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Publication number:

**0 431 275 A2**

12

**EUROPEAN PATENT APPLICATION**

21 Application number: 90118894.6

51 Int. Cl.<sup>5</sup>: **B65H 23/02**

22 Date of filing: 02.10.90

30 Priority: 22.11.89 FI 895581

43 Date of publication of application:  
12.06.91 Bulletin 91/24

84 Designated Contracting States:  
**DE ES FR GB SE**

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54 **Device for spreading of component webs.**

57 The invention concerns a device for spreading of component webs ( $W_1, W_2 \dots W_{n-1}, W_n$ ), comprising a first, bowed, revolving roll (10) fitted at one side of the web (W) and a second, bowed, revolving roll (11) fitted at the opposite side of the web (W), as well as a swing mechanism (15,16,17), which is fitted to act upon said rolls (10,11) so as to alter the deflection angles ( $b_1, b_2$ ) of the component webs ( $W_1, W_2 \dots W_n$ ,

$W_{n-1}, W_n$ ) and thereby to produce the desired spreading (C) of the component webs ( $W_1, W_2 \dots W_{n-1}, W_n$ ). The device is provided with a regulation mechanism (12,13), which is fitted to correct the directional angles ( $g_1, g_2$ ) between said rolls (10,11) and the web (W) to the desired values with all values of the deflection angle ( $b_1, b_2$ ).

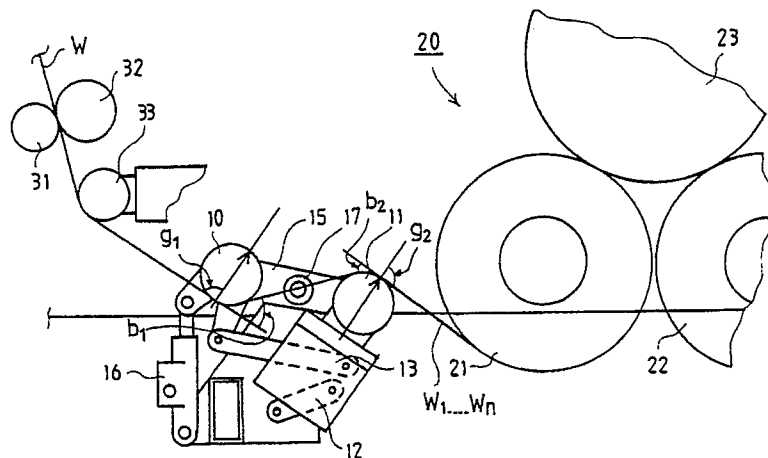


FIG. 3

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## DEVICE FOR SPREADING OF COMPONENT WEBS

The invention concerns a device for spreading of component webs, comprising a first, bowed, revolving roll fitted at one side of the web and a second, bowed, revolving roll fitted at the opposite side of the web, as well as a swing mechanism, which is fitted to act upon said rolls so as to alter the deflection angles of the component webs and thereby to produce the desired spreading of the component webs.

By means of spreading of the component webs, attempts are made to separate the individual strips slit, e.g., in a slitter in the lateral direction sufficiently far from each other to ensure detaching of the reels from each other. In the spreading of the component webs, the objective is to perform the lateral shifting of the web so that lateral gliding of the web in the spreader member is avoided, by guiding the web by means of a first spreader member by deflecting towards the side and by means of a second spreader member so that its original running direction is restored. In prior art, as spreader members, for example, rods, beams or revolving roll mantles mounted on an axle bent into curved form are employed. A revolving roll mantle may be composed, e.g., of rigid mantle units, or it may be continuous and elastic. The mantle units may also be separate. In a spreader with a revolving mantle, the problem is, however, often encountered that the direction of movement of the web and the vector of rotation that represents the rolling of the revolving roll mantle are, at least at some location on the mantle, placed obliquely to each other. In such a case, the web is affected by a force component which attempts to shift the web by sliding on the roll mantle in the axial direction corresponding to the longitudinal direction of the roll mantle.

