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

(11) EP 0 628 098 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
09.10.1996 Bulletin 1996/41

(21) Application number: **93905604.0**

(22) Date of filing: **26.02.1993**

(51) Int Cl.[6]: **D06C 7/00**, D06C 15/06

(86) International application number:
PCT/IT93/00016

(87) International publication number:
WO 93/17167 (02.09.1993 Gazette 1993/21)

(54) **AN IMPROVED APPARATUS FOR CONTINUOUSLY DECATIZING OF FABRICS ON A CYLINDER WITH LOCAL STEAM GENERATION**

VORRICHTUNG ZUM KONTINUIERLICHEN DEKATIEREN VON GEWEBEN AUF EINE TROMMEL

APPAREIL AMELIORE DE DECATISSAGE EN CONTINU DE TISSUS SUR UN CYLINDRE A GENERATION LOCALISEE DE VAPEUR

(84) Designated Contracting States:
DE ES FR GB

(30) Priority: **28.02.1992 IT MI920448**

(43) Date of publication of application:
14.12.1994 Bulletin 1994/50

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Description

The present invention relates to an improved apparatus for continuously decatizing fabrics on a cylinder with local steam generation.

A method of continuous decatizing is known, as well as the relevant apparatus, for a dimensional conditioning of fabrics by causing them to pass about a very hot rotating steel cylinder, e.g. at a temperature of 160-180°C. From DE-A-3.412.982 it is known to feed the previously damp or wet fabric between said heated cylinder and a water-proof endless (ring-shaped) web or back cloth which is moved forward at the same speed as the hot cylinder and subjected to a great tensile strength so that it can apply an important pressure onto the fabric in contact with the hot cylinder. The moisture contained in the fabric evaporates to produce steam.

Still according to this prior art, since the water-proof, extremely taut, is also provided with some elasticity and is larger than the fabric to be treated, the generated steam cannot outflow as it is stopped by the elastic web under tension on one side and, on the other side, by the hot metal cylinder. The steam has thus the tendency to get compressed with augmentation of its pressure untill exceeding, also slightly, the atmospheric value and being able to exert a high temperature action at a greater pressure than the atmospheric one, as if the fabric were in autoclave.

It is also known that the required high tautness for the water proof web, not only to squeeze the fabric, but also to avoid steam leakages, gives rise to a number of inconveniences and to an anomalous wear of the web itself. Furthermore, in spite of high values of web tension, the squeezing pressure on each cm of cloth results to be relatively poor owing to the amplitude of the surface on which squeezing is exerted. For example, with a tensioning or pulling strength of 40.000 kg applied onto the web, if its surface in contact with the cylinder (through the cloth) is of 10.000 cm^2 (approximately corresponding to a cloth of 150 cm in height extending in contact with the web along about 70 cm), the squeezing action will be of only 4 kg/cm^2.

Since at present it has been fully demonstrated that to obtain good results of dimensional conditioning of fabrics the mechanical squeezing is a basic factor, and perhaps the most important, it is an object of the present invention to provide an improved continuously decatizing apparatus through which a strong squeezing can be obtained with a good tightness for steam even without applying high mechanical tensions on the water-proof web which will have not to be necessarily provided with elasticity. An extremely good continuous decatizing shall be obtained with a water-proof, inelastic carrier web or back cloth which is only slightly taut and consequently not subjected to wear, even though a very high mechanical pressure is exerted onto the fabric by means of pressing cylinders having their axes parallel to the axis of the central decatizing cylinder and the lateral surface rotating at the same speed of the latter, of the carrier web and of the fabric, being able to press the carrier web against the heated cylinder while squeezing at the same time the fabric therebetween.

Furthermore accordingly to the present invention the heat to produce the decatizing steam is preferably applied onto the fabric from the outside of apparatus, namely through the same pressing cylinders instead of the inner hot cylinder the temperature of which can be kept at about 100°C to avoid condensation.

These and additional objects, advantages and characteristics of the apparatus according to the present invention will be clearer from the following detailed description of a preferred embodiment given by way a non-limiting example with reference to the annexed drawings wherein:

FIGURE 1 shows a schematic view of an illustrative apparatus according to the present invention;
FIGURE 2 shows a similar view of an alternative embodiment of figure 1; and
FIGURE 3 shows a partial view of the apparatus of Figure 1, taken in the direction of arrow H without considering rolls 3, 3a.

