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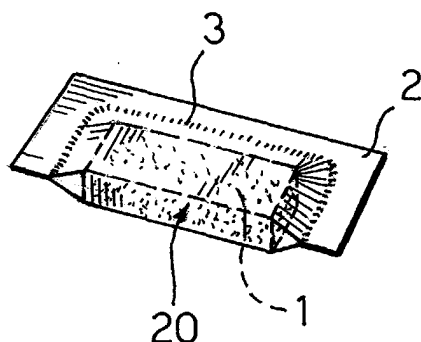
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(54) **Sealing wrapper for food products, corresponding process and installation**

(57) A sealed wrapping for foodstuffs (1) such as chocolates, sweets, pralines and the like. The wrapping comprises a single sheet of wrapping material (2) forming a bent part for receiving the product (1). The wrap-

ping is sealed by means of a single welding line (3) which extends according to a path having the ends located on the bent part (20) and which surrounds the product (1).

**Fig. 4**



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## Description

**[0001]** The present invention relates to sealed wrappers (so-called "hermetic" wrappers) for foodstuffs, such as for example confectionery products.

**[0002]** In the packaging of foodstuffs, it is necessary to take into account different requirements, first of all the need to ensure that the product will remain unaltered for as long a period as possible after packaging.

**[0003]** In order to achieve the above purpose, for some time there has been known, also for foodstuffs of small format (such as chocolates, sweets, pralines, etc.), wrapping of the products in sealed wrappers of the type commonly referred to as "flow-pack". This technique of wrapping envisages starting from a reel of sheet material, which is wrapped around the product in the longitudinal direction by a forming device so as to form a continuous tubular intermediate piece of wrapping closed by a first longitudinal sealing line. The products to be wrapped advance in the tubular intermediate piece, and the ensemble thus obtained is subjected to the action of one or more closing stations. Here, the tubular intermediate piece is flattened, welded and cut in the areas of separation between successive products so as to give rise to individual wrappers. An example of this technique is described in the document EP-A-0 957 043.

**[0004]** Even if considerations of a functional nature (linked, for example, to the fact that the regions where the transverse end welds of the flow-pack wrapping overlap the longitudinal welding or sealing line may constitute areas that are critical for the purposes of the seal) are left aside, the flow-pack wrapping appears unquestionably as a result of an industrial process. This wrapping thus proves far from suitable for use in the case of products (such as certain confectionery products) to which it is intended to associate a wrapping of a more traditional type, such as traditional wrapping for sweets, with the product contained in a wrapping which has one or both of its ends twisted to form fantails (fantail twist-wrapping).

**[0005]** For this reason, there have already been proposed in the known art solutions that aim at reproducing said more traditional forms of wrapping.

**[0006]** A solution of this type is described, for example, in the document WO-A-02/22445: individual lengths of an intermediate piece of a flow-pack wrapping type, wrapped around the product so as to form a tubular structure, undergo squeezing in a radial direction so as to form areas of crinkling to some extent reminiscent of the fantail twist-wrapped ends of a wrapping for sweets of a traditional type.

**[0007]** The main drawback of this type of wrapping lies in the fact that the action of sealing with respect to the external environment should be carried out precisely in the areas subjected to radial compression. Tests show, however, that, even resorting to a wrapping material that can undergo at least partial melting in the ar-

reas subjected to radial compression, the degree of effective sealing with respect to the external environment is rather modest. This fact is altogether understandable, given that, in the aforesaid areas, the wrapping material subjected to compression in a radial direction tends to form creases in a way that is altogether uncontrolled. As a result, creases or ridges are formed having a pattern that is altogether random, between which there may easily remain open, or may open up after a short period time, paths of communication with the external environment.

**[0008]** Solutions that enable an excellent degree of sealing to be obtained with respect to the external environment are described in the documents EP-A-0 591 742 and EP-A-0 790 184. In both cases, they are, however, solutions in which a wrapping comprising two elements of sheet material is used.

**[0009]** The purpose of the present invention is to provide a wrapping capable of combining, with extreme structural simplicity, and consequently with extreme simplicity and economy of fabrication, excellent sealing qualities (hermetic sealing).

