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(54) Title: Packaging for solid food products and method for the production thereof.

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PACKAGING FOR SOLID FOOD PRODUCTS AND METHOD FOR THE PRODUCTION THEREOF

DESCRIPTION

Field of application

The present invention refers, in general, to packaging made of plastic material for food products, in particular pasta, rice and similar foodstuffs and to a method for the production of such packaging.

Prior art

In the packaging of pasta, rice and similar solid foodstuffs that can be stored at room temperature, two types of packaging have long been employed: cardboard boxes and transparent plastics bags, often printed and normally of polypropylene or, less often, polyethylene.

These two types of packaging both offer advantages and disadvantages. Transparent plastics bags have the merit of allowing immediate appraisal of the shape and overall look of the food content (e.g. the size of the pasta shape or grain of rice). On the other hand, the bag tears easily on opening and is not easy to close satisfactorily once some of the contents have been removed. In addition, because the plastics it is made of is pliable, the packaging does not lend itself well to being kept tidily in a cupboard or on a shelf.

Cardboard boxes, on the other hand, although mechanically strong and easy to close, have the drawback of not allowing the contents to be visually inspected, so that the purchaser's selection can only be based on a picture of the product printed on the packet.

The methods for the production of the two types of packaging described above are obviously very different. That used for producing plastics packaging uses established "flow-pack" technology while the method for producing cardboard boxes is based on traditional paperboard box-making techniques starting with die-cut cardboard blanks.

In the past, various attempts have been made to create packagings that combine the advantages of the two types of packaging discussed above. One of the solutions proposed in the prior art is to provide a window of varying size on one side of a cardboard box, covering the opening with a sheet of transparent plastic.

This solution, however, although affording, on the one hand, limited visibility of the box

contents, compromises, on the other hand, the mechanical strength of the box, to an extent proportional to the size of the window. It also substantially increases production costs, which, for low added value products such as pasta or rice, is not really sustainable.

Summary of the invention

The problem underlying the present invention, therefore, was to make packaging available for food products such as pasta or rice, which combined the advantages of the two packaging types discussed above but without their disadvantages and involving production costs comparable with those for conventional cardboard boxes.

Such a problem has been solved, according to this invention, by a packaging for food products, comprising a solid food product contained in a rigid box, parallelepiped in shape, characterized in that said box is made of rigid transparent plastic material with a bending resistance of at least 90 Taber units (TU).

Bending resistance is measured with an instrument called a Stiffness Tester, made by Taber Industries of the USA, in accordance with test T489 set by T.A.P.P.I. (Technical Association of the Pulp and Paper Industry). One Taber unit is defined as the bending moment of 1/5 of a gram applied to a 1.5 inch wide specimen at a 5 cm test length, flexing it to an angle of 15°. A Taber unit is the equivalent of 1 gram centimeter.

The rigid transparent plastic material referred to is preferably formed of polypropylene, in sheets with a grammage of at least 0.40 kg/m^2 and preferably between 0.45 and 0.6 kg/m^2.

This can be either mono- or multi-layer polypropylene sheet.

The use of a sheet of rigid transparent plastic material with a bending resistance as specified above, allows to produce the boxes for the packaging according to the invention, using the apparatus that are conventionally employed for the production of cardboard boxes.

In a further aspect, the present invention relates to a method for the production of a packaging comprising a solid food product and a substantially parallelepiped shaped box , wherein the method includes the following steps:

a) providing a die-cut blank comprising four rectangular portions, corresponding to the side walls of the finished box, defined by three fold lines, and a plurality of flaps, intended to form the top and bottom of the finished box, the rectangular portions at either end being

bound to one another and being fold onto one anotherso as to form a flattened half-finished box;

b) opening said flattened half-finished box by pulling the folded opposed walls away from one another;

c) metering the food product into the half-finished box;

d) folding and gluing the flaps adjacent to the ends of the half-finished box, so as to close said ends and yield the package,

characterized in that said die-cut blank is formed of a sheet of rigid transparent plastic material with a bending resistance of at least 90 Taber units.

In some instances, step c), metering the food product into the half-finished box, is carried out once the flaps adjacent to one end of the half-finished box have been folded and glued; that is done when dispensers are used that drop the product from a certain height into the half-finished box, in order to prevent the product from escaping through the end that is still open.

