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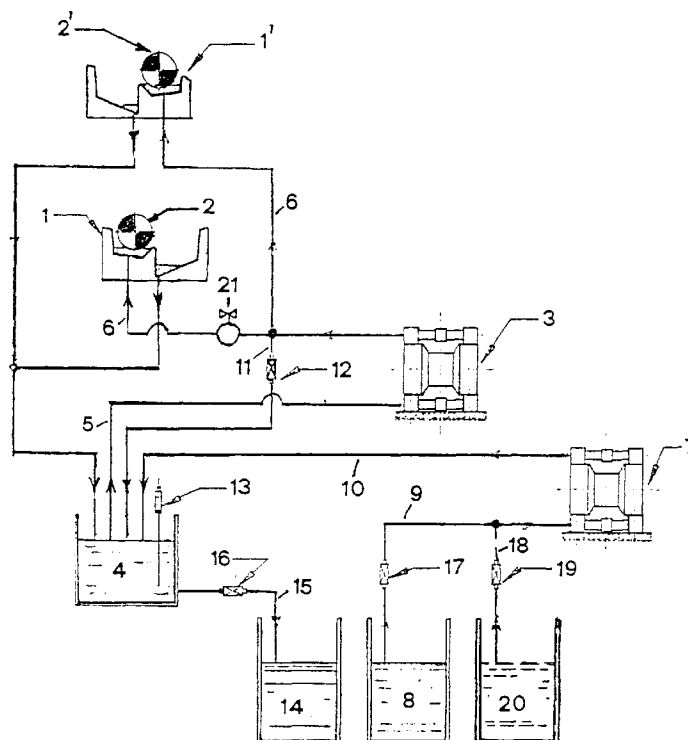
16.04.1997 Bulletin 1997/16(51) Int Cl.⁶: **B05C 1/08, B05C 9/04**(21) Application number: **96830510.2**(22) Date of filing: **07.10.1996**

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BE CH DE FR GB IT LI(72) Inventor: **Billi, Renzo****50018 Scandicci (Firenze) (IT)**(30) Priority: **16.10.1995 IT FI950209**(74) Representative: **Martini, Lazzaro****Studio Brevetti Ing. Dr. Lazzaro Martini s.r.l.****Via dei Rustici 5****50122 Firenze (IT)**(71) Applicant: **Benninger S.p.A.****50041 Calenzano (Firenze) (IT)****(54) Plant for continuous spreading on textile, paper and similar materials**

(57) Plant for continuous spreading on a textile, paper or similar sublayer, comprising: - a first tank (1) having an upper chamber with a predetermined amount of bath therein for the coating of the sublayer (S) and a lower chamber wherein the bath overflowing from the upper one is collected: located in correspondence of the upper chamber of said first tank (1) is first a motor-driven, spreading roller (2) which is intended to distribute the bath over a surface of the sublayer (S) by virtue of its rotation and the contact thereof with the surface of the same sublayer (S) driven into motion by means

which comprise at least a motor-driven roller (R) on which the sublayer (S) being coated with coating material winds up; - a second tank (1') which is shaped like the first (1), but located at higher level, and provided with a corresponding second motor-driven, spreading roller (2') which operates as the first roller (2), on the sublayer (S) surface which is not acted upon by said first roller (2); - a first pump (3) for feeding the upper chamber of each said tanks (1) and (1') through supply conduits (5, 6); - a second pump (7) intended to draw the bath of coating material from a third tank (8).

Fig. 1

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Description

The present invention relates to a plant for continuous spreading on textile, paper and similar materials.

It is known that the so-called "spreading" is a process consisting essentially in the application of a thin continuous coating on a textile or paper sublayer.

Also known is that, until now, the distribution of the coating on both sides of the sublayer has represented a technical problem and a great concern to those skilled in the art.

One object of the present invention is to provide a plant allowing the spreading on each side of the sublayer.

A further object of the invention is to provide a steady monitoring of the actual consumption of the product intended to coat the sublayer.

Moreover, an object of the present invention is to allow a complete automation of the plant's washing by utilizing substantially the same means used for feeding the substances to be distributed over the substrate.

This result has been achieved, according to the invention, by adopting the idea of making an apparatus having the features indicated in claim 1. Further characteristics being set forth in the dependent claims.

