

Nov. 22, 1949

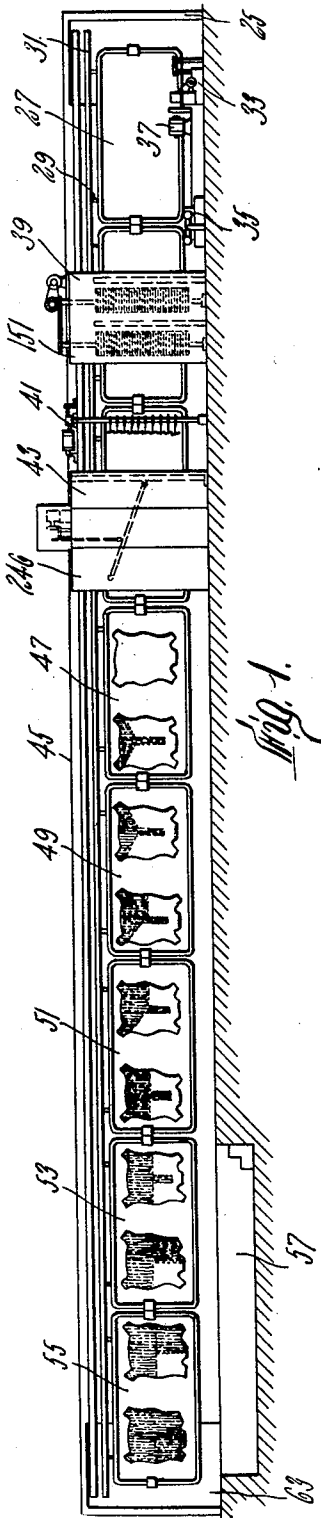
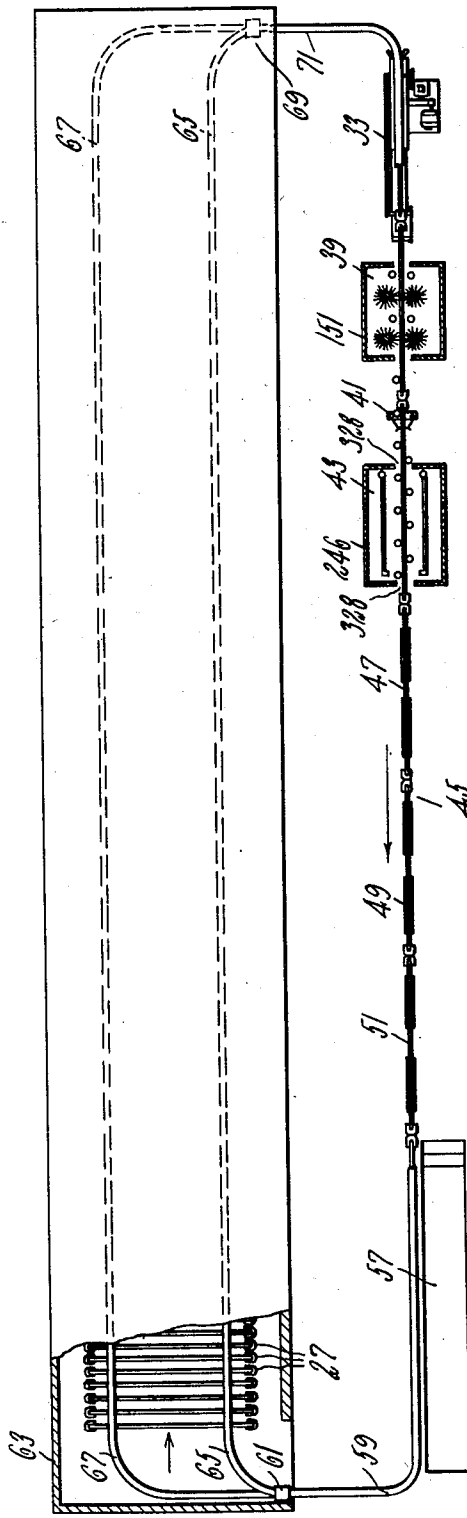
R. L. GRIFFIN ET AL

2,488,907

APPARATUS FOR PASTING SKINS

Filed March 23, 1944

7 Sheets-Sheet 1



Inventors
Roger L. Griffin
Norman S. Moore
by their attorney
Alfred H. Hilditch

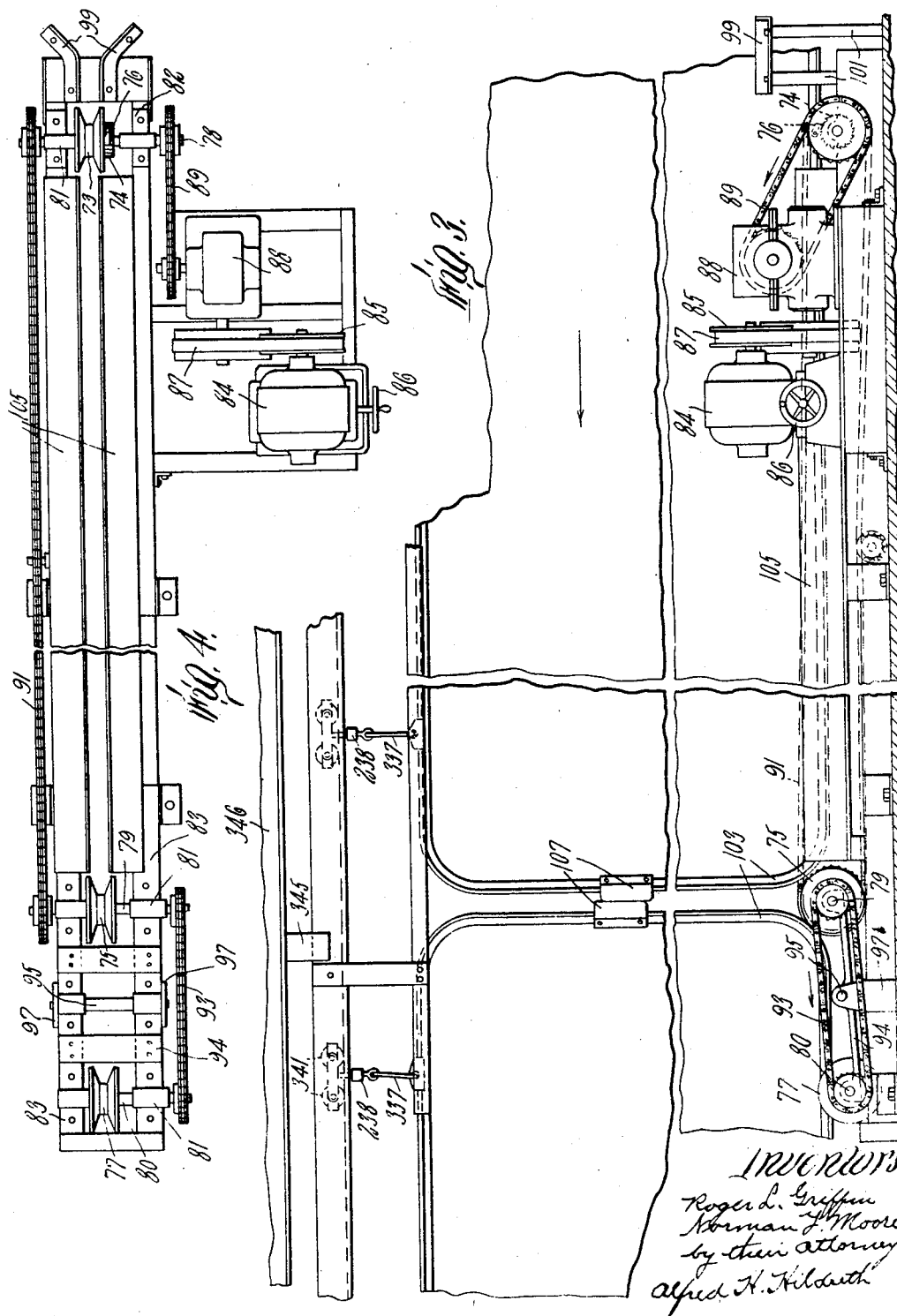
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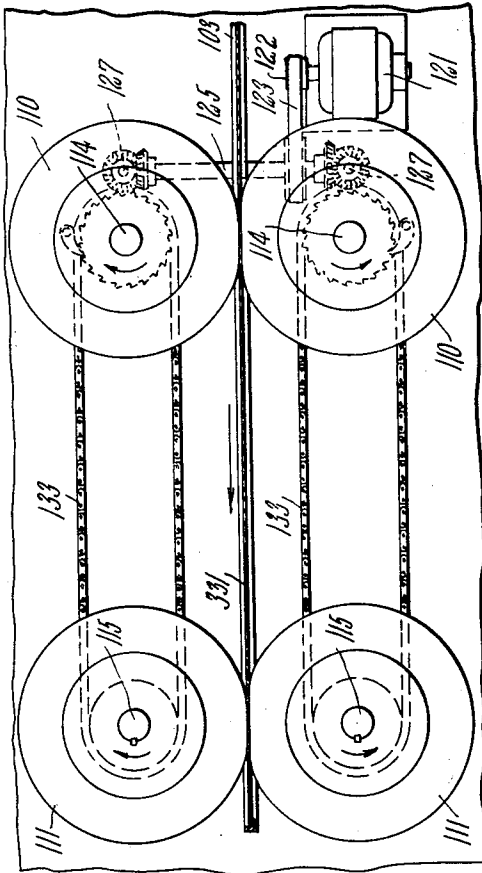


