

[54] **SAMMYING PRESSES**
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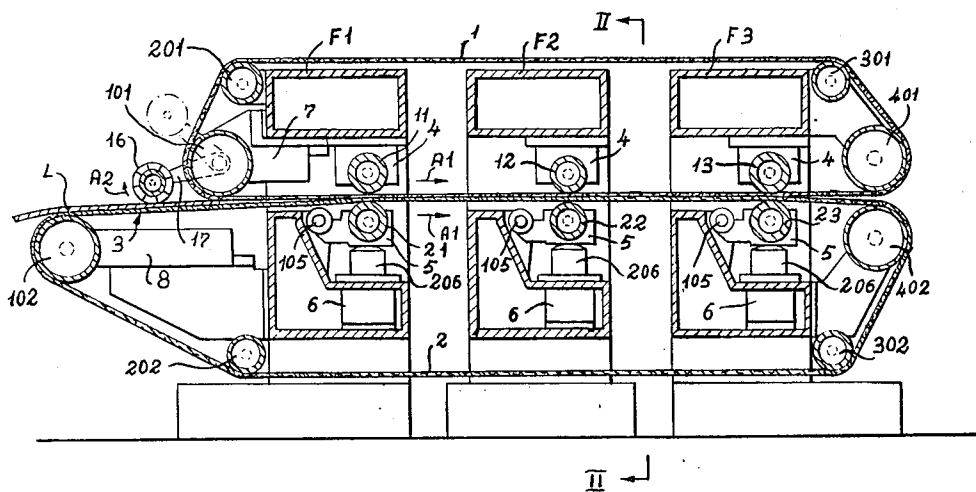
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[57] **ABSTRACT**

This invention relates to continuous sammying presses, i.e., machines for squeezing moisture from hides, leather or the like. Ordinarily, such presses employ endless revolving belts made of porous material, such as felt, and have two straight runs, one above the other, between which the hide is sandwiched. The belts are moved in the same direction and at the same speed between cooperating press rolls that are pressed one against the other. In order to reduce pressure on the belts, which is brought about by the use of the normal single pair of press rolls, the invention provides that there shall be at least two pairs of sequentially arranged press rolls. This arrangement enables the pressure at any one point to be reduced but without, however, increasing the time of processing.

