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MACHINE FOR STRETCHING AND DRYING SKINS

Filed Dec. 8, 1928

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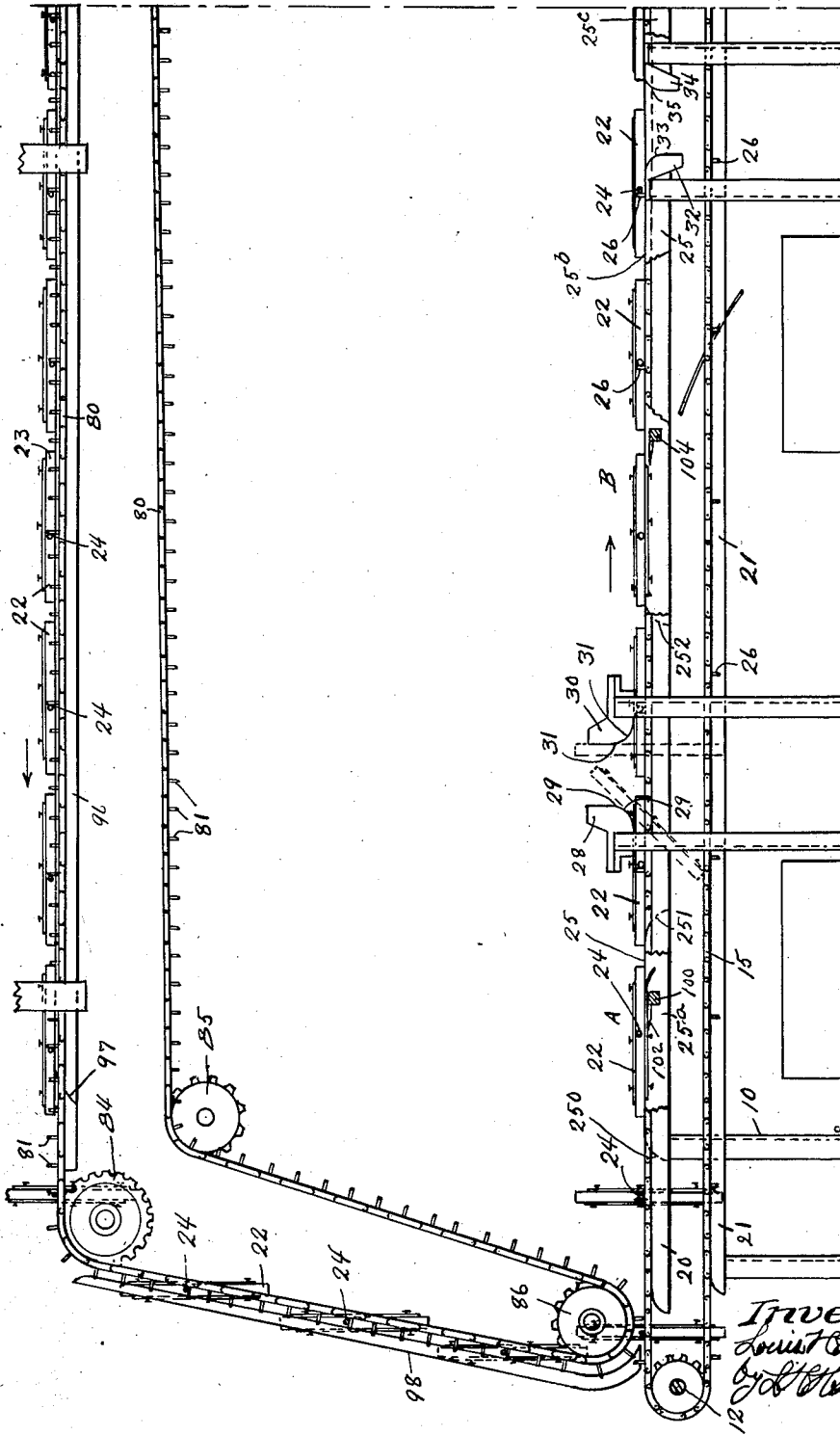


Fig. 1.

