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MACHINE FOR STACKING HIDES.

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2 Sheets-Sheet 1

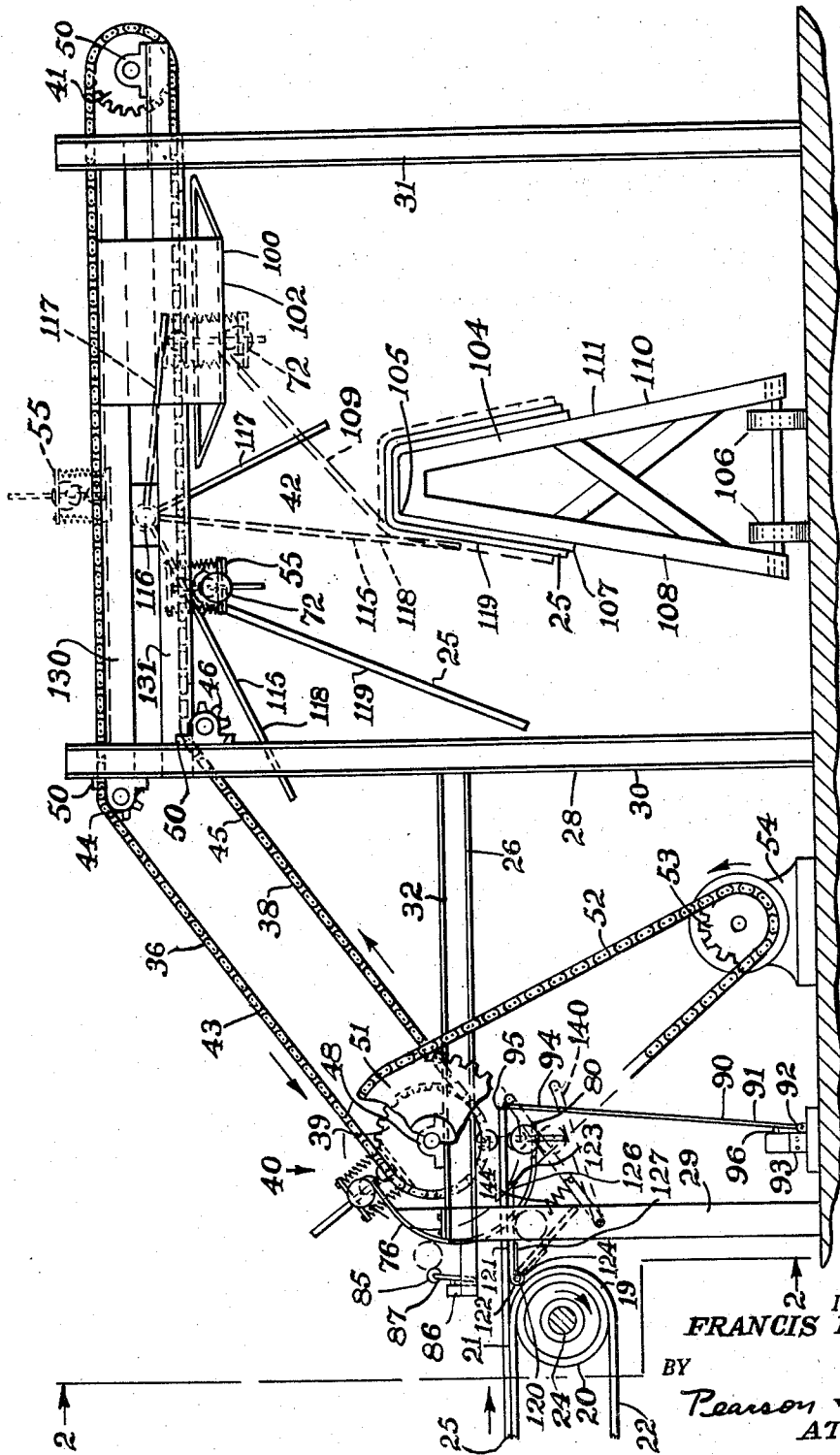


Fig. 1.