As a sheet of rigid transparent plastic material, a polypropylene sheet is preferably used with a bending resistance as described above and having a grammage of at least 0.4 kg/m^2 and preferably between 0.45 and 0.6 kg/m^2.

The steps described above are carried out with the apparatus that are traditionally used for producing packagings for pasta and similar solid foods, comprising cardboard boxes, without the need for substantial alterations.

Refining the method for the industrial production of the packaging according to the invention was not without technical difficulties. The step of opening the flattened half-finished box proved to be particularly critical, whereas such a step does not create any particular problems when normal cardboard is used.

Step b) of pushing the opposed folded walls away from one anther, proved problematic because the plastics sheets currently used in the production of packagings for non food items (typically perfumes or clothing such as socks or underwear) did not display sufficient mechanical strength to stand the stresses imposed by the apparatus that open the folded and flattened half-finished boxes. Sheets like these are actually designed for being shaped entirely by hand and therefore do not need to provide any particular degree of rigidity.

In addition, the sheets of plastic material, unlike the cellulose material from which so-called "flat" cardboard is made, do not exhibit a structure with fibres aligned primarily in the same direction as the mechanical action employed to open or unfold the box and so do not immediately lend themselves to this method.

In experiments, it was observed that only sheets of plastic material with a bending resistance equal to or greater than 90 Taber units were capable of withstanding the mechanical stresses imposed by the apparatus responsible for opening the flattened half-finished boxes.

Through the method according to the present invention, it is possible to manufacture a packaging for solid food products that offers the advantages of both known packagings, i.e. those made of cardboard and those made of pliable transparent plastic material, but avoiding the disadvantages of either of them. All of this while using the normal apparatus that are conventionally employed in the production of cardboard boxes, without the need for any structural alterations whatever and thus without additional costs.

This invention will now be further illustrated by referring to the figures below and describing an embodiment of the packaging and the method according to the invention, as set out herebelow by way of a non limiting example.

Brief description of the drawings

Fig. 1 is a perspective view of a package in accordance with this invention;

Fig. 2 is a plan view of a die-cut blank used in the production of the packaging according to this invention;

Fig. 3 is a perspective view of a half-finished box manufactured in the course of the method according to the invention;

Fig. 4 is a schematic reproduction of the equipment used in the method according to the invention.

Detailed description of a preferred embodiment

Fig. 2 is a schematic representation of a transparent polypropylene die-cut blank with a grammage of 0.45 kg/m^2 and a bending resistance of 95 Taber units (determined with a 150-B stiffness tester manufactured by Taber Industries of the U.S.A.), used in the production of a package in accordance with this invention.

The die-cut blank, generally indicated with the number 1, comprises two identical rectangular portions, 2 and 2', intended to form walls 102 and 102' respectively of the finished box, between which is positioned a narrower rectangular portion 3, intended to form wall 103 of the finished box, defined by fold lines 4 and 5. Fold line 6 defines the boundary between rectangular portion 2' and rectangular portion 3', which is identical to the narrow portion 3 and intended to form wall 103' of the finished box. Attached to the short sides of each one of the rectangular portions 2, 2', 3 and 3' referred to above are flaps 7, 7', 8 and 8' respectively. The end wall 2, has a flap 10 that extends longitudinally and is separated from wall 2 by fold line 9. This flap 10 is designed to be glued onto a peripheral area of the end rectangular portion 3' adjacent to its free long side 11.

Once the above flap 10 has been glued onto said peripheral area of the end rectangular portion 3', a half-finished box 101, flattened by being folded on fold lines 6 and 4, is obtained.

The thus obtained flattened half-finished items are stacked inside the loader of an automated boxing machine, as shown (entirely schematically) in Fig. 4.

This machine 11, withdraws the flattened half-finished box 101 from the loader 14, using a series of suction pads 12, arranged on mobile arms 13 or similar devices and opens it by pulling the opposed folded walls away from one another until it assumes a rectangular section, as illustrated in Fig. 3. A device suitable for withdrawing the flattened half-finished boxes from the loader and opening them is described, for example, in patent application EP-A-590 568 but various similar devices are available on the market.