As is well known, the extent of the separation gap between the component webs is adjusted either by altering the curve radius, by altering the gap between the rolls or the gap between the spreader members, or by altering the deflection angle of the web. If the size of the spreading gap is adjusted by altering the distance between the spreader members, this affects the size of the machine concerned, and thereby the use of this possibility of regulation is complex. If regulation based on alteration of the curve radius is used in the spreading of the component webs, the use of this mode of regulation requires very high precision, for even a little change in the curve radius has a strong effect on the distance between the component webs.

The commonest mode of adjusting the magnitude of the separation gaps between the compo-

nent webs is to perform it by adjusting the angle of deflection of the web across the spreader members. In such a case, the web makes a steeper or less steep angle when it passes over the spreader members, whereby the distance between the component webs is changed.

When the angles of deflection of the web at the spreader devices are altered, the directional angles of the arcs relative the web are also altered. A change in the directional angle of an arc causes a lateral component of rolling in the web, which causes problems, because the slide friction force between the web and the spreader rolls causes disturbance in the spreading. As is well known, the directional angles have been adjusted manually, which is slow and difficult.

The object of the present invention is to provide a device for spreading of component webs wherein the factors explained above do not cause problems, because the correcting of the directional angle is mechanically positively controlled.

In view of achieving the objectives stated above and those that will come out later, the device in accordance with the invention is mainly characterized in that the device is provided with a regulation mechanism, which is fitted to correct the directional angle between said rolls and the web to the desired value with all values of the deflection angle.

By means of the device in accordance with the invention, the directional angles between the arcs in the spreader members and the web are automatically regulated to the correct values when the deflection angles of the web are adjusted as the amount of spreading is being increased or reduced.

In the following, the device in accordance with the invention will be described in more detail with reference to the figures in the accompanying drawing.

Figure 1 is a schematical illustration of the principle of the deflection spreader as viewed from below.

Figure 2 is a schematical side view of the principle of deflection spreading and of its control quantities.

Figure 3 is a schematical illustration of a device in accordance with the invention.

In Fig. 1 it is shown schematically how the slit component webs  $W_1, W_2 \dots W_{n-1}, W_n$  arrive at the first spreader roll 10 in a direction in which the mantle of the roll 10 rolls directly in the direction P of running of the web W. The component webs  $W_1 \dots W_n$  are turned around the arc 10' of the roll 10 (Fig. 2) in the direction  $R_{10}$  of rolling of the first roll

10, being at the same time deflected outwards, each component web  $W_1...W_n$  in its own direction  $P_1, P_2...P_n$ . Gaps C are opened between the component webs  $W_1...W_n$ . Each component web  $W_1...W_n$  arrives at the second roll 11 in the direction  $R_{11}$  of rolling of the mantle, being turned along with the mantle to the original straight direction P of running. The component webs  $W_1...W_n$  are detached from the second spreader roll 11, and there are the necessary separation gaps C between the component webs  $W_1...W_n$ .

Fig. 2 is a schematical illustration of quantities that affect the deflection spreading. In the figure, the web is denoted with the reference W, the web running below the first spreader roll 10 while its arc 10' spreads the web into component webs  $W_1...W_n$ . Hereupon the component webs  $W_1...W_n$  run over the second spreader roll 11, whose arc 11' turns the component webs  $W_1...W_n$  into their original direction P of running (Fig. 1). In the figure, the curve radii of the spreading arcs 10', 11' are denoted with the references  $r_1, r_2$ . The distance between the spreader rolls 10, 11 is denoted with the reference 1. The deflection angles of the web in across the rolls 10, 11 are denoted with the reference  $b_1, b_2$ , and the directional angles of the spreading arcs 10', 11' relative the web in are denoted with  $g_1$  and  $g_2$ .

