Jan. 31, 1933. A. R. SCHOENKY 1,895,524

BOX TOE CONDITIONING MACHINE

Filed March 19, 1928 3 Sheets-Sheet 1

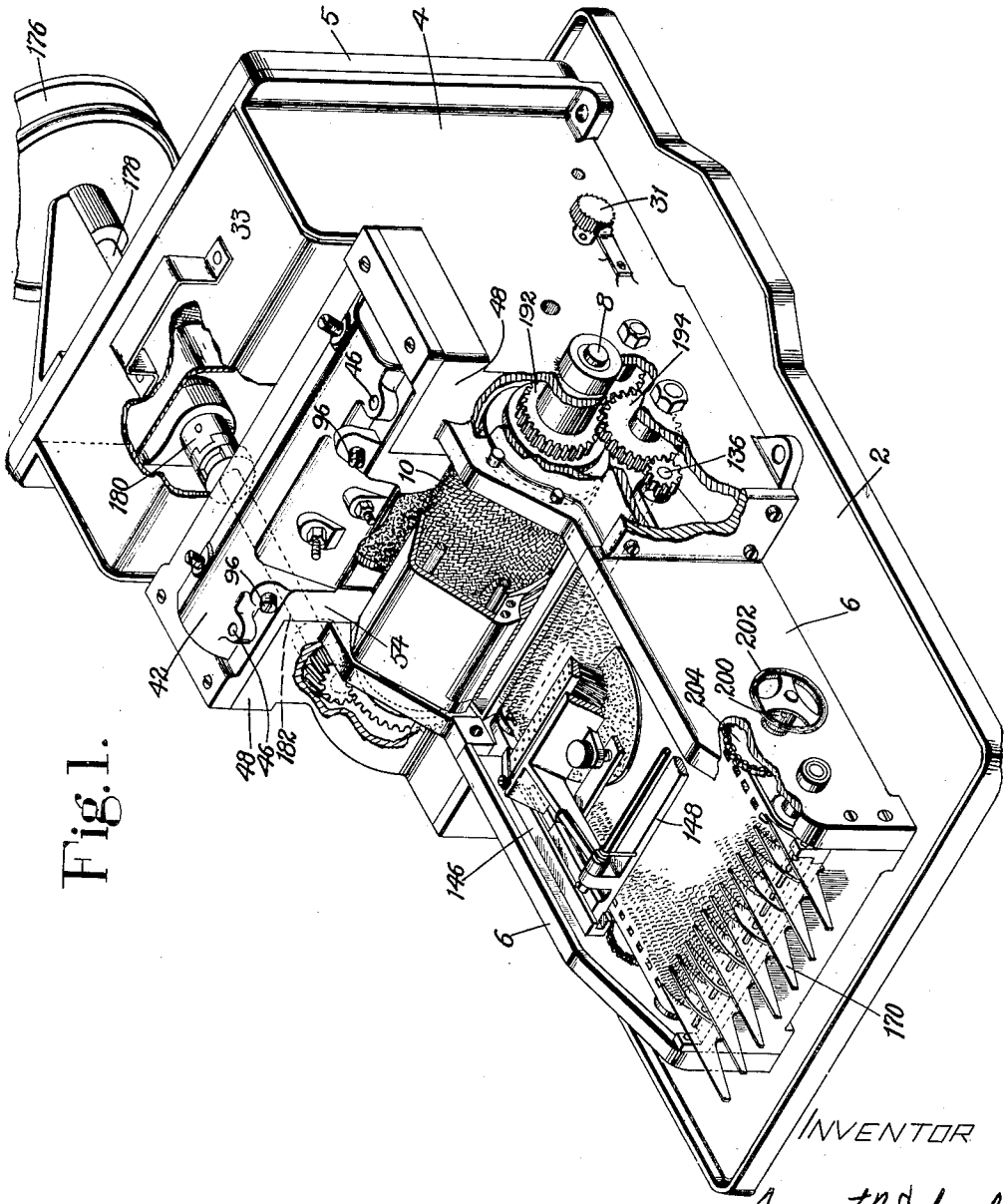


Fig. 1.

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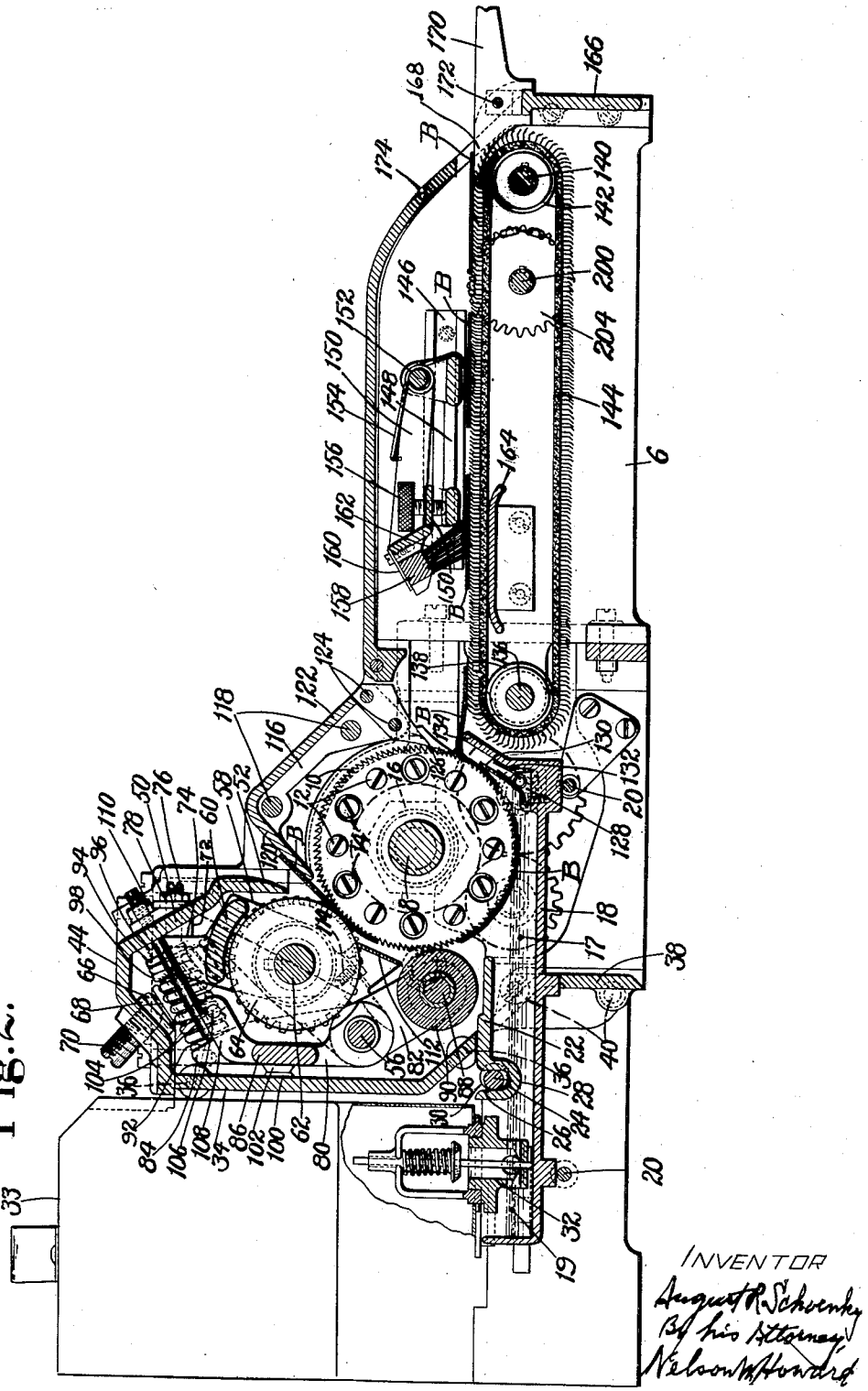


Fig. 2.