The open half-finished box 101 is then passed to another section of the machine, consisting essentially of a chain conveyor 15 wherein one of the ends of the half-finished box is closed by folding and gluing flaps 7, 7', 8 and 8' to form a bottom, thus obtaining a box open at one end.

Generally, the narrower flaps (8 and 8') are folded first, using guide and push means 16 (these are essentially passive guide devices for the front facing flap and pushing devices for the rear flap) shown schematically in Fig. 4a.

Subsequently, similar guide and push means 17, shown schematically in Fig. 4b and located downstream on the pathwayof the chain conveyor, cause one of the larger size flaps 7 or 7' to fold onto the previously folded smaller flaps 8 or 8'.

At this point, suitable glue feed devices (not shown) deposit a layer of glue onto part of the

folded larger flap and other similar guide and push means 18, shown schematically in Fig. 4c, fold the other larger flap, thus closing the bottom of the open half-finished box which becomes, at this point, a box, which is open at the end opposite the bottom just described.

In a subsequent section of the boxing machine 11, known devices 19, shown entirely schematically, dispense, by gravity, the pasta or other loose solid food products into the box, which is finally closed by folding and gluing the flaps at the open end of the box by means of known folding devices and glue feed devices, analogous to those previously described for closing the bottom of the box and shown under the same reference numbers in Figures 4d and 4e.

The finished packagins are then passed to the next stage, by means of suitable conveyor belts, to be packed into cartons.

In other boxing machines, designed for packaging food products with an elongated shape (e.g. spaghetti or grissini), the product is put into the open half-finished box lying horizontally, by means of special pusher bars. Once the food is in, both ends of the open half-finished box are closed by folding and gluing the respective flaps on opposite ends of the half-finished box.

CLAIMS

1. Packaging for food products, comprising a solid food product contained in a rigid box, that is parallelepiped in shape, characterised in that said box is made of a rigid transparent plastic material with a bending resistance of at least 90 Taber units.

2. Packaging according to claim 1, wherein said rigid transparent plastic material is polypropylene in sheets with a grammage of at least 0.40 kg/m^2, and preferably between 0.45 and 0.6 kg/m^2.

3. A method for the production of a packaging comprising a solid food product and a box essentially parallelepiped in shape, , wherein said method comprises the following steps:

a) providing a die-cut blank (1) comprising four rectangular portions (2, 2', 3 and 3'), corresponding to the side walls (102, 102', 103 and 103') of the finished box, defined by three fold lines (4, 5 and 6), and a plurality of flaps (7, 7', 8 and 8') intended to form the top and bottom of the finished carton, the rectangular portions at either end (2 and 3') being bound to one another and being folded onto one another, so as to form a flattened half-finished box (101);

b) opening said flattened half-finished box (101) by pulling the opposed folded walls away from one another;

c) metering the food product into the half-finished box (101);

d) folding and gluing the flaps (7, 7', 8 and 8') adjacent to the ends of the half-finished box (101) so as to close said ends and yield said package,

characterized in that said die-cut blank (1) is made from a sheet of a rigid transparent plastic material with a bending resistance of at least 90 Taber units.

4. A method according to claim 3, wherein step c) of metering the food product into the half-finished box (101) is carried out once the flaps (7, 7', 8 and 8') adjacent to one of the two ends of the half-finished box (101) have been folded and glued, so as to close said end, and wherein a polypropylene sheet with a grammage of at least 0.4 kg/m^2 and preferably between 0.45 and 0.6 kg/m^2 is used as the sheet of plastic material.

5. Use of a sheet of rigid transparent plastic material with a bending resistance of at least 90 Taber units in the production of a packaging for solid food products, optionally wherein the grammage of said polypropylene sheet is at least 0.45 kg/m^2 and preferably is between 0.45 and 0.6 kg/m^2.

