPH T. BRENNAN.