The advantages deriving from the present invention lie essentially in that it is possible to apply the coating product over the whole surface of the sublayer, such as, for example, over yarns, ribbons or rolls of fabric, webs of paper material and the like, in a relatively simple, fast, economical and reliable manner; that it is possible to evaluate, with extreme accuracy and at any moment, the consumption of the coating material, thereby allowing also to check for any possible plant's operation anomaly and to feed the coating material with the necessary precision and according to specific work requirements; that it is possible to automate the washing cycle of the plant and to use, for this purpose, the same means adopted for the feeding of the coating material.

These and other advantages and characteristics of the invention will be best understood by anyone skilled in the art from a reading of the following description in conjunction with the attached drawings given as a practical exemplification of the invention, but not to be considered in a limitative sense, wherein: Fig. 1 shows a diagram of a plant according to the invention; Fig. 2 shows schematically the side view of a machine for waxing textile materials which is provided with a plant according to the invention.

Reduced to its basic structure, and reference being made to the figures of the attached drawings, a plant for continuous spreading on a textile, paper or similar sublayer, according to the invention, comprises in combination:

- a first tank (1) having an upper chamber with a predetermined amount of bath therein for the coating of the sublayer (S), and a lower chamber wherein

the bath overflowing from the upper one is collected: located in correspondence of the upper chamber of said tank (1) is a first motor-driven, spreading roller (2) which is intended to distribute the bath over a surface of the sublayer (S) by virtue of its rotation and the contact thereof with the surface of the same sublayer (S) driven into motion by means which comprise at least a motor-driven roller (R), on which the sublayer (S) being coated with coating material winds up;

- a second tank (1') which is shaped like the first (1), but located at higher level, and provided with a corresponding second motor-driven, spreading roller (2') which operates as said first roller (2) on the sublayer (S) surface which is not acted upon by said the first roller (2);
- a first pump (3) - of positive displacement type, for example - intended to draw the bath from a corresponding container (4) and feed it to the upper chamber of each one of said first and second tanks (1, 1') through feeding conduits (5, 6);
- a second pump (7) - of positive displacement type, for example - intended to draw the bath of coating material from a corresponding container (8) and feed it into the container (4) which supplies the said first pump (3) through respective conduits (9, 10). The conduit (9) for feeding the said second pump (7) being suitably provided with a corresponding intercepting valve (17).

Advantageously located intermediate between said first and second roller is a third roller (22) engaged to corresponding motion means, such as an actuator cylinder, and mounted on a slide with vertical axis (23), on which the sublayer (S) rests when exiting from said first roller (2), so as to operate, with the displacement of the roller (23) along the axis of the supporting slide (22), the release of the sublayer (S) out of contact with one or both the spreading rollers (2, 2').

Advantageously, according to the invention, the said tanks (1) and (1') are connected to the container (4) of the coating material through a conduit intercepted by a pneumatic valve (12) so as to allow, upon command, the emptying of the tanks (1, 1') and the return of the held-therein liquid to the container (4). The said valve (12) being in closed condition during the operating step of the plant, and in open condition during the emptying of tanks (1, 1').

Also advantageously provided is an ultrasound sensor (13) for the instantaneous detection of the bath level within said container (4).

Advantageously, upstream of said first tank (1) and, respectively, downstream of said second tank (1') there is provided a corresponding sensor for measuring the humidity degree of the sublayer (S), so as to evaluate exactly the difference between the humidity degree of the sublayer (S) upon its entry to, and exit from the plant.

Again, advantageously, there is provided a recovery

container (14) connected to the container (4) of the coating material through a conduit (15) provided with an intercepting valve (16) to allow the recovery of the bath whenever the container (4) is to be emptied, such as during the plant's washing stage to be described below. The said second pump (7) is advantageously connected, by means of a conduit (18) provided with an intercepting valve (19), to a container (20) holding the liquid for the washing of the tanks, containers and conduits of the plant.

Also provided is a tap (21) interposed between the said first pump (3) and the upper chamber of said first tank (1) to allow for the adjustment, in a differentiated manner, of the flow of coating material from the first pump (3) to the tanks (1) and (1').

In place of the said tap (21) a conduit (not shown) may be advantageously provided, having an "Y" branch for feeding the upper chambers of the two tanks (1, 1').

The plant's valves and pumps are operable by programmable electronic means known per se to those skilled in the industrial automation, and will not therefore be described in detail.

The operation of the above described plant is as follows.