5 Claims, 3 Drawing Figures



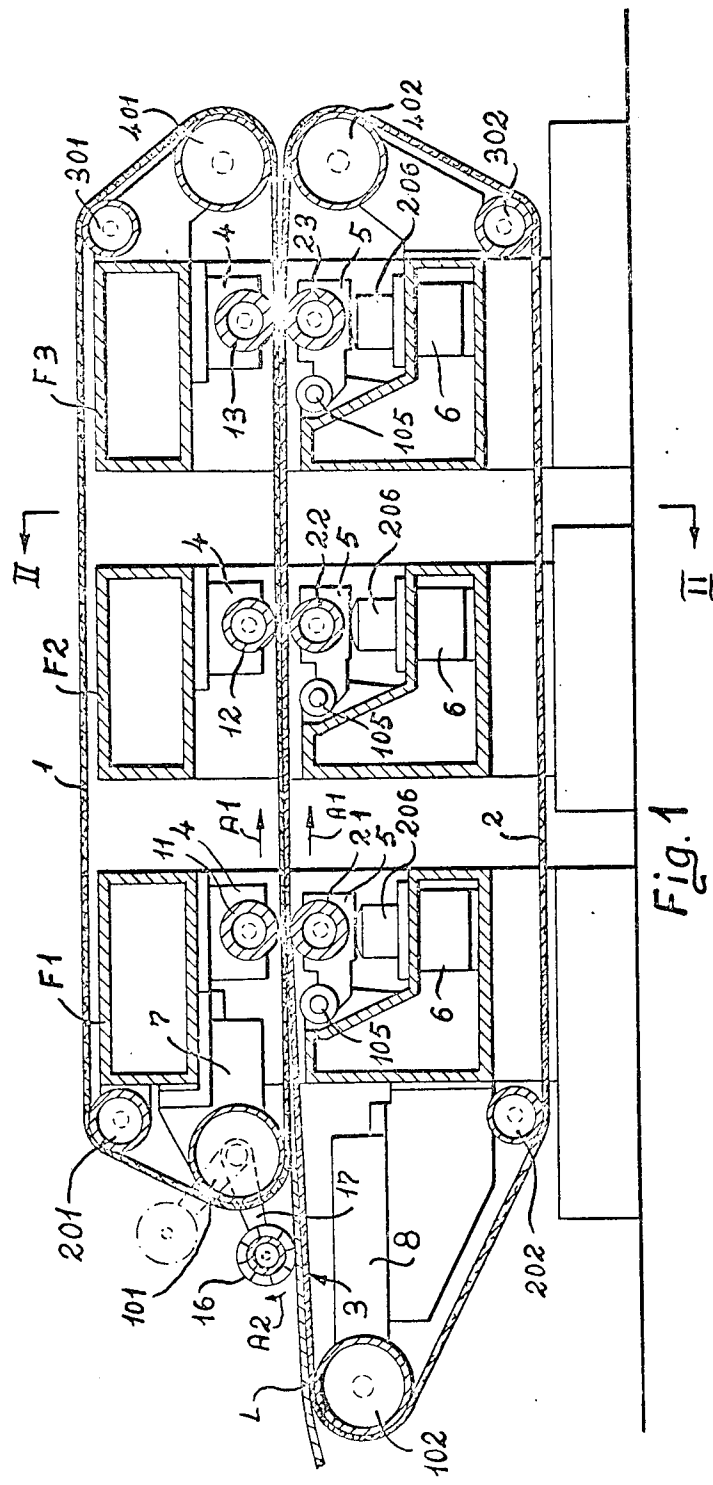


Fig. 1

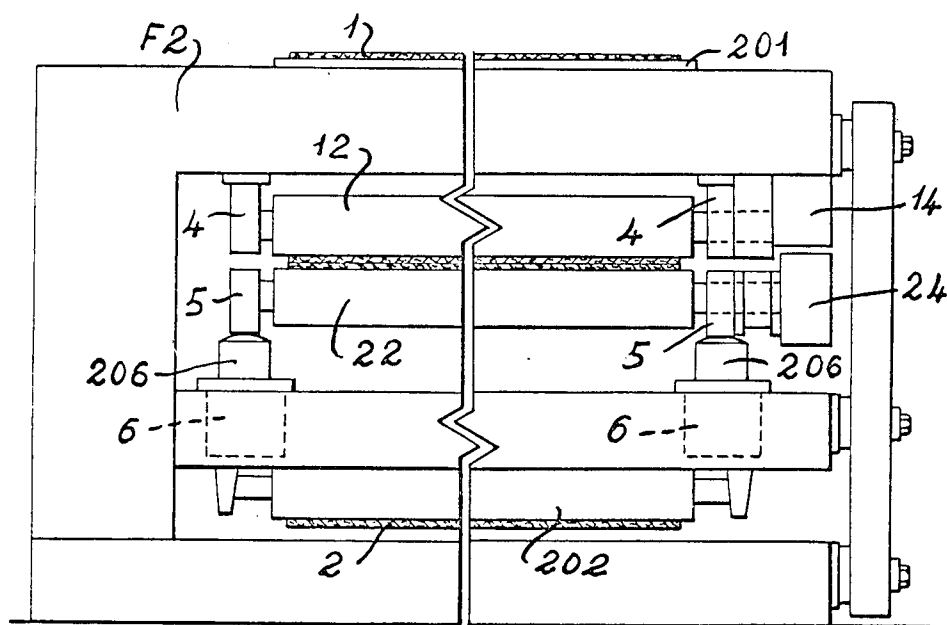
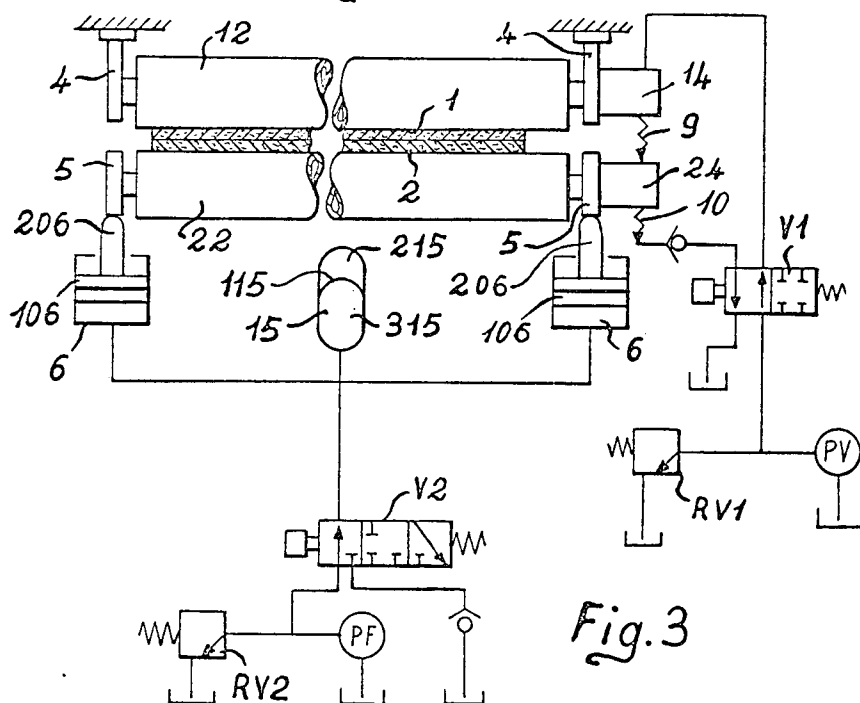