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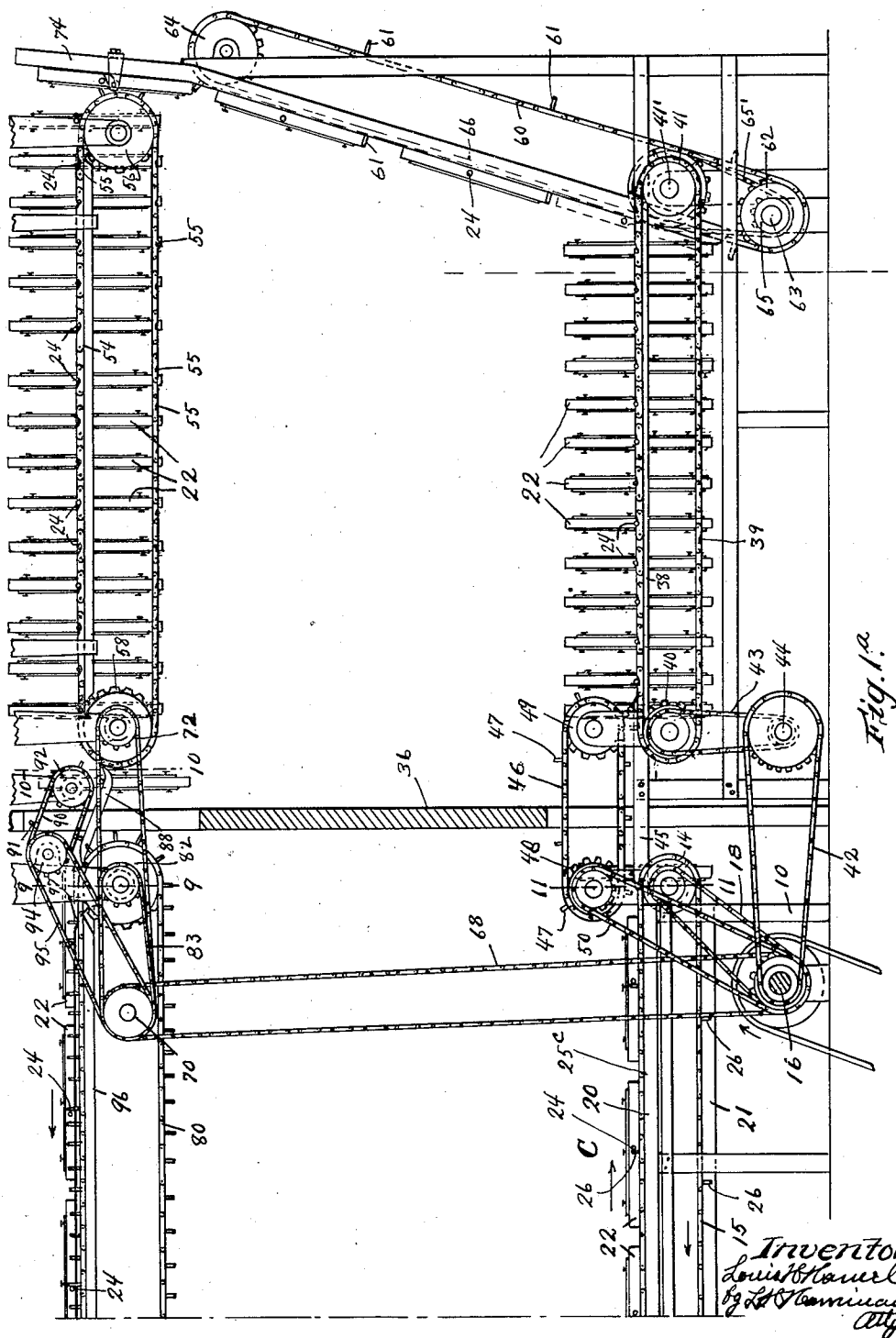
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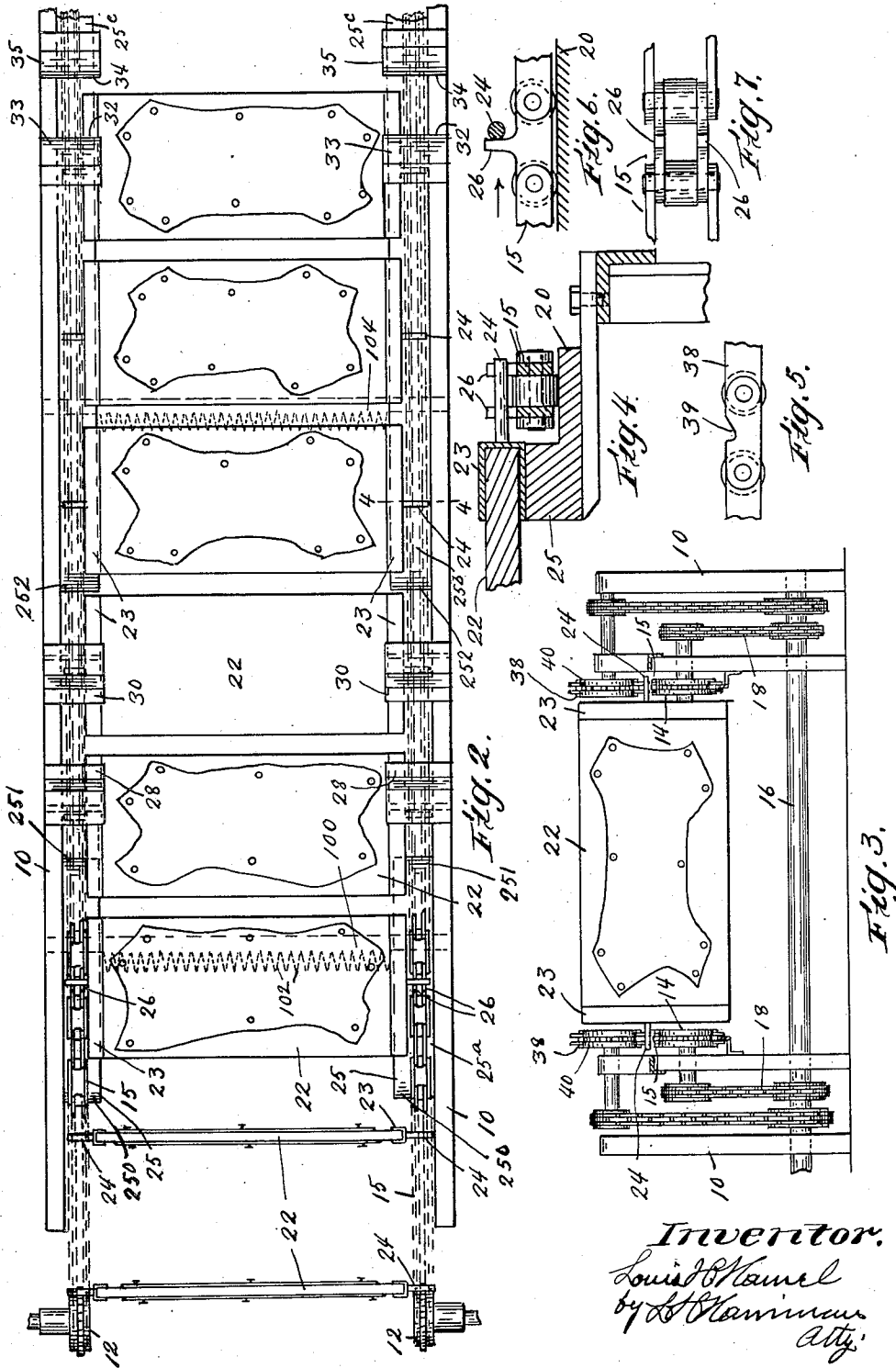
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5 Sheets-Sheet 3



