(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 034 077 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
11.03.2009 Bulletin 2009/11

(21) Application number: **08380261.1**

(22) Date of filing: **01.09.2008**

(51) Int Cl.:
D06C 19/00 *(2006.01)* ***D06B 3/16*** *(2006.01)*
D06B 3/28 *(2006.01)*

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

(30) Priority: **10.09.2007 ES 200702410**

(71) Applicant: **Jaume Anglada Viñas S.A.**
08120 La Llagosta (ES)

(72) Inventor: **Anglada Viñas, Jaume**
08230 Matadepera (Barcelona) (ES)

(74) Representative: **Curell Aguilà, Marcelino et al**
Curell Suñol
European Patent Attorneys
Passeig de Gràcia, 65 bis
08008 Barcelona (ES)

(54) Machine for processing textile webs and corresponding processing method

(57) Machine for processing textile webs and corresponding processing method, with the machine comprising first and second chambers (1, 2) for gathering a textile web (5), first and second driving means (3, 4) for introducing and removing textile web (5). Also, it has third driving means (8) for producing the alternative movement of web (5) between the first and second chambers (1, 2). Web (5) forms a striking path (9) between the first and second chambers (1, 2) that comprises at least a first and a second branch (13, 14). The first and second branches (13, 14) move at a longitudinal speed (L). Also, between the first and second branches (13, 14) at least one active striking unit (6) strikes web (5) at a speed that has a perpendicular component (N) that is normal to the longitudinal speed (L). This perpendicular component (N) is at least two times greater than the longitudinal speed (L).

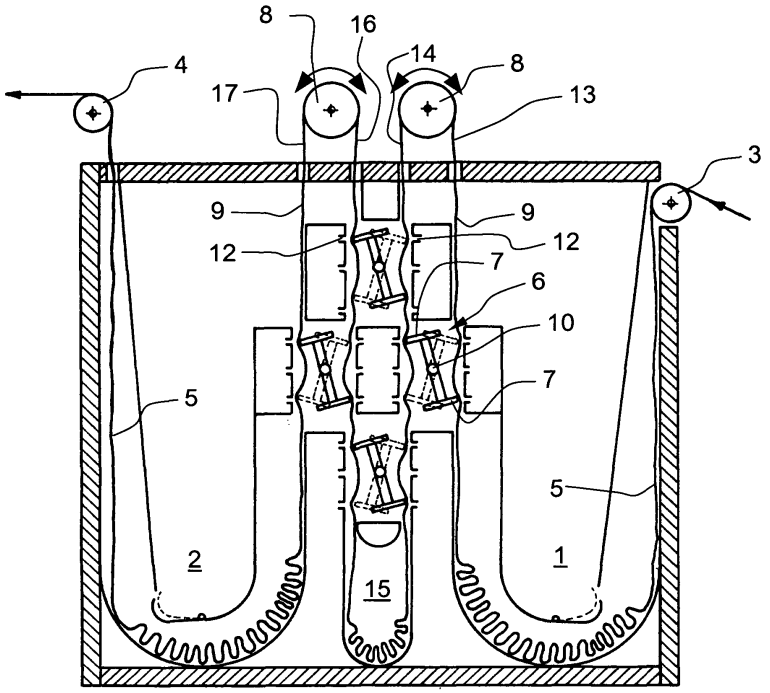

FIG. 1

EP 2 034 077 A1

Description

Field of the invention

[0001] The invention relates to a machine for processing textile webs comprising a first chamber for gathering an input textile web, a second gathering chamber for the output of said textile web, first driving means for gradually introducing said textile web into said first chamber, second driving means for gradually removing said textile web from said second chamber, and third alternative operation driving means suitable for producing the alternative movement of said textile web between said first chamber and said second chamber.

[0002] Also, the invention relates to a method for processing textile webs.

State of the art

[0003] In the state of the art, machines are known for processing fabric on a web, wherein a web of fabric is moved along a path between two gathering chambers. Along the path, between both gathering chambers, various impact elements are provided which the fabric knocks against as it is being processed. This processing is known in Spanish as *"tumbleado",* which is a Spanish adaptation of the English term "tumbling". By striking the web against the impact elements, the tumbling gives the fabric web a softer, more flexible and voluminous texture by relaxing the web structure.