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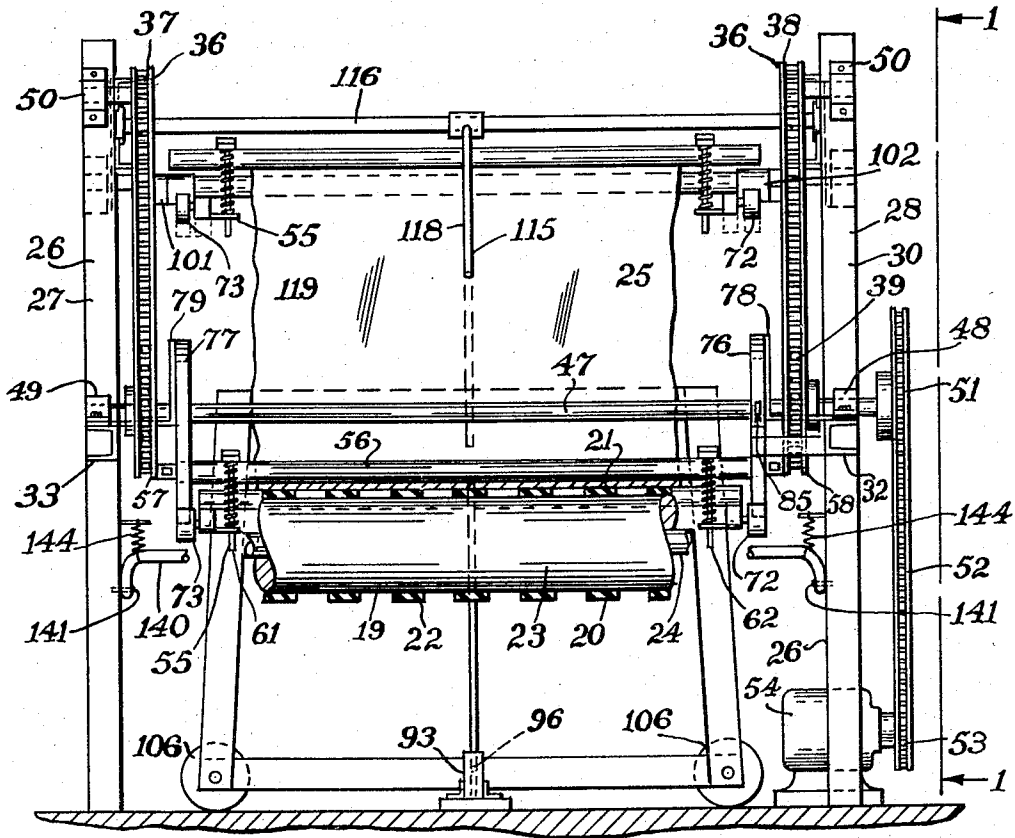


Fig. 2.

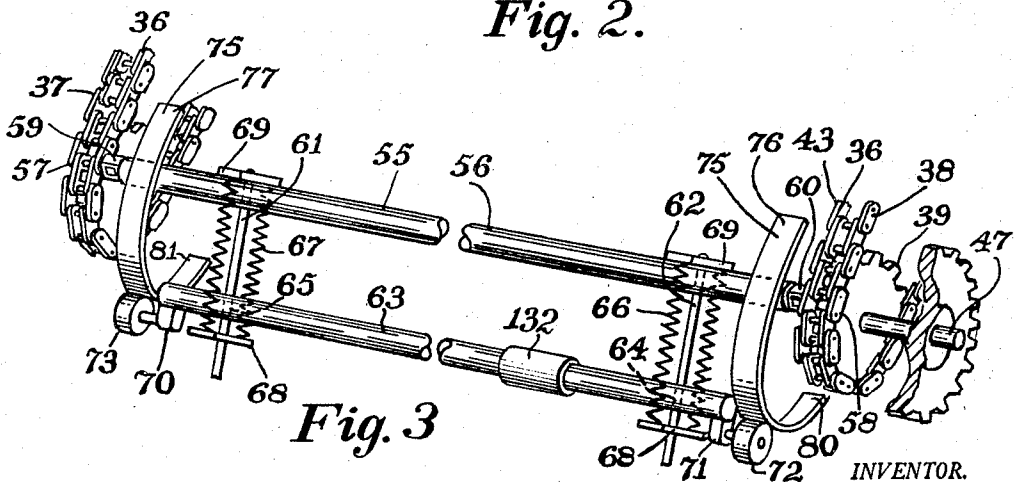


Fig. 3

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## MACHINE FOR STACKING HIDES