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Fig. 3.

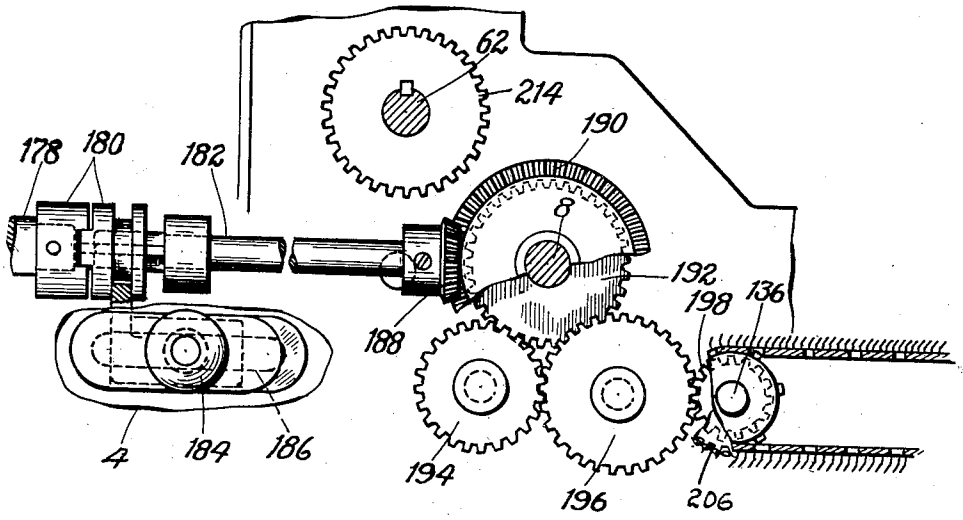
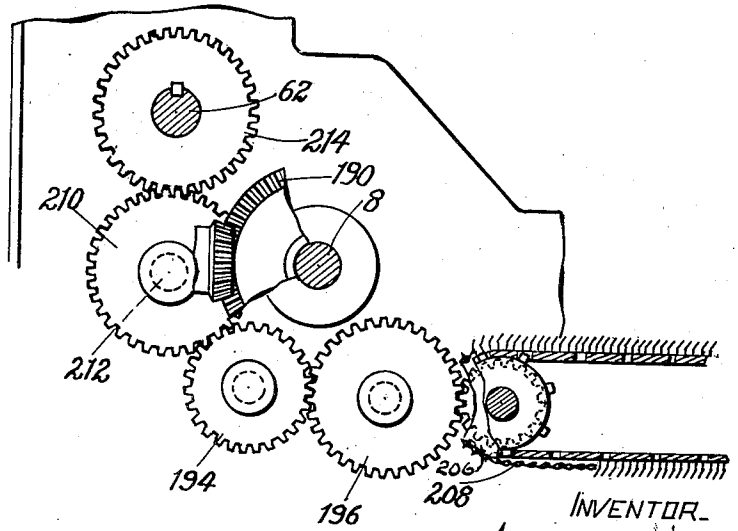


Fig. 4.



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UNITED STATES PATENT OFFICE

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BOX TOE CONDITIONING MACHINE

Application filed March 19, 1928. Serial No. 262,856.

This invention relates to a machine for conditioning or tempering articles, and is herein illustrated as embodied in a machine for conditioning stiffening members of shoes such as box toe blanks, counters, and the like.

Blanks of the so-called self hardening type commonly consist of a fabric base impregnated with a stiffening substance, such for example, as celluloid, which may be rendered temporarily limp and pliable by treatment with a softening liquid such, for example, as acetone. The blank, thus rendered temporarily limp and pliable, is assembled, with an upper and an insole upon a last and is then subjected first to the operation of a pulling-over machine and then to that of a lasting machine, which operations stretch and pull the upper about the last and secure it in position, the box toe blank being thus conformed to the toe portion of the last. After the softening liquid has evaporated, the box toe becomes stiff and resilient.

Hitherto the blanks have commonly been conditioned by dipping them manually into the softening liquid and then allowing them to drain and sometimes to mull in the vapor of the liquid. This procedure, however, has certain disadvantages. The blanks of different classes—heavy and light, for instance—differ considerably in the rapidity with which they become soft when immersed, so that some blanks require a longer immersion than others. The operator thus cannot dip all classes of blanks for the same period of time since, were such a procedure adopted, some blanks would become too soft or would lose some of their stiffening substance by reason of its going into solution, while other blanks would not be soft enough. The operator is hence compelled to exercise judgment with respect to different classes of blanks and to bestow considerable care upon dipping the blanks, all of which involves the expenditure of time and labor. Moreover, the results obtained are liable not to be uniform, so that some of the treated blanks may not be in exactly the desired condition.

According to one feature of the invention there are provided means for increasing the porosity of a work piece, and means for subjecting the work piece, at a locality of the work piece which is being acted upon by the porosity-increasing means, to the influence of a conditioning medium. A receptacle may also be provided for the conditioning medium; and in the illustrated machine, the porosity-increasing means serves also to convey the work piece through the conditioning medium in such a receptacle. In the illustrated machine the porosity-increasing means consists of a driven roll having pointed projections upon its periphery; and the work piece is impaled upon these projections to render it more porous. While thus impaled, the work piece or blank is carried by the roll first into and then out of a softening or conditioning liquid. Provision is made, in the illustrated machine, for wiping any surplus conditioning liquid from the blank and for delivering the blank in a position conveniently accessible to the operator. With the above-described construction, the conditioning of the blanks takes place rapidly and with substantially uniform results irrespective, within limits, of the original porosity of the blanks, since the effect of the action of the impaling projections is to permit the conditioning fluid to permeate all of the blanks in substantially the same short interval during which the blanks are subjected to the action of the conditioning fluid.

Hitherto, there has been a considerable fire hazard connected with the conditioning of shoe stiffeners. The conditioning liquid is commonly volatile and inflammable, and a considerable amount of it is placed in a receptacle and replenished from time to time. In the commonly employed manual dip process, the operator is quite liable to slop the liquid about and to leave the receptacle for the volatile liquid uncovered.

In accordance with another feature of the invention there is provided a container or pan of comparatively small capacity in which the immersion of the blank takes place, a reservoir of larger capacity connected by a passage with the pan, and means interposed between the dipping pan and the reservoir for preventing the passage of a flame. In the illustrated machine the pan and the reservoir

are separated by a fire wall and are connected through the wall by a passage for liquid, the construction being such that the reservoir is entirely closed except for its connection to the dipping pan; and the level of the liquid in the pan is maintained by barometric pressure.

The invention further consists in various features of construction and combinations and arrangements of parts herein shown and claimed, the advantages of which will be apparent to those skilled in the art from the following description, reference being had to the accompanying drawings, in which,

Fig. 1 is a perspective view of a machine embodying the invention;

Fig. 2 is a longitudinal section in elevation of the machine shown in Fig. 1;

Fig. 3 is a detail showing the driving mechanism; and

Fig. 4 is a detail showing an alternative arrangement of the driving mechanism.

