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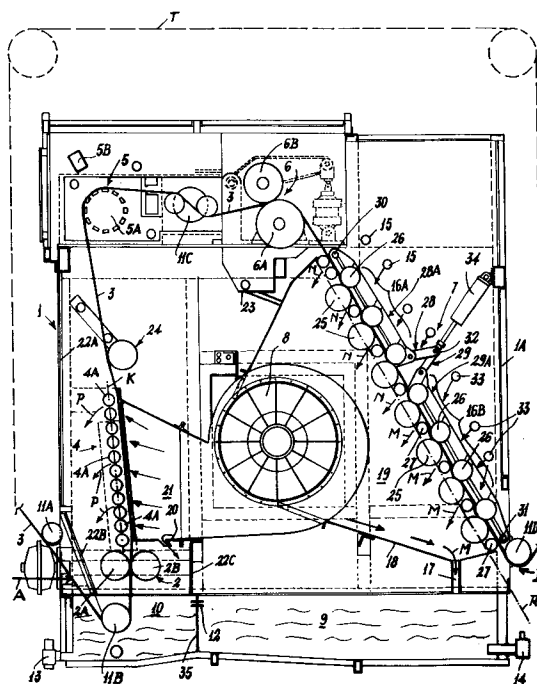
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I-20129 Milano (IT)(54) **Device for treating fabrics in open width during their processing, in particular for their scouring.**

(57) A device for the wet treatment of fabrics (3) in open width, in particular for their scouring, comprising at least one tank (9, 10) for wetting the fabric (3) and collecting the treatment liquid, at least one presser and drive member (2, 6) for the fabric (3), at least one member (5) for controlling the positioning of the fabric, and at least one suction member (8) having a suction mouth (19) opposing both a roller bank (7) and sprayer members (15, 33).

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This invention relates to a device for the wet treatment of fabrics in open width, in particular for their scouring.

The fabrics are preferably but not exclusively of wool, mixed wool or cotton.

Apparatus have been known for some time for the wet treatment of fabrics in open width, comprising a tank containing treatment liquids, means for spraying these latter onto the fabric, means for mangling the fabric (in the present context the term "mangling" means the passage of the fabric through presser means to eliminate at least part of its wetting liquid) and means for drawing the treatment liquid through the fabric.

All known apparatus have however certain drawbacks.

In this respect, they are bulky and hence require large rooms for their installation, besides being relatively costly.

In addition, each of said means requires an independent circuit for conveying and collecting the treatment liquids, plus operation control circuits. This results in high energy consumption and considerable usage of treatment liquids.

An object of the present invention is to provide a device of small overall size and of simple and reliable operation which is able to effect the required treatments within times which are equal to if not less than the times employed by traditional apparatus.

A further object is to provide a device of the aforesaid type which reduces both energy consumption and the liquid quantity used.

These and further objects which will be apparent to the expert of the art are attained by a device in accordance with the accompanying claims.

The present invention will be more apparent from the accompanying drawing, which is provided by way of non-limiting example and in which the single figure represents a schematic vertical longitudinal section through a preferred embodiment of the device according to the present invention.

With reference to said figure, the device according to the invention comprises a structure 1 with which there are associated, starting from its entry A and terminating with its exit B, a first pair of rollers 2 for pressing and driving the fabric 3 to be treated, a first inclined idle roller bank 4 for supporting and counteracting the fabric, a conventional widening and centering member 5 for the fabric 3, a second pair 6 of presser and drive rollers 6, a second inclined roller bank 7 for wetting/mangling and driving the fabric, a first and a second tank (9, 10) for collecting the treatment liquid, for example water, and a plurality of idle tensioning and guide rollers 11A, B, C, D for the fabric 3.

Said rollers, roller banks and tanks all have a width at least equal to the maximum width of the

fabric to be treated.