Fig. 2

Fig. 6

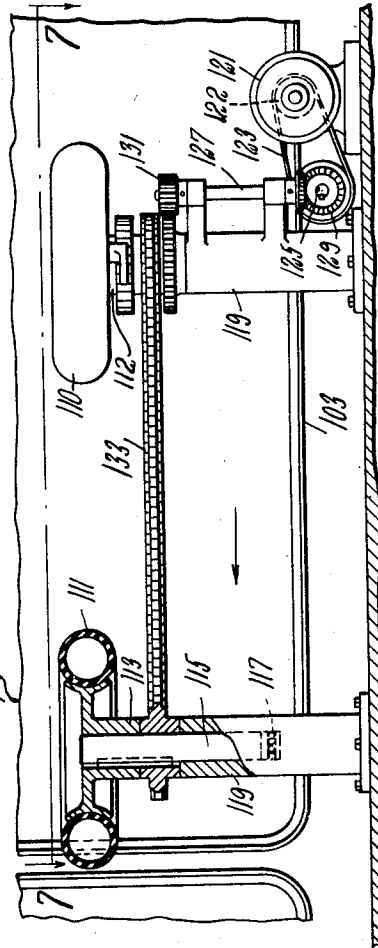
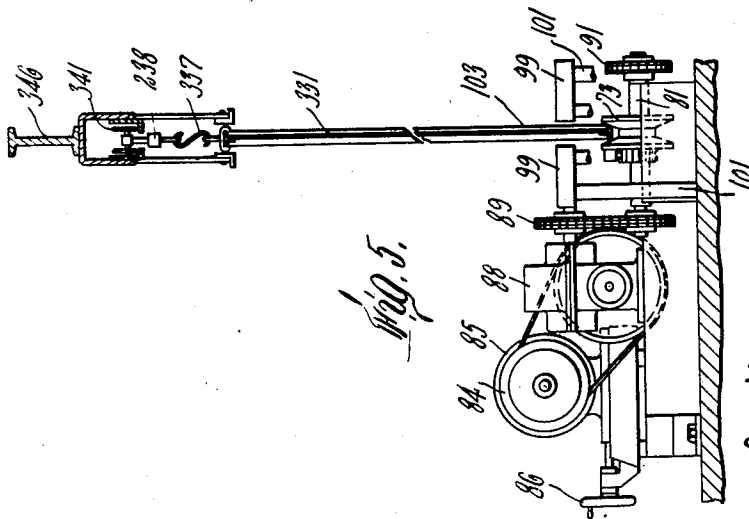


Fig. 5

Inventors
Roger L. Griffin
Adrian J. Moore
by their attorney
Alfred H. Kilduff

Nov. 22, 1949

R. L. GRIFFIN ET AL

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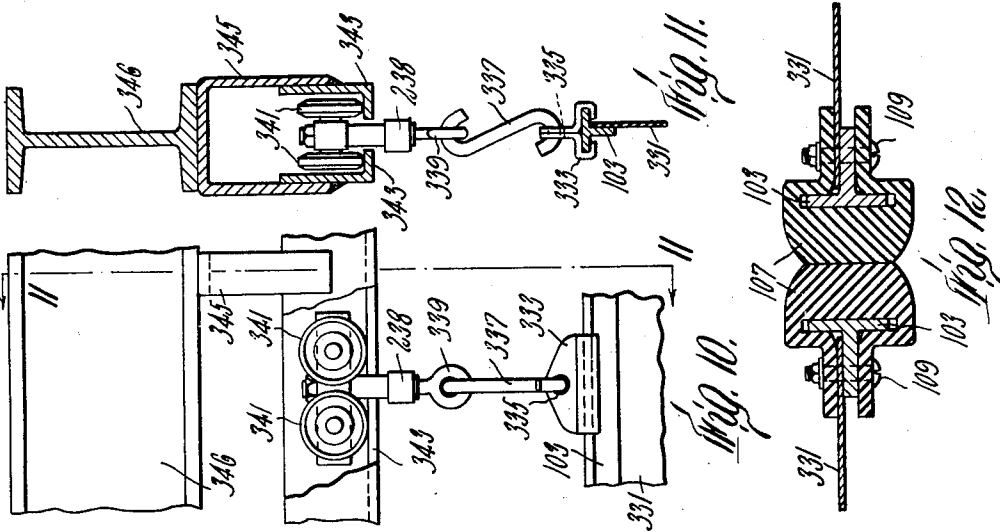
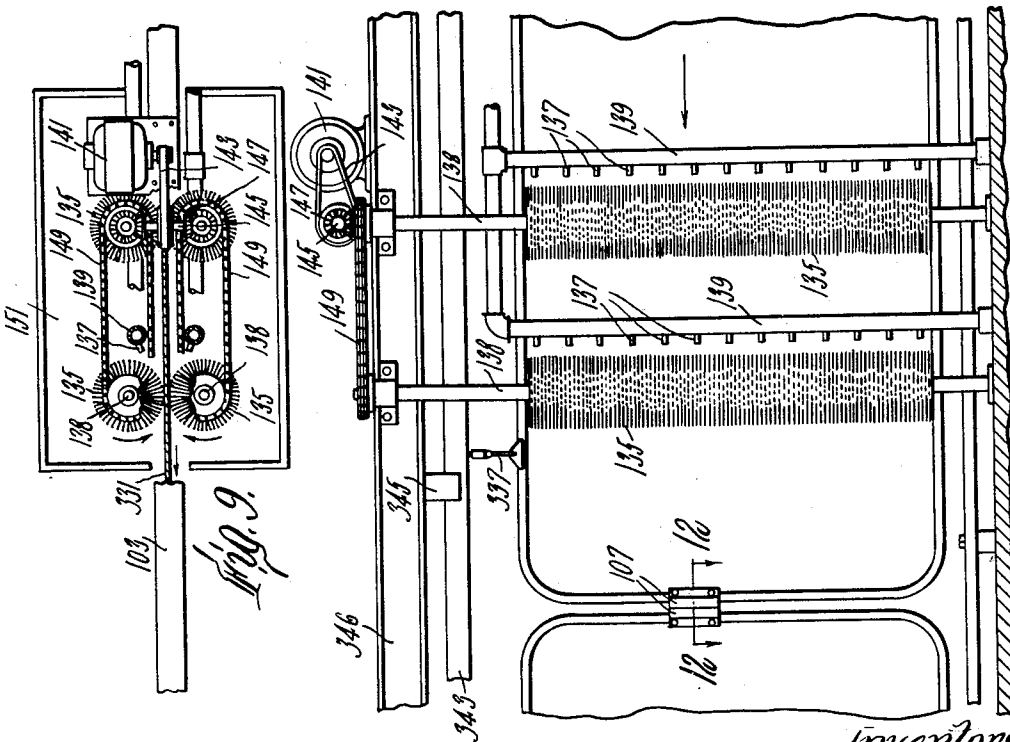


Fig. 8.