Before proceeding to a detailed description of the machine a brief description of its general mode of operation will be given. Referring more particularly to Fig. 2, the machine comprises a pricking roll 10 and a presser roll 64 to which a blank B is presented by the operator. The blank is impaled upon the pricking roll and carried by said roll first into a softening liquid in a receptacle 18 and then out of said liquid. As the blank moves upwardly, after having been thus immersed, it is stripped from the pricking roll by stripping comb fingers 126 and delivered upon the upper run of a conveyor 144, said conveyor moving the blank beneath a wiper in the form of a brush 158 and finally delivering it upon a skeleton table formed by the horizontal upper surfaces of spaced stripper members 168. The operator may then pick up the conditioned blank and assemble it in the upper of a shoe. As will be explained later, the machine may be fitted to operate in two different ways. In both cases the pricking roll is driven continuously while the presser roll 64 is idly mounted so as to be rotated only when a blank is passing between the rolls. In one case the belt conveyor 144 also is driven continuously, so that a blank presented to the rolls is immersed in the liquid and delivered upon the tops of the stripper members 168 in the space of a few seconds, the blank being then immediately assembled in a shoe upper. In the other case the conveyor is not driven directly, but is geared to the roll 64 so that, whenever a blank passes between the rolls, the conveyor is moved a distance dependent upon the length of the blank. When the machine is fitted in this manner and is in operation, there are always a plurality of blanks resting upon the conveyor and each blank remains upon the conveyor for some time before it is delivered to the operator. Inasmuch, however, as the chamber in which the conveyor is mounted is a substantially closed one and contains vapor of the conditioning liquid, the box toes remain soft and pliable. The showing in Fig. 2 is intended to illustrate, not a plurality of blanks, but successive positions of the same blank as it passes through the machine.

Secured upon a base plate 2 is a housing consisting in part of a pair of side walls 4 connected by a rear wall 5 and of a pair of plates 6 which constitute the side walls of a narrower and forwardly extending portion of the housing. Extending across the main portion of the housing, and journaled in bearings formed in the side walls 4, is a shaft 8 carrying a pricker roll or carrier 10 having pointed projections formed upon its periphery. The roll 10 is built up longitudinally of laminated units, each consisting of a small group of circular saw blades and spacing members of relatively less diameter placed therebetween to form grooves, the blades and the spacing members being clamped tightly together by means of bolts 12, the bolt heads of each unit extending without clearance into openings formed in the adjacent unit to prevent torsional slip between any two units. The saw teeth, which constitute the pointed projections, are pointed in the direction of rotation, that is, counterclockwise as viewed in Fig. 2. Openings 14, enlarged if necessary, are provided in each unit to accommodate the nuts of the bolts 12 of the adjacent unit, as shown in Fig. 2. The entire assembly of units, constituting the roll 10, is clamped between a thrust collar integral with the shaft 8 and a nut 16 threaded upon the shaft 8. This construction has been found preferable to one in which all of the saw blades and spacing members are clamped together in a single unit, for in the latter case it is more difficult to obtain clamping pressure sufficient to bind the blades and the spacing members tightly together along the shaft 8. The spacing members also are saw blades with their teeth pointed in the direction of rotation for a purpose presently to be described.

A receptacle or vessel 18 for the softening liquid rests upon two rods 20 extending across and supported by the wall members 4. Formed integrally with the vessel 18 and extending across the central portion thereof is a cover 22 which extends downwardly to form a partition 24 separating the vessel 18 into forward and rear compartments 17 and 19 respectively. The partition 24 does not extend all the way to the bottom of the vessel 18, but it extends below the surface of the liquid therein so that a liquid seal is always maintained between the compartments 17 and 19, there being a passage beneath the partition 24 whereby communication is afforded between the two compartments. In cases where the liquid employed might form an inflammable vapor, the partition 24 will

prevent a flash from passing from one compartment to the other, if accidental ignition should occur. Formed in the partition 24 is a transverse downwardly extending groove 26 to accommodate a rod 28, the latter having an eccentric 30 formed upon either end thereof, the eccentrics 30 being journaled in the respective side walls 4. One of the eccentrics 30 has a knurled head 31 (Fig. 1) extending outwardly from the wall of the member 4, whereby the operator, by turning the eccentrics 30, may adjust the position of the vessel 18 upon the rods 20 forwardly or rearwardly for a purpose presently to be described. Extending down into the rear compartment 19 of the vessel 18 is a feed nozzle 32 of a reservoir 33 supported by the walls 4, the liquid in the reservoir 33 feeding out through the openings of the nozzle 32 into the vessel 18 to maintain automatically a constant level therein determined by the height of the openings of the nozzle 32 above the floor of the vessel 18, this arrangement being known as a barometric feed device. The height of the liquid is so arranged and the vessel 18 is so positioned with relation to the roll 10 that the lower portion of the periphery of the latter will dip beneath the surface of the liquid in the forward compartment 17 of the vessel 18, and the compartment 17 is therefore termed, and will hereafter be referred to, as a dipping pan. The dipping pan 17 and the compartment 19 are only large enough to carry out their respective purposes above described. They are not depended upon to store the liquid, and consequently have relatively small capacities as compared with the reservoir 33. The surface of the exposed liquid is thus reduced to a minimum.

A plate 34 secured to the side walls 4 of the housing member by screws 36 extends completely across the main portion of the housing from the top thereof down to the level of the upper surface of the cover 22 of the vessel 18. A plate 38 secured to the side walls 4 of the housing member by screws 40 extends completely across the main portion of the housing from the bottom thereof up to the lower edge of the plate 34, the plate 38 being notched to accommodate the vessel 18. The two plates 34 and 38 together completely divide the space within the main portion of the housing and outside of the vessel 18 into separate compartments, the reservoir 33 being positioned to the rear of these plates and the roll 10 and its associated mechanism being positioned forward of them, rendering it impossible for a vapor flash to travel from either compartment to the other outside the vessel 18 in case of accidental ignition. These plates taken with the cover 22 and the partition 24 constitute a fire wall which, as shown in Fig. 2, is spaced from the reservoir 33 to avoid any direct transfer of heat to the reservoir in case the liquid or vapor in the compartment 17 should become ignited.

Supported upon the upper edges of the walls 4 and extending across the machine is a frame 42 having a top wall 44 (Fig. 2) in which are formed a pair of holes 46 (Fig. 1) adapted to receive upstanding dowel pins for positioning the frame 42. The walls 4 on either side of the machine have inturned flanges 48 which are beneath the forward edge of the top wall 44 to support the latter and carry dowel pins which enter the holes 46. The flanges 48 extend only a short distance inwardly, leaving a wide gap between them, and their downward extension is determined by the roll 10 for which sufficient clearance must be provided. The top wall 44 adjacent its rear edge rests upon the upper edge of the partition 36, and adjacent to its lateral edges it rests upon the upper edges of the side walls 4. The central portion of the top wall 44 is raised above the supporting surfaces adjacent to its edges, having a flat top portion, a downwardly and rearwardly sloping portion, and a downwardly and forwardly sloping portion 50 which extends into the space between the two inturned flanges 48 and which terminates in a downwardly extending wall 52. On either side of the sloping wall 50 and its continuation 52, and integral therewith are vertical flanges 54 which abut the adjacent flanges 48 of the respective walls 4. Integral with the frame 42 and depending from the top wall 44 thereof, and disposed adjacent to and within the respective side walls 4 are hangers which support a stationary shaft 56, the latter extending crosswise of the machine.