The tanks are separated by a wall 35 and are arranged at the base of the structure 1 of the device according to the invention. At the top of the wall 35 there is a passage duct or weir 12 which connects together the two tanks.

These latter both comprise a pump 13 and 14. The pump connected to the tank 10 transfers the liquid contained in it to another fabric treatment device (not shown) positioned upstream, whereas the pump connected to the tank 9 transfers the liquid contained in it to a plurality of nozzles 15 (of which only there are shown in the figures) positioned in proximity to the upper part 16A of the inclined roller bank 7.

The tank 9 is closed upperly and is connected via a duct 17 to the inclined lower wall 18 of the suction side 19 of a turbine 8 driven by a motor, not shown. The tank 10 is upperly open to receive the liquid originating from the first mangling rollers 2, plus the liquid leaving a duct 20 connected to the delivery side 21 of the turbine 8, and the liquid originating from the idle roller bank 4 against which the fabric rests. To convey the liquid to said tank 10, with the structure 1 there are associated a plurality of walls 22A, B, C arranged to form a funnel for the tank 10.

The first rollers 2 for driving and mangling the fabric 3 leaving the tank 10 are associated in usual manner with the support structure in an intermediate position between the tank 10 and the first roller bank 4. The rollers 2, which are of equal size, comprise an idle roller 2A, and a motorized roller 2B connected in conventional manner to a usual motor, for example an electric motor (not shown), whereas the idle roller is elastically and adjustably urged against the motorized roller in any known manner.

The first roller bank 4 comprises a plurality of idle rollers 4A of equal size (eleven are shown in the example) associated with the device structure 1.

Specifically, the rollers 4A are arranged spaced apart one above another with their axes of rotation mutually parallel and contained in a single plane inclined to the vertical, the roller bank being positioned opposite the delivery mouth 21 of the turbine 8.

The fabric widening and centering member 5 positioned above the first roller bank 4 is of usual type known to the expert of the art, for example of the type comprising a staved roller 5A and a usual sensor 5B for controlling said staved roller 5A on the basis of measured data.

The second pair of presser and drive rollers 6 for the fabric 3 is positioned above the turbine 8 substantially at the same height as the centering member and comprises a first motorized roller 6A

and an idle roller 6B which is elastically urged adjustably against the motorized roller. Below these latter there is provided a funnel means 23 connected to the suction side 19 and arranged to collect the liquid squeezed from the fabric 3.

Between the roller bank 4 and the centering member 5 the device of the invention also comprises a conventional floating potentiometric roller 24 arranged to feed a signal to a control member (not shown but of conventional type) for the motors associated with the motorized rollers of the device in order to synchronize the movement of the two presser rollers 6A and 2B and the movement of the motorized rollers of the second roller bank 7.

According to an important aspect of the invention, the second roller bank 7 is positioned between the tank 9 and the second pair of rollers 6 and is inclined along the axis R so as to face the suction mouth 19 of the turbine 8.

According to this important aspect, said roller bank 7 comprises a first group of synchronously rotating motorized rollers 25 (seven in the illustrated example), a second group of idle rollers 26 (also seven in the example) overlying and cooperating with the motorized rollers 25 to mangle the fabric, and a third group of idle rollers 27 (nine in the example) for supporting and guiding the fabric and interposed between one motorized roller and the next but spaced therefrom.

The rollers of each of the three said groups are spaced apart with their axes of rotation mutually parallel. In addition, the axes of rotation of the rollers of the three groups lie in three different planes inclined in the same direction as the axis R and parallel to each other.

The motorized rollers 25 and the interposed support rollers 27 are associated in conventional manner with the support structure 1 of the device according to the invention.

The upper group of mangling rollers 26, indicated by 16A in Figure 1, is supported in a frame 28A connected to a connecting rod 28, the remaining group of rollers 26 (indicated by 16B) being mounted in a second frame 29A connected to a connecting rod 29.