[0004] An example of these machines can be found in Spanish patent ES2172364 in the name of the same applicant. This machine comprises a gathering chamber for the input fabric, a gathering chamber for the output fabric, first means for gradually introducing the fabric into the first chamber and second means for gradually removing the fabric from the second chamber. Also, between both chambers a passage conduit is provided for the fabric web, through which, fabric propulsion means by means of a high speed air jet that operate alternatively to produce an alternative movement of the fabric between both chambers. In this conduit impact elements are provided that can receive the impact of the fabric. These impact elements move between an impact position and a passage position in a way that is synchronised with the alternative movement of the fabric.

[0005] In this machine the fabric web moves at high speed between both chambers, whereas the impact elements are static as the web passes. This arrangement consumes a considerable amount of energy due to the high speed at which the web has to be propelled. Moreover, when the web hits against the impact elements, it rubs constantly. This constant rubbing causes the phenomenon known as "peeling"; in other words, the fabric is worn by the rubbing.

[0006] Also, in this machine, the high-speed air jet propulsion means are not always used efficiently. This is due to the fact that different width webs are processed and, when processing narrow webs, the electricity used to generate the air currents is not fully utilized, and therefore electrical energy is consumed unnecessarily. Moreover, the air jet propulsion also hinders the simultaneous processing of two or more fabric webs arranged in parallel in the machine. For example, the fabric webs for towels are usually narrow and only partially occupy the useful processing width of the machine. So, in order to reduce the total processing time, it is advisable to provide two or more webs in a parallel arrangement along the processing width so that they can run simultaneously between the first and second gathering chambers. However, when it is desired to process two or more webs in parallel in the same processing sequence, the characteristics of the fabric in these webs need to be virtually identical. Otherwise, the feeding speed of each web between both chambers may be different. Moreover, the high speed air jet produces a lateral drift phenomenon in the webs which does not allow narrow webs to be processed and may cause them to become tangled together. Both phenomena can interrupt the tumbling processing and this considerably affects the processing time and therefore the processing costs.

Disclosure of the invention

[0007] The aim of the invention is to overcome this drawback. This aim is achieved through a machine for processing textile webs of the type indicated at the beginning, characterized in that between said first gathering chamber and said second chamber, said textile web forms a path comprising at least a first striking branch and a second striking branch, with said first and second branches moving at a longitudinal speed, in that between said first and second branches said machine comprises an active striking unit with a striking element, with said striking element striking said textile web at a speed that has a perpendicular component that is normal to said longitudinal speed, with said perpendicular component being, at least, two times greater than said longitudinal speed.

[0008] In fact, contrary to the state of the art machines, in this machine the web moves at a rather slow speed, whereas the striking elements hit the web at a high speed. This is a substantial difference, since on the one hand, much less power is needed to move the web, thereby reducing the electrical consumption of the machine. On the other hand, the striking elements hit the web cleanly, virtually without rubbing it. In other words, the striking is substantially perpendicular to the trajectory of the textile web. By virtue of this aspect, the "peeling" effect is not produced on the textile web, which is highly desirable, as optimum tumbling is achieved without thereby spoiling the textile web, or varying its superficial appearance.

[0009] There are many ways of producing the striking action perpendicular to the textile web, such as for example, by moving the striking element in a lineal direction using a slider mechanism. Nevertheless, preferably said

striking element swings around a rotation axis.

[0010] Preferably said striking element performs an alternative movement around said rotation axis, so that said striking element strikes said first and second branches alternatively. This can double the number of strikes each time the textile web passes.

[0011] Preferably said striking unit comprises two striking elements diametrically opposite to said rotation axis. Irrespective of the fact that this characteristic can quadruple the number of strikes made on the web, what is even more significant is that this is a balanced system, which is particularly important in reducing possible machine breakdowns.

[0012] Preferably, the machine comprises two third driving means provided between said first and second textile web gathering chambers, and a third gathering chamber is provided between said two third driving means, so that said path comprises a third and a fourth striking branches, and between said second and third branches said machine comprises a striking unit. This arrangement has several advantages. On the one hand, both surfaces of the textile web can be processed, which avoids having to re-introduce the textile web on the reverse side to process the surface that has not yet been processed. Also, with the third gathering chamber reverse rollers are not needed. This is particularly interesting because it avoids any unnecessary tension on the textile web.

