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(71) Applicant: **GE.MA.TA. S.p.A.**
36070 Trissino (VI) (IT)

(72) Inventor: **MAITAN, Gianni**
30122 Venezia (IT)

(74) Representative: **Bettello, Pietro**
Via Col d'Echele, 25
36100 Vicenza (IT)

(54) **SPLITTING MACHINE FOR DIVIDING THE THICKNESS OF SKINS IN TWO PARTS, TRANSVERSALLY, SO AS TO SEPARATE THE UPPER PART FROM THE LOWER PART OF SAID SKINS, ACCORDING TO THE THICKNESS**

(57) The finding concerns a splitting machine for dividing the thickness of skins in two parts, transversally, so as to separate the upper part from the lower part of said skins. In such a machine, with methods per se known, there is an upper conveyor roller (100), as well as a second articulated roller (200), between which the skin (P) is introduced and also a third roller (300), arranged below with respect to said second roller (200).

The present invention provides that in such a splitting machine there is an introduction zone which conveys the skin directly into the cutting area, the stretching/widening of the above mentioned skin, which starts from the central area and extends laterally outwards, being carried out by means for stretching action and introduction action of the skin between the rollers.

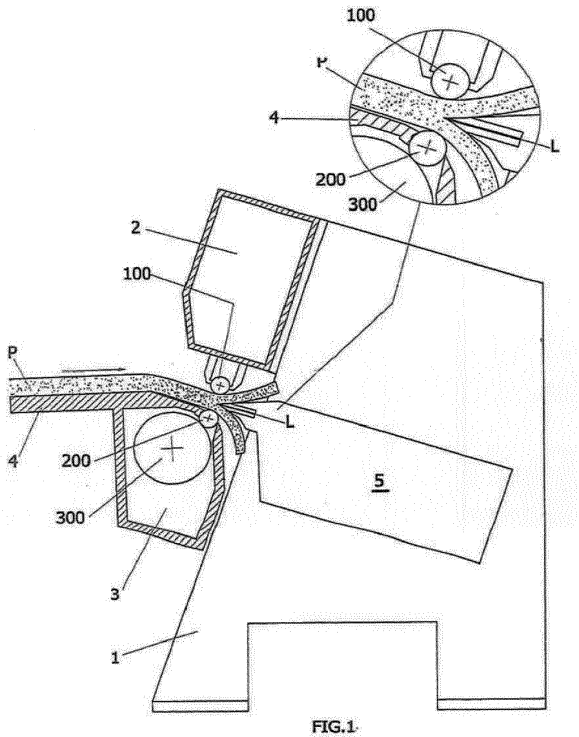

FIG.1

EP 3 366 786 A1

Description

[0001] The present invention relates to a splitting machine for dividing the thickness of skins in two parts, so as to separate the upper part from the lower part of said skins, transversally, being provided with an introduction device of the skin which facilitates the operators, according to the general part of claim 1.

[0002] It is known that the so-called splitting machines are machines which are used in the tan industry for splitting the skin according to the thickness, so as to obtain a more precious part, which is commonly referred to as "grain" and which corresponds to the outer part of the skin covering the animal's body and a less precious part, referred to as "split", corresponding to the skin part on the animal's body which is in contact with the flesh.

[0003] The skins may be split in "pelt", that is, immediately after the fleshing operation, or in "blue", after being tanned, or "dry", after being refined.

[0004] In an embodiment of the known type, the splitting machines consist substantially of a frame, which supports a top transverse, to which a first roller belongs, commonly referred to as "upper conveyor roller" and arranged with the horizontal axis, which develops in the direction of the width of said frame and a bottom transverse, on which a second roller rests, commonly referred to as "lower conveyor roller", opposite to the first roller and a third roller, covered in rubber, arranged below with respect to said second roller, said rollers all being mutually parallel.

[0005] A plane, preferably inclined, arranged at a middle position between said transverses and in front of said rollers, guides the skin to be split which is to be advanced, compressed between said first roller and said second roller, against a splitting blade, which is supported by a central beam, arranged on the opposite part of side inclined plane and which is supported by said frame.

[0006] A pair of flywheels, arranged at the sides of the frame, place the blade in rotation, making it translate longitudinally according to the axis of the two conveyor rollers, carrying out the splitting of the skin, which is pushed against thereof.

[0007] In particular, in the splitters which work very viscid skins and which are therefore difficult to control, the first roller or "upper conveyor roller", supported by the top transverse, is provided with helical grooves, which start from the central area of the roller and develop, according to mutually opposing propellers, rightwards and leftwards, so as to facilitate the widening of the skin; the second roller, i.e. the "lower conveyor roller", preferably, consists of a plurality of mutually coaxial and radially movable rings, which serve to compensate for the difference in thickness of the skin that is split.

