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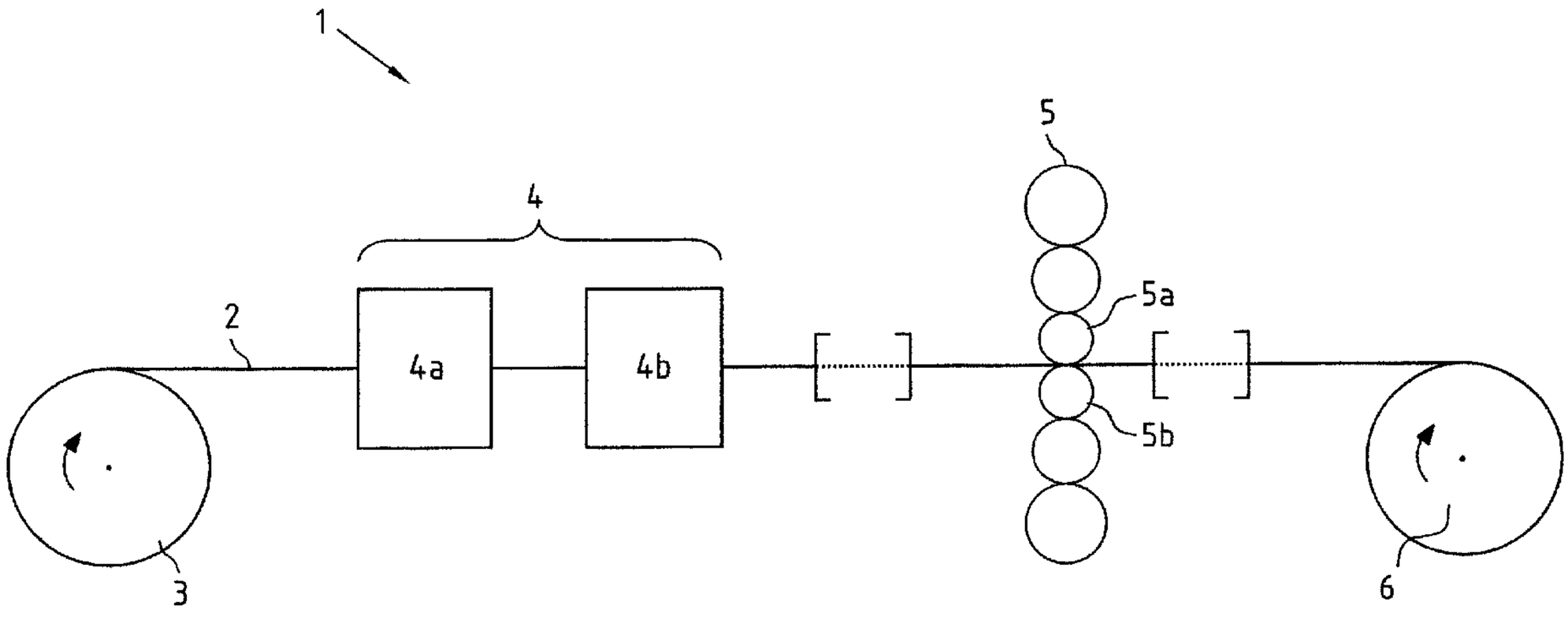
(54) Titre : PROCEDE PERMETTANT DE PRODUIRE UNE BANDE EN ALUMINIUM A DES FINS D'EMBALLAGE ET BANDE AINSI PRODUITE

(54) Title: METHOD FOR PRODUCING A STRIP FOR PACKAGING PURPOSES



(57) Abrégé/Abstract:
The invention relates to a method for producing a strip consisting of aluminium or an aluminium alloy for packaging purposes, in particular for cans, can lids or can closures. The object of providing a method for producing an individualised aluminium strip for packaging purposes, with which decorative or identification elements can be reliably embossed without additional production steps being required, for example at the producer of the packaging means, is achieved in that decorative or other identification elements are embossed into the strip in the last rolling pass of cold rolling and in that the strip thickness is greater in the area of the decorative and identification elements than in the remaining areas of the strip.