With reference to the drawings, an endless, ring-shaped water-tight carrier web 2 is continuosly wound, partly but preferably along at least 180°, on a heated metal cylinder 1. A set of rolls 3, 3a-3e causes said carrier web 2, of water-proof material to be fed at the same peripheral speed of cylinder 1, while keeping the same at the correct position and without practically exerting thereon a pulling action, except for the minimum necessary to prevent slipping about the feeding rolls themselves, thus ensuring a ring-like running.

A fabric 4 to be conditioned, shown by broken lines, upon being previously soaked or at least moistened, gets into contact with both the endless web 2, being larger than the fabric, and cylinder 1, which is heated in a known way, at a temperature sufficient to avoid condensation of at least 100°C, being wound thereabout for the same length as the ring web 2 with which it forms a so-called "sandwich".

According to the present invention, about the hot cylinder 2, and namely along the winding length of the said sandwich, with an inelastic web 2 (Fig. 1), there is provided a number or anyway at least one pair of pressing cylinders 6 rotatably mounted on respective axes parallel to the axis X-X of cylinder 1. Their axes are pushed against the surface of cylinder 1, placed centrally with respect to them, through known means such as the represented pneumatic or oleodinamic pistons 7, but also whichever different means, so as to exert a very high pressure onto the underlying sandwich. It should be noted that while the axes of cylinder-piston 7 have been represented as directed radially with respect to axis X-X of cylinder 1, it is not to be excluded that the pressure is exerted by each cylinder 6 along a direction

which is possibly different from the perpendicular to the surface of hot cylinder 1, at each generating line of contact between the two cylinders at each moment.

The pressure exerted by cylinder 6 has the dual purpose of producing a sensible squeezing of the fabric to be conditioned or decatized and at the same time to seal at the end points A, B of the endless sandwich the steam which would tend to escape owing to its pressure higher than the atmospheric one, which has been generated upon contacting of wet fabric with hot cylinder 1.

According to a preferred embodiment of the present invention, the pressing cylinders 6, except for the firstly encountered by web 2 in the direction of winding on cylinder 1, had been heated themselves and if the latter cylinder is at only 100°C (anti-condensation), it will be the same pressing cylinder to have also the task of generating the decatizing steam, with temperatures of 160-180°C while transferring from the outside the required vaporisation heat. With such a solution it will not be strictly necessary to heat the carrier web 2 upstream of the zone of contact with cylinder 1. However, if instead said web is heated, the first cylinder 6 after inlet roll 3 could be prevented from heating, where no sensible heat loss from web 2 has been yet experienced. All drawbacks are thus avoided which are due to temperature differences between the external surface of web 2 and the internal one, being in contact with the fabric, as well as in the longitudinal direction, with decreasing temperatures from point A to point B.

As mentioned above, according to the present invention the water-proof web does not need to be elastic, but the apparatus with possibly hot, pressure cylinders may however show advantages also in this case. In fact, while the elastic carrier web (e.g. rubberized or silicone-based) is capable of retaining the steam by itself, the pressing cylinders 6 of the present invention have however the useful effect of an increased squeezing action on the fabric, which is commonly insufficient if provided by only the elastic feature of the web, as stated before, unless extremely high tensions are exerted, but however in some questionable way. In this case, indeed, as the steam has not to be retained at both ends A, B where sealing is ensured by the elastic tension of web 2, even only one pressing cylinder 6 could reach the purpose satisfactorily, as shown in figure 2.

With reference to figure 1, it should be noted that, in spite of the seal at zones A and B, the steam could however escape from the side ends of cylinder 1. To avoid this, as shown in figure 3, rubberized gaskets 5, 5' are provided at both sides of cylinder 1, near its ends, in a zone preferably comprised between the width of fabric 4 and that of carrier web 2, having a greater width, as stated above. In this way the water-proof web 2, pressed by cylinders 6 against the side gaskets 5, 5' ensures the steam tightness also in an axial direction. It will be seen that in figure 3 only the two end cylinders 6 have been represented, i.e. in correspondence with the generating lines A, B of cylinder 1, but obviously additional intermediate pressing cylinders 6 may be provided thus improving the seal along all the peripheral zone of cylinder 1, where steam is generated.