[0008] The third roller is a cylinder covered in rubber, commonly referred to as "rubber roller", arranged in contact with said second ring roller.

[0009] The skin to be split is inserted between said first upper conveyor roller provided with helical grooves and said second lower conveyor roller, consisting of coaxial rings, which, rotating around the axis thereof, feed it against the blade.

[0010] Operatively the splitting machines with manual introduction require expert operators, capable of carrying out, besides the manual introduction action, which is carried out in a dangerous situation, due to the proximity of the hands to the conveyor rollers which rotate in a convergent way, also the so-called "accompanying and widening" action, which is carried out over the entire length of the skin, in order to obtain a constant thickness on all the parts of the above mentioned skin.

[0011] Currently, splitting machines are used which have solved the safety factor, maintaining the operators that maneuver the skin away from the conveyor rollers, by the use of an automatic introducer composed of two ring wrapped belts, one overlapped on the other, so as to determine a middle area which feeds the skin and wherein the front ends of said belts are positioned in the introduction zone of the skin and the closest possible to the conveyor rollers,

[0012] By way of example, the patent document EP 3121293 B1 is cited (fig. 1, the following references refer to this patent), where the two overlapping reciprocal conveyor belts (refs. 11, 12) which drag the skin (ref. P) between the conveyor rollers (lines 100, 102), located upstream of the cutting blade (ref. 103), are highlighted. Again by way of example, the patent document US 6,698,255 B1 (fig. 1, the following references refer to this patent) is cited, where a lower conveyor belt (ref. 15) and a drive roller (ref. 13), which goes to replace and perform the action of an upper conveyor belt, are present.

[0013] Again by way of example, the patent document WO 2011/148077 A1 (fig. 1, the following references refer to this patent) is cited, where the two conveyor belts (ref.3,5) are mounted on a wheeled structure to form an independent introduction device (ref. 1) which is positioned immediately upstream of the working area, specifically immediately upstream of the drive rollers of the splitting machine. Again by way of example, the Italian patent document VI2011A000092 (figs. 1, 2, the following references refer to this patent) is mentioned, where the introducer (ref.1), consisting of the two conveyor belts (refs. 2, 3), is supported by a swinging arm (ref. 10).

[0014] In practice, the use of such types of introducers shows the drawback that, in the passage between the two overlapping ribbons and between the two upper and lower conveyor rollers, the skin advances in an irregular way, in practice it is "refused", with the consequent damaging of the initial part of said skin.

[0015] This disadvantage has been partly solved with a constructive solution in which the two conveyor belts, which constitute the introducer, engage directly with the drive rollers of the splitting machine.

[0016] Still by way of example, the splitting machine in the Italian patent document VR2015A000028 (fig. 1, the references which follow relate to such a patent) is cited, where a splitting machine is described, provided with a movable feeding belt (ref.12), which defines a closed

path, arranged at a lower bench (ref. 2), on which the skin is placed, which extends from the inlet gap (ref. 7), engaging the compensator roller (ref. 8), to the outlet gap (ref. 10), where the stretching action is carried out by two opposing spreader rollers (refs. 5, 6) associated with regulating means (refs. 15-18); the feeding action, at the feeding portion (ref. 13), is carried out by the use of a pulling surface (ref. 14), defining a support surface of said feeding portion (ref. 13) and of an abutment plate (ref. 23), facing the feeding belt (ref. 12) at the pulling surface (ref. 14) and from the opposite part thereof to define an introduction channel (ref. 24) within which the skin feeds; said abutment plate (ref. 23) is movable to regulate the height of said introduction channel (ref. 24) by at least one actuator cylinder (ref. 25), operating perpendicularly to the feeding direction (ref. D). Furthermore, the use of a further movable feeding belt (ref. 26) is provided, arranged at the upper head (ref. 3) and comprising a further feeding portion (ref. 27), arranged between the inlet gap (ref. 7) and the outlet gap (ref. 10), wherein said further movable feeding belt (ref. 26) defines a closed path which encloses an inner area (ref. 27) and is wrapped around at least the abutment roller (ref. 6), the abutment plate (ref. 23) and the guide roller (ref. 9).

[0017] Operatively the splitting machine described above shows several drawbacks which depend on the fact that the skin in the inlet gap (ref. 7) is subjected first to the compression carried out by the two opposing spreader rollers (ref. 5, 6) and, subsequently, to the compression between the support/pulling surface (ref. 14) and the upper opposing abutment plate (ref. 23) which, in practice, prevents the above mentioned skin from widening towards the outer sides, or from forming an optimal stretching.