Fig. 2



SAMMYING PRESSES

The present invention relates to a continuous sammying press, i.e., a machine for squeezing moisture out of hides, leather or the like, to make the moisture content equal, having two superposed endless revolving belts made of porous material pervious to water, more especially felt, the superimposed sides, moved in the same direction and at the same speed, together with the hide laid therebetween, being caused to run between cooperating rolls pressed one against the other.

The known machines of this type have a single pair of press rolls, so that it is necessary to exert a very strong pressure on the hide that is passing through, if a sufficiently high speed of passage and an economically justifiable productive capacity are to be achieved. Consequently, very powerful and costly pressure arrangements have to be provided for the pressing of the rolls together. Through the high bearing pressure of the press rolls, the felt belts running therebetween are subjected to a very high wear, so that they wear out in a comparatively short time and have to be changed very often, which brings about very high operating costs. If, on the other hand, the bearing pressure of the press rolls is reduced for the purpose of obviating these disadvantages, the speed of passage of the hides has to be reduced accordingly, whereby the productive capacity of the machine is undesirably reduced.

It is therefore an object of the invention to obviate or minimize the disadvantages of the known continuous sammying presses, and to provide a machine in which, although a high speed of put-through of the hides is attained, with a consequently large productive capacity of the machines, the bearing pressure of the cooperating press rolls and consequently also the wear on the felt belts is substantially reduced and the frequent costly exchanges of these belts are avoided.

In accordance with the invention, this task is solved by arranging at least two pairs of press rolls one after another in the direction of passage of the hides, etc., through the machine. This enables the bearing pressure between the press rolls of the individual successive pairs of press rolls to be substantially smaller than in the case of the known machines having a single pair of rolls. However, since the hide, upon its passage through the successive pairs of press rolls, is squeezed out more than once, i.e., repeatedly, even with a very high speed of passage of the hides, the liquid can be squeezed out of these latter to the requisite degree.

The invention is thus based on the realization that, to squeeze the liquid out of the hide, even a comparatively low amount of pressure applied is sufficient if the hide is subjected to this pressure for a fairly long time.

In the case of a machine in accordance with the invention, however, this exertion of pressure lasting for a fairly long time does not—as in the case of the known machines—need to be achieved with a single pair of press rolls and a reduction in the speed of through-put. On the contrary, in accordance with the invention, the entire pressing time necessary with a reduced amount of pressure applied, is distributed among two or more successive pairs of press rolls. Consequently, the hide that is to be squeezed out can be passed through the machine at a high speed. The machine of the invention consequently has a large productive capacity, i.e., it makes it possible to squeeze out a large number of hides per unit of time. At the same time, the felt belts—as a result of the reduced bearing pressure of the press rolls—are subject to considerably less wear, so that their life is substantially extended.

Advantageously, the bearing pressure of the earlier pair or pairs of press rolls in the direction of travel of the hide may be less than that of the later pair or pairs of press rolls. Thus, in particular, the bearing pressure of the various pairs of press rolls may increase progressively in the direction of travel from pair to pair. In this way, the amount of pressure applied by the individual successive pairs of press rolls is arranged to obtain a progressive squeezing of the moisture out of the hide so that on the one hand a better, i.e., a more intense and more uniform squeezing out of the hide, and on the other hand a greater speed of passage, can be achieved.

