Aug. 2, 1932. H. FREUDENBERG 1,869,472

METHOD OF AND MACHINE FOR OPERATING UPON HIDES, SKINS, AND LEATHER

Filed Sept. 7, 1927 2 Sheets-Sheet 1

Fig. 1a

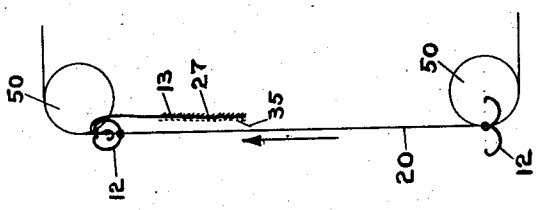
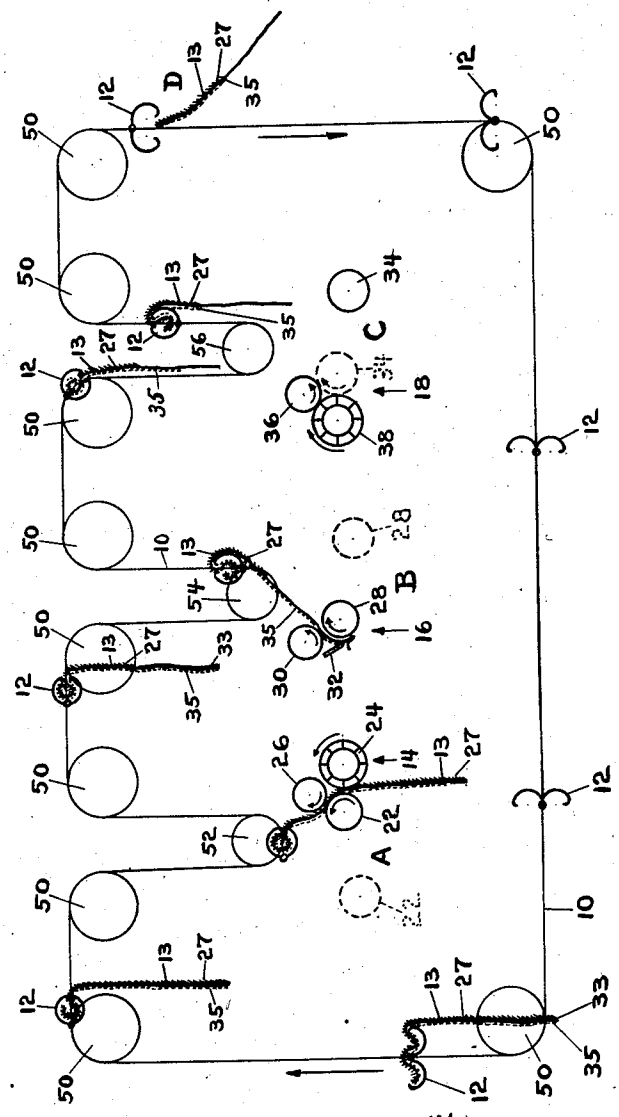