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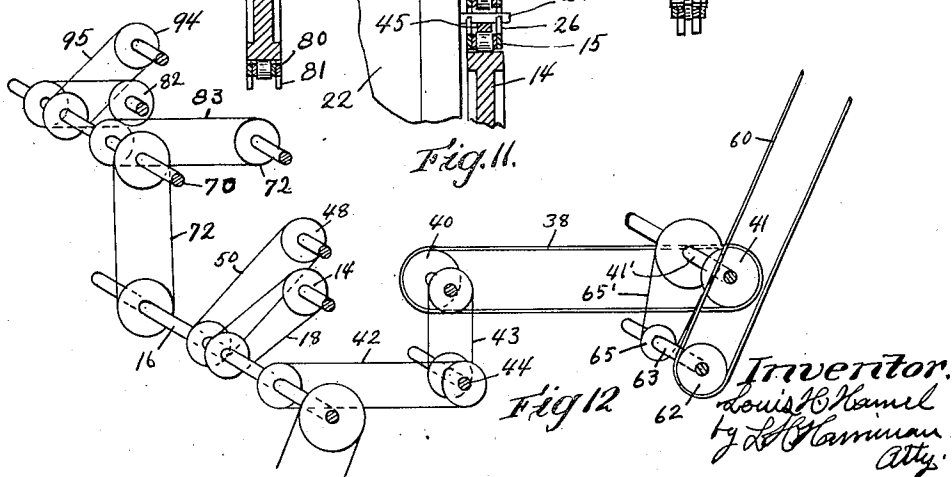
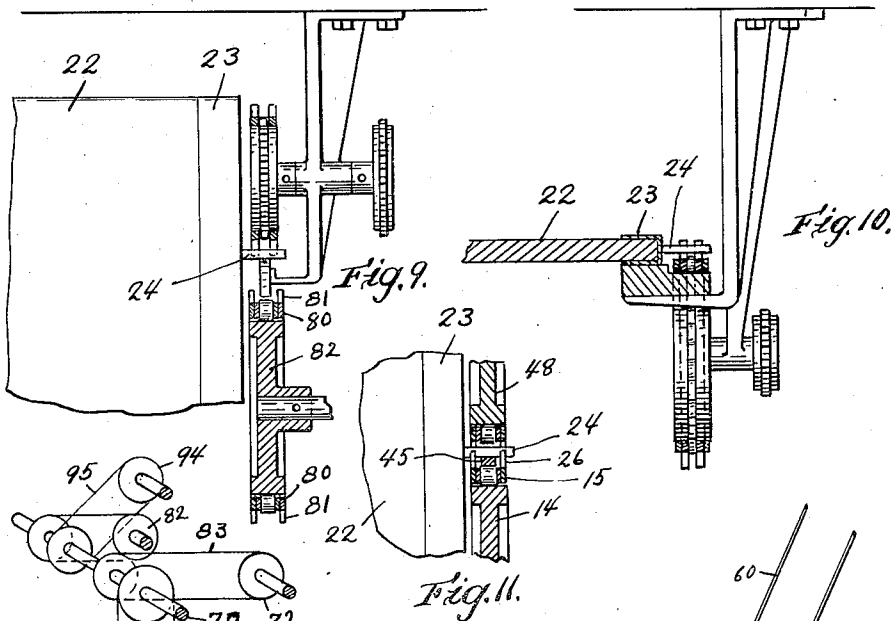
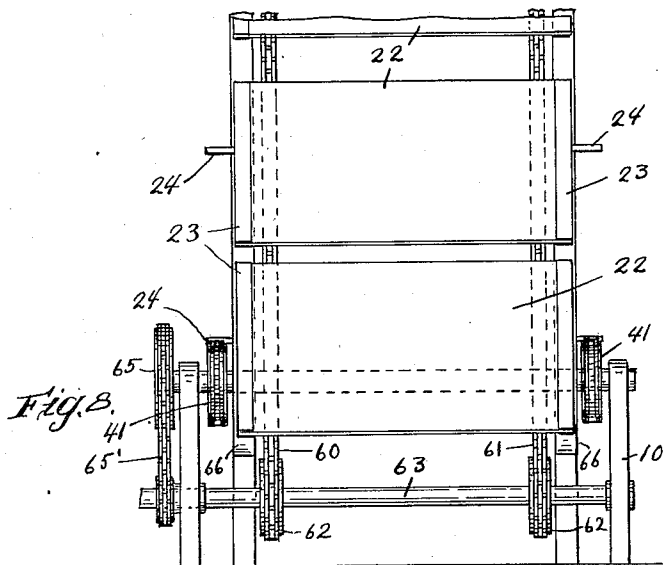
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MACHINE FOR STRETCHING AND DRYING SKINS

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5 Sheets-Sheet 4



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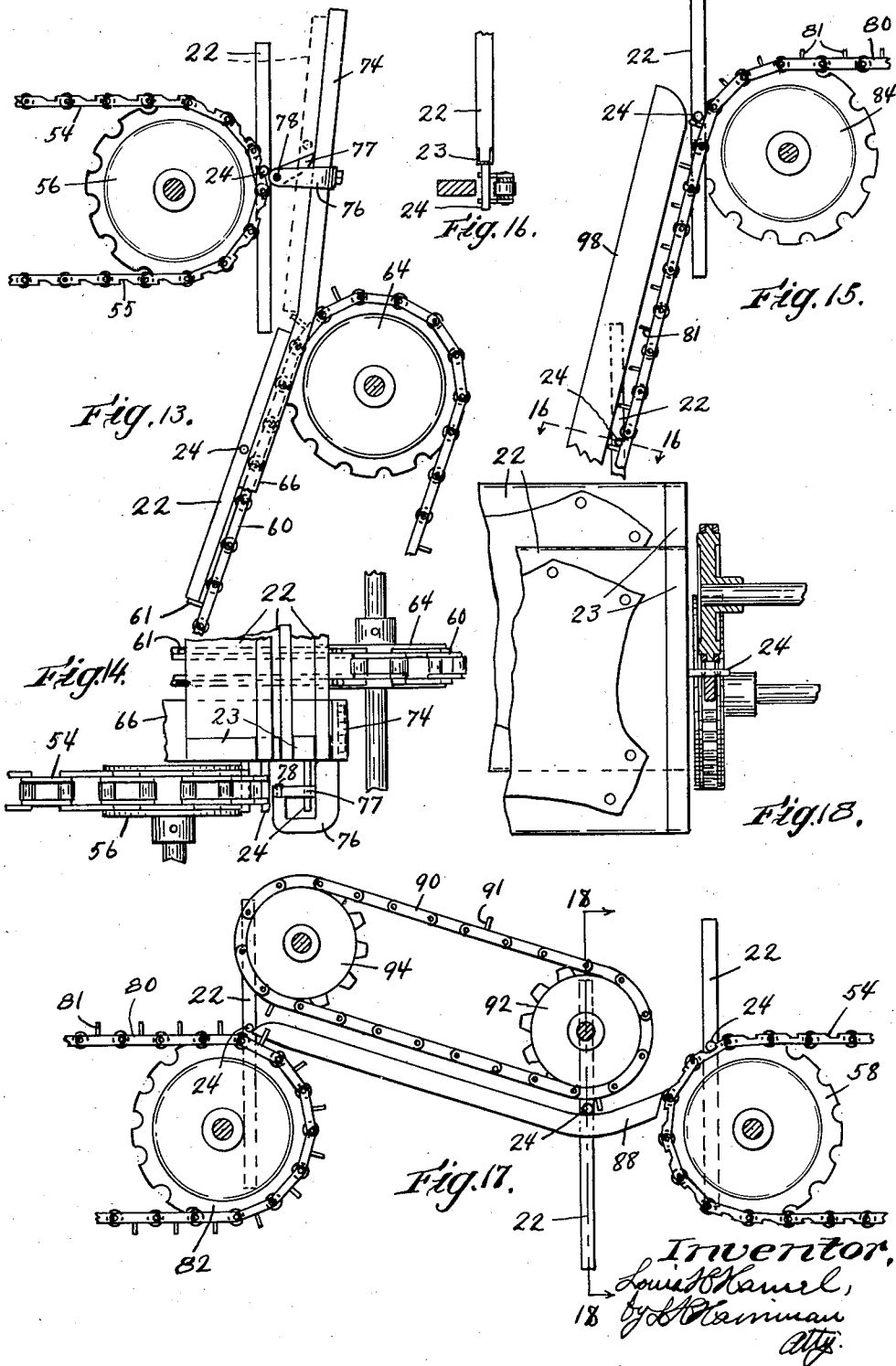
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MACHINE FOR STRETCHING AND DRYING SKINS

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5 Sheets-Sheet 5



UNITED STATES PATENT OFFICE

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MACHINE FOR STRETCHING AND DRYING SKINS

Application filed December 8, 1928. Serial No. 324,613.