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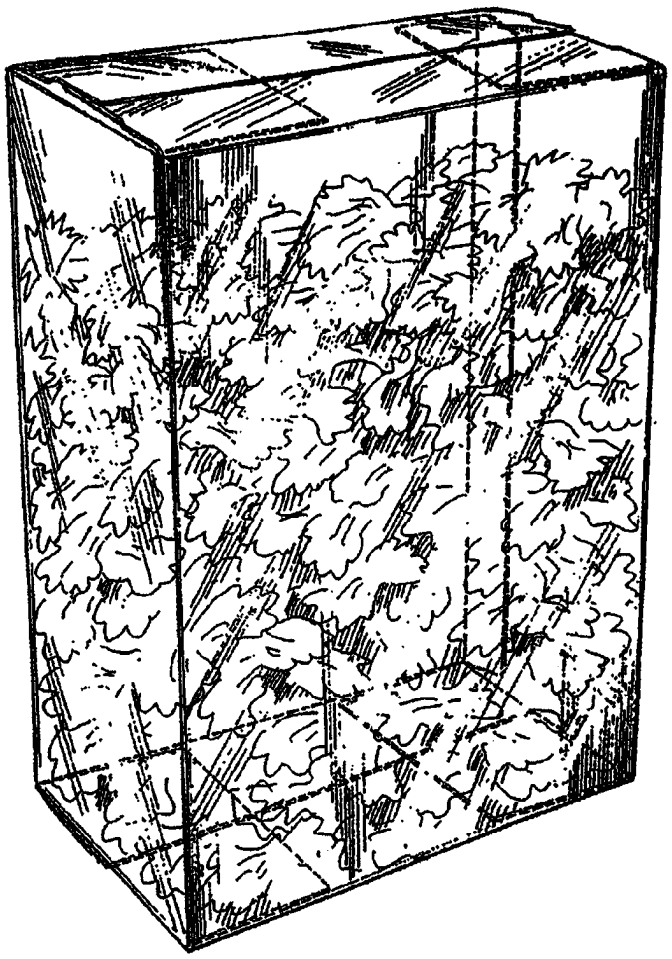