A roll carrier frame 58, in the form of an elongated yoke, has end portions which are pivotally mounted on the shaft 56, and which extend forwardly and upwardly therefrom, being connected by a bar 60. Journalled in the end portions of the frame 58 between the shaft 56 and the bar 60 is a shaft 62, upon which is mounted a wooden roll 64, one function of which is to press the blanks against the pricking roll 10, the surface of the roll 64 being covered with sandpaper. A compression spring 66, interposed between a thrust collar 68 and an abutment formed on the bar 60, urges the frame 58 and the roll 64 toward the pricking roll 10. The stress of the spring 66 is adjusted, to tension the roll 64, by means of a screw 70 threaded in the rearwardly and downwardly sloping face of the top wall 44 and carrying the thrust collar 68. The forwardly and downwardly sloping wall 50 has a boss 72 extending both inwardly and outwardly and providing vertical surfaces in a plane transverse of the machine. Against the inner vertical face of the boss 72 abuts a lug 74 extending upwardly from the bar 60 to determine the minimum

clearance between the rolls 64 and 10. A greater clearance may be provided by means of an adjusting screw 76 threaded in the boss 72 and having a lock nut 78, the inner end of the screw 76 engaging the lug 74 to effect the desired clearance.

In order to ensure that the blanks shall be firmly impaled upon the pricking roll in every case, there is provided an auxiliary presser roll 90. A carrier frame 80 for the roll 90 consists of a pair of forwardly and downwardly extending arms 82 pivotally mounted upon the shaft 56 and a pair of upwardly extending arms 84 integral with the arms 82 and connected to each other by a bar 86, preferably integral with the arms 84. Journalled in the respective arms 82 is a shaft 88 carrying a wooden roll 90, smaller in diameter than the roll 64, and covered with sandpaper. Interposed between an abutment 92 formed upon the upper portion of each of arms 84 and thrust collars 94 carried respectively upon the inner ends of a pair of adjusting screws 96, which are threaded through bosses having forwardly and downwardly inclined faces on the top wall 44, is a compression spring 98 for urging the frame 80 and the roll 90 toward the roll 10. A boss 100 formed on the partition 34 engages a boss 102 formed on the bar 86 to determine the minimum clearance between the rolls 90 and 10. A greater clearance may be provided by means of a hook 104 engaging a pin 106 carried in a pair of spaced ears 108 extending upwardly and forwardly from the bar 86. The shank of the hook 104 passes out through the forwardly and downwardly sloping wall 50, its outer end being threaded to receive an adjusting nut 110 which abuts a boss on the above-mentioned wall 50 to determine a roll clearance greater than the minimum. A guide plate 112 is mounted adjacent the pricking roll 10 to bridge substantially the space between the rolls 64 and 90 and thereby guide the advancing end of the work if the latter is not already impaled upon the roll 10, between the rolls 90 and 10. The guide plate 112 is carried by the end portions of the frame 58, being secured thereto at its ends by screws 114.

In order to cover the upper portion of the pricking roll 10 as well as to provide means for facilitating the presentation of blanks to the machine, a frame 116 extends across the machine and partly over the pricking roll 10, being mounted upon a pair of supporting cross bars 118 which are supported by the side walls 4. The frame 116 has a wall 120 which slopes downwardly and rearwardly, and a wall 122 which slopes downwardly and forwardly, these two walls serving as a guard for the pricker roll 10 and co-operating with the walls 4, 48, 34 and 38 to enclose the space within the housing. The wall 120 is directed tangentially with respect to the pricker roll 10 in the direction of feed thereof and in addition to its other functions above described, the wall 120 serves as a chute for feeding the blanks to the pricker roll 10.

After a blank has been carried by the pricking roll through the conditioning liquid, it is removed from the roll and directed upon the conveyor 144 by the fingers 126 of a stripper comb which project into the grooves between the rows of teeth on the pricking roll. Mounted in the forward portion of the frame 116 and extending lengthwise thereof, that is, crosswise of the machine, are two supporting rods 124, upon which are mounted the fingers 126 of the stripper comb. The fingers 126 extend into the grooves of the pricker roll 10, being substantially tangential to the bottom of the grooves and pointed against the direction of feed, sufficient clearance being provided in case the spacing members of the roll 10 are saw blades. A finger 126 is provided for each groove of the roll 10, the portion of the finger which enters the groove being relatively thin, and the portion which is secured upon the rods 124 being relatively thick to effect proper spacing of the fingers and to align them with the grooves in the roll 10.

It is desirable that the surplus liquid which adheres to both sides of an immersed blank be wiped off. This is accomplished in the illustrated machine by a wiper plate 130 and by the brush 158 which has been previously mentioned. The wiper plate is mounted as follows:—

Within the dipping pan 17 and adjacent the forward end thereof is secured a bearing block 128. Pivotally mounted upon the block 128 is a forwardly and upwardly extending plate 130 which extends across the pan 17. A spring 132 coiled about the pivot rod of the plate 130 has its ends interposed between the plate 130 and the forward wall of the pan 17, thus serving to urge the free edge of the plate 130 toward the roll 10. The plate 130 extends in the direction of feed of the roll 10, and serves to wipe off any free liquid which may adhere to the outer surface of blanks impaled upon the roll 10. The tension of the spring 132 is adjusted by shifting the vessel 18 forwardly or rearwardly, by turning the eccentrics 30 as above described. The knurled head 31 by which the eccentrics 30 are turned is held against accidental movement by a spring latch of usual construction. The forward wall 134 of the pan 17 extends upwardly and forwardly, for a purpose later to be described.

Journalled in the rearward portions of the walls 6 and extending thereacross is a shaft 136 carrying a roll 138. Journalled in the forward portion of the walls 6 and extending thereacross is a shaft 140 carrying a roll 142. The conveyor belt 144, preferably of rubberized fabric, runs over the rolls 138 and 142,

the outer surface of the belt 144 having a multiplicity of upstanding wires, as in card clothing. The rolls 138 and 142 rotate in a clockwise direction, as viewed in Fig. 2, and the above-mentioned wires are formed with their ends inclined toward the direction of travel of the belt 144. The rolls 138 and 142 are substantially on the same level, and the run of the belt 144 is therefore substantially horizontal, the level of the tops of the wires of the upper surface of the belt 144 being at or slightly below the ends of the comb fingers 126, so that when a blank is stripped from the roll 10 it will fall upon the surface defined by the tops of said wires. The forward inclination of the wall 134 permits the roll 138 to be positioned relatively close to the pricking roll 10, thereby assuring that the belt 144 will properly receive the blanks as they are stripped from the roll 10.

The brush 158, which as has been explained serves to wipe the surplus liquid from the side of each blank opposite to that from which surplus liquid was wiped by the plate 130, is mounted above the upper run of the conveyor belt in the following manner:—

Secured upon each of the walls 6 is a horizontal guideway 146 for a slide 148, which extends across the machine. A frame 150 is pivotally mounted for up and down movement upon a pin 152 carried in the slide 148 and extending transversely of the machine. A spring 154 coiled about the pin 152 and having a free end bearing down upon the frame 150 urges the latter toward its lowermost position. An adjusting screw 156, threaded in a cross member of the frame 150 and with its end bearing upon a cross member of the slide 148 determines the lowermost position to which the frame 150 is urged by the spring 154. The brush 158 extends across the frame 150, its ends being received in notches in the free end of the frame 150. A plate 160, loosely pivoted to the frame 150 adjacent each end of the brush 158, may be swung over the upper surface of the latter to secure it in the notches. The bristles 162 of the brush 158 extend downwardly and are inclined in the direction of travel of the upper run of the belt 144. Extending across the machine beneath the brush 158 and secured at each end to one of the side wall members 6 is a plate 164 for supporting the upper run of the belt 144. The brush 158 may be adjusted forwardly or rearwardly for blanks of different length by moving the slide 148 in the guideways 146. It is desirable to adjust the brush 158 to a forward position for long blanks, to avoid any possibility of crumpling them as they are delivered to the belt 144. The slide 148 is clamped in adjusted position in its guideways 146 by a set screw (not shown) threaded through one of the side walls 6 and passing through the adjacent guideway 146, its end bearing against the side of the slide 148.