**[0010]** According to the present invention, the above purpose is achieved thanks to a wrapping having the characteristics referred to in the ensuing claims. The invention also regards the corresponding process of fabrication, as well as the corresponding plant.

**[0011]** Basically, the solution according to the invention is characterized in that it gives rise to a wrapping that comprises a single sheet element closed by a single welding or sealing line.

**[0012]** For the above purpose, there is provided a sealed wrapping for foodstuffs, which comprises:

- a wrapping sheet with a bent part or hollow, which receives at least one foodstuff product; and
- a sealing line which extends so as to close said wrapping sheet along a path that surrounds said at least one foodstuff product and has the ends located in a position corresponding to said bent part.

**[0013]** Evidently, the term "wrapping sheet" is here understood to indicate any sheet material capable of isolating the product in an effective way from the external environment.

**[0014]** Once again, the term path which "surrounds" the foodstuff product is here understood to indicate a path which extends around the product (a path preferably having a generally arched, i.e., C-shaped pattern), usually privileging quite a tight relationship of wrapping, thus guaranteeing a wrapping of the product that is as adherent as possible, this being a result that can be favoured by possible actions of smoothing, brushing or other operations.

**[0015]** The invention will now be described, purely by way of non-limiting example, with reference to the annexed drawings, in which:

- Figures 1 to 5 illustrate successive steps of a process designed to provide a wrapping according to the invention; and
- Figure 6 is a side elevation of the corresponding plant.

**[0016]** The exemplary embodiment illustrated in what follows relates to the production of a wrapping for a foodstuff product 1 consisting, for example, of a confectionery product, such as a chocolate, a sweet, a praline, etc. of various shapes.

**[0017]** In particular, this may be a product provided with a coating, such as for example a coating of ground hazelnuts, grated coconut, grated meringues, etc.

**[0018]** In any case, neither the dimensions, nor the shape, nor again the nature and/or specific characteristics of the product (single or composite) constitute an element of limitation of the present invention.

**[0019]** The product 1 is designed to be wrapped in a wrapping constituted by a single sheet element 2 of a laminar wrapping material of the type widely used for the wrapping of confectionery products.

**[0020]** This is consequently a sheet material capable of isolating the product effectively from the external environment. It may be, for example, a sheet of aluminium foil and/or plastic material. The material in question may be a "combined" material, i.e., a material which comprises at least one first layer, designed to constitute the outer part in the finished wrapping, and a second layer, designed to constitute the inner part in the finished wrapping, and which presents, for example, characteristics of heat-sealability.

**[0021]** A typical example of combined material of this nature is a material consisting of an outer foil made of aluminium coated on the internal surface with a plastic material, such as polyethylene.

**[0022]** It will be appreciated in any case that the solution described herein is not in any way limited to a particular choice of the sheet wrapping material, nor to the adoption of particular technical procedures of closing/sealing of the wrapping material itself.

**[0023]** In the exemplary embodiment illustrated herein (which, it is once again emphasized, is purely an example), it is assumed that the process starts from an element of sheet material 2 having, for example, the form of a square or approximately square sheet with a side of a few centimetres in length.

**[0024]** As will emerge more clearly from what follows, the said individual element of wrapping may in fact be defined by a portion or length of a continuous sheet material, which is reeled off a reel and subjected to segmentation so as to form individual elements of wrapping.

**[0025]** On the element of wrapping 2 represented by Figure 1 there is then laid, in an approximately central position, the product or article 1 to be wrapped.

**[0026]** In the drawings, the said product is represented in the form of a body having a parallelepipedal shape; however, it will be understood that the product 1 may be

of any shape.

**[0027]** In a further step of the process of formation of the wrapping, the element of sheet material 2 is wrapped around the product 1 so as to form:

- a bent part 20, which in effect receives within it the product 1; and
- two lateral branches 21, which extend from the bent part 20 and are laid on the opposite faces of the product 1 (top and bottom faces in the orientation illustrated herein).

**[0028]** From an examination of Figure 3, it may readily be appreciated that the sheet of wrapping is wrapped around the product 1 in such a way as to form a sort of pocket or envelope in which the lateral branches 21 conserve a substantially plane orientation, whatever the shape of the product 1.