Claims

1. An apparatus for continuously decatizing fabrics (4) on a heated cylinder (1) at temperature of at least 100°C, sufficient to locally generate steam upon contacting a previously moistened or soacked fabric (4), and to prevent the generated steam from condensation, said fabric being fed between said hot cylinder (1) and a water-tight web (2) continuously wound in an endless fashion between two steam-tight points on cylinder (1), respectively of inlet (A) and outlet (B), whereby said web (2) and fabric (4) form a continuous sandwich being fed forward at the same rotation speed of cylinder (1) about its axis (X-X), characterized by further comprising one or more pressing cylinders (6) located at the outside of said cylinder (1) and capable of rotating at the same peripheral speed about respective axes which are parallel to each other and to the axis (X-X) of cylinder (1), there being provided means (7) for pushing said pressing cylinders (6) against the outer periphery of said cylinder (1) while squeezing at the same time said sandwich formed of said water proof web (2) and fabric (4) between said points (A,B).

2. An apparatus according to claim 1, characterized in that said pressing cylinders (6) are heated, except for the first of them getting in touch with the said web (2).

3. An apparatus according to claim 2, characterized in that said pressing cylinders (6) are heated at a high temperature for vaporization of fabric (4).

4. An apparatus according to anyone of the preceding claims, characterized in that said pushing means (7) are pneumatic or oleodinamic cylinder-piston systems whose action is exerted onto the axes of cylinders (6) in a direction perpendicular to the surface of cylinder (1).

5. An apparatus according to anyone of the preceding claims, characterized in that said web (2) is essentially without elasticity and the pressing cylinders (6) are at least in number of two, the first and the last of which are respectively coincident with the said points (A, B).

6. An apparatus according to claim 1, characterized in that said web (2) is of elastic character and acts as a sealing for the steam having a width larger than that of fabric (4), between said points (A, B) there

being provided only one pressing cylinder (6).

7. An apparatus according to anyone of the preceding claims, characterized in that at both sides of cylinders (1), in a zone comprised between the peripheral edges of fabric (4) and web (2), of greater width, two circumferential rubberized gaskets (5, 5') are applied to said cylinder for sealing the steam in an axial direction, in co-operation with the water-tight web (2).

Patentansprüche

1. Vorrichtung zum kontinuierlichen Dekatieren von Geweben (4) auf einem beheizten Zylinder (1) bei einer Temperatur von mindestens 100°C, die ausreicht, um beim Kontakt eines zuvor angefeuchteten oder getränkten Gewebes (4) örtlich Dampf zu erzeugen und den erzeugten Dampf an einer Kondensation zu hindern, wobei das Gewebe zwischen dem heißen Zylinder (1) und einem wasserdichten Webstoff (2) zugeführt wird, der kontinuierlich in endloser Form zwischen zwei dampfdichten Punkten auf den zylinder (1), beziehungsweise eines Einlasses (A) und eines Auslasses (B) gewickelt ist, wobei der Webstoff (2) und das Gewebe (4) einen kontinuierlichen Sandwich-Aufbau bilden, der mit der gleichen Rotationsgeschwindigkeit des Zylinders (1) um dessen Achse (X-X) vorwärts gerichtet zugeführt wird, gekennzeichnet ferner durch einen oder mehrere Preßzylinder (6), die an der Außenseite des Zylinders (1) angeordnet und imstande sind, mit der gleichen Umfangsgeschwindigkeit um jeweilige Achsen zu rotieren, die parallel zueinander und zu der Achse (X-X) des Zylinders (1) verlaufen, wobei Mittel (7) zum Andrücken der Preßzylinder (6) gegen den Außenumfang des Zylinders (1) vorgesehen sind, die gleichzeitig den durch den wasserdichten Webstoff (2) und das Gewebe (4) gebildeten Sandwich-Aufbau zwischen den Punkten (A, B) zusammenpressen.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß
die Preßzylinder (6) mit Ausnahme des ersten, der mit dem Webstoff (2) in Kontakt kommt, beheizt sind.

3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß
die Preßzylinder (6) auf eine hohe Temperatur zur Dampfbehandlung des Gewebes (4) erhitzt werden.

4. Vorrichtung nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß die Andrückmittel (7) pneumatische oder öldynamische Zylinder-Kolbensysteme sind, deren Druck auf die Achsen der Zylinder (6) in senkrechter Richtung zu der Oberfläche des Zylinders (1) gerichtet ist.

5. Vorrichtung nach einem der vorgehenden Ansprüche, dadurch gekennzeichnet, daß der Webstoff (2) im wesentlichen keine Elastizität besitzt und die Anzahl der Preßzylinder (6) mindestens zwei beträgt, wobei der erste und der letzte Zylinder jeweils mit den Punkten (A, B) zusammenfallen.

6. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Webstoff (2) elastischer Natur ist und als Dampfabdichtung wirkt, die breiter ist als das Gewebe (4), wobei zwischen den Punkten (A, B) lediglich ein Preßzylinder (6) vorgesehen ist.