A vertical wall 166 extends across the front of the machine, being secured at each end in one of the side walls 6. The upper edge of the wall 166 is notched at intervals to receive the stripping comb fingers 168, which likewise are notched to fit the wall 166 and which extend rearwardly between the lines of wires on the belt 144. The upper edges of the fingers 168 define a surface continuous with the surface defined by the ends of the wires of the upper run of the belt 144, the rear ends of the fingers 168 being beveled downwardly to engage the under surface of a blank carried by the wires. About half of the fingers 168 extend forwardly as well as rearwardly, the forward portions 170 of these fingers constituting a holder from which the conditioned blanks may readily be picked up by the operator. A rod 172 extends across the machine above the wall 166, its ends being mounted in the respective walls 6. The rod 172 passes through each of the fingers 168 and serves to hold the latter securely in position. A cover plate 174 extends across the walls 6 and together with the base plate 2 and the side walls 4, serves to house the belt 144 and the brush 158 and its associated parts, having an opening at its forward end large enough to permit delivery of the blanks upon the fingers 168.

The pricking roll 10 and the belt 144 are driven by a pulley 176 (Fig. 1) bracketed upon the rear wall 5. A shaft 178 operatively connected to the shaft of the pulley 176 extends through the rear wall 5 and may be connected by a clutch 180 (Fig. 3) to a forwardly extended shaft 182. The clutch 180 comprises two engaging members, one fixed upon the shaft 178 and the other slidably keyed upon the shaft 182, and may be engaged or disengaged by means of a yoke seated in a groove in the keyed member, the yoke being shifted by a knob 184 (Fig. 3) which extends out through a slot 186 in one of the side walls 4. The reservoir 33 is offset to accommodate the shafts 178 and 182 and the clutch mechanism. The forward end of the shaft 182 carries a beveled pinion 188 which engages a beveled gear 190 secured to the shaft 8 adjacent one end thereof. The opposite end of the shaft 8 carries a gear 192 which drives a gear 194 journalled upon a stub shaft mounted in one of the walls 4; the gear 194 drives a gear 196 similarly journalled; and the gear 196 drives a pinion 198 secured upon one end of the shaft 136, whereby the belt 144 is driven.

It is desirable to provide means whereby the operator may turn the roll 10 directly. One end (not shown), therefore, of the shaft 8 is formed to receive the socket of a turning crank. It is also desirable to provide means for enabling the operator to advance the

belt 144 directly, in cases where the above-described gearing may not be employed. To this end a shaft 200 (Figs. 1 and 2) is journalled in one of the walls 6. The outer ends of the shaft 200 carry hand wheels 202. On the shaft 200 are mounted sprocket wheels 204. On the shaft 136 are mounted sprocket wheels 206 smaller in diameter than the wheels 204, and chains 208 run respectively over the two sets of sprocket wheels, whereby the turning of the hand wheels 202 will drive the belt 144 at a relatively rapid rate.

The gear 192 is mounted on the end of the shaft 8 with a view to ready removal and replacement. In cases where an intermittent feed of the belt 144 for each blank presented to the machine is desired, the gear 192 is removed from the shaft 8, and a gear 210 (Fig. 4) is mounted upon a stub shaft 212 extending from the side walls 4. A gear 214 is normally secured upon an end of the roll shaft 62; and when a blank is fed between the pricker roll 10 and the roll 64, the blank causes the latter to rotate, this rotation being transmitted from the gear 214, through the gear 210 to the gear 194, and thence through the gears 196 and 198 to the roll 138. The belt 144 will thus be advanced during the feeding of each blank between the rolls 10 and 64, and will at other times be at rest, except when the operator turns the hand wheels 202.

In operation, a blank B is fed down the chute 120 between the pressure roll 64 and the pricker roll 10. The pressure of the roll 64 under the influence of the springs 66 will ordinarily be sufficient to impale the blank B upon the teeth or pointed projections of the roll 10. In the case of a stiff, heavy blank which might not readily bend to the curvature of the roll 10, the lower pressure roll 90 bends the blank against the roll 10 and impales it thereupon. The guide plate 112 insures that the advancing end of the blank B, if not already impaled upon the roll 10, will pass between the lower roll 90 and the roll 10. The teeth of the roll 10 not only penetrate the surface of the blank B to increase its porosity, but also crack the stiffening material with which the blank is impregnated and break up the surface layer, further to increase its porosity. It is evident that the blank is thus rendered more absorbable to the conditioning liquid. The teeth of the spacer members of the roll 10 serve to take up the liquid in the pan 17, the liquid filling the spaces between the pricking member and between the teeth of the spacing members, and adhering by capillary attraction. The teeth of the spacer members, being pointed in the direction of rotation of the roll 10, in some measure serve as buckets to facilitate the taking up of liquid. As the blank is impaled upon the roll 10, the liquid carried by the latter is simultaneously applied to and spreads over the adjacent surface of the blank, entering the cracks caused by the impaling teeth. As the blank is dipped beneath the surface of the liquid, owing to the rotation of the roll 10, the outer surface of the blank is exposed to the liquid and a fresh supply of the liquid enters the grooves of the roll. As the blank passes the plate 130, all surplus or free liquid adhering to its outer surface is wiped off by the plate 130. As the blank is stripped from the roll 10 by the comb fingers 126, the liquid carried up by the grooves of the roll 10 and also the liquid adhering to the inner surface of the blank fills up the holes formed in the blank by the perforating teeth of the roll 10. The blank then falls upon the upper run of the belt 144, being supported upon the ends of the wires projecting therefrom, and is carried beneath the brush 158, the bristles 162 of which wipe off all surplus or free liquid adhering to the upper surface of the blank. The raised wall 134 of the pan 17 supports the trailing end of the blanks, and when intermittent feed is employed, serves to prevent the trailing end from dipping down into the liquid in the pan 17 in case the blank is halted in a position where this might be possible. The blank is then advanced by the upper run of the belt 144 to the fingers 168, its leading edge resting upon the forward extensions 170 in a position to be grasped readily by the operator. The fact that the feed chute 120 slopes rearwardly enables it to receive work pieces presented to it by a rearward movement of the operator's hand. The work pieces after treatment are returned to the operator, who stands in front of the machine, by the forward movement of the belt 144. The operator may thus feed the untreated work pieces and receive the treated work pieces without changing his position.