**[0029]** In practice, the two lateral branches 21 are substantially parallel to one another, separated by a distance substantially corresponding to the thickness or height of the product 1.

**[0030]** In yet a further subsequent step of the process, as is represented in Figure 4, the two lateral branches 21 are connected to one another by a sealing line 3.

**[0031]** The sealing line 3 connects the two branches of the sheet of wrapping according to a path that surrounds the foodstuff product 1. It is therefore in general a path having an overall arched, i.e., C-shaped pattern, with the ends located in a position corresponding to the bent part 20, the said bent part evidently already performing an action of sealed reception of the product 1, without any need to form lines of connection.

**[0032]** In order to form the sealing line 3 it is possible to resort to a wide variety of techniques extensively adopted in the packaging industry, in particular for the packaging of foodstuffs.

**[0033]** Consequently, the sealing line 3 may be made - for example - by means of hot-sealing, cold-sealing, sealing with or without weld material, ultrasound welding, laser welding or, possibly, by means of a mere action of embossing.

**[0034]** As regards the path of the sealing line 3, albeit preserving the general enveloping pattern in regard to the product 1, it is possible to adopt different choices.

**[0035]** The tests currently conducted by the present applicant indicate as preferential the choice of a path with a substantially continuous arched pattern, consequently without any cusps and/or any overlapping of ridges or creases of wrapping material (i.e., without the overlapping of more than two layers of wrapping material). Areas of this type could result, for example, from the connection of two contiguous rectilinear stretches and could lie at the basis of phenomena of concentration of states of coercion that might weaken the seal of the sealing line.

**[0036]** As further finishing operation, the wrapping presented in Figure 4 may be completed by forming one

or two fantail, twist-wrapped parts 4 so as to bestow on the wrapping as a whole the typical appearance of a wrapping for sweets. This result may be obtained (in a known way) by subjecting to twisting the longitudinal end or ends of the wrapping, or else resorting to other methodologies aimed at obtaining a fantail twist.

**[0037]** It will be appreciated that the possible formation of said fantail twist-wrapped parts (which - it is once again emphasized - does not represent an imperative characteristic of the solution described herein) does not adversely affect the characteristics of sealing of the sealing line 3. This is, in fact, obtained by connecting the two lateral branches 21 of the sheet wrapping material 2 whilst these are kept in a condition of substantial planarity.

**[0038]** The connection between the two branches 21 is therefore extremely intimate and continuous, and consequently such as to withstand, without weakening, any possible subsequent deformations of the wrapping.

**[0039]** Now passing to an examination of the diagram of the plant of Figure 6, the reference number 10 designates a unreeling assembly from which is reeled off the sheet material that is to constitute the wrapping 2.

**[0040]** Starting from the unreeling device 10 (which is of a known type), the sheet material 2 is fed towards a forming assembly 12 designed to bestow on the sheet material the general U-like shape comprising the bent part 20 and the lateral branches 21 (see Figure 3).

**[0041]** Also the forming device 12 may be considered in itself as an element of a known type. It is in fact obtainable according to the criteria widely used for making forming devices which, in packaging machines of a flow-pack type, close the sheet material according to a general tubular pattern.

**[0042]** Whilst the tubular wrapping formed in flow-pack machines (or in the solution described in WO-A-02/22445) is characterized typically in that it is closed by a longitudinal sealing line and in that it has a substantially circular cross-sectional profile, the corresponding intermediate piece obtained in the plant of Figure 6 is instead open (see once again Figure 3), in the sense that the two lateral branches 21 are not connected to one another in a position corresponding to their distal margins.

**[0043]** Once again, the intermediate piece represented by Figure 3 presents a general U-shaped development, with the two lateral branches 21 maintained in a substantially flattened condition. As has already been said previously, this fact is important for achieving a continuous and intimate connection, provided by means of the sealing line 3, which lies at the base of the characteristics of sealing of the final wrapping.

**[0044]** Feed of the products 1 to be wrapped in the direction of the area where the forming device 12 operates is ensured by a conveyor 14 consisting, for example, of a motor-driven belt conveyor of the type widely used in plants for packaging foodstuffs.

**[0045]** The said conveyor 14 co-operates with the

forming device 12 so as to cause the products 1 to be inserted in the wrapping material folded to form a U shape at regular distances apart, thus creating a loading station designated as a whole by 16.

