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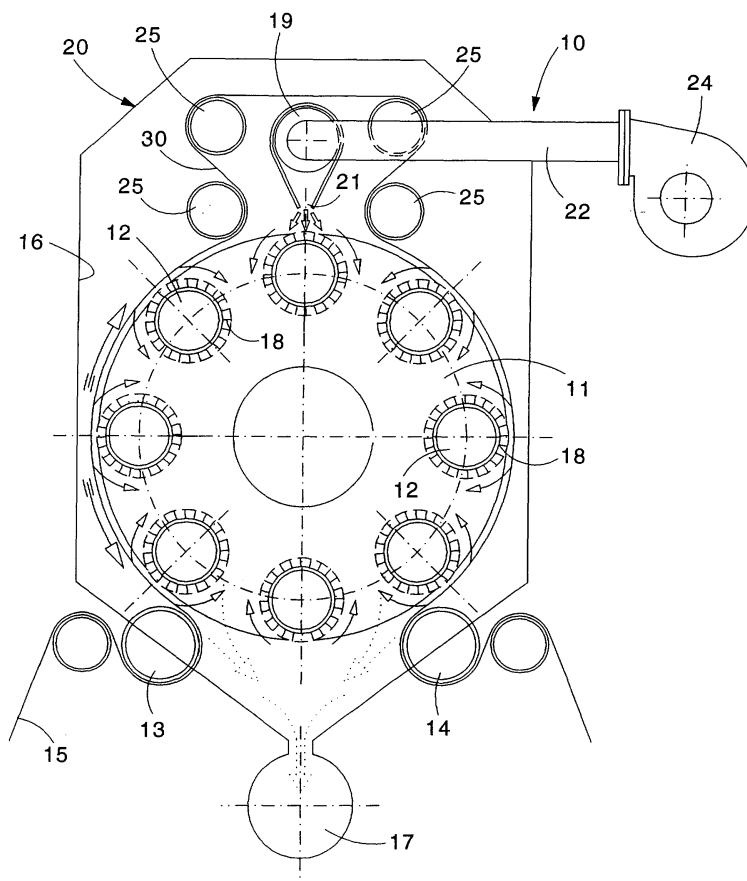
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(54) **Device for the automatic cleaning of cylinders in grinding or brushing machines with rotary drum**

(57) Device for the automatic cleaning of cylinders (12) in grinding or brushing textile machines (20) with a rotary drum (11), comprising at least a delivery element

(19) arranged in cooperation with the periphery of the drum (11). The device comprises a ventilator (24) able to feed to the delivery element (19) a continuous jet of air with high delivery and high pressure.



EP 1 473 401 A1

Description

FIELD OF THE INVENTION

[0001] The present invention concerns a device for the automatic cleaning of cylinders in grinding or brushing machines with a rotary drum, by means of a continuous jet of compressed air.

[0002] The invention is applied on textile machines comprising a rotary drum on whose periphery a plurality of cylinders or rollers are mounted, covered with abrasive or filamentary material suitable to achieve a surface finishing treatment on a fabric passing through in contact with their outer surface.

[0003] The invention is used both to keep the cylinders constantly clean, and also to cool them, improving the result of the surface finishing action and increasing the duration of the covering in conditions of efficiency.

BACKGROUND OF THE INVENTION

[0004] Grinding or brushing textile machines with a rotary drum are known, comprising a plurality of cylinders or rollers in contact with which a fabric to be treated is made to pass.

[0005] The cylinders generally have a covering made of abrasive or filamentary material suitable to generate the desired surface treatment on the fabric passing through. An example of a machine of this type can be seen in EP-B-1.007.776 in the name of the Applicant.

[0006] One of the main disadvantages of this type of machine derives from the fact that, during functioning, on the covering of the cylinders remnants of the fabric being worked accumulate (waste), which cause a rapid blockage of the abrasive or filamentary covering of the cylinders themselves. If the fabric being treated is a piece of synthetic fiber, such as nylon, polyester or such-like, or if it is treated with resins, as happens for spread fabrics, such waste tends to melt on the surface of the abrasive material due to the heat generated by the abrasive action, making it rapidly unusable. Moreover, considerable problems are created with the lack of uniformity of the action between one cylinder and another. Another disadvantage derives from the rapid over-heating of the abrasive covering, due to the friction generated by the passage of the fabric, which determines a non-homogeneous and imperfect finishing action.