Fig. 3 is a schematical illustration of an exemplifying embodiment of the invention as applied in a carrier-drum slitter 20. The web iW is introduced in a way in itself known, guided by the guide rolls 31, 32, 33, into the device in accordance with the invention, from which the component webs are passed, in this embodiment, into a carrier-drum slitter 20, by the intermediate of a first roll 21 and a second roll 22, to be wound into a roll 23. In this exemplifying embodiment, the device for spreading of the component webs  $W_1...W_n$  consists of two bowed revolving rolls 10, 11 and of a swing mechanism 15, 16, 17. By means of a regulation mechanism 12, 13 the directional angles  $g_1, g_2$  (Fig. 2) of the revolving, bowed rolls 10, 11 are corrected to the desired values when the spreading is adjusted by means of the swing mechanism 15, 16, 17. The adjustment of the spreading or separation takes place by means of a technique in itself known so that the piece 15 is turned by means of a jack 16 around an articulated joint 17, whereby the deflection angles  $b_1, b_2$  of the paper web W across the rolls 10, 11 become larger or smaller.

As is shown in Figs. 1, 2 and 3, the device comprises a first, bowed, revolving roll 10 fitted at one side of the web W and a second, bowed, revolving roll 11 fitted at the opposite side of the web W. The device further comprises a swing mechanism 15, 16, 17, by whose means the rolls 10, 11 are affected to alter their deflection angles

$b_1, b_2$  and thereby to provide the desired spreading C for the component webs  $W_1...W_n$ . The device is provided with a regulation mechanism 12, 13, which corrects the directional angles  $g_1, g_2$  of the rolls 10, 11 and of the web W to correct values. This regulation mechanism 12, 13 may be composed, e.g., of articulation arms 12, 13, as is shown in Fig. 3. The directional angles  $g_1, g_2$  are adjusted by means of the articulation arms 12, 13 so that the directional angles  $g_1, g_2$  of the rolls 10, 11 relative the web W are always invariable, preferably  $90^\circ$ . The rolls 10, 11 that are used as spreader members may be fragmentary rolls or continuous, bowed rolls, or equivalent.

The device in accordance with the invention is suitable for use in the spreading of component webs of a variety of web materials. The web material may consist of plastic film, fabric, paper, metal sheet, cardboard or of equivalent material.

Above, the invention has been described with reference to one advantageous exemplifying embodiment of same only. This is, however, by no means supposed to confine the invention to this exemplifying embodiment alone, but many variations and modifications are possible within the scope of the inventive idea defined in the following patent claims.

The invention concerns a device for spreading of component webs ( $W_1, W_2...W_{n-1}, W_n$ ), comprising a first, bowed, revolving roll (10) fitted at one side of the web (W) and a second, bowed, revolving roll (11) fitted at the opposite side of the web (W), as well as a swing mechanism (15, 16, 17), which is fitted to act upon said rolls (10, 11) so as to alter the deflection angles ( $b_1, b_2$ ) of the component webs ( $W_1, W_2...W_{n-1}, W_n$ ) and thereby to produce the desired spreading (C) of the component webs ( $W_1, W_2...W_{n-1}, W_n$ ). The device is provided with a regulation mechanism (12, 13), which is fitted to correct the directional angles ( $g_1, g_2$ ) between said rolls (10, 11) and the web (W) to the desired values with all values of the deflection angle ( $b_1, b_2$ ).

### Claims

1. Device for spreading of component webs ( $W_1, W_2...W_{n-1}, W_n$ ), comprising a first, bowed, revolving roll (10) fitted at one side of the web (W) and a second, bowed, revolving roll (11) fitted at the opposite side of the web (W), as well as a swing mechanism (15, 16, 17), which is fitted to act upon said rolls (10, 11) so as to alter the deflection angles ( $b_1, b_2$ ) of the component webs ( $W_1, W_2...W_{n-1}, W_n$ ) and thereby to produce the desired spreading (C) of the component webs ( $W_1, W_2...W_{n-1}, W_n$ ), **characterized** in that the device is provided with a regulation mechanism (12, 13), which is fitted to correct the directional angles ( $g_1, g_2$ ) between said

rolls (10,11) and the web (W) to the desired values with all values of the deflection angle ( $b_1, b_2$ ).