In accordance with a further feature of the invention, the individual successive pairs of press rolls, preferably together with the associated rotary drives and pressure mechanisms, are mounted on frames which are separate and independent one from another. Mounted on the frames of the pairs of press rolls arranged at the intake end and at the discharge end of the machine are preferably also the corresponding guide and tension rolls of the two felt belts. Both the distance between the individual successive pairs of rolls can be varied by adjusting the position of the corresponding frames, and the number of pairs of press rolls can be increased or decreased, as desired. The through-run machine of the invention can consequently also subsequently be adapted to requirements with simple constructional means and in a very short time.

This possibility of modification, and the adaptability of the machine as a result thereof, may, in accordance with a further feature of the invention, additionally be enhanced by driving each press roll by an associated hydraulic motor, which is preferably arranged in the region of a head end of the associated press roll and is coupled with this latter directly or via a reduction gear.

In accordance with a further advantageous feature of the invention, associated with each pair of press rolls is a separate independent hydraulic system for the rotary drive of the press rolls. In this connection, preferably the two hydraulic motors of each pair of press rolls are connected in series in the circuit of the pump of the associated hydraulic system. By this means, with a completely synchronous running, i.e., the same rotational speed of the two cooperating press rolls, can be obtained with more certainty.

The one press roll of each pair of press rolls is, in known manner, mounted so as to be adjustable to and from its associated counterroller and pressed against this latter with the necessary amount of pressure. The adjustable press roll may be pivoted in bearing members which are displaceable in sliding guides. This arrangement, however, has the disadvantage that it calls for a very precise machining of the sliding guides for the displaceable bearing members. Nevertheless, the danger of a canting of the bearing members cannot be precluded with sufficient certainty. In accordance with the invention, remedial measures may be taken by mounting the adjustable press roll of each pair of rolls on a rocking lever or levers.

The press rolls of each pair may be pressed together in known manner by hydraulic pressure cylinders. In this case, in accordance with the invention, provision is made for the fact that associated with each pair of press rolls is a separate independent hydraulic system for the actuation of the corresponding pressure cylinders. By this means, on the one hand the modification of the spacing and/or of the number of pairs of press rolls is facilitated and on the other hand the setting of different amounts of pressure applied of the individual pairs of press rolls is made possible.

In accordance with another advantageous feature of the invention, the hydraulic system associated with the pressure cylinders, of each pair of press rolls has a hydropneumatic pressure reservoir, which is connected as directly as possible, and along the shortest possible path, to the pressure cylinders. This hydropneumatic pressure reservoir effects a springing of the adjustable press roll to and from its counterroll, i.e., it makes possible small cushioned movements of the adjustable press roll in relation to its counterroll even when the associated hydraulic pressure cylinders are under pressure and their connection to the remaining hydraulic system is interrupted.

The hydropneumatic pressure reservoir makes possible, by this means, an automatic adaptation of the machine of the invention to the unavoidable differences in thickness of the individual hides or of different areas of a hide. Moreover, the hydropneumatic pressure reservoir compensates for the pressure losses occurring due to a relatively long pressure transfer of the hydraulic cylinders and the pressure fluctuations arising upon temperature changes, and thereby ensures a substantially constant bearing pressure of the press rolls, i.e., a uniform squeezing out of the hides that are passing through.

In order that the invention may be more clearly understood, reference will now be made to the accompanying drawings which show one embodiment thereof by way of example, and in which:

FIG. 1 shows a machine in accordance with the invention, in vertical longitudinal section,

FIG. 2 shows a cross section of the machine along the line II—II of FIG. 1, and

FIG. 3 shows the two hydraulic systems associated with a pair of press rolls.

Referring now to the drawings, there is shown a continuous sammying press for squeezing liquids out of hides, leather or the like, which has two endless, revolving, substantially horizontal belts, 1, 2, made of felt or another porous material which is pervious to water. The two felt belts 1, 2 are respectively guided around upper guide rolls 101, 201, 301, 401 and lower guide rolls 102, 202, 302, 402 so that the lower straight run of the upper belt is superposed over the upper straight run of the lower belt, said two straight runs being moved in the same direction at the same speed, the direction of travel being indicated by the arrow. The intake end of the straight run of the lower belt 2 is longer than that of the upper felt belt 1 and forms a free and approximately horizontal surface 3 upon which the hides L to be pressed can be laid.