Fig. 1



INVENTOR

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Fig. 3

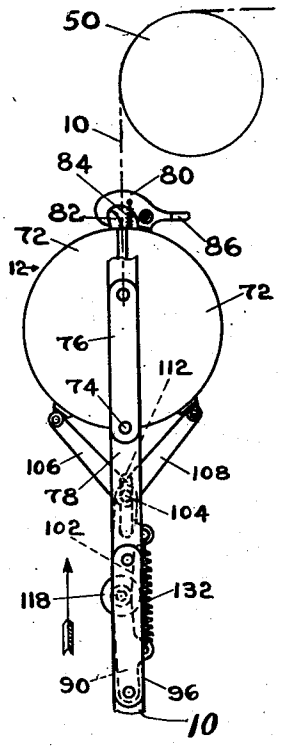


Fig. 4

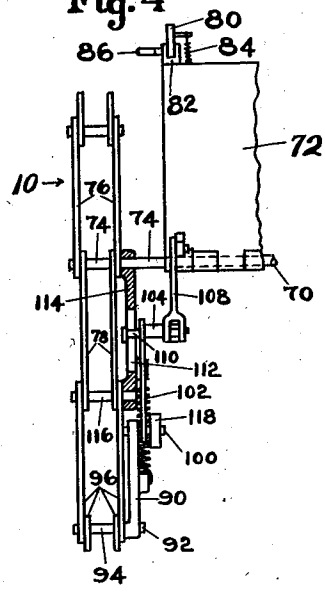


Fig. 5

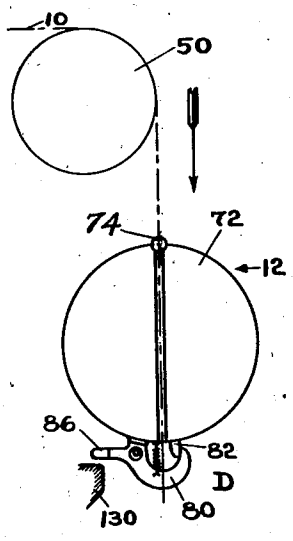


Fig. 6

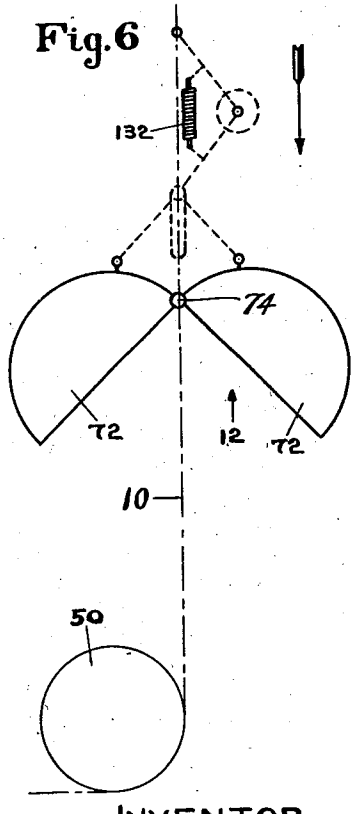
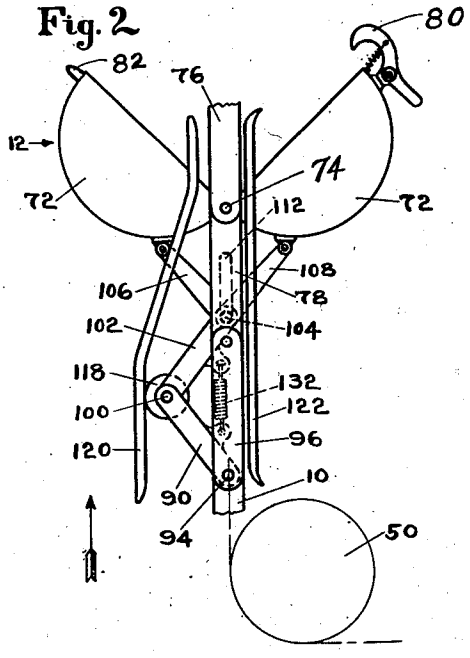


Fig. 2



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Patented Aug. 2, 1932 1,869,472

UNITED STATES PATENT OFFICE

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METHOD OF AND MACHINE FOR OPERATING UPON HIDES, SKINS, AND LEATHER

Application filed September 7, 1927, Serial No. 218,016, and in Germany September 11, 1926.

This invention relates to methods of and machines for operating upon hides, skins, leather and other similar pieces of work. While it is exemplified in its application to performing beam-house operations upon hides and skins, it is to be understood that the invention may have other applications and uses.

Commonly, the first operation in the beam-house of a tannery is that of unhairing for which special machines have long been provided, each requiring the attention of one or two workmen in introducing the pieces of work into the machine which operates on only one-half of each piece of work at a time. It follows that each piece of work must be introduced twice into the unhairing machine and that in performing these operations the workman or workmen must reverse the position of the piece of work following the first operation so that at the second operation the untreated portion left after the first operation may be operated upon, thus completing the unhairing operation for that piece of work. Following the unhairing operation it is common practice, though not with all classes of hides and skins, to cheek the hide or skin, that is, to reduce the thickness of the head and neck portions by splitting off the excess-thickness portions by means of a cutter so that the head and neck portions will come to have substantially the same thickness as that of the body portion of the same hide or skin. In many tanneries this cheeking operation requires the attention of two men operating a cheeking machine, particularly in operating upon hides of considerable size and weight. Either before or after the cheeking operation both hides and skins are fleshed to remove fat, connective tissue, and flesh from the flesh side of the hide or skin. Here again, the industry has for many years utilized special machines which require two workmen for each machine, unless indeed small skins are being fleshed. As in the unhairing operation each skin is introduced twice into the machine since approximately a half of the hide or skin is operated upon at each operation, it being necessary, as in the unhairing operation, to reverse the hide or skin between each of the fleshing operations.

It is an object of this invention to provide for economies in the beam-house, reducing the number of workmen for the beam-house machines, and obviating the necessity for the greater part of the laborious and even exhausting work heretofore performed in attending each of these machines.

To these ends, the invention, considering it in its machine aspect, provides means for gripping a hide or skin and controlling it while it is passing successively through a plurality of machine operations, the means referred to maintaining its grip upon the hide or skin while it is being presented for each operation and also during its passage from one field of operation to another. Thus, instead of having to manipulate the work after each machine operation in accordance with the requirements of the old and well-known arrangements, a number of operations may be performed mechanically and at a very considerable saving of time and effort. Subsequently to the first set of operations, each hide or skin is subjected to a similar series of operations while mechanically controlled to completed the desired operations upon that portion of each hide or skin which was gripped by the gripping and controlling means during the first set of operations.

Beam-house machines are usually of the type in which each machine cycle comprises a work-receiving part and a work-treating part. In view of this fact, the means for gripping a piece of work and introducing its successively into the machines of a set is organized to facilitate timing of the work-receiving part of the cycle of each machine with respect to the gripping means so that an ungripped portion of each of a plurality of pieces of work may be operated upon during the work-treating part of the cycle of each machine in turn and while under control through the gripped portion thereof. Commonly, too, the beam-house machines are of the type in which a work-supporting roll moves between a work-receiving position and a work-presenting position with respect to

an operating tool in the machine so that while the work support is in work-receiving position a substantial space is provided between the work-support and the tool for ready introduction of the work. Accordingly, the illustrated mechanism is organized to present in turn the ungripped portion of each of a plurality of pieces of work to each of the series of machines while its work support is in work-receiving position under control of the operator.

As herein illustrated, conveyor mechanism, comprising work-gripping means which pass over a plurality of guiding rolls so arranged that hides or skins suspended from the gripping means may be introduced in turn into each machine, is effective to present ungripped portions of each of the pieces of work in turn to each of a set of beam-house machines without losing control of the hides or skins throughout the series of operations or during transfer between successive operations. In the illustrated organization, the travel of the conveyor is timed to take up the slack in the work as the latter is fed out of each machine, the arrangement being such that the conveyor does not drag the work through any of the machines. Because of this fact the grippers may seize the hide or skin with a pressure just sufficient to support it, thereby obviating the danger of damaging the hide or skin at a time when it is tender and particularly susceptible to injury.

While the conveyor may be operated intermittently so as to come to rest while a hide or skin is being operated upon at each of a plurality of stations, preferably, and as shown, the conveyor is continuously driven, the necessary dwell in the horizontal traveling movement of the hide or skin to permit each machine to begin operating on the work being secured by reason of the travel of the work and of the work-gripping means downwardly toward and upwardly from the conveyor guiding roll located directly above and adjacent to each machine, the horizontal travel of the hide or skin in going around the lower half of the conveyor guiding roll having the effect of slowing up the rate of travel of the hide or skin at the end of its downward travel and at the beginning of its upward movement, thus giving the operator time to initiate operation of the machine below the conveyor guiding roll.