Inventors
Roger L. Griffin
Norman J. Moore
by their attorney
Alfred H. Hildebrand

Nov. 22, 1949

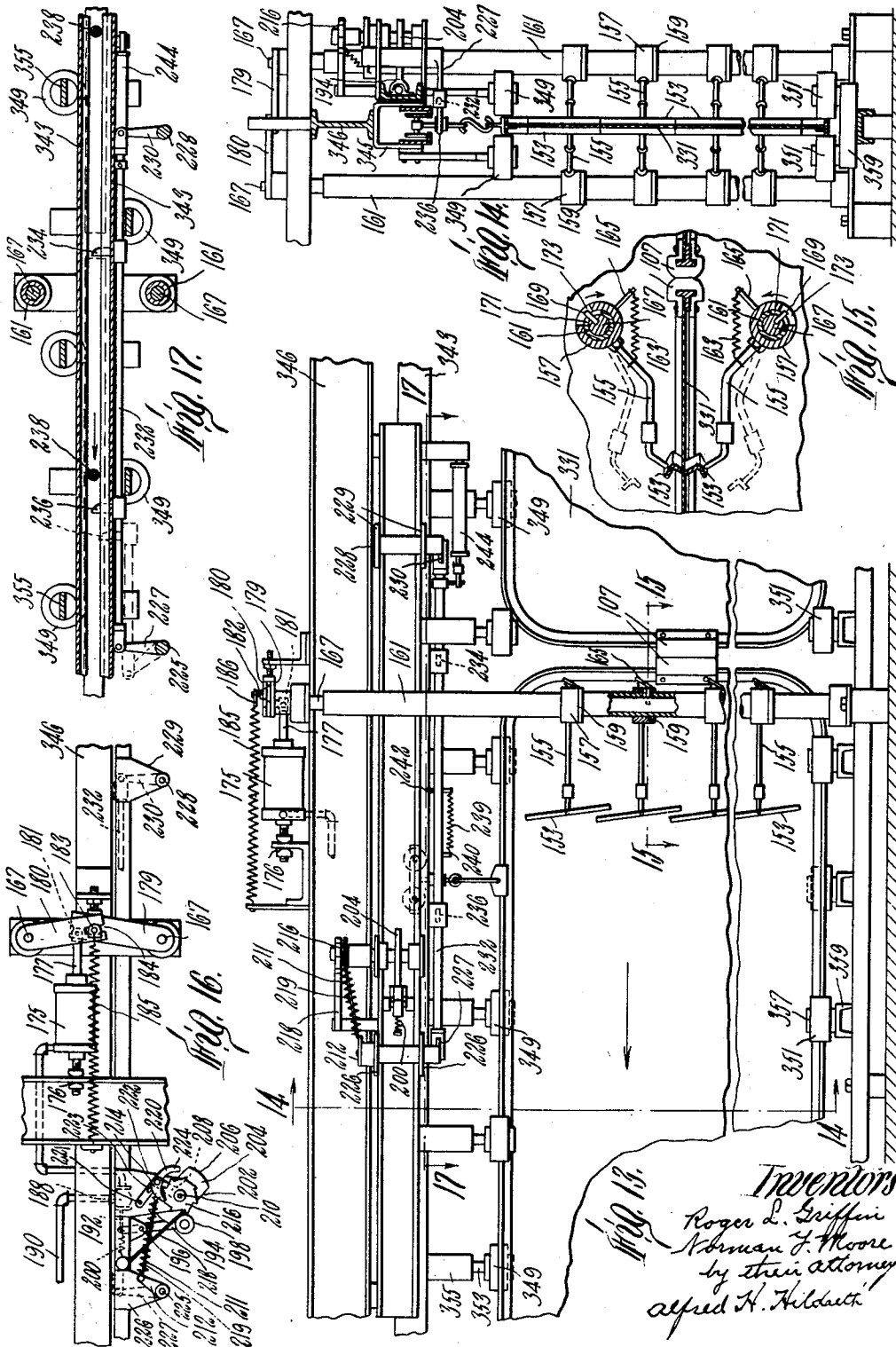
R. L. GRIFFIN ET AL

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7 Sheets-Sheet 5



Inventors
Roger L. Griffin
Norman J. Moore
by their attorney
Alfred H. Hildreth

Nov. 22, 1949

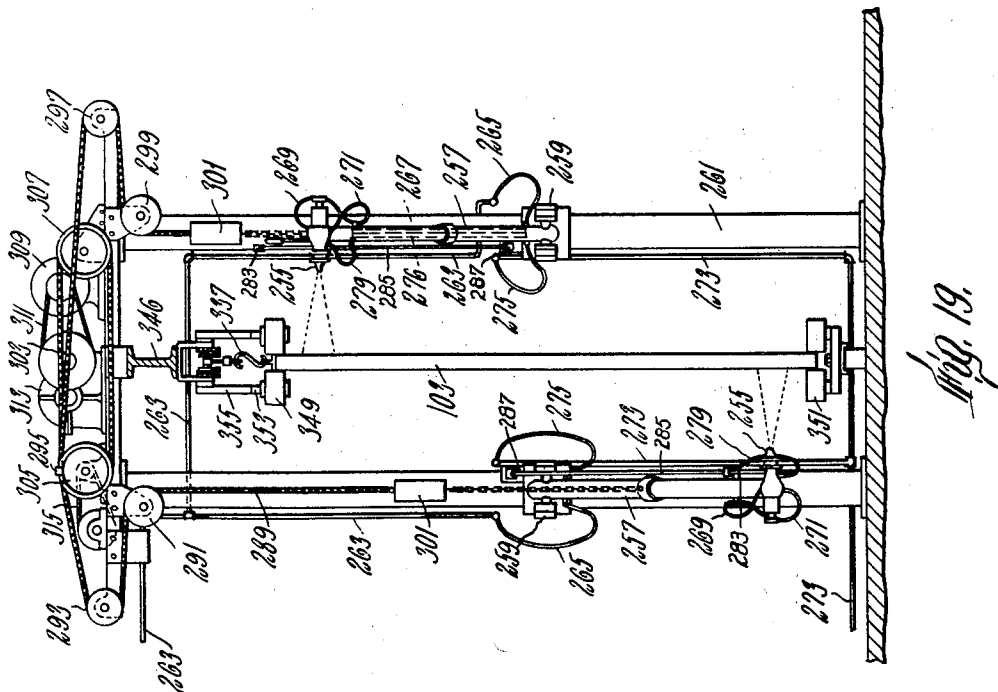
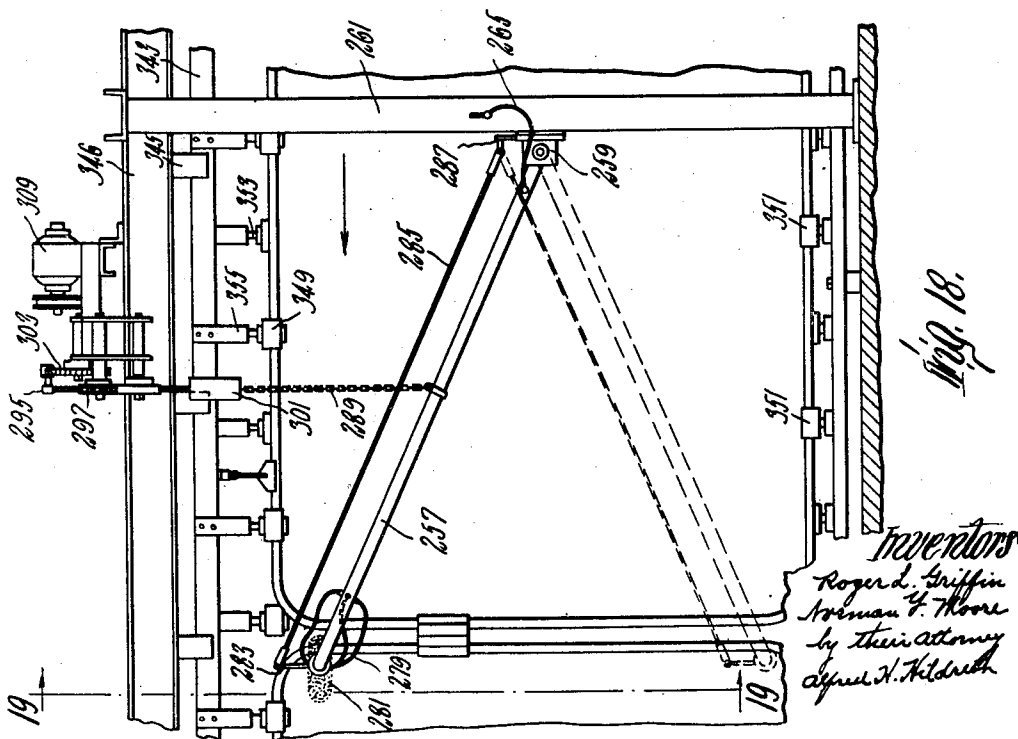
R. L. GRIFFIN ET AL

