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(54) **METHOD FOR PRODUCING COLLECTIONS OF PRINTED PRODUCTS, AND DEVICE FOR CARRYING OUT SAID METHOD**

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(57) **ABSTRACT**

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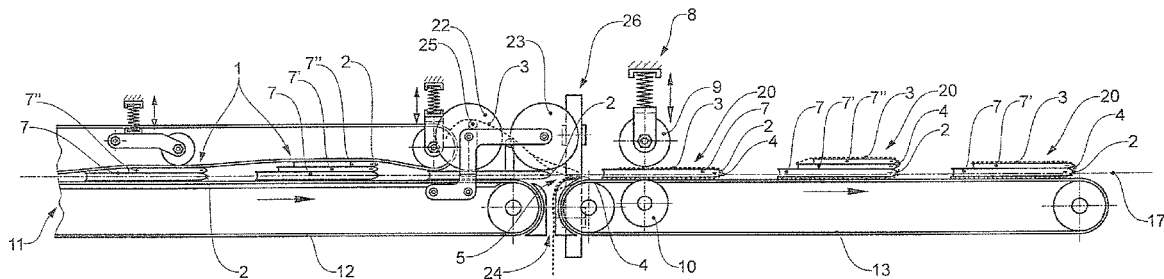
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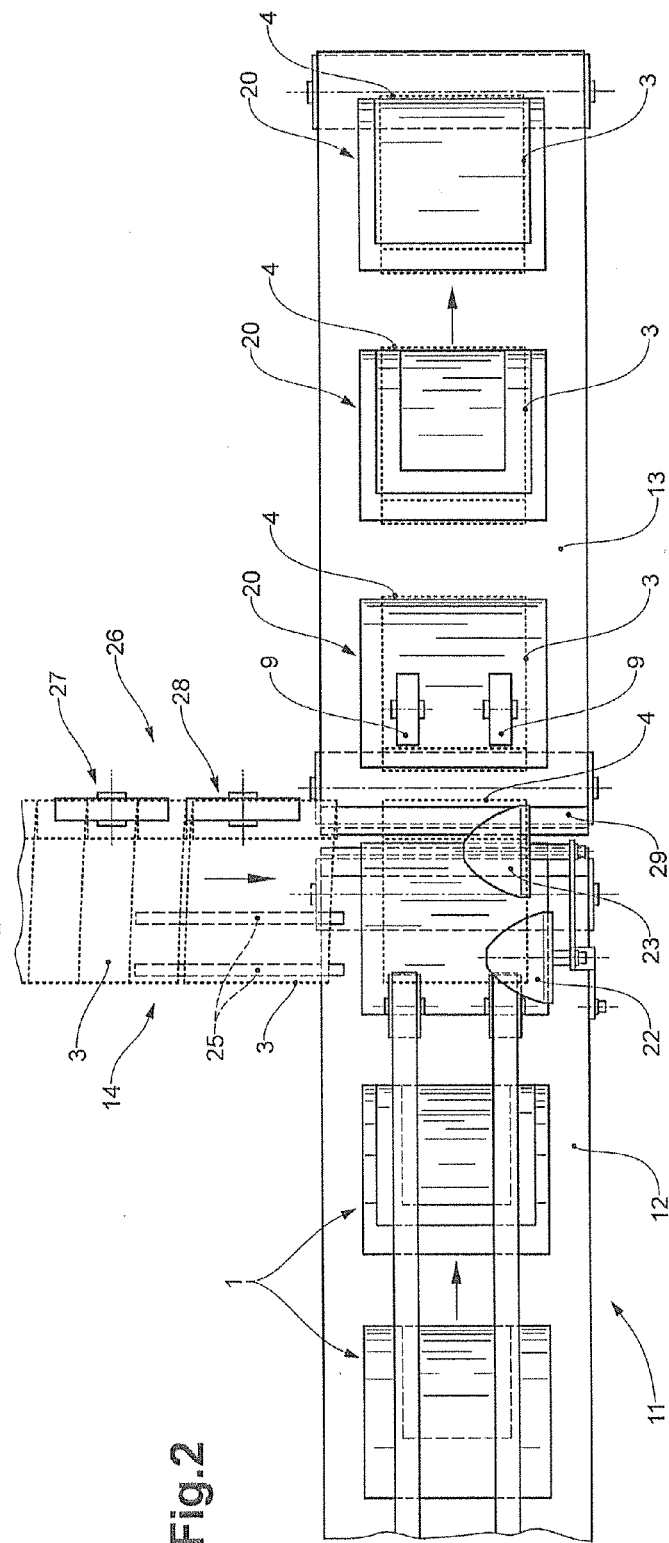
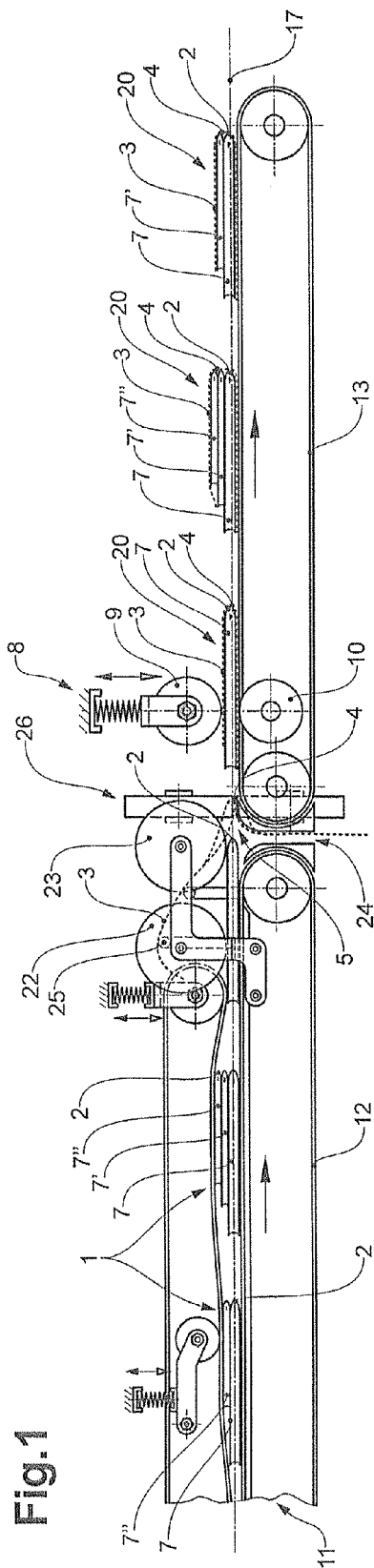
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In a method for producing a collection (20) of pre-products by inserting a first pre-product (1) into a second pre-product (3), it is provided according to the invention that a first pre-product (1) and a second pre-product (3) are provided, wherein the second pre-product (3) has a wrapping fold (4) with a fold inner side (5). The second pre-product (3) is conveyed into an insertion position, in which the second pre-product (3) is opened and faces with the fold inner side (5) toward the first pre-product (1). The first pre-product (1) is conveyed into the opened second pre-product (3) and against the fold inner side (5) so as to form the collection (20), the second pre-product (3) assumes the conveying direction of the first pre-product (1), and the collection (20) is provided for further processing.





