

12 **EUROPEAN PATENT APPLICATION**

21 Application number: **86830369.4**

51 Int. Cl.4: **D06C 17/00**

22 Date of filing: **11.12.86**

The title of the invention has been amended
(Guidelines for Examination in the EPO, A-III,
7.3).

43 Date of publication of application:
15.06.88 Bulletin 88/24

64 Designated Contracting States:
AT BE DE ES FR GB GR NL

71 Applicant: **FAMIT di Cosmai & C. S.n.c.**
Via B. del Bianco, 5
I-50047 Prato Firenze(IT)

72 Inventor: **Sanchini, Stefano**
Via Lapo Gianni 10
I-50047 Prato Firenze(IT)

74 Representative: **Mannucci, Gianfranco,**
Dott.-Ing.
Ufficio Tecnico Ing. A. Mannucci Via della
Scala 4
I-50123 Firenze(IT)

54 **Fulling machine.**

57 In order to avoid or to reduce statistically a repetition of the previous folds, when the fabric passes repeatedly through the operating members (5) of the machine, a rotor (14) is provided with several transversal elements (15) that are rotating according to axes offset in respect to the axis of the rotor and are in contact with the fabric and can deviate to a limited extent the trajectory thereof; these elements (15) can be freely rotating or driven; at least some of them have projecting edges which are located in positions at some distance from transversal planes in respect to the rotation axis, for the previously mentioned function.

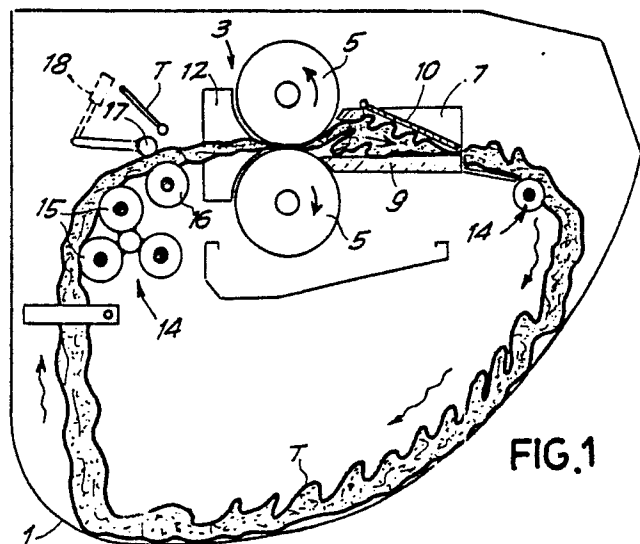


FIG.1

"FULLER FOR THE FULLING OPERATIONS OF FABRICS WITH ROTOR PROVIDED WITH EPICYCLIC ELEMENTS IN ORDER TO AVOID THE FORMATION OF FOLDINGS"

The invention is related to a typical machine for the finishing of fabrics, which is used for fulling treatment in wet conditions, that is a treatment for the felting and shrinking of the fabric. The apparatus, which is a fuller, acts on the fabric in such a way that a repetition of the previous folds is avoided or statistically reduced when the fabric passes repeatedly through the operating members of the machine. For this purpose, according to the application, one or more transversal rotating members are provided, which are grazed by the fabric or in contact therewith and can deviate to a certain extent the trajectory of the fabric; these rotating members have projecting edges which are located preferably at a certain distance from transversal planes in respect to the rotation axis. The projecting edges, that are suitably spaced one from the other along the rotating member or each rotating member, can have a more or less plane development but slanting (rather than perpendicular) in respect to the rotation axis of the member by which said projecting edges are carried. These projecting edges can be formed with a continuous convex curvature, with a uniform or variable curvature along the perimeter, or even with convexities and concavities, or even with a polygonal development. Said transversal rotating members are carried by a unit or rotor whereon they are mounted according to axes that are parallel and spaced in respect to the rotor axis, at least some of said rotating members being equipped with projecting edges.

The rotating members can be idly mounted on the rotor driven to rotate, respectively they can be driven into rotation each one around its own axis.

One of said rotating members can be smooth.

The rotation of the unit or rotor and that of these members (driven or idle) induce in the fabric alternate cyclical pushes - that are caused by the slants of the edges - which pushes help a change in the arrangement of the fabric in respect to the arrangement that is induced by the incipient folds. As a consequence, these incipient folds are practically cancelled and, in the cord type fabric, the probability related to the formation of persistent folds in the same points during the repeated passages is avoided or reduced.

In order to keep the fabric in contact with said transversal rotating members the apparatus can also include a pressure roller, supported by a movable unit with a counterweight that makes the roller press the fabric with a pressure action suitably adjusted; the oscillating unit with counterweight is formed in such a way that it allows an easy lifting

of the pressure roller in case of irregularities or enlargements on the fabric, thereby causing the machine to stop, in case said enlargements cause a damage to the machine operating members, and thus it is able to replace the so called "little control frame" that is installed in the conventional fulling machines for that purpose.

