Patent claims

1. A device for rotating two-dimensional sheet-type or film-type products, or a stack thereof, characterized by at least two drive-roller pairs (11, 12; 13, 14) which are disposed beside one another so as to be spaced apart for conveying the products (1), the drive speed of said drive-roller pairs (11, 12; 13, 14) being modifiable in such a manner that the two roller pairs, oriented toward the same conveying direction, are operable at different speeds, whereby the position of the product is detectable by means of sensors being connected to the drive or the drives of the roller pairs, respectively, and both the upper and the lower rotating rollers are driven, whereby the product is rotated by about 90°, and conveying of the documents is not interrupted.

2. The device as claimed in claim 1, characterized in that on at least one roller pair the speed is decreasable in relation to the conveying speed.

3. The device as claimed in claim 1, characterized in that the speed of the one roller pair is decreasable and the speed of the other roller pair is increasable.

4. The device as claimed in one of claims 1 to 3, characterized in that the roller pairs have separate drives

(33, 35).

5. The device as claimed in one of claims 1 to 4, characterized in that the product is infed to the roller pairs symmetrically to the roller pairs.

6. The device as claimed in one of claims 1 to 5, characterized in that the sensors are light barriers or rev transmitters.

7. The device as claimed in one of claims 1 to 6, characterized in that ahead of and/or after the roller pairs further conveying-roller pairs (51, 52; 53, 54 / 61, 62; 63, 64) are provided, wherein the rollers are optionally configured so as to be separable from one another in order to permit free rotation during rotation of the product.

8. The device as claimed in one of claims 1 to 7, characterized in that the device selectively enables a rotating operation or a linear conveyance of the products without rotation.

9. A method for rotating at least one sheet-type or film-type product, or a stack thereof, characterized in that the product is infed to two conveying-roller pairs which are disposed beside one another so as to be spaced apart, the

speed of at least one of the roller pairs being modified after engagement of the product by the two roller pairs in such a manner that the product is rotated until the desired rotation is completed, upon which for further conveying of the product the speed of the two roller pairs is set so as to be identical again , whereby the position of the product is detected by means of sensors being connected to the drive or the drives of the roller pairs, respectively, and both the upper and the lower rotating rollers are driven, whereby the product is rotated by about 90°, and conveying of the documents is not interrupted when the roller pairs rotate at different speeds.

10. The method as claimed in claim 9, characterized in that during the rotating operation the speed of the one roller pair is increased and the speed of the other roller pair is decreased.

11. The method as claimed in one of claims 9 or 10, characterized in that for controlling the speed of the two roller pairs the speed, and length of the product is detected by means of sensors.

12. The method as claimed in one of claims 9 to 11, characterized in that ahead of the rotating device the product is infed in a symmetrical manner to the conveying

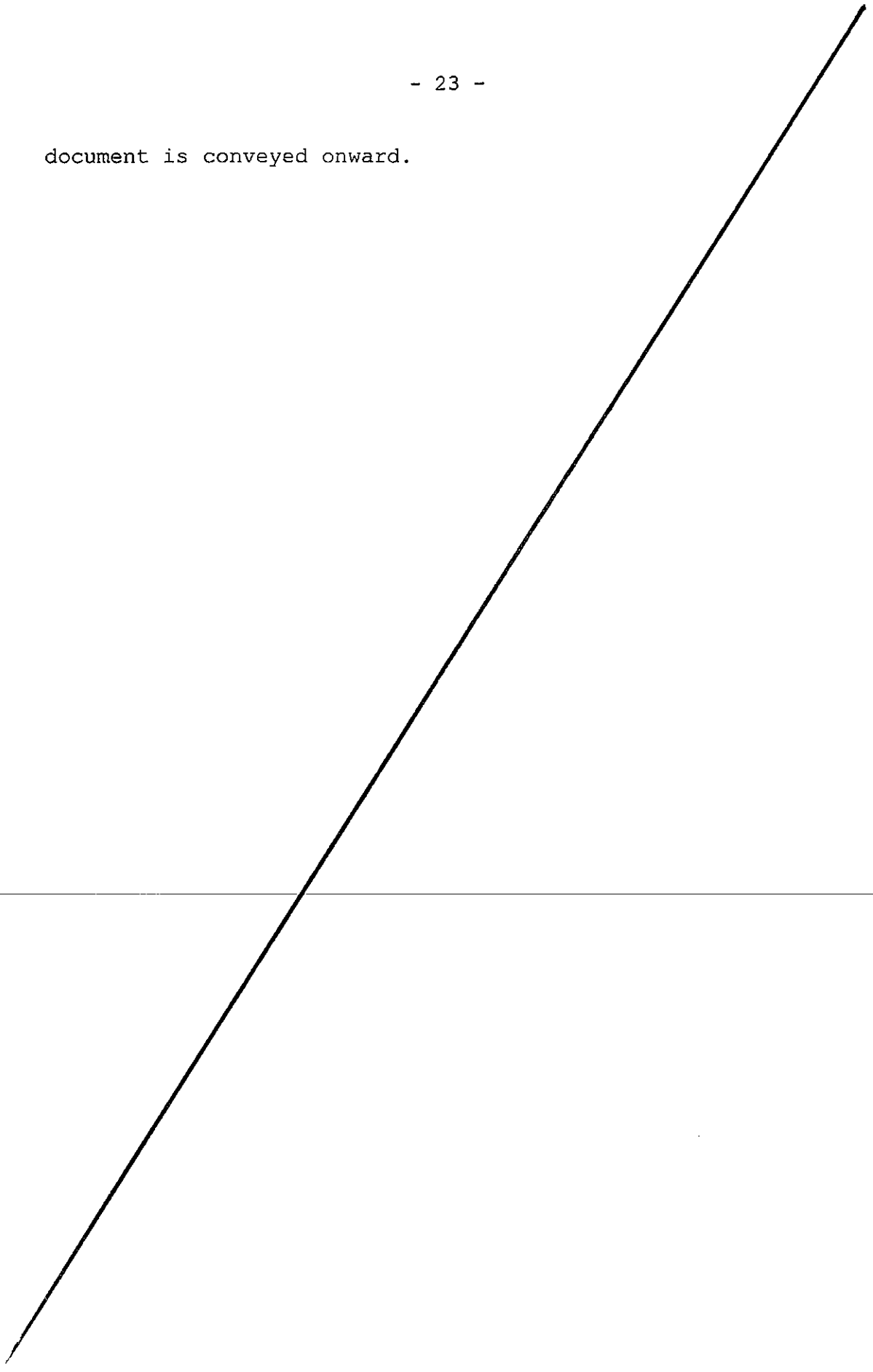
axis and after the rotating device is delivered in a symmetrical manner to the conveying axis.