Each of the frames 28A, 29A has one end 30, 31 pivoted to the structure 1 of the device according to the invention, their other end being pivoted, at a point 32 common to the two connecting rods 28, 29, to the rod of a cylinder-piston unit 34, for example of pneumatic type.

The cylinder-piston unit 34 is used to control the pressure between the rollers 26 and the motorized rollers 25, in such a manner as to be able to vary it on the basis of the desired working conditions.

A plurality of spray nozzles 15 and 33 are associated with the roller bench 7, they being dis-

tributed over the entire length of the rollers 26 (only six rollers are shown in the figure).

These spray nozzles are positioned so that the water jet emitted by them is directed into the space between one roller 26 and the next. Side walls (not shown but of conventional type) are provided in proximity to the lateral ends of the idle rollers 26 and between one such roller and the next, to limit the escape of the water sprayed by the nozzles 15, 33 from the sides of the roller bank 7. Advantageously, the side walls are associated with movable support elements so that the distance of said side walls from the edges of the fabric can be adjusted as the fabric width varies.

The spray nozzles 15 are connected to the tank 9 via the pump 14 as stated, whereas the spray nozzles 33 are connected to a different conventional feed circuit (not shown) associated for example with another fabric treatment device (not shown) positioned downstream and arranged to feed the members 33 with a cleaner treatment liquid than that contained in the tank 9.

The turbine 8 is of usual type and comprises a suction mouth 19 and a delivery mouth 21, which have an aperture size such as to embrace the roller bank 7 and the roller bank 4 respectively.

The device of the invention operates as follows.

The fabric has firstly to be inserted into the device by passing it around the idle guide rollers 11A, 11B, between the first pair of presser and drive rollers 2, along the first roller bank 4, around the centering member 5, around the guide rollers 11C, between the second pair of rollers 6 and between the presser rollers 25, 26 of the second roller bank 7.

The tank 10 is then filled with the treatment liquid, for example water.

The motors connected to the motorized rollers 2B, 6A and 25 are then operated to advance the fabric through the various members of the device.

As stated, said motors are mutually synchronized by a conventional controller which receives signals relative to the correct movement of the fabric from the floating potentiometric roller 24.

The fabric 3 guided by the idle rollers 11A and 11B is firstly immersed in the tank 10 and then in passing between the two rollers 2A, B is mangled to eliminate the water contained in it.

The fabric is then again wetted by the jet of water and air projected by the delivery mouth 21 of the turbine 8 onto that portion of fabric resting against the inclined first roller bank 4 (the water feed to the turbine is described hereinafter).

Part of the water projected onto the fabric passes through it to flow between one roller and another of the bank 4 and fall into the tank 4 as shown schematically by the arrows P in the figure.

The wet fabric then passes over the potentiometric roller 24 to reach the centering-widening member 5 where in the usual manner, by means of the measurements of the sensor 5B and the possible movement of the staves of the roller 5A, the fabric is correctly and uniformly widened out, removing the folds. The fabric, guided by the idle roller 11C, then reaches the second pair of presser and drive rollers 6 where the water retained in the fabric is again eliminated by mangling.

The fabric then enters the second roller bank 7 where it is subjected to a succession of scouring and mangling operations.

In this respect, the spray nozzles 15 and 33 wet the fabric along that portion between one pair of cooperating presser rollers 25, 26 and the next (see arrows S), while at the same time the water is compelled to pass through the fabric by the action of the turbine 8 on the suction mouth 19. For this purpose the idle rollers 27 are spaced apart from the pairs of presser rollers 25, 26 to enable the water to be drawn from the fabric. The water which passes through the fabric is partly conveyed into the turbine 8 (see arrows N) and then projected via the mouth 21 against the first roller bank 4, and partly falls into the tank 9 (see arrows M).

As stated, the spray nozzles 15 are fed with the water contained in the tank 9, whereas the nozzles 33 are fed with water which is not recycled and is hence cleaner, it originating from a different circuit (not shown).