[0007] The patent application IT-A-2001A000080 in the name of the Applicant discloses a blowing device, arranged below the rotary drum, which delivers a discontinuous jet of compressed air from below upwards in coincidence with the passage of the cylinders.

[0008] However, such device is burdensome with regard to its construction and cumbersome with regard to its installation, since it needs a specific compressed air plant arranged near the machine.

[0009] Moreover, due to the low flows of air delivered and the need for a certain waiting time for the reloading

of an air accumulation tank, in machines with drums rotating at high speed this device does not guarantee an efficient cleaning of the cylinders, and has difficulties in coordination between the rotation of the drum and the frequency of delivery of the jet of air.

[0010] Another disadvantage of such device is the fact that the jet of compressed air is delivered from below upwards, and this causes the dirt to fall back towards the previously cleaned cylinders.

[0011] Purpose of the invention is to achieve a device suitable to keep constantly clean the grinding or brushing cylinders of a rotary drum textile machine, which will prevent the accumulation thereon of waste, dust or other fabric discard deriving from the treatment, and which does not need any coordination between the speed of rotation of the rotary drum and the delivery of the jet of air.

[0012] Another purpose of the invention is to achieve a cleaning device that is easy and economical to make and to install, which does not need waiting times for the accumulation of air and which has ample quantities of air delivered, in order to guarantee an efficient cleaning of the cylinders and a good cooling of the surface of the latter, even in machines with high speeds of rotation of the rotary drums.

[0013] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0014] The present invention is set forth and characterized in the main claims, while the dependent claims describe other innovative characteristics of the invention.

[0015] In accordance with the aforesaid purposes, the invention provides at least a delivery element able to constantly deliver a jet of air at high pressure and high delivery, located in a position such as to be able to constantly cooperate, acting from above downwards, with the surface of a cylinder during the rotation of the rotary drum on which the cylinders are mounted.

[0016] According to a characteristic feature of the present invention, such delivery element is connected with ventilator means able to generate a constant jet of air with high values of delivery and pressure, for example in the range respectively of about 100 m³/min and 0.04÷0.6 bar of relative pressure (1,004÷1,06 bar of absolute pressure).

[0017] In a preferential embodiment, the element that delivers the jet of air consists of a hollow bar with a length correlated to that of the cylinders to be cleaned, having an axis substantially parallel to that of the cylinders, and at least an air-outlet aperture facing towards the surface of the cylinders.

[0018] In another preferential embodiment, the delivery element is arranged in cooperation with the upper

part of the rotary drum, so that the dirt removed from the surface of the cylinders can be deposited due to gravity towards the bottom of the machine and be discharged, for example by means of suction, to the outside. In this embodiment, the fabric being worked is detached for a certain segment of the drum by means of guide rollers that create a loop inside which the delivery element is arranged.

[0019] A first advantage of the invention is that it delivers a continuous jet of air at high delivery and high pressure, without needing costly compressed air plants, accumulation tanks or complicated steps to coordinate the rotation of the drum and the delivery of the jet of air.

[0020] Moreover, since the loop of fabric is provided in the upper zone of the rotary drum, it is possible, as said, to position the delivery element inside the loop, facilitating the operations to discharge the dirt, and preventing the dirt from depositing on the cylinders that have just been cleaned.

[0021] Another advantage is that, since the jet of air is continuous and constant, a uniform cooling of the cylinders is guaranteed during the working steps, thus determining a homogenous level of finishing on the fabric.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example with reference to the attached drawing which shows a schematic front view of a grinding or brushing machine with a rotary drum in which the present invention is used.

DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT OF THE INVENTION

[0023] With reference to the attached drawing, a grinding machine 20 has a rotary drum 11 on whose periphery a plurality of cylinders 12 are mounted, also rotating around their own axis, and provided with an abrasive or filamentary covering 18. At inlet to and at outlet from the drum 11 there are drawing rollers, respectively 13 and 14, the function of which is to feed to the grinding machine 20 a fabric 15 to be treated, keeping a desired winding tension.

