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(54) **MACHINE AND A METHOD FOR DEPOSITING A LAYER OF A CHEMICAL SUBSTANCE ON HIDES**

(57) Machine for depositing a layer of a chemical substance on hides, in particular a coloring or protective layer comprising:

- a rotating roller (6), configured to spread said chemical substance on said hides,
- a doctor blade (10) mounted on a support structure (20) and configured to come into contact with said roller (6) and to regulate the quantity of chemical substance which is deposited by the roller on said hides,

- means (52) for the automated control of the pressure that said doctor blade (10) exerts on said roller (6), characterized in that said automated control means (52) comprise:

- systems (51) for measuring the pressure that said doctor blade (10) exerts on said roller (6).
- movement means (40), configured to move said doctor blade (10) and / or said support structure (20) so as to regulate the pressure that this exerts on said roller (6).

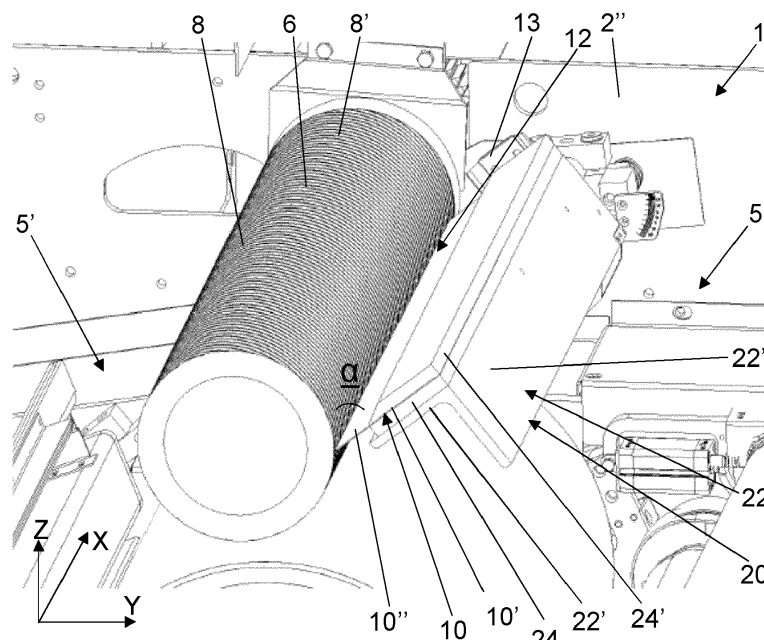


FIG. 1

Description

[0001] The present invention relates to a machine and a method for depositing a layer of a chemical substance on hides and in particular a machine and a method for depositing a layer of a coloring or protective chemical substance on a surface of one or more hides.

[0002] Machines are known which involve passing the hide to be treated - i.e. the hide on which a protective and / or coloring layer must be applied - in contact with a grooved rotating roller, on which it was previously sprayed or poured or in any case applied the chemical to be deposited on the hide. In order to allow the contact of said roller with the chemical substance to be deposited, an inclined doctor blade is usually applied, which delimits an environment with the roller portion upstream of the minimum distance line between them, inside which the chemical substance itself is contained. In order to dose the quantity of chemical substance to be deposited on the hide, it is provided to position the doctor blade substantially in contact with the surface of the rotating roller.

[0003] However, this solution is not fully satisfactory since, following prolonged use, the doctor blade can wear out due to possible rubbing with the rotating roller. This can lead to an increase in the distance between the doctor blade and the surface of the roller, with a consequent lower wiping efficiency of the doctor blade itself and an uneven distribution of chemical substance in the layer deposited on the hide.

[0004] Furthermore, the doctor blade can wear unevenly along its length, for example due to inaccuracies in its positioning or in the surface processing of the rotating roller and this entails the need to reposition the doctor blade in a differentiated manner along its entire length.

[0005] CN210506395 discloses a machine for depositing a layer of a liquid chemical substance on a hide; it comprises a roller, on which the chemical substance to be deposited is poured, and a scraper blade which allows to limit the quantity of chemical substance that is deposited on the hide. In particular, the doctor blade is hinged at both ends, and connected to a spring which, with its elastic reaction, automatically and elastically keeps the free edge of the doctor blade in contact with the roller.

[0006] However, this solution is not fully satisfactory as it does not allow accurate control of the amount of chemical substance deposited on the hide, since the only possible action is the elastic reaction of the spring, which cannot be controlled in real time, but only when the spring is chosen, and in particular in view of its elastic constant.

[0007] The object of the invention is to propose a machine for depositing a layer of a chemical substance on hides, capable of overcoming the drawbacks of the known solutions.

[0008] Another object of the invention is to propose a machine which allows to accurately control the distance between the doctor blade and the roller.

[0009] Another object of the invention is to propose a

machine which allows to accurately control the inclination of the doctor blade with respect to the roller.

[0010] Another object of the invention is to propose a machine which allows the use of different rollers, reducing the interruption times of the machine itself.

[0011] Another object of the invention is to propose a machine which allows the use of rollers rotating in a direction which is in concordance with or discordant with respect to the direction of advancement of the hides.

[0012] Another object of the invention is to propose a machine which is simple and quick to clean.

[0013] Another object of the invention is to propose a machine which is simple and quick to maintain.

[0014] Another object of the invention is to propose a machine which is simple and quick to implement and with low costs.

[0015] Another object of the invention is to propose a machine which is alternative and / or improved with respect to the known solutions.

[0016] Another object of the invention is to propose a machine which allows to limit the wear of the spreading roller.

[0017] Another object of the invention is to propose a machine which allows to limit the contamination of the chemical substance to be spread.

[0018] Another object of the invention is to propose a machine that can be used with rollers of different sizes, made with different materials and with different surface treatments.

[0019] Another purpose of the invention is to propose a machine which allows to deposit a chemical substance on hides in a homogeneous and constant way over time.

[0020] Another object of the invention is to propose a method for depositing a layer of a chemical substance on hides, which allows to achieve all the purposes stated for the machine.