The points of the pricker roll 10 enter into non-slipping engagement with the work piece, and, inasmuch as the total area which they engage is relatively small compared to the total area of one side of the work piece, a maximum extent of the surface of the work piece is presented to the conditioning liquid in the pan 17. The upstanding wires of the conveyor belt 144 likewise engage a relatively small portion of the total area of one side of the work piece, and thus enable a maximum extent of the area of the work piece to be subjected to the action of the vapor within the housing. These upstanding wires also, by reason of the fact that they engage a relatively small total area of the work piece, present a minimum of supporting surface to the sticky softened work piece, thereby reducing adhesion to a minimum. Because of their inclination in the direction of travel, and their stiffness resulting from their relative shortness, and also their relatively small total area of contact, these wires

hold the work piece against slipping as the latter passes under the bristles 162.

It will be noted that the interior of the housing is substantially enclosed from the atmosphere, the openings provided for the entrance and emergence of the blank B, that is, the opening between the chute 120 and the wall 52 and the opening between the forward end of the cover plate 174 and the upper edge of the front wall 166, being relatively small. Evaporation of the liquid within the vessel 18 is thus retarded, and, inasmuch as the escape of inflammable vapor into the atmosphere is prevented, the fire hazard is greatly diminished. Moreover, the space within the housing is saturated with the vapor of the liquid, and when operating the machine intermittently, the blank may be allowed to mull upon the belt 144 as long as may be desired without danger of drying.

When operating the machine with continuous feed, the blanks B may be fed as rapidly as desired. They are not ordinarily, however, fed more than one at a time. A plurality of blanks is shown in Fig. 2 to illustrate the successive positions of a single blank in passing through the machine, rather than a plurality of blanks.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A conditioning machine having, in combination, means constructed and arranged to increase the porosity of a work piece, and means for subjecting the work piece, at a locality of the work piece which is being acted upon by said porosity-increasing means, to the influence of a conditioning medium.

2. A conditioning machine having, in combination, means constructed and arranged by progressive engagement with a work piece to render the work piece more absorbent, and means for subjecting the work piece, at a locality of the work piece which is being acted upon by said absorbent rendering means, to the influence of an absorbable conditioning medium.

3. A conditioning machine having, in combination, driven means constructed and arranged to render more absorbent a work piece and to impart to the work piece a feeding movement, and means for subjecting the work piece, at a locality of the work piece which is in feeding engagement with said driven means, to the influence of an absorbable conditioning medium.

4. A conditioning machine having, in combination, a receptacle for a softening medium, and driven means constructed and arranged to increase the porosity of a work piece and to pass the work piece through the softening medium in said receptacle.

5. A conditioning machine having, in combination, a receptacle for a softening medium, and driven means constructed and arranged to increase the porosity of a work piece, and to pass the work piece through the softening medium in said receptacle, said driven means being positioned to engage the work piece at a locality of the work piece which is within said receptacle.

6. A conditioning machine having, in combination, means operable by penetration to increase the porosity of a blank which has been impregnated with a stiffening agent, and means for subjecting the blank, at a locality of the blank which is engaged by said porosity-increasing means, to the action of a conditioning medium.

7. A machine for conditioning a blank impregnated with a stiffening agent having, in combination, means for pricking and feeding the blank, and means for subjecting the blank at a locality of the blank which is engaged by said pricking and feeding means, to the action of a softening medium.

8. A conditioning machine having, in combination, a receptacle for a conditioning liquid, and means for penetrating a blank which has been impregnated with a stiffening agent, thereby to increase the porosity of the blank, said penetrating means being constructed and arranged to feed the blank through the conditioning liquid in said receptacle.

9. A conditioning machine having, in combination, a receptacle for a conditioning liquid, and means for increasing the porosity of the interior of a blank which has been impregnated with a stiffening agent, said porosity-increasing means being constructed and arranged to pass the blank through the liquid in said receptacle.

10. A conditioning machine having, in combination, a receptacle for a conditioning liquid, a roll partially immersed in the liquid in said receptacle and having pointed projections adapted to impale a blank, and means for impaling a blank upon the projections of said roll, whereupon rotation of said roll will pass the blank through said liquid.

11. A conditioning machine having, in combination, a receptacle for a conditioning liquid, a roll partially immersed in said liquid and having pointed projections adapted to impale a blank, means for impaling a blank upon the projections of said roll, and means for rotating said roll to pass the impaled blank through said liquid.

12. A conditioning machine having, in combination, a receptacle for a conditioning liquid, a roll partially immersed in the liquid in said receptacle and having pointed projections, means for impaling a blank upon the projections of said roll, whereupon rotation of said roll will pass the blank through said liquid, and means for stripping the impaled blank from said roll.

13. A machine for conditioning a blank impregnated with a stiffening agent having, in combination, a carrier having projections upon its surface, a roll positioned for pressing a blank to be treated against said carrier, thereby to crack the stiffening agent with which said roll is impregnated, and resilient means for urging said roll against a blank to press the blank against said carrier.

14. A conditioning machine having, in combination, a member constructed and arranged to impale a blank and to subject the blank to the action of a conditioning medium, a conveyor for the blank, and means for transferring the impaled blank from said member to said conveyor.

15. A conditioning machine having, in combination, a member constructed and arranged to impale a blank and to subject the blank to the action of a softening liquid, a conveyor for the blank, means for transferring the impaled blank from said member to said conveyor, and means for removing surplus liquid from the blank before the blank is completely transferred to said conveyor.

16. A conditioning machine having, in combination, means for holding a blank by engagement with one face thereof and for dipping the blank into and out of a softening liquid, and means for wiping surplus liquid from the opposite face of the blank while the blank is held by said dipping means.

17. A conditioning machine having, in combination, means for dipping a blank of sheet material into and out of a softening liquid, means for stripping the blank from said dipping means, means engageable with one surface of the blank to press the blank against said dipping means and constructed and arranged to wipe surplus liquid from said surface of the blank, and means for wiping surplus liquid from the other surface of the blank.

18. A conditioning machine having, in combination, a pan for holding a softening liquid, means for dipping a blank into and out of said liquid, and means resiliently mounted upon said pan and constructed and arranged to engage the blank as the blank emerges from the liquid to wipe surplus liquid from said blank and to return the surplus liquid to said pan.

19. A conditioning machine having, in combination, a pair of rolls between which a blank may be presented by an operator, a receptacle for liquid into which one of the rolls dips, and means for causing the blank to be carried by said last-named roll first in a direction from the operator, then through the liquid and then toward the operator and for delivering the blank back to the operator.

20. In a conditioning machine, the combination of a roll having pointed projections arranged in circles around the roll with depressed spaces between said circles and a comb having fingers extending into the depressed spaces for stripping off blanks impaled upon said projections.

21. In a conditioning machine, a dipping pan, a reservoir for a volatile inflammable softening liquid, a barometric feed device between said reservoir and said pan for supplying liquid from said reservoir to said pan at a constant level, and means spaced from said reservoir and interposed between said pan and said feed device for preventing the passage of a flame from vapor above said pan to the vapor around said feed device.

22. In a conditioning machine, a dipping pan, a reservoir, a fire wall interposed between and spaced from said pan and said reservoir, and means for providing for the passage of a softening liquid between said reservoir and said pan.

23. In a conditioning machine, a movably mounted pan, means for carrying a blank into and out of a liquid within said pan, means carried by said pan for wiping surplus liquid from the blank as the latter emerges from the liquid within the pan, and a spring for urging said wiping means against the blank on said carrying means, said spring being constructed and arranged for adjustment of its tension by a movement of said pan.

24. In a machine for softening a shoe stiffener, a receptacle for a conditioning liquid and a feed member positioned in said receptacle and comprising a roll composed of a set of circular saw blades of relatively greater diameter for engaging the stiffener and a set of circular saw blades of relatively less diameter, each blade of less diameter being disposed between two blades of greater diameter and serving to the extent of its thickness to space the two blades of greater diameter from each other.