Other features of the invention relate to improved means for gripping the work on a conveyor and to means for automatically controlling the gripping means so as to close and lock the latter upon each piece of work in turn at the beginning of its travel to and through the machine and to release the work following the completion of the set of operations.

In its method aspect the invention is characterized by radical changes in the handling of hides and skins which make it practical to effect the economies above referred to and to lessen the labor of the operatives by the employment of apparatus such as that provided by this invention. From this viewpoint the invention comprises performing a plurality of operations upon both grain and flesh surfaces of a portion only of each of a plurality of hides or skins presented in succession to each of a plurality of machines such as beam-house machines of the types referred to, and subsequently performing the same or a similar series of operations upon the remaining portion of each of the hides or skins in succession. Thus, as herein set forth by way of illustration, the invention comprises gripping a portion of a hide or skin, performing a plurality of operations in succession upon an ungripped portion of the hide or skin while the latter is controlled by its gripped portion, and subsequently performing the same or a similar series of operations on the untreated portion of the hide or skin while it is under control through the gripping of the first-treated portion.

These and other features and characteristics of the invention will now be described in detail and pointed out in the appended claims.

In the drawings

Fig. 1 is a diagrammatic representation of a series of beam-house machines together with a conveyor mechanism for presenting pieces of work in succession to the machines;

Fig. 1*a* is a diagrammatic representation of one end of a conveyor mechanism for carrying pieces of work to a plurality of machines, the conveyor mechanism being represented in line with the conveyor mechanism of Fig. 1;

Fig. 2 is a detail view of the mechanism for automatically closing the grippers upon the pieces of work;

Fig. 3 is a view similar to Fig. 2 showing the gripper in closed position;

Fig. 4 is a view of a gripper and gripper operating mechanism looking from the right in Fig. 3;

Fig. 5 is a detail view showing the means for initiating opening of the grippers in succession; and

Fig. 6 is a view of a gripper in its open position during its descent along with a vertical run of the conveyor chain.

In the illustrated apparatus an endless conveyor 10 provided with a plurality of grippers 12 is operative to present each of a plurality of pieces of work 13 in succession to an unhairing machine 14 at station A, to a cheeking machine 16 at station B, and finally to a fleshing machine 18 at station C. Subsequently, the pieces of work are discharged in turn at station D with unhairing, cheeking and fleshing operations completed all on the same portion of each of the pieces of work.

Since the cheeking operation is performed if at all only on one portion of each hide or skin, that is, upon the head and neck portions of the hide or skin, a conveyor mechanism 20 (Fig. 1*a*) which is identical in all respects with the conveyor mechanism 10 is provided to present the partially treated hides or skins to a plurality of machines which may include unhairing and fleshing machines (not shown), the cheeking machine, however, being omitted. While carried by the conveyor 20 each piece of work 13 is gripped by its treated portion so that the untreated portion may be presented to unhairing and fleshing machines like those at stations A and C. This completes the beam-house operations on these hides or skins.

The beam-house machines are preferably of the type shown in United States Letters Patent No. 873,790, granted Dec. 17, 1907, upon application of Rood and Perkins, in which a bed roll for receiving and supporting a piece of work is movable to work-receiving position where it is spaced a considerable distance from the tool or other instrumentality for operating upon the work, thus making it easy to introduce the piece of work by simply suspending it from the conveyor to which it is gripped and lowering it into the space between the bed roll and the tool. Subsequently, the bed roll moves into co-operative relation with respect to the tool, carrying a portion of the suspended work with it.

Upon inspection of the unhairing machine 14 at station A it will be observed that a bed roll 22, in its operative position, is shown pressing the hide or skin against a bladed cylinder 24 and also against a pinch roll 26. As a matter of fact, the bed roll 22 presses the piece of work against the pinch roll 26 just before the work reaches operative position with respect to the bladed cylinder 24 so that the feeding of the work by the bed roll 22 and the pinch roll 26 is started just before the cylinder begins to operate. At the time that the piece of work 13 was introduced into machine 14 the bed roll 22 was in the position indicated by dotted lines at the left of its solid-line position at station A. Since the bed roll 22 and the pinch roll 26 are both turning, at a rapid rate as compared to the speed of the conveyor 10, in directions to feed the piece of work backwardly out of the machine and in a direction to release the piece of work to the control of the conveyor 10, the latter may continue its movement during the unhairing operation. The hair on a piece of work 13 is indicated at 27 by shading. It will be noticed, upon inspection of the piece of work 13 between stations A and B, that the hair was removed from a portion of the hide or skin by the machine at station A.

Following the unhairing operation, the piece of work is presented to the cheeking machine 16 at station B at a time when bed roll 28 is in its work-receiving position indicated by dotted lines at the right of its solid-line position. At the proper time the bed roll 28 moves to press the work against a pinch roll 30 and to present the head and neck portions of the hide or skin to a cheeking cutter indicated at 32 to have thick portions 33 reduced by splitting off the excess thickness. Upon inspection of the machine at station B it will be observed that the bed roll 28 co-operates with the pinch roll 30 in feeding the piece of work upwardly in a direction to release it to the control of the conveyor 10.

Following the cheeking operation the hide or skin is next presented to a fleshing machine at station C to have fat, connective tissue, and pieces of flesh indicated by dotted line 35 removed from the flesh side of the hide or skin. Here again, a bed roll indicated by reference character 34 is in open position while the work is being introduced. Upon moving to work presenting position, the bed roll presses the hide or skin against a pinch roll 36 and then against a fleshing cylinder 38. As in the machines disclosed at stations A and B, the bed roll and pinch roll of the fleshing machine operate to feed the work upwardly in a direction to release it to the moving conveyor 10. Since the beam-house machines all feed the work in a direction and at a speed sufficient to release it to the control of the conveyor, the grippers 12 clamp the work with a pressure just sufficient to carry it and present it to the different machines. In other words, the conveyor does not drag the work through the machines but simply takes up the slack and consequently the gripping pressure of the grippers does not need to be so great as to mar the tender hides and skins. All of the desired beam-house operations having now been performed upon the same portion of the hide or skin, approximately one-half thereof, this piece of work is released at station D so that it may be secured to the similar conveyor 20 (Fig. 1*a*), this time being engaged by a gripper 12 in such a way as to present the unfinished portion of the work to another set of machines which will include an unhairing machine and a fleshing machine such as those disclosed at stations A and C respectively, the cheeking machine being omitted for reasons already stated.