**[0046]** Fed, in said conditions, by a further conveyor (of which usually the intermediate piece of wrapping material constitutes an active element, since it transports with it the products 1 located therein), the products are carried into a position corresponding to a closing station 18, which makes the sealing line 3 and segments the ribbon of wrapping material in the areas left free by the products so as to give rise to distinct wrappers.

**[0047]** According to a structure in itself known, the closing station 18 may be of the type with vertical reciprocating movement and thus comprise a base or anvil part 18a, as well as an active mobile element 18b, which moves vertically and is lowered periodically onto the anvil part 18a, thus creating the sealing line 3 and carrying out cutting of the individual wrappers. For the above purpose, the base part 18a and/or the active element 18b usually present surface indentations that define the path of the sealing line 3. The base part 18a and/or the active element 18b may have associated thereto heating elements and/or ultrasound generators (not specifically illustrated but of a known type) when the sealing technology adopted involves the application of heat and/or ultrasound.

**[0048]** Advantageously (and also here according to criteria in themselves known), the closing station 18 may be built so as to carry out, in addition to the vertical movement that leads the base part 18a and the active element 18b to close against one another with the interposition of the wrappers, also a movement of "tracking" of the advance of the wrappers. The said tracking movement causes the action of formation of the sealing line 3 to come about in conditions of practically no relative movement.

**[0049]** The fixed anvil part 18a may present a top surface that is at least slightly hollowed so as to ensure that the sealing line 3 (made with the wrapping comprised between the parts 18a and 18b closed against one another) will be obtainable in conditions of perfect symmetry.

**[0050]** Usually, the sealing unit 18 carries associated thereto cutting elements (not specifically illustrated, but of a known type) aimed at causing the continuous ribbon of sheet material 2 to be divided after or concomitantly with the formation of the sealing line 3 so as to give rise to individual wrappers, such as the wrapping designated by C in Figure 6.

**[0051]** The reference number 20 designates a shaping station, in which one or both of the longitudinal ends of the wrapping C are subjected to a further treatment (for example twisting) so as to form the fantail parts 4 of Figure 5.

**[0052]** The wrappers thus completed are gathered in a gathering station 22 in view of the subsequent further packaging.

[0053] As has already been said previously, the formation of one or more fantail parts 4 constitutes an optional and non-imperative step of the solution described herein.

[0054] It will therefore be understood that, without prejudice to the principle of the invention, the details of implementation and the embodiments may vary, even to a major extent, with respect to what is described and illustrated purely by way of non-limiting example, without departing from the scope of the invention, as defined by the claims that follow.

## Claims

1. A sealed wrapping for foodstuffs, comprising:

- a wrapping sheet (2) with a bent part (20), which receives at least one product (1), and
- a sealing line (3), which extends so as to close said wrapping sheet (2) along a path that surrounds said at least one product (1) and has the ends located in a position corresponding to said bent part (20).

2. The wrapping according to Claim 1, **characterized in that** said wrapping sheet (2) is constituted by a material that can undergo sealing with a technique chosen in the group constituted by: hot-sealing, cold-sealing, sealing with weld material, sealing without weld material, ultrasound welding, laser welding, embossing.

3. The wrapping according to Claim 1 or Claim 2, **characterized in that**, in a position corresponding to said sealing line (3), the wrapping is constituted by sheet material (2) subjected to an operation chosen in the group constituted by: hot-sealing, cold-sealing, sealing with weld material, sealing without weld material, ultrasound welding, laser welding, embossing.

4. The wrapping according to any one of the preceding claims, **characterized in that** said sealing line (3) extends along a path free from cusps.

5. The wrapping according to any one of the preceding claims, **characterized in that** said sealing line (3) extends along a path free from areas of overlapping of ridges or creases of wrapping material (2).

6. The wrapping according to any one of the preceding claims, **characterized in that** said sheet of wrapping comprises two lateral branches (21), which extend from said bent part (20) on opposite sides of said at least one product (1), said sealing line (3) extending so that it connects said lateral branches (21).

7. The wrapping according to Claim 6, **characterized in that**, at least in the area of said sealing line (3), said lateral branches (21) are substantially co-planar with respect to one another.