Abstract

The invention relates to a method for producing a strip consisting of aluminium or an aluminium alloy for packaging purposes, in particular for cans, can lids or can closures. The object of providing a method for producing an individualised aluminium strip for packaging purposes, with which decorative or identification elements can be reliably embossed without additional production steps being required, for example at the producer of the packaging means, is achieved in that decorative or other identification elements are embossed into the strip in the last rolling pass of cold rolling and in that the strip thickness is greater in the area of the decorative and identification elements than in the remaining areas of the strip.

Method for producing a strip for packaging purposes

The invention relates to a method for producing a strip consisting of aluminium or an aluminium alloy, in particular for packaging purposes, preferably for producing cans, can lids or can closures. Furthermore, the invention relates to a strip, produced according to the method according to the invention, in particular for packaging purposes.

When producing packaging, for example for foodstuffs, individualised packaging is increasingly desired. This individualisation is intended to result in identifying the packaging more effectively with the associated product name of the producer. This individualisation increasingly also relates to packaging consisting of aluminium strips. An example of such packaging is a beverage can. Individualising the packaging can, for example, be achieved via an imprint which is applied by the producer of the packaging means. Moreover, it is possible to emboss patterns, symbols or other identification elements into, for example, an aluminium strip, directly before producing the packaging means. Embossing dies or embossing means, for example, have to be provided at the aluminium strip machining plant for this purpose. To avoid this, it is known from the international patent application WO 2006/058424 A1, to already emboss the aluminium strip during manufacture by means of a finishing roll. In order, on the one hand, to emboss an identification element, for example a logo, into the aluminium strip, it is proposed in the abovementioned international patent

application that the embossing rolls should only bring about plastic deformation of the areas of the strip provided with an identification element. For this purpose, the embossing rolls have areas sticking out of the roll surface which are used to emboss, for example, a logo. The remaining strip areas, i.e. the strip areas between the logos, are not, in contrast, plastically deformed during the embossing process.

The problem with this method now is that flawless embossing of the identification elements, patterns or logos requires particularly meticulous setting of the embossing rolls. It is, therefore, difficult to guarantee a reliable process for embossing the logos into the strip.

Taking this as the starting point, the present invention has been set the object of providing a method for producing an individualised strip for packaging purposes, with which decorative or identification elements can be reliably embossed into the strip without additional production steps being required, for example at the producer of the packaging means.

According to a first teaching of the present invention, the above disclosed object is achieved in that decorative or other identification elements are embossed into the strip during the last rolling pass of cold rolling and in that the strip thickness is greater in the area of the decorative and identification elements than in the remaining areas of the strip.

In contrast to the method known from the prior art, the strip areas which are not to be embossed by the identification

element or the company logo are therefore more greatly reduced in thickness than the areas to be embossed, so that these have a greater strip thickness. As a result of this, the embossing step can be incorporated into a finishing roll step and the method step for embossing the identification elements or, respectively, logos can, at the same time, be combined with an increased degree of deformation. The method according to the invention ensures that a reliable process for embossing the decorative or identification elements is carried out without greater difficulties arising from setting the work rolls in the fabrication process.

Preferably, at least one of the work rolls used during cold rolling has depressions for embossing the decorative or identification elements into the strip, so that in the roll gap the material of the rolled strip flows into the depressions and consequently produces areas of increased strip thickness. The amplitude of the embossing profile in the strip is at most 4 µm due to the depressions in the work roll. The depressions in the work roll are preferably laser textured. Other methods for creating the depressions in the roll can also, however, be used. Furthermore, it is also possible for both work rolls to have corresponding depressions, it is only essential that the strip areas which do not have any decorative or identification elements are more greatly reduced in thickness than the remaining areas which have the decorative or identification elements.

A particularly cost-effective exemplary embodiment of the method according to the invention can be provided by embossing the decorative or identification elements in-line with the production of the strip, for example for packing

purposes. In-line in this case means that a production line for producing unembossed strips is used and at least one work roll of the last cold rolling pass is replaced by a work roll having decorative or identification elements as depressions and this work roll embosses the decorative or identification elements into the strip for packaging purposes.