For guiding and for causing movement of the flexible conveyor 10, the latter passes around and over a plurality of sprocket wheels 50, some of which are driven to cause movement of the conveyor 10 while others such as those at 52, 54, 56 may be idlers serving to guide the conveyor to such positions that the pieces of work carried by the con-

veyor may be introduced into the respective machines at stations A, B and C. The operation of this part of the mechanism may be briefly described as follows: When a gripper 12 has reached a position indicated at station E (Fig. 1) a hide or skin is placed in engagement with the gripper, a sufficient amount of the hide or skin being placed within the scoop-like gripper to provide against displacement of the hide or skin through the action of gravity upon the portion hanging suspended from the gripper. As the conveyor moves in the direction of the arrow in Fig. 1 the gripper 12 is caused to close upon the hide or skin by means which will hereinafter be described. When the gripped hide or skin has been lowered into position between the bed roll 22 and the cylinder 24 of the unhairing machine at station A the bed roll is caused to move to work-presenting position with respect to the cylinder by the tripping of a treadle or other means for controlling the clutch of the unhairing machine. The clutch of each of the machines may be tripped by an operator who works in timed relation to the conveyor to cause opening and closing of the bed rolls of each machine. It will be observed that there is a dwell in the horizontal movement of the hide or skin from left to right in this figure while the conveyor 10 is traveling down one side of the sprocket wheel 52 and up the other side thereof and also a slowing of the rate of downward movement and of the beginning of the upward movement in passing around the wheel 52 which affords time sufficient for operation of the bed roll to be initiated by the operator and for the bed roll to move to work presenting position with respect to the bladed cylinder 24 and also to feed the work sufficiently to release it to the slower moving conveyor 10 which moves fast enough to take up the slack in the hide or skin, as heretofore stated. The operations at B and C take place in a manner similar to that at station A, the difference in the operation depending upon the difference in the tools to which the work is presented.

For mounting the grippers 12 upon a pair of chains in the conveyor mechanism 10, a pivot rod 70 (Fig. 4), which serves as the pintle for connecting hinge portions of two gripper members 72 of each gripper 12, is provided with an extension 74 (Figs. 3 and 4) at each end of the gripper 12, the said extension 74 serving as a connecting means between the gripper 12 and the chain at one end of the gripper and also as a pivot for two sets of chain links 76, 78. In an apparatus designed for operating on skins each gripper 12 will be about five feet long, while in an apparatus for operating on large hides it may be as long as ten feet. Hence the chains of the conveyor 10 will be spaced a considerable distance from each other at opposite ends of the grippers 12. For holding the two halves 72 of the gripper 12 in gripping relation to a piece of work, there is provided a pivoted hook member 80 adjacent to one end portion of a gripper member 72 while the other gripper member 72 carries a pin 82 with which the hook 80 engages to hold the gripper members 72 in gripping relation to the work, a spring 84 being provided for yieldingly holding the hook 80 in engagement with the pin 82. As most clearly shown in Fig. 4 of the drawings, the hook 80 has a laterally extending handle member 86 which may be utilized for manually releasing the hook for engagement with the pin 82 should occasion arise but which will normally be used in connection with other means to be described for automatically moving the hook to inoperative position, thus permitting the work to be released from the gripper. In machines designed to operate upon large pieces of work, a hook 80 with the co-operating parts just described will be provided at each end of the gripper members 72.

Preferably, and as shown, means is provided for automatically closing the grippers 12 in succession upon the pieces of work as each gripper in turn moves upwardly away from station E (Fig. 1). In the illustrated construction, this means comprises a toggle mechanism comprising a toggle lever 90 (Figs. 2 and 4) pivoted upon an extension 92 of a pivot pin 94 of chain links 96. At its other end the toggle lever 90 is connected by a pivot pin 100 to a second toggle lever 102, which is pivoted upon a pivot pin 104 carried by two links 106, 108. These links 106, 108 are pivoted at their opposite ends to brackets on the gripper members 72. One end of the pivot pin 104 is reduced in diameter as at 110 (Fig. 4) to be slidably received in a slot 112 in a link 114 secured to links 78 of the conveyor chain 10. In the construction shown, this link 114 is supported at one end by the extension 74 of the pintle 70 while at its other end it is secured to the chain links 78 by means of an extension of a pivot pin 116 which pivotally connects the set of links 78 with the links 96. Carried by the pivot pin 100 of the toggle levers 90, 102 is a cam roll 118 adapted to engage with a cam bar 120 (Fig. 2) during upward movement of the gripper 12 from the station E. For holding the conveyor chain 10 against buckling during co-operation of the cam roll 118 and the cam bar 120, the chain is backed by a guiding backing member 122. It will be readily understood that as the roll 118 is gradually forced to the right in Fig. 2 the gripper members 72 will be caused to close upon each other until finally the hook 80 engages over the pin 82 to hold the gripper members 72 in closed engaging relation with the work.

Upon reference to Fig. 5 of the drawings it will be observed that means is provided for automatically unlocking the hook member 80

with respect to the pin 82. This figure shows an abutment 130 carried by a stationary part of the machine frame (not shown) with which the laterally extending handle 86 of the hook member 80 will engage when the gripper 12 with its piece of work has reached station D. As soon as the hook 80 is moved to unlocking position the gripper members 72 are moved apart not only by the weight of the piece of work but also by the tension of a spring 132, the ends of which are connected to the toggle levers 90 and 102, the effect of the spring 132 being to break the toggle and draw the toggle levers to a position where the gripper members 72 are pulled to opening position to release the work, as shown in Fig. 6.