2,488,907

APPARATUS FOR PASTING SKINS

Filed March 23, 1944

7 Sheets-Sheet 6



Inventors
Roger L. Griffin
Norman F. Moore
by their attorney
Agnes H. Fildes

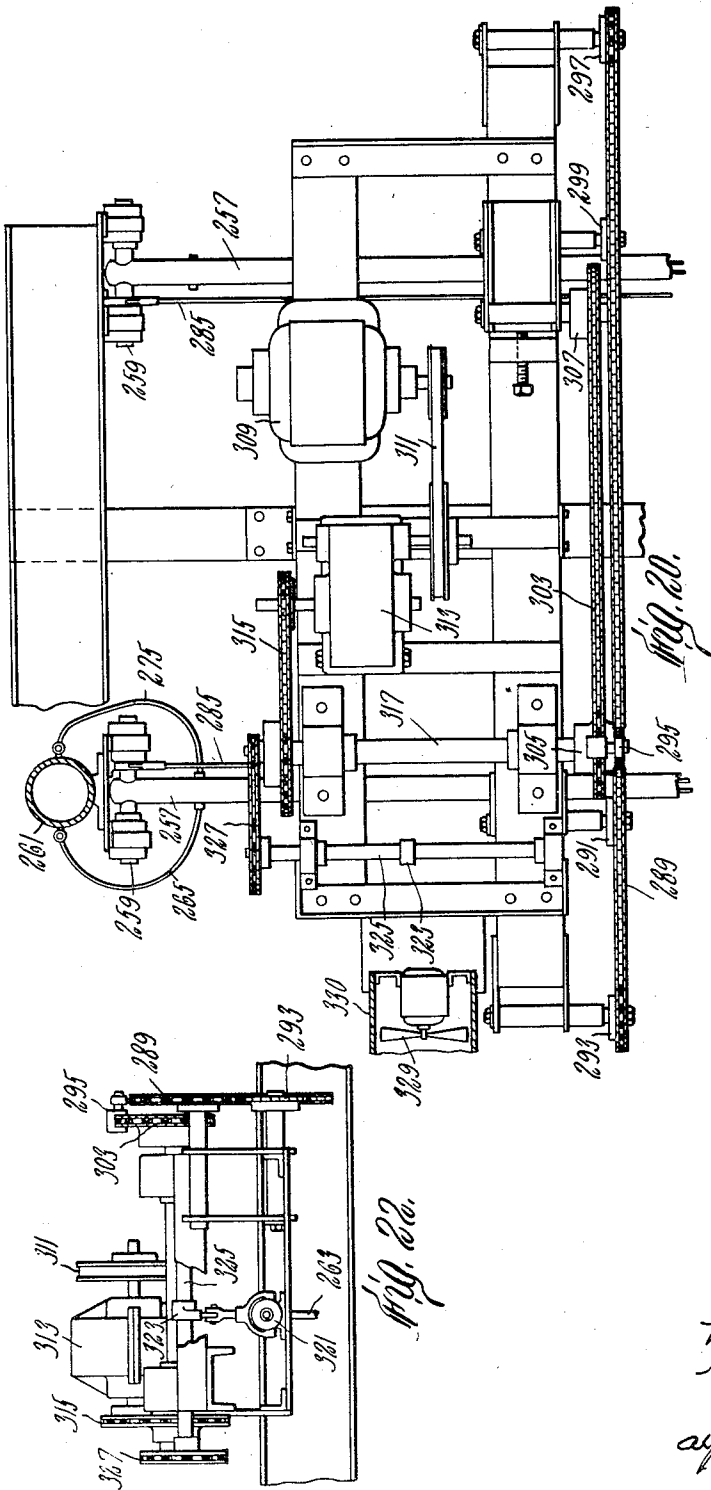
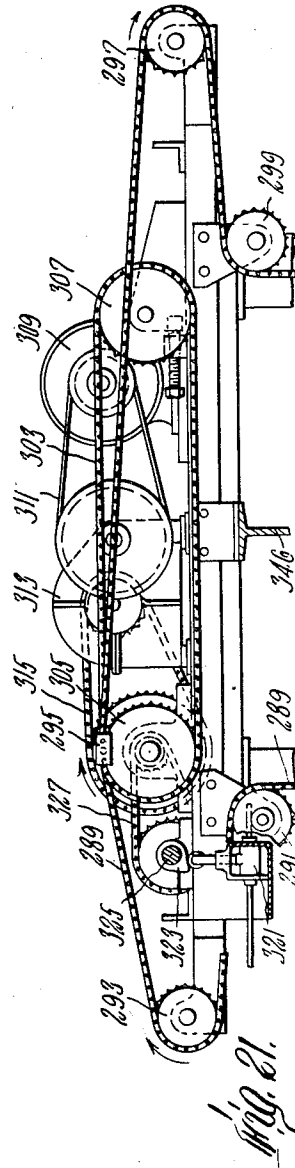
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2,488,907

Filed March 23, 1944

7 Sheets-Sheet 7



Inventors
Roger L. Griffin
Norman Y. Moore
by their attorney
Alfred H. Hildreth

UNITED STATES PATENT OFFICE

2,488,907

APPARATUS FOR PASTING SKINS

Roger L. Griffin, Marblehead, and Norman Y. Moore, Danvers, Mass., assignors to A. C. Lawrence Leather Company, Peabody, Mass., a corporation of Maine

Application March 23, 1944, Serial No. 527,706

7 Claims. (Cl. 69—1)

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The present invention relates to an apparatus for pasting skins, that is, for stretching and drying tanned skins and the like upon boards or plates.

It is the object of the present invention to provide such a system or apparatus which shall require a minimum amount of light manual labor, shall be expeditious and efficient in operation both with respect to quality as well as to quantity of product, and may be constructed and operated at relatively low cost.

To the above ends one feature of the present invention consists in the apparatus wherein the several operations on the plates and skins, preparatory to the drying operation, are all performed while the plates are being continuously advanced by power at a uniform and relatively high rate of speed.

Another feature of the invention consists in the automatic, consecutive, and rapid performance of certain operations on the plates, such as washing, drying and applying paste thereto, preparatory to the manual application of the skins, and while the plates are all being advanced at relatively high speed.

Still another feature of the invention is the feeding of a continuous series of contacting plates by means of a power drive unit arranged to act upon the rearmost plate of the series which in turn pushes along ahead of it all the other plates in the series.