2. Device as claimed in claim 1, **characterized** in that the regulation mechanism (12,13) is composed of articulation arms.

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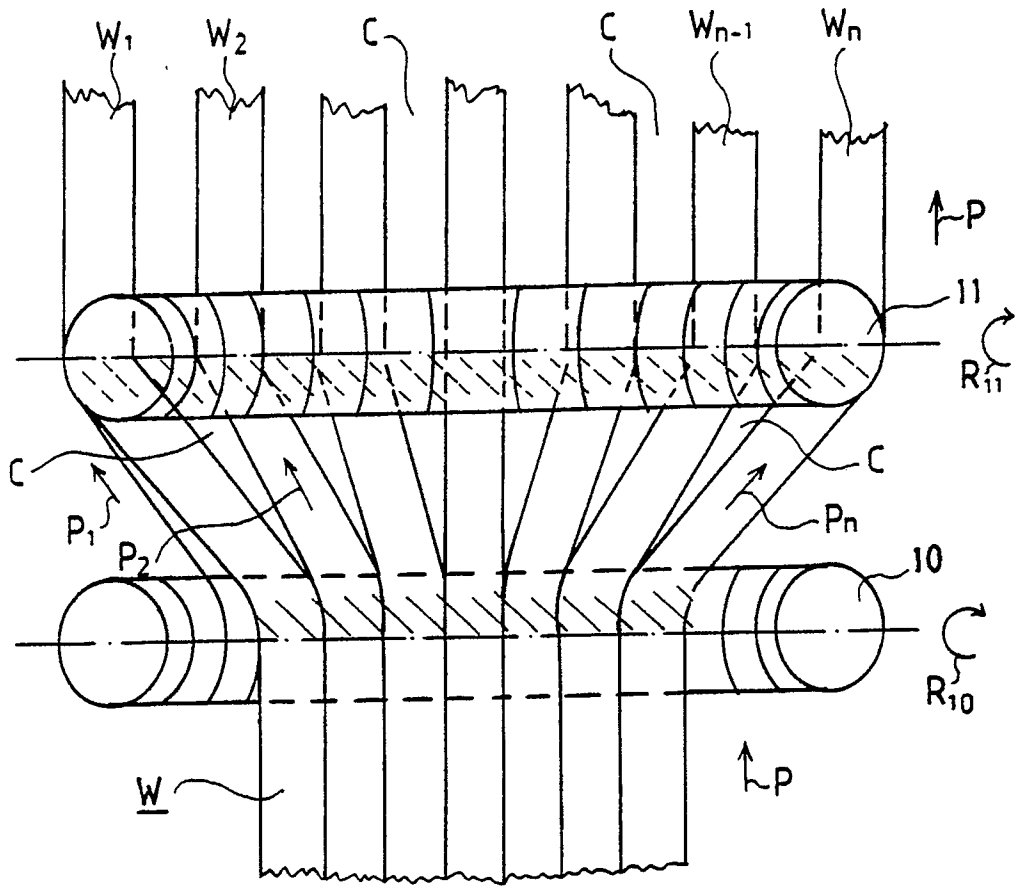