[0021] All these objects, both individually and in any combination thereof, and others which will result from the following description, are achieved, according to the invention, with a machine for depositing a layer of a chemical substance on hides according to claim 1 and with a method according to claim 10.

[0022] The present invention is further clarified hereinafter in some of its preferred embodiments reported for purely illustrative and non-limiting purposes with reference to the attached drawing tables, in which:

- Figure 1 shows a perspective view of the machine according to the invention,
- Figure 2 shows a front view of the handling means in a first embodiment,
- Figure 3 shows them in a second embodiment,
- Figure 4 shows a detail of the cleaning devices,
- Figure 5 shows in a different perspective view the machine according to the invention deprived of a side wall and
- Figure 6 shows a detail of the support structure of the doctor blade.

[0023] In the present description, the axis X means the axis of the spreading roller, the Y axis the direction of advancement of the hides to be treated and the Z axis a vertical axis orthogonal to the previous ones.

[0024] As can be seen from the figures, the machine 1 according to the invention is configured to spread a chemical substance, preferably liquid and / or viscous, on a hide.

[0025] It is understood that by "hide", here we mean a natural and / or synthetic leather, or an eco-leather, that is a leather worked with specific methods and / or machine configured to reduce its environmental impact or a two-dimensional product made of synthetic material, for example plastic, with characteristics similar or at least similar to leather, and in general a two-dimensional product of finished dimensions to be used in leather goods. Preferably, the hides to be treated are finished or substantially finished products, which are obtained from the final stages of the leather manufacturing, treatment and / or finishing processes.

[0026] Furthermore, the chemical substance can be a paint, or a glue, and in general a chemical substance suitable for making a coating on said hide, such as a resin, preferably polymeric, or a polyurethane-based substance. In particular, the chemical substance may have different abrasiveness characteristics, which may depend on the particle size of any solid particles dispersed within it, on the chemical composition, or on other properties.

[0027] Conveniently, the hide can be fed to the machine by means of a suitable transport line, for example comprising a conveyor belt, on which the hides to be treated are positioned. This transport line can substantially define a direction and a direction of advancement of the hides, defined by the Y axis.

[0028] In the transport line, an entrance of the hides is recognized, through which the hides to be treated - i.e. without the chemical substance layer applied - they enter the machine itself, and an exit of the hides, from which the treated hides - i.e. with the layer of chemical substance applied - come out.

[0029] The machine 1 comprises an external structure 2 configured to contain, at least partially, its different components, and this comprises a pair of side walls 2', 2" positioned on the sides of the line of advancement of the hides.

[0030] In particular, the machine 1 comprises a first roller 6, which is arranged with its axis X transverse, that is, perpendicular to the direction of advancement of the hides and is configured to receive the chemical substance to be deposited on a surface of the hide being treated.

[0031] Advantageously, the roller 6, and in particular its surface, can have an appropriate processing, which for example can provide a plurality of recesses 8 and projections 8', preferably ordered, in order to define asperities in which the chemical substance can be collected to be deposited.

[0032] Advantageously, said projections 8' can define an external surface, which is the surface furthest from the X axis. Advantageously, said surface can substantially correspond to that of a cylinder, comprising a plurality of voids in correspondence with the recesses 8.

[0033] In a preferred form of construction the roller 6 can be made of steel, preferably with a high carbon content and its construction can advantageously provide for a plurality of surface treatments aimed at improving its useful life and / or reducing its wear; for example the roller 6 can be chromed and / or Teflon-coated or it can be coated with polymeric materials, in order to allow the deposit of specific chemical substances.

[0034] In an embodiment not shown, the machine 1 can advantageously comprise a plurality of rollers 6, mounted on a structure which allows rapid interchangeability with others, for example having different surface characteristics. In particular, there may be three or four rollers 6, preferably positioned at the vertices of a regular polygon. Advantageously, the structure can rotate around an axis passing through the center of the polygon defined by the rollers 6, in order to quickly bring the selected roller into the position suitable for depositing the chemical substance on the hide. These different rollers may have the same or different dimensions and / or may have been subjected to different surface treatments and / or have the recesses 8 and / or the protrusions 8' in a different arrangement, or have these recesses and / or these protrusions distributed in more or less dense way in order to deposit a greater or lesser quantity of chemical substance on the hides, according to the needs.

[0035] Conveniently, the roller 6 can be rotated in a direction that can be in agreement with the direction of advancement of the hide, or it can be discordant, according to the type of processing to be carried out, that is, according to the characteristics of the chemical substance and / or roller 6 and / or hides.

[0036] The roller 6 and the hide can substantially define a line or a thin band of mutual contact, substantially parallel to the X axis.

[0037] The machine 1 further comprises a blade or doctor blade 10 configured to regulate the amount of chemical substance that the roller 6 can drag with it in rotation, and therefore, the amount of chemical substance that will then be deposited on the hide, as will become clear later.

[0038] Preferably, the doctor blade 10 can have a length substantially corresponding to that of the roller 6, and in particular it can have a development along the X axis substantially equal to that of the roller 6.

[0039] Advantageously, said doctor blade 10 can be substantially in contact with the external surface of the roller 6, in order to prevent the percolation of excessive quantities of chemical substance. In particular, the doctor blade 10 can be substantially in contact with the protrusions 8' present on the surface of the roller 6, so as to allow the chemical substance to pass only through the recesses 8.

[0040] Advantageously, the doctor blade 10 can be thin, and in particular it can have thickness between a few hundredths of a millimeter and a few millimeters, in order to have good flexibility and to adhere elastically to the surface of the roller 6 to limit its consumption and / or its wear.