The two superimposed straight runs of the belts 1, 2, run between pairs of sequentially arranged cooperating press rolls 11-21, 12-22, 13-23. Each pair of press rolls 11-21, 12-22 and 13-23, is mounted on a separate independent frame F1, F2, F3, respectively, which, considered in the direction of passage A1, has approximately the shape of a rectangular frame, as is more especially evident from FIG. 2. The top roll 11, 12, 13, of each pair is mounted in pivot bearings 4, which are secured to the associated frame F1, or F2, F3. The bottom roll 21, 22, 23, of each pair is, on the other hand, carried by two rocking levers 5, which are pivotally mounted on the associated frame F1, F2, F3, about a horizontal pivot 105 extending transversely to the direction of hide travel. The guide rolls 101, 201 or 102, 202, of the two belts 1, 2 at the intake end of the machine are mounted in the frame F1 of the first pair of press rolls 11, 21. The guide rolls 101 and 102 are in the form of tension rollers and are mounted on sliding carriages, one of which is seen at 8 in FIG. 1, which are shiftable and securable in the longitudinal direction of the machine in corresponding sliding guides of the frame F1. The guide rolls 301, 401 or 302, 402 of the two belts 1, 2 at the discharge end of the machine are mounted in the frame F3 of the final pair of press rolls 13, 23.

The lower press rolls 21, 22, 23 are pressed against the associated top press rolls 11, 12, 13 with the superimposed straight runs of the two felt belts 1, 2 interposed between the pairs. To this end, the two rocking levers 5, which carry each bottom press roll 21, or 22, 23, can each be urged upwardly by the piston rod 206 of one hydraulic pressure cylinder 6 fastened to the corresponding frame F1, or F2, F3.

All the press rolls 11, 12, 13, 21, 22, 23 are positively driven in the direction of travel A1 of the superimposed sides of the two felt belts 1, 2. For the rotary drive, both the top roll 11, or 12, 13, and the bottom roll 21, or 22, 23 of each pair is provided with its own hydraulic motor 14 or 24, which is arranged on a head side of the associated press roll and is coupled with this latter either directly or via a reduction gear, as is represented more especially in FIGS. 2 and 3 for the pair of press rolls 11, 21. The hydraulic motor 14 of the top press roll 11, or 12, 13 is fastened on the outside of a bearing 4 of the associated top roll to this bearing or to the upper traverse of the corresponding frame F1, or F2, F3. The hydraulic motor 24 of the bottom press roll 21, or 22, 23 is fastened on the same side of the machine externally to the corresponding rocking lever 5 of the associated bottom roll and swingable together with this rocking lever 5.

The press rolls 11-21, 12-22, 13-23, driven at the same peripheral speed by the associated hydraulic motors 14, 24 and pressed one against the other by the hydraulic pressure cylinders 6, entrain the upper and lower straight runs of the

belts running between the top rolls 11, 12, 13 and the bottom rolls 21, 22, 23, in the direction of travel A1 and thereby bring about the rotary motion of the two belts 1, 2. It is, of course, also possible to drive at least one of the guide rolls 101, 201, 301, 401 or 102, 202, 302, 402 of each belt.

Associated with each pair of press rolls 11-21, 12-22, 13-23 are two hydraulic systems which are separate and independent from each other, as is more especially represented in FIG. 3 for the pair of press rolls 12-22. One hydraulic system serves for the drive of two hydraulic motors 14, 24 and has a pump PV having a variable delivery, the pressure line of which is connected via a safety and overpressure valve RV1 to the oil tank and via a pilot valve V1 to the two hydraulic motors 14, 24 of the associated pair of press rolls 12, 22. The two hydraulic motors 14, 24 are connected in series in the hydraulic circuit of the pump PV. The hydraulic motor 24 of the adjustable bottom press roll 22 is connected by flexible lines 9, 10 on the one hand to the hydraulic motor 14 of the stationarily mounted top press roll 12 and on the other hand to the hydraulic circuit of the pump PV. The reflux of this hydraulic circuit can be effected via the pilot valve V1 which is a multiway valve.