In operating the novel mechanism shown in the drawings by the aid of which the method of this invention may advantageously be practiced, a plurality of operations are performed upon the same portion of each hide or skin before it is turned end for end for a set of operations upon its untreated portion. It is thus possible to grip a hide or skin by mechanical means to maintain control of it during a series of operations upon the same portion thereof and then to engage the treated portion with the same or a similar gripping means while the untreated portion is carried through a set of operations to complete the treatment of the hide or skin.

With reference to the illustrated apparatus, a hide or skin, while under control by the gripping means 12, has a portion thereof unhaired, then cheeked, and finally fleshed while maintained under control by the same gripping means. Subsequently, the treated part of the hide or skin is similarly gripped and then the untreated portion is first unhaired and then fleshed. Since sheep and goat skins are not cheeked, this operation is omitted when they are sent through the beamhouse.

As the gripper 12 passes upwardly from station E the gripper is caused to close upon the hide or skin, as the case may be, by automatically operated means such as that disclosed in Figs. 2, 3 and 4 of the drawings. At station A the hide or skin is acted upon by an unhairing machine which unhairs approximately one-half of the hide or skin. The conveyor, during the unhairing operation, may be stationary, although it is preferred that it should continue to move since the timing of the conveyor 10 with respect to the operations of the unhairing machine at station A, of the cheeking machine at station B, and of the fleshing machine at station C, may be readily accomplished, and since there is a dwell in the movement of the hide or skin in a direction from left to right of the apparatus shown in Fig. 1, while the hide or skin is descending on one side of the sprocket wheel 52, 54 or 56 and while it is ascending on the other side of the same sprocket wheel. Furthermore, each of the machines shown at stations A, B, and C feeds the work outwardly in a direction to release it to the conveyor which moves with a speed just sufficient to take up the slack in the piece of work undergoing any one of the operations at the various stations. After the unhairing operation at station A the conveyor carries the same hide or skin to station B where the head and neck portions are cheeked, and subsequently to station C where the unhaired portion is fleshed. This skin may now be returned to station E of the same apparatus and passed through a second time to unhair and flesh the untreated portion of the hide or skin, the cheeker at station B being left inoperative during this second trip of the hide or skin, since only one portion of any hide or skin is ever cheeked. Preferably, however, a second apparatus will be provided similar to that shown in Fig. 1*a* with the exception that it will not comprise a cheeking machine. By practicing the new method with the aid of the illustrated apparatus, two or three men may perform the work of attending to three machines which formerly required the constant attention of five or six men. If the apparatus is designed for operating upon small skins, such as goat and calf, only one man may be needed at station E to place a skin upon a gripper 12 when it reaches this station. If the apparatus is designed for handling heavy hides two men will be required at station E.

It will be readily understood that besides beam-house operations upon hides and skins, other operations may be performed such as putting-out, drying, and staking simply by substituting at stations A, B and C the appropriate machines for the work.

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

1. That improvement in methods of operating upon hides, skins, and pieces of leather having grain and flesh surfaces which comprises performing a set of operations upon both grain and flesh surfaces of a portion only of each of a lot of hides, skins, or pieces of leather, the pieces of work being moved to successive work-treating stations, and subsequently performing the same set of operations upon the remaining portion of each of the same lot of pieces of work.

2. That improvement in methods of operating upon hides, skins and pieces of leather having grain and flesh surfaces which comprises performing a set of operations upon both grain and flesh surfaces of a portion only of each of a lot of hides, skins, or pieces of leather, while moving the pieces of work in succession to work-treating positions, and subsequently operating upon the remaining

portions of each of the same lot of pieces of work.

3. That improvement in methods of operating upon hides, skins and pieces of leather having grain and flesh surfaces which comprises performing a set of operations upon both grain and flesh surfaces of a portion only of each of a lot of hides, skins, or pieces of leather, while moving the pieces of work continuously in succession to and by work-treating positions, and subsequently operating upon the remaining portions of each of the same lot of pieces of work.

4. That improvement in methods of operating upon hides, skins and pieces of leather which comprises gripping a portion of each of a plurality of hides, skins, or pieces of leather, performing a plurality of operations upon an ungripped portion of each of the plurality of pieces of work while each piece is controlled through its gripped portion, the pieces of work being moved in succession to and by work-treating positions, and subsequently performing a plurality of operations upon the remaining portion of each piece of the same lot of work.

5. That improvement in methods of operating upon hides, skins and pieces of leather which comprises gripping a portion of each of a plurality of hides, skins, or pieces of leather, performing a plurality of operations in succession upon an ungripped portion of each of the pieces of work while moving the pieces of work continuously in succession to and by work-treating positions and while each piece is controlled through its gripper portion, and subsequently performing a plurality of operations upon the remaining portion of each piece of the same lot of work.

6. That improvement in methods of operating upon hides, skins and pieces of leather having grain and flesh surfaces which comprises gripping a portion of each of a plurality of pieces of work, performing a plurality of operations in succession upon both grain and flesh surfaces of a portion only of each of the plurality of pieces of work while each piece is controlled through its gripped portion, and subsequently performing a plurality of operations upon the remaining portion of each piece of the same lot of work.

7. That improvement in methods of operating upon hides, skins and pieces of leather which comprises gripping a marginal portion of each of a plurality of pieces of work, performing a plurality of operations upon a portion only of each of the plurality of pieces of work while each piece is controlled through its gripped marginal portion, releasing each piece of work after the performance of the operations on the said portion of the work, gripping each piece of work by engagement with a portion thereof which has been operated upon, and performing a plurality of operations upon the remaining portion of each piece of work of the same lot while under control through the gripped portion thereof.