7. Vorrichtung nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß an beiden Seiten des Zylinders (1) in einem Bereich, der sich zwischen den Randkanten des Gewebes (4) und des breiteren Webstoffes (2) erstreckt, zwei gummierte Umfangsdichtungen (5, 5') zur Dampf abdichtung in Axialrichtung und in Zusammenwirkung mit dem wasserdichten Webstoff (2) auf dem Zylinder angebracht sind.

Revendications

1. Appareil de décatissage en continu de tissus (4) sur un cylindre (1) chauffé à une température d'au moins 100°C, suffisante pour générer localement de la vapeur au contact d'un tissu (4) préalablement humidifié ou trempé, et pour empêcher la condensation de la vapeur générée, ledit tissu étant passé entre ledit cylindre chauffé (1) et une toile étanche à l'eau (2) enroulée en continu et sans fin entre deux points du cylindre (1) étanches à la vapeur, respectivement l'entrée (A) et la sortie (B), ladite toile (2) et ledit tissu (4) formant un sandwich continu avançant à la même vitesse de rotation que le cylindre (1) autour de son axe (X-X), caractérisé en ce qu'il comprend en outre un ou plusieurs rouleaux presseurs (6) disposés à l'extérieur dudit cylindre (1) et susceptibles de tourner à la même vitesse périphérique autour de leurs axes respectifs qui sont parallèles entre eux et à l'axe (X-X) du cylindre (1), des moyens de poussée (7) étant prévus pour appliquer lesdits rouleaux presseurs (6) contre la circonférence extérieure dudit cylindre (1) tout en comprimant en même temps, entre lesdits points (A, B), ledit sandwich constitué par ladite toile étanche à l'eau (2) et ledit tissu (4).

2. Appareil selon la revendication 1, caractérisé en ce que lesdits rouleaux presseurs (6) sont chauffés, à l'exception du premier d'entre eux qui arrive en con-

tact avec ladite toile (2).

3. Appareil selon la revendication 2, caractérisé en ce que lesdits rouleaux presseurs (6) sont chauffés à une température élevée pour vaporiser l'eau du tissu (4).

4. Appareil selon l'une quelconque des revendications précédentes, caractérisé en ce que lesdits moyens de poussée (7) sont constitués par des systèmes à vérin de type pneumatique ou oléodynamique, dont l'action s'exerce sur les axes des rouleaux (6), dans une direction perpendiculaire à la surface du cylindre (1).

5. Appareil selon l'une quelconque des revendications précédentes, caractérisé en ce que ladite toile (2) ne présente pratiquement aucune élasticité et en ce que les rouleaux presseurs (6) sont au moins au nombre de deux, le premier et le dernier d'entre eux coïncidant respectivement avec lesdits points (A, B).

6. Appareil selon la revendication 1, caractérisé en ce que ladite toile (2) est de nature élastique et se comporte comme un joint d'étanchéité pour la vapeur, en ayant une largeur supérieure à celle du tissu (4), un seul cylindre presseur (6) étant prévu entre lesdits points (A, B).

7. Appareil selon l'une quelconque des revendications précédentes, caractérisé en ce que, des deux côtés du cylindre (1), dans une zone comprise entre les bords périphériques du tissu (4) et de la toile (2) plus large, deux joints caoutchoutés circonférentiels (5, 5') sont appliqués sur ledit cylindre pour assurer l'étanchéité à la vapeur dans la direction axiale, en coopération avec la toile (2) étanche à l'eau.

