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(54) **Plant for continuous spreading on textile, paper and similar materials**

Anlage zur Beschichtung von Papieren, Textilien oder ähnlichen Materialien

Installation de revêtement de papier textiles ou matériaux similaires

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EP 0 768 119 B1

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Description

[0001] The present invention relates to a plant for continuous spreading on textile, paper and similar materials.

[0002] It is known, from DE 3739873, a plant for coating web-type materials including a plurality of tanks for storing a coating substance and roller-type spreading means for applying said coating substance on the web-type material.

[0003] 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.

[0004] 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.

[0005] 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.

[0006] 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.

[0007] 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.

[0008] 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 sim-

ilar 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).

[0009] In Fig. 1 of the attached drawings the upper chambers of the tanks (1, 1') are denoted by the letters (U) and respectively (U') and the lower chambers are denoted by the letters (L) and respectively (L').

[0010] 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').

[0011] 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).

[0012] 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.

[0013] 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.

[0014] 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).

[0015] 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 supports 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).

[0016] 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, including:

- means for storing a coating material and means for applying said coating material onto the sublayer;
- a first tank (1) having an upper chamber (U) with a predetermined amount of bath therein for the coating of the sublayer (S) and a lower chamber (L) 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 (U, U') of each of said tanks (1) and (1') through feeding conduits (5, 6) ;

characterized in that it comprises:

- 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').

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.

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.

Patentansprüche

1. Anlage zum kontinuierlichen Auftragen auf eine Unterschicht aus textilem Material, Papier oder ähnlichem, wobei die Anlage folgendes umfaßt:

- Einrichtungen zum Speichern eines Beschichtungsmaterials und Einrichtungen zum Aufbringen dieses Beschichtungsmaterials auf die Unterschicht,
- einen ersten Tank (1), der eine obere Kammer (U) mit einer vorbestimmten Menge eines Bades zum Beschichten der Unterschicht (S) und eine untere Kammer (L) umfaßt, in der das aus der oberen Kammer überlaufende Bad gesammelt wird, wobei im Bereich der oberen Kammer des Tanks (1) eine erste motorgetriebene Auftragwalze (2) angeordnet ist, die dazu dient, das Bad über eine Oberfläche der Unterschicht (S) aufgrund ihrer Rotation und ihrer Berührung mit der Oberfläche dieser Unterschicht (S) zu verteilen, die mit Hilfe von Einrichtungen zu einer Bewegung angetrieben wird, die wenigstens eine motorbetriebene Walze (R) umfassen, auf welche die Unterschicht (S), die mit dem Beschichtungsmaterial beschichtet wird, aufgewickelt wird,
- einen zweiten Tank (1'), der wie der erste Tank (1) geformt aber auf einem höheren Niveau angeordnet und mit einer entsprechenden zweiten, motorgetriebenen Auftragwalze (2') ausgestattet ist, die wie die erste Walze (2) auf die Oberfläche der Unterschicht (S) einwirkt, auf welche die erste Walze (2) nicht einwirkt,
- eine erste Pumpe (3), die dazu dient, das Bad aus einem entsprechenden Behälter (4) abzusaugen und es der oberen Kammer (U, U') eines jeden Tanks (1, 1') über Zuführleitungen (5, 6) zuzuführen,

dadurch gekennzeichnet, daß die Anlage

- eine zweite Pumpe (7) umfaßt, die dazu dient, über entsprechende Leitungen (9, 10) durch

Ansaugen das Bad aus Beschichtungsmaterial aus einem entsprechenden Behälter (8) abzusaugen und es dem Behälter (4) zuzuführen, der die erste Pumpe (3) speist.