8. The wrapping according to Claim 6 or Claim 7, **characterized in that**, at least in a position corresponding to said sealing line (3), said lateral branches (31) are substantially free from creases or ridges.

9. The wrapping according to any one of the preceding claims, **characterized in that** said sealing line (3) extends according to a general arched path.

10. The wrapping according to any one of the preceding claims, **characterized in that** it moreover comprises at least one end part (4) having a fantail conformation.

11. The process for sealed wrapping of foodstuffs (1), comprising the operations of:

- forming (12) a wrapping sheet (2) with a bent part (20),
- setting said at least one product (1) in said bent part, and
- forming (18) a sealing line (3), which extends so as to close said wrapping sheet (2) along a path that surrounds said at least one product (1) and has the ends located in a position corresponding to said bent part (20).

12. The process according to Claim 11, **characterized in that** it comprises the operation of making said wrapping sheet (2) with a material that can undergo sealing with a technique chosen in the group constituted by: hot-sealing, cold-sealing, sealing with weld material, sealing without weld material, ultrasound welding, laser welding, embossing.

13. The process according to Claim 11 or Claim 12, **characterized in that** it comprises the operation of making said sealing line (3) by means of an operation chosen in the group constituted by: hot-sealing, cold-sealing, sealing with weld material, sealing without weld material, ultrasound welding, laser welding, embossing.

14. The process according to any one of Claims 11 to 13, **characterized in that** it comprises the operation of forming (18) said sealing line (3) along a path free from cusps.

15. The process according to any one of Claims 11 to 14, **characterized in that** it comprises the operation of forming (18) said sealing line (3) along a path free from areas of overlapping of ridges or creases of wrapping material (2).

16. The process according to any one of Claims 11 to 15, **characterized in that** it comprises the operations of:
- forming (12) in said sheet of wrapping two lateral branches (21) which extend from said bent part (20) on opposite sides of said at least one foodstuff product (1), and
  - forming (18) said sealing line (3) so that it connects said lateral branches (21).
17. The process according to Claim 16, **characterized in that** it comprises the operation of keeping said lateral branches (21) substantially co-planar with respect to one another in the area of formation of said sealing line (3).
18. The process according to Claim 16 or Claim 17, **characterized in that** it comprises the operation of keeping said lateral branches (31) substantially free from creases or ridges at least in a position corresponding to said sealing line (3).
19. The process according to any one of the preceding Claims 11 to 18, **characterized in that** it comprises the operation of forming (18) said sealing line (3) according to a general arched path.
20. The process according to any one of the preceding Claims 11 to 19, **characterized in that** it comprises the operation of forming (20) in said wrapping at least one end part (4) having a fantail conformation.
21. A plant for sealed wrapping of foodstuffs (1), comprising:
- a forming device (12) for forming a wrapping sheet (2) with a bent part (20);
  - a loading station (16) for setting said at least one foodstuff product (1) in said bent part; and
  - a sealing station (18) configured for forming a sealing line (3), which extends so as to close said wrapping sheet (2) along a path that surrounds said at least one foodstuff product (1) and has the ends located in a position corresponding to said bent part (20).
22. The plant according to Claim 21, **characterized in that** said sealing station (18) is a station operating according to a technique chosen in the group constituted by: hot-sealing, cold-sealing, sealing with weld material, sealing without weld material, ultrasound welding, laser welding, embossing.
23. The plant according to Claim 21 or Claim 22, **characterized in that** said sealing station (18) is configured for forming said sealing line (3) along a path free from cusps.
24. The plant according to any one of Claims 21 to 23, **characterized in that** said sealing station (18) is configured for forming said sealing line (3) along a path free from areas of overlapping of ridges or creases of wrapping material (2).
25. The plant according to any one of Claims 21 to 24, **characterized in that** said forming device (12) is configured for forming (12), in said sheet of wrapping, two lateral branches (21), which extend from said bent part (20) on opposite sides of said at least one foodstuff product (1), and **in that** said sealing station (18) is configured for forming (18) said sealing line (3) so that it connects said lateral branches (21).
26. The plant according to any one of Claims 21 to 25, **characterized in that** said sealing station (18) is configured for keeping said lateral branches (21) substantially co-planar with respect to one another in the area of formation of said sealing line (3).
27. The plant according to any one of Claims 21 to 26, **characterized in that** said sealing station (18) is configured for keeping said lateral branches (31) substantially free from creases or ridges at least in a position corresponding to said sealing line (3).
28. The plant according to any one of the preceding Claims 21 to 27, **characterized in that** said sealing station (18) is configured for forming said sealing line (3) according to a general arched path.
29. The plant according to any one of the preceding Claims 21 to 28, **characterized in that** it comprises a shaping station (20) for forming, in said wrapping, at least one end part (4) having a fantail conformation.