The tip speed of the rotor can be greater, less than or the same as the slide speed of the fabric. In case of driving into rotation of the rotating member or rotating members mounted on the rotor, the rotation of said members can be predetermined in order to obtain an average tangential speed which is different from the speed of the fabric that slides against said members. It is possible to provide a lower tip speed than the speed of the fabric that is recalled from the pool by the action of the cylinders, the transversal members tending then to slow down even to a limited extent the fabric movement; by providing the rotating members downstream in respect to the case fulling channel, the tip speed of these could be greater than that of the fabric. The relative speeds can be even opposite in respect to those mentioned above.

The invention will be better understood by following the description and the enclosed drawing, that shows a practical non limitative exemplification of the same invention. In the drawing:

Fig.1 shows a schematic drawing of a fulling machine in vertical section according to a plane perpendicular to the cylinders axis;

Fig.2 shows an example of a rotor in a separated axial view;

Fig.3 shows a partial detail of the rotor in a lateral view.

According to what is illustrated in the enclosed drawing, numeral 1 indicates the pool or tank of a fulling machine or fuller, wherein the overhead traditional operating group 3 includes a couple of cylinders 5 with horizontal axes and adjustable distance, which are included between the sides 7 of a so called "fulling channel or case" that is completed by a bottom 9 adjacent to cylinders 5, and a so called "slipper or fulling tongue" 10 that is articulated at the upper end and movable downwards in order to be in contact with the fabric that is processed, this tongue being suitably pressed in order to obtain the effect of pushing or compressing the fabric in the case or channel. Numeral 12 indicates shaped elements that help for the inlet of the fabric between the cylinders.

The fabric T is recalled by the cylinders 5 that rotate according to the arrows and, by lifting the fabric from the pool 1, squeeze and compress it in

the space defined between the members 7, 9 and 10 of the case or fulling channel, until the fabric, that is compressed and continuously fed by cylinders 5, gets out of the case to fall again into the pool. The fabric is engaged with its ends to form a ring and can pass through the cylinders 5 thus forming a single turn or two or more turns.

Upstream of the cylinders 5, along the fabric trajectory in the portion between the pool and the cylinders, a rotor 14, 14A is provided wherefrom star shaped supports 14B support three transversal members 15 idly rotating or driven into rotation. By the rotation of the rotor 14, the members 15 deviate the fabric in the above mentioned area coming in turn into contact with the fabric.

A possible roller 16 can cooperate with a pressure roller 17 that can be realized upon an oscillating unit with a counterweight 18 or by another suitable way; the pressure roller 17 with said oscillating unit can replace the so called "little frame" T for stopping the machine in case of irregularities and enlargements that could be present in the fabric just before the inlet of cylinders 5.

The deviation that can be imposed on the fabric by the rotating members 15 permits a contact between the rotating members 15 and the fabric for the function described herebelow.

At least two of the rotating members 15 have a core 15A and a plurality of fins or other projections 15B typically slanting in respect to the axis of the core 15A, if fins or other plane projections are provided; anyway the perimetrical edge of said projections or fins must have an arrangement not belonging to a transversal plane in respect to the rotation axis. The edge of a fin or projection 15B can be completed by an annular pad, and can be suitably made round. The development of the perimetrical edge can be more or less circular, or oval or polygonal with the angles more or less rounded, and even with different profiles, eventually with the presence of limited concavities. One of the members carried by the rotor 14 is a smooth cylinder 15E. The rotor 14 is driven into rotation; the members 15, 15E can be idle on the rotor supports 14B or driven into rotation.

The function of members 15 consists in that they operate by pushing the fabric transversally in a cyclic way in one direction or in the other, just because of the slanting development of the edges of the projections or fins 15B by this way the tendential arrangement of the fabric is modified and in the cylinders 5 and in the case or channel the fabric is prevented from taking again the previous folded attitude in a practically satisfactory way. The various members 15 follow one another in contact with the fabric, jointly with the intercalary intervention of the smooth roller 15E.

The members 15 can be driven by the same

fabric that slides on them or they can be driven to rotate at different speed (greater or lower) or equal in respect to the speed of fabric sliding, in combination with the motion imposed by the rotor 14.

The position of the rotor 14 can be modified in respect to what is illustrated on Fig.1, even up to a position downstream of the case or channel.

It is understood that the drawing shows an example, given only as a practical demonstration of the invention, the invention being able to vary in its forms and arrangements without nevertheless departing from the idea informing the same invention.