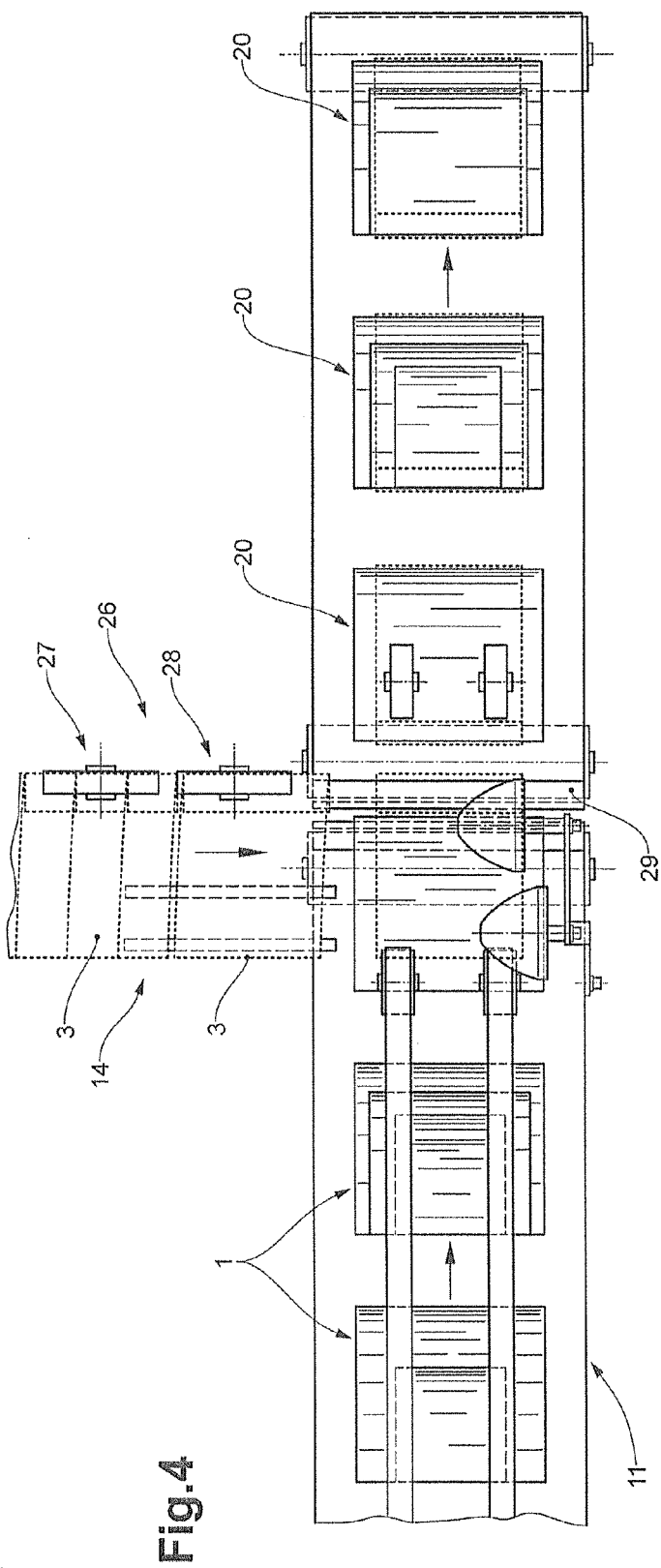
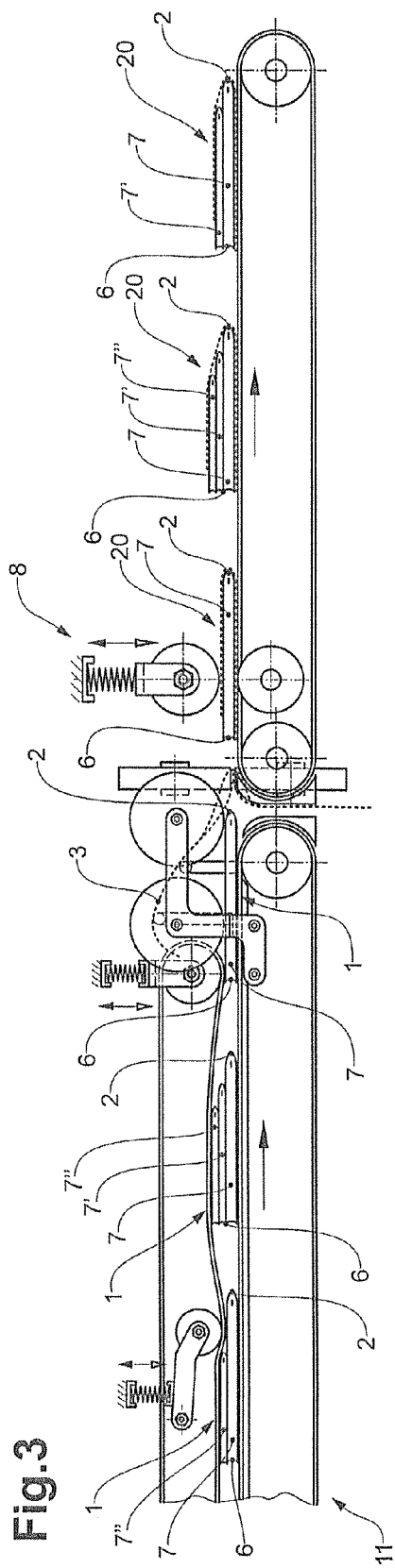