Fig. 1

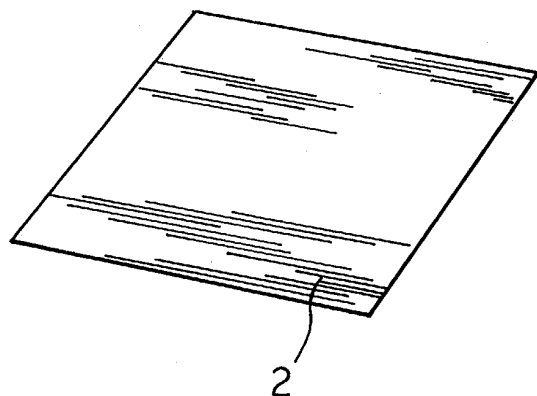


Fig. 2

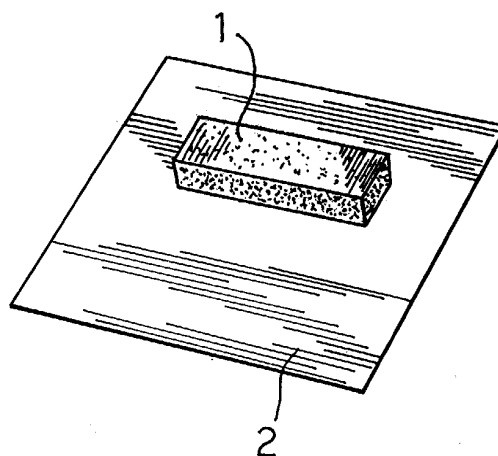


Fig. 3

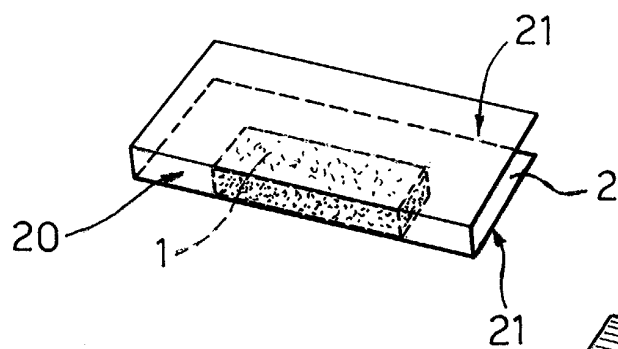


Fig. 4

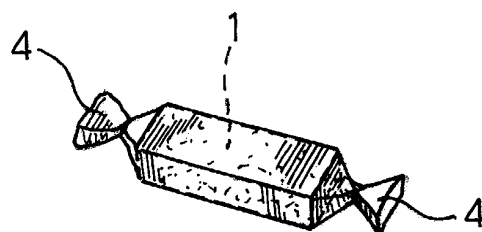
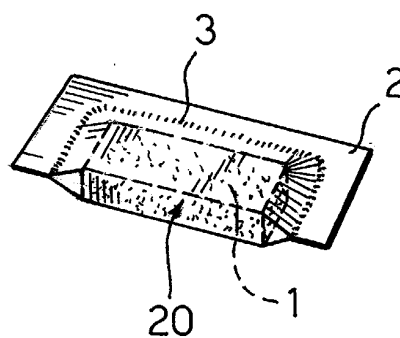
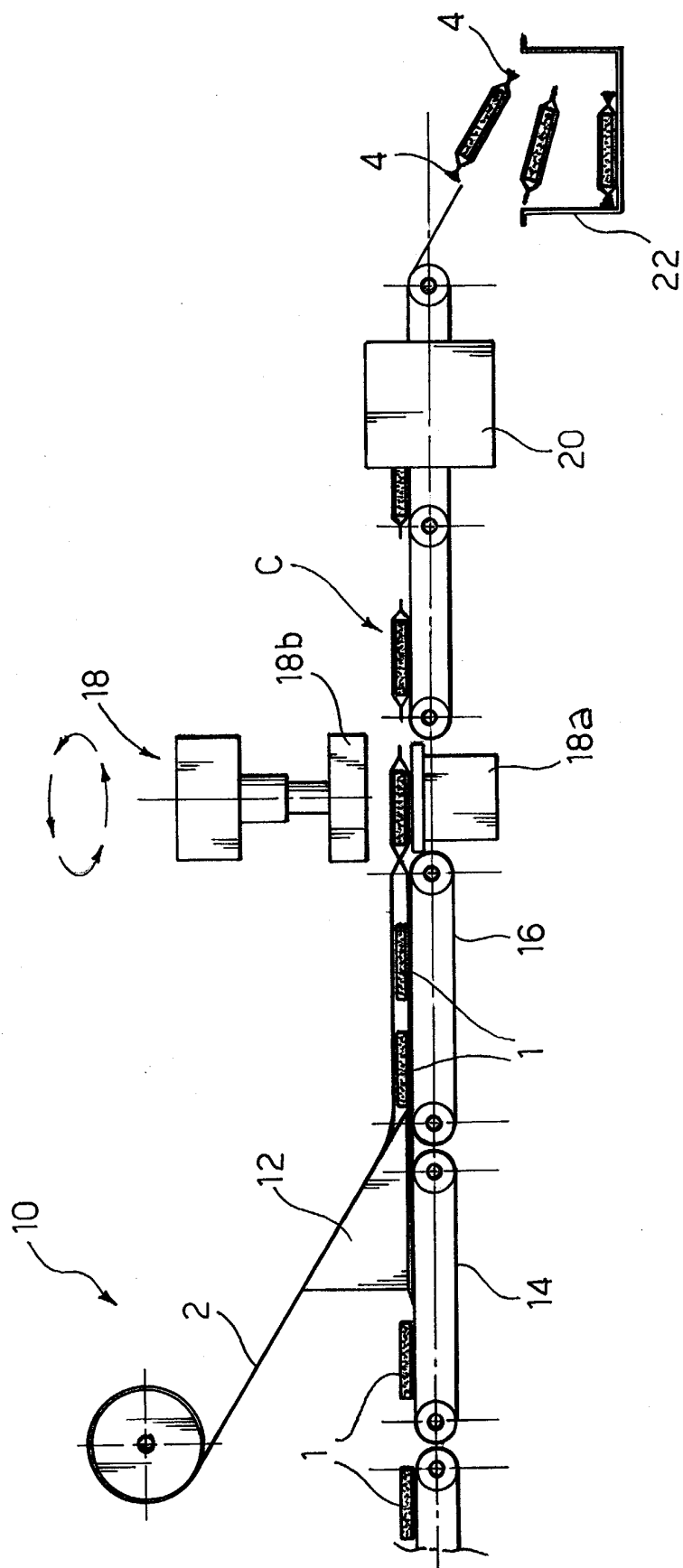


Fig. 5

Fig. 6







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# EUROPEAN SEARCH REPORT

Application Number  
EP 03 42 5304

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	WO 03 035479 A (VAN DEN BROEK ARJAN JACOB ;BEST QUALITY B V (NL); VAN DEN BERG MAX) 1 May 2003 (2003-05-01) * page 3, line 24 - page 4, line 7; figures 1A-1G *	1-9, 11-19, 21-28	B65D75/20 B65B9/06 B65B11/48 B65B61/24
X	US 5 722 215 A (YUYAMA SHOJI) 3 March 1998 (1998-03-03)  * claim 1; figure 1 *	1-9, 11-19, 21-28	
X	US 2002/184857 A1 (O'CONNOR LAWRENCE ET AL) 12 December 2002 (2002-12-12)  * claim 1; figures 1-4 *	1-8, 11-18, 21-27	
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The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>7 October 2003</b>	Examiner <b>Grentzius, W</b>
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/82 (P04001)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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