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16 Claims. (Cl. 271—86)

This invention relates to a machine for handling and stacking flexible, non-symmetrical sheets and particularly relates to the stacking of animal hides in a tannery.

In the treatment of animal hides in a tannery, one procedure has been to manually stack a pile of hides on a horse, move the horse to a machine, feed the hides individually into the machine and receive the hides back from the machine, again manually stack the hides on the horse and then move the horse to another machine for a similar cycle. Of late through and through machines have been developed whereby the hides are manually fed to the front of the machine from a stack on a horse, then are automatically delivered from the rear of the machine where the hides must again be manually stacked upon a horse. The continuous or through and through machines obviously save time and effort but still more time and effort may be saved by providing a machine for receiving each hide at the exit of a machine and automatically stacking the same on a horse ready for movement to, and feeding to, the next treatment machine.

A machine for this purpose is disclosed in U.S. Patent No. 2,572,472, issued October 23, 1951, to Griffin, wherein an oscillating arm pivoted at the bottom picks up the leading portion of a hide in oscillating fingers and swings the hide in an arc to drop it over a horse. A somewhat similar machine is disclosed in U.S. Patent No. 1,609,228, issued November 30, 1926, to Walcott, wherein an oscillating arm pivoted at its top picks up the leading portion of a hide in normally open pivoted jaws, and swings the jaws and the hide through an arc to deposit the hide on a pile.

The principal object of this invention is to provide a machine and method for receiving individual hides at one location, and piling or stacking such hides at another location, meanwhile transporting said hides to a desired distance therebetween.

Another object of the invention is to provide a stacking machine having hide clamping means of sufficient width to accommodate hides of maximum width and not requiring any adjustment to also handle hides of lesser widths.

A further object of the invention is to provide normally spring closed clamping bars having an elongated, lateral area of contact on both sides of the leading edge portion of a hide whereby the amount of spring grip may be predetermined to avoid damage to the hide and whereby the pull on the hide is evenly distributed across its width to avoid tearing or slippage.

Another object of the invention is to provide mechanism for receiving and gripping the leading edge portion of a non symmetrical sheet of large area being discharged from a flat conveyor, moving the sheet in depending position to any desired point in a factory and depositing the sheet flatwise on top of a pile of similar sheets or on another flat conveyor.

Still another object of the invention is to provide means for not only carrying a depending hide up to a horse, but for carrying the top half well past the horse while simul-

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aneously pushing down on the lower half in advance of the horse, thus assuring a neat stack on the horse.

A still further object of the invention is to prevent any whip or acceleration of a depending hide by advancing the gripped portion thereof only in comparatively straight lines on an endless conveyor with little or no acceleration or deceleration along the path thereof.

In the drawings

Fig. 1 is a side elevation of the machine of the invention in section on line 1—1 of Fig. 2.

Fig. 2 is a front end elevation on line 2—2 of Fig. 1, and

Fig. 3 is a perspective view of the clamping means of the invention.

In the drawings, 19 represents the delivery end of the endless carrier 20 of any well known type of machine for treating large sheets of non symmetrical outline such as animal hides. Carrier 20 includes a horizontal upper stretch 21, a lower stretch 22, a drum, or set of spaced apart pulleys, such as 23 and a shaft 24. Carrier 20 may be a web of rubber or may be made up of spaced apart narrow flat webs, ribbons, belts, wires or the like. It is portrayed only to show the relative positioning of the stacking machine and forms no part of this invention.