[0013] As already mentioned, with the state of the art machines different web widths are processed, whereby the air jet propulsion means are not used efficiently, since the useful width of the machine is not always occupied. Therefore, preferably, in the machine according to the invention said third driving means are electromechanical driving means that comprise textile web dragging rollers. Also, the invention proposes a textile web processing method with a machine according to the invention that comprises simultaneously processing at least two textile webs, where said textile webs are gathered simultaneously in said first chamber by said first driving means, they are removed simultaneously from said second chamber by said second driving means, where said third alterative operation driving means produce the simultaneous alternative movement of said textile webs between said first chamber and said second chamber, where said first and second branches of said textile webs move simultaneously at a longitudinal speed, and where said striking unit hits said textile webs simultaneously with a striking element at a speed that has a perpendicular component that is normal to said longitudinal speed.

[0014] In fact, in the machine according to the invention the web is moved alternatively by the mechanical dragging action produced by the rollers. In turn, the rollers are driven by electric motors, which provides two important advantages. The first advantage is that it avoids the unnecessary waste of energy which implies that the air jet blows idle in the state of the art machines when the web does not cover the machine's full useful width. On the other hand, when various webs are processed in parallel, thanks to the dragging action of the rollers, it is guaranteed that all the webs move at the same speed. This implies that webs with very different physical characteristics can be processed simultaneously. Also, in the machine according to the invention neither is it essential that the width of the various webs be the same.

Brief description of the drawings

[0015] Other advantages and characteristics of the invention can be appreciated from the following description, wherein, some preferable non-limiting embodiments of the invention are described, with reference to the accompanying drawings, in which:

Fig. 1 is a front schematic view of a first embodiment of the invention.

Fig. 2 is an enlarged view of a striking unit.

Fig. 3 is a front schematic view of a second embodiment of the invention.

Detailed description of some embodiments of the invention

[0016] Figure 1 shows a first embodiment of the machine according to the invention. The machine has a first and a second gathering chamber 1, 2 for textile web 5. Textile web 5 is introduced into the first chamber 1 by first driving means 3 and it is removed by second driving means 4. Between the first and second chambers 1, 2 two third driving means 8 are responsible for moving textile web 5 alternatively between the first and second chambers 1, 2. As it can be seen in the figures, between the two third driving means 8, in the machine a third textile web gathering chamber 15 is provided. The gathering of textile web 5 is electronically controlled to guarantee that the whole machine works correctly constantly. The striking path 9 that textile web 5 forms between first and second chambers 1, 2, has a first and a second striking branches 13, 14 between first chamber 1 and third chamber 15, and third and fourth branches 16, 17 between third chamber 15 and second chamber 2.

[0017] Also, the machine comprises four striking units 6 provided between pairs of branches 13, 14, 16, and 17 that have two striking elements 7 arranged diametrically opposite to rotation axis 10. This way, striking elements 7, perform an oscillating alternative movement with respect to rotation axis 10. For example, striking unit 6 provided between first and second branches 13, 14 strikes against the same surface of textile web 5. The moment that top striking element 7 of said striking unit 6 hits against first branch 13, lower striking element 7 hits against second branch 14.

[0018] In turn, the two striking units 6 provided on the third chamber 15, hit against the opposite surface of textile web 5, which reduces the processing time of said textile web 5. Also, in this embodiment the use of reverse

rollers is avoided, whereby textile web 5 moves with a very reduced tension level, which is very advantageous in that it does not stretch the fabric prematurely, and instead causes it to shrink.

[0019] As can be seen in the figures, associated to striking units 6 there are gas outlets 12 that spray a jet of gas onto the contrary surface of textile web 5 in the area where striking units 6 are located. This spraying of gas onto textile web 5 is particularly favourable because, as can be seen in Figure 2, it causes the web to form a curve that guarantees that striking element 7 strikes in an idlely; in other words, that it does not strike web 5 against a solid surface, which would contribute to wearing the material of web 5 prematurely. Advantageously, the gas sprayed is hot air. With this, if processing a wet textile web 5, this spraying of gas can be used to dry the material during the tumbling. Alternatively, if the textile web is processed dry, the gas can also be steam, which softens the fabric and also improves the tumbling results.