The container (4) is fed by the pump (7) which draw by suction the bath from the container (8). The upper chamber of the tanks (1, 1') are fed continuously by the pump (3) which draw by suction the bath from the container (4), the latter thereby acting as a plenum chamber of the bath-feeding means. The amount of product fed into the lower tank (1) may be metered by means of the tap (21). The continuous detection of the consumption of the coating material is made through the level sensor (13). This allows adjusting in a corresponding manner the rotation speed of the rollers (2, 2'), calibrating the instruments - known per se - measuring the current humidity degree of the treated sublayer, and adjusting the flowrate of the pump (3). The overflowing of the bath from the upper to the lower chamber of each tank (1, 1') makes it possible to continuously refresh the bath of coating material laid onto the sublayer (S) by the rollers (2, 2'). The washing of the plant is made by emptying the tanks (1, 1') with the valve (12) in open condition, and then closing the valve (17) and opening the valve (19), thereby aspirating the washing liquid from the container (20) and putting it in circulation within the plant's conduits by means of the pumps (6, 7).

With reference to the application example illustrated in Fig. 2, the sublayer (S) consists of a textile yarn unwinding from a reel carried by a known per se feeding group (T). The coating material is a bath of liquid wax for the waxing of the yarn. On its exit from the spreading roller of the upper tank (1'), which in the present example acts as a waxing roller in cooperation with the lower tank (1), the yarn is fed to a drying apparatus (A) of the type described in the Italian patent application No. FI95A171. Said apparatus (A) is mounted on a frame comprising two stanchions (24) to which two fixed, parallel, horizontal brackets (25) are mounted and each of which sup-

ports a corresponding tank (1, 1'). Mounted at the outlet of the apparatus (A) is a sensor which measures the degree of residual humidity of the treated material.

It will be appreciated that the amount of coating material which can be distributed over the sublayer (S) is variable also in relation to the speed of rotation of the spreading rollers (2, 2') and to the feeding speed of the sublayer (S).

It is understood, moreover, that materials of other type, such as ribbons or rolls of fabric, webs of paper materials, yarns or bands of synthetic materials or woven and not woven composites, may be treated in an equivalent way, and that the coating material may be however different from the wax, provided it is suitable for spreading a continuous coat on the sublayer.

Claims

1. Plant for continuous spreading on a textile, paper or similar sublayer characterized in that it comprises in combination:
 - a first tank (1) having an upper chamber with a predetermined amount of bath therein for the coating of the sublayer (S) and a lower chamber wherein the bath overflowing from the upper one is collected: located in correspondence of the upper chamber of said tank (1) is a first motor-driven, spreading roller (2) which is intended to distribute the bath over a surface of the sublayer (S) by virtue of its rotation and the contact thereof with the surface of the same sublayer (S) driven into motion by means which comprise at least a motor-driven roller (R), on which the sublayer (S) being coated with coating material winds up;
 - a second tank (1') which is shaped like the first (1), but located at higher level, and provided with a corresponding second motor-driven, spreading roller (2') which operates, as the first roller (2), on the sublayer (S) surface which is not acted upon by said first roller (2);
 - a first pump (3) intended to draw the bath from a corresponding container (4) and feed it to the upper chamber of each of said tanks (1) and (1') through feeding conduits (5, 6);
 - a second pump (7) intended to draw by suction the bath of coating material from a corresponding container (8) and feed it into the container (4) which supplies the said first pump (3) through respective conduits (9, 10).
2. Plant according to claim 1 characterized in that, located intermediate between said first and second rollers (2, 2'), is a third roller (22) engaged to corresponding motion means, such as an actuator cylinder, and mounted on a slide with vertical axis (23),

on which the sublayer (S) rests when exiting from said first roller (2), so as to allow, with the displacement of the roller (23) along the axis of the supporting slide (22), the release of the sublayer (S) out of contact with one or both the spreading rollers (2, 2').