An animal hide 25, is shown supported on the upper stretch 21 of carrier 20 and advancing in the direction of the arrow to typify an operation taking place in many different treatment machines in a tannery. It will be apparent that without a suitable machine to handle the succession of individual hides delivered by carrier 20, it is necessary to station an operator at the delivery end of each such machine to strip and stack each successive hide. It should also be noted that such hides are flexible, of large area, non symmetrical and ungainly, whereby stacking devices for flat, uniform, comparatively rigid sheets are not usually adaptable for use therewith.

The machine of this invention includes a frame work 26 formed by two spaced apart side walls 27 and 28. As illustrated, each side wall such as 27 is skeletonized and formed of suitable rigid uprights 29, 30 and 31 and horizontal connecting frame pieces 32 and 33. The uprights such as 29 preferably reach up to a level with the upper stretch 21 of a carrier 20 and the uprights 30 preferably reach up to a level to support the maximum length hide in a depending position without the hide dragging on the floor. The uprights 31 may be comparatively close to the uprights 30 as shown, or a plurality of such uprights may be provided if the hides are to be conveyed a considerable distance. Hangers supported from the ceiling of the room may be substituted for the uprights such as 31 without departing from the scope of the invention. The walls 27 and 28 are spaced apart laterally a greater distance than the width of a carrier 20 and a greater distance than the maximum width of the non symmetrical hides to be handled by the machine.

An endless conveyor 36 is carried by frame work 26 and includes a pair of oppositely disposed chains 37 and 38 or the mechanical equivalent thereof. Each chain such as 38 is trained around a sprocket 39 at the loading zone 40, and around a sprocket 41 beyond the unloading zone 42, the upper stretch 43 being supported on idler sprocket 44 and the lower stretch 45 being supported on idler sprocket 46. A lateral shaft 47, journalled in bearings 48 and 49 supported on frame pieces such as 32 and 33, carries the sprockets such as 39 to cause both chains 37 and 38 to advance together. Shaft 47 extends entirely across the space between the side walls 27 and 28 while the other sprockets such as 41, 44 and 46 are carried by stub shafts journalled in bearings such as at 50. Shaft 47 also carries a sprocket 51, driven by a chain 52 from the driving sprocket 53 of a motor 54 or other suitable

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source of power. A separate source of power is preferred because the stacking machine of the invention operates intermittently rather than continuously, and is actuated only by the arrival of a hide such as 25 in the loading zone 40.

The clamping means 55 of the invention, as best shown in Fig. 3, is carried by the endless conveyor 36 and follows a closed path from the loading zone 40 proximate the delivery end 19 of carrier 20 to the unloading zone 42, which is the predetermined releasing location, and then returns to the loading zone 40. It should be noted that the machine of this invention is intended to transport animal hides which are heavy and of unsymmetrical outline and that the hides hang below the conveyor without other support than from the clamping means. To overcome dropping by slippage and to prevent permanent grip marks on the hide, the clamping means extend entirely across the top and bottom face of the leading edge portion of a hide to secure a firm grip over a wide area. The clamping means 55 preferably includes a rigid bar 56 fixed at each opposite end to an oppositely disposed link 57 and 58 of conveyor 36 by suitable brackets such as 59 and 60. These may be any desired number of clamping means 55 spaced along conveyor 36 depending on the length of the conveyor and the rapidity of action desired and three of the same are provided in the embodiment shown. A pair of rigid upstanding guide rods 61 and 62 are fixed to each bar 56 proximate the ends thereof and spaced apart sufficiently to accommodate the usual maximum width of sheet to be handled. A second rigid bar 63 contains holes 64 and 65 for the rods 61 and 62 whereby bar 63 is slideable toward and away from bar 56 in a straight line but in the manner of a movable jaw and a stationary jaw. Springs such as 66 and 67 are arranged to constantly urge bar 63 into contact with bar 56 whereby the normal position of the clamping means is closed. Suitable end pieces such as 68 and 69 are provided on each rod such as 61 to limit the movement of the clamping means 55. Roller cam followers such as at 72 and 73 are mounted on suitable brackets 70 and 71 at each opposite end of the movable bar 63.