[0020] Figure 2 shows in detail the operating principle of the machine according to invention. Textile web 5 moves at a longitudinal speed L, orientated in a substantially vertical direction. Striking element 7 performs a rotational movement around rotational rotation axis 10. This way, if the speed of striking element 7 is decomposed into a perpendicular component N and a longitudinal component, the perpendicular component N will be at least two times greater than the longitudinal speed L at which textile web 5 moves.

[0021] The machine according to the invention has higher features than the state of the art machines. In particular, this machine can perform about 24,000 strikes per minute, whereas the state of the art machines only performed a maximum of about 75 strikes per minute. Evidently this leads to a very significant reduction in the processing times and consequently also in costs.

[0022] Moreover, it is worth mentioning that a textile web 5 intended for manufacturing towels weighs approximately 800 g/m^2 dry and 1500 g/m^2 wet. As a person skilled in the art will appreciate, moving these masses at high speed implies using a considerable amount of electricity. Thanks to the fact that the machine according to the invention moves the textile web at slow speeds, the electricity used is drastically reduced. In particular, the speeds at which the web moves in machines that are already known vary between 400 and 1000 m/min, whereas in the machine according to the invention, the movement speed varies between 25 and 40 m/min.

[0023] Figure 3 shows a second embodiment of the machine according to the invention. The difference in this machines lies mainly in the fact that the third textile web gathering chamber 15 is not provided. As said third chamber 15 is absent, reverse rollers 11 have to be used that increase the tension on the textile web, which makes this embodiment more appropriate for heavy and originally rigid webs which do not need to be shrunk, such as in webs of artificial leather, thick upholstery, etc.

[0024] Furthermore, it is also worth mentioning the advantage implied by the alternative driving by rollers that are driven by electric motors. In particular, the textile web transport system that uses a large flow of compressed air requires power rates of between 22 and 50 kW, depending on the useful width, whereas with a textile web transport system that uses rollers the power required is between 1.1 and 1.5 kW. If we add to this value the power required by the ventilators associated to the gas outlets 12, the overall power required is between 40% and 60 % of the total power needed for a textile web transport system that runs on a high flow of compressed air.

Claims

1. Machine for processing textile webs comprising a first chamber (1) for gathering an input textile web (5), a second gathering chamber (2) for the output of said textile web (5), first driving means (3) for gradually introducing said textile web (5) into said first chamber (1), second driving means (4) for gradually removing said textile web (5) from said second chamber (2), and third alternative operation driving means (8) suitable for producing the alternative movement of said textile web (5) between said first chamber (1) and said second chamber (2), **characterized in that**

   [a] between said first chamber (1) and said second chamber (2), said textile web (5) forms a striking path (9) comprising at least a first striking branch (13) and a second striking branch (14),
   [b] with said first and second branches (13, 14) moving at a longitudinal speed (L), **in that**
   [c] between said first and second branches (13, 14) said machine comprises an active striking unit (6) with a striking element (7),
   [d] with said striking element (7) striking said textile web (5) at a speed that has a perpendicular component (N) that is normal to said longitudinal speed (L), and
   [e] with said perpendicular component (N) being, at least, two times greater than said longitudinal speed (L).

2. Machine according to claim 1, **characterized in that** said striking element (7) swings around a rotation axis (10).

3. Machine according to claim 162, **characterized in that** said striking element (7) performs an alternative movement around said rotation axis (10), so that said striking element (7) strikes said first and second branches (13, 14) alternatively.

4. Machine according to any of the claims 1 to 3, **characterized in that** said striking unit (6) comprises two striking elements (7) diametrically opposite to said

rotation axis (10).

5. Machine according to any of the claims 1 to 4, **characterized in that** it comprises two third driving means (8) provided between said first and second textile web gathering chambers (1, 2), and a third textile web gathering chamber (15) provided between said two third driving means (8), so that said path (9) comprises a third and fourth striking branches (16, 17), and **in that** between said second and third branches (14, 16) said machine comprises a striking unit (6).

6. Machine according to any of the claims 1 a 5, **characterized in that** said third driving means (8) are electromechanical driving means comprising textile web dragging rollers.