Claims

1) A fulling machine or fuller suitable for acting the fabric in such a way that a repetition of the previous folds is avoided or statistically reduced when the fabric passes again through the operating members of the machine, including more transversal rotating members (15), that are in contact with the fabric or can deviate to a certain extent the trajectory of the fabric (T), said rotating members being carried by a rotor type unit (14), whereon they are mounted according to axes parallel and spaced from the axis of the rotor; at least some of said rotating members (15) being equipped with projecting edges (15B).

2) A machine according to the preceding claim, characterized in that the rotating members (15) are idly mounted on the rotor (14), which is driven into rotation.

3) A machine according to claim 1, characterized in that the rotating members (15) are each one driven into rotation around their own axis.

4) A machine according to the preceding claims, characterized in that one of said rotating members (15) is smooth.

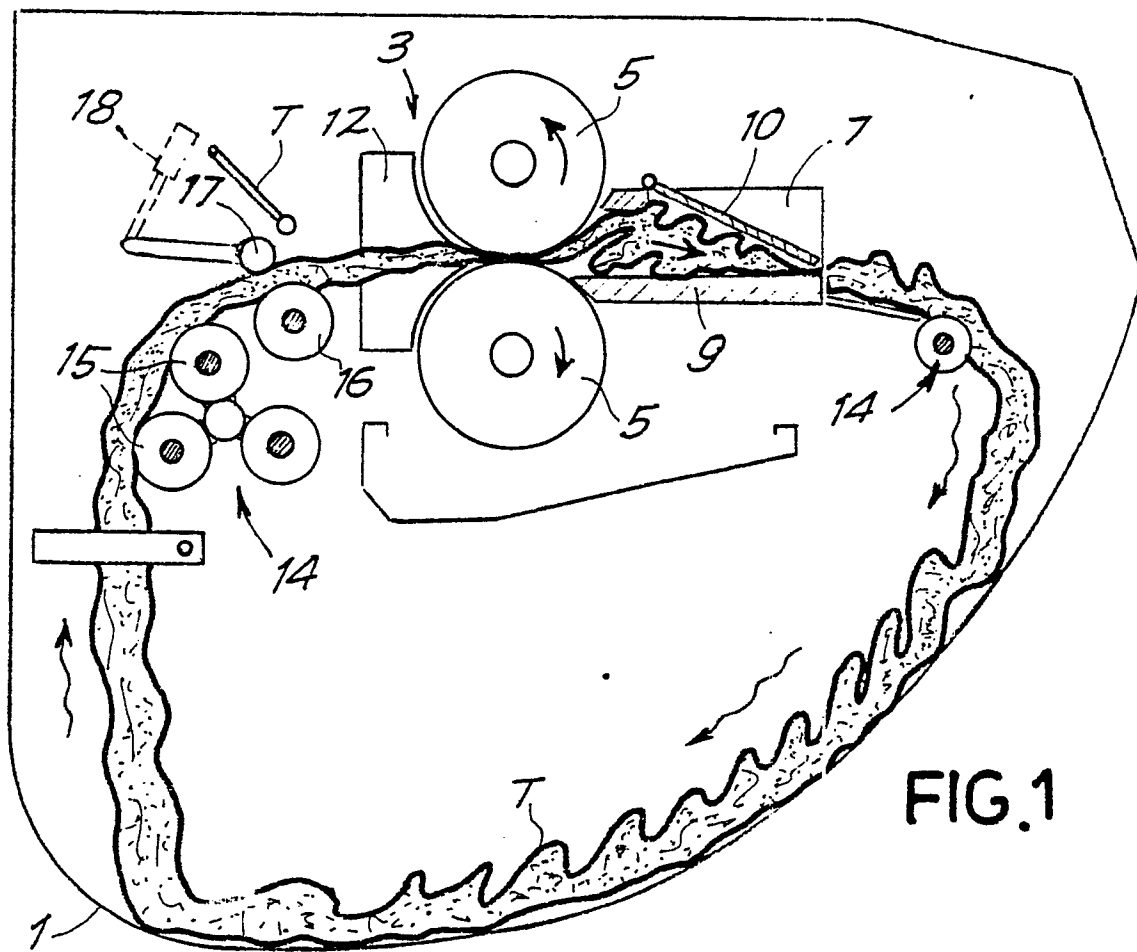


FIG.3

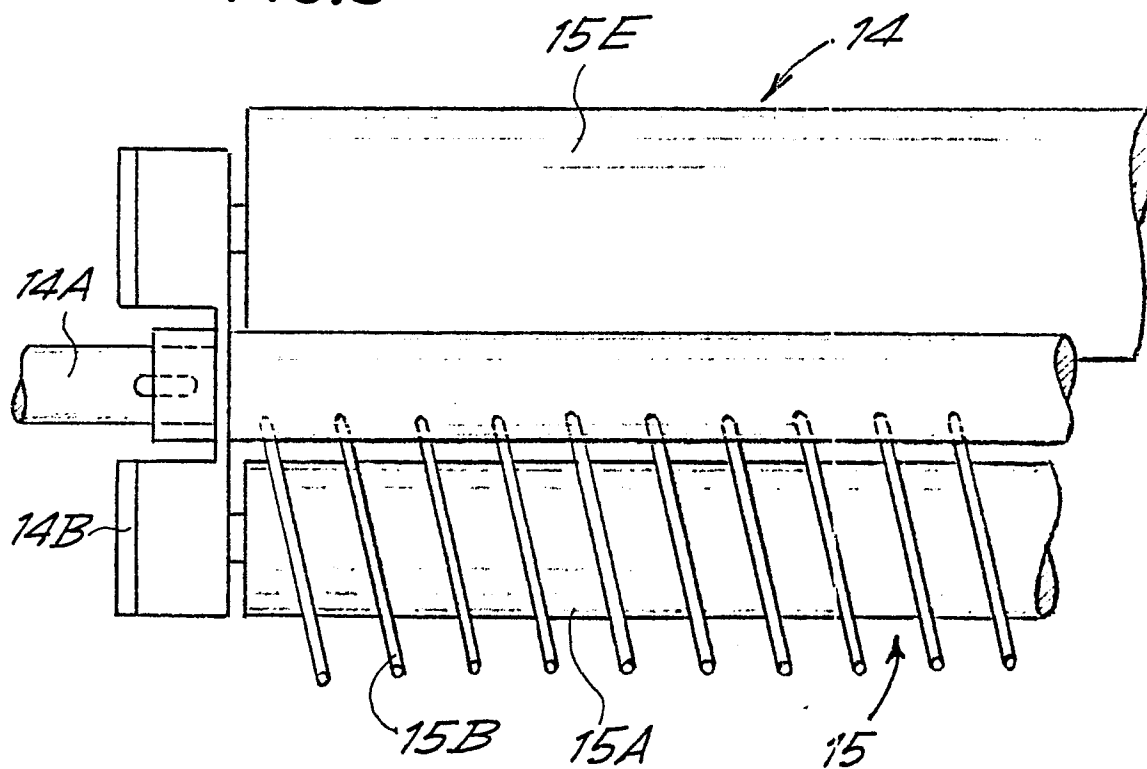
