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(11) Publication number:

**0 053 619  
B1**

(12)

## EUROPEAN PATENT SPECIFICATION

- (45) Date of publication of patent specification: **13.03.85**      (51) Int. Cl.<sup>4</sup>: **B 65 H 23/188, G 06 K 15/16**  
(21) Application number: **81901500.9**  
(22) Date of filing: **15.06.81**  
(86) International application number:  
**PCT/SE81/00179**  
(87) International publication number:  
**WO 81/03651 24.12.81 Gazette 81/30**

(54) **DEVICE AT PRINTING PLANTS FOR PROVIDING A WEB WITH INFORMATION.**

(30) Priority: **16.06.80 SE 8004463**

(43) Date of publication of application:  
**16.06.82 Bulletin 82/24**

(45) Publication of the grant of the patent:  
**13.03.85 Bulletin 85/11**

(84) Designated Contracting States:  
**FR**

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Courier Press, Leamington Spa, England.

**EP 0 053 619 B1**

## Description

The present invention relates to a device at printing plants for providing a web, preferably a perforated paper web, with information.

Modern printing plants such as laser printing plants or ink jet printers operate at very high printing speeds and provide prints of 0,7—0,8 m/s. One condition for being able to utilize such high speeds at printing plants for e.g. printing forms, is that the web for receiving the print may be fed through the printer at high speed and collect the printed web in such a way that it directly may be used in subsequent-treatment plants such as sheet-formation and/or folding plants. It has long been known various types of devices for feeding webs through printing plants, but these are not suitable for use in modern printing plants.

The object of the present invention is to provide by simple means a device which permits efficient feeding and collecting of webs provided with prints in printing plants operating at high printing speeds. This is attained substantially by means of the device defined in the following claim 1.

The invention will be further described in the following with reference to the accompanying drawings, in which

fig. 1 is a side view schematically illustrating a printing plant with a device according to the invention;

fig. 2 schematically illustrates a brake unit forming part of the plant of fig. 1;

figs. 3 and 4 schematically illustrate sensors forming part of the plant of fig. 1; and

fig. 5 schematically illustrates a control unit forming part of the plant of fig. 1.

The plant shown is adapted for printing a formaliner-perforated paper web 1 and collecting said web such that it may be used directly for subsequent treatment. The paper web 1 is intended for the manufacture of forms and subsequent treatment thereof is intended to occur in sheet-formation and/or folding plants. The plant is substantially comprised by a feeding device 2 for feeding the paper web which runs via an inlet sensor 3 to a printer unit 4 for printing information on the web 1. The printed paper web 1 runs via an outlet sensor 5 to a receiving device 6.

The feeding device 2 comprises a machine frame 7 with a recess 8 for storing a roll 9 on which the perforated web 1 for printing is reeled. The frame 7 further comprises a lifting device for lifting the roll 9 and positioning the same in the recess 8. The lifting device includes a pivotally mounted lifting arm 10 provided with a fork (not shown) for the roll 9 and pivotable by means of a cylinder-piston device 11 forming part of a hydraulic or pneumatic system (not shown).

The feeding device 2 also comprises an unrolling device 12 for unrolling the web 1 from the roll 9 and a brake unit 13 for braking the roll 9. The unrolling device 12 has two feed rolls 14 and 15 between which the web runs and at least one of said rolls 14, 15 is operated by a driving unit 16. The paper web 1 runs from the roll 9 to the

unrolling device 12 via three conducting rolls 17, 18 and 19 of which the roll 19 is stored on a pendulum arm 20 forming part of the brake unit 13. The arm 20 cooperates with a disc brake 22 (see fig. 2) via a brake cylinder 21 and said disc brake cooperates with the roll 9.

When the unrolling device 12 reduces its speed, the tension in web portion 1a between the roll 9 and the unrolling device 12 will lessen, whereby the pendulum arm 20 will swing downwards. This swing of the pendulum arm is transferred via the brake cylinder 21 to the disc brake 22, which brakes the rotation of the roll 9. When the tension of the web portion 1a again increases, the arm 20 swings upwards, whereby the braking effect of the brake unit 13 on the roll 9 is reduced. The brake cylinder 21, disc brake 22 and other members of the brake unit 13 are of a well-known type with well-known function and are thus not further described.

