COMMONWEALTH OF AUSTRALIA

Patents Act 1952

CONVENTION APPLICATION FOR A STANDARD PATENT

I/WE, BULL S.A. , 121, Avenue de Malakoff - 75116 Paris, France

hereby apply for the grant of a Standard Patent for an invention entitled:

PACKAGING INSERT, CONTAINER FOR SUCH AN INSERT AND PACKAGING PROCESS USING SUCH AN INSERT

which is described in the accompanying complete specification.

This application is made under the provision of Part XVI of the Patents Act 1952 and is based on an application for a patent or similar protection made

in France on 26 january 1988
No. (88 00879)

in on
No. (

My/Our address for service is:

F.B. RICE & CO.,
28A Montague St.
Balmain NSW 2041

Dated this 25th day of January 1989

BULL S.A.

By: _____
Registered Patent Attorney

To: The Commissioner of Patents
COMMONWEALTH OF AUSTRALIA

Commonwealth of Australia
The Patents Act 1952

DECLARATION IN SUPPORT

In support of the (Convention) Application made by:

BULL S.A., 121, Avenue de Malakoff, 75116 Paris, France

for a patent for an invention entitled: PACKAGING INSERT, CONTAINER FOR SUCH AN INSERT AND PACKAGING PROCESS USING SUCH AN INSERT

I (We) Michel COLOMBE

of and care of the applicant company do solemnly and sincerely declare as follows:

a) ~~I am (We are)~~ the applicant(~~s~~) ~~for the patent~~

or

b) I am (We are) authorised by the applicant(s) for the patent to make this declaration on its behalf.

Delete the following if not a Convention Application.

The basic application(~~s~~) as defined by section 141 (~~142~~) of the Act was (~~were~~) made

on 26 January 1988 in France

on in

on in

by BULL S.A.

The basic application(~~s~~) referred to in this paragraph is (~~are~~) the first application(~~s~~) made in a Convention country in respect of the invention the subject of the application.

a) ~~I am (We are) the actual inventor(s) of the invention.~~

or

b) Jean-Claude VILAS BOAS, 26, Rue de la Republique, 95110 Sannois France

is (~~are~~) the actual inventor(s) of the invention and the facts upon which the applicant is (~~are~~) entitled to make the application are as follows:

The applicant is a person who would if a patent were granted upon application made by the actual inventor be entitled to have the patent assigned to it.

Declared at Paris this 13th day of May 1991

Signed Status General Manager Industrial Property Dept.

Declarant's Name Michel COLOMBE

F. B. RICE & CO PATENT ATTORNEYS

This form is suitable for any type of Patent Application. No legalisation required.

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(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 623368

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PACKAGING INSERT, CONTAINER FOR SUCH AN INSERT AND PACKAGING PROCESS USING SUCH AN INSERT

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(56) Prior Art Documents
WO 88/3903
AU 575774 63112/86
GB 2149753

(57) Claim

1. A packaging insert for maintaining and protecting a product in a container, wherein said insert is produced from plastic material in a continuous generally planar form and is cut to the desired size so as to substantially envelop the product, and wherein its cross- section contains retaining ~~portions~~ means which extend in the direction transverse to the plane of the insert for resisting displacement of the product in the container;

said retaining ~~portions~~ means being defined by at least one groove, said groove or grooves being arranged to receive the product and to hold it laterally, and wherein the insert contains at least one contact surface for contact with the internal surfaces of the container;

wherein the contact surface, which is opposite to an insert surface which has the retaining portions, has a shape generally reciprocal with that of the insert surface so as to allow stacking or rolling of the inserts in storage; and.

wherein the insert is in the form of a continuous ribbon, one side of which is the contact surface which comes into contact with the internal walls of the container, and which has pivoting means which facilitate its bending around the product.

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3. The packaging insert according to claim 2, wherein each cut extends across the width of the insert and, in the longitudinal section of the insert, each cut has the shape of a T.

6. A packaging insert for maintaining and protecting a product in a container, wherein said insert is produced from a plastics material in a continuous generally planar form and is cut to the desired size so as to at least partially envelop the product, and when said insert envelops the product, the cross section of said insert contains retaining portions which extend from an insert surface transverse to the plane of the insert for resisting displacement of the product in the container, and

wherein said insert consists of a continuous chain of cushions having an adaptable shape, said cushions succeeding each other in a series and which are produced from two flexible sheets, adjacent surfaces of which are joined together at intervals, wherein each cushion is further defined by a free space between the sheets which is filled with an inflating agent, wherein the packaging insert can be cut at any desired length; and

wherein adjacent cushions are separated from each other by a narrow web section, each of said web sections defining a hinge for the insert.

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P 3363

COMPLETE SPECIFICATION

(ORIGINAL)

Class Int. Class

Application Number :

Lodged :

Complete Specification Lodged :

Accepted :

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Priority : 26 January 1988

Related Art :

Name of Applicant : BULL S.A.

Address of Applicant : 121, Avenue de Malakoff - 75116 Paris, France

Actual Inventor/s : Jean-Claude Vilas Boas

Address for Service : F.B. RICE & CO., Patent Attorneys, 28A Montague Street, BALMAIN 2041.

Complete Specification for the invention entitled:
PACKAGING INSERT, CONTAINER FOR SUCH AN INSERT AND PACKAGING PROCESS USING SUCH AN INSERT

The following statement is a full description of this invention including the best method of performing it known to us/me:-

The present invention concerns a packaging insert and a container for such an insert. It also concerns a packaging process using such an insert. It finds application in the field of packaging and preparation of objects which are solid but fragile and which are destined for storage or transport.

Packaging inserts to be placed between the packaged product and the box which is destined to contain it are known in prior art. According to current practice the expert knows how to arrange the angle inserts which will cushion acceleration which is too sudden (mainly impacts) and separate the packaged product from its container. Such packaging inserts are made of synthetic materials such as polystyrene. The corner packaging inserts present the first inconvenience because they require a long handling period and can in practice not be automated.

Another solution which improves the wedging and in particular the handling of the packaging inserts proposes half moulds of plastic materials the shape of which is totally enveloping and which are easily handled. However, during the introduction into the box the moulds have to be held by their free ends and they have then the tendency to separate from the product to be packaged, and in the extreme case let it slip out.

A common inconvenience of the two prior solutions is that they require considerable space for storage before use. In effect, the packaging inserts are stockpiled in the store before being transferred and the space they occupy is lost for any other activity or undertaking.

In one broad form the present invention provides a packaging insert for maintaining and protecting a product in a container, wherein said insert is produced from plastic material in a continuous generally planar form and is cut to the desired size so as to substantially envelop the product, and wherein its cross- section contains retaining means which extend in the direction transverse to the plane of the insert for resisting displacement of the product in the container;

said retaining means being defined by at least one groove, said groove or grooves being arranged to receive the product and to hold it laterally, and wherein the insert contains at least one contact surface for contact with the internal surfaces of the container;

wherein the contact surface, which is opposite to an insert surface which has the retaining portions, has a shape generally reciprocal with that of the insert surface so as to allow stacking or rolling of the inserts in storage; and

wherein the insert is in the form of a continuous ribbon, one side of which is the contact surface which comes into contact with the internal walls of the container, and which has pivoting means which facilitate