FIG. 1

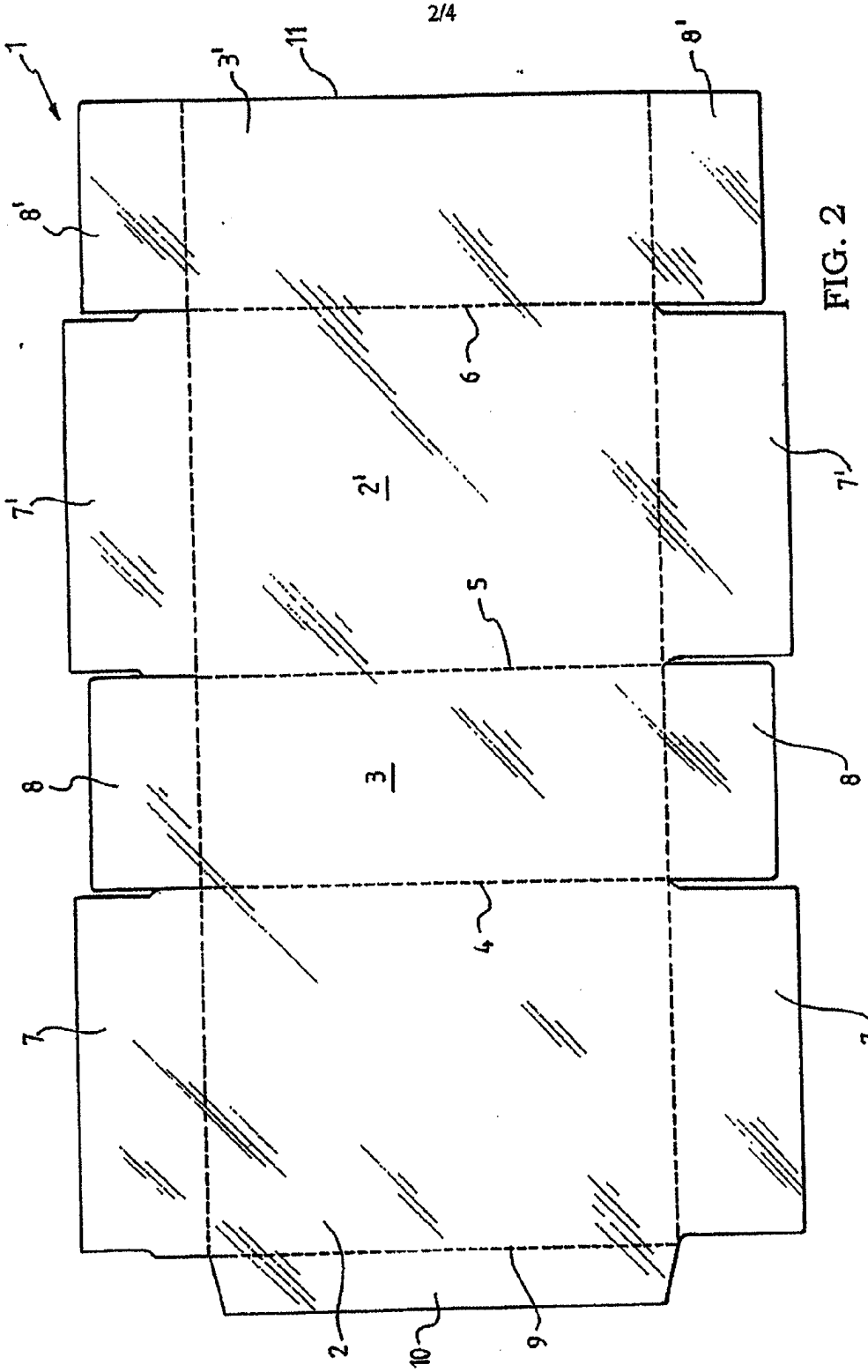


FIG. 2

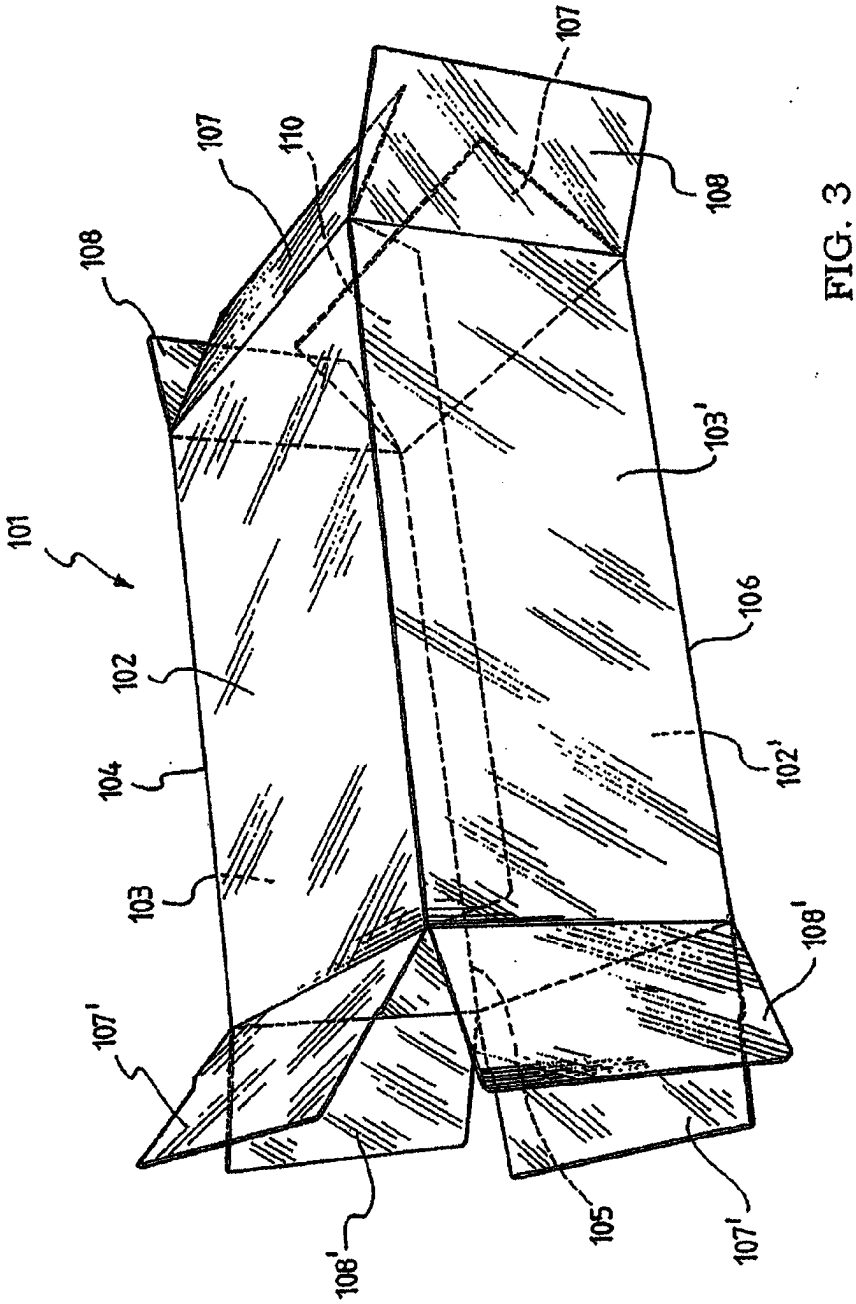

107
107
110
108
108
101
103'
106
102
102'
104
103
108'
107'