Fig.5

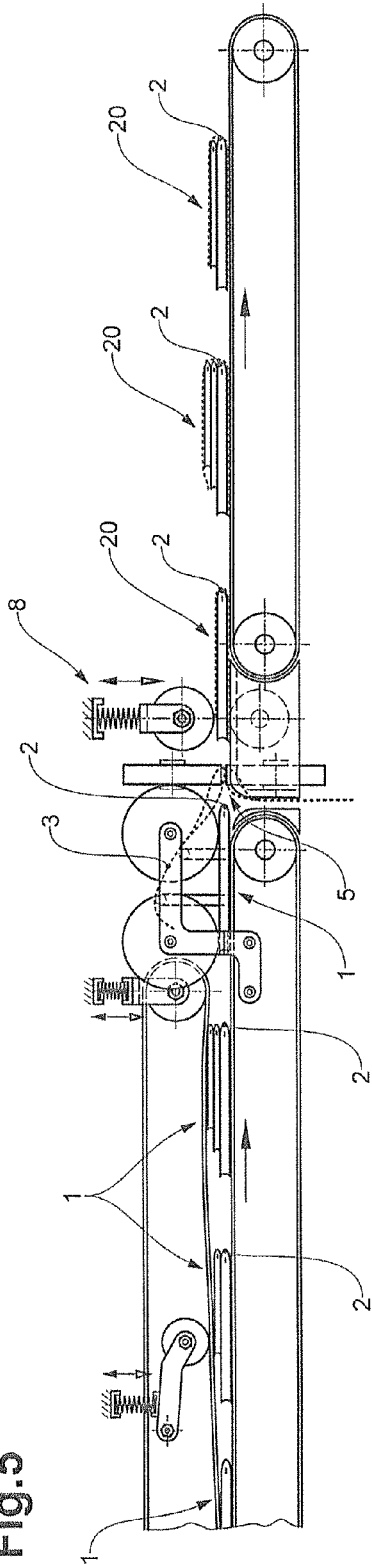


Fig.6

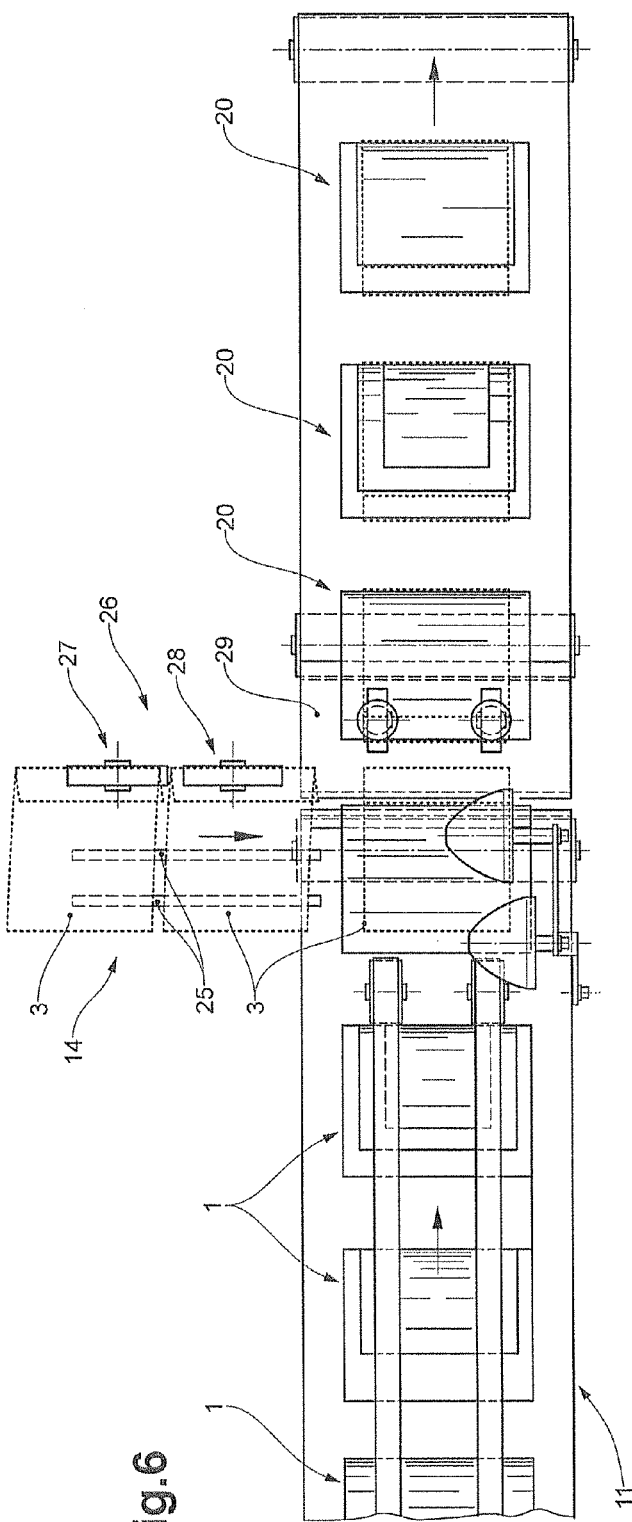


Fig.7

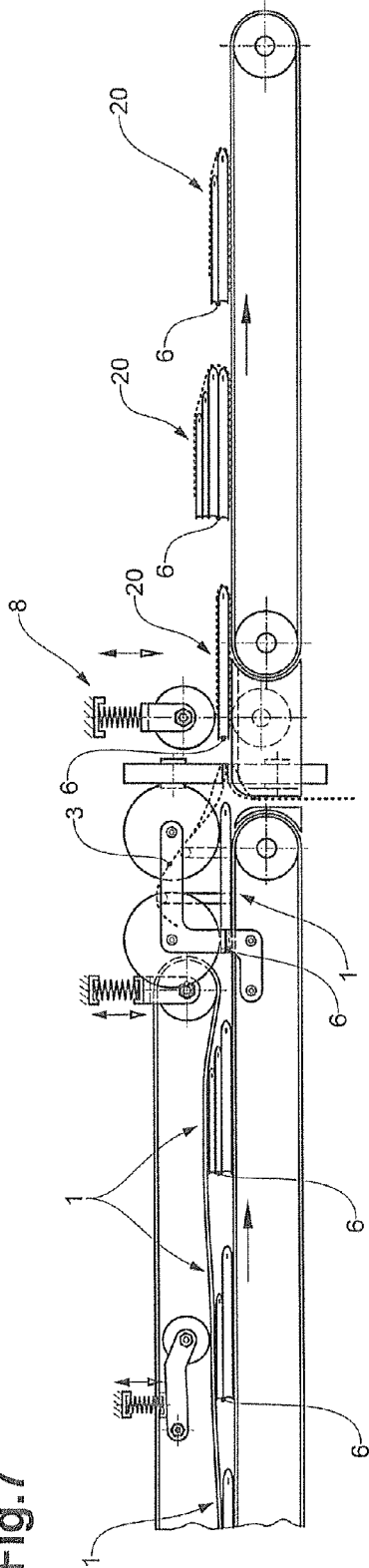


Fig.8

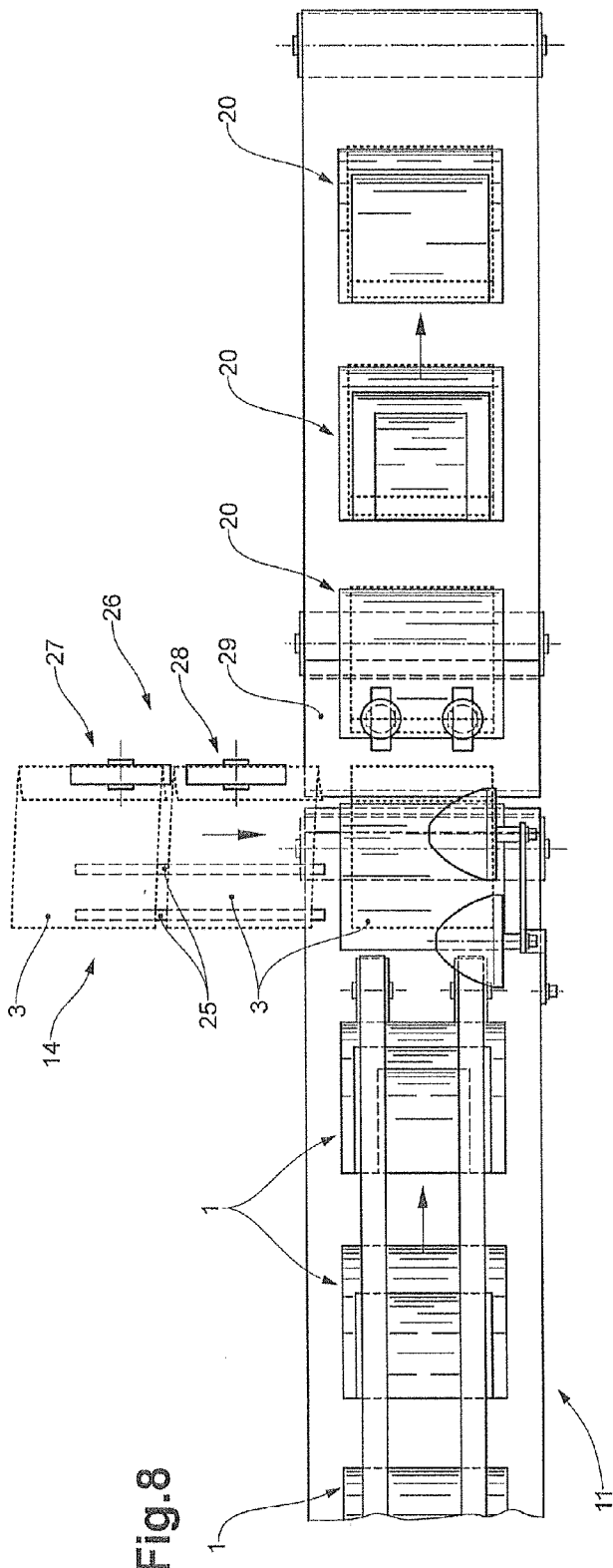


Fig.9

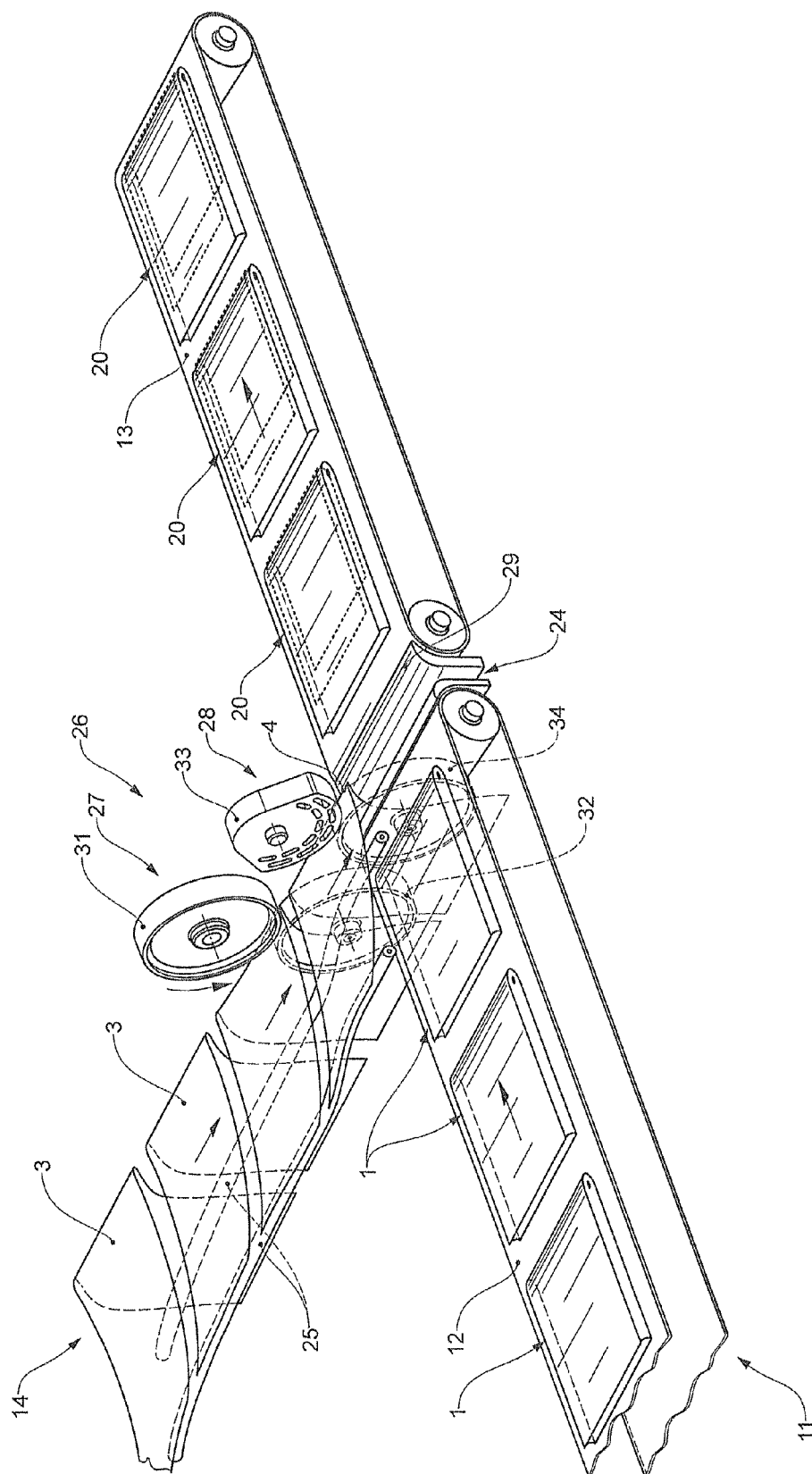


Fig.10

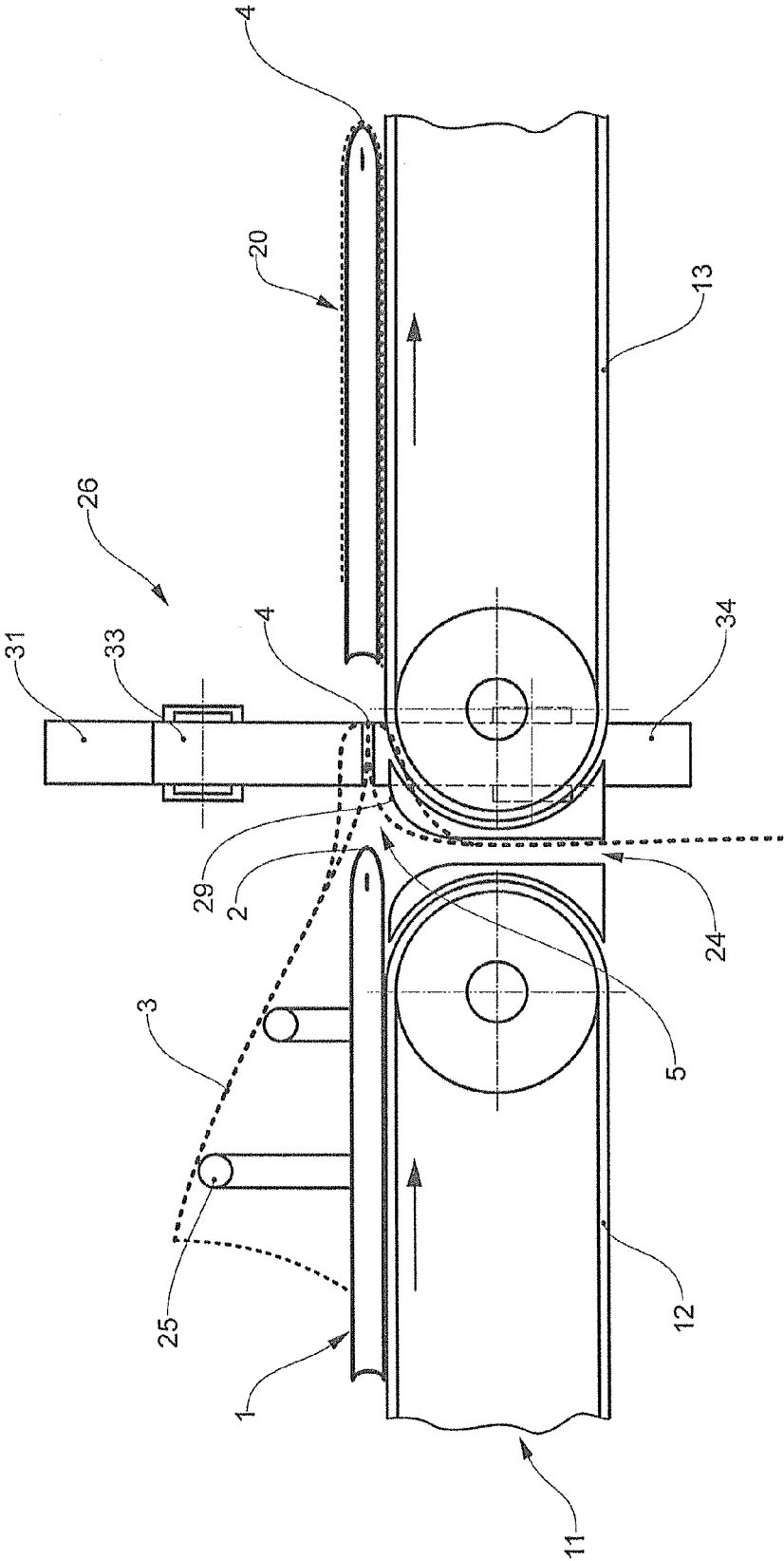
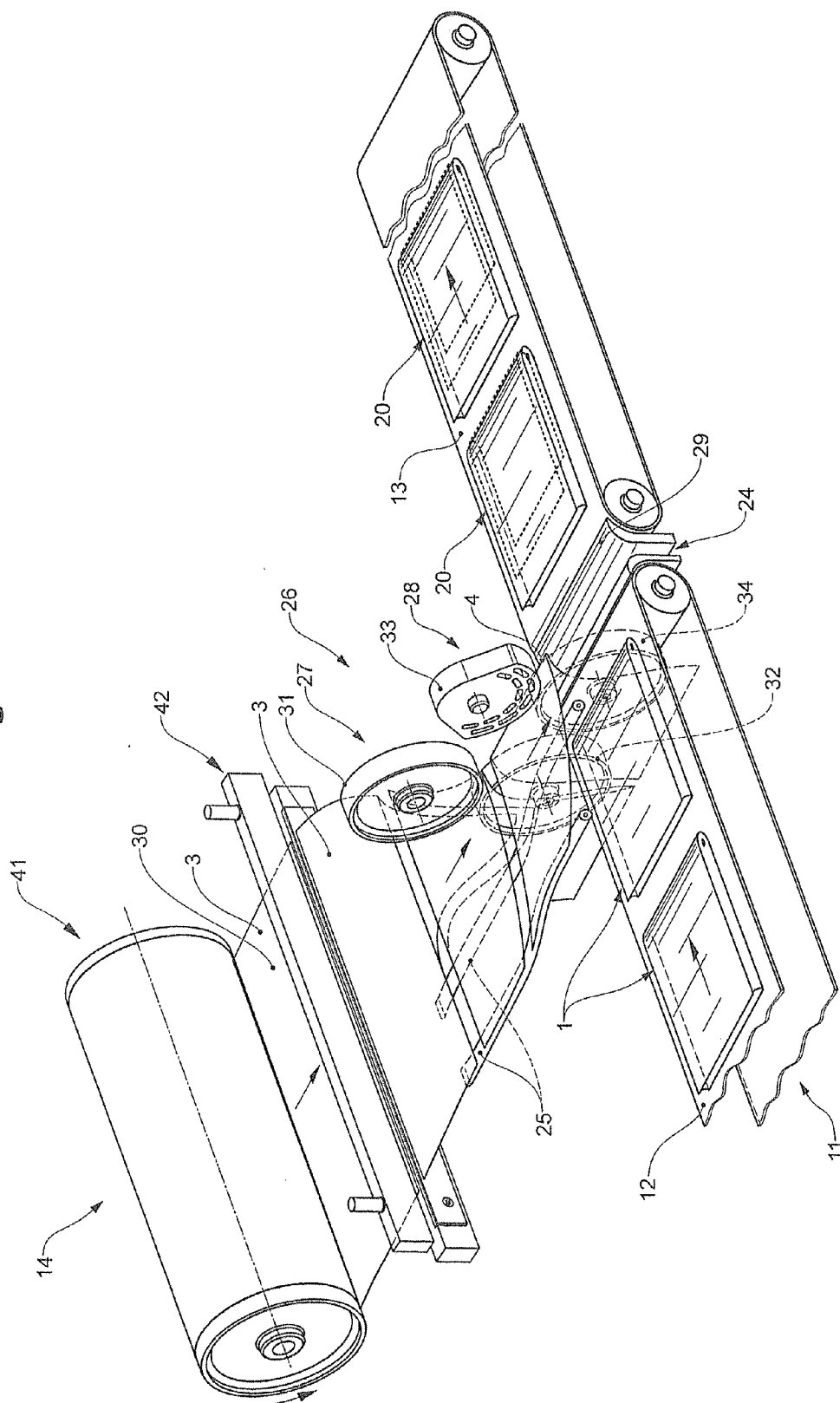


Fig. 11



METHOD FOR PRODUCING COLLECTIONS OF PRINTED PRODUCTS, AND DEVICE FOR CARRYING OUT SAID METHOD

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Swiss Patent Application 00910/15, filed 24 Jun. 2015, Swiss Patent Application 00943/15, filed 30 Jun. 2015, Swiss Patent Application 01064/15, filed 21 Jul. 2015 and Swiss Patent Application 01065/15, filed 21 Jul. 2015, the priority documents corresponding to this invention, to which a foreign priority benefit is claimed under Title 35, United States Code, Section 119, and their entire teachings are incorporated, by reference, into this specification.

BACKGROUND OF THE INVENTION

[0002] Field of the Invention

[0003] The invention relates to the field of further processing pre-products (particularly printed products in the context of print finishing). It relates to a method and a device for producing collections of printed products.

[0004] The invention also relates to a device for carrying out the method.

[0005] Discussion of Related Art

[0006] The term “direct mailing” has long been used to describe activities in which advertising pamphlets, brochures, flyers, printed sheets, product samples and the like, which usually were often enclosed (inserted) in a newspaper or magazine as enclosures for advertising purposes, are collected from several advertisers in order to make therefrom a large number of collections, each of which contains a printed product from a plurality of advertisers and is delivered and distributed to the recipients (for example households) in the form of a small stack.

[0007] In order to be able to better handle the individual stack-like collections of printed products during transport and distribution, it is advantageous to take measures to hold together the individual stacks.

[0008] Methods and devices for holding together stacked printed products or related products by wrapping with other holding-together elements are known from the prior art.