7. Machine according to any of the claims 1 a 6, **characterized in that** each striking unit (6) has at least one associated gas outlet (12) that is suitable for spraying a jet of gas onto said textile web (5), with said gas outlet (12) being provided on the surface of said textile web (5) opposite said corresponding striking unit (6).

8. Machine according to claim 7, **characterized in that** said gas is hot air.

9. Machine according to claim 7, **characterized in that** said gas is steam.

10. Machine according to any of the claims 1 a 9, **characterized in that** said textile web (5) is introduced dry into said machine.

11. Machine according to any of the claims 1 a 9, **characterized in that** said textile web (5) is introduced wet into said machine.

12. Method for processing textile webs in a machine according to any of the claims 1 to 11, **characterized in that** it comprises simultaneously processing at least two textile webs (5), where said textile webs (5) are gathered simultaneously in said first chamber (1) by said first driving means (3), they are removed simultaneously from said second chamber (2) by said second driving means (4), where said third alternative operation driving means (8) produce the simultaneous alternative movement of said textile webs (5) between said first chamber (1) and said second chamber (2), where said first and second branches (13, 14) of said textile webs (5) move simultaneously at a longitudinal speed (L), and where said striking unit (6) strikes said textile webs (5) simultaneously with a striking element (7) at a speed that has a perpendicular component (N) that is normal to said longitudinal speed (L).