Fig.1

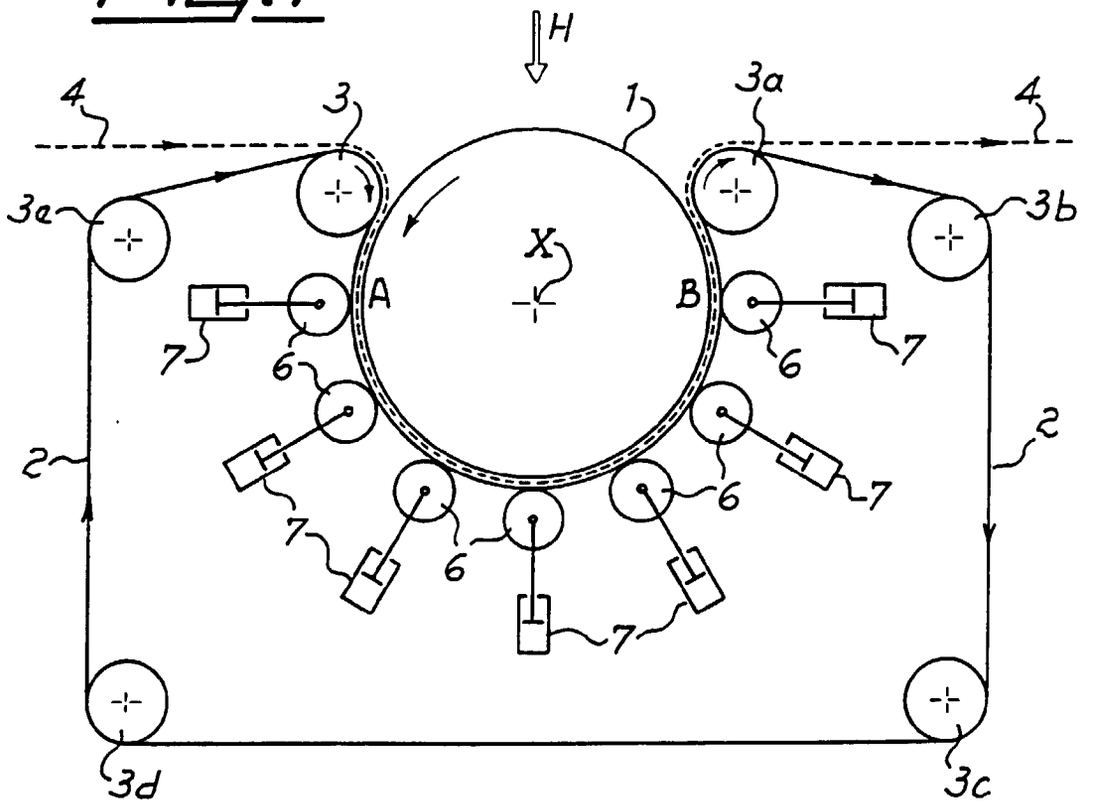


Fig.2

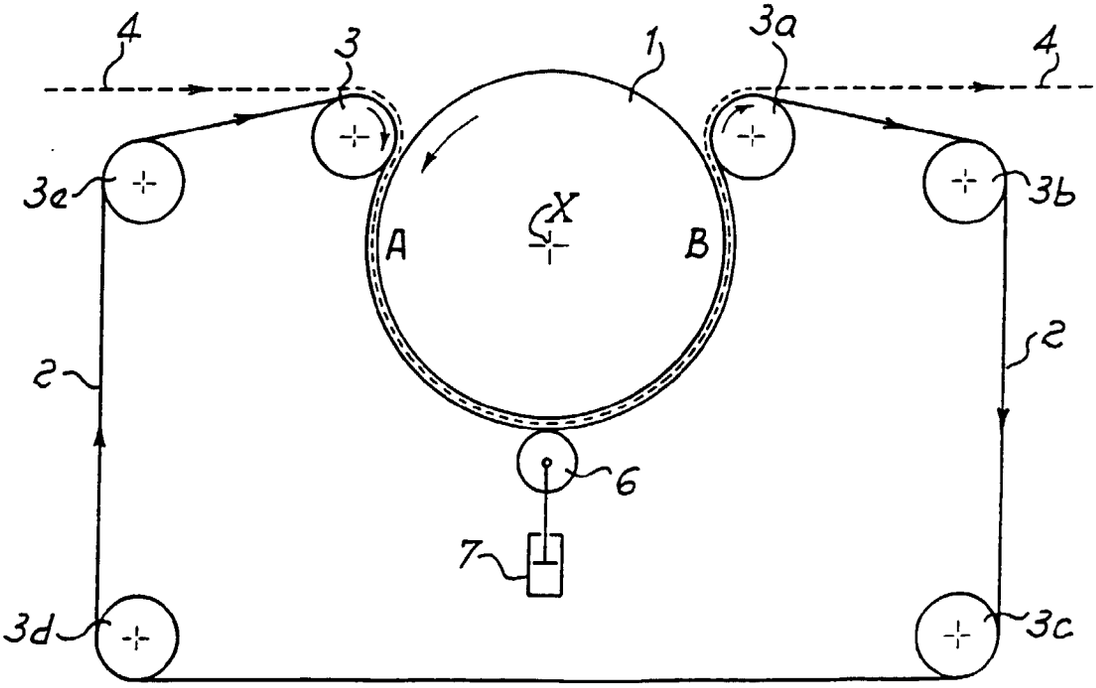


Fig.3