[0018] Furthermore, the use of the upper movable feeding belt (ref. 26) eliminates the widening action carried out by the guide roller (ref. 9) through the helical grooves on the surface thereof.

[0019] Object of the present invention is to provide a splitting machine wherein an introduction zone is formed which conveys the skin directly to the cutting area and wherein the stretching/widening effect of the above mentioned skin, which starts from the central area and extends laterally outwards, is no longer dependent on the manual ability of the operator in accompanying and centrally stopping the skin during the feeding step.

[0020] Such an object is achieved with a splitting machine provided with means for the stretching action and the action of introducing the skin between the conveyor rollers which are provided with technical features outlined in one or more of the following claims.

[0021] The invention will appear more clearly through the description of a possible embodiment thereof, made by way of a non-limiting example, with the aid of the accompanying drawings, in which:

- fig. 1 shows a schematic side view of a splitting machine of the in se known type, with manual introduction, to divide or split the skins;
- fig. 2 shows a schematic side view of a splitting machine of the in se known type, with automatic introduction, to divide or split the skins;
- fig. 3 shows a front view of the splitters of fig. 1, 2;
- fig. 4 a schematic side view of a splitting machine according to the invention;
- fig. 5 shows a front view of such a machine, dissected according to line V-V of fig. 4.

[0022] As seen in fig. 1, a splitting machine of normal production with manual introduction comprises a frame 1, which supports:

- a top traverse 2, which supports a first upper conveyor roller 100, arranged with horizontal longitudinal axis which develops in the direction of the frame 1 and is provided on the surface with helical grooves, which start from the central area of the roller and develop, according to mutually opposing propellers, rightwards and leftwards, so as to facilitate the widening of the skin;
- a bottom traverse 3, which supports a second lower articulated roller 200, opposed to said first top conveyor roller 100 and a third rubber roller 300, arranged below said second articulated roller 200, said two rollers 200 and 300 being arranged with longitudinal axes parallel to the axis of said first upper conveyor roller 100;
- a plane 4, on the transverse 3 and arranged parallel to the above mentioned rollers, with the function of facilitating the manual introduction of the skin "P" by the operators between the upper conveyor roller 100 and the lower articulated roller 200, which feed the skin "P" against a splitting blade "L".
- a frame 5, whose function is to support the splitting blade "L" and the means that horizontally translate said blade "L" according to an assigned direction or in an opposite direction, through the clockwise or anticlockwise rotation of flywheels 6, between which said blade "L" is arranged.

[0023] As seen in fig. 2, a splitting machine of normal production with automatic introduction provides that the introduction of the skin "P" between the rollers 100 and 200 occurs through an automatic introducer "C" composed of two ring wrapped belts, one overlapped on the other, so as to determine a middle area which feeds the skin and wherein the front ends of said belts are positioned in introduction zone of the skin and the closest possible to the two conveyor rollers.

[0024] As seen in fig. 3, the lower articulated roller 200 is made of a plurality of rings 201, mutually coaxial and radially movable, to be able to adapt to variations in thickness of the above mentioned skin "P", when it is split, while the rubber roller 300, in contact with said lower articulated roller 200, absorbs the thrust of the same re-

ceived by the skin, in consequence to the difference of thickness of the skin which is split.

[0025] As seen in fig. 4, the novelty of the present invention consists in creating a splitting machine consisting of:

- a top traverse 2, which supports a first upper conveyor roller 100, arranged with horizontal longitudinal axis which develops in the direction of the frame 1 and is provided on the surface with helical grooves, which start from the central area of the roller and develop, according to mutually opposing propellers, rightwards and leftwards, so as to facilitate the widening of the skin;
- an upper transverse 3, which supports a second lower articulated roller 200, opposed to said first upper conveyor roller 100 and a third rubber roller 300, arranged below said second lower articulated roller 200, so as to support it, said two rollers 200 and 300 being arranged with longitudinal axes parallel to the axis of said first upper conveyor roller 100; said roller 200 consists of a plurality of rings 201 mutually coaxial and radially movable, which serve to compensate the difference of thickness of the skin which is split.
- a frame 5, whose function is to support the splitting blade "L" and the means that horizontally translate said blade "L" according to an assigned direction or in an opposite direction, through the clockwise or anticlockwise rotation of the flywheels 6, between which said blade "L" is arranged;
  and to comprise a conveyor station 400 of the skin "P" directly to the cutting area, consisting of:
- a conveyor belt 10 of the skin "P" to the cutting area, defined by a closed loop belt 11, which extends from the front zone "K", to the two rollers 100 and 200 and therefore at the back zone "Z" of said rollers and wherein said belt 11 partially wraps on the second lower articulated roller 200 to allow the blade "L" to cut said skin, said closed loop belt 11 is associated with a motor drive roller 13, a series of diverter return rollers 12, a centring roller 14 of the movements of the closed loop belt 11 and a spreader roller 15 of the skin "P";
- an accompanying belt 20 of the skin "P", arranged above the conveyor belt 10 and parallel to the rollers 100 and 200, consisting of a closed loop belt 21, to which a motor drive roller 22, a centring roller 23 of the movements of the closed loop belt 21, a transverse, commonly referred to as "pen" 24, made of a plurality of rollers 25 of reduced diameter, to allow the approach of the end of said accompanying belt 20 to the area of introduction of the skin "P";
- a spreader roller 15, arranged parallel to the rollers 100 and 200, positioned below the portion 11' of the closed loop belt 11 which is dominated by the portion 21' of the closed loop belt 21 and consists of a series of rollers 16 which extend over the entire working length and are arranged according to a convex arched trajectory, where the central area of the spreader roller 15 is higher than a gradient "h" with respect to the two ends of the same.