[0009] DE 41 31 277 C1 discloses a method and a device suitable therefor, by which an object to be packaged can be united with a special packaging blank. A device is disclosed in which an object to be packaged passes from a first feeding device to a second feeding device. The second feeding device has a lower belt which is guided on one side over a roller. By virtue of a pressing device, which has a pressing roller and a guide element, a deflection of the packaging blank at the roller is intended to take place in order to guide the packaging blank in different ways onto the object to be packaged. In said method, the packaging blank is wrapped around the object to be packaged, the apex region of the wrapping not being subjected to any special processing. In order to prevent the packaging blank that has been wrapped around from unfolding again by itself due to internal stresses, it is thus only possible to use packaging blanks having particular properties (for example with regard to the inherent stiffness and the weight per unit area).

[0010] EP 0952006 A2 discloses a method for fabricating printed letters, an envelope, a device for fabricating the envelope as well as a method for fabricating the envelope. The application discloses the packaging of printed letters by

way of a full envelope comprising a single sheet of paper or plastic which is specially cut as a packaging means, that is to say a specific packaging product. To this end, such a single sheet is said to be cut by means of a cutting unit and then folded, wherein tabs folded at fold edges can be bonded to one another by an application of adhesive.

[0011] WO 2012/084494 A2 discloses a method for assembling a stack of pre-products resting loosely one on top of the other, the composition of such pre-products and a device for producing such compositions. To this end, the stack to be assembled is provided in a first step, said stack consisting of pre-products resting loosely one on top of the other, and in a second step a connecting element is fitted on an edge of the stack such that said element overlaps the two outer pre-products of the stack in an adhesive manner. This method offers reliable assembly for many applications, but requires special connecting elements which are glued.