In the accompanying drawings, which illustrate an apparatus or system operating in accordance with and embodying the constructions of the present invention,

Fig. 1 is a side elevation of the conveyor and of the feeding, washing, drying, paste spraying and skin applying units or stations, and Fig. 2 is a top plan view of the same together with the drier, with certain portions in section; Fig. 3 is an enlarged side elevation of the power feeding mechanism for advancing the plate through the washing, drying, paste spraying, and skin applying stations; Fig. 4 is a top plan view of such feed mechanism, and Fig. 5 is an end view looking from the right of Figs. 3 and 4; Fig. 6 is a side elevation, partly in section, of a modified form of power feed mechanism, and Fig. 7 is a top plan view of the same; Fig. 8 is a side elevation of the washing unit with the enclosing casing removed to show more clearly the construction and arrangement of the parts contained therein, and Fig. 9 is a top plan view of the same; Fig. 10 is a detail view in side elevation of the conveyor track and trolley and connections for supporting the

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plates, and Fig. 11 is a transverse vertical section of the same on line 11—11 of Fig. 10; Fig. 12 is an enlarged detail in horizontal section of portions of two adjacent plates and their contact and abutting members, taken on line 12—12 of Fig. 8; Fig. 13 is a side elevation of the drying or squeegee unit and its operating and controlling mechanism with the enclosing casing removed; and Fig. 14 is a front end elevation of the same taken on line 14—14 of Fig. 13, with the power cylinder for the squeegee devices omitted; Fig. 15 is a fragmentary horizontal section on line 15—15 of Fig. 13, showing the squeegee devices and their supporting arms and actuating shafts; Fig. 16 is a top plan view of the control and actuating mechanisms for the squeegee devices; and Fig. 17 is a longitudinal horizontal section on line 17—17 of Fig. 13 of a portion of such mechanism; Fig. 18 is a side elevation of the paste spraying unit with the casing removed, and Fig. 19 is an end view of the same, taken on line 19—19 of Fig. 18; Fig. 20 is a top plan view of the actuating mechanism and controls for the paste spraying devices; Fig. 21 is an end elevation of the same, and Fig. 22 is a side elevation looking from the right of Fig. 21.

The machine illustrated in the drawings comprises a closed orbit conveyor system with overhead track and trolleys upon which the skin-receiving plates are permanently suspended. These plates are first advanced by hand to a power feed mechanism which advances them successively through the washing unit or station, the drying or squeegee unit, the paste applying or spraying unit, and finally the skin applying station where pairs of operatives on opposite sides of the plates apply tanned skins to the pasted plates, each pair stretching or slickering only certain definite portions of the skins.

From the skin applying station the plates are advanced by hand to the drier, through which they are slowly passed under power, such advance being controlled by the operator at the discharge end of the drier who withdraws the plates, strips the dried skins therefrom, and returns them to the starting point, thus completing the cycle of operation.

Referring now to Figs. 1 and 2 of the drawings, which show more or less diagrammatically the complete system or apparatus, and assuming point 25 at the right hand end of the apparatus as the starting point of the cycle, the plates 27, supported from the trolleys 29 on the overhead conveyor track 31, are advanced by hand to the power feed unit or station 33. Here they are en-

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gaged and supported at their bottom edges by rolls driven by motor. Each board as it is advanced by the drive in turn engages the board just ahead of it and advances that board as well as all of the other boards through or past the washing unit 39, drying or squeegee unit 41, paste applying unit 43, and the long skin-applying or stretching unit 45, which, as shown in Fig. 1, is of sufficient length to accommodate five plates, each carrying a pair of skins on each side.

In the apparatus illustrated in the drawings, a crew of five pairs of operatives are provided for at this unit, the first pair applying the skin to the plate and stretching it across the neck and part way down the middle of the back, as shown on the left hand portion of plate 47, no skin yet having been applied to the right hand portion. The second pair of operatives stretch the skin in the right hand upper corner, plate 49 showing the skins before and after such operation; the third pair stretch the upper left hand corner of the skin, plate 51 similarly showing the skins before and after the operation; the fourth pair stretch the lower right hand part of the skin, as shown in similar manner on plate 53; and the fifth and last pair stretch the lower left hand portion, as shown in the same way on plate 55.

To facilitate this stretching operation on the lower half of the skins, the fourth and fifth pairs of operatives work from a pit 57 so that they can stand erect while performing these final operations.

As the plates with the pasted skins are discharged from the stretching unit 45, they are pushed by hand along the short connecting section 59 of the conveyor, over the switch 61 and into the drier 63 where they are supported upon two conveyor tracks 65 and 67 transversely of the same in close relation.

Once in the drier the plates are advanced in an intermittent or step-by-step movement by suitable power driven mechanism controlled by the operator, stationed at the discharge end 69 of the drier. After each actuation or step movement an operator withdraws the plate adjacent the exit from the drier, strips the skins from both sides, and then advances the plate by hand over the short connecting section 71 of the conveyor to the initial or starting point 25, thus completing the cycle of operation and movement of the plate.

The drier 63 is of well known and conventional construction, with suitable heating means within the same and circulating fans, humidifying devices, and air inlet and discharge openings. The plate advancing mechanism within the drier and controls thereof are also of well known and standard construction, and since their specific constructions are not material to the description and understanding of the present invention, they will not be here described.

Taking up now in detail the several units which form the different parts or elements of the apparatus or system as a whole, and beginning with the power drive 35 which advances the plates through the washing, drying, pasting and stretching stations, this drive is shown in enlarged detail in Figs. 3 and 4, and comprises three V-grooved feed rolls 73, 75 and 77, mounted on shafts 78, 79 and 80, respectively, supported in bearings 81 carried by the supporting plates 82 and 83. Feed roll 73 is loose upon shaft 78, but is arranged to be driven therefrom by a one-direction clutch comprising the ratchet wheel 74 fixed on the shaft and the co-operating pawl 76 pivotally mounted on the roll 73. Rolls 75 and 77 are fixed upon

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their respective shafts 79 and 80. These feed rolls engage the bottom edge of the plate, raising the later slightly so that practically the entire weight is applied on the rolls, thus giving sufficient friction to insure proper advance of the plate supported thereon and also of the series of plates ahead and passing through the washing, drying, pasting and stretching stations or units.

The feed roll 73 is driven by the motor 84 which is provided with a variable speed driving pulley 85 and adjusting hand wheel 86, of usual and well known construction. A belt 87 transmits motion to the speed-reduction unit 88, and the sprocket and chain connection 89 to the shaft 78 of the feed roll 73. The feed roll 75 is in turn driven by the chain and sprocket connection 91 from the shaft 78 of the feed roll 73, and the feed roll 77 is driven by a supplementary chain and sprocket connection 93 from the shaft 79 of the feed roll 75.

The purpose of the ratchet and pawl drive from shaft 78 to feed roll 73 is to permit a board to be advanced by hand while in engagement with only roll 73 of the feed unit to bring it into immediate contact with the next preceding board while that is still being advanced by the unit, thus avoiding gaps or spaces between adjacent boards as they pass through the unit and the later temporary stoppage of the train or series of boards until the rearwardly-spaced board then driven by the unit contacts the rear board of the stationary series.

In order to insure the positive driving of the plate as it is leaving the feed unit, the supporting plates 83 for the rolls 75 and 77, are carried by a frame 94 pivotally mounted on the shaft 95 carried by the stationary members or lugs 97. Thus there will always be at least two of the rolls operating to drive the line of plates, as shown in Fig. 3, and for a part of the time all three rolls, so that continuous and uniform advance will be insured.

The plates as they enter the feed drive unit are guided at their front edge by converging guides 99 supported upon the posts 101 in position to engage the vertical portion of the metal molding strips 103, which cover the front or advancing edge as well as all other edges of the plate, and guide the bottom edge of the plate with its horizontal molding strip into the groove of feed roll 73, as shown in Fig. 5. As the plate engages the roll, the front end of the plate is slightly raised so that its weight is transferred from the trolley to the feed roll, thus insuring sufficient pressure to give positive and uniform feeding movement to the plate.

On leaving the roll 73 the front edge of the plate passes between the vertical guides 105, see Fig. 4, which guide the bottom of the plate to the second feed roll 75, the parts just before engagement being in the position shown in Fig. 3, with the front portion of the plate at that time supported by the trolley, and the rear portion by the roll 73. At this moment it will be noted that both plates shown in Fig. 3 are being driven by the feed rolls, the leading or left-hand plate by roll 77, and the following or right-hand plate by roll 73. As soon as the leading edge of the following plate contacts the roll 75 and for a short time thereafter all three rolls will be driving, rolls 73 and 75 operating upon the following plate and roll 77 upon the leading plate, and then when the leading plate reaches roll 77, all three rolls operate upon the following plate alone. Finally this plate leaves the first roll 73 and for a time is

driven by both rolls 75 and 77, while a third plate is engaged and driven by roll 73. Thus uniform feed of the work is assured, since never less than two of the feed rolls and some of the time all three rolls are in operative engagement with one or more of the plates.