It has been shown experimentally that the aforesaid fabric wetting and drying succession effected by the device of the invention is totally effective in eliminating dirt and size from the fabric. The fabric is scoured by the device in a substantially shorter time than by known devices, resulting in a higher production rate.

The device also results in an appreciable saving in consumption of treatment liquid, which is continuously recycled, excluding the percentage which overflows from the tank 9 to the tank 10 and is then fed upstream by the pump 13 when operating continuously.

The fabric can be fed to the machine either continuously or discontinuously according to whether the device forms part of a fabric treatment chain comprising several devices, or operates in an isolated manner, ie with the fabric being recycled as shown by the dashed line T.

The direction of advancement of the fabric can be reversed relative to that indicated, if more than one fabric scouring cycle is necessary.

Finally, it should be noted that the embodiment represented is described by way of example only, and that modifications can be made to the device, for example by using further pairs of presser and drive rollers or by varying the arrangement of the

supporting or scouring roller banks.

Claims

- 5 1. A device for the wet treatment of fabrics in open width, in particular for their scouring, characterised by comprising at least one treatment chamber (9, 10) for the fabric (3), at least one presser and drive member (2, 6) for the fabric (3), and at least one suction member (8) having a suction mouth (19) opposing a roller bank (7) comprising a plurality of parallel, co-operating fabric presser and drive rollers (25, 26) cooperating with a plurality of sprayer members (15, 33), the jets from which strike the fabric.
- 10 2. A device as claimed in claim 1, characterised in that said fabric presser and drive members (2, 6) comprise at least one pair of opposing rollers (2A, 2B; 56A, 6B) between which the fabric (3) passes.
- 15 3. A device as claimed in claim 2, characterised in that one of the rollers (2B, 6A) of said pair is motorized whereas the other (2A, 6B) is idle, these latter being associated with movable support members to enable the pressure between said idle and motorized rollers to be adjusted.
- 20 4. A device as claimed in the preceding claims, characterised in that the support element for the idle rollers (25, 26) associated with the roller bank (7) comprises at least one frame pivoted at one end (30, 31), and connected at its other end to a cylinder-piston unit (34).
- 25 5. A device as claimed in the preceding claims, characterised in that said pairs of opposing rollers (25, 26) of said roller bank (7) are spaced apart, between one pair and the next there being provided at least one idle support and guide roller (27), which is itself spaced apart from said pairs.
- 30 6. A device as claimed in the preceding claims, characterised in that said sprayer members (15, 33) are arranged to feed the treatment liquid jets between one pair of said fabric presser and drive rollers (25, 26) and the next.
- 35 7. A device as claimed in claim 6, characterised in that said sprayer members are divided into two groups (15, 33) each associated with its own feed circuit.
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8. A device as claimed in one or more of the preceding claims, characterised in that on the suction side of the suction member (8) there are provided two frames (28A, 29A) provided with idle rollers (26) and controlled by common cylinder-piston means. 5

9. A device as claimed in one or more of the preceding claims, characterised in that the suction member (8) comprises a delivery mouth (21) positioned in front of an idle roller bank (4) against which the fabric rests during its passage in front of said mouth. 10