[0012] European patent application no. 15001321.7, which was not published before the present application, was filed on 5 May 2015 in the name of Ferag AG and discloses a device for producing collections composed of a plurality of different printed products. Some of the printed products are in each case used as a packaging element, into which the other printed products are inserted. In this way, graspable units can be produced which can easily be removed by hand from a transport container by a distributor. In contrast to previously known methods for producing such collections, in this method no special additional packaging means are required, such as films or tapes. As a result, the costs of producing collections can be lowered and the amount of waste created can be reduced. Said patent application discloses a number of methods and devices for producing such collections. One embodiment of a wrapping device suitable for this purpose has a brush roller with bristles bent in the direction of rotation, which bends upward approximately at right angles a section of a packaging element which has been placed beforehand partially below an intermediate stack (for example of printed documents). In a subsequent step, this packaging section is bent back over the intermediate stack as soon as the packaging element and the intermediate stack enter the intermediate space between two transport belts. Another wrapping device disclosed in the aforementioned application has rod-shaped entraining elements which are rotated about an axis of rotation oriented transversely to the movement direction of the unit consisting of intermediate stack and packaging element. These entraining elements additionally perform an oscillating movement transversely to the conveying direction, for which a relatively complicated and/or maintenance-intensive mechanism or control system may be required. Both wrapping devices disclosed in said application are suitable for a large number of wrapping products and intermediate stacks. However, with certain groups of wrapping products and intermediate stacks, particularly in the case of wrapping products with relatively high inherent stiffness, the wrapping may be unstable, that is to say may have a tendency to unfold, which is undesirable.

[0013] EP 2462043 B1 discloses a folding assembly and a method for folding an overlapping stream of products in order to enable folding directly at the outlet of a rotary printing machine. To this end, the products are said to be folded in such a way that in each case the trailing products are arranged partially inside the leading product. When folding the products, therefore, one product is said to entrain the respective trailing product and folding is said to take

place in the direction of that side which is touched by the trailing product. This has the advantage, inter alia, that overlapping streams can be processed directly at the outlet of the rotary printing machine, without being intermediately stored beforehand.

[0014] WO 2008/074325 A1 discloses a method for wrapping a stack of sheets, brochures or the like, in which the stacks are transported at a distance one behind the other on a transport path. By means of a special swivel wheel, one wrapping sheet is pulled from a provided supply of sheets and is positioned vertically in a gap between two successive stacks. The swivel wheel then provides means which fold the sheet around the stack moving past. The complicated movement of the swivel wheel prevents a high processing speed of the stacks.

SUMMARY OF THE INVENTION

[0015] The methods and devices known from the prior art make it possible to wrap pre-products in order to hold the latter together. However, additional means, such as spots of adhesive for example, are often necessary in the products or collections produced by these methods, in order to ensure a sufficiently durable wrapping by the respective holding-together elements. This is the case, for example, when relatively thick stacks of printed products are to be wrapped. In products produced by said methods, the apex region of the wrapped-around holding-together element is often also irregularly shaped. For example, this region may not quite be straight or may have bumps. This is particularly problematic when a printed product is being used as the holding-together element, since the appearance thereof is critically impaired as a result. It is therefore an object of the invention to provide a simple method which makes it possible to wrap first pre-products with second pre-products and which, in comparison to the methods known from the prior art, efficiently prevents the product that has been wrapped around from unfolding again, and wraps a holding-together element around at a predefined location in an advantageous and reproducible manner.

[0016] Another object of the invention is to provide a device by which such a method can be carried out.

[0017] These and other objects are achieved by claims 1 and 17. Embodiments of the invention will become apparent from the dependent claims.

[0018] One embodiment of a method for producing a collection of pre-products by inserting a first pre-product into a second pre-product according to the invention is characterized by the following steps:

- [0019]** providing a first pre-product;
- [0020]** providing a second pre-product, which has a wrapping fold with a fold inner side;
- [0021]** conveying the second pre-product into an insertion position, in which the second pre-product is provided for the insertion of the first pre-product and faces with the fold inner side toward the first pre-product;
- [0022]** conveying the first pre-product into the provided second pre-product and against the fold inner side so as to form the collection;
- [0023]** the second pre-product assumes the conveying direction of the first pre-product;
- [0024]** providing the collection for further processing.

[0025] The further processing of the collection may be, for example, a further conveying of the collection and/or a stacking of a number of collections and/or an addressing of the collections.

[0026] According to one embodiment of the method according to the invention, the second pre-products, once the wrapping fold has been formed, are not closed until the collection is formed. There is thus no need for an opening operation, which in the case of certain types of second pre-product may be able to be carried out only with difficulty.

[0027] According to one embodiment of the method according to the invention, the first and/or second pre-products may comprise a plurality of printed products. Such printed products may be, for example, advertising pamphlets, brochures, magazines, flyers or printed sheets.

[0028] The individual printed products may be different printed products which have different dimensions and/or weights.

[0029] The first and second pre-products may also comprise further products, such as product samples for example.

[0030] In one embodiment of the method, the first pre-product is conveyed in a conveying plane and the second pre-product is provided in the conveying plane. As a result, it is possible to gather together a plurality of printed products which differ greatly from one another in terms of their dimensions.

[0031] Good results can be achieved if the second pre-product is conveyed into the conveying plane of the first pre-product substantially perpendicular to the conveying direction of the first pre-product, into the insertion position. As a result, the first and second pre-products can if necessary be brought together easily without the conveying of the first pre-products having to be interrupted.

[0032] In a further embodiment of the method, the second pre-product may have a primary fold (or fold edge). Such a primary fold (or fold edge) may be for example a fold and/or a stapling and/or a binding of a printed product.

[0033] Particularly short cycle times when carrying out the method can be achieved if a second pre-product has a primary fold and is conveyed with the primary fold in front when being conveyed into the insertion position.

[0034] In a further embodiment of the method, the second pre-product comprises a plurality of printed products which each have a primary fold, the printed products being oriented in such a way that the primary fold thereof is arranged in front when being conveyed into the insertion position.

[0035] A further embodiment is characterized in that the second pre-product is folded not in half but rather so that the wrapping fold divides the second pre-product into a larger and a smaller sub-area. If a collection produced in this way is placed flat with the larger sub-area upward, the weight of this larger sub-area prevents any unfolding of the second pre-product wrapped around the first pre-product. As a result, in certain cases (if desired), there is no need for further fastening means (such as glue spots for example).

[0036] In one embodiment of the method, the second pre-product may be provided with the wrapping fold while being conveyed into the insertion position. Such an embodiment has the advantage, inter alia, that (if desired) the same means can be used for conveying as for folding, as a result of which a device used for carrying out the method can be constructed from fewer components. If necessary, however,

the second pre-product may also be folded already in an upstream step, or may be pre-folded.

[0037] As an alternative or in addition, the second pre-product may already be provided with the wrapping fold before being conveyed into the insertion position.

[0038] The second pre-product may also be a closed, folded pre-product, which is opened before the collection is formed.

[0039] In one embodiment of the method, the movement of the collection takes place transversely to the orientation of the edge of the wrapping fold of the second pre-product.

[0040] According to a further embodiment of the method, a plurality of second pre-products, prior to being fed in, are conveyed at least in some sections in an overlapping arrangement, in which a leading second pre-product is in each case arranged over the respective trailing second pre-product. In this way, the conveying speed of the second pre-products can be reduced and certain second pre-products can be conveyed better on curved sections.

[0041] In one embodiment of the method, a plurality of second pre-products are conveyed in a folded and overlapping arrangement, in which the outer side of a leading folded second pre-product, which outer side is directed outward after the folding, is arranged at least partially on the inner side of the respective trailing second pre-product, which inner side is directed inward after the folding. As a result, in particular pre-folded second pre-products can easily be opened in order to be brought together with the first pre-products, since the leading second pre-products in each case help to keep open the respective trailing second pre-products.

[0042] In another embodiment of the method, a plurality of second pre-products are conveyed in an overlapping arrangement, in which the inner side of a leading second pre-product is in each case arranged partially on the outer side of the respective trailing second pre-product. As a result, in the case of certain second pre-products, the folding operation can be assisted and the conveying into the insertion position can be made easier.

[0043] For certain applications, according to one embodiment of the method, the second pre-product is provided as a section of a paper or film web (hereinafter also referred to as "web").

[0044] In one embodiment of the method, the web is a single-ply web and the second pre-product is provided with a wrapping fold having a fold inner side before it is made available.

[0045] In another embodiment of the method, the web is a multi-ply web, in particular a folded and/or creased web.

[0046] For certain applications, the paper or film web may be unwound from a roll.

[0047] In one embodiment of the method, the paper or film web is processed between the roll and the site at which the second pre-product is located in the insertion position.

[0048] In one embodiment of the method, the web is printed using a printing machine and is wound onto a roll. The web is then unwound again from the roll and a second pre-product is provided as a section of the web.

[0049] According to another embodiment of the method, the web is printed using a printing machine and a second pre-product is provided as a section of said web without the web being wound onto a roll in the interim.

[0050] In a further embodiment of a method, the second pre-product is cut from the web before being conveyed into

the insertion position. As a result, second pre-products can be conveyed at particularly high speeds into the insertion position and thus the cycle times can be shortened.