[0026] In detail, the closed loop belt 11, besides being partially wrapped around the lower articulated roller 200, it is associated with a series of diverter return rollers 12, to a motor drive roller 13, to a centring roller 14 of the movements of the closed loop belt 11 to a spreader roller 15 of the skin "P".

[0027] Still in detail, the spreader roller 15 has the gradient "h" of variable value, to have the possibility of generating a convex arched trajectory equally variable, so as to achieve the right widening effect in relation to the type of skin "P".

[0028] Operatively, in the conveyor station 400 of the present invention, the spreader roller 15 and the accompanying belt 20 work in combination to define an optimal area "K" of introduction of skin "P" between the two rollers 100 and 200.

[0029] Specifically, the spreader roller 15, being susceptible to sliding in a direction perpendicular to the feeding direction "x" of the skin "P" (see arrow F1), generates a compression on the portion of skin which slides between the two opposing portions 11' and 21' of the belts 11 and 21, so as to achieve the effect of stretching and, consequently, the widening of said skin while, in addition, the accompanying belt 20, being susceptible to sliding in a direction concurrent to the feeding direction "x" of the skin "P" (see arrow F2), regulates the action of introduction of the skin between the two rollers 100 and 200 (by way of example, the movement of the upper belt described in the patent document EP 3121293 B1 (figs.1-3, ref. 11) is mentioned, where it is expected that, after the introduction of the skin, the belt will come back and rise).

[0030] Furthermore, advantageously, the present invention provides that a front portion 11" of the conveyor belt 10 protrudes from the above accompanying belt 20, to allow the manual stretching of the skin "P" before entering the conveyor station 400.

[0031] As outlined above, it is understood that the predetermined objects have been achieved, since the operator only needs to place the skin "P", in maximum safety conditions, on the front portion 11" of the conveyor belt 10, protruding from the accompanying belt 20, leaving at the conveyor station 400 the task of stretching and introduction of the above mentioned skin between the two rollers 100 and 200.

Claims

1. SPLITTING MACHINE FOR DIVIDING THE THICKNESS OF SKINS IN TWO PARTS, TRANSVERSALLY, SO AS TO SEPARATE THE UPPER PART FROM THE LOWER PART OF SAID SKINS, ACCORDING TO THE THICKNESS, in order to obtain

a more precious part which is commonly referred to as "grain" and corresponding to the outer part of the skin covering the animal's body and a less precious part, referred to as "split" corresponding to the skin part on the animal's body which is in contact with the flesh, consisting of:

- a top traverse (2), which supports a first upper conveyor roller (100), arranged with horizontal longitudinal axis which develops in the direction of the frame (1) and is provided on the surface with helical grooves, which start from the central area of the roller and develop, according to mutually opposing propellers, rightwards and leftwards, so as to facilitate the widening of the skin;
- a bottom traverse (3), which supports a second lower articulated roller (200), consisting of a plurality of mutually coaxial and radially movable rings (201), which serve to compensate for the difference in thickness of the skin that is split, opposed to said first top conveyor roller (100) and a third rubber roller (300), arranged below said second articulated roller (200) so as to support it, said two rollers (200, 300) being arranged with longitudinal axes parallel to the axis of said first top conveyor roller (100);
- a frame (5), whose function is to support the splitting blade (L) and the means that horizontally translate said blade (L) according to an assigned direction or in an opposite direction, through the clockwise or anticlockwise rotation of flywheels (6), between which said blade (L) is arranged,