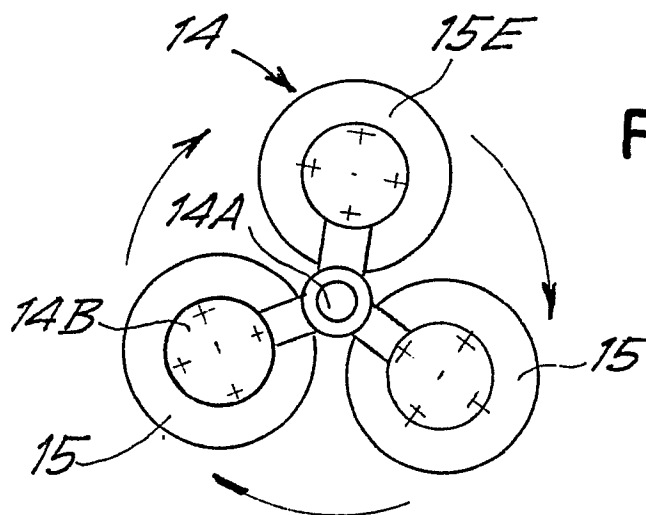


FIG.2





EP 86 83 0369

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	DE-B-1 054 049 (H. HANRATHS) * Whole document *	1	D 06 C 17/00
A		3, 4	
Y	--- US-A-3 136 146 (GRACE & CO.) * Whole document *	1	
A		2	
A	--- GB-A-1 592 151 (I.W.S. NOMINEE) * Figure 2 *		
A	--- FR-A-1 206 249 (BENTELER-WERKE AG)		TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	--- DE-C- 838 738 (HÜTTENWERK, EISENGIESSEREI & MASCHINENFABRIK MICHELSTADT AG)		D 06 C
A	--- GB-A- 5 952 (HEMMER GmbH) (A.D. 1913)		
A	--- GB-A- 355 264 (GESSNER)		
	--- -/-		
The present search report has been drawn up for all claims.			
Place of search THE HAGUE		Date of completion of the search 07-07-1987	Examiner PETIT J.P.
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	



EP 86 83 0369

DOCUMENTS CONSIDERED TO BE RELEVANT			Page 2
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	FR-A- 619 198 (GIOVANNI)		

A	FR-A-2 137 913 (BERTOLDI)		

			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 07-07-1987	Examiner PETIT J.P.
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	