[0051] Good results can be achieved if the web wound onto the roll is a single-ply web which, after being unwound from the roll, is folded or creased before a second pre-product is cut from the web.

[0052] In a further embodiment of a method, the web is a multi-ply folded and/or creased web and the second pre-product is at least partially opened after being cut from the web and before being conveyed into the insertion position.

[0053] Particularly good results can be achieved if the web, prior to being cut, is intermediately stored in a buffer, for example a loop buffer. On the one hand, particularly clean cut edges can be achieved as a result. On the other hand, the cutting process, and/or the device necessary therefor, can in this way be simplified.

[0054] According to one embodiment of a method according to the invention, the web is printed using a digital printing machine. By using a digital printing machine, it is possible if necessary to produce a web comprising sections of different second pre-products. In this way, for example, collections with individualized wrappings can easily be produced.

[0055] In one embodiment of such a method, the second pre-products may be personalized advertising products, the content of which is aimed at a particular recipient or a particular group of recipients. As an alternative or in addition, such a second pre-product may also include a personal addressing to a recipient or to a group of recipients. A group of recipients may be formed, for example, of the inhabitants of a geographic region, a town, a village or a district or a building. In a further embodiment of the method, a collection may be conveyed more slowly after it has been formed than the first pre-product was conveyed before the collection was formed.

[0056] In one embodiment, collections are conveyed in an overlapping arrangement, as a result of which the conveying speed of the collections can be reduced. In this case, trailing collections may be arranged for example in each case partially over a leading collection.

[0057] A particularly good bringing-together of first and second pre-products can be achieved if the conveying of the second pre-product into the insertion position takes place against a stop element. Such a stop element can for example assist and/or limit the conveying and thus can influence the orientation of the second pre-product relative to the first pre-product, as will be explained in greater detail below.

[0058] According to one embodiment of the invention, in an upstream method step, N individual printed products are provided, wherein the first pre-product is formed of N-x (x=1, 2, 3 . . .) of the N individual printed products and the second pre-product is formed of the x remaining individual printed products. As a result, the costs per collection produced can be lowered and waste arising from packaging materials can additionally be avoided. In such an embodiment, the first pre-products and second pre-products are therefore identical, whereby the second pre-products are not special or specific packaging means.

[0059] In particular, in one embodiment of the method according to the invention, it is possible that x=1, that is to say the first pre-product can thus be wrapped by just one individual printed product.

[0060] Particularly cleanly wrapped collections can be achieved if a collection produced is moved through a pressing-together device, in which the second pre-product is pressed onto the first pre-product.

[0061] Good results can be achieved if the first pre-product comprises a plurality of printed products which have a preferred edge and the printed products are arranged in a stacked manner in such a way that their preferred edges jointly form a stack edge which forms an edge region that is conveyed against the fold inner side of the second pre-product. In the case of collections formed in accordance with such an embodiment of the method, the individual printed products are particularly well secured against slipping out of the collection when gripped by hand.

[0062] Collections which can be gripped particularly well by hand can also be achieved if at least some of the individual printed products have a fold, a stapling or a binding and are placed one on top of the other in such a way that the folds or staplings or bindings form a leading edge region which is conveyed against the fold inner side of the second pre-product. In this way, it is possible inter alia to reduce the risk of individual printed products falling out of the collection when the collection is gripped by hand.

[0063] A folded and/or stapled and/or glued edge may also be referred to as a fold edge.

[0064] In a further embodiment of this method, some of the printed products are to be arranged with their fold edge on the side opposite the leading edge region, in order to achieve a more uniform thickness of the first pre-product.

[0065] In a further embodiment of the method, the preferred edges of the printed products can be assumed to be those edges which are arranged on the side opposite the fold edge.

[0066] Such an edge may also be referred to as the flower.

[0067] If some or all printed products of the first pre-product have such a flower, these printed products having the flowers can be stacked one above the other or one on top of the other so that a leading edge region is formed of the flowers, which is conveyed against the fold inner side of the second pre-product.

[0068] In another embodiment of this method, some of the printed products are to be arranged with their flower on the side opposite the leading edge region, in order to achieve a more uniform thickness of the first pre-product.

[0069] In a further embodiment of the method, at least some of the printed products have fold edges and are arranged in a stacked manner in such a way that the fold edges jointly form a stack edge. The stack edge is in this case arranged on the side opposite the leading edge region of the first pre-product, as will be explained in greater detail below. Such an embodiment of the method may be advantageous, for example, if the first pre-product comprises printed products of different dimensions, since the thickness of the leading edge region can thus be reduced, thereby promoting the insertion of the first pre-product into the second pre-product and counteracting a subsequent undesired unfolding of the second pre-product.

[0070] In a further embodiment of the method, at least some of the printed products have flowers and are arranged in a stacked manner in such a way that the flowers jointly form a stack edge which is arranged on the side of the first pre-product opposite the leading edge region that is conveyed against the fold inner side of the second pre-product.

[0071] A device according to the invention for carrying out such a method generally comprises a first conveyor device which conveys the first pre-product into the opened second pre-product, which is in the insertion position, and against the fold inner side. It also comprises a second conveyor device which conveys the second pre-product into the insertion position.

[0072] In one embodiment of the device according to the invention, the first conveyor device conveys a formed collection in the conveying direction of the first pre-product.

[0073] In a further embodiment of the device according to the invention, the first and second conveyor device have different conveying directions which span a common conveying plane. With such a device, in particular first and/or second pre-products consisting of stacked printed products can be processed in a particularly gentle manner.

[0074] A particularly reliable and fast production of collections can be achieved if the first and second conveyor device are arranged in such a way that the conveying directions thereof are substantially perpendicular to one another. This applies in particular when the first and the second conveyor device span a common conveying plane, that is to say the second conveyor device conveys the second pre-products from one side into a transfer region in which the first pre-products are pushed into the second pre-products.

[0075] In such an embodiment of a device, the second pre-products are conveyed into the insertion position substantially in the direction of the edge of their wrapping fold. The movement of the collection then takes place transversely to the edge of the wrapping fold.

[0076] In particular, such a movement transverse to the edge of the wrapping fold may be at right angles to the edge of the wrapping fold.

[0077] In a further embodiment of the device, the first and second conveyor device span a horizontal common conveying plane.

[0078] Particularly clean wrapping folds can be achieved if the second conveyor device is assigned a pressing unit which folds the second pre-product before the latter reaches the insertion position.

[0079] In one embodiment of this aspect of the invention, the pressing unit comprises at least one pressing roller pair.

[0080] A particularly stable folding operation and at the same time also an advantageous conveying into the insertion position can be achieved if the device has a pressing unit comprising two or more pressing roller pairs.

[0081] In a further embodiment of the invention, one pressing roller pair may comprise at least one segment roller, as will be explained in greater detail below.

[0082] If necessary, a second pre-product may be scored before the wrapping fold is generated.

[0083] A second pre-product may if necessary also have a plurality of wrapping folds. This may be advantageous in particular in the case of relatively thick first pre-products, since in this way an unfolding of the second pre-products can be efficiently counteracted.

[0084] In one embodiment of the device, the device comprises a mechanism which ensures that the supplied second pre-product can be fed in. Such a mechanism may for example guide and/or open the supplied second pre-product before and/or during the conveying thereof into the insertion position and/or may orient and/or hold it relative to the first pre-product, as will be explained in greater detail below.

Such a mechanism may comprise for example bow-shaped or plate-shaped elements which deform the second pre-product so that the latter is opened. Compressed air may also be used to assist this operation of opening the second pre-product.

[0085] Particularly cleanly wrapped collections can be achieved if the device has a pressing-together device, in which the second pre-product is pressed onto the first pre-product. If necessary, such a pressing-together device may also bring about a targeted compressing of the collections to be produced.

[0086] Good results can be achieved if the pressing-together device has at least one pressing roller pair or press roll pair, through which the collection is passed.

[0087] In order to be able to precisely align the first and second pre-product relative to one another, the device may have a stop element which limits the conveying of the second pre-product in the insertion position. Such a stop element may be, for example, a stop bar or a stop slide.

[0088] Good results can be achieved if the stop element comprises at least one combination roller. As an alternative or in addition to the aforementioned alignment of the second pre-product, such a combination roller may if necessary convey the first and/or second pre-product into the region where they are brought together and/or may initiate and/or assist the operation of closing the second pre-product once the first pre-product has been inserted, as will be explained in greater detail below. In particular, such a combination roller may if necessary assist a conveying of the pre-product in a clamped manner. Particularly good results can be achieved if the combination roller is a conical roller or frustoconical roller, or a roller having a semi-spherical profile, or a roller having a bell-shaped profile.

[0089] Good results can be achieved if a combination roller and a second conveyor device are arranged relative to one another in such a way that a second pre-product is conveyed by the second conveyor device until said second pre-product is clamped between the combination roller and the first conveyor device, and as a result a further conveying in the conveying direction of the second conveyor device is prevented.

[0090] According to one embodiment, the first and/or second conveyor device comprises belt conveyors. Such embodiments of the invention enable easy and reliable transport of many types of pre-products and collections.