[0024] The cylinders 12 can vary in number, for example from 4 to 40, but this number is not limitative for the purposes of the invention.

[0025] The rotary drum 11 is inserted inside a box-like suction chamber 16, provided at the lower part with a suction pipe 17 able to discharge dust and working waste which are produced during the working of the fabric.

[0026] An automatic air cleaning device for the covering 18 of said cylinders 12 is indicated in its entirety by the reference number 10.

[0027] The device 10 comprises an air delivery ele-

ment 19, in this case a circular tube, arranged substantially parallel and in a close position to the periphery of the cylinders 12. The air delivery element 19 advantageously has a length correlated to that of the cylinders 12 and is equipped with a delivery slit 21 facing towards the drum 11 and hence towards the surface of the cylinders 12.

[0028] Such slit 21 has a width suitably designed so that the jet of air is distributed in the most uniform manner possible and the speed of impact on the cylinder 12 is as high as possible.

[0029] The air delivery element 19 is located in the upper part of the machine 20, inside a loop 30 of the fabric 15, so that the dirt removed from the surface of the cylinders 12 by means of the jet of air can fall downwards, be sucked in by the suction pipe 17 and suitably discharged. The loop 30 of the fabric 15 is formed by four guide rollers 25 arranged, in this case substantially in a square, around the delivery element 19, so that the fabric 15 is diverted by them and passes over the delivery element 19 itself. This allows a better cleaning action by the jet of air on the cylinders 12.

[0030] The delivery element 19 is connected by means of a tube 22, possibly equipped with valve means which are not shown here, with a pair of ventilators 24 arranged parallel, of which only one is visible in the drawings. Each of the ventilators 24 has an electric power of about 5.5 KW, and the combined action of the two ventilators 24 generates a jet of air with a high delivery, about 100 m³/min and a relatively high pressure, about 0.04÷0.6 bar of relative pressure.

[0031] It is clear, however, that modifications and/or additions of parts may be made to the device 10 as described heretofore, without departing from the field and scope of the present invention.

[0032] For example, the activation of the ventilators 24 and hence the constant delivery of the air by the element 19 to one of the cylinders 12, can be commanded by a control and command unit, of a known type and not shown in the drawings, in order to regulate the intensity of the delivery of air, and possibly the times of intervention.

[0033] It is also clear that, although the present invention has been described with reference to a specific example, a person of skill in the art shall certainly be able to achieve many other equivalent forms of cleaning device for cylinders of grinding and brushing machines, all of which shall come within the field and scope of the present invention.

Claims

1. Device for the automatic cleaning of cylinders (12) in grinding or brushing textile machines (20) with a rotary drum (11), comprising at least a delivery element (19) arranged in cooperation with the periphery of said drum (11), **characterized in that** it com-

prises ventilator means (24) able to feed to said delivery element (19) a continuous jet of air with high delivery and high pressure.