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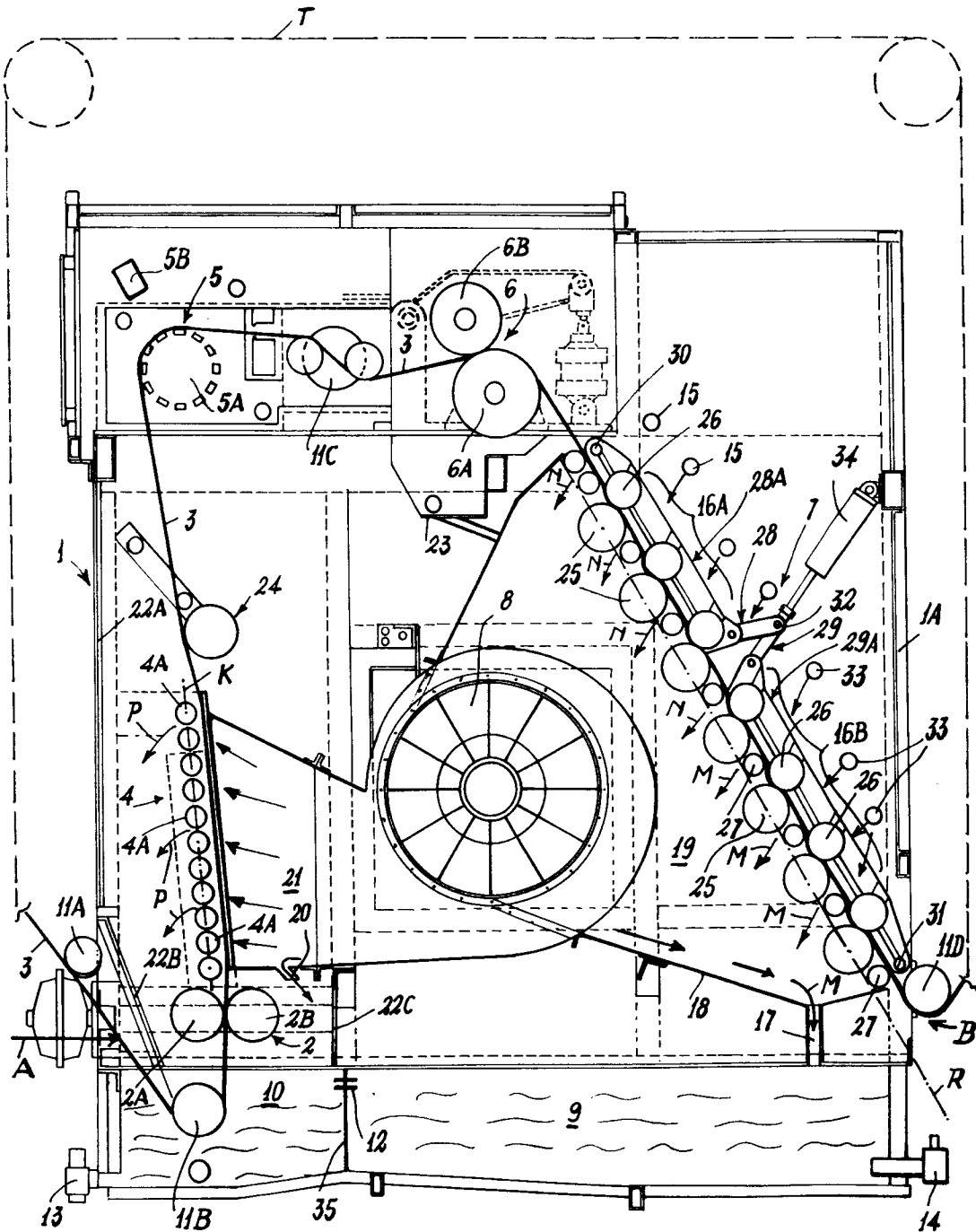
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EUROPEAN SEARCH REPORT

Application Number

EP 93 10 1565

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.5)
A	EP-A-0 325 789 (BERTOLDI) * the whole document * ---	1,2	D06B5/08
A	US-A-3 475 927 (BERTOLDI) * the whole document * ---	1	
A	US-A-1 723 514 (KLEIN) ---		
A	EP-A-0 230 093 (HIKOSAKA) ---		
A	DE-A-2 543 524 (HOECHST) ---		
A	GB-A-1 189 568 (BRUCKNER) ---		
A	FR-A-1 453 340 (CONRADO VALLS FORNE) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			D06B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18 MAY 1993	Examiner PETIT J-P
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