[0091] In one embodiment of a device according to the invention, the first conveyor device comprises at least two transport sections lying in one plane, between which an at least temporary conveyor gap is left free, into which the second pre-product is placed in the insertion position. In this way, the second pre-product can be placed into the insertion position in a particularly simple manner. Such an at least temporary conveyor gap may be, for example, a gap in a belt conveyor.

[0092] In order to be able to process particularly heavy and/or flexible first pre-products, the device may have a conveyor table which conveys the first pre-product into the second pre-product, the latter being in the insertion position.

[0093] As an alternative or in addition, the first pre-product may also be lifted partially and temporarily out of the conveying plane as it is inserted into the second pre-product.

[0094] In a further embodiment of a device according to the invention, at least one section of the second conveyor

device is movable in the conveying direction of the first pre-products. In this way, when the first pre-product is conveyed into the opened second pre-product, the relative speed between the first and second pre-product can be set differently from the conveying speed of the first pre-product. As a result, a particularly gentle bringing-together of the first pre-products can be achieved if necessary, or particularly compact collections can be produced.

[0095] In order to prevent unfolding of the second pre-product that has been wrapped around, a device according to the invention may have a glue application device which applies glue to the first and/or second pre-product so that these adhere to one another at least temporarily. Good results can be achieved, for example, using removable adhesives, for example as glue spots and/or glue lines.

[0096] According to one embodiment of a device according to the invention, the second conveyor device is assigned means for providing a paper and/or film web (web).

[0097] A particularly space-saving device can be achieved if said device has means for feeding a second pre-product which is wound onto a roll as a section of a web.

[0098] According to a further embodiment of a device according to the invention, the second conveyor device is assigned a cutting device for cutting the second pre-product from the paper or film web. This cutting device may be arranged in the conveying path of the second conveyor device and may be designed in such a way that it cuts the second pre-product from the paper web or a film web. In this way, the second pre-product can be fed to the device as a web. As a result, as already described, individualized collections for example can easily be produced if necessary.

[0099] According to a further embodiment of a device according to the invention, said device comprises a cutting device which cuts the second pre-product from a paper or film web (web). In this way, the second pre-product can be fed to the device as a web. As a result, as already described, individualized collections for example can easily be produced if necessary.

[0100] Good results can be achieved if the cutting device comprises a laser and/or a static blade and/or a rotating blade and/or a blade which is displaceable in the conveying direction of the second pre-product.

[0101] In a further embodiment of a device according to the invention, said device comprises means for opening or keeping open and guiding a folded or creased second pre-product after the latter has been cut from a web by a cutting device.

[0102] A particularly space-saving device can be achieved if said device has means for feeding a second pre-product which is wound onto a roll as a section of a web.

BRIEF DESCRIPTION OF THE DRAWINGS

[0103] The invention will be explained in greater detail below on the basis of exemplary embodiments and in connection with the drawing, in which:

[0104] FIG. 1 shows in a schematic side view a first exemplary embodiment of a device according to the invention, during operation;

[0105] FIG. 2 shows a plan view of the device of FIG. 1;

[0106] FIG. 3 shows in a schematic side view a second exemplary embodiment of a device according to the invention, during operation;

[0107] FIG. 4 shows a plan view of the device of FIG. 3;

[0108] FIG. 5 shows in a schematic side view a third exemplary embodiment of a device according to the invention, during operation;

[0109] FIG. 6 shows a plan view of the device of FIG. 5;

[0110] FIG. 7 shows in a schematic side view a fourth exemplary embodiment of a device according to the invention, during operation;

[0111] FIG. 8 shows a plan view of the device of FIG. 7;

[0112] FIG. 9 shows a schematic perspective view of a fifth exemplary embodiment of a device according to the invention, during operation;

[0113] FIG. 10 shows a schematic detail view of an exemplary embodiment of a transfer region of a device according to the invention, in side view;

[0114] FIG. 11 shows a schematic perspective view of a sixth exemplary embodiment of a device according to the invention, during operation.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0115] FIGS. 1 and 2 schematically show a first exemplary embodiment of a device according to the invention, during operation. The device has a horizontal first conveyor device 11 with a conveying plane 17. The first conveyor device 11 comprises a first transport section 12, on which first pre-products 1 are being conveyed. The illustrated first pre-products 1 are printed products 7, 7', 7". The first transport section 12 comprises belt conveyors arranged at a distance from one another, wherein the first pre-products 1 are transported in a manner clamped between the belts of the belt conveyors. In order to be able to transport first pre-products 1 of different dimensions, the upper of the two belt conveyors is spring-mounted in the vertical direction. The second transport section 13 is likewise substantially formed by a belt conveyor. As can be seen in FIG. 2, the illustrated device also comprises a second conveyor device 14, by which second pre-products 3 are conveyed toward the first conveyor device 11 from the side. In the embodiment shown in FIGS. 1 and 2, the second pre-products 3 are conveyed by the second conveyor device 14 in an overlapping arrangement at least in some sections. The second conveyor device 14 may to this end also comprise a folding assembly, as described for example in EP 2462043 B2. A pressing unit 26, which comprises two pressing roller pairs 27, 28, is arranged in the region of the second conveyor device 14. By virtue of these pressing roller pairs 27, 28, the second pre-products 3 are on the one hand conveyed toward the first conveyor device 11 (this being illustrated schematically by the arrow) and on the other hand are also folded so as to produce a wrapping fold 4. To this end, the cylindrical pressing roller pairs 27, 28 press together the pre-creased (or pre-scored) parts of the second pre-product 3 in the region of the pre-crease and thus stamp or fix the wrapping fold 4. During this, the pressing roller pair 28 arranged closer to the first conveyor device 11 rotates faster than the other pressing roller pair 27, as a result of which the second pre-product 3 that is to be conveyed into the insertion position is accelerated relative to the subsequent second pre-products 3, whereby the overlapping arrangement is terminated and in each case just one single second pre-product 3 is conveyed into the insertion position. During the folding operation, the second pre-products 3 are partially guided by a mechanism 25 in order subsequently to enable the insertion of the first pre-products 1. The mechanism 25, which is likewise shown

only schematically, consists of two bow-shaped guides which lift upward in the vertical direction the part of the second pre-product 3 located above the wrapping fold 4 in FIGS. 1 and 2. The first and second conveyor device 11, 14 are synchronized with one another so that the second conveyor device 14 in each case conveys a second pre-product 3 into the insertion position just before a first pre-product 1 is conveyed into a transfer region 24, in which the two pre-products 1, 3 are brought together. During this bringing-together, the first pre-products 1 are conveyed by a first combination roller 22 and are partially fixed on the first transport section 12. At the same time, a second combination roller 23 helps to position the second pre-product 3 relative to the first pre-product 1 in the conveying direction of the second conveyor device 14, and also to initiate the process of closing the second pre-product 3 once the pre-products have been brought together. The device also has in the transfer region 24 a supporting surface 29 which aids the positioning of the second pre-product 3, as will be explained in greater detail below (cf. FIGS. 9 and 10). The first and second conveyor device 11, 14 are synchronized in such a way that, as soon as a second pre-product 3 is in the insertion position in the transfer region 24, a first pre-product 1 is conveyed into the provided second pre-product 3 and against the fold inner side 5, as a result of which a collection 20 is formed. The collections 20 that are formed are then conveyed away on a second transport section 13. During this, the collections 20 are guided through a pressing-together device 8, in which the second pre-product 3 is tightly pressed onto the first pre-product 1 by means of pressing rollers 9, 10 from two directions.

[0116] The first pre-products 1 shown in FIGS. 1 and 2 consist in each case of different combinations of large, medium-sized and small printed products 7, 7', 7" stacked one on top of the other. These printed products each have a fold (or a fold edge) and are arranged in a stacked manner in such a way that their folds/fold edges form a leading stack edge 2 which, when the first and second pre-products 1, 3 are brought together, is conveyed in each case against the fold inner side 5 of the associated second pre-product 3. The flower of the largest printed product 7 forms a trailing stack edge 6. First pre-products 1 constructed in this way enable a secure wrapping of a second pre-product 3 around all of the printed products 7, 7', 7" to be wrapped. As a result, it is possible to avoid the situation whereby, when a finished collection 20 is gripped by hand, individual printed products 7, 7', 7" fall out of the collection. With this type of collection, easy gripping of all pre-products by just one hand is ensured.

[0117] The embodiment of a device according to the invention which is shown schematically in FIGS. 3 and 4 is constructed in a manner substantially identical to the device shown in FIGS. 1 and 2. However, the printed products 7, 7', 7" are in this case arranged in a stacked manner in such a way that their flowers form a trailing stack edge 6. The first pre-products 1 thus stacked are in each case conveyed with the fold edge of the lowermost printed product 7, which forms a leading edge of the first pre-product 1, at the front into the provided second pre-product 3 and against the fold inner side 5. A method using stacked first pre-products 1 constructed in this way may be advantageous in order to be able to wrap first pre-products 1 having a relatively large total thickness (or large maximum stack height). Insertion is made easier since such first pre-products 1 have a reduced thickness (or height) in the region of the leading edge.

Moreover, second pre-products **3** which have been wrapped therearound thus remain in the wrapped-around state to an improved extent. At the same time, due to the stack edge **2** formed of the flowers at one side and the wrapped-around second pre-product **3** at the other side, such collections **20** can have a precisely defined external shape, which simplifies the further processing thereof.