At the loading zone 40, the first actuating mechanism 75 for the clamping means 55 is located. First actuating mechanism 75 preferably comprises a pair of stationary, oppositely disposed, arcuate cam tracks 76 and 77, each mounted on the frame work 26 by suitable brackets 78 and 79 and each in the path of a cam roller follower 72 or 73. As each clamping means 55 arrives at the loading zone 40 the cam tracks 76 and 77 gradually move the rectilinearly separable, rigid bar 63 away from the rigid bar 56 against the tension of the springs such as 66 and in the straight line path controlled by the guides or rods 61 and 62. When the cam followers 72 and 73 of each bar 63 reach the terminal ends 80 and 81 of cam tracks 76 and 77 the springs cause bar 63 to snap tightly and quickly against bar 56 to grip a portion of a sheet then located therebetween.

Stop means 85 is provided preferably in the form of a micro switch 86 in circuit with the power circuit of motor 54 in a well known manner. The contact arm 87 of switch 86 is in the path of some portion of clamping means 55 such as the roller follower 72 of the bar 63 whereby the arm 87 is actuated each time a clamping means 55 arrives at the switch 85. Actuation of arm 87 breaks the circuit to motor 54 and conveyor 36 thus slows down to a halt to bring the clamping means 55 which actuated the switch 85 to a stop just before the terminal ends 80 and 81 of cam tracks 76 and 77. Switch 85 is mounted in loading zone 40 on frame work 26, and preferably about intermediate of the path of cam followers 72 and 73 in rounding cam tracks 76 and 77. Each successive clamping means 55, as it enters loading zone 40, thus trips the stop means 85 and causes the conveyor to halt with the bars 63 and 56 separated ready to receive a hide from carrier 20.

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Sensing means 90 is also provided in the loading zone 40 preferably in the form of an elongated lever 91 pivoted at its base 92 to a suitable floor bracket 93 or to the frame work 26 if desired. The free terminal end portion 94 of lever 91 is centrally disposed laterally of the machine and in the path of a sheet or hide advancing from the delivery end 19 of carrier 20. The normal position of end 94 is beyond the terminal ends 80 and 81 of cam tracks 76 and 77 and thus beyond the location of halt of the clamping means 55, the latter then being open to receive a sheet or hide. The leading edge portion 95 of a sheet or hide must, therefore, have been presented into and have passed beyond the spread apart bars 56 and 63 a distance of several inches before the portion 95 engages and moves the lever 91. Upon moving of lever 91, a suitable micro switch 96 closes the power circuit to motor 54 causing the conveyor 36 to start, causing the cam followers 72 and 73 to drop off the cam tracks 76 and 77 and causing bar 63 to press the leading edge portion of the hide against bar 56 under spring pressure. The forward and upward movement of the lower stretch 45, carries clamping means 55 along, with the hide such as 25 gripped completely across the top and bottom leading edge surfaces thereof and with the remainder of the hide depending from the conveyor. It will be apparent that light beams such as from a photo cell or tube could be used as the stop means or sensing means of the invention, but because of the non symmetrical nature of the sheets usually handled in the machine the use of mechanically actuated trip mechanism is found preferable and less likely to skip a sheet or hide.

At any predetermined location reachable by a conveyor such as 36, an unloading zone such as 42 is located and second actuating mechanism 100 for the successive clamping means 55 is provided to release the gripped hides. Second actuating mechanism 100 includes a pair of oppositely disposed arcuate cam tracks 101 and 102, each in the path of a roller cam follower such as 72 and 73. As best shown in Fig. 1, each cam track 102 is shaped to move the cam followers away from the conveyor 36 thus moving bar 63 in a straight line along the guide rods 61 and 62 from bar 56 and releasing the grip on the leading edge portion of a hide. If it is desired to deposit the hides on another flat conveyor the conveyor 36 would be directed above, and advanced at greater speed than the other conveyor thus draping the hide thereon and then releasing its grip.