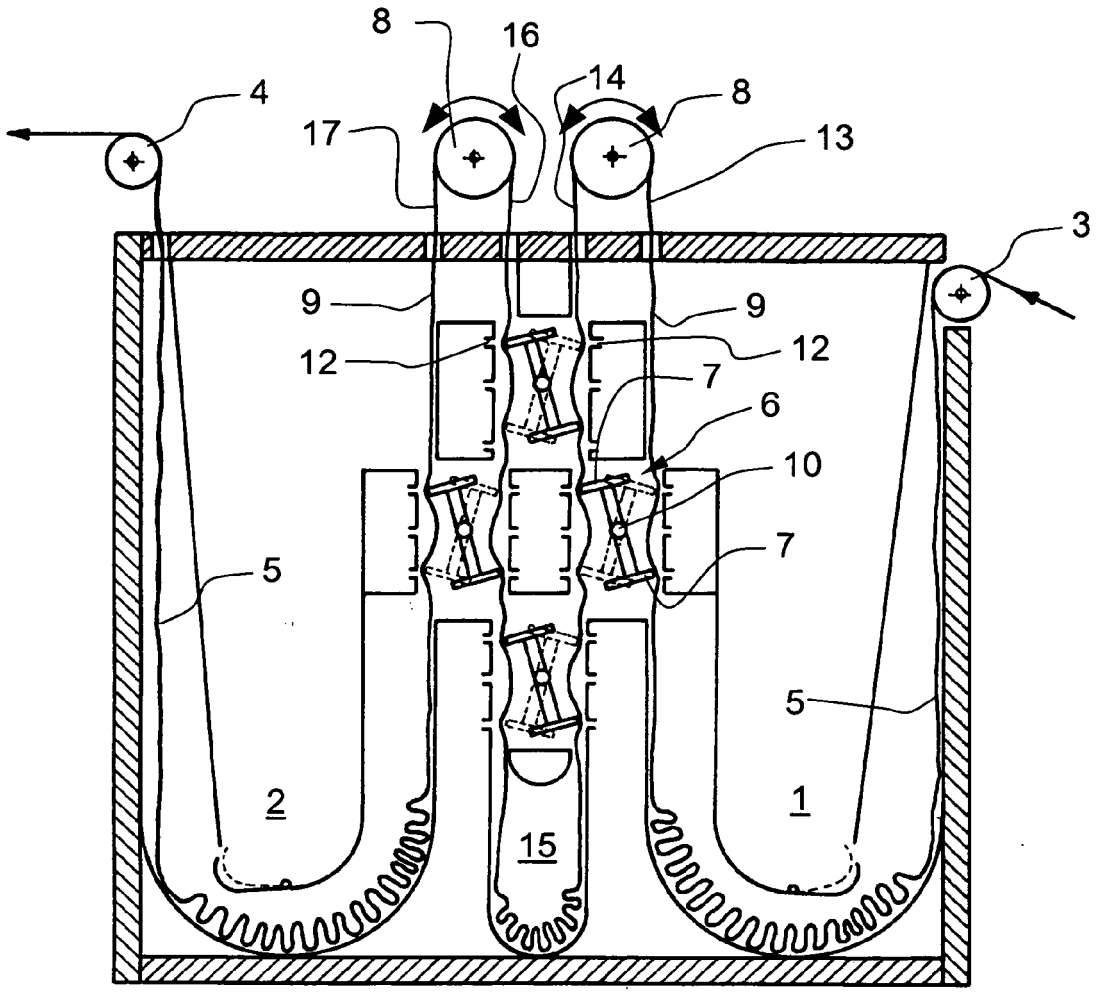

FIG. 1

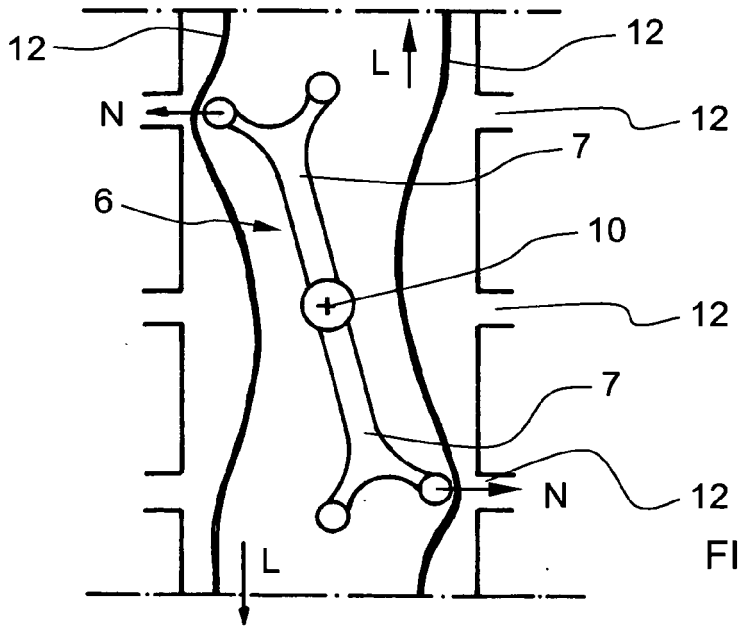

FIG. 2

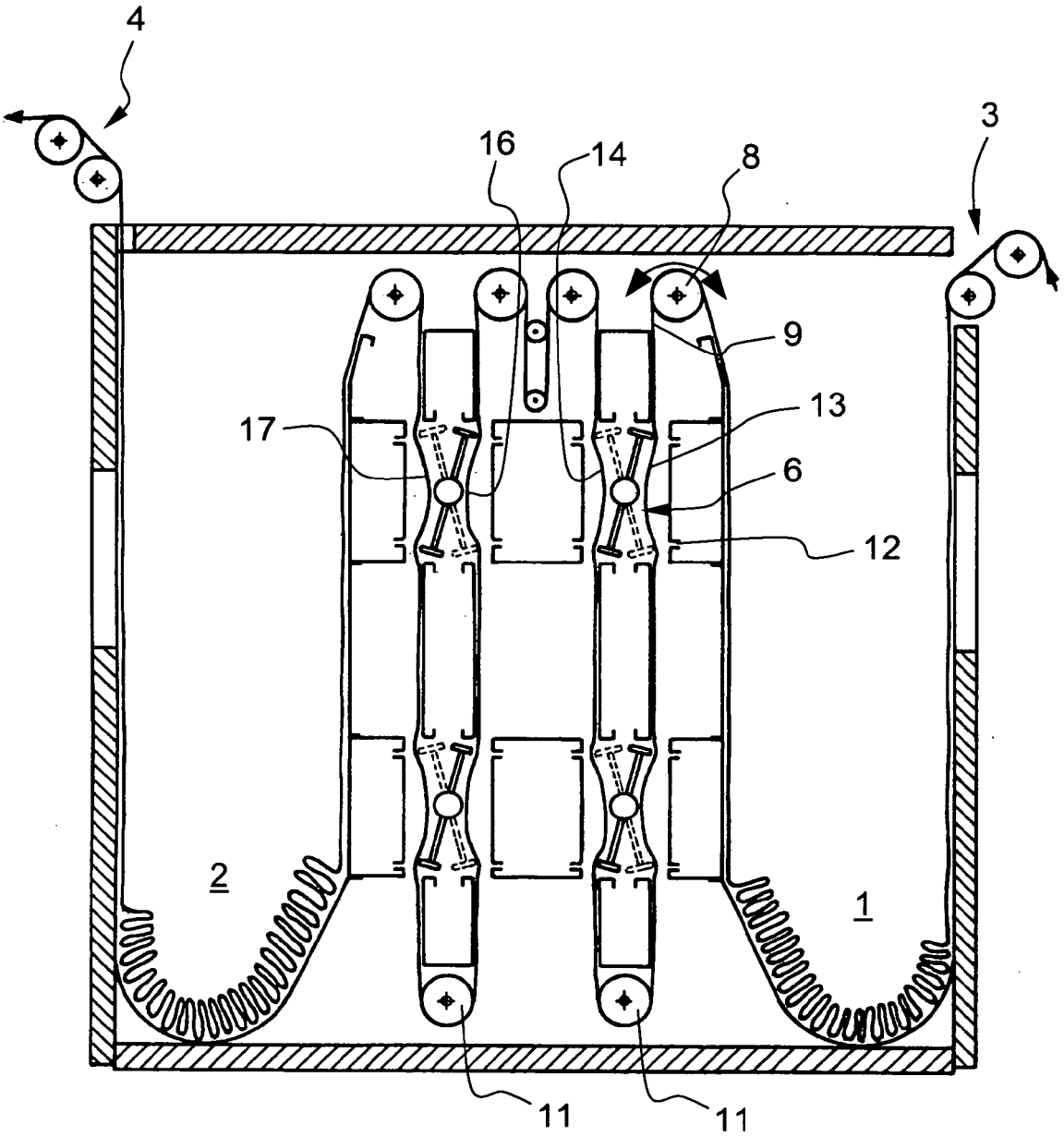

FIG. 3

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 08 38 0261

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
D,A	EP 1 054 093 A (JAUME ANGLADA VINAS S A [ES]) 22 November 2000 (2000-11-22) * the whole document *	1-12	INV. D06C19/00 D06B3/16 D06B3/28
A	DE 32 19 086 A1 (BABCOCK TEXTILMASCH [DE]) 8 December 1983 (1983-12-08) * the whole document *	1-12	
A	EP 0 787 963 A (TURBANG PROTOTIPS SL [ES]) 6 August 1997 (1997-08-06) * the whole document *	1-12	
A	FR 2 626 898 A (PENET CHARLES [FR]) 11 August 1989 (1989-08-11) * the whole document *	1-11	
A	FR 1 206 249 A (BENTELER WERKE AG) 8 February 1960 (1960-02-08) * the whole document *	1-11	

TECHNICAL FIELDS SEARCHED (IPC)

F26B
D06C
D06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	12 January 2009	Bichi, Marco

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 08 38 0261

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-01-2009

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1054093 A	22-11-2000	AT 267904 T	15-06-2004
		BR 0002167 A	02-01-2001
		CA 2307980 A1	20-11-2000
		CN 1274781 A	29-11-2000
		DE 60010971 D1	01-07-2004
		DE 60010971 T2	28-10-2004
		ES 2172364 A1	16-09-2002
		ES 2220378 T3	16-12-2004
		PT 1054093 T	29-10-2004
		TR 200001426 A2	21-02-2001
		US 6425271 B1	30-07-2002
DE 3219086 A1	08-12-1983	IT 1163343 B	08-04-1987
EP 0787963 A	06-08-1997	AT 208030 T	15-11-2001
		DE 69616503 D1	06-12-2001
		DE 69616503 T2	11-07-2002
		ES 2120335 A1	16-10-1998
		JP 9188959 A	22-07-1997
		PT 787963 T	29-04-2002
		TR 970226 A2	21-03-1997
		US 5881581 A	16-03-1999
FR 2626898 A	11-08-1989	NONE	
FR 1206249 A	08-02-1960	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- ES 2172364 **[0004]**