[0118] The embodiment of a device according to the invention which is shown schematically in FIGS. **5** and **6** is once again of similar construction to the devices shown in FIGS. **1** to **4**. The printed products **7**, **7'**, **7''** of the first pre-products **1** once again each have a fold (or a fold edge) and are arranged in a stacked manner in such a way that their folds/fold edges form a leading stack edge **2**. However, the second pre-products **3** are in this case not supplied in an overlapping arrangement but rather are supplied individually. Such an embodiment of the invention may be advantageous for processing for example particularly large and/or heavy second pre-products **3**. In comparison to what is shown in FIGS. **1** to **4**, the illustrated device also has a relatively large supporting surface **29**, which still supports the produced collections **20** even when the latter are being guided through the pressing-together device **8**. The first pre-products **1** are constructed in the same way as the first pre-products **1** shown in FIGS. **1** and **2**.

[0119] The embodiment of a device according to the invention which is shown schematically in FIGS. **7** and **8** is constructed in a manner analogous to the device shown in FIGS. **5** and **6**. The printed products **7**, **7'**, **7''** of the first pre-products **1** are in this case once again arranged in a stacked manner in such a way that their flowers form a trailing stack edge **6**. In this case, however, the first pre-products **1** are constructed in the manner shown in FIGS. **3** and **4**.

[0120] FIG. **9** shows in a perspective view a further embodiment of a device according to the invention, said device having a pressing unit **26** comprising a first and second pressing roller pair **27**, **28**, which at least aids the formation of a wrapping fold **4** in the second pre-product **3**. Both the illustrated pressing unit **26** and the first and second pressing roller pair **27**, **28** contained therein may be viewed in combination or in each case individually as a separate inventive concept. As such, in particular both the pressing unit **26** comprising the two pressing roller pairs **27**, **28** can be used in combination with one another as shown, or the two pressing roller pairs **27**, **28** can each be used individually per se also in other embodiments of devices according to the invention. The first pressing roller pair **27** comprises an upper and a lower cylindrical pressing roller **31**, **32**, whereas the second pressing roller pair **28** comprises a lower cylindrical pressing roller **34** and an upper segment roller **33** having a radius which varies in the circumferential direction. The segment roller **33** has a region (conveying segment) of increased radius, which is designed in such a way that a second pre-product **3** arranged between the second pressing roller pair **28** can thus be conveyed in a clamped manner in the direction of the first conveyor device **11**, or respectively the transfer region **24**. The second pressing roller pair **28** may be configured in such a way that a second pre-product **3** passing therethrough is folded (or stamped) by the pressing rollers **33**, **34**, or a folding of the wrapping fold **4** that has for example already been initiated beforehand by the first pressing roller pair **27** is enhanced. In particular, however, the second pressing roller pair **28** may also be configured in

such a way that it does not significantly change an existing wrapping fold **4** but rather serves primarily for conveying the second pre-product **3**, which has already been folded. By using such a segment roller **33**, it is possible to convey a second pre-product **3** in a clamped manner until just before the latter is brought together with the first pre-product **1** (or to convey it reliably until the insertion position is reached), but reliably to release the clamping once the collection has been produced. Such a second pressing roller pair **28** may therefore also be arranged in the transfer region **24** between the first and second transport section **12**, **13**, without this impairing the conveying of the first pre-products **1** or of the collections **20**. The second pre-products **3** are moreover folded in such a way that the parts of the folded second pre-products **3** located in each case over the first pre-products **1** in FIG. **9** are larger than the parts located under the first pre-products **1**. This prevents the second pre-products **3** from unfolding again in the case of the horizontal collections **20** that are shown.

[0121] FIG. **10** schematically shows the transfer region **24**, in which a collection (not shown) is produced from a first and second pre-product **1**, **3**. To this end, the second pre-product **3** is clamped by a pressing unit **26** in such a way that a wrapping fold **4** is formed. At the same time, the second pre-product **3** thus folded is conveyed into the illustrated insertion position. The second pre-product **3**, in the illustrated region above the wrapping fold **4**, is guided during this by the mechanism **25** consisting of two round profiles, and is held in the open state. Below the wrapping fold **4**, the second pre-product **3** is guided by a supporting surface **29**. As soon as the second pre-product **3** is in this insertion position, the first pre-product **1** is conveyed by the belt conveyor of the first transport section **11** into the opened second pre-product **3** and against the fold inner side **5**, as a result of which a collection (not shown) is formed. The latter is then fed by the belt conveyor of the second transport section **13** to further processing.

[0122] FIG. **11** shows in a perspective view a further embodiment of a device according to the invention, comprising a pressing unit **26** which is constructed in a manner substantially identical to the pressing unit **26** shown in FIG. **9**. However, the second pre-products **3** are in this case provided as sections of a web **30**. This web **30** has been printed in an upstream printing process (not shown), pre-folded and then wound in the folded state onto a roll **41**. In the illustrated device, the web **30** is unwound from the roll **41** and the second pre-products **3** are cut from the web **30** by a cutting device **42**. They are then opened with the aid of the mechanism **25** and fed to the pressing unit **26**, which at least aids the formation of a wrapping fold **4** in the second pre-product **3**.

We claim:

1. A method for producing a collection (**20**) of pre-products (**1**, **3**) by inserting a first pre-product (**1**) into a second pre-product (**3**), comprising the steps:
 - a. providing a first pre-product (**1**);
 - b. providing a second pre-product (**3**), which has a wrapping fold (**4**) with a fold inner side (**5**);
 - c. conveying the second pre-product (**3**) into an insertion position, in which the second pre-product (**3**) is provided for the insertion of the first pre-product and faces with the fold inner side (**5**) toward the first pre-product (**1**);

- d. conveying the first pre-product (1) into the provided second pre-product (3) and against the fold inner side (5) so as to form the collection (20);
- e. the second pre-product (3) assumes the conveying direction of the first pre-product (1);
- f. providing the collection (20) for further processing.
- 2. The method according to claim 1, wherein the first pre-product (1) is conveyed in a conveying plane (17) and the second pre-product (3) is provided in the conveying plane (17).
- 3. The method according to claim 2, wherein the second pre-product (3) is conveyed into the conveying plane (17) substantially perpendicular to the conveying direction of the first pre-product (1), into the insertion position.
- 4. The method according to claim 1, wherein the second pre-product (3) includes a primary fold.
- 5. The method according to claim 4, wherein the second pre-product (3) is conveyed with the primary fold in front when being conveyed into the insertion position.
- 6. The method according to claim 1, wherein the second pre-product (3) is provided with the wrapping fold (4) while being conveyed into the insertion position.
- 7. The method according to claim 1, wherein the second pre-product (3) is provided with the wrapping fold (4) before being conveyed into the insertion position.
- 8. The method according to claim 6, wherein a plurality of second pre-products (3), prior to being fed in, are conveyed at least in some sections in an overlapping arrangement, in which a leading second pre-product (3) is in each case arranged over the respective trailing second pre-product (3).
- 9. The method according to claim 1, wherein the first and/or second pre-products (1, 3) comprise a plurality of printed products (7, 7', 7'').
- 10. The method according to claim 1, wherein the conveying of the second pre-product (3) into the insertion position takes place against a stop element (21).
- 11. The method according to claim 1, wherein the second pre-product (3) is provided as a section of a paper or film web (30).
- 12. The method according to claim 11, wherein the paper or film web (30) is unwound from a roll (41).
- 13. The method according to claim 11, wherein the paper or film web (30) is processed between the roll (31) and the site at which the second pre-product (3) is located in the insertion position.
- 14. The method according to claim 1, wherein, in an upstream method step, N individual printed products (7) are

provided, the first pre-product (1) is formed of N-x (x=1, 2, 3 . . .) of the N individual printed products (7) and the second pre-product (3) is formed of the x remaining individual printed products (7).

15. The method according to claim 14, wherein x=1.

16. The method according to claim 1, wherein the collection (20) produced is moved through a pressing-together device (8), in which the second pre-product (3) is pressed onto the first pre-product (1).

17. A device for carrying out a method according to claim 1, further comprising:

g. a first conveyor device (11) which conveys the first pre-product (1) into the provided second pre-product (3), which is in the insertion position, and against the fold inner side (5);

h. a second conveyor device (14) which conveys the second pre-product (3) into the insertion position.

18. The device according to claim 17, wherein the first and second conveyor device (11, 14) have different conveying directions which span a common conveying plane (17).

19. The device according to claim 17, wherein the first and second conveyor device (11, 14) are arranged in such a way that the conveying directions thereof are substantially perpendicular to one another.

20. The device according to claim 17, wherein the second conveyor device (14) is assigned a pressing unit (26) which folds the second pre-product (1) before the latter reaches the insertion position.

21. The device according to claim 17, wherein the device comprises a mechanism (25) which ensures that the supplied second pre-product (3) can be fed in.

22. The device according to claim 17, wherein the device includes a pressing-together device (8), in which the second pre-product (3) is pressed onto the first pre-product (1).

23. The device according to claim 17, wherein the device includes a stop element (21) which limits the conveying of the second pre-product (3) in the insertion position.

24. The device according to claim 23, wherein the stop element (21) comprises at least one combination roller (22, 23).

25. The device according to claim 17, wherein the second conveyor device (14) is assigned means for providing a paper or film web (30).

26. The device according to claim 25, wherein the second conveyor device (14) is assigned a cutting device (42) for cutting the second pre-product (3) from the paper or film web (30).

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