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3. Plant according to claim 1 characterized in that the said tanks (1) and (1') are connected to the container (4) of the coating material through a conduit intercepted by a pneumatic valve (12) so as to allow, upon command, the emptying of the tanks (1, 1') and the return of the liquid held therein to the container (4): the said valve (12) being in closed condition during the operating step of the plant, and in open condition during the emptying of tanks (1, 1').
4. Plant according to claim 1 characterized in that it comprises an ultrasound sensor (13) for the instantaneous detection of the bath level within said container (4).
5. Plant according to claim 1 characterized in that upstream of said first tank (1) and, respectively, downstream of said second tank (1') is provided a corresponding sensor for measuring the humidity degree of the sublayer (S), so as to evaluate exactly the difference between the humidity degree of the sublayer (S) upon its entry to, and exit from the plant.
6. Plant according to claim 1 characterized in that it comprises a recovery container (14) connected to the container (4) of the coating material through a conduit (15) provided with an intercepting valve (16) to allow the recovery of the bath whenever the container (4) is to be emptied, such as during the plant's washing stage to be described below.
7. Plant according to claim 1 characterized in that said second pump (7) is connected, by means of a conduit (18) with intercepting valve (19), to a container (20) which holds the liquid for the washing of the tanks, containers and conduits of the plant.
8. Plant according to claim 1 characterized in that a tap (21) interposed between the said first pump (3) and the upper chamber of said first tank (1) to allow for the adjustment, in a differentiated manner, of the flow of coating material from the first pump (3) to the tanks (1) and (1').
9. Plant according to claim 1 characterized in that said plant's valves and pumps are operable by programmable electronic means.

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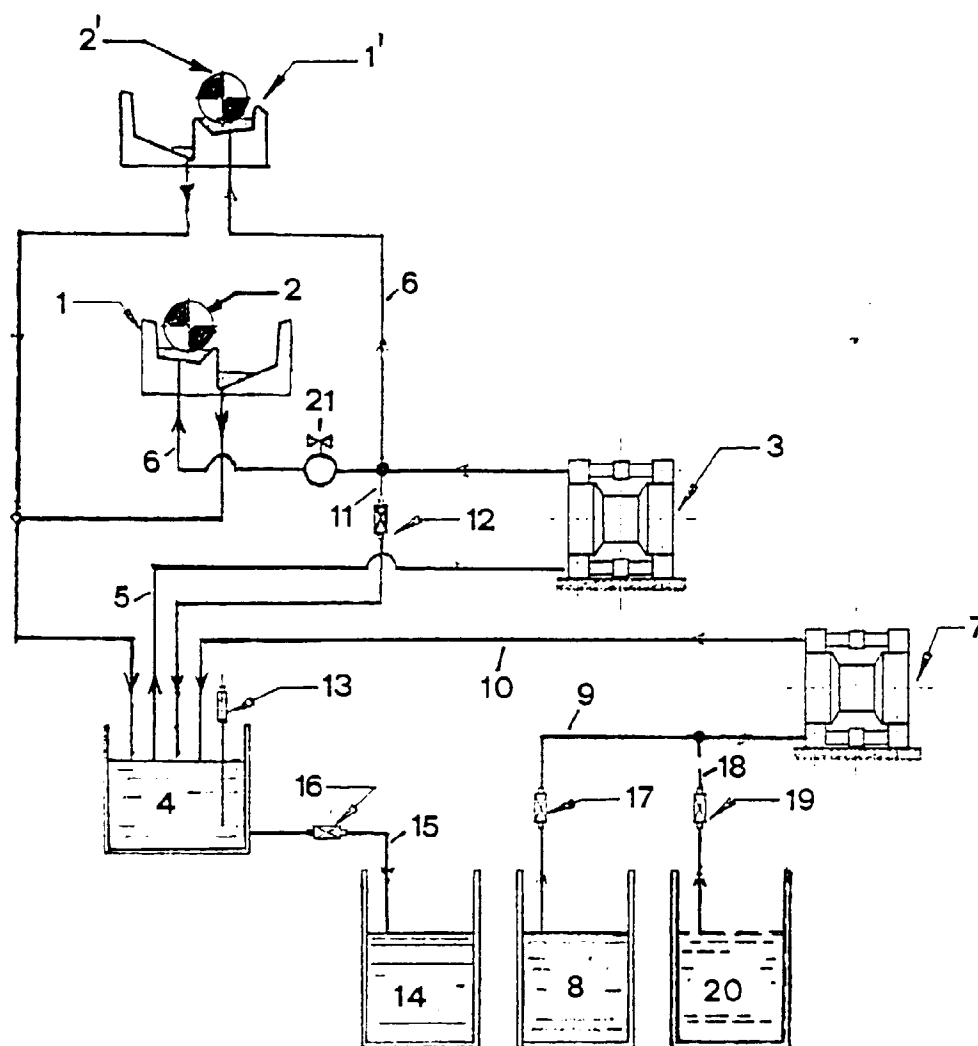
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Fig. 1