However, it is considered more desirable at the present time in the art to be able to stack one hide or sheet on top of another on a horse such as shown at 104. The upper rearwardly facing edge 105 of a horse 104 is arranged to constitute a barrier to the lower portion of a hide carried in clamping means 55 as the clamping means enters unloading zone 42. Horse 104 is mounted on wheels 106 whereby it may be wheeled to any desired part of a tannery and is of sufficient weight to not be overturned by the hide and to offer a strong opposing force to the advance of the hide. As illustrated, the upstanding barrier formed by the horse 104 is positioned in advance of the second clamping means actuating mechanism 100 whereby the lower half 107 of a hide 25 is draped on the rearward facing side 108 of the horse before the upper half 109 of the hide is released to fall on the forward side 110 of the horse.

Preferably the stacking means 111 of the invention not only includes a barrier to the advance of the intermediate portion of a hide 25, such as horse 104, but also includes a pushing arm 115 also in advance of the actuating mechanism 100. Arm 115 is pivoted by rod 116 to frame work 26 at the unloading zone 42 and includes a portion 117 in the path of each clamping means 55 passing thereby. Thus the advance of each clamping means 55 raises the arm portion 117 and lowers the arm portion 118 to exert a downward push on the trailing, rearwardly facing surface such as 119 of each hide such as 25. The lower

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half 107 of each hide therefore not only meets a barrier such as horse 104 but is pushed against that barrier and held from slipping temporarily while the upper half is being carried past the barrier and then dropped.

If it is desired to merely deposit one hide on top of another on a flat platform, such a platform may be substituted for horse 104 and the arm portion 117 still serves to push the lower halves of the hides down flatwise on the platform.

The stripping means 120 of the invention includes a platform 121 having its rearwardly facing, laterally extending edge 122 normally positioned in a plane below the plane of the undersurface of a hide on carrier 20 and in advance of the shaft 24 of the carrier 20. The forwardly facing, laterally extending edge 123 of platform 121 is normally positioned in a plane between the planes of the bar 56 and the bar 63 and just slightly in rear of the bars when they are halted in their fully open position at the loading station 40. The rearward edge 122 of platform 121 is arranged to engage drum 23 and either strip the leading edge of a hide therefrom, or simply guide the leading edge onto the platform. The platform 121 bridges the gap up to the halted clamping means 55 and guides the leading edge of a hide under bar 56 and over bar 63 in order that the leading edge may be gripped between the bars. Platform 121 is pivoted on a horizontal axis at 124 to a suitable bracket not shown but mounted on frame work 26 and the forward portion 126 of the platform is yieldably supported by tension springs such as 127. The platform 121 thus yields when contacted by a gradually opening bar 63 rounding the cam tracks 76 and 77 and then springs back upwardly to its normal hide supporting and guiding position. When the carrier 20 is made up of laterally spaced wires laterally spaced extensions may be provided on platform 121 to pass over drum or pulleys 23 and down between each adjacent pair of wires. The platform 121 in any case constitutes a continuation of the upper stretch of carrier 20, pivoted at its rearward end and yieldable downwardly at its forward end to automatically bridge the gap from the carrier to the clamping means 55 at the loading zone 40.

In operation each individual and successive hide such as 25 delivered by carrier 20 is guided by the yieldable platform 121 into the mouth of an open pair of bars 56 and 63 of a halted clamping means 55. When the leading edge of the hide has advanced several inches into the unobstructed opening between the bars, the sensing lever 91 is actuated to start the conveyor 36. The starting of conveyor 36 immediately causes rollers 72 and 73 to drop off the cam tracks 76 and 77 and causes bar 63 to close under predetermined pressure of springs 67. The leading edge portion of the hide is thus gripped, the hide pulled away from carrier 20 and drawn upwardly to be advanced in depending position along conveyor 36. Upon arrival at the unloading zone 42 the lower half of the hide is met by a barrier while the upper half is released by the opening of the clamping means 55. As soon as the next succeeding clamping means 55 arrives at loading zone 40 the stop means 85 stops the conveyor 36 with cam tracks 76 and 77 causing the bars 56 and 63 to spread to fully open position ready to receive the next succeeding hide.