The other hydraulic system associated with each pair of press rolls serves for the actuation of the hydraulic pressure cylinders 6 and has a pump PF having a constant delivery, the pressure line of which is connected on the one hand via a safety and overpressure valve RV2 to the oil tank and on the other hand via a control valve V2 to the two pressure cylinders 6. The valve V2 may be in the form of a multiway valve having three alternative positions. In one position it connects the conveyor line of the pump PF to the pressure cylinders 6, while in a second position it interrupts the connection of the pressure cylinders 6 both to the pump PF and to the reflux to the oil tank or reservoir. In the third position, the valve V2 connects the pressure cylinders 6 to the oil tank. Connected to the outlet side of the valve V2 is a hydropneumatic pressure reservoir 15, which communicates directly with both pressure cylinders 6. This hydropneumatic pressure reservoir 15 consists of a pressure tank which is subdivided by a diaphragm 115, or by a piston, into an upper chamber 215 filled with gas or air and a lower chamber 315 which is filled with oil and which is connected to the pressure chambers of the pressure cylinders 6 beneath the pistons 106.

The hydraulic systems associated with the individual pairs of press rolls 11-21, 12-22, 13-23 are independent of each other, i.e., each pair of press rolls has its own pump PV for the rotary drive of the press rolls via the hydraulic motors 14, 24 and its own further pump PF for pressing the bottom roll against the top roll via the hydraulic pressure cylinders 6. Consequently, the bearing pressure of the press rolls 11-21, or 12-22, 13-23 for each pair of press rolls can be regulated and set separately. More especially the bearing pressure of the press rolls of the first pair of press rolls 11-21 can be smaller than that of the press rolls of the following pairs 12-22, 13-23 and can also increase progressively in the direction of travel A1 from pair to pair of the press rolls.

The hide L that is to be squeezed out is spread out on the loading surface 3 formed by the lower belt 2 at the intake end of the machine and is introduced between the superimposed straight runs of the belts 1, 2. The hide L subsequently runs, together with the belts 1, 2 covering it on both sides, in the direction of the arrow A1 between the press rolls of the successive pairs 11-21, 12-22, 13-23 and in so doing, moisture is squeezed out of it. The squeezing pressure exerted by each individual pair of press rolls can be comparatively weak, while the rotary speed of the belts 1, 2 and consequently also the productive capacity of the machine can be very high.

Nevertheless, the requisite squeezing of the moisture out of the hide L is achieved, since this latter is squeezed out more than once, i.e., repeatedly, in one passage through the machine and is subjected to the squeezing pressure altogether for a fairly long time. At the same time, the belts 1, 2 are not exposed to any damaging excessively high pressure and consequently also not to any high wear.

During the passage of the hide L through each pairs of press rolls 11-21, or 12-22, 13-23, the associated hydropneumatic pressure reservoir 15 connected to the hydraulic pressure cylinders 6 makes possible small cushioned lowering motions of the cylinder pistons 106 and consequently of the bottom press roll 21, or 22, 23, braced thereon, even when the connection between the cylinders 6 acted upon by pressure and the pump PF, or the reflux to the oil tank is interrupted (central position of the valve V2). By this means, individual hides having areas of different thickness, or separate hides of different thicknesses can be passed through the machine continuously with substantially similar bearing pressures.

Above the free loading surface 3 formed by the lower belt 2 at the intake end of the machine there may be arranged a hide flattening or widening roll 16, which is provided with helical ribs or the like directed outwardly from the center of the roll in opposite directions. This flattening or widening roll 16 is driven in a direction of rotation indicated by arrow A2 different from the direction of travel A1 of the superimposed straight runs of the belts 1, 2 and this roll may, for example, be mounted so as to be movable up and down on the frame F1 of the first pair of press rolls with the aid of rocking levers 17. The roll 16 can consequently be brought into a raised position of rest, represented in dot-dash lines in FIG. 1, in which it permits the introduction of the hide L, between the belts 1, 2 under the guide and tension roller 101 of the upper belt 1. As soon as the belts 1, 2 grasp the forward end of the hide L and entrain this latter in the direction of travel A1, the roll 16 is lowered into the active position, represented by solid lines in FIG. 1, in which it comes into contact with the hide L and spreads this latter out, or smooths out folds prior to its entry between the belts 1, 2.

The invention is, of course, not restricted to the embodiment represented and described above, by way of example, but may be modified more especially as regards specific constructional details, without departing from its scope as defined by the appended claims.