This invention relates to apparatus employed in the manufacture of leather and more particularly to apparatus employed in connection with the stretching and drying operations which are performed on skins in this connection.

While various methods of stretching and drying skins, after they have been "put out", are employed, the method, at this stage of the operation, of stretching the skins on flat boards and securing them thereto by tacks is generally employed, the usual practice being to secure a skin to each side of a flat board, and then place the board in a drying room where it remains until the skins are dry.

The boards employed for this purpose must be of sufficient area to receive the skins of the largest size operated on in the factory, and therefore are of considerable weight and consequently are difficult to handle, so that the labor cost of placing the boards in, and removing them from the drying room, removing the tacks and otherwise handling the boards during the tacking on operation, is an item of considerable importance.

The primary object of my invention is to provide an apparatus for automatically handling the boards on which the skins are stretched and dried, so that all manual handling of the boards in connection with the operations of tacking on, drying and removing the tacks will be eliminated, and the operation of tacking on will be slightly facilitated.

Further objects of the invention are to provide specific forms of apparatus for handling the boards during the several operations above referred to, which will be simple, effective and durable and is capable of installation in a factory room of ordinary height.

I accomplish these objects by providing means for automatically handling the skin-holding boards by a series of endless conveyers, one of which, at the beginning of the operation, holds each board in a horizontal position and simultaneously moves it slowly along, so that the workmen may place a skin on its top side and stretch and secure it with tacks, while it is passing a certain position, after which it automatically turns the board

over, so that a second skin may be secured on its opposite side in like manner, then conveying the boards, with a skin on each side thereof, successively to a drying chamber through which they are slowly carried, and then delivered to a conveyer, which returns them to the starting point, during the latter part of which operation the tacks which hold the skins on the board are automatically removed, so that the skins will be delivered, stretched and dried while the boards will again be successively moved into the initial position.

For a more complete disclosure of the invention reference is made to the following specification, in connection with the accompanying drawings in which:

Figs. 1 and 1a, taken together, show, in side elevation, a complete embodiment of the invention.

Fig. 2 is a plan view of a portion of the primary conveyer.

Fig. 3 is an end elevation of the delivery end of the primary conveyer.

Fig. 4 is a detail, sectional view, on an enlarged scale, at line 4—4 of Fig. 2.

Fig. 5 is a detail, side view of one of the drier chain links.

Figs. 6 and 7 are detail side and plan views of one of the primary conveyer links.

Fig. 8 is an elevation of the lower portion of the drier chamber elevating conveyer.

Fig. 9 is a detail sectional view, at line 9—9 of Fig. 1a.

Fig. 10 is a similar view at line 10—10 of Fig. 1a.

Fig. 11 is a similar view at line 11—11 of Fig. 1a.

Fig. 12 is a diagram, in perspective, of the power transmitting means for the several conveyers.

Fig. 13 is a detail view in side elevation of the adjacent ends of the elevating and return conveyers.

Fig. 14 is a plan view thereof.

Fig. 15 is a detail view in side elevation of a portion of the return conveyer.

Fig. 16 is a detail sectional view, at line 16—16 of Fig. 15.

Fig. 17 is a detail side elevation of the

transferring means employed between the upper drier conveyer and the return conveyer.

Fig. 18 is a sectional view at line 18—18 of Fig. 17.

In the drawings, the machine as a whole is shown in side elevation by Figs. 1 and 1a taken together, and comprises a pair of parallel frames 10 which are mounted on the floor of the room in which the machine is located and separated by a distance corresponding to the length of the skin-supporting boards which are used in connection therewith. A sprocket 12 is journaled on the inner side of each frame at one end thereof and a similar sprocket 14 is journaled in line with each sprocket 12 at the opposite end of the frame. The corresponding sprockets each have an endless chain 15 passing about the same. The sprockets 14 are shown as driven from a main driving shaft 16 by a chain 18, so that said chains are driven uniformly. The chains are of common type, comprising the usual links and rollers, and horizontal tracks 20, 21 are provided for both upper and lower portions of each chain between their sprockets, on the inner sides of the frame, so that they will be sustained in a horizontal position, and prevented from sagging, the rollers thereof being arranged to roll on the tracks, so as to avoid friction from dragging. A series of wood plates 22, commonly called boards, are provided which are similar to those ordinarily employed for stretching and drying skins, said boards being flat, and rectangular in form and slightly longer than wide. Metal binding and protecting strips 23 are secured to each side of each board close to each end, and a trunnion 24 is mounted on each end edge, said trunnions being arranged in axial alignment and the axial line of the trunnions being parallel to the side edges of the board and at one side of its center of gravity, or longitudinal middle line, so that when the board is supported on its trunnions, and is free to turn thereon, it will swing by its gravity into a vertical position. A track 25, having a horizontal supporting face, is secured on the inner sides of the frame, close to and at the inner side of the chain tracks 20, the tracks 25 being arranged to support the boards thereon in a horizontal position with their metal binding strips 23 in direct contact therewith, as shown in Fig. 4. Directly opposite links of the chains 15 are provided, at suitable intervals, with fingers 26, which project perpendicularly outward therefrom, in position to engage the trunnions 24 of the boards when the latter are supported in position between the chains, the arrangement being such that, when a board is supported with its side edge strips 23 resting on the tracks 25, its trunnions 24 will project over the chains 15 and will be simultaneously engaged by a pair of

fingers 26 on each chain, so that, as the chains are driven in the direction of the arrows in Figs. 1, 1a the boards will be drawn along or tracks 25, and will be held with their end edges parallel with the tracks.

The spacing of the fingers 26 on the successive links is also such that when a series of boards are successively delivered thereto, and are supported horizontally on the tracks 25, their adjacent edges will be in proximity and their trunnions will be engaged by the fingers, so that the boards will be moved along the tracks in as close proximity as practicable, as indicated in Fig. 1.

In connection with the above described construction, means are provided for successively inverting the boards as they are drawn along the tracks, so that one side and then the other will be uppermost. In the cycle of operations hereinafter described the boards will be delivered to the tracks 25, or pass thereon at the receiving end of the chains 15, in a position in which the portion of each board which is of lighter weight will be at the side of the axial line of the trunnion which is in advance, as indicated at position A in Fig. 1. In providing means for inserting each board when it is moved forward from this position, the track 25 is divided into sections, the first of which is indicated as section 25a, on which the board is supported when in position A, said track sections 25a having downwardly inclined faces 250 and 251 at its ends. A second track section 25b, having a downwardly inclined end face 252, is located at a suitable distance from the section 25a and in line therewith and oppositely disposed abutments 28 and 30 are mounted on the frame, at each side, midway between the adjacent ends of the track sections 25a, 25b, said abutments being located in the vertical plane of the tracks and having curved faces 29 and 31 at their adjacent edges, which are located above the level of the axis of the trunnions of each board when engaged by the chains.