The paper web 1 runs from the unrolling device 12 to the printer unit 4 via the inlet sensor 3, which is adapted to control the unrolling device 12 such that the web portion 1b of the web runs in a slack condition between the unrolling device 12 and a feeding unit 23 in the printer unit 4.

In principal, the inlet sensor 3 comprises a container 24 open at the top and in which the web portion 1b is hanging down. A photocell device — comprising a photocell unit — with transmitter and receiver 25, 26 of a type known per se, is mounted in the container 24. By means of this photocell unit 25, 26, it is possible to sense how far down the web portion 1b is hanging in the container 24, whereby the driving unit 16 of the unrolling device 12 is controlled via a control unit 27 such that its unrolling speed is reduced when the web portion 1b is lowered in the container and increases when said portion is raised. Hereby, the web portion 1c is automatically brought to always run slack, which is very important for a satisfactory operation of the feeding unit 23 of the printer unit 4 and thus the printing process.

The feeding unit 23 of the printer unit 4 comprises a driven conveyor belt 28 with pins 29 engaging the holes (not shown) of the web when said web is driven through the printer unit 4. The feeding unit 23 and the various arrangements of the printer unit 4 for printing information on the paper web 1 are well-known and are therefore not further described.

The outlet sensor 5 is of the same type as the inlet sensor 3 and thus comprises a container 29 having a photocell unit with transmitter and receiver 30 and 31. The photocell unit cooperates with a control device 32 which controls a driving motor 33 of a web driving device 34 forming part of the receiving device 6. The outlet sensor 5 controls said driving device 34 such that the web portion 1c between said device and the feeding unit 23 always runs in slack condition, which is also essential for not affecting the feeding and printing operations of the printer unit 4.

The paper web 1 runs from the web driving device 34 to a reeling device 35 comprising a

reeling roll 36. The web portion 1d running between the web driving device 34 and the reeling roll 36 passes a control unit 37 arranged to sense changes in tension in the web portion 1d and control the reeling speed of the reeling device 35 relative to said changes in tension.

The driving device 34 and the control unit 37 can have various structural embodiments of which especially simple and useful embodiments are shown in figs. 1 and 5. According to these embodiments the driving device 34 has two feed rolls 38, 39 of which at least one is driven by the driving unit 33, whereby the paper web 1 runs to the roll 38 via a conducting roll 40, extends around more than half the periphery of the rolls 38, 39 to the roll 39, extends around more than half the periphery of the roll 39 and runs away via a conducting roll 41. Hereby, a suitable efficient grip is obtained between the rolls 38, 39 and the paper web 1 such that it does not slide on the rolls 38, 39 but is fed without sliding.

The control unit 37 comprises a pivotally mounted pendulum arm 42 with at least one and preferably two conducting rolls 43, 44 (see fig. 5), whereby the web portion 1d runs from the conducting roll 41, down below the conducting roll 43, up above a conducting roll 45, down below the conducting roll 44, up above a conducting roll 46 and via conducting rolls 47, 48 to the reeling roll 36 and in below a pressure roll 49.

The pendulum arm 42 is pivotally mounted on a horizontal axis 50 such that it swings upwards if the tension in the web portion 1d increases and downwards if the tension is reduced.

This pendulum arm 42 cooperates with an electric control device 51 having a potentiometer 52 which is arranged to register the magnitude and direction of the swinging movements of the pendulum arm 42. The electric control device 51 is designed to convert the values obtained from the potentiometer 52 for the swinging of the pendulum arm to electric signals for controlling a control unit 53 of the electric control device 51. This control unit 53 is adapted to control a connection 54 between a driving aggregate 55 for operating the reeling roll 36 and said roll 36, whereby the driving aggregate may include a conventional three-phase motor and the connection comprises a so called eddy current coupling.