According to a subsequent exemplary embodiment of the method according to the invention, after finish-rolling the strip is wound onto a coil, so that a strip having decorative or identification elements can be conveyed to the further production steps, for example production steps for producing a can lid or a can closure.

The decorative or identification elements can be particularly reliably introduced into the strip by the reduction per pass during the embossing rolling pass being between 20% and 40%. It was discovered that the strip can be embossed even at these reductions per pass and can lead to particularly good and clean embossing results.

According to another embodiment of the method according to the invention, the work rolls of the embossing roll pair have different grinding structures. This is particularly advantageous if depressions for embossing the decorative or identification elements are only provided in one work roll.

Very good embossing results were, according to another embodiment of the method according to the invention, in particular obtained by carrying out the last embossing roll pass in a sexto roll stand.

Preferably, the final strip thickness is 0.15 mm to 0.5 mm, preferably 0.2 mm to 0.35 mm. This final strip thickness is particularly preferred for producing packages, for example cans, can lids or can closures. The strip can, however, also be used for other purposes and also for other packages.

The strip particularly preferably consists of a 5xxx aluminium alloy which, in addition to very good deformability behaviour, also attains very high strength values. It is, however, also possible to produce strips from other aluminium alloys with the method according to the invention, for example from type 1xxx, 3xxx or even 8xxx aluminium alloys.

According to a second teaching of the present invention, the above disclosed object is achieved by a strip produced according to the method according to the invention, wherein the strip comprises embossed decorative and identification elements and the strip thickness is greater in the area of the decorative or identification elements than in the remaining areas of the strip.

The strip according to the invention is individualised by the embossed decorative or identification elements without additional costs, for example due to another production step, accruing.

There are now many ways of enhancing and further developing the method according to the invention and the strip according to the invention. For this purpose, reference is made, on the one hand, to the claims subordinate to Claim 1 and to the description of an exemplary embodiment in conjunction with the drawing. The drawing shows in

Fig. 1 a schematic view of a finishing roll train for carrying out the method according to the invention for producing an aluminium strip for packaging purposes,

Fig.2 a work roll pair of the finishing roll stand from Fig. 1 and

Fig. 3 in a schematic, sectional view, an exemplary embodiment of a strip according to the invention for packaging purposes.

Fig. 1 shows an exemplary embodiment of a finishing roll train 1 for cold rolling an aluminium strip 2 which has been produced, for example, by hot rolling a slab. The aluminium strip 2 is uncoiled from a decoiler 3 and conveyed to further processing steps 4. The further production steps can, for example, consist of cold rolling and intermediate annealing as a strip. They are, however, not necessary to implement the present invention. The production steps 4 can, therefore, also be omitted, provided, for example, that the strip is intermediately annealed in batches, i.e. intermediately annealed while being wound on a coil, and then conveyed to the last rolling pass.

In the last rolling pass in a sexto roll stand 5, the strip is rolled to the final thickness, wherein preferably the reduction per pass is between 20 to 40%. In the present exemplary embodiment, the work roll 5a has depressions for embossing decorative or other identification elements, which during the final rolling pass causes areas with an increased

strip thickness to be introduced, namely the areas of the decorative or identification elements. Of course, instead of the sexto roll stand, it is also possible for other roll stands to be employed. Up to now, however, good embossing results have only been confirmed on a sexto roll stand.

The aluminium strip rolled to the final thickness in such a way is then wound onto a coiler 6. However, before winding, yet more production steps, for example surface treatment, can be carried out. The final thickness of the aluminium strip in the present exemplary embodiment is 0.2 mm to 0.35 mm. By the use of the aluminium alloy, preferably a type 5xxx aluminium alloy, a particularly high strength for the aluminium strip and, at the same time, good deformability thereof during further processing is possible even with the narrow wall thicknesses.