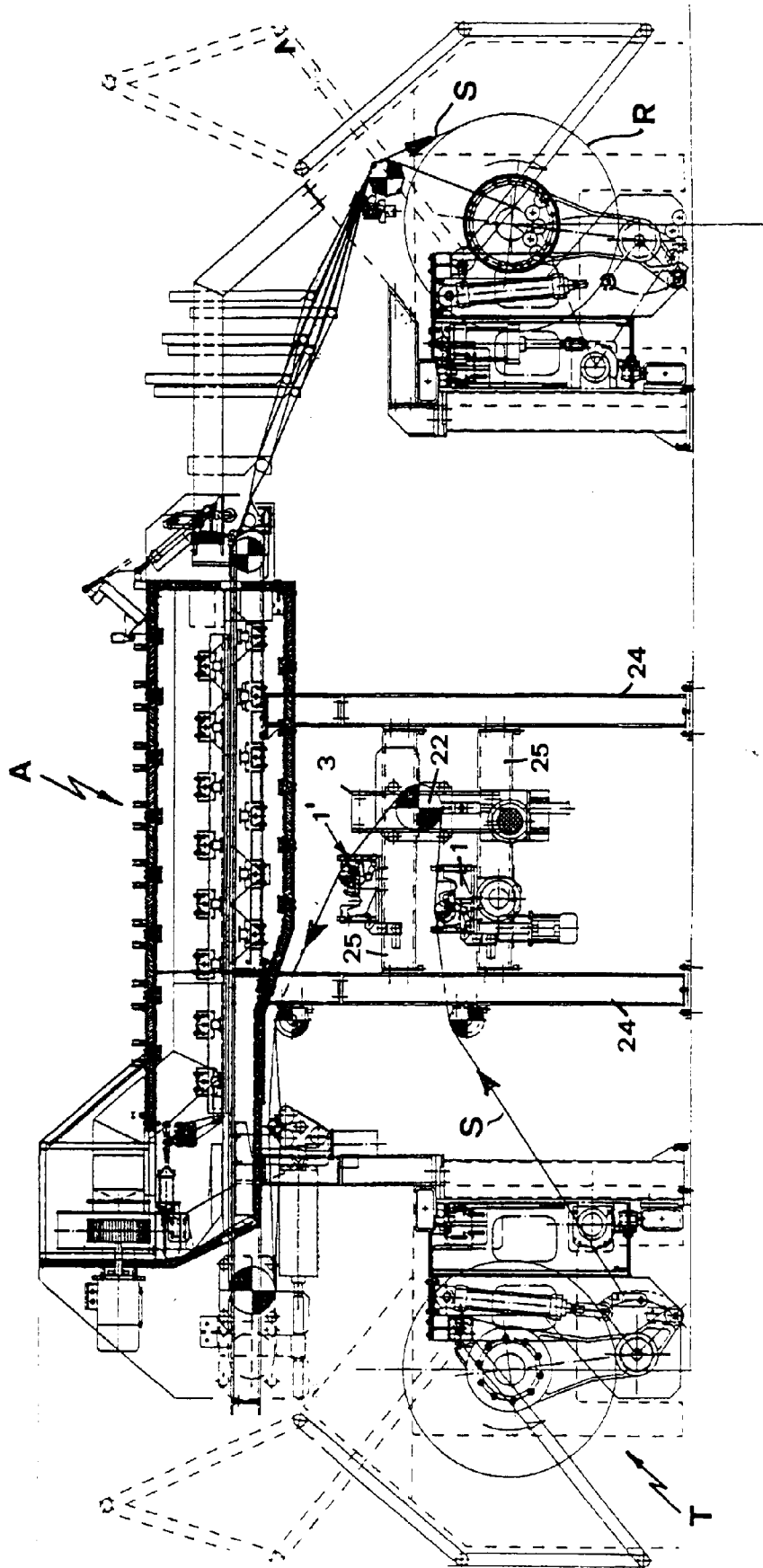


Fig. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0510

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.6)
A	DE-C-37 39 873 (HAUSMANN) 19 January 1989 * the whole document * ---	1	B05C1/08 B05C9/04
A	US-A-5 075 128 (GNUECHTEL HERMAN C ET AL) 24 December 1991 * the whole document * ---	1,8,9	
A	DE-A-20 27 166 (LOCKWOOD TECHNICAL) 16 December 1971 * page 7, line 17 - line 33 * -----	1,4	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B05C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10 January 1997	Examiner Juguet, J
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			

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