2. Anlage nach Anspruch 1, dadurch gekennzeichnet, daß zwischen der ersten und der zweiten Walze (2, 2') eine dritte Walze (22) angeordnet ist, die mit entsprechenden Antriebseinrichtungen, wie z.B. einem Betätigungszyylinder in Eingriff steht und auf einem Schlitten mit vertikaler Achse (23) montiert ist, auf welcher die Unterschicht (S) aufliegt, wenn sie die erste Walze (2) verläßt, um so durch eine Verschiebung der Walze (23) längs der Achse des Tragschlittens (22) eine Freigabe der Unterschicht (S) zu ermöglichen, so daß sie außer Kontakt mit einer oder beiden Auftragwalzen (2, 2') kommt.
3. Anlage nach Anspruch 1, dadurch gekennzeichnet, daß die Tanks (1, 1') mit dem Behälter (4) für das Beschichtungsmaterial über eine Leitung verbunden sind, die durch ein pneumatisches Ventil (12) unterbrochen ist, so daß auf ein Befehlssignal das Entleeren der Tanks (1, 1') und das Zurückführen der in ihnen enthaltenen Flüssigkeit zum Behälter (4) ermöglicht wird, wobei das Ventil (12) während des Arbeitsvorganges der Anlage geschlossen und während des Entleerens der Tanks (1, 1') geöffnet ist.
4. Anlage nach Anspruch 1, dadurch gekennzeichnet, daß sie einen Ultraschallsensor (13) umfaßt, der dazu dient, den momentanen Badpegel im Behälter (4) zu detektieren.
5. Anlage nach Anspruch 1, dadurch gekennzeichnet, daß stromaufwärts vom ersten Tank (1) und demgemäß stromabwärts vom zweiten Tank (1') ein entsprechender Sensor zum Messen des Maßes der Feuchtigkeit der Unterschicht (S) vorgesehen ist, um so exakt die Differenz zwischen dem Ausmaß der Feuchtigkeit auf der Unterschicht (S) bei ihrem Eintritt in die Anlage und bei ihrem Austritt aus der Anlage zu ermitteln.
6. Anlage nach Anspruch 1, dadurch gekennzeichnet, daß sie einen Rückgewinnungsbehälter (14) umfaßt, der mit dem Behälter (4) für das Beschichtungsmaterial über eine Leitung (15) verbunden ist, die mit einem Unterbrechungsventil (16) versehen ist, um das Rückgewinnen des Bades immer dann zu ermöglichen, wenn der Behälter (4) beispielsweise bei einem Anlagen-Waschvorgang entleert werden soll.
7. Anlage nach Anspruch 1, dadurch gekennzeichnet, daß die zweite Pumpe (7) über eine Leitung (18) mit einem Unterbrechungsventil (19) mit einem Behälter (20) verbunden ist, der die Flüssigkeit für das Waschen der Tanks, Behälter und Leitungen der Anlage enthält.

8. Anlage nach Anspruch 1, dadurch gekennzeichnet, daß ein Hahn (21) zwischen der ersten Pumpe (3) und der oberen Kammer des ersten Tanks (1) zwischengeschaltet ist, um in einer differenzierten Weise die Strömung von Beschichtungsmaterial von der ersten Pumpe (3) zu den Tanks (1, 1') zu ermöglichen.
9. Anlage nach Anspruch 1, dadurch gekennzeichnet, daß die Ventile und Pumpen der Anlage durch programmierbare elektronische Einrichtungen steuerbar sind.

Revendications

1. Installation pour l'étalement continu sur un textile, un papier ou une sous-couche similaire, comprenant:
 - des moyens pour stocker un matériau de revêtement et des moyens pour appliquer ledit matériau de revêtement sur la sous-couche;
 - une première cuve (1) comportant une chambre supérieure (U) contenant une quantité prédéterminée d'un bain pour le revêtement de la sous-couche (S) et une chambre inférieure (L), dans laquelle le bain débordant de la chambre supérieure est collecté; et un premier rouleau d'étalement (2) entraîné par un moteur est disposé en correspondance avec la chambre supérieure de ladite cuve (1), rouleau d'étalement qui est destiné à répartir le bain sur une surface de la sous-couche (S) sous l'effet de sa rotation et de son contact avec la surface de cette sous-couche (S) entraînée en déplacement par des moyens qui comprennent au moins un rouleau (R) entraîné par un moteur et sur lequel s'enroule la sous-couche (S) recouverte par un matériau de revêtement;
 - une seconde cuve (1'), qui est conformée comme la première cuve (1), mais est située à un niveau plus élevé et est pourvu d'un second rouleau d'étalement correspondant (2') entraîné par un moteur et qui agit, comme le premier rouleau (2) sur la surface de la sous-couche (S), sur laquelle ledit premier rouleau (2) n'agit pas;
 - une première pompe (3) destinée à soutirer le bain depuis un conteneur correspondant (4) et l'envoyer à la chambre supérieure (U, U') de chacune desdites cuves (1) et (1') par l'intermédiaire de conduits d'amenée (5, 6),

caractérisée en ce qu'elle comprend

- une seconde pompe (7) destinée à soutirer par aspiration le bain du matériau de revêtement à partir d'un conteneur correspondant (8) et l'amener dans le conteneur (4), qui alimente ladite première pompe (3) au moyen de conduits respectifs (9, 10). 5

- 2. Installation selon la revendication 1, caractérisée en ce que dans une position intermédiaire entre lesdits premier et second rouleaux (2, 2') est disposé un troisième rouleau (22) qui engrène avec des moyens de déplacement correspondants, comme par exemple un vérin d'actionneur, et est monté sur une glissière possédant un axe vertical (23), sur laquelle la sous-couche (S) est en appui lorsqu'elle sort dudit premier rouleau (2) de manière à permettre, avec le déplacement du rouleau (23) le long de l'axe de la glissière de support (22) le détachement de la sous-couche (S) écartant cette dernière de son contact avec l'un des deux rouleaux d'étalement (2, 2') ou avec ces deux rouleaux. 10 15 20