[0041] Furthermore, the doctor blade 10 is configured to define, with the surface of the roller 6, a basin 12, inside which the chemical substance to be deposited on the hide is poured and / or sprayed. Advantageously, the side walls of said basin 12 can be made by means of a pair of laminar elements (not shown), which are positioned at the opposite ends of the doctor blade 10. Advantageously, said laminar elements can be configured to come into contact with the doctor blade 10 and with the roller 6 in order to prevent the chemical substance from escaping from the basin 12 through passages that do not correspond to the desired ones, which are those in correspondence with the recesses 8 and / or at the points where the external surface of the roller 6 is not in contact with the doctor blade 10. In particular, for example said laminar elements, can be held in position by means of suitable elastic elements 13, which are constrained to one end of the support structure 20.

[0042] In a preferred embodiment, the doctor blade 10 can be made of metallic material, for example in harmonic steel, in order to have a high resistance to wear. In another embodiment, the doctor blade 10 can be made of a carbon fiber-based material, preferably also comprising suitable additives. In this way it is possible to reduce the formation of burrs during use, which could fall into the chemical substance to be deposited and could therefore damage the roller 6 and / or the hide, on which the chemical substance is deposited.

[0043] The doctor blade is positioned on the upstream side or on the downstream side of the roller 6 with reference to the direction of advancement of the hides, according to the direction of rotation of the roller with respect to them. In particular, if the roller 6 is rotated in a direction concordant with the direction of advancement of the hides, the doctor blade 10 is positioned between the inlet of the hides and the roller 6, while if the roller 6 is rotated in a direction contrary to the direction of advancement of the hides, the doctor blade 10 is positioned between the roller 6 and the exit of the hides.

[0044] Advantageously, the doctor blade 10 can be positioned so as to form an angle α lower than 90° , and preferably between 35° and 75° , with the surface of the roller 6 at the contact line.

[0045] Advantageously, as mentioned, the doctor blade 10 and the roller 6 define a basin 12 inside which the chemical substance to be deposited on the hides can be poured.

[0046] Conveniently, the pouring and / or spraying of the chemical substance in the basin 12 or in the adjacent area of the roller 6 can be carried out by hand or, preferably, by means of suitable ducts 14, which preferably terminate with nozzles 16.

[0047] Advantageously, suitable agitation devices 18 may be present of the chemical substance operating inside the basin 12 in order to prevent the coagulation of the chemical substance itself, or the sedimentation of any solid particles present in suspension, or in any case to keep the composition and / or the physical / chemical properties homogeneous of the chemical itself. Advantageously, said agitation devices 18 of the chemical substance can comprise one (or more) paddle 18', which is preferably at least partially immersed inside the chemical substance present in the basin 12 and can be moved by a corresponding motor, which makes them perform an alternating movement along the basin 12. If there are a plurality of paddles 18', it is possible that each one is moved along only a portion of the basin 12.

[0048] Alternatively, the devices for stirring the chemical substance can comprise one or more ultrasound sources configured to send pressure waves on the surface and / or inside the chemical substance to be handled, or they can include suitable motors configured to shake one or more of the walls that form the basin 12.

[0049] Furthermore, the machine 1 can comprise a cleaning device 19 (or more) configured to spray a liquid, such as a mixture comprising water and suitable surfactants, in said basin 12, in order to allow the dissolution of any solid and / or liquid residues, and their consequent removal. For example, the cleaning device can comprise at least one nozzle connected to suitable means for feeding the mixture.

[0050] Advantageously, the doctor blade 10 can be mounted on a suitable support structure 20 configured to keep the doctor blade in position. In particular, said support structure can comprise a support element 22, preferably constituted by a section bar, which defines two surfaces 22', 22" preferably angled to each other at about 90° , so as to improve the strength and its resistance to mechanical deformation.

[0051] Advantageously, a first surface 22' can be associated, preferably by means of a first stabilizing plate 24, the doctor blade 10.

[0052] Advantageously, there may also be a second stabilizing plate 24' positioned so as to hold the doctor blade 10 under pressure with the first plate 24.

[0053] Advantageously, the second stabilizer plate 24', which is configured to be in an upper position, and therefore closer and / or more exposed to the chemical substance to be spread, can be coated with materials which make it impermeable to said chemical substance to be spread, for example it can be Teflon coated.

[0054] In a preferred embodiment, the doctor blade 10 can comprise a first portion 10', held between the first 24 and the second 24' stabilizing plate, in order to provide support and support for the doctor blade itself, and a second portion 10" which is configured to protrude from said stabilizing plates 24, 24' in the direction of the roller 6, and whose free edge is substantially in contact with the outer surface of the roller itself. Advantageously, said second portion 10" can be from 3 to 10 cm wide according

to the type of product to be spread, the angle of incidence and other suitable parameters.

[0055] Advantageously, the first stabilizing plate 24 can have one or more through holes which allow the insertion of suitable adjustment and fixing means 25 which allow to fix the doctor blade 10 to the stabilizing plate itself in the desired position. For example, said adjustment and fixing means may comprise positioning pins 25, which allow an accurate, preferably centesimal, positioning of the doctor blade 10.

[0056] In a preferred embodiment, the machine 1 may comprise suitable means 52 configured to allow to control, also in an automated manner, the force with which the doctor blade 10 is pressed against the roller 6. In particular, said means can be configured to modify the pressure of the doctor blade 10 exerted on the roller 6 on the basis of a command entered by the user and / or the detections of appropriate sensors, as will be clear later. In particular, moreover, said means 52 can be configured to allow to keep constant the force with which the doctor blade 10 is pressed against the roller 6. This is particularly advantageous since, during use, as mentioned, the doctor blade 10, and in particular, its second portion 10" can wear out, and therefore substantially shorten, and therefore decrease the force with which it is pressed against the roller 6. This can have undesirable consequences, such as the variation in the amount of chemical substance deposited on the roller over time and / or the non-homogeneity of the chemical substance layer deposited on two different portions of a single hide. Thanks to the invention all these unwanted consequences are limited or eliminated.

[0057] Advantageously, said means 52 can comprise manual means and automated means.