By individualising the aluminium strip with the method according to the invention, the secondary producer is able to identify the products produced from it without having to resort to other technologies, for example additional imprinting or the like. All additional production steps increase the production costs which are very important with these products.

In Fig. 2, the work roll pair 5a, 5b, used in the sexto roll stand illustrated in Fig. 1, is illustrated schematically in a perspective view. Whilst the work roll 5a has depressions 7, which are used to emboss decorative or identification elements into the aluminium strip, no depressions are provided on the work roll 5b. The strip produced in such a way therefore has decorative or identification elements which

in one direction out of the plane of the strip have a greater strip thickness than the remaining strip areas. Both work rolls 5a, 5b have different grinding structures to optimise the flow of material into the depressions when the strip is finish-rolled, so that the flow of the aluminium material into the depressions of the work roll 5a in the roll gap is supported during finish-rolling. However, it is also possible for both work rolls 5a and 5b to have depressions for embossing decorative or identification elements.

As a result, at the end of finish-rolling, an aluminium strip 2 for packaging purposes is wound onto a coil, which was not so greatly reduced in thickness in the area of the decorative elements 8 and in this respect has a greater strip thickness than in the remaining areas 9 of the strip which were not provided with decorative or identification elements. A maximum embossing profile of 4 µm results from this.

Claims

1. Method for producing a strip consisting of aluminium or an aluminium alloy for packaging purposes, characterised in that decorative or other identification elements are embossed into the strip during the last rolling pass of cold rolling, the strip thickness is greater in the area of the decorative or identification elements than in the remaining areas of the strip and the amplitude of the embossing profile in the strip is at most 4 µm.

2. Method according to Claim 1, characterised in that at least one of the work rolls used during cold rolling has depressions for embossing the decorative or identification elements into the strip.

3. Method according to Claim 1 or 2, characterised in that the decorative or identification elements are embossed in-line with the production of the strip for packaging purposes.

4. Method according to any one of Claims 1 to 3, characterised in that after finish-rolling the strip is wound onto a coil.

5. Method according to any one of Claims 1 to 4, characterised in that the reduction per pass during the embossing rolling pass is between 20% and 40%.

6. Method according to any one of Claims 1 to 5, characterised in that the work rolls of the embossing roll pair have different grinding structures.

7. Method according to any one of Claims 1 to 6, characterised in that the last, embossing rolling pass is carried out in a sexto roll stand.

8. Method according to any one of Claims 1 to 7, characterised in that the final strip thickness is 0.15 mm to 0.5 mm, preferably 0.2 mm to 0.35 mm.

9. Method according to any one of Claims 1 to 8, characterised in that the strip consists of a 5xxx aluminium alloy.

10. Strip consisting of aluminium or an aluminium alloy, in particular for packaging purposes produced according to a method according to any one of Claims 1 to 9, characterised in that the strip comprises embossed decorative or identification

elements, the strip thickness is greater in the area of the decorative or identification elements than in the remaining areas of the strip and the amplitude of the embossing profile in the strip is at most 4 µm.