The control unit 37 operates in such a way that the pendulum arm 42 via the electric control device 51 controls the connection 54 so that the speed of rotation of the roll 36 automatically increases immediately upon reduction of the tension in the web portion 1d and so that the speed of rotation of the roll 36 automatically decreases immediately upon a tension increase in the web portion 1d. Hereby, the paper web 1 is wound up on the roll 36 at constant tension, which is essential for being able to directly use the paper reel 56 formed on the roll 36 for subsequent treatment.

The illustrated control unit 37 preferably comprises a load device 57 adapted to affect the

control unit 37 such that said unit applies predetermined load on the web portion 1d for providing a certain tension therein. The load device 57 includes a pneumatic system 58 (connected to a not shown compressed air outlet) with an air regulator 59, a pressure meter 60 and a cylinder-piston device 61 connected to the pendulum arm 42. The cylinder-piston device 61 is arranged to apply a load on the pendulum arm 42 determined by the air regulator 59, whereby the pressure meter 60 is adapted to indicate the instantaneous load on the web portion 1c.

The control unit 37 also comprises a shock absorber device 62 for shock absorbing the movements of the pendulum arm 42. The device 62 preferably comprises a cylinder-piston device directly connected to the arm 42.

The invention may vary within the scope of the following claims regarding details in the various embodiments. The pendulum arm may e.g. be a sensing means of another type than an arm.

### Claims

1. Device in printing plants for providing a web, preferably a perforated paper web, with information, whereby the web (1) runs from a feeding device (2) via an inlet sensor (3) to a printer unit (4) and therefrom via an outlet sensor (5) to a receiving device (6) and whereby the inlet sensor controls the feeding device to feed the web such that it runs in slack condition to a feeding unit (23) for feeding thereof through the printer unit while the outlet sensor controls the receiving device to feed the web such that it runs in slack condition from the feeding unit, characterized in that the receiving device (6) comprises a web driving device (34) controlled by the outlet sensor (5) and holding the web (1), that in said web driving device the web portion (1c) running from the feeding unit (23) in slack condition is transformed into a stretched web portion (1d) under the influence of a reeling device (35) and a web drawing unit (37), which includes a sensing means (42) cooperating with the web portion (1d) running between the driving device (34) and the reeling device (35), that said sensing means is arranged to alter position in dependence on variations in tension in said web portion, that the sensing means cooperates with an electric control device (51) which in relation to the magnitude of the alterations in position of the sensing means controls a connection (54) of eddy current type between a driving aggregate (55) and a reeling roll (36) of the reeling device (35), that the electric control device, preferably including a potentiometer (52), is adapted to register the position changes of the sensing means and that the values registered control a control unit (53) for controlling the connection (54).

2. Device according to claim 1, characterized in that the web driving device (34) has two feed rolls (38, 39), whereby the web (1) runs over more than half the periphery of one of said rolls (38) and extends via a space between the rolls to the other

of said feed rolls (39), whereafter the web runs over more than half the periphery of said other roll.

## Revendications

1. Dispositif pour machines à imprimer pour produire une bande, de préférence une bande de papier perforée, contenant des informations, dans lequel la bande (1) passe d'un dispositif d'alimentation (2) par un détecteur d'entrée (3) à un dispositif d'impression (4) et de celui-ci par un détecteur de sortie (5) à un dispositif de réception (6) et dans lequel le détecteur d'entrée contrôle le dispositif d'alimentation de sorte qu'il fait avancer la bande de façon à passer en état relâché à un organe d'alimentation (23) pour l'avance de la bande à travers le dispositif d'impression (4) tandis que le détecteur de sortie contrôle le dispositif de réception de sorte qu'il fait avancer la bande de façon à passer en état relâché de l'organe d'alimentation, caractérisé par le fait que le dispositif de réception (6) comprend un dispositif (34) d'entraînement de la bande, qui est contrôlé par le détecteur de sortie (5) et qui maintient la bande (1), que dans ledit dispositif d'entraînement de la bande, la partie de bande (1c) passant de l'organe d'alimentation (23) en état relâché est transformée en une partie de bande tendue (1d) sous l'action d'un dispositif d'enroulement (35) et d'un dispositif de tirage de la bande (37), ledit dispositif de tirage comportant un palpeur (42) qui coopère avec la partie de bande (1d) passant entre le dispositif d'entraînement (34) et le dispositif d'enroulement (35), que ledit palpeur est destiné à changer de position en dépendance de variations de la tension de la partie de bande, que le palpeur coopère avec un dispositif électrique de contrôle (51) qui par rapport à la grandeur des variations de position du capteur contrôle une connexion (54) du type à courants de Foucault entre un organe d'entraînement (55) et un rouleau d'enroulement (36) du dispositif d'enroulement (35), que le dispositif électrique de contrôle, comportant de préférence un potentiomètre (52), est conçu pour enregistrer les changements de position du palpeur et que les valeurs enregistrées contrôlent un organe de contrôle (53) contrôlant la connexion (54).