In order to insure proper engagement or abutment of adjacent plates so that the leading plate may be advanced by the following plate, the leading and following vertical edges of each plate are provided with a rubber abutment member 107, see Fig. 4 and in enlarged detail Fig. 12. These members are attached to the edge of the plate and the molding 103 by means of the clamping screws or bolts 109. The contact faces of these abutment members are of sufficient width to insure engagement between the adjacent plates, and being of rubber, are noiseless in operation.

An alternate form of feed mechanism is shown in Figs. 6 and 7 wherein the co-operating pairs of hollow circular tubes or tires 110 and 111 are carried by the hubs 112 and 113 (Fig. 6) mounted upon the pairs of vertical shafts 114 and 115 supported upon the ball thrust bearings 117 in the bearing posts 119. One pair 114 of these vertical shafts is driven from the motor 121 through variable speed pulley 122, belt 123, counter shaft 125 and vertical shafts 127, with bevelled gearing 129 at the lower ends and spur reduction gearing 131 at the upper ends. The hubs for tires 110 are loosely mounted upon their shafts 114, while tires 111 are fixed upon their shafts 115.

The shafts 114 carry the ratchet wheels 134, and the hubs for tires 110 carry the pawls 135 to permit the hand advance of a board past tires 110 as described in connection with a similar arrangement in the construction shown in Figs. 3, 4 and 5. The second pair 115 of shafts is driven through sprocket and chain connections 133 from the first mentioned pair 114.

The tubes or tires are inflated sufficiently to give the required driving pressure upon the opposite sides or faces of the plate, yet yield to permit the passage of the molding or binding 103 at the front and rear edges thereof. No guides are required with this modified construction, the tires themselves directing the plates to the position for engagement, and also maintaining them in proper vertical position in their passage through the feed unit.

The washing unit 39 shown in Figs. 8 and 9, comprises two pairs of vertically mounted brushes 135 mounted upon vertical shafts 138, and two pairs of vertically spaced nozzles 137 supplied with water through the feed pipes 139. The water is discharged continuously from the nozzles onto the plates in advance of and close to the brushes, which are continuously rotated so that the contacting portions of the brushes move over the plates in a direction opposite to the direction of the feed or movement of the plates.

The shafts 138 carrying the brushes 135 are driven from the motor 141, through the belt and pulley drive 143 to the shaft 145 and the bevelled gearing 147 to the first pair of brushes, the second pair being driven from the first by chain and sprocket connections 149.

The brushes and nozzles are enclosed within a casing or chamber indicated at 151, see Fig. 1, preferably of glass so that the operation of brushes and nozzles may be observed. The continuous flow of water and the contact with the rotating brushes remove all foreign material such as dirt, scraps of leather, and excess of paste

from the faces of the plates leaving them smooth and clean.

From the washing unit the plates pass to the drying or squeegee unit 41 where excess water is removed preparatory to the application of paste. This unit, shown in detail in Figs. 13, 14 and 15, and its actuating and controlling mechanisms in Figs. 16 and 17, comprises two series of vertically spaced, rubber bladed wipers or squeegees 153, one series on each side of the plate, which bear yieldingly against opposite faces of the plate and remove the surplus water therefrom as the plates travel through the unit.

The wiper blades or squeegees 153 are mounted in overlapping slightly oblique relation, as shown in Fig. 13, upon arms 155 fixed upon hubs 157 supported by collars 159 fixed upon the stationary hollow shafts 161. Tension springs 163 secured at one end to the arms 155 and at the other end to pins 165 projecting from fixed collars 159, tend normally to hold the wiper blades in contact with the surface of the plate, but permit the plates to be lifted therefrom at predetermined intervals to allow for the passage between the blades of the metal binding or molding 103 on the front and rear edges of the plates.

This movement is accomplished by means of oscillating vertical shafts 167 mounted within the fixed tubular shafts 161 and carrying beneath each hub 157 an actuating pin 169 which extends through the horizontal slot 171 in the tubular shaft and into the horizontal slot 173 in the wall of the hub, which latter slot is of substantially less linear length than the former slot 171. Thus, by oscillation of the inner shaft 167 in the direction of the arrow, Fig. 15, the pin 169 is caused to engage one end face of the slot 173, positively rotating the hub 157 in the direction to raise the wipers from the plates. When the inner shaft 167 is oscillated in the opposite direction, the movement of the pin 169 will permit the wipers, under the action of the springs 163, again to engage the plates after the passage between the wipers of the front and rear edges of the plates.

The shafts 167 are given their oscillatory movements by pneumatically actuated mechanism which comprises a power cylinder 175 mounted for slight swivelling movement upon the frame of the machine at 176 and having a piston rod 177. Fixed upon the ends of the shaft 167 are the overlapping arms 179 and 180 to the lower of which, 179, is connected the end of the piston rod by means of the ball and socket joint 181. Fixed adjacent the end of the same lower arm is the upstanding stud 182 upon which is rotatably supported the grooved roller 183, the latter fitting within the slot 184 in the end of the upper arm 180. Thus the two arms operate in unison in their limited oscillatory movements, being moved outwardly from the cylinder by the power strokes of the piston to permit the squeegees or wipers to come into engagement with the plate under the action of the springs 163. The arms are moved in the opposite direction, or inwardly toward the cylinder, to raise the squeegees from the plates against the tension of springs 163 by means of the tension spring 185 attached at one end to a clip 186 upon the stud 182 and at the other end to the frame of the machine.

The operation of the pneumatic cylinder 175 is controlled by the air valve 188 in the compressed air supply line 190 through actuation of the stem 192 of the valve to admit air to the cyl-

inder when the stem is moved outwardly as shown in Fig. 16, and to cut off such supply and vent the cylinder when the valve stem is moved inwardly.

The mechanism for actuating the valve stem comprises the lever 194 pivoted midway its ends at 196 with its upper end connected to the valve stem and its lower end carrying the cam roll 198. The tension spring 200 with one end connected to a fixed portion of the frame of the apparatus, the other end connected to the upper extremity of the lever 194, normally tends to open the valve, but is free to do so only when the lower portions 202 of the double faced cam 204 come into engagement with the cam roll 198, the higher faces 206 of the cam acting to close the valve and to hold it closed for a measured period of time when such faces engage the roll.

The cam is rotated in an anti-clockwise direction, viewed in Fig. 16, by means of the pawl lever 208 loosely mounted upon the shaft 210 and arranged to be oscillated periodically through tension spring connection 211 from the short lever 212. The pawl lever 208 carries a pawl 214 pivoted thereon and arranged to engage and drive the ratchet wheel 216 fixed upon the cam shaft when the pawl is oscillated in one direction, the ratchet wheel being held from backward rotation by the spring 218 when the pawl lever makes its idle or return stroke. This return stroke is effected by means of the rod 219 positioned within actuating spring 211, connected at one end to the pawl lever and at the other arranged to engage an abutment (not shown) on the short lever 212.

In order to limit the stroke or movement of the pawl lever 208 to slightly in excess of the extent required to advance the ratchet one tooth, a stop lever 220 has been provided, pivoted at 221 upon the depending ear 222 on the frame of the apparatus, such lever having a slot 223 midway its length to receive an extension (not shown) of the pivot pin of the pawl. The curved extremity 224 of the stop lever is positioned to engage the cam shaft 210 after the pawl has moved the ratchet one tooth by the short lever 212, further movement of such lever being permitted by the yielding of actuating spring 211.

The short lever 212 is fixed upon the shaft 225 supported in downwardly extending ears 226 from the frame of the apparatus, and carries, held fixed therein, the long arm 227. A similar shaft 228 is supported upon the ears 229 spaced to the right in Fig. 16, and on the second shaft is fixed a similar long arm or lever 230. Supported by the arms or levers 227 and 230 is the connecting bar 232 carrying the dogs 234 and 236, which normally, when said levers are vertical as shown in Fig. 17, stand in the path of contact block 238 on the depending stem of the trolley, see Figs. 10 and 11. As each trolley passes these dogs 234 and 236, it contacts first dog 234 and then dog 236, carrying the dogs and bar in the direction of the feed and turning the supporting levers 227 and 230 until they are brought to the position shown in dotted line in Fig. 17, when the dogs will have been moved sufficiently to one side to permit the trolley to pass without causing further movement thereof.