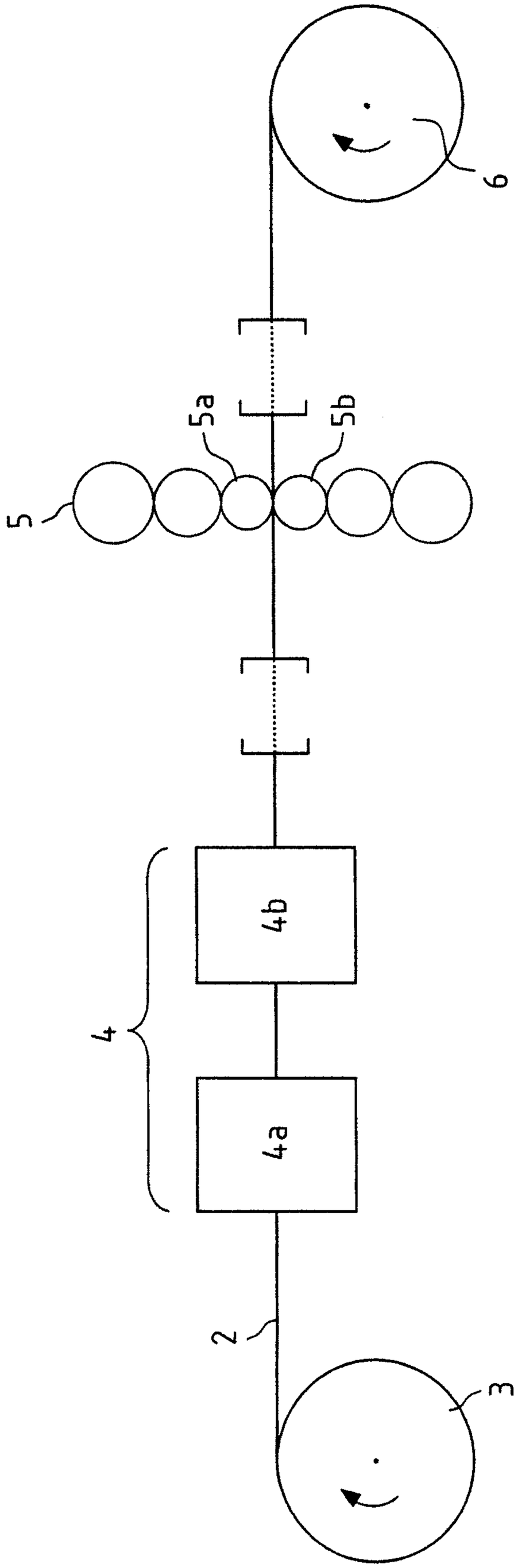


Fig. 1

Fig. 2

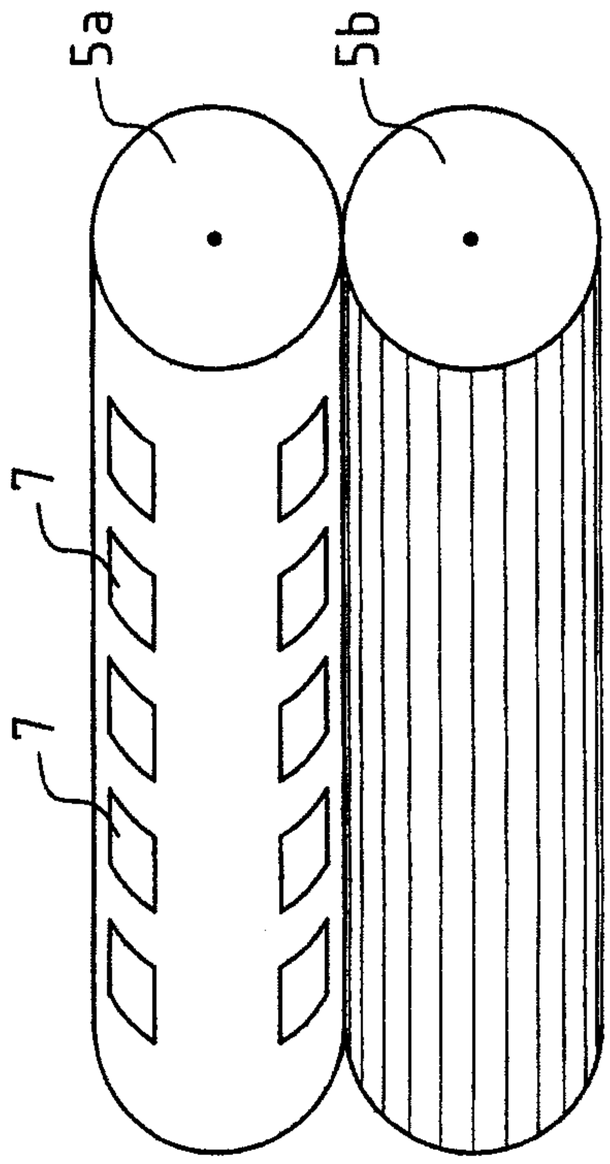
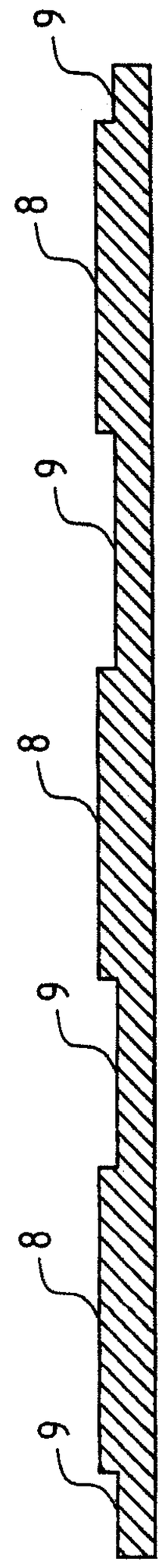