2. Dispositif selon la revendication 1, caractérisé par le fait que le dispositif d'entraînement (34) de la bande présente deux rouleaux d'alimentation (38, 39), la bande (1) passant autour de plus de la moitié de la circonférence de l'un (38) desdits deux rouleaux et s'étendant par un espace entre les rouleaux à l'autre (39) desdits deux rouleaux d'alimentation, après quoi la bande

s'étend autour de plus de la moitié de la circonférence de l'autre (39) desdits deux rouleaux.

## Patentansprüche

5 1. Vorrichtung an Druckmaschinen zum Aufbringen von Informationen auf eine Bahn, vorzugsweise eine gelochte Papierbahn, in welcher Vorrichtung die Bahn (1) von einer Zufuhrvorrichtung (2) über einen Eingangssensor (3) zu einer Druckeinheit (4) und von dort über einen Ausgangssensor (5) zu einer Empfangsvorrichtung (6) läuft und in welcher der Eingangssensor die Zufuhrvorrichtung steuert, so dass sie die Bahn derart zuführt, dass die Bahn in schlaffem Zustand zu einer Zufuhreinheit (23) läuft, die die Bahn durch die Druckeinheit führt, während der Ausgangssensor die Empfangsvorrichtung steuert, so dass sie die Bahn derart zuführt, dass die Bahn in schlaffem Zustand von der Zufuhreinheit wegläuft, dadurch gekennzeichnet, dass die Empfangsvorrichtung (6) eine die Bahn (1) haltende und von dem Ausgangssensor (5) gesteuerte Bahnantriebsvorrichtung (34) aufweist, dass in der genannten Bahnantriebsvorrichtung der von der Zufuhreinheit (23) in schlaffem Zustand weglaufende Bahnteil (1c) unter der Wirkung einer Aufrollvorrichtung (35) und einer Bahnzieheinheit (37) in einen gestreckten Bahnteil (1d) umgewandelt wird, welche Bahnzieheinheit einen mit dem zwischen der Antriebsvorrichtung (34) und der Aufrollvorrichtung (35) laufenden Bahnteil (1d) zusammenwirkenden Fühler (42) umfasst, dass der genannte Fühler derart angeordnet ist, dass er in Abhängigkeit von Spannungsänderungen in dem genannten Bahnteil seine Stellung ändert, dass der Fühler mit einer elektrischen Steuervorrichtung (51) zusammenwirkt, welche im Verhältnis zu der Grösse der Stellungsänderungen des Fühlers eine Schaltung (54) vom Wirbelstromtyp zwischen einem Antriebsaggregat (55) und einer Rolle (36) der Aufrollvorrichtung (35) steuert, dass die elektrische Steuervorrichtung, die vorzugsweise einen Potentiometer (52) aufweist, angeordnet ist, die Stellungsänderungen des Fühlers zu registrieren, und dass die registrierten Werte eine Steuereinheit (53) zur Steuerung der Schaltung (54) steuern.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, dass die Bahnantriebsvorrichtung (34) zwei Zufuhrrollen (38, 39) aufweist, wobei die Bahn (1) über mehr als den halben Umfang der einen (38) dieser beiden Rollen läuft und sich durch einen Zwischenraum zwischen den Rollen zu der anderen (39) der genannten Zufuhrrollen erstreckt, wonach die Bahn über mehr als den halben Umfang der genannten anderen Rolle läuft.

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FIG. 1