- 3. Installation selon la revendication 1, caractérisée en ce que les cuves (1) et (1') sont raccordées au conteneur (4) du matériau de revêtement par l'intermédiaire d'un conduit contenant une vanne pneumatique (12) de manière à permettre, sur commande, le vidage des cuves (1, 1') et le retour du liquide retenu dans les cuves au conteneur (4); ladite vanne (12) étant en position fermée pendant l'étape de fonctionnement de l'installation et en position ouverte pendant le vidage des cuves (1, 1'). 25 30 35

- 4. Installation selon la revendication 1, caractérisée en ce qu'elle comprend un détecteur à ultrasons (13) servant à détecter instantanément le niveau du bain à l'intérieur dudit conteneur (4). 40

- 5. Installation selon la revendication 1, caractérisée en ce qu'en amont de ladite première cuve (1) et respectivement en aval de ladite seconde cuve (1') est prévu un capteur correspondant servant à mesurer le degré d'humidité de la sous-couche (S) de manière à évaluer exactement la différence entre le degré d'humidité de la sous-couche (S) lors de son entrée dans l'installation et de sa sortie hors de l'installation. 45 50

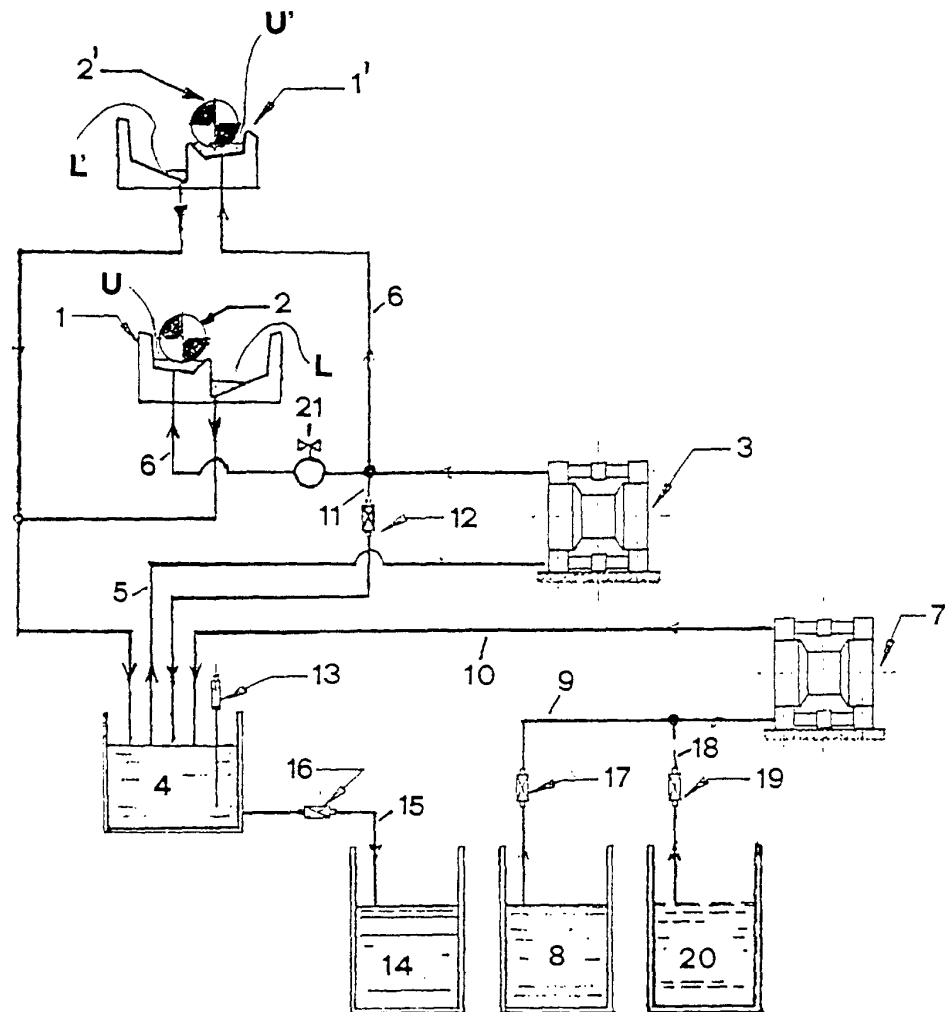
- 6. Installation selon la revendication 1, caractérisée en ce qu'elle comprend un conteneur de récupération (14) raccordé au conteneur (4) du matériau de revêtement par l'intermédiaire d'un conduit (15) pourvu d'une vanne de sectionnement (16) pour permettre la récupération du bain chaque fois que le conteneur (4) doit être vidé, comme par exemple pendant l'étape de lavage de l'installation. 55

- 7. Installation selon la revendication 1, caractérisée en ce que ladite seconde pompe (7) est raccordée, au moyen d'un conduit (18) contenant une vanne de sectionnement (19), à un conteneur (20) qui contient le liquide pour le lavage des cuves, des conteneurs et des conduits de l'installation.