With this arrangement when a board is moved along the track sections 25a until its front edge and lighter weight portion is moved beneath the abutment 28, its heavier portion will, at the same time, reach the inclined faces 251 at the ends of track sections 25a and will swing downward thereon, about its trunnions as a center, causing the front portion of the board to swing against faces 29 of abutments 28, so that, by the time the board is moved away from said face it will have gradually swung into a vertical position, as indicated in the dotted line positions in Fig. 1, at which time it will be entirely supported by the chains. On further forward movement, the opposite side of the upper portion of the board will be moved into contact with the faces 31 of abutments 30, and as these spaces engage the board above

its trunnions, its swinging movement will be continued as it is advanced by the chains, forward movement of its then upper portion being thus arrested, so that its lower or heavier portion will be swung upward, until its lower edge has been swung up above the lower end of the inclined face 252 of the track section 25b, and then, on further movement, the edge of the board will be first engaged with the inclined face 252 and, then it will be slid onto the track section 25b and into position B thereon, in which position it will be inverted with relation to position A, and, as it is slid along the tracks, its heavier portion will be foremost. A third track section 25c is provided, which is separated from the section 25b and fixed abutments 32, 34, having faces 33, 35, are provided at the adjacent ends of track sections 25b and 25c, respectively beneath the level of the top surfaces thereof, so that, as the board is slid along on section 25b, its heavier portion will swing down into the space between the faces 33, 35, being held from too rapid movement by faces 33, which extend downward from the top surface of section 25b, until it swings on its trunnions into a vertical position, then, on further movement, the side which was previously uppermost will be moved into contact with face 35 below the level of the trunnions, so that the swinging movement will be continued as the forward movement progresses until the board has been drawn up onto the track section 25c into position C Fig. 1a.

In the operation of the machine, position B of Fig. 1 may be considered as the initial position in which the endless chain of operations is started, in which position a board is solidly supported on the track sections 25b, which form a table therefor, ready for the reception of a skin. The speed of movement of the chains 15 corresponds to the time required for the tacking on operation. An operator stands at each side of the frame, one near the point where the board moves into the horizontal position B and the other near the middle of track section 25b. A skin will be placed on the board and the first operator will then spread it out and tack about one half of its edge portions to the board, stretching the skin so as to remove wrinkles in the usual manner, as the board moves in front of him. Then the second operator will finish the operation of stretching and tacking on the skin in like manner. The board will then be inverted, as before described, and then two other operators will stretch and tack a skin onto the other side of the board, while supported on track section 25a, in like manner. The tacks employed for this purpose have large heads and long shanks, so that only a short portion of the shank of each tack is driven into the board and its head will be at a sufficient distance from the skin to permit

ready removal thereof, as hereinafter described.

A drying room, indicated at the right of a partition 36 in Fig. 1a, is located adjacent the sprockets 14 at the delivery end of the conveyor formed by chains 15, and a pair of conveyer chains 38, are mounted on sprockets 40, 41 therein and driven from the main shaft 16 by intermediate chains 42, 43, and sprockets on a shaft 44 at a speed which is much lower than the speed of chains 15. The chains 38, are driven in direct alignment with chains 15 and are similar in construction thereto, except that, instead of fingers 26, each pair of links is provided with a recess 39 in the middle thereof to receive the trunnions 24, as shown in Fig. 5.

Means are provided for transferring the boards, to each side of which the skins have been attached, from the chains 15 to the chains 38, which preferably comprise a pair of narrow horizontal tracks 45, which are supported in position to extend at one end between the links of chains 15, as they pass about sprockets 14, as shown in Fig. 11, said tracks 45 being beveled on their under sides so that they may be extended close to the path of the rolls of chains 15, and their upper surfaces being slightly beveled to points below the level of the top sides of the link, as shown in Fig. 1a, so that, as the fingers 26, which are engaged with the trunnions of a board, are moved from a vertical position, as they are carried down about the sprockets 14, they will push the trunnions onto the tracks 45. The track sections 25c are terminated at such a distance from the sprockets 14, that each board will swing into a vertical position and be temporarily supported on the chains 15 by its trunnions when, or before the trunnions are pushed onto tracks 45. A pair of transferring chains 46 are arranged to be driven over sprockets 48, 49 which are arranged directly above the sprockets 14 and 40 and in the vertical plane in which the chains 15 and 38 are driven, said chains 46 being provided with projecting fingers 47 similar to fingers 26, which are arranged at suitable intervals. The chains 46 are driven from the main shaft 16, at the speed of chains 15, by a chain 50, and move in such a path that, when the trunnions of a board have been pushed onto the transfer tracks 45, they will be engaged by the fingers 47 of chains 46, and moved along on said tracks 45 until they are directly over the sprockets 40, at which point the tracks 45 are terminated, so that they will be moved onto the chains 38 of the drying chamber. The relative speeds of the chains 15 and 38 is such that a board will be delivered to each pair of notched links of chain 38 and the boards will be supported side by side in a vertical position on the chain in as close proximity as practical, as indicated in Fig. 1a, the rates of the speed of chain 15 to that

of chain 38 being made to correspond inversely to the number of boards on the chains, respectively, for a certain length. That is, the speed of the chain 38 is greatly reduced as compared with the speed of chain 15 and the number of boards for a certain length of chain 38 will be correspondingly increased.

A return conveyer for the drying room, comprising a pair of chains 54 which pass about sprockets 56, 58, is provided directly over the conveyer chains 38, the construction being substantially the same as that of the latter and the links thereof having trunnion receiving recesses 55. Means are provided for elevating the boards successively from the chains 38 to the chains 54, comprising a pair of chains 60, which pass about sprockets 62, 64, the sprockets 62 being mounted on a shaft 63, which is located beneath the shaft 41' of sprockets 41 and is driven from the shaft 41' by a sprocket and chain 65, 65', the arrangement being such that chains 60 travel a distance slightly greater than the width of the boards 22 while the chains 38 are moving a distance equal to the distance between adjacent boards thereon. The chains 60 are provided with fingers 61, which are spaced apart a distance slightly greater than the width of the boards and are adapted to engage the edge portions of the boards, said chains 60 being located between the chains 38 and being driven, as they travel between their sprockets, upwardly at a slight inclination from the vertical, so that the angle with relation to the chains 38 is slightly obtuse. The lower sprocket 62 is so arranged that, when a board on the chain 38 has nearly reached the sprocket 42, the lower edge of the board will be carried against the elevator chains 60, and, as the chain 38 is advanced, the board will be swung towards a position in which the board would lie flat against the chains 60, as indicated in Fig. 1a. Before this position is reached, the lower edge of the board will be engaged by a pair of fingers 61 on the chains 60, which will carry the board upward, the fingers 61 of each chain being arranged in directly opposite relation, so that two fingers thereof will engage the edge of the board simultaneously. A pair of guide tracks 66 are also preferably provided adjacent, and in the plane of the chains 60, as shown in Figs. 7 and 8, so that the boards will rest against them when lifted. The chains 60 are driven at a considerably higher speed than that at which chain 38 is driven, so that the board will be lifted at such a speed that its lower edge will be above, or clear of the next board on the chain 38 by the time the latter board is lifted forward towards the chains 60. The upper sprockets 64, about which the elevator chains 60 pass, is located beneath, to one side of, and in proximity to the drier chain sprocket 56, and means are provided for