13. The method as claimed in one of claims 9 to 12, characterized in that, in order to enable the product to slide through the further conveying rollers during the rotating operation, further conveying-roller pairs upstream and/or downstream of the two roller pairs are operable in such a manner that the rollers of the further conveying-roller pairs are separated from one another during the rotating operation of the product.

14. The method as claimed in one of claims 9 to 13, characterized in that the product may selectively be conveyed in a rotated or non-rotated manner.

15. The method as claimed in one of claims 9 to 14, characterized in that the product is a rectangular document which is infed so as to be symmetric to the roller pairs, and the position of the center of the document is modified in such a manner from a linear conveyance (claim 8) that a rotating operation is modifying the center movement in relation to the symmetry axis of the direction of movement of the document out of the center of the conveying symmetry axis A until the center again comes to lie on the symmetry axis, upon which the rotation movement is completed and the

document is conveyed onward.



Patent claims

1. A device for rotating two-dimensional sheet-type or film-type products, or a stack thereof, characterized by

at least two drive-roller pairs (11, 12; 13, 14) which are disposed beside one another so as to be spaced apart for conveying the products (1), and configured such that both the upper and lower rotating rollers are driven rollers,

sensors configured to measure the position and speed of the products, and

a controller configured to receive information from the sensors, the drive speed of said drive-roller pairs (11, 12; 13, 14) being modifiable in such a manner that the two roller pairs, oriented toward the same conveying direction, are operable at different speeds, whereby

the speed of at least one of the roller pairs can be modified by the controller after engagement of the products by the two roller pairs in such a manner that products are rotated until the desired rotation is completed without interrupting conveying onward in a linear manner and to rotate products without permanently displacing a conveying axis of the products.

2. The device as claimed in claim 1, characterized in that on at least one roller pair the speed is decreasable in relation to the conveying speed.

3. The device as claimed in claim 1, characterized in that the speed of the one roller pair is decreasable and the speed of the other roller pair is increasable.

4. The device as claimed in claim 1, characterized in that the roller pairs have separate drives (33, 35).

5. The device as claimed in claim 1, characterized in that the product is infed to the roller pairs symmetrically to the roller pairs.

6. The device as claimed in claim 1, characterized in that the position of the product is detectable by means of sensors, said sensors being connected to the drive or the drives of the roller pairs, respectively.

7. The device as claimed in claim 1, characterized in that ahead of and/or after the roller pairs further conveying-roller pairs (51, 52; 53, 54 / 61, 62; 63, 64) are provided, wherein the rollers are optionally configured so as to be separable from one another in order to permit free rotation during rotation of the product.

8. The device as claimed in claim 1, characterized in that the device selectively enables a rotating operation or a

linear conveyance of the products without rotation.

9. A method for rotating at least one sheet-type or film-type product, or a stack thereof, comprising the steps of:

- feeding the product to two conveying-roller pairs which are disposed beside one another so as to be spaced apart,
- monitoring the position and the speed of the product with sensors,
- making corresponding calculations depending on a length of the product by a controller,
- modifying the speed of at least one of the roller pairs after engagement of the product by the two roller pairs by the controller in such a manner that the product is rotated until the desired rotation is completed, without interrupting conveying onward in a linear manner and without permanently displacing a conveying axis of the product, or a stack thereof,
- upon which for further conveying of the product the speed of the two roller pairs is set so as to be identical again.

10. The method as claimed in claim 9, characterized in that during the rotating operation the speed of the one roller pair is increased and the speed of the other roller pair is decreased.

11. The method as claimed in claim 9, characterized in that for controlling the speed of the two roller pairs the position, speed, and length of the product is detected by means of sensors.

12. The method as claimed in claim 9, characterized in that ahead of the rotating device the product is infed in a symmetrical manner to the conveying axis and after the rotating device is delivered in a symmetrical manner to the conveying axis.

13. The method as claimed in claim 9, characterized in that, in order to enable the product to slide through the further conveying rollers during the rotating operation, further conveying-roller pairs upstream and/or downstream of the two roller pairs are operable in such a manner that the rollers of the further conveying-roller pairs are separated from one another during the rotating operation of the product.

14. The method as claimed in claim 9, characterized in that the product may selectively be conveyed in a rotated or non-rotated manner.

15. The method as claimed in claim 9, characterized in that the product is a rectangular document which is infed so as to

be symmetric to the roller pairs, and the position of the center of the document is modified in such a manner that a rotating operation modifies the center movement in relation to the symmetry axis of the direction of movement of the document until the center again comes to lie on the symmetry axis, upon which the rotation movement is completed and the document is conveyed onward.