[0058] For example, the inclination of the support structure 20 can be modified in order to adjust the contact angle α between the doctor blade 10 and the roller 6. Preferably, the angle can be measured by means of a suitable graduated scale positioned at one of the two sides of the support structure itself.

[0059] Advantageously, for this purpose, said means 52 can comprise a suitable rotation apparatus 29 configured to rotate said support structure 20 around an axis parallel to the X axis.

[0060] Said rotation apparatus can, for example, comprise in a traditional way two bodies 31, 34 which are clamped around the shaft 32 around which the support structure 20 rotates. In particular, said bodies 31, 34 can be tightened and / or loosened by using two screws 30, preferably positioned on opposite sides with respect to the shaft 32, in order to lock and / or unlock the rotation of the support structure 20 around the shaft itself.

[0061] Advantageously, the support structure 20 can be moved, in a direction substantially parallel to the Y axis, so as to increase or reduce the pressure that the doctor blade 10 exerts on the roller 6 and / or the distance of the doctor blade 10 from the roller 6. Advantageously, said movement can be operated in a motorized and / or

automated manner.

[0062] Conveniently, therefore, the support structure 20 can be moved on a straight line, preferably along the Y direction, or it can be rotated around an axis parallel to the X axis and external and separate from the support structure itself. Advantageously, for this purpose, said control means 52 can comprise suitable movement means 40 comprising a suitable actuator.

[0063] Advantageously, said movement means 40 can be directly associated with the support structure 20, and in particular with one of the side walls 2, 2' of the machine 1, preferably outside the environment in which the hides are treated.

[0064] In a first embodiment, said movement means 40 can comprise a cylinder 42, preferably pneumatic, or alternatively for example hydraulic, configured to move along an axis, in particular parallel to the Y axis. The movement of the cylinder 42 can be transferred to the support structure 20 by means of suitable gears 43, in order to cause its movement along an axis, which is also parallel to the Y axis.

[0065] In a further embodiment (not shown) said movement means 40 may comprise a motor, preferably electric, preferably brushless, and more preferably a torque motor, configured to move the support structure 20. Conveniently the electric motor can be connected directly (direct drive) to the support structure 20, or it can be connected to it by means of suitable gears configured to reduce the speed of rotation of the motor and / or the speed of the structure of s support 20.

[0066] In particular, the support structure 20 can be rigidly associated with a protruding block 44, which advantageously can protrude outside the side walls 2', 2". Conveniently, said protruding block 44 can be mounted on at least one carriage 46 so as to be able to slide in a substantially horizontal direction - ie substantially parallel to the Y axis. Advantageously, the carriage 46 and / or the protruding block 44 can be Teflon coated in order to reduce the friction and allow to obtain a more precise control on the movement of the latter.

[0067] In the embodiment, shown in Figure 3, the movement means 40 can comprise, in addition to the cylinder 42 and / or the motor, a lever 47 constrained to a fulcrum 48, and configured to transmit the movement of the cylinder 42 and / or the motor to the support structure 20. In particular, said lever 47 is configured to transform the rectilinear movement of the cylinder into a rotary movement. Advantageously, the first arm 47' of the lever 47 can be connected, directly or indirectly, to said cylinder 42 and / or said motor, while the second arm 47" of said lever 47 can be connected to said support structure 20.

[0068] Advantageously the first arm 47' can have a length between 100 and 200 mm while the second arm 47" can have a length between 100 and 200 mm. Conveniently, the ratio between the length of the first arm 47' and that of the second arm 47" can be comprised between about 1:2 and about 2:1, and preferably it can be 1:1. It is understood that said ratio can be modified on

the basis of constructional needs, for example on the basis of the dimensions of the cylinder 42 and / or the force that it can exert.

[0069] Conveniently in this embodiment the support structure 20 can be configured to rotate around the fulcrum 48, under the action of the lever 47.

[0070] Conveniently in the embodiment which provides for the use of the electric motor, the lever 47 can be pivoted directly on the output of the electric motor, and can be rotated by it.

[0071] Advantageously both in the embodiment which comprises the lever 47 and in the one which comprises the protruding block 44, on the side wall 2, 2' there may be a suitable slot 50, through which the gears 43, and in particular the lever 47 or the protruding block 44 are rigidly connected to the support structure 20. Conveniently the slot 50 can be configured to allow the sliding and / or guide said element, which connects the lever 47 to the support structure 20, and can have, for example, a substantially elongated, straight or curved development.

[0072] Advantageously, the gears 43 can comprise a mechanical stop 45, preferably adjustable, configured to limit the movement of at least one gear 43, in order to limit the advancement of the doctor blade 10.

[0073] Conveniently said movement means 40 can be associated with both ends of support structure 20, in order to regulate the force, with which the doctor blade 10 is pressed against the cylinder 6 in a homogeneous way. In particular, in this case said movement means can comprise suitable gears 43 which allow to transfer the motion generated by a single actuator to both ends of the doctor blade 10 or, preferably, they can provide a plurality of actuators (cylinders 42 and / or motors) or also a combination of motors and cylinders 42.

[0074] Advantageously, said control means 52 comprise suitable systems 51 for measuring the force exerted by the movement means 40 on the support structure 20. In particular, therefore, said systems 51 allow to control the force developed by said at least one actuator. In particular, therefore, said force measurement systems 51 allow to measure and / or calculate the pressure that the doctor blade 10 exerts on the roller 6.

[0075] Advantageously, in one embodiment, said measurement systems 51 can comprise a load cell 54 configured to measure the force exerted by the cylinder 42 on the gears 43.

[0076] Alternatively, in the embodiment which includes an engine, the measuring systems 51 can for example comprise suitable systems for measuring the torque exerted by the engine itself, or the number of revolutions, or the power delivered.

[0077] Advantageously, in an embodiment not shown there may also be at least one further device for measuring the torque, to which the doctor blade 10 is subjected due to the friction with the rotating roller 6. Advantageously, for example, a load cell can be present, for example of the torsional type, associated with said support structure 20, in order to measure the torque to which the doctor

blade 10 is subjected.