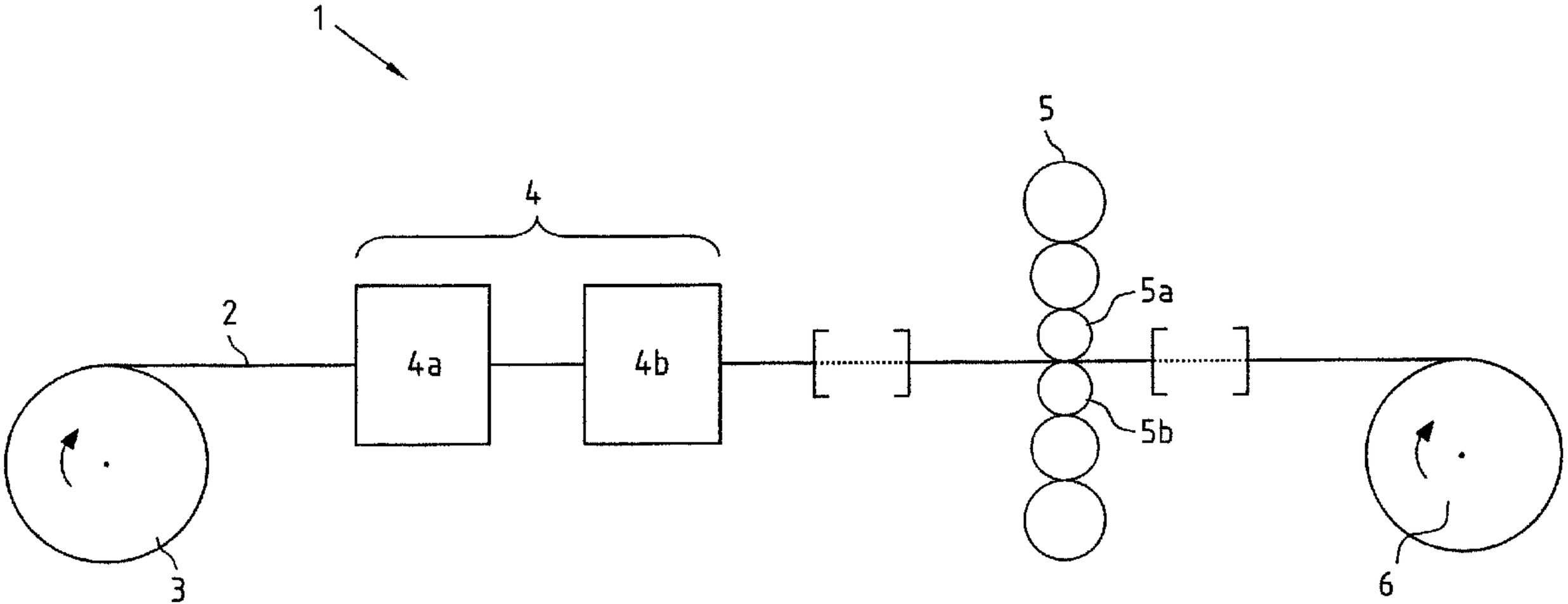


Fig. 3

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