Preferably rigid longitudinally extending supports such as 130 and 131 are mounted on frame work 26 under the upper and lower stretches of conveyor 36 to prevent any sag or any sidewise movement of the chains 37 and 38. Preferably also a laterally extending yieldable support 140 is pivotally mounted on frame 26 at 141 and cooperable with lever 91 to support and guide the trailing portion of a sheet, leaving the loading zone 40, while also lending rigidity to the lever 91. Springs 144 are provided to resiliently urge element 140 upwardly. The movable clamping bar 63 may be provided with a sleeve 132 of rigid material which is freely revoluble therearound when the

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clamping means 55 is in open position. Any tendency of a hide to stick to the movable bar is thus overcome.

I claim:

1. A machine for individually and successively receiving horizontal, heavy, animal hides of non-symmetrical outline from a moving hide carrier, transporting said hides, in depending position to a predetermined location, and releasing said hides at said predetermined location, said machine comprising an endless conveyor following a closed path and having a lower stretch extending from a loading zone proximate the delivery end of a hide carrier to an unloading zone at said predetermined releasing location; plural normally spring closed, rectilinearly separable, clamping means, carried by said conveyor, each said clamping means comprising a pair of oppositely disposed, smooth, parallel clamping jaws adapted to grip a hide completely across the top and bottom leading edge surfaces thereof and to support said hide in depending position from said lower stretch; first clamping means actuating mechanism at the loading zone of said machine for opening each of said clamping means; stop means on said machine for halting said conveyor with a clamping means opened at said loading zone; hide sensing means, at said loading zone, actuated by the arrival of a hide in position to be gripped between an open clamping means to restart said conveyor; and second clamping means actuating mechanism, at said unloading zone, for opening each of said clamping means to release each successive hide arriving at said unloading zone.

2. A combination as specified in claim 1 wherein the parallel jaws of said spring closed clamping means comprise a pair of rigid bars, each coextensive with the width of a hide and mounted to move toward and away from each other in a straight line to form, when separated, an unobstructed opening for receiving an unsymmetrical leading edge portion of a hide spaced in rear of the carrier.

3. A combination as specified in claim 1 wherein the parallel jaws of said spring closed clamping means comprise a pair of rigid bars, extending entirely across said machine, a pair of parallel rigid guides oppositely disposed on one of said bars, and perpendicular thereto for slidably supporting the opposite ends of the other of said bars and a coil spring encircling each of said guides for urging one said bar toward the other on said guides.

4. A combination as specified in claim 1 wherein one of said clamping jaws includes a cam roller fixed at each opposite end thereof and both of said clamping means actuating mechanisms each comprise stationary cam tracks in the path of said rollers at the loading and unloading zones for opening said clamping means.

5. A combination as specified in claim 1 wherein said conveyor includes a pair of spaced apart, parallel endless chains and said clamping means comprises a first, straight, rigid bar extending transversely between opposite links of said chains, a second straight rigid bar adapted to move rectilinearly toward and away from said first bar while parallel thereto and springs associated with said bars for urging the same into normally closed position one abutting the other.

6. A combination as specified in claim 1 plus stripping means, and extending the full width of a hide independent of said clamping means at the loading zone for stripping an unsymmetrical leading edge portion of an animal hide from a hide carrier and guiding said portion into said clamping means.

7. A combination as specified in claim 1 plus stripping means, independent of said clamping means and extending the full width of a hide, said stripping means comprising a downwardly yieldable platform of rigid material for receiving the leading edge portion of each successive hide on said carrier and guiding the same into position to be gripped by an open clamping means.

8. A combination as specified in claim 1 plus stacking means at said unloading zone including a pushing arm in

advance of said second clamping means actuating mechanism and actuated by the passage of a clamping means to push the trailing portion of a hide downwardly simultaneously with the release of a hide by said clamping means at the unloading zone.