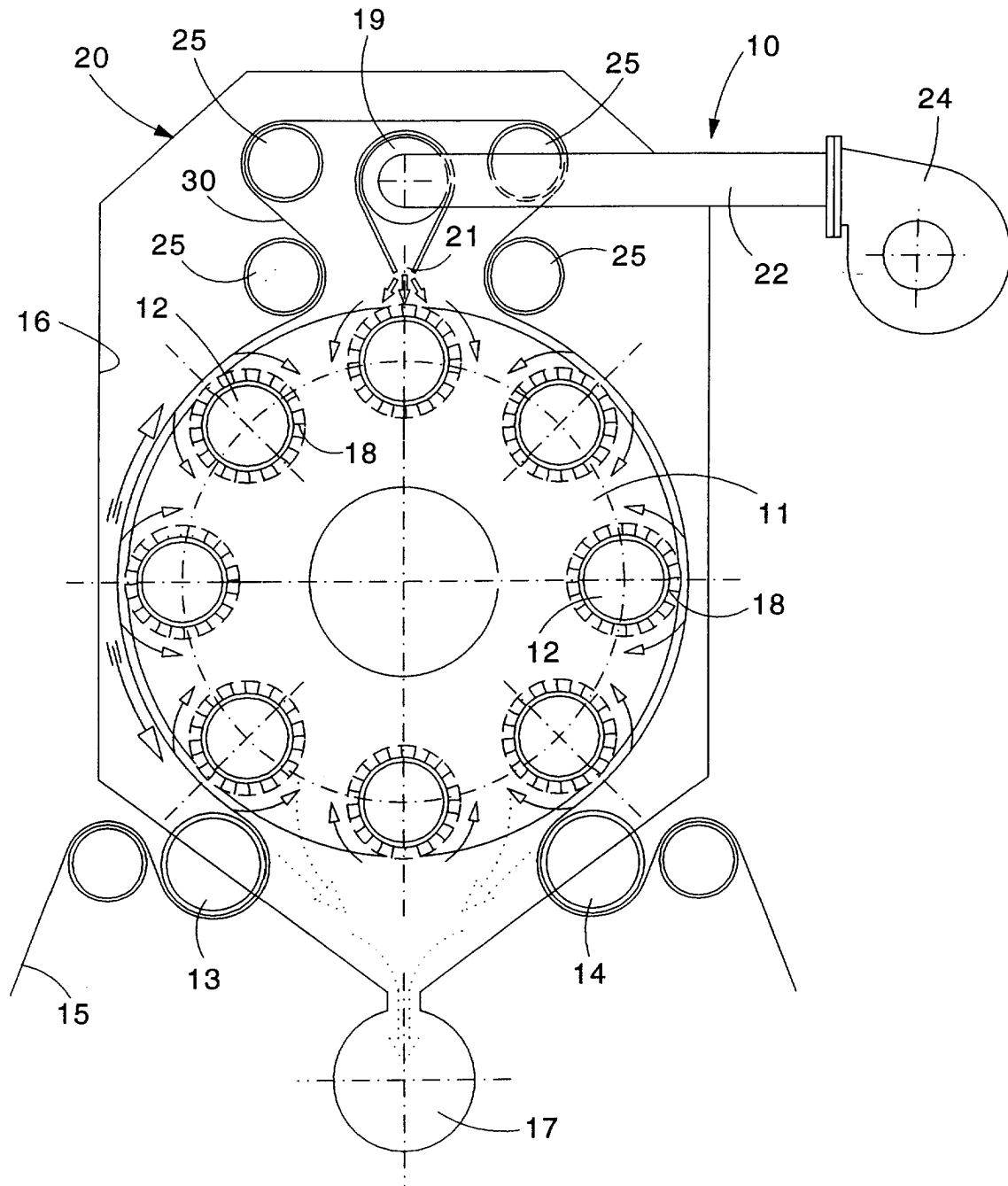
2. Device as in claim 1, **characterized in that** said ventilator means (24) are able to deliver air continuously with a delivery in the range of 100 m³/min. 5
3. Device as in claim 1 or 2, **characterized in that** said ventilator means (24) are able to deliver air continuously at a pressure of about 0.04÷0.6 bar of relative pressure. 10
4. Device as in claim 1, **characterized in that** said delivery element (19) is arranged in cooperation with the upper part of said rotary drum (11) in order to allow the dirt removed from the surface of said cylinders (12) to fall downwards due to gravity. 15
5. Device as in claim 4, wherein said cylinders (12) are able to act on at least a fabric (15), **characterized in that** it is arranged inside a loop (30) of said fabric (15) created by a plurality of guide rollers (25) associated with the upper part of said rotary drum (11). 20
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6. Device as in claim 1, **characterized in that** said delivery element (19) that delivers the jet of air consists of a hollow bar with a length correlated to that of said cylinders (12), has an axis substantially parallel to that of said cylinders, and comprises at least an air outlet aperture (21) facing towards the surface of at least one of said cylinders (12). 30
7. Device as in any claim hereinbefore, **characterized in that** said ventilator means comprise two electric ventilators (24) arranged parallel and each one having an electric power of about 5.5 KW. 35

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EUROPEAN SEARCH REPORT

Application Number
EP 04 10 1813

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 4 August 2004	Examiner D'Hulster, E
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
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EP 04 10 1813

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