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105
107'

FIG. 3

FIG. 4d

FIG. 4e

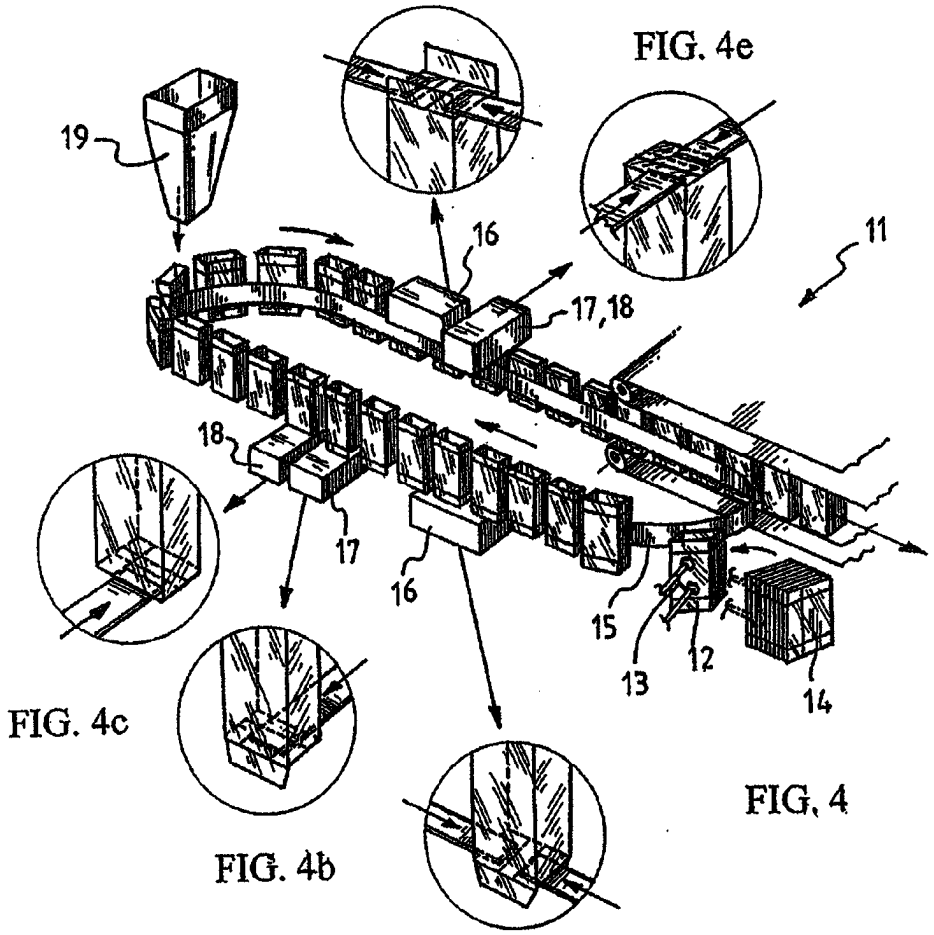


FIG. 4c

FIG. 4b

FIG. 4

FIG. 4a