8. That improvement in methods of operating upon hides, skins and leather which comprises gripping a marginal portion of each of a plurality of pieces of work, performing unhairing, cheeking and fleshing operations in succession upon a portion only of each of the plurality of pieces of work while each piece is controlled through its gripped marginal portion and while the pieces of work are being moved continuously in succession to work-treating positions, releasing each piece of work after the performance of the operations on the said portion of the work, gripping each piece of work by engagement with a portion thereof which has been operated upon, and performing unhairing and fleshing operations upon the remaining portion of each piece of work of the same lot while under control through the gripped portion thereof.

9. That improvement in methods of operating upon hides, skins and leather which comprises gripping a marginal portion of each of a plurality of pieces of work, performing unhairing, cheeking, and fleshing operations upon a portion only of each of the plurality of pieces of work while each piece is controlled through its gripped marginal portion, releasing each piece of work after the performance of the operations on the said portion of the work, gripping each piece of work by engagement with a portion thereof which has been operated upon, and performing unhairing and fleshing operations upon the remaining portion of each piece of work of the same lot while under control through the gripped portion thereof.

10. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of mechanisms for performing a plurality of operations upon a portion of each of a plurality of pieces of work, and means for securely gripping a portion of each piece of work constructed and arranged for carrying each piece of work while held by its gripped portion to the work-operating mechanisms in succession to present an ungripped portion of the work for treatment by each of said mechanisms.

11. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of machines operating in series for performing a plurality of beamhouse operations in succession upon a portion of each of a plurality of pieces of work, and means for gripping a portion of each piece of work and bodily movable for presenting each piece of work while controlled through its gripped portion to each machine in the series of machines.

12. In an apparatus for operating upon

hides, skins, leather and other similar pieces of work, a plurality of mechanisms for performing beam-house operations on pieces of work, and means for securely gripping each piece of work and carrying said piece of work through each mechanism in succession while maintaining it under control through the gripped portion thereof.

13. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of mechanisms for operating on a piece of work, each mechanism operating in a cycle having a work-receiving part and a work-treating part, and means for gripping a piece of work and introducing it successively into the plurality of operating mechanisms while the latter are in the work-receiving part of the cycle of each mechanism, so that an ungripped portion of the work is operated upon by the several mechanisms while under control through the gripped portion thereof.

14. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of mechanisms for operating on pieces of work, each having a tool and a work-supporting member movable to work-receiving position, said work-supporting member of each mechanism being subsequently movable to work-presenting position with respect to the tool in said mechanism, and means for gripping a piece of work movable into position for the introduction of a portion of the piece of work into each of the mechanisms in succession while the work support thereof is in work-receiving position.

15. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of mechanisms for operating on pieces of work, each having a tool and a work-supporting member movable to work-receiving position, said work-supporting member of each mechanism being subsequently movable to work-presenting position with respect to the tool in said mechanism, and means for gripping a piece of work and holding it suspended, said means being movable to introduce a suspended portion of the piece of work into the space between the tool and the work support of each mechanism while the work support thereof is in work-receiving position, and said gripping means being also operative to carry the piece of work from one mechanism to another whereby the suspended portion of the piece of work is successively operated upon while securely held by the gripping means.

16. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of mechanisms for performing different operations upon a piece of work, and a flexible conveyor means having a gripping member for seizing a piece of work, said conveyor means being movable into position for the introduction of a portion only of the piece of work into each mechanism in succession and to carry it from one mechanism to another while the gripping member retains control of the piece of work.

17. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of beam-house machines operable in series, and a conveyor having grippers for engaging pieces of work and for carrying said pieces of work through each machine in succession while maintaining the pieces of work under control through the gripped portions thereof.

18. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of machines operable in series, and a conveyor having grippers each adapted to enclose a part of a piece of work and to present the free part of the work to each of the series of machines whereby the free portion of the work is operated upon successively while under control through the gripped portion thereof.

19. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of machines operating in series, each machine having an instrumentality for operating on the work and a work-supporting member movable to work-receiving position, said work-supporting member of each machine being subsequently movable to work-presenting position with respect to the work-operating instrumentality, and a conveyor having grippers for the pieces of work and movable to introduce each piece of work in succession into each of the machines while the work-supporting member thereof is in work-receiving position, and to transfer the pieces of work successively from one machine to another whereby a plurality of operations is performed in succession upon the pieces of work.

20. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of machines, each having an instrumentality for operating on pieces of work and a work-supporting member movable to work-receiving position, said work-supporting member of each machine being subsequently movable to work-presenting position with respect to the work-operating instrumentality, and conveyor means for gripping pieces of work to hold them suspended and movable to introduce a suspended portion of each piece of work into the space between the operating instrumentality and the work-supporting member of each machine while the work-supporting member is in work-receiving position, said conveyor means being movable to carry pieces of work from one machine to another during operation of the several instrumentalities whereby the suspended portions of the pieces of work are successively operated upon while securely held by the conveyor means.

21. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of mechanisms for performing different operations upon a piece of work, a conveyor having grippers for seizing pieces of work and movable to present the pieces of work to each mechanism in succession, and means for automatically closing and locking the grippers on the pieces of work and for causing the grippers to open to release the work after it has undergone treatment by said mechanisms.

22. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of mechanisms for performing different operations upon a piece of work, a conveyor having grippers for seizing pieces of work and movable to present the pieces of work to each mechanism in succession, and means controlled by the conveyor for closing and locking the grippers in succession on pieces of work and for causing the grippers to open to release the work after it has undergone treatment by said mechanisms.

23. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of mechanisms for performing different operations upon a piece of work, a conveyor having grippers for seizing pieces of work and movable to present the pieces of work to each mechanism in succession, and means comprising stationary abutments for automatically closing and locking the grippers in succession on pieces of work and for causing the grippers to open to release the work.

24. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism for operating upon a piece of work, and means for presenting the work to the mechanism provided with a gripper for holding the piece of work on the work-presenting means, said gripper comprising a plurality of gripper members relatively movable toward each other to grip a piece of work and away from each other to release the piece of work, and means for locking the gripper members in work-gripping position.

25. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism for operating upon a piece of work, and means for presenting the work to the mechanism provided with a gripper for holding the piece of work on the work-presenting means, said gripper comprising a plurality of gripper members relatively movable toward each other to grip a piece of work and away from each other to release the work, means for closing the gripper members upon a piece of work, and a latch member for locking the gripper members in gripping relation to the work.

26. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism for operating upon a piece of work, and means for presenting the work to the mechanism provided with a gripper for holding the piece of work on the work-presenting means, said gripper comprising a pair of gripper members relatively movable toward each other to grip a piece of work and away from each other to release the work, a toggle and cam mechanism operative to close the gripper members upon a piece of work, and a latch member to lock them in work-gripping relation to the work.

27. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism for operating upon a piece of work, and means for presenting the work to the mechanism provided with a gripper for holding the piece of work on the work-presenting means, said gripper comprising a pair of gripper members relatively movable toward each other to grip a piece of work and away from each other to release the work, a toggle and cam mechanism operative to close the gripper members upon a piece of work, a latch member to lock them in work-gripping relation to the work, and a stationary abutment in the path of the latch for releasing the latter to permit the gripper members to open to release the work.

28. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism for operating upon a piece of work, and means for presenting the work to the mechanism provided with a gripper for holding the piece of work on the work-presenting means, said gripper comprising a plurality of gripper members relatively movable toward each other to grip a piece of work and away from each other to release the piece of work, means for locking the gripper members in work-gripping position, and means rendered effective by the work-presenting means for releasing the locking means to permit the gripper to release the work.

29. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism for operating upon a piece of work, and means for presenting the work to the mechanism provided with a gripper for holding the piece of work on the work-presenting means, said gripper comprising a plurality of gripper members relatively movable toward each other to grip a piece of work and away from each other to release the work, means for closing the gripper members upon a piece of work, means for locking the gripper members in gripping relation to the work, and means in the path of the locking means for releasing the latter to permit the gripper to release the work.

30. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism for operating upon a

piece of work, and a conveyor for presenting the work to the mechanism provided with a gripper for holding the piece of work on the conveyor, said gripper comprising a pair of gripper members relatively movable toward each other to enclose and grip a portion of a piece of work, toggle mechanism for closing the gripper members upon the work, a cam for actuating the toggle mechanism, means for locking the gripper members in gripping relation to the work, and a stationary member in the path of the locking means for causing the latter to release the gripper members to permit the latter to release the work.

31. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism for operating upon a piece of work, and a conveyor for presenting the work to the mechanism provided with a gripper for holding the piece of work on the conveyor, said gripper comprising a pair of gripper members, a pintle for hingedly connecting the gripper members, said pintle serving also to connect the gripper pivotally to the conveyor, means for automatically closing the gripper members upon a piece of work, and means for causing the gripper members to open at a predetermined point in the path of the gripper to release the piece of work.

32. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism for operating upon a piece of work, and a conveyor for presenting the work to the mechanism provided with a gripper for holding the piece of work on the conveyor, said gripper comprising a pair of gripper members relatively movable toward each other to grip a piece of work and away from each other to release the work, spring means operative to maintain the gripper members yieldingly in open, work-receiving condition relatively to each other, means controlled by the conveyor for closing the gripper members upon a piece of work, means for locking the gripper members in gripping relation to the work, and other means controlled by the conveyor for causing the gripper members to open to release the piece of work.

33. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism for operating upon a piece of work, and means for presenting the work to the mechanism provided with a gripper for holding the piece of work on the work-presenting means, said gripper comprising a pair of gripper members relatively movable toward each other to grip a piece of work and away from each other to release the work, means automatically operative to close the gripper members upon a piece of work and lock them in work-gripping relation to each other, and a stationary abutment in the path of the locking means for releasing the latter to permit the gripper members to open to release the work.

34. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism for operating upon a piece of work, and a conveyor for presenting the work to the mechanism provided with a gripper for holding the piece of work on the conveyor, said gripper comprising a pair of gripper members relatively movable toward each other to grip a piece of work and away from each other to release the work, means comprising toggle mechanism for closing the gripper members upon a piece of work, locking means for holding the gripper members in gripping relation to the work, and a stationary abutment, said locking means having a portion adapted to contact with the stationary abutment during the movement of the conveyor to cause unlocking of the gripper members to permit the latter to release the work.

35. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of mechanisms for operating successively on a piece of work, each having a tool and a work-supporting member movable to work-receiving position, said work-supporting member of each mechanism being also movable to work-presenting position with respect to said tool, a flexible conveyor having means for gripping a piece of work and holding it suspended, and means for guiding the flexible conveyor so that portions thereof approach each of the operating mechanisms from above to introduce the suspended portion of the work into the space between the tool and the work support of each mechanism in succession while the work support of that mechanism is in work-receiving position, said mechanisms and said conveyor being operable in timed relation to each other to permit introduction of the work, operation thereon of each individual mechanism, and transfer of the piece of work from one mechanism to another in succession.

36. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of mechanisms for operating successively on a piece of work, each having a tool and a work-supporting member movable to work-receiving position, said work-supporting member of each mechanism being also movable to work-presenting position with respect to said tool, a flexible conveyor provided with a gripper for seizing a piece of work and holding it suspended, and a plurality of guiding wheels for the conveyor arranged to provide descending and ascending runs in the conveyor above each of the operating mechanisms whereby to introduce a piece of work into an operating mechanism during downward movement of the gripper with the descending run of the conveyor and to lift the piece of work away

from said operating mechanism during upward movement of the gripper along with the ascending run of the conveyor, said mechanisms and said conveyor being operable in timed relation to each other to permit introduction of the work into each operating mechanism, operation thereon of each individual mechanism, and transfer of the piece of work to the other operating mechanisms in succession.

37. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism having a tool and a work-supporting member movable between work-receiving position and work-presenting position with respect to the tool, and means for introducing a piece of work while the work-supporting member is in work-receiving position and for supporting the piece of work while the latter is being delivered from the mechanism.

38. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism having a tool and a work-supporting member movable between work-receiving position and work-presenting position with respect to the tool, and conveyor means comprising a work-gripping member for introducing an ungripped portion of a piece of work between the tool and the work-supporting member while the latter is in work-receiving position, the work-gripping means being movable for supporting a constantly increasing portion of the piece of work as it is being discharged from the mechanism during operation of the tool.

39. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism having a tool and a work supporting member movable between work receiving position and work presenting position with respect to the tool, a conveyor for introducing a piece of work into the mechanism while the work supporting member is in work receiving position and for withdrawing the piece of work and supporting it while it is being delivered from the mechanism, and a conveyor guiding roll around which the conveyor passes to cause it to move directly toward the mechanism in introducing the piece of work, the construction and arrangement being such that travel of the conveyor around the guiding roll produces a dwell in the traveling movement of the piece of work between the introduction and the withdrawal thereof during which the work supporting member may move to work presenting position so that the mechanism may start in operation before the work is moved away therefrom.

40. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a mechanism having a tool and work feeding means comprising a work supporting member movable between work receiving position and work presenting position with respect to the tool, a conveyor movable at a rate less than that of the work feeding means and operative to introduce a piece of work into the mechanism while the work supporting member is in work receiving position and for supporting the piece of work while the latter is being delivered from the mechanism, said conveyor comprising a gripper for gripping the work with a moderate pressure so as not to injure the latter, and a guiding roll for the conveyor around which the latter passes in introducing the work into the mechanism and withdrawing it therefrom, the construction and arrangement being such that a dwell is provided in the traveling movement of the piece of work between the introduction and the withdrawal thereof during which a certain amount of slack is accumulated in the piece of work to be gradually taken up during the further movement of the conveyor after the dwell and without exerting any pull on the piece of work in moving it away from the mechanism.

41. That improvement in methods of operating upon hides, skins and leather which comprises performing unhairing, cheeking and fleshing operations in succession upon a portion only of each of a plurality of pieces of work while the pieces of work are being moved continuously in succession to work treating positions, and subsequently performing unhairing and fleshing operations upon the remaining portion of each piece of work of the same lot.

42. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of machines each having an instrumentality for operating on pieces of work and a work-supporting member movable to work receiving position, said work supporting member of each machine being subsequently movable to work presenting position with respect to the work-operating instrumentality, means for gripping a piece of work to hold it suspended, and a continuously movable conveyor having a plurality of the gripping means and constructed and arranged to introduce a suspended portion of each piece of work into the space between the operating instrumentality and the work supporting member of each machine while the work supporting member is in work receiving position, there being a dwell in the movement of the gripping means when it is over each machine to facilitate operation of each machine in relation to the movement of the work, said conveyor being movable to carry pieces of work from one machine to another during operation of the several instrumentalities whereby the suspended portions of the pieces of work are successively operated upon while securely held by the conveyor supported gripping means.

43. In an apparatus for operating upon

hides, skins, leather and other similar pieces of work, a plurality of machines each having an instrumentality for operating on pieces of work and a work supporting member movable to work receiving position, said work supporting member of each machine being subsequently movable to work-presenting position with respect to the work operating instrumentality, each machine having also means for feeding the work out of the machine during treatment thereof by the work-operating instrumentality, means for gripping a piece of work to hold it suspended, and a conveyor having a plurality of the gripping means and being continuously movable at a slower rate than the rate of the work feeding means of each machine, the conveyor with its gripping means being arranged to introduce a suspended portion of each piece of work into the space between the operating instrumentality and the work supporting member of each machine while the work supporting member is in work receiving position, said conveyor being also movable to carry pieces of work from one machine to another during operation of the several instrumentalities and of the work feeding means associated therewith in each machine whereby the suspended portions of the pieces of work are successively operated upon while securely held by the conveyor supported gripping means.

44. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of machines each having an instrumentality for operating on pieces of work and a work supporting member movable to work receiving position, said work supporting member of each machine being subsequently movable to work presenting position with respect to the work operating instrumentality, each machine having means for feeding work out of the machine during the operation of the work operating instrumentality, gripper members for gripping pieces of work to hold them suspended, and a conveyor having a plurality of the gripper members and movable to carry the gripper members in succession to positions adjacent to said machines so that the suspended portion of each piece of work may be introduced into each machine in turn while the work supporting member of the machine is spaced with respect to the work operating instrumentality of that machine, the work feeding means of each machine being arranged to feed the work substantially in the direction of movement of the conveyor and at a greater rate of speed than the conveyor, the arrangement being such that the feed of the work by each machine facilitates the operation of the conveyor and its gripper members in carrying the work from one machine to another.

45. In an apparatus for operating upon hides, skins, leather and other similar pieces of work, a plurality of machines each having an instrumentality for operating on pieces of work and a work supporting member movable to work receiving position, said work supporting member of each machine being subsequently movable to work presenting position with respect to the work operating instrumentality, each machine having work feeding means for feeding a piece of work out of the machine during the operation of the work operating instrumentality, a plurality of gripper members for gripping and holding pieces of work suspended from the gripper members, a conveyor to which the gripper members are attached, said conveyor being continuously driven at a substantially slower rate than that of the work feeding means of each machine, and idler rolls, one adjacent to each machine, about which the conveyor passes with its gripper members, the construction and arrangement being such that each gripper member moves downwardly toward one of the machines in passing around the idler roll whereby a suspended portion of the work is introduced into the machine while the work supporting member of the machine is spaced with respect to the work operating instrumentality, there being a dwell in the movement of each gripper member around the idler roll, thus facilitating the timing of the machine by the operator so that the work supporting member may move to work presenting position with respect to the work operating instrumentality before the gripper member with its piece of work starts upwardly at the full rate of movement of the conveyor and while the piece of work is being fed out of the machine at a greater rate of speed than that of the conveyor, the conveyor being continuously movable to carry pieces of work from one machine to another during operation of the several instrumentalities whereby the suspended portions of the pieces of work are successively operated upon while securely held by the conveyor supported gripper members.

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

HANS FREUDENBERG.