[0078] Advantageously, in an embodiment not shown there may also be at least one further device for measuring the torque, to which the doctor blade 10 is subjected due to the friction with the rotating roller 6, and this further device may consist of a cell load associated with the rotation apparatus 29.

[0079] In a preferred embodiment, the support structure 20 can also be moved transversely with respect to the direction of advancement of the hides and alternately and continuously back and forth by suitable handling means. This prevents, or at least reduces, the rate of formation of lumps and / or aggregates in the contact line between the doctor blade 10 and the roller 6. Advantageously, said movement can be motorized.

[0080] Advantageously, said machine 1 and in particular said control means 52 can comprise a control and processing unit (not shown), which can advantageously control the operation of the movement means 40.

[0081] Advantageously, said control and processing unit can be configured to obtain information from the systems 51 for measuring the force exerted by the actuator of the movement means 40. To this end, the control and processing unit is configured to calculate and / or measure, on the basis of this information, the force with which the doctor blade 10 is pressed against the roller 6. Advantageously, in addition to the information mentioned above, the control unit can also use information related to the frictions suffered by the various components of the mechanism that allows the movement of the doctor blade 10.

[0082] Advantageously, moreover, the control and processing unit can be configured to modify the force exerted by the actuator 42, and in particular the pressure of the fluid sent to it, and / or the torque exerted, or the number of revolutions, or the power supplied by the motor, in order to maintain substantially constant the pressure exerted by the doctor blade 10 on the roller 6. Advantageously this can be achieved by means of a control of the PID type suitably implemented in said control and processing unit.

[0083] The operation of the machine 1 according to the invention is clear from what has been said above.

[0084] In particular, the user can position the doctor blade 10 in contact with the external surface of the cylinder 6, precisely adjusting the pressure and / or the angle α of incidence. The doctor blade can be positioned between the roller 6 and the inlet of the hides or between the roller 6 and the outlet of the hides, according to the foreseen processing, and in particular of the direction of rotation foreseen for the roller 6.

[0085] The roller 6 is then put into rotation and the chemical substance can be poured into the basin 12 thus defined, for example by means of the nozzles 16 fed by the ducts 14.

[0086] Subsequently, the hides can be made to advance along the transport line.

[0087] As the doctor blade 10 wears, and consequently

its second portion 10" shortens, the pressure measuring systems 51 detect the variation in the force applied by the actuator; for example they can detect a forward movement of the piston 42, or a decrease in the torque generated by the motor and / or an advancement thereof, and in substance quantities which are connected to the variation of the pressure that the doctor blade 10 exerts on the roller 6.

[0088] Subsequently the movement means 40 can come into action to reposition the support structure 20 in order to keep constant the force, with which the doctor blade 10 is pressed against the roller 6, and therefore in order to keep the quantity of chemical substance constant deposited on the hide.

[0089] In particular, the control and processing unit can be configured to detect the change in force which is exerted by the doctor blade 10 on the roller 6 and which is measured by the means 52, and consequently to actuate said actuator (cylinder 42 and / or electric motor) in order to restore the default and / or pressure desired by the user.

[0090] From what has been said it is clear that the machine according to the invention is particularly advantageous, indeed, optimal in that:

- allows you to accurately position the doctor blade with respect to the roller,
- allows you to change in real time the force with which the doctor blade is pressed against the roller, compensating for the effects of wear.

[0091] In particular, unlike CN210506395, the present invention implements, thanks to the presence of the squeegee pressure measurement systems on the roller, a true feedback system, allowing to regulate the pressure exerted on the roller in a controlled manner, and to vary it for example to vary the amount of chemical that is deposited.

Claims

1. Machine for depositing a layer of a chemical substance on hides, in particular a coloring or protective layer comprising:

- a rotating roller (6), configured to spread said chemical substance on said hides,
- a doctor blade (10) mounted on a support structure (20) and configured to come into contact with said roller (6) and to regulate the quantity of chemical substance which is deposited by the roller on said hides,
- means (52) for the automated control of the pressure that said doctor blade (10) exerts on said roller (6),

characterized in that said automated control

means (52) comprise:

- systems (51) for measuring the pressure that said doctor blade (10) exerts on said roller (6).
- movement means (40), configured to move said doctor blade (10) and / or said support structure (20) so as to regulate the pressure that this exerts on said roller (6).

2. Machine according to claim 1 **characterized in that** said movement means (40) comprise at least one cylinder (42) and preferably two cylinders (42) connected to said support structure (20) by means of suitable gears (43).

3. Machine according to one or more of the preceding claims **characterized in that** said movement means are configured to translate said doctor blade (10) along an axis (Y) substantially parallel to the direction of advancement of said hides inside the Machine itself.

4. Machine according to one or more of the preceding claims **characterized in that** said gears (43) comprise a protruding block (44) rigidly associated with said support structure (20), and positioned on at least one carriage (46).

5. Equipment according to one or more of the preceding claims, **characterized in that** said gears (43) comprise a lever (47) secured to a fulcrum (48), and having:

- a first arm (47') associated with said actuator (42),
- a second arm (47'') associated with said support structure (20).

6. Machine according to the preceding claim **characterized in that** the ratio between the length of said first arm (47') and said second arm (47'') is between 1:2 and 2:1, and is preferably 1:1.

7. Machine according to one or more of the preceding claims **characterized in that** said pressure measurement systems (51) comprise a load cell (54) configured to measure the force exerted by said at least one cylinder (42) on the gears (43).

8. Machine according to one or more of the preceding claims **characterized in that** said movement means (40) comprise an electric motor, preferably a brushless motor or a torque motor.

9. Machine according to one or more of the preceding claims **characterized in that** it comprises a control and processing unit connected with said movement means (40) and with said pressure measurement

systems (51) in order to implement a feedback control on the pressure which said doctor blade (10) exerts on said roller (6).