As soon as the trolleys pass by the dogs the bar 232 and its dogs and levers are all immediately returned to their initial or starting positions under the action of tension spring 239 (see Fig. 13) attached at one end to the pin 240 on the bar and at the other end to the fixed mem-

ber 242 on the frame of the apparatus. To avoid shock or jar when the bar reaches the limit of its return movement, a check or dash-pot device is provided, such as the door check 244.

The forward movement of the bar and the turning of the arms 227 and 212 actuate the pawl lever 208 through tension spring 211 to make its operative stroke and turn ratchet 216 the distance of one tooth and the cam 204 one-eighth of a revolution.

The dogs 234 and 236 are so positioned on bar 232 with respect to the spacing of the trolleys, and the peripheral lengths of the high faces 206 of the cam 204 are such that two actuations of the ratchet are required for the passage of such high faces beneath the cam roll 198, while six actuations are required for the passage of the low faces 202. The cam 204 is so set and the dogs 234 and 236 are so positioned that the wipers will be raised just before they are contacted by the rear edge of each plate and are lowered just after the passage of the front edge of the following plate, thus avoiding all possibility of damage to the wipers from contact with the projecting molding strips at the front and rear edges of the plates.

For the drying or squeegee unit the plates pass to the paste applying unit 43, shown in detail in Figs. 18 and 19, with actuating and controlling mechanism illustrated in larger scale in Figs. 20, 21 and 22. For clearness of illustration, the enclosing walls of the pasting unit are not shown in the detail drawings, but are indicated at 246 in Figs. 1 and 2.

The paste applying mechanism as shown in Figs. 18 and 19 comprises a pair of oscillating spray nozzles 255, spaced apart to permit the passage of the moving plates therebetween, and mounted upon the free ends of the oscillating arms 257 pivoted in brackets 259 fixed to the vertical posts 261. These nozzles may be of any standard type, such as the nozzle commercially known as the De Vilbiss nozzle, with compressed air and spray material supplied from suitable sources. The discharge of material, in the present instance, paste, is controlled by the atomizing air, the nozzle being provided with a suitable valve for cutting off the flow of paste when the atomizing air is cut off and re-establishing such flow when the atomizing air is again supplied to the nozzle.

In the present apparatus the atomizing air is supplied from a suitable source through the air pipe 263 and flexible connection 265 to the pivoted arm 257, rigid pipe connection 267 within the arm 257, indicated as a broken line in Fig. 19, and flexible connections from said pipe connection 267, one 269 to the paste-controlling valve within the nozzle and the other, 271, to the nozzle itself to atomize the paste.

The paste is supplied from some suitable source of supply, where it is held under low air pressure, through supply pipe 273, flexible connection 275 to pipe connection 276 within the arm 257, and final flexible connection 279 to the nozzle.

The nozzle 255 is provided with a discharge orifice of a shape to give a spray somewhat elliptical in cross-section, as indicated at 281, Fig. 18. The nozzle unit is pivotally supported at the end of the arm 257, and means are provided for oscillating the unit to maintain the major axis of discharge or spray substantially parallel to the line of the feed, thereby insuring a more even distribution of the paste over the surface of the plate. These means comprise a short arm 283 rigidly fixed upon the nozzle unit and connected

by the link 285 with arm 287 of bracket 259 upon the post 261. The pivot of the link in this bracket is offset from the pivot of arm 257 in bracket 259 in the same direction and to the same extent as the outer pivotal connection of the link 285 is to the pivot of the nozzle 283. As a result, as the arm 257 is raised and lowered in operation, the nozzle is oscillated in the direction and to the extent required to maintain the major axis of the discharge substantially parallel to line of feed.

The mechanism for raising and lowering the arm and with it the paste spraying nozzle, comprises the chain 289 attached at one end to the arm 257, passing thence upwardly and around idlers 291 and 293 to the block or link 295, thence around the idlers 297 and 299 downwardly to the other oscillating arm 257 where the other end is attached. Weights 301, inserted in the chain 289 immediately above the arms 257, take up any slack in this chain and help to overcome the inertia of the sprockets and chain when their direction of movement is being reversed to lower the arms.

In order to impart to the vertical end portions of the chain their alternate upward and downward movement to oscillate the arms and nozzles, the block or link 295 is connected to a continuously driven, horizontally arranged, endless chain 303, passing over the driving pulley 305 and idler 307 (see Figs. 20 and 21). A motor 309 through the belt and pulley connection 311 to speed reducing unit 313, and thence through chain and sprocket connection 315, drives the shaft 317 which carries the driving sprocket 305 for horizontal endless chain 303.

As the block 295 travels from left to right in its upper path, see Fig. 21, the top end of the left hand chain 289 is pulled to the right, while the top end of the right hand chain is paid out to the right, with the result that the left hand arm 257 is raised as viewed in Fig. 19, and the right hand arm is lowered. As the block or link 295 passes around sprocket 307 its movement is reversed, and it now travels to the left of Fig. 21 on the lower leg of the chain. The movement of the chain 289 is also reversed and the left hand arm 257 of Fig. 19 is now lowered and the right hand arm raised. As the link passes around the left hand or driving sprocket 305 all these motions are again reversed.

It will be noted that these reversals resulting from the passage of the connecting link around one or the other of the sprockets, are effected without shock or jar, the actuating chain and the arms being slowed down gradually, brought to a stop, and then started gradually in the opposite direction, thus avoiding objectionable noise, excessive wear on the parts, and waste of energy.

In order to insure an even distribution of paste over the effective surface of the plates, not only are the nozzles pivotally mounted in the free end of the supporting arms 257 and means provided for maintaining the major axis of the paste spray substantially in the line of feed as above described, but the actuating mechanism for raising and lowering the arms and nozzles is arranged to impart a slight over-throw at the end of each upward and downward stroke or movement. To avoid needless waste of paste at such times the supply of air and paste is automatically cut off from the nozzles just before the nozzle reaches a position opposite the top or bottom edge of the plate as the case may be, and is about to pass above or

below the same. Similarly, the supply of air and paste is again automatically re-established just as the nozzle at the beginning of its return stroke again reaches such point.

The supply of compressed air for actuating the nozzle which controls the discharge of paste, and which also supplies the atomizing air for spraying the same, is controlled by an air valve 321, the openings and closings of which are controlled by the cam 323 on the cam shaft 325, see Figs. 21 and 22, driven through chain and sprocket connection 327 from shaft 317 in timed relation with the sprockets 305 and 307 and link 295 so that the cam will hold the air valve 321 closed while the link 295 is passing around said sprockets, and permitting it to remain open at all other times, the cam making two revolutions for each complete cycle of the link 295.

In order to prevent the escape of paste spray from the spraying chamber into the room through the narrow openings 328 provided for the passage of the plates and trolleys, an exhausting propeller fan 329 is provided, mounted above the chamber proper and within the end of the exhaust pipe 330 leading to some outside point of discharge. The action of the fan in withdrawing air and spray from the chamber results in a flow of air into the chamber through the openings in the chamber wall, thus effectively preventing the escape of any of the paste spray.

From the paste applying unit the boards, with both faces coated with paste, pass to the skin applying unit where the wet skins are manually applied to and stretched upon both faces of the plates by pairs of workmen, the men of each pair being positioned on opposite sides of the plates, and each pair stretching only a certain specified portion.

If five pairs of workmen are employed as indicated with the apparatus in the drawings, the first pair at station 47, see Fig. 1, applies the wet skins to the pasted faces of the plates, and stretches them with their slickering tools or blades across the shoulders and part way down the middle of the back, as indicated in the shaded portions. During this operation the board is moving toward the left at steady and uniform speed imparted to it by the power feed mechanism shown in Figs. 3 and 4, through the intervening plates which are passing through the washing, drying and paste applying units.