- 8. Installation selon la revendication 1, caractérisée en ce qu'une prise (21) est intercalée entre ladite première pompe (3) et la chambre supérieure de ladite première cuve (1) pour permettre l'ajustement, d'une manière différenciée, de l'écoulement du matériau de revêtement depuis la première pompe (3) en direction des cuves (1) et (1').

- 9. Installation selon la revendication 1, caractérisée en ce que lesdites vannes et pompes de l'installation peuvent être actionnées par des moyens électroniques programmables.

Fig. 1



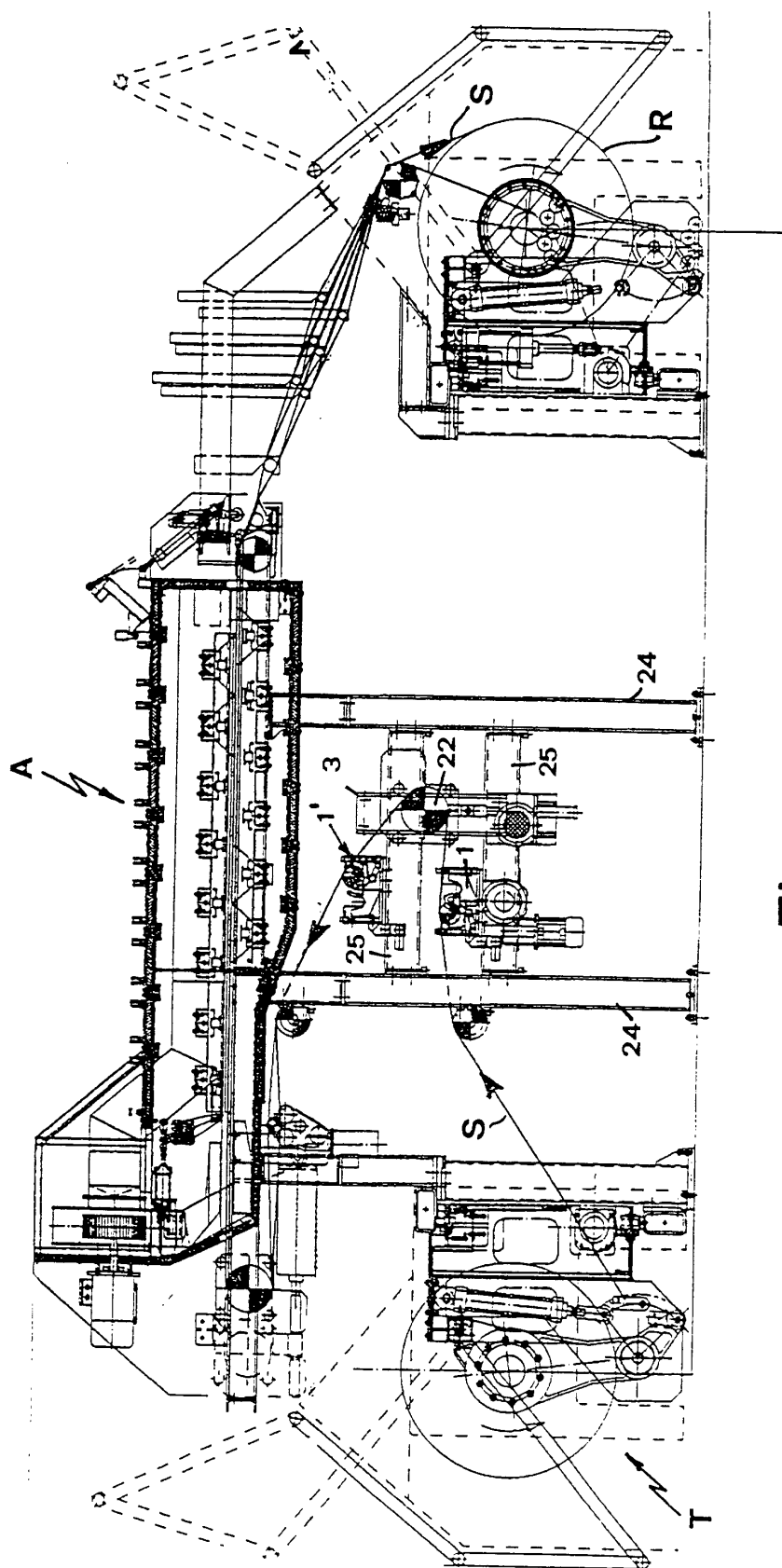


Fig. 2