1. A continuous sammying press for squeezing moisture from hides, leather, or the like, comprising:

- a first frame located at an inlet end of said press;
- a plurality of upper and lower intake end guide rolls rotatably mounted in said first frame;
- at least one pair of first press rolls, an upper roll of said first pair being in juxtaposition to a lower roll of said first pair, and rotatably mounted in said first frame;
- a second frame located at an outlet end of said press;
- a plurality of upper and lower outlets and guide rolls rotatably mounted in said second frame;
- at least one pair of second press rolls, an upper roll of said second pair being in juxtaposition to a lower roll of said second pair, and rotatably mounted in said second frame;
- at least one third frame disposed between said first and second frames;
- at least one pair of third press rolls, an upper roll of said third pair being in juxtaposition to a lower roll of said third pair, and rotatably mounted in said third frame;
- a first endless belt of porous material impervious to water mounted around said upper intake end guide rolls, said upper outlet end guide rolls and said upper rolls of said first, second and third pair of press rolls; and
- a second endless belt of porous material pervious to water mounted around said lower intake guide rolls, said lower outlet end guide rolls and said lower rolls of said first, second, and third pair of press rolls, having a surface in juxtaposition to a surface of said first endless belt.

2. A continuous sammying press substantially as set forth in claim 1, further characterized in that:

- a separate hydraulic motor is adapted to drive each roll of said first, second and third pair of press rolls; and
- each pair of said press rolls have an independent hydraulic system supplying working fluid to its associated hydraulic motors.

3. A continuous sammying press for squeezing moisture from hides, leather, or the like, comprising:

at least two pair of rotatably mounted press rolls, each of said pair of press rolls having an upper roll disposed in juxtaposition above a lower roll;

- a first endless belt of porous material pervious to water mounted around said upper rolls of said pair of press rolls;
- a second endless belt of porous material pervious to water mounted around said lower rolls of said pair of press rolls, having a surface in juxtaposition to a surface of said first endless belt;

an hydraulic motor operatively associated with each of said upper and lower press rolls;

means to drive said first and second endless belts in opposite rotational directions, and at the same speed;

- a separate hydraulic system operatively associated with each of said pair of press rolls to supply working fluid to both its associated said motors;

an hydraulic pump operatively associated with each of said separate hydraulic systems; and

said hydraulic motors of each of said upper and lower press rolls are connected in series with said pump in its associated hydraulic system.

4. A continuous sammying press for squeezing moisture from hides, leather, or the like, comprising:

- at least two pair of rotatably mounted press rolls, each of said pair of press rolls having an upper roll disposed in juxtaposition above a lower roll;

said lower rolls adapted to move upwardly to exert a force on said upper rolls;

- a first endless belt of porous material pervious to water mounted around said upper rolls of said press rolls;

a second endless belt of porous material pervious to water mounted around said lower rolls of said pair of press rolls, having a surface in juxtaposition to a surface of said first endless belt;

an hydraulic motor operatively associated with each of said upper and lower rolls;

means to drive said first and second endless belts in opposite rotational directions, and at the same speed;

- a separate first hydraulic system operatively associated with each of said pair of press rolls to supply working fluid to both its associated said motors;

said hydraulic motors of each of said upper and lower press rolls being connected in series with said pump in its associated first hydraulic system;

at least two pressure cylinders each operatively associated with one of said lower rolls to move said lower roll upwardly against one of said upper rolls to exert a force thereon;

a separate independent second hydraulic system operatively associated with each of said pressure cylinders; and

an hydropneumatic pressure reservoir operatively connected to said pressure cylinders.

5. A continuous sammying press for squeezing moisture from hides, leather, or the like, comprising:

- at least two pair of rotatably mounted press rolls, each of said pair of press rolls having an upper roll disposed in juxtaposition above a lower roll;

a first endless belt of porous material pervious to water mounted around said upper rolls of said pair of press rolls;

a second endless belt of porous material pervious to water mounted around said lower rolls of said pair of press rolls, having a surface in juxtaposition to a surface of said first endless belt;

said second endless belt extending beyond said first endless belt at an inlet end of said press forming a free, substantially horizontal loading surface to receive material to be processed; and

- a rotatably mounted flattening roll having helical ribs, adapted for generally vertical adjustment to allow it to be lowered to engage material to be processed, or raised to a position of rest permitting the introduction of said material directly between said first and second belts, disposed above said loading surface, and driven in a direction of

rotation opposing to the direction of travel of material to be processed between said first and second belts.

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