transferring the boards from the chains 60 to the chains 54, which latter are driven at the same slow speed as chains 38 by a chain 68, from the main shaft 16, thru a counter shaft 70 and a chain 72, which engages the shaft of sprockets 58. To accomplish this transfer, deflecting tracks 74 are extended from the upper ends of the guide tracks 66 at the outer sides thereof, and in position to engage the trunnions of the boards while supported on chains 60, said tracks 74 being extended vertically, so that, as a board is pushed upward, its trunnions will engage said tracks 74 and be slightly tilted towards the sprocket 56. An arm 76 is extended from each track 74 towards the adjacent sprocket 56 and a gravity dog 77 is pivoted on each arm at 78 and extended towards the track 74 in a position midway between the links of the chain 54, so that its end rests against the track 74, in which position its top side inclines downward to the sprocket 56, so that, as the board is pushed upward by chains 60, its trunnions will strike the under sides of dogs 77 and lift them until the trunnions pass their ends, so that the dogs drop back into normal position, at which time the fingers 61 on chains 60 will be moving about the top sprocket 64 and will be withdrawn from beneath the edge of the board, so that the latter will fall back slightly and its trunnions will be caught by the dogs and will slide down the top sides thereof, onto the chains 54 and will be supported thereby until the latter move so that the trunnions will pass into the notches 55 of opposite links thereof and will be carried on with the board suspended vertically by its trunnions, as indicated in Fig. 1a. The boards thus delivered will be slowly carried to the entrance side of the drying room.

A return conveyer is provided which comprises a pair of chains 80, which pass about driving sprockets 82, driven by chain 83 from the counter shaft 70 at the same speed as that at which the chains 15 are driven, said chains 80 having projecting fingers 81 as each link and being carried over guide sprockets 84, 85 and downward into proximity to the chains 15 and about sprockets 86. Means for transferring the boards from chains 54 to chains 80 are provided which comprise tracks 88, which terminate at one end between the links of the chains 54, as closely to the path of the rollers of the latter as practical, and at a point slightly above the level of the axis of sprockets 58, so that, as a board, with its trunnions held in the recesses of the links of chain 54, is carried downward about sprockets 58, it will slide by gravity from the recesses onto the tracks 88, the top sides of which are inclined downward from the ends adjacent the sprockets 58, so that the boards will slide downward thereon for a short distance, and come to

rest, as indicated in Fig. 17. The tracks 88 are extended upward at a slight inclination to a point directly over the sprockets 82 and between the links of chain 80, the adjacent end portions of said tracks 88 being inclined downward thereto. For the purpose of transferring the boards from the position to which they are delivered by chains 54 to chains 80, transferring chains 90, having projecting fingers 91, are arranged to be driven about sprockets 92, 94 in a path which will carry said fingers 91 into engagement with the trunnions of a board after it has been delivered to tracks 88 and will move them upward on said tracks until they are delivered to the chains 80, which will continue the return movement of the boards.

For the purpose of providing head room over the chains 15, and for other reasons, it is desirable to transport the boards horizontally as they are returned by chains 80. For this purpose tracks 96 are provided in positions corresponding to those of tracks 25, and are provided with inclined end faces 97 which are arranged to be engaged by the sides of the boards below their trunnions causing them to be swung into a horizontal position as they are drawn onto the tracks 96. Said tracks 96 are terminated adjacent the guide sprockets 84, so that when the trunnions of each board reach a point over said guide sprockets, the board will be drawn from the tracks 96 and will swing to a vertical position. The sprockets 86 are so arranged with relation to sprockets 84 that the chains 80 travel downward at a slight inclination from the vertical and as the trunnions of a board are carried past a vertical line from the axis of the sprockets 84, they will slide down to the next fingers 81 on the chain 80. To prevent disengagement of the trunnions from the chains 80, guard rails 98 are provided close to the chains, so that the ends of the fingers 81 pass in close proximity thereto, as shown in Figs. 15 and 16, said rails being extended downward about the sprockets 86, into proximity with the chains 15, so that, after the trunnions of a board pass the horizontal line through the center of said sprocket 86, they will slide against the guard rails 98, but will be held from falling by the fingers 81, with which they are engaged until they reach the ends of said rails and pass onto the chains 15, so that the board will then be suspended on the latter, as indicated in Fig. 1. Each board is then carried along while supported vertically by chains 15 until the sides thereof are engaged below its trunnions by the inclined end faces 250 of the track sections 25a and then the board will be swung to a horizontal position and returned to position A of Fig. 1.

The skins on the boards when they reach this point will have become sufficiently dry to permit removal therefrom and means are

provided for automatically pulling out the tacks by which they were secured, as the boards are carried along by the chains 15. While various means may be employed for this purpose, a preferable means, which is illustrated in Figs. 1 and 2, is employed which consists of a form of stationary rake 100, which is provided with a series of blunt pointed teeth 102 and is mounted beneath the path of the boards when drawn along on the track sections 25a, so that the teeth extend horizontally in a plane slightly beneath the plane of the under side of the board when supported on said track sections and point in the opposite direction to that in which the boards are drawn while supported thereon. With this construction, as a board, while in position A passes over the rake, its teeth will pass between the skin on the under side of the board and the heads of the tacks which secure the skin thereto and the shanks of the tacks will pass between the teeth, so that the tacks will be drawn from the board and will fall into a receptacle beneath the rake while the skin will pass over the rake and fall into a receptacle provided therefor.

A second rake 104, similar in all respects to rake 100, is mounted in like manner beneath the level of track sections 25b and as the board will be inverted on passing from track section 25a to sections 25b, as already described, the tacks in the opposite side of the board will be withdrawn and the skin removed, which was on the opposite side of the board, in like manner.

When the board is inverted, in passing from position A, it will be carried into position B, so that the side thereof from which the skin has been removed by rake 100 will be uppermost, and, as the board is moved horizontally along in position B, hereinbefore termed the "initial" position, a fresh skin will be tacked on the then top side of the board, while, at the same time, the tacks will be removed from its under side by the rake 104. Then the board will again be inverted, so that the side from which the skin was last removed will be uppermost, and the board will be moved into position C, and, while it is being carried along in this position, a second skin will then be tacked on this side also, as previously described.

The operation of stretching and tacking the skins onto the boards, then drying them while thus held, and then removing them from the boards and attaching fresh skins thereto, may thus be performed continuously without stopping the movement of any of the chains, and, by providing a dry room of suitable capacity, the speed at which the operation may be performed will depend principally on the rapidity with which the skins may be tacked on.