9. A combination as specified in claim 1 plus stacking means at said unloading zone comprising an upstanding horse in the path of the leading surface of the lower half of a hide and a pushing arm, in advance of said second clamping means actuating mechanism, and actuated by the passage of a clamping means to push the trailing portion of a hide downwardly against the rearward wall of the horse simultaneously with the release of a hide by said clamping means at said unloading zone.

10. A combination as specified in claim 1 plus a laterally extending, yieldable, support, cooperable with said sensing means, and in the path of the trailing portion of a hide at the loading zone for supporting and guiding said trailing portion as it leaves said loading zone on said conveyor.

11. A machine for removing hides from a hide carrier and stacking the same, said machine comprising endless conveyor means extending from proximate the delivery end of a hide carrier upwardly and away therefrom to a point above a stacking location; a plurality of pairs of spring clamping, rigid bars spaced along said conveyor, each pair adapted to secure a grip entirely across a hide and support the same in pendant position, at least one bar of each pair having a cam roller at each opposite end thereof and both bars of each pair extending transversely of said conveyor a distance sufficient to receive the full width of a hide therebetween; a first pair of oppositely disposed cam roller tracks, each in the path of one of said rollers proximate the delivery end of a hide carrier and adapted to spread said bars apart against spring pressure; conveyor halting means, actuated by the arrival of each successive pair of clamping bars at the terminus of said cam roller tracks in fully open position to stop said conveyor; hide stripping means, cooperable with a hide carrier, and adapted to guide an unsymmetrical leading edge portion of each successive hide delivered thereby into the space between said open clamping bars; conveyor starting means, actuated by the passage of the leading edge portion of a hide through the space between said open bars to restart said conveyor thereby removing said rollers from said first cam tracks and enabling said bars to close under spring pressure across the leading edge portion of a hide; a second pair of oppositely disposed cam roller tracks, each in the path of one of said rollers in rear of a point above a stacking location, and adapted to spread said bars apart against spring pressure to release a hide, and an upstanding barrier in the path of the leading surface of the lower half of a hide suspended from said clamping bars on said conveyor, said barrier being adapted to receive a draped hide and positioned in advance of said second pair of cam roller tracks for intercepting the lower portion of a hide before the upper portion thereof is released from said clamping bars.

12. A combination as specified in claim 11 wherein said conveyor starting means includes a lever pivoted at its base to said machine at the loading zone and having its free terminal portion spaced in rear of, and opposite, the opening between a pair of separated bars halted at the loading zone, said lever being arranged to restart said conveyor upon being pivoted rearwardly by the leading edge portion of a hide already well into said opening.

13. A combination as specified in claim 11 wherein said stripping means comprises a hide supporting platform of full hide width in continuation of the upper stretch of a moving hide carrier and extending into the path of a pair of clamping bars at the delivery end of said carrier, said platform being yieldably mounted on said machine for permitting the passage thereby of said clamping bars.

14. A combination as specified in claim 11 plus a rotatable sleeve on one of said spring pressed clamping bars, said sleeve being freely revoluble when said clamping bars are in open position.

15. A combination as specified in claim 11 plus a pushing lever pivoted to said machine, and including a transversely extending pushing bar, said lever including an actuating arm in the path of the clamping bars on said conveyor in the zone of said stacking location whereby the passage of said bars thereby forces said pushing bar downwardly against the trailing surface of a hide suspended from said clamping bars.

16. In a machine of the character described, the combination of a pair of widely spaced apart, parallel, endless chains following a closed path from a loading zone to an unloading zone; a plurality of pairs of straight, rigid clamping jaws extending transversely between said chains at spaced distances therearound, each pair of jaws being of greater width than the width of an article to be gripped thereby; spring means on said jaws for normally spring pressing the same together; cam means at said loading zone adapted to first open said jaws against spring pressure and then to permit spring pressure to close said jaws; electric means at said loading zone adapted to stop each successive pair of jaws in the loading zone while said jaws are open; electric means at said loading zone adapted to start said chains when an article has partially passed through the space between said open jaws thereby causing said jaws to close with a firm grip entirely across said article and cam means at said unloading zone adapted to first open said jaws against spring pressure to release an article and then to permit spring pressure to close said jaws.

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