and it comprises a conveyor station (400) of the skin (P) directly to the cutting area, consisting of:
- a conveyor belt (10) of the skin (P) to the cutting area, defined by a closed loop belt (11), which extends from the front zone (K) to the two rollers (100, 200) and the back zone (Z) of said rollers and which partially wraps on the second lower articulated roller (200) to allow the blade (L) to cut said skin, said closed loop belt (11) being associated with a motor drive roller (13), a series of diverter return rollers (12), a centring roller (14) of the movements of the closed loop belt (11) and a spreader roller (15) of skin (P) and where said spreader roller (15) is arranged parallel to the rollers (100, 200), positioned below a portion (11') of the closed loop belt (11) which is dominated by a portion (21') of a closed loop belt (21);
- an accompanying belt (20) of the skin (P), arranged above the conveyor belt (10) and parallel to the rollers (100, 200), consisting of a closed loop belt (21) to which are associated a motor drive roller (22), a centring roller (23) of the movements of the closed loop belt (21), a traverse, commonly referred to as "pen" (24), consisting of a plurality of rollers (25) of reduced diameter to allow the approach of the end of said accompanying belt (20) to the introduction zone of the skin (P);

said splitting machine being characterized in that

said spreader roller (15) consists of a series of rollers (16) which extend over the entire length of the working area and are arranged according to a convex arched trajectory, the central area of said spreader roller (15) being higher than a gradient (h) with respect to the two ends of the same.

2. SPLITTING MACHINE, according to claim 1, **characterized in that** the spreader roller (15) has the gradient (h) of variable value, to have the possibility of generating a convex arched trajectory equally variable, so as to achieve the right widening effect in relation to the type of skin (P).

3. SPLITTING MACHINE, according to one or more of the preceding claims, **characterized in that** the spreader roller (15) and the accompanying belt (20) work in combination to define an optimal area (K) of introduction of skin (P) between the two rollers (100, 200).

4. SPLITTING MACHINE, according to claim 4, **characterized in that** the spreader roller (15) is susceptible to slide in a direction perpendicular to the feeding direction (x) of the skin (P), to generate a compression on the portion of skin sliding between the two opposing portions (11', 21') of the belts (11, 21), so as to achieve the effect of stretching and widening of said skin.

5. SPLITTING MACHINE, according to one or more of the preceding claims, **characterized in that** it provides a front portion (11") of the conveyor belt (10) which is protruding from the above accompanying belt (20), to allow the manual stretching of the skin (P) before entering the conveyor station (400).

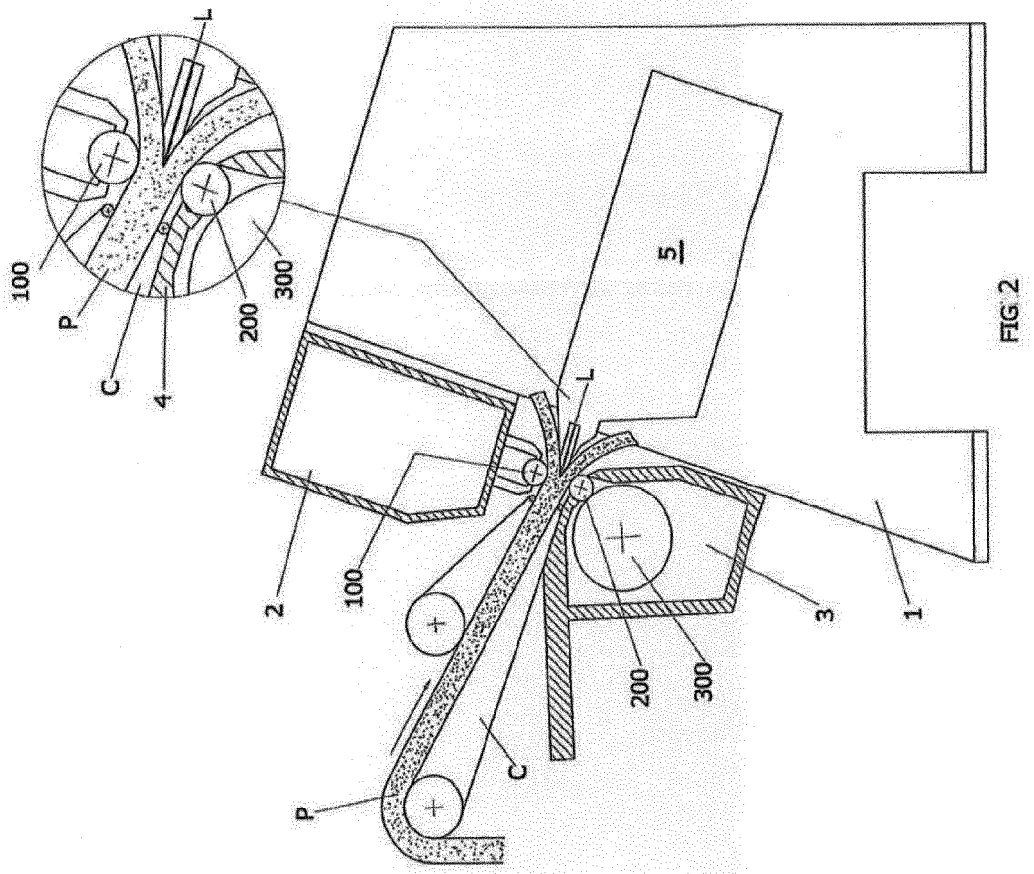
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FIG. 2