25. In a machine for softening a shoe stiffener, a feed member and means for pressing the shoe stiffener against said feed member, said feed member comprising a laminated roll having a plurality of units disposed longitudinally upon a common axis, each unit comprising a plurality of individual members disposed longitudinally upon the common roll axis and being clamped together axially of the roll, and means for locking said units against relative torsional slip.

26. A conditioning machine comprising a container for a conditioning medium and a plurality of members cooperating to increase the porosity of an article to be treated, one of said members being constructed and arranged to carry the article through conditioning medium in said container.

27. A conditioning machine comprising a receptacle for a conditioning fluid and a member having a surface adapted upon pres-

sure of a blank against said surface to increase the porosity of the blank, said member being constructed and arranged to pass the blank through conditioning fluid in said receptacle.

28. A conditioning machine comprising a receptacle for a conditioning liquid and a member having pointed projections for impaling a blank to increase the porosity of the blank and also to secure the blank upon said member, said member being constructed and arranged to pass the impaled blank through liquid in said receptacle.

29. A conditioning machine having, in combination, a receptacle for a conditioning liquid, a roll partially immersed in the liquid in said receptacle, means on said roll for holding a blank upon the roll against the action of gravity as the roll is rotated to carry the blank through the liquid, and stationary means for stripping the blank from the roll.

30. A conditioning machine having, in combination, a receptacle for a conditioning liquid, a roll partially immersed in liquid in said receptacle, said roll having a plurality of grooves in its periphery, means on said roll for holding a blank to carry the blank through the liquid as the roll is rotated, and a plurality of fingers extending respectively into said grooves to strip the blank from the roll.

31. A conditioning machine having, in combination, a roll having projections upon its surface, and a plurality of rolls constructed and arranged to press a blank which has been impregnated with a stiffening agent against the first-mentioned roll to render the blank more porous and to curve the blank against the first-mentioned roll.

32. A conditioning machine having, in combination, means for dipping a blank of sheet material into and out of a softening liquid, means for stripping the blank from said dipping means, means for wiping surplus liquid from one surface of the blank before the blank has been completely stripped from said dipping means, and means for wiping surplus liquid from the other surface of the blank after the blank has been stripped from said dipping means.

33. A conditioning machine having, in combination, a receptacle for a conditioning liquid, a driven roll partially immersed in the liquid in said receptacle, said roll having a plurality of grooves in its periphery, means for holding a work piece upon said roll whereby said roll in its rotation carries the work piece through the liquid in said receptacle, and a plurality of fingers extending respectively into said grooves at a position above the level of the liquid in said receptacle to strip the work piece from said roll.

34. A conditioning machine comprising a driven feed roll having pointed projections upon its periphery, means constructed and arranged to impale a work piece upon the projections of said feed roll at a rearwardly moving portion of said feed roll, means for subjecting the work piece to the action of a conditioning medium while the work piece is being fed by said feed roll, and means for stripping the work piece from said feed roll at a position wherein the portion of said feed roll upon which the work piece has been impaled is moving forwardly.

35. A conditioning machine comprising a pair of rolls constructed and arranged to receive between them a work piece, one of said rolls being driven to feed the work piece, means for subjecting the work piece to the action of a conditioning medium while the work piece is being fed by said driven roll, and means for delivering the conditioned work piece at a position upon the same side of the bite of said rolls as that from which the work piece was received by said rolls.

36. A conditioning machine comprising a driven feed roll having pointed projections upon its periphery, a presser roll constructed and arranged to impale by pressure upon the projections of said feed roll a work piece which is presented to the bite of said rolls, means for subjecting the work piece to the action of a conditioning medium while the work piece is being fed by said feed roll, and means for stripping the work piece from said feed roll at a position upon the same side of the bite of said rolls as that from which the work piece was presented.

37. A conditioning machine comprising a receptacle for a conditioning liquid, a driven feed roll partially immersed in the conditioning liquid in said receptacle and having pointed projections upon its periphery, a presser roll constructed and arranged to impale by pressure upon the projections of said feed roll a work piece which is presented to the bite of said rolls whereupon the work piece is carried by said feed roll through the conditioning liquid in said receptacle, and means for stripping the work piece from said feed roll at a position upon the same side of the bite of said rolls as that from which the work piece was presented.

38. A conditioning machine comprising a receptacle for a conditioning liquid, a driven feed roll partially immersed in the conditioning liquid in said receptacle and having pointed projections on its periphery, a presser roll constructed and arranged to impale by pressure upon the projections of said roll a work piece which is presented to the bite of said rolls, the axis of said presser roll being disposed upwardly and rearwardly of the axis of said feed roll and said feed roll being driven in a direction to carry the work piece first downwardly and rearwardly, then forwardly through the liquid in said receptacle, and then upwardly out of the liquid, and means for stripping the work piece from said

feed roll after the work piece emerges from the liquid.

39. A conditioning machine having, in combination, a receptacle for a conditioning liquid, and means for feeding a work piece, said feeding means having a plurality of projections adapted to enter into non-slipping engagement over a relatively small total area with opposite sides of the work piece, said feeding means being also constructed and arranged to pass the work piece into and out of the conditioning liquid in said receptacle.

40. A conditioning machine having, in combination, a receptacle for a conditioning liquid, and means for feeding a work piece, said feeding means having a plurality of projections adapted to enter into non-slipping engagement over a relatively small total area with opposite sides successively of the work piece, said feeding means being also constructed and arranged to pass the work piece into and out of the conditioning liquid in said receptacle.

41. A conditioning machine having, in combination, a feed member provided with a plurality of points constructed and arranged to penetrate one side of a work piece, means for subjecting the work piece to the action of a conditioning medium while the work piece is being advanced by said feed member, another feed member having a plurality of projections constructed and arranged to enter into non-slipping engagement with the opposite side of the work piece, and means for transferring the work piece from the first-mentioned feed member to the second-mentioned feed member.

42. A conditioning machine having, in combination, means for feeding a work piece, said feeding means being constructed and arranged successively to engage opposite sides of the work piece, means for subjecting both sides of the work piece to the action of a conditioning liquid as the work piece is being advanced by said feeding means, and means for wiping surplus conditioning liquid successively from the sides of the work piece which are not engaged by said feeding means, said feeding means being also constructed and arranged non-yieldingly to hold the work piece against said wiping means.

43. A conditioning machine having in combination, means for feeding a work piece, said feeding means being constructed and arranged successively to engage opposite sides of the work piece, means for subjecting both sides of the work piece to the action of a conditioning liquid as the work piece is being advanced by said feeding means, and means for wiping surplus conditioning liquid successively from the sides of the work piece which are not engaged by said feeding means, said wiping means being constructed and arranged to press the work piece against the feeding means.

44. A conditioning machine having, in combination, means for feeding a work piece, said feeding means being provided with a plurality of projections engageable successively with opposite sides of the work piece, means for subjecting both sides of the work piece to the action of a conditioning liquid as the work piece is being advanced by said feeding means, and means for wiping surplus conditioning liquid successively from the sides of the work piece which are not engaged by said feeding means while the work piece is being advanced by said feeding means.

45. A conditioning machine having, in combination, means for feeding a work piece, said feeding means being provided with a plurality of projections engageable successively with opposite sides of the work piece, means for subjecting both sides of the work piece to the action of a conditioning liquid as the work piece is being advanced by said feeding means, means for wiping surplus conditioning liquid successively from the sides of the work piece which are not engaged by said feeding means while the work piece is being advanced by said feeding means, and resilient means acting upon said wiping means to cause the latter to press the work piece against said feeding means.