I claim:

1. In a machine for stretching and drying

skins, a series of boards on the opposite sides of which the skins may be stretched and secured, means for supporting said boards horizontally and for simultaneously conducting them successively between predetermined points, and means for automatically inverting each board at an intermediate position in its travel between said points.

2. In a machine for stretching and drying skins, a series of flat boards on the opposite sides of which the skins may be stretched and secured, a table having a horizontally disposed surface for supporting said boards, a conveyer arranged to conduct said boards successively between predetermined points while supported on said table and means for automatically inverting each board as it is moved past a position between said points, so that one side will be uppermost during one portion of its travel and the opposite side will be uppermost during the other portion of its travel.

3. In a machine for stretching and drying skins on separate boards, a table having a horizontally disposed surface for supporting the boards in position for the skins to be stretched and secured thereon, a continuously operated endless conveyer for conducting the boards successively for a predetermined distance while supported on said table and means for automatically inverting each board at an intermediate point of its travel as it is moved by the conveyer.

4. In a machine for stretching and drying skins, a series of flat boards to the opposite sides of which the skins are secured, a table having a horizontally disposed top face for supporting said boards, a conveyer arranged for pivotal engagement with said boards, to draw the same successively over said table, said table having an opening at an intermediate point therein arranged to permit each board to swing into a vertical position while pivotally supported by the conveyer, and means arranged to engage each board and complete its swinging movement to a relatively inverted position as it is moved to a position in which it is again supported horizontally on the table.

5. In a machine for stretching and drying skins, a series of flat boards to the opposite sides of which the skins are secured, a table having a horizontally disposed top face for supporting said boards, a conveyer arranged for pivotal engagement with each board at one side of its center of gravity and to draw the boards over the table successively while supported thereon, said table being arranged to permit each board to swing to a vertical position by its gravity while supported on said conveyer at an intermediate point in its travel thereover and abutting means arranged to cause the swinging movement of the board to be continued to a relatively in-

verted horizontal position as it is actuated by the conveyer.

6. In a machine for stretching and drying skins, a series of flat, skin-supporting boards, each having a pair of aligned trunnions disposed in opposite relation at the end edges thereof and so arranged that the weight of the board is greater at one side of the axial line of the trunnions than at the other, whereby the board will be held in an upright position when supported by its trunnions, a table having a horizontally disposed supporting face and having an opening at an intermediate point therein, a conveyer arranged to engage the trunnions of each board, to draw the boards successively over said table, said opening being arranged to permit the heavier portion of each board to swing downward therethru and to be drawn therefrom as the conveyers are advanced, so that the position of the board will be reversed.

7. In a machine for stretching and drying skins, a series of flat, skin-supporting boards, each having a pair of aligned trunnions disposed in opposite relation at the end edges thereof and so arranged that the weight of the board is greater at one side of the axial line of the trunnions than at the other, whereby the board will be held in an upright position when supported by its trunnions, two disconnected track sections, each arranged to support said boards in a horizontally disposed position, a continuously operated endless conveyer arranged to engage said trunnions and draw said boards along each track section successively, said track sections being arranged to permit each board to swing on its trunnions into a vertical position as it is moved from one section and an abutment arranged to engage each board at one side of its axial line, so as to complete the inversion of the board, as it is moved by said conveyer onto the other section.

8. In a machine for stretching and drying skins, a series of flat, skin-supporting boards, each having a pair of aligned trunnions disposed in opposite relation at the end edges thereof, and so arranged that the weight of the board is greater at one side of the axial line of the trunnions than at the other, whereby the board will be held in an upright position when supported by its trunnions, a track having a horizontally disposed surface for supporting said boards, a pair of endless chains at opposite sides of said track, each chain having a series of fingers arranged to engage said trunnions and draw said boards along said track as the chains are driven, said track being discontinued at an intermediate point therein, to permit the heavier portion of each board to pass therethru and swing the board on its trunnions into an upright position while supported on said chains, and an abutment arranged to engage each board at one side of the axis of its trunnions after it

has swung into said upright position, to swing the board to a reversed horizontal position on further movement of the chains.

9. In a machine for stretching and drying skins, a series of flat boards, conveying means for conducting said boards successively comprising a relatively high speed conveyer combined with supporting means for the boards arranged to conduct them horizontally edgewise while the skins are attached to the sides thereof, a drying chamber having a relatively low speed conveyer therein arranged to support the boards side by side thereon, means to transfer the boards successively from the delivery end of the high speed conveyer to the supply end of the low-speed conveyer and means to transfer the boards from the delivery end of the latter to the supply end of the former.

10. In a machine for stretching and drying skins, a series of flat, skin-supporting boards, a primary conveyer arranged to conduct said boards edgewise while supported horizontally between a receiving and a delivery position, means for inverting each board at a point between said positions, to permit a skin to be attached to both sides of each board during its travel therebetween, a drying chamber, a secondary conveyer arranged to conduct said boards from a receiving to a delivery position therein, means for automatically transferring the boards successively from the delivery position of the primary conveyer to the receiving position of the secondary conveyer and means for automatically returning the boards from the delivery position of the secondary conveyer to the receiving position of the primary conveyer.

11. In a machine for stretching and drying skins, a series of flat, skin-supporting boards, a primary conveyer arranged to conduct said boards edgewise while rigidly sustained in a horizontal position, a drier chamber, a secondary conveyer in said drier chamber arranged to conduct said boards side by side in a vertical position, means to drive said primary conveyer at a speed which permits the skins to be attached to the boards as they are carried horizontally and to drive said secondary conveyer at a relatively lower speed, means to transfer said boards from the delivery end of the primary conveyer to the receiving end of the secondary conveyer, and means to transfer the boards from the delivery end of the secondary conveyer to the receiving end of the primary conveyer.

12. In a machine for stretching and drying skins, a series of flat, skin-supporting boards, a horizontally disposed table, a primary conveyer arranged to move said boards successively over said table while supported at one side thereon and with their adjacent edges in proximity, means for inverting each board at an intermediate point in its travel thereon, a drying chamber, a secondary con-

veyer therein arranged to support said boards vertically with their adjacent sides in proximity and to move the same between predetermined points therein, means for automatically transferring the boards from the delivery end of said primary conveyer to the receiving end of the secondary conveyer and from the delivery end of the latter to the receiving end of the former and for driving said conveyers in time with each other so that the speed of the secondary conveyer is reduced in proportion to the speed of the primary conveyer according to the ratio of the boards engaged by each conveyer for a certain distance thereon.