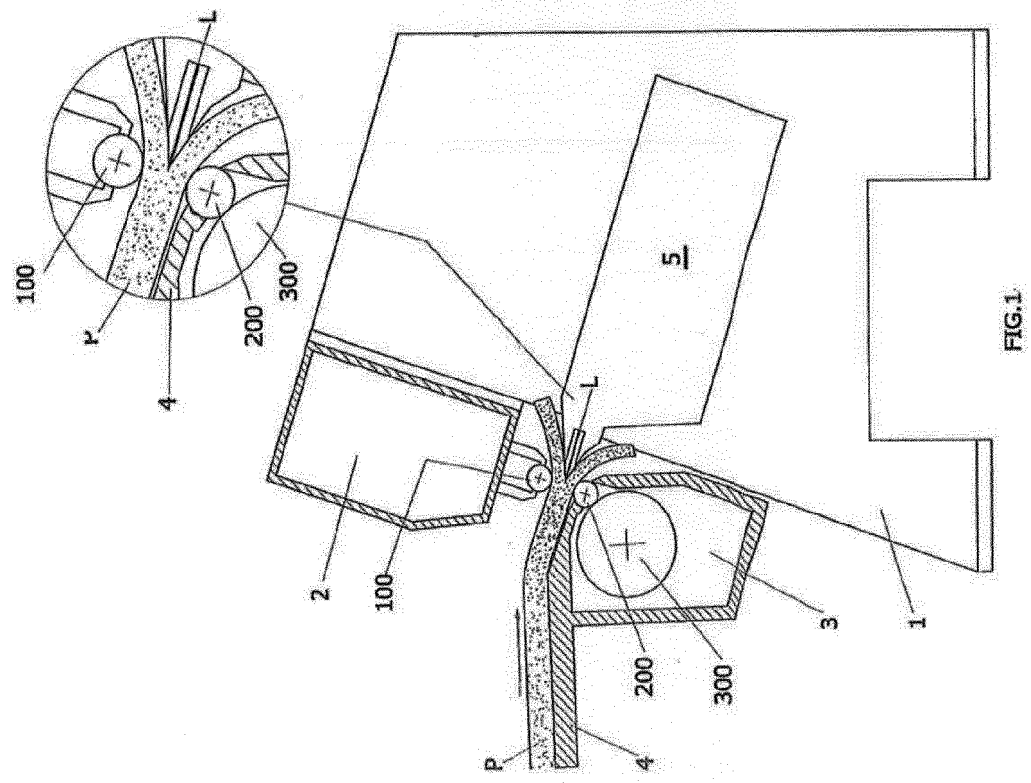
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FIG.1