FIG. 1

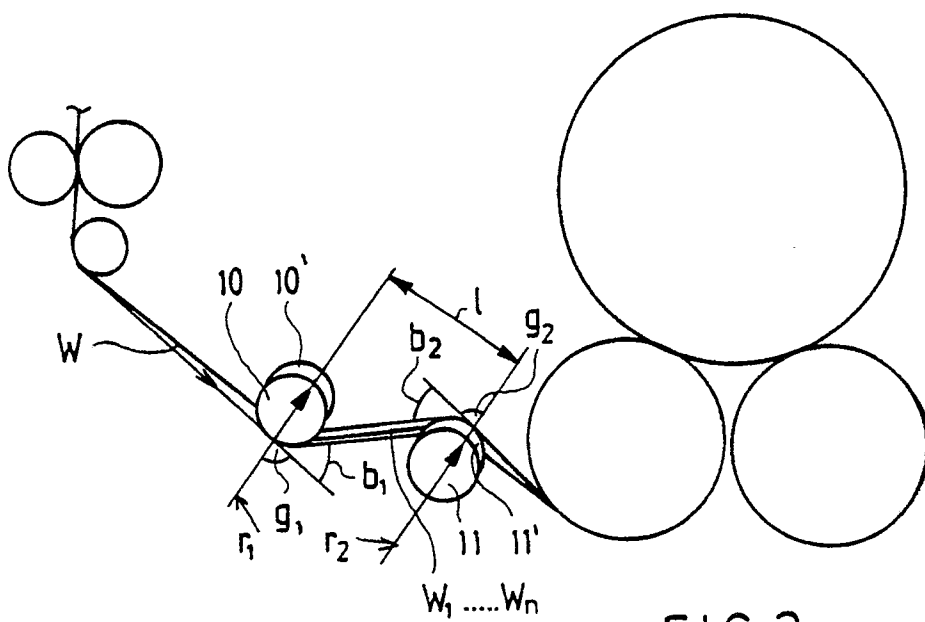


FIG. 2

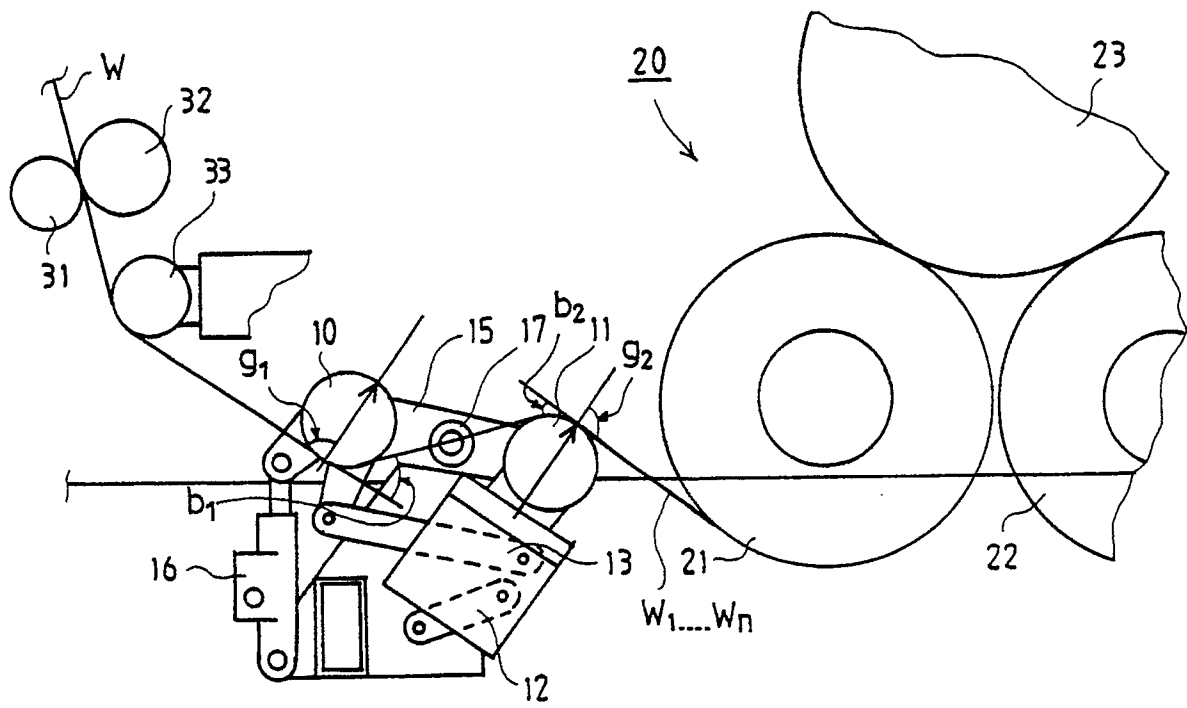


FIG.3