10. Machine according to one or more of claims 8,9 **characterized in that** said electric motor is connected to said control and processing unit configured to control its output torque. 5

11. Machine according to one or more of the preceding claims, **characterized in that** it comprises a control and processing unit configured to operate said movement means (40) in order to maintain constant the pressure exerted by said doctor blade (10) on said roller (6) regardless of the degree of wear of said doctor blade (10). 10 15

12. Machine according to one or more of the preceding claims **characterized in that** said movement means (40) are positioned outside the walls (2', 2'') which define the hide processing environment. 20

13. Machine according to one or more of the preceding claims **characterized in that** said support structure (20) can be moved in a transverse direction with respect to the direction of advancement of said hides in said Machine. 25

14. Method for depositing a layer of a chemical substance on hides by means of a roller (6) placed in contact with a doctor blade (10) **characterized in that** during the whole working process the pressure exerted by said doctor blade (10) on said roller (6) is automatically adjusted on the basis of measurements carried out on the pressure itself by said pressure measuring means (51). 30 35

15. Method according to the preceding claim **characterized by** using a machine according to one or more of claims 1-13. 40

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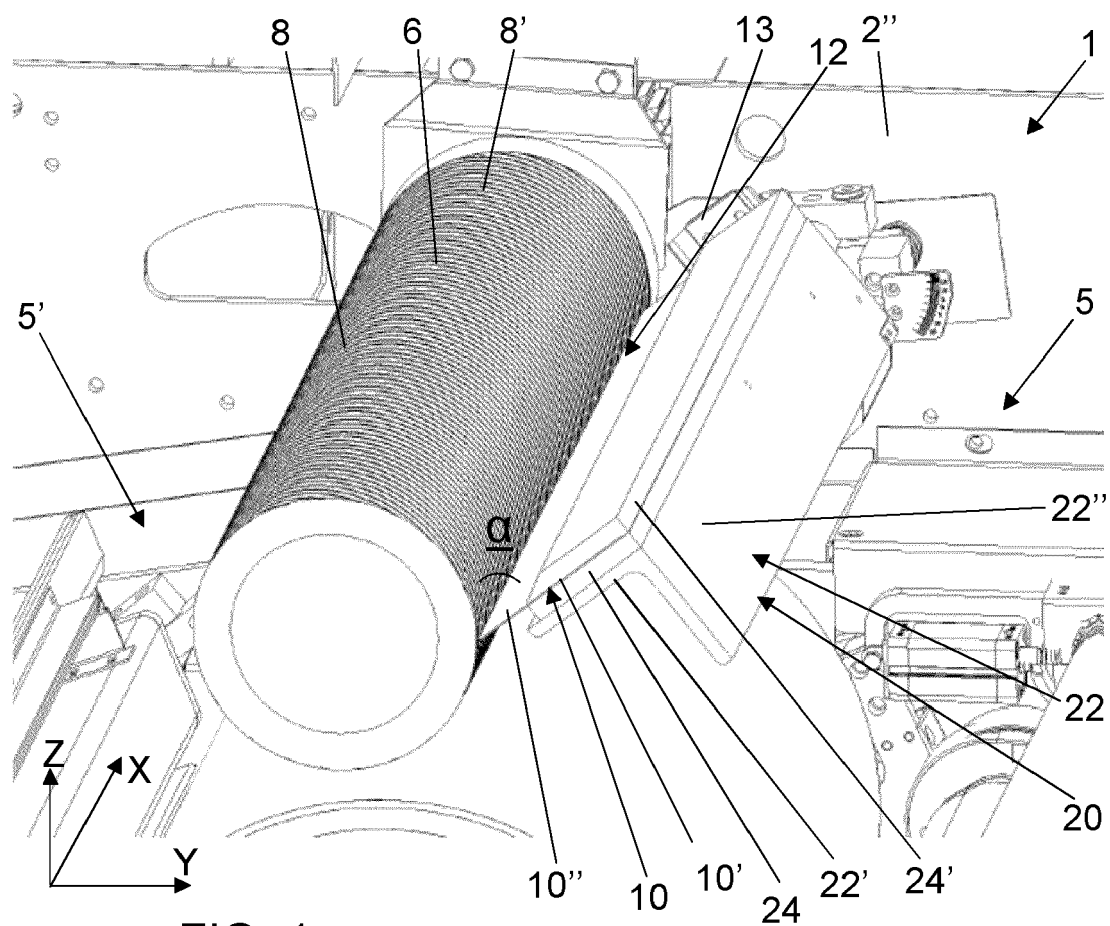