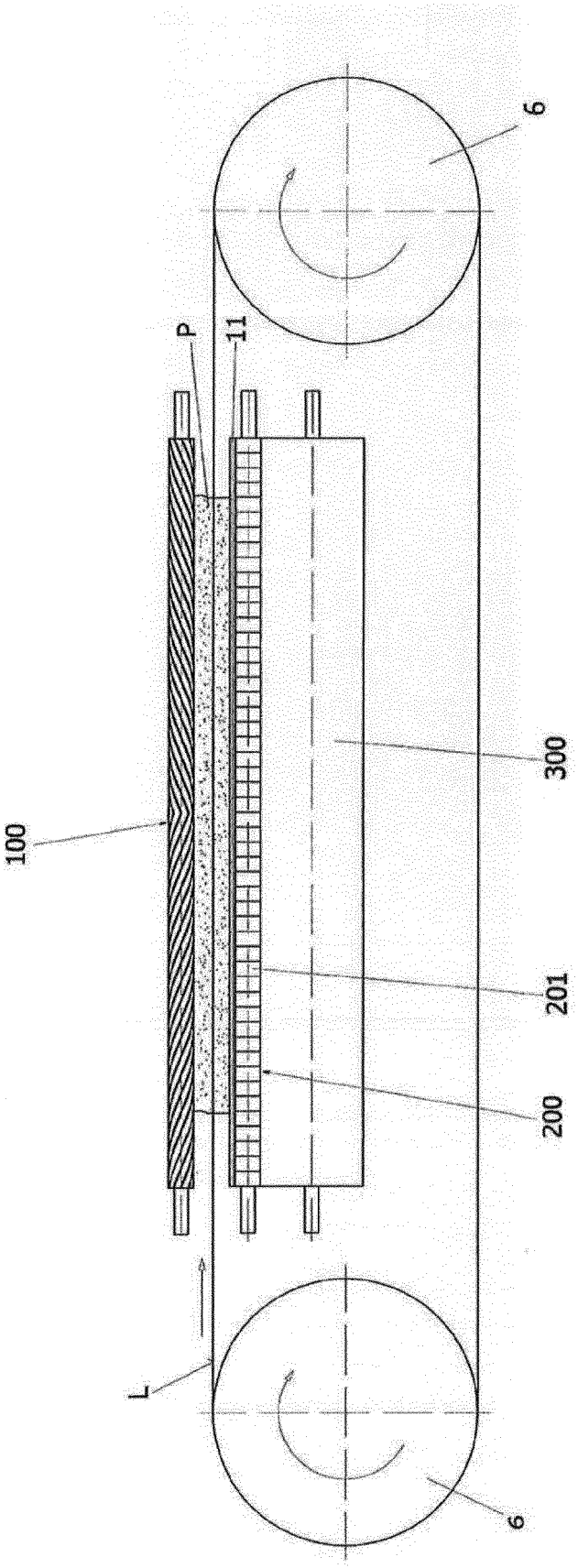

FIG.3

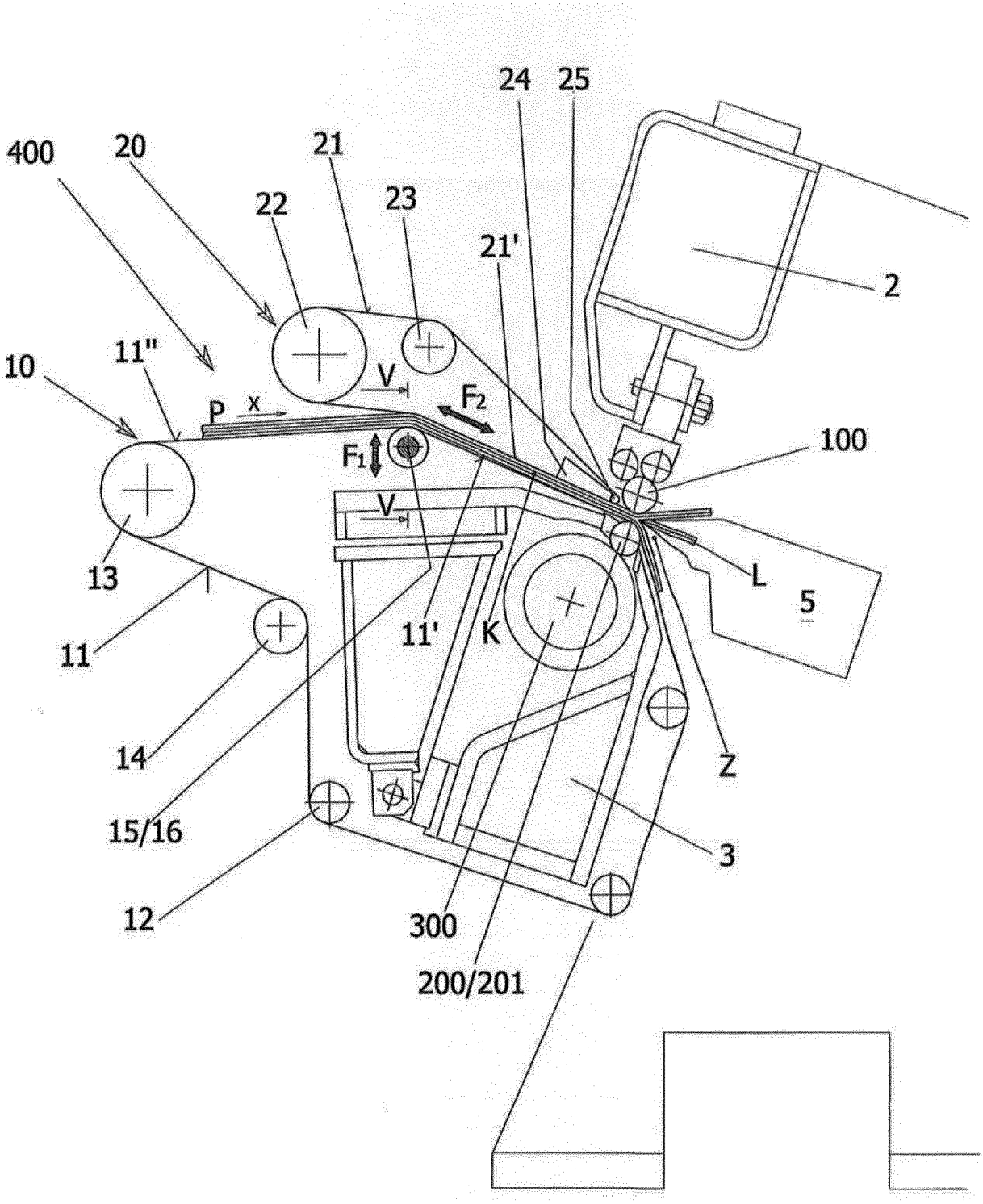
400
20
21
22
23
24
25
21'
2
10
11"
V
P
x
F2
100
F1
V
13
11
11'
K
L
5
14
Z
15/16
3
12
300
200/201