46. A conditioning machine having, in combination, means for subjecting both sides of a work piece to the action of a conditioning liquid and for wiping surplus conditioning liquid from one side of the work piece, a driven feed member, means for transferring the work piece to said driven feed member with the wiped side of the work piece in engagement with said driven feed member, and means for wiping surplus conditioning liquid from the unwiped side of the work piece while the work piece is being advanced by said driven feed member.

47. A conditioning machine having, in combination, means for subjecting both sides of a work piece to the action of a conditioning liquid and for wiping surplus conditioning liquid from one side of the work piece, a driven feed belt having a plurality of upstanding wires to support the work piece, means for transferring the work piece to said driven feed belt with the wiped side of the work piece supported by the tops of said upstanding wires, and means for wiping surplus conditioning liquid from the unwiped side of the work piece while the work piece is being advanced by said driven feed belt.

48. A conditioning machine having, in combination, means for subjecting work pieces to the action of a conditioning liquid, separate means for wiping surplus conditioning liquid from the opposite sides respectively of the work piece, and means for feeding a plurality of discontinuous work pieces past said wiping means, said feeding means being constructed and arranged to engage one side

of each work piece while presenting the opposite side to one of said wiping means, and to engage the opposite side of the work piece while presenting the first-mentioned side of the work piece to the other of said wiping means.

49. A conditioning machine having, in combination, means for feeding a plurality of discontinuous work pieces by engagement first with one side of a work piece and then with the opposite side of the work piece, means for subjecting each work piece to the action of a conditioning liquid while the first-mentioned side of the work piece is engaged by said feeding means, and means for wiping surplus conditioning liquid from each side of the work piece while the respective opposite side is engaged by said feeding means.

50. A conditioning machine having, in combination, a receptacle for a conditioning liquid, means for feeding a work piece by engagement with one side thereof into and out of the conditioning liquid in said receptacle, means for thereafter feeding the work piece by engagement with the opposite side thereof, and means for wiping surplus conditioning liquid from each side of the work piece while the respective opposite side is engaged in turn by said feeding means.

51. A conditioning machine having, in combination, a receptacle for a conditioning liquid, means engageable with one side of a work piece for feeding the work piece through the liquid in said receptacle, a wiper engageable with the opposite side of the work piece for wiping surplus liquid from the work piece as the work piece is advanced by said feeding means, means engageable with said opposite side of the work piece for thereafter feeding the work piece, and a wiper engageable with the first-mentioned side of the work piece to wipe surplus liquid from the work piece as the work piece is advanced by the second-mentioned feeding means.

52. A conditioning machine having, in combination, a receptacle for a conditioning liquid, a driven feed member constructed and arranged to engage one side of a work piece and to pass the work piece into and out of the conditioning liquid in the receptacle, a member constructed and arranged to wipe surplus conditioning liquid from the opposite side of the work piece while the work piece is being advanced by said feed member, means for stripping the work piece from said feed member, another driven feed member constructed and arranged to receive the work piece as the work piece is stripped from the first-mentioned feed member and to advance the work piece by engagement with said opposite side of the work piece, and a member constructed and arranged to wipe surplus conditioning liquid from the first-mentioned side of the work piece while the work piece is being advanced by the second-mentioned feed member.

53. A conditioning machine having, in combination, a driven feed member provided with a plurality of points for engagement with one side of a work piece, means for subjecting both sides of the work piece to the action of a conditioning liquid and for wiping surplus conditioning liquid from the opposite side of the work piece while the work piece is being advanced by said driven feed member, means for stripping the work piece from said feed member, another driven feed member constructed and arranged to receive the work piece as the work piece is stripped from the first-mentioned feed member and to advance the work piece by engagement with said opposite side of the work piece, and a member constructed and arranged to wipe surplus conditioning liquid from the first-mentioned side of the work piece while the work piece is being advanced by the second-mentioned feed member.

54. A conditioning machine having, in combination, a driven feed member provided with a plurality of points arranged in rows for engagement with one side of a work piece, means for subjecting both sides of the work piece to the action of a conditioning liquid and for wiping surplus conditioning liquid from the opposite side of the work piece while the work piece is being advanced by said driven feed member, a plurality of fingers extending into the spaces respectively between the rows of points on said driven feed member for stripping the work piece from said feed member, another driven feed member constructed and arranged to engage said opposite side of the work piece as the work piece is stripped from the first-mentioned feed member, and a member constructed and arranged to wipe surplus conditioning liquid from the first-mentioned side of the work piece while the work piece is being advanced by the second-mentioned feed member.

55. A conditioning machine having, in combination, a driven feed member provided with a plurality of points for engagement with one side of a work piece, means for subjecting both sides of the work piece to the action of a conditioning liquid and for wiping surplus conditioning liquid from the opposite side of the work piece while the work piece is being advanced by said driven feed member, another driven feed member having a plurality of projections arranged in rows positioned for engagement with said opposite side of the work piece, means for transferring the work piece from the first-mentioned feed member to the second-mentioned feed member, means for wiping surplus conditioning liquid from the first-mentioned side of the work piece while the work piece is being advanced by the second-mentioned feed mem-

ber, and a plurality of fingers extending into the spaces respectively between the rows of projections of the second-mentioned feed member for stripping the work piece from the second-mentioned feed member.

56. A conditioning machine having, in combination, means for subjecting both sides of a work piece to the action of a conditioning liquid and for wiping surplus conditioning liquid from one side of the work piece, a driven feed member, means for transferring the work piece to said driven feed member with the wiped side of the work piece in engagement with said driven feed member, means for wiping surplus conditioning liquid from the unwiped side of the work piece while the work piece is being advanced by said driven feed member, and a housing for said driven feed member adapted to contain the vapor of the conditioning liquid whereby the work piece on said feed member is subjected to the action of said vapor.

57. A conditioning machine having, in combination, means for subjecting both sides of a work piece to the action of a conditioning liquid and for wiping surplus conditioning liquid from one side of the work piece, a feed member, means for transferring the work piece to said feed member with the wiped side of the work piece in engagement with said feed member, means for wiping surplus conditioning liquid from the unwiped side of the work piece while the work piece is being advanced by said feed member, a housing for said feed member adapted to contain the vapor of the conditioning liquid whereby the work piece as it is advanced by said feed member is subjected to the action of said vapor, and means for continuously driving said feed member.

58. A conditioning machine having, in combination, means for feeding a work piece, means for subjecting both sides of the work piece to the action of a conditioning medium during the feeding of the work piece by said feeding means, means for wiping surplus conditioning liquid from one side of the work piece, a feed member, means for transferring the work piece to said feed member with the wiped side of the work piece in engagement with said feed member, means for wiping surplus conditioning liquid from the unwiped side of the work piece while the work piece is being advanced by said feed member, a housing for said feed member adapted to contain the vapor of the conditioning liquid, and driving means for said feed member adapted to be actuated by another work piece as said other work piece is fed by said feeding means and to be idle when another work piece is not being fed by said feeding means, thereby enabling said feed member to hold the first-mentioned work piece at rest in said chamber during the interval between the feeding of successive work pieces by said feeding means, during which interval the first-mentioned work piece is subject to the action of the vapor within said chamber.

In testimony whereof I have signed my name to this specification.

AUGUST R. SCHOENKY.