FIG. 1

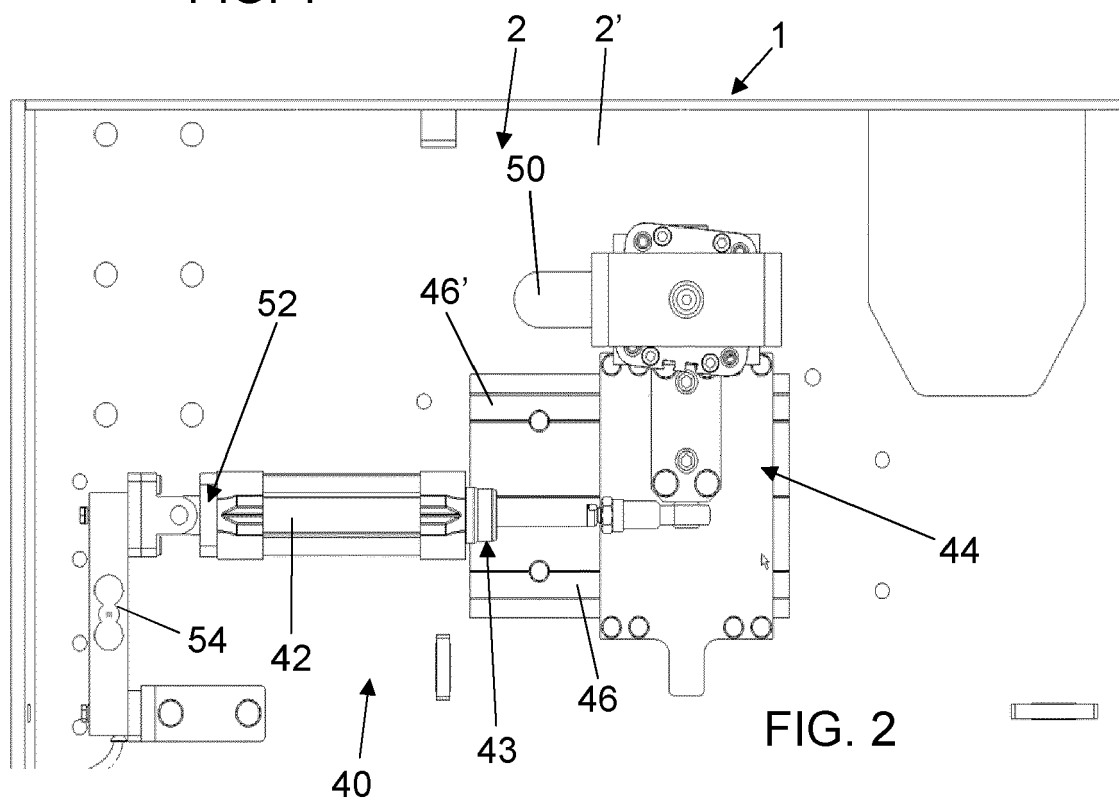


FIG. 2

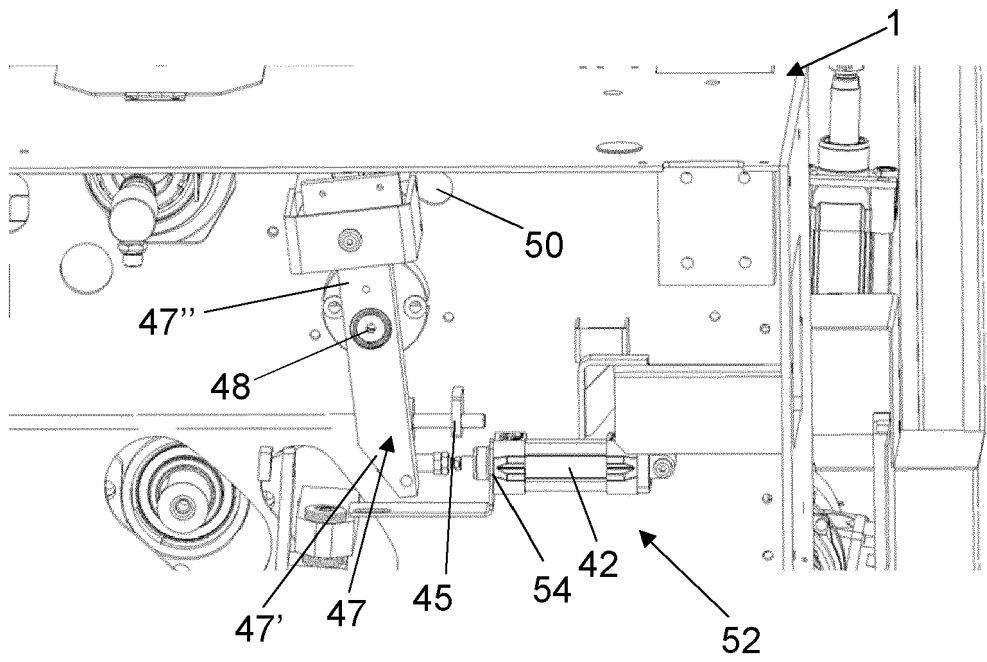


FIG. 3

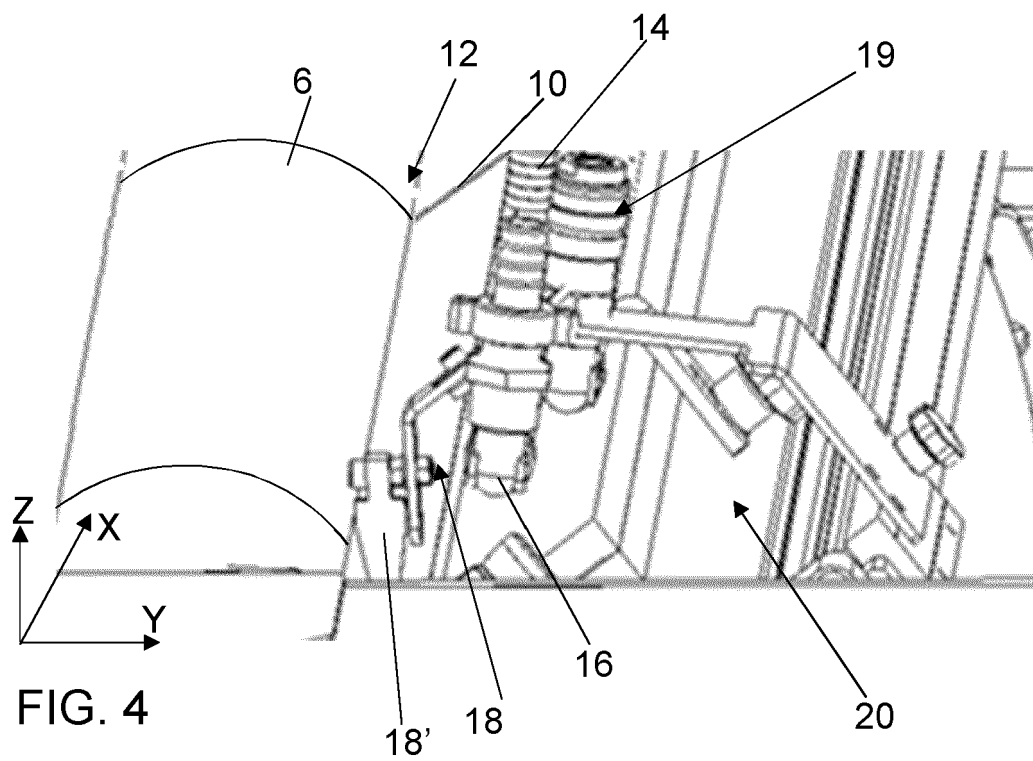


FIG. 4

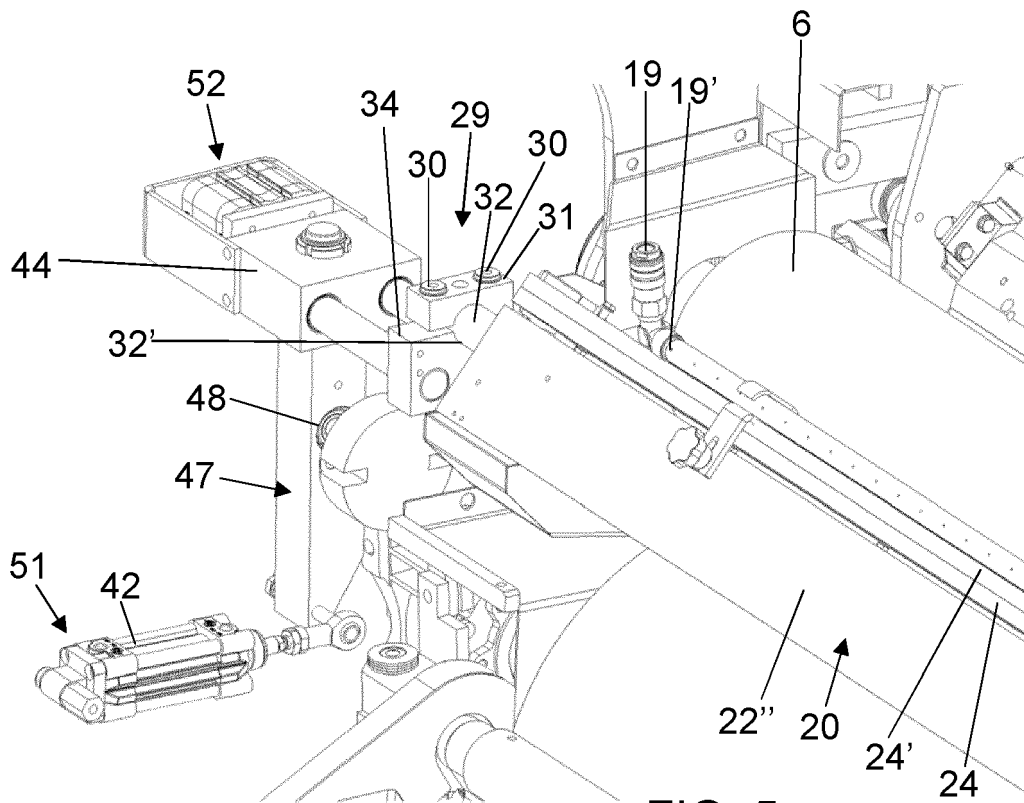


FIG. 5

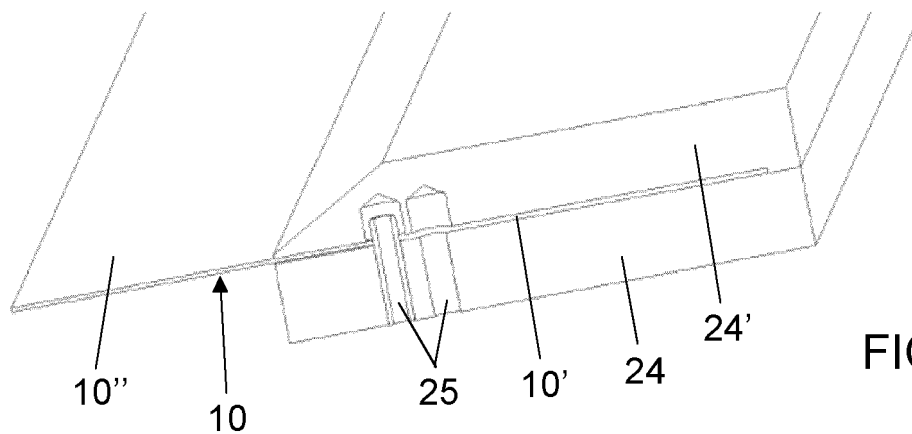


FIG. 6



EUROPEAN SEARCH REPORT

Application Number

EP 21 21 1329

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X, D	DATABASE WPI Week 202004 Thomson Scientific, London, GB; AN 2020-42935B XP002803255, & CN 210 506 395 U (JIAOZUO LONGFENG ENTERPRISE CO LTD) 12 May 2020 (2020-05-12) * abstract * -----	1-15	INV. C14C15/00 C14C11/00 B05C1/08 B05C11/02
A	EP 0 972 576 A2 (INCOMA SRL [IT]) 19 January 2000 (2000-01-19) * paragraphs [0001] - [0014] * * claim 1; figures 1-3 * -----	1-15	
A	EP 2 410 089 A2 (THEMA SYSTEM S R L [IT]; LEO DANIELE [IT]) 25 January 2012 (2012-01-25) * paragraphs [0001], [0002], [0013] - [0050] * * claims 1, 7, 14 * -----	1-15	TECHNICAL FIELDS SEARCHED (IPC) C14C B05C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		22 March 2022	Neugebauer, Ute
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 21 21 1329

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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22-03-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 210506395	U	12-05-2020	NONE

EP 0972576	A2	19-01-2000	AT 304901 T 15-10-2005
		DE 69927322 T2 29-06-2006	
		EP 0972576 A2 19-01-2000	
		IT VI980137 A1 15-01-2000	
		TR 199901654 A2 21-02-2000	

EP 2410089	A2	25-01-2012	EP 2410089 A2 25-01-2012
		IT 1401049 B1 12-07-2013	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 210506395 [0005] [0091]