FIG.4

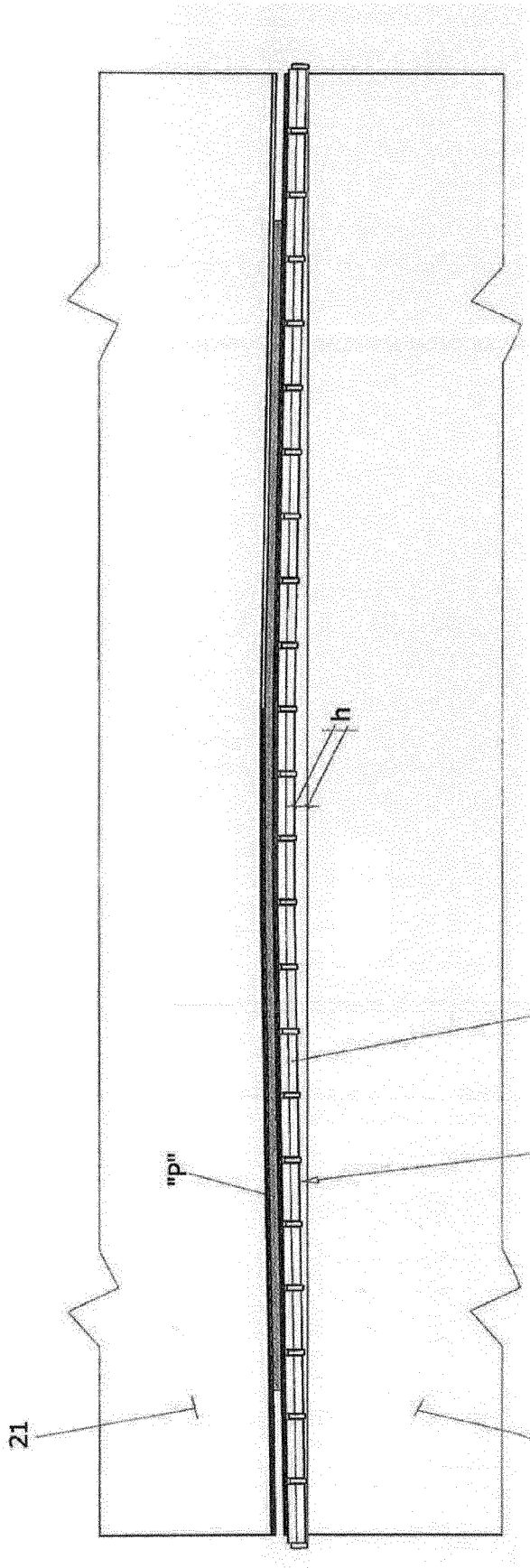

FIG.5

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EUROPEAN SEARCH REPORT

Application Number
EP 18 15 6217

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	US 3 736 776 A (REPETTO S) 5 June 1973 (1973-06-05) * abstract *	1-5	
A	EP 3 121 293 A1 (GE MA TA SPA [IT]) 25 January 2017 (2017-01-25) * the whole document *	1-5	

TECHNICAL FIELDS SEARCHED (IPC)

C14B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	26 February 2018	Bichi, Marco

CATEGORY OF CITED DOCUMENTS

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26-02-2018

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REFERENCES CITED IN THE DESCRIPTION

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