While the workmen at the first station 47 are applying and stretching the skins on the freshly pasted plate, the men at station 49 are stretching the upper right hand corner of the skins on the next preceding plate, which is also advancing under power from the feed mechanism. Similarly, the workmen at station 51 are stretching the upper left hand corner of the skins of the next preceding plate; at station 53 the workmen, standing in the pit 57, stretch the lower right hand corner of the skins on still another plate, while those at station 55, also standing in the pit, stretch the skins at their lower left hand corner on the leading plate of the series, thereby completing the stretching of the entire surface of the skins on the pasted plates.

As the plates leave the final skin applying station, they are manually propelled by an operative along the trolley connection 59 through automatic switch 61 and into the drier 63, changing their advance from edge presentation to face presentation and passing through the drier while extending transversely across the same and spaced from one another to permit the free circulation

of the drying air between and over the adjacent faces.

The circulating fans, fresh air supply, and heating surfaces of the drier are all so arranged and timed with relation to the speed of advance by the power drive that the proper and desired drying of the leather will be effected by the time each plate reaches the exit of the drier where the dried skin is stripped off and the plate is returned to the feed unit to begin another cycle of operation.

The plates illustrated in the drawings are formed of sheet steel 331 bound around their edges with a T-shaped metal protective strip 103, see Fig. 11. Spaced from the ends of the plates on the top edges thereof are the supporting clips 333 which pass around and beneath the side lips of the protective strip and are provided in their upper portion with an aperture 335 through which passes the S-shaped supporting link 337. The upper hook of this link engages the opening or eye in the depending member 339 of the trolley, which is provided with four wheels 341 rolling upon the spaced L-shaped rails 343 welded to the inverted U-shaped member 345 carried by the I beams 346 of the structure.

While the plates are not removed from their trolleys at any point during their cycle of operation, nevertheless the links 337 permit easy disconnection in the event that, for one reason or another, it is desired to remove a plate for inspection or replacement. Furthermore, the double pivotal connection of the links 337 permits the slight vertical lifting of the plate when it engages the grooved rolls of the feed mechanism, the trolley at such times being relieved of practically all the weight of the plate, which is now borne by the feed rolls, insuring steady and regular advance of the entire line of plates through the skin applying stations and intervening units.

In order to insure the proper vertical positioning of the plates as they pass through the washing, drying, pasting and skin applying units, guide rolls 349 and 351 are provided to engage the protective strip at the top and bottom edges of the plates. The top rolls 349 are carried upon depending studs 353 from fixed supports 355, while the bottom rolls turn upon bearing members 357 on the inverted U-members 359. See Fig. 13.

In the operation of the pasting apparatus above described, the plates remain suspended at all times upon the trolleys which travel upon the overhead rails around the closed orbit of the conveyor. The first step in their cycle of operations is the advancing by the operator to the feeding unit of a plate from which a dried skin has just been removed. From this point until the plate is presented to another operator with pasted skins stretched upon both faces, the plate is being advanced by the feed unit, first by direct contact therewith and then by the movement of the following plates as they each in turn pass through such feed unit.

After the plate leaves the feed unit it is carried through the washing unit where it is thoroughly cleansed by the constantly flowing jets of water and the rotating brushes. Next it passes through the drying unit where wipers or squeegees remove the water remaining on the surfaces, the wipers being automatically lifted to permit the passage of rear and front edges of adjacent plates with their projecting molding or reinforcing strips.

The plate, still driven by the feed unit through the intervening plates, next passes the paste ap-

plying devices where both faces are given an even coating of paste by the vertically oscillating spray nozzles.

Thus far the operations have been entirely automatic and the plates have been made ready for the operatives for the application and stretching of the skins in regular and rapid sequence. The speed of movement of the prepared plates is so fast that each pair of operatives stationed on opposite sides of the moving plates have only sufficient time to operate upon a relatively small portion of the skins. In the apparatus illustrated in the drawings five pairs of operatives are employed, the first pair applying the skin to the plate and thereafter each pair stretching approximately one-fourth of the area of each skin, and the last two pairs standing in pits so that they may more conveniently reach the bottom portions of the skins.

As soon as the final stretching is completed, the plates are propelled by hand across the short connecting section of the conveyor to the funnel drier through which they are advanced at a relatively low rate of speed while held in closely spaced, transverse arrangement. This feed, which is of the intermittent or step-by-step type, is under the control of the operator at the discharge end of the drier who, with the help of an assistant when required, strips the dried skins from the plates and advances the latter to the feed unit to begin again their cycle of operations.

By the apparatus and its method of operation herein described, the maximum output and highest quality of product is attained with a minimum amount of manual labor, and that is of the lighter and least objectionable type and for only those parts when judgment and manual skill are especially required. Furthermore, since each workman operates alone upon the same definite portion of each skin, responsibility for defective workmanship is easily and quickly fixed, thus insuring the maintenance of the required quality of product.

In the apparatus herein shown and described provision has been made for five skin applying stations to accommodate five pairs of workmen. This number, however, may be varied as required to handle the skins as fast as they are presented by the power feed, the speed of which will be adjusted through its variable speed motor pulley to maintain the drier in continuous operation. Where, due to the character or size of the skins, less than the average time for drying is required, the power feed will be correspondingly speeded up and one or more additional pairs of workmen will be provided. Conversely, when the drying time has to be lengthened, the power feed will be slowed down and the operating force at the skin applying station correspondingly reduced. Thus the apparatus may be operated at all times at full capacity as determined by the size and effectiveness of the drier.

In the apparatus of the present invention, the paste is applied to the plates smoothly and evenly so that an excess of adhesive material is avoided. Furthermore, by applying the paste to the plate instead of to the skin, as in the prior practice by means of a hand swab or sponge, there is no substantial penetration of the paste into the fibres of the skin which would require subsequent washing to remove the same.

While in the accompanying drawings and specification there is shown and described what is now considered to be the preferred form of the present invention, it is to be understood that

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the invention is not necessarily limited to such specific construction but may be embodied in other forms and arrangements within the meaning and scope of the appended claims.

Having thus described the present invention, what is claimed is:

1. A pasting apparatus comprising a trolley conveyor, plates suspended from the conveyor, means for advancing the plates on the conveyor, means juxtaposed to the path of travel of the plates for applying paste thereto, and a series of skin applying stations for the operatives along the path of advance of the plates, one of said stations having a depressed floor to give the operatives easy access to the bottom portions of the plates and of the skins to facilitate operation thereon.

2. A pasting apparatus comprising a trolley conveyor, plates suspended from the conveyor, means for advancing the plates on the conveyor, means juxtaposed to the path of travel of the plates for applying paste thereto, and a series of skin applying stations along the path of advance of the plates to permit a series of operatives each to attach a different portion of the skin to the plates, the end station in the direction of movement of the work having a depressed floor to facilitate the attachment of the lower portions of the skins to the plates.

3. A pasting apparatus comprising a trolley conveyor, plates suspended from the conveyor, means for advancing the plates along said conveyor, means for washing the plates, means for drying the washed plates, means for applying paste to the dried plates, and guiding devices for the lower edges of the plates as they move past the feeding, washing, drying and paste applying means.

4. A pasting apparatus comprising a trolley conveyor, plates suspended from the conveyor, and means for advancing the plates, means for washing the plates, means for drying the washed plates and means for applying paste to the dried plates while they are suspended from the conveyor.

5. A pasting apparatus comprising a trolley conveyor, plates suspended from the conveyor, means for advancing the plates, and mechanism

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operating automatically and successively on the plates while suspended from the conveyor, said mechanism including means for washing the plates, means for drying the washed plates and means for applying paste to the dried plates.

6. A pasting apparatus comprising a trolley conveyor, plates suspended from the conveyor, means for advancing the plates in a contacting series, mechanism successively operating automatically and simultaneously upon opposite faces of the plates while suspended from the conveyor, said mechanism including means for washing the plates, means for drying the washed plates, and means for applying paste to the dried plates.

7. A pasting apparatus comprising a conveyor, means for continuously advancing the plates on the conveyor at a substantially uniform speed, and mechanism for washing the plates, means for drying the washer plates, and means for applying paste thereto while they are continuously advancing on the conveyor.

ROGER L. GRIFFIN.
NORMAN Y. MOORE.

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