13. In a machine for stretching and drying skins a series of flat, skin-supporting boards and means for conducting said boards successively through a cycle of operations comprising conveying means for automatically moving each board horizontally from an initial position for a predetermined distance while it is supported with one side uppermost to permit a skin to be secured by tacks to said side, means for inverting each board, so that its opposite side is uppermost, and for moving it horizontally for a further distance while thus supported, to permit a second skin to be secured by tacks to said opposite side, a drying chamber and means for conducting the boards therethru, tack removing means and conveying means arranged to conduct the board from said chamber past said tack removing means, to remove the tacks in each side of the board and return it to the initial position.

14. In a leather making machine, a series of flat, skin-supporting boards each having a pair of aligned trunnions at opposite edges so arranged that the board will be held in an upright position by its gravity when supported thereby, a table for supporting said boards horizontally, a pair of primary endless conveyers, each having a series of suitable spaced shoulders, means for driving said conveyers in position to engage said shoulders with said trunnions and draw said boards over the table, a pair of secondary endless conveyers arranged to receive the boards from said primary conveyers and to support the same thereon in spaced relation by their trunnions, means for driving said secondary conveyers at a relatively lower speed than that at which said primary conveyers are driven, the length of the spaces between the boards when carried by said secondary conveyers being arranged to correspond to the reduced speed of the conveyers in comparison with the speed and spacing of the abutments of said primary conveyers.

15. In a machine for stretching and drying skins a series of skin-supporting boards, a primary conveyer arranged to conduct the boards horizontally between predetermined points while supported horizontally, a dry-

ing chamber having two secondary conveyers therein arranged one directly above the other with their receiving and delivering ends in opposite relation and adapted to support the boards vertically thereon, means to deliver the boards successively from the delivery end of the primary conveyer to the receiving end of one of said secondary conveyers and for transferring the boards from the delivery end of the latter to the receiving end of the other secondary conveyer and a return conveyer arranged to transport the boards from the delivery end of the last named conveyer to the receiving end of the primary conveyer.

16. In a machine for stretching and drying skins, a series of skin-supporting boards, a primary conveyer arranged successively to conduct the boards horizontally between its receiving and delivering ends while supported horizontally, two drying conveyers arranged one directly over the other with their receiving and delivering ends in opposite relation and with one of said drying conveyers in alignment with said primary conveyer, a return conveyer arranged in line with the other drying conveyer and in the vertical plane of the primary conveyer and means for transferring the boards from the delivery end of each conveyer to the receiving end of the adjacent conveyer, to provide a continuous cycle of operations.

17. In a machine for stretching and drying skins, a series of skin-supporting boards, a primary conveyer arranged successively to conduct the boards horizontally between its receiving and delivering ends while supported horizontally, two drying conveyers arranged one directly over the other with their receiving and delivering ends in opposite relation, the lowermost thereof being disposed in alignment with said primary conveyer, with their receiving and delivering ends adjacent each other and having means for transferring the boards from one to the other, means for transferring the boards from the delivery to the receiving end of said drier conveyers, and a return conveyer disposed directly over said primary conveyer with its receiving end adjacent the delivery end of the uppermost drier conveyer, and having means for transferring the boards from the latter thereto and from its delivery end to the receiving end of the primary conveyer.

18. In a machine for stretching and drying skins, a series of boards adapted to have the skins secured to both sides thereof by tacks, a primary conveyer arranged to conduct the boards horizontally from its receiving to its delivering end and having means to carry each board horizontally for the first portion of said distance, means arranged to pull the tacks from the underside of the board while carried through said first portion of the dis-

tance, means for inverting each board and for pulling the tacks from the opposite side of the board as it is carried horizontally through a second portion of the distance and means for reinverting the board and carrying it horizontally for a further distance, for the purposes set forth.

19. In a machine for stretching and drying skins, a series of flat skin-supporting forms each having aligned trunnions at its ends arranged to cause the same to swing by gravity to a vertical position when supported thereby, a primary conveyer arranged to engage the trunnions of the boards and to conduct them horizontally and means for supporting the boards in a horizontal position as they are conducted thereby, a drying room having a secondary conveyer therein arranged to support the boards vertically by their trunnions, and means to drive said conveyers simultaneously in one direction at different speeds, a third conveyer arranged in the drying room in the vertical plane of the secondary conveyer and adapted to support the boards by their trunnions and a return conveyer similarly arranged with relation to the primary conveyer, means to drive said third conveyer and said return conveyer at corresponding speeds and in the opposite direction from that in which the other conveyers are driven and means to transfer the boards from the delivery end of each conveyer to the receiving end of the next conveyer in the order named to provide a complete cycle of operations.

20. In a machine for stretching and drying skins, a series of boards to the sides of which the skins are attached, a primary conveyer having means operating in conjunction therewith to hold the boards edge to edge in positions to permit the skins to be attached to the sides thereof as they are conveyed, a drying chamber having a secondary conveyer therein arranged to support the boards side by side in proximity to each other, means to operate said primary conveyer at a relatively high speed as compared with that at which the secondary conveyer is driven and means for automatically transferring the boards from said primary to said secondary conveyer.

21. In a machine for drying skins, a series of boards to the sides of which the skins are attached, a drying chamber, means for conveying the boards in a closed path comprising means to convey them from an initial position at a predetermined speed outside said chamber while held edge to edge in positions to permit the skins to be attached to the sides thereof as they are conveyed, means to deliver the boards successively to said chamber, means to convey them therein side by side at a relatively low speed first in one direction and then in the opposite direction, and to deliver them from said

chamber and means to return the boards as they are delivered from said chamber to said initial position.

22. In a system for drying skins while
5 mounted on opposite sides of drying boards, means to conduct the boards edgewise from an initial position first with one side uppermost and then with the other side uppermost, to permit a skin to be attached to each side
10 while the side is facing upwardly, a drying chamber, means to deliver the boards bearing the skins thereto and to conduct them therein to the rear and then to the front thereof, and to return them to said initial position successively, means for removing the
15 skin from one side of each board before it is returned to initial position and for thereafter moving it into said initial position with the side uppermost from which the skin has
20 been removed, and means for removing the skin from the other side of the board before its position is again reversed.

23. In a system for drying skins, a series of boards to opposite sides of which the skins
25 are attached and having trunnions projecting from opposite edges thereof, a conveyer consisting of a pair of chains arranged to be driven in parallel, and to engage the trunnions, and propel the boards, a pair of tracks
30 arranged to support the boards horizontally while propelled by said chains comprising two separated sections arranged to permit the boards successively to swing to a vertical position and to be inverted as they pass from
35 one section to the next.

24. In a system for drying skins while mounted on opposite sides of drying boards, means to conduct the boards edgewise from
an initial position first one side up and then
40 the other side up to permit the skins to be attached to both sides thereof, a drying chamber, means to deliver the boards bearing the skins thereto and to conduct them therein at a relatively low speed, while supported in
45 proximity side by side, to the rear of the chamber and then to the front thereof, and means for removing the skins from the boards after delivery from said chamber and, for returning them successively to the initial
50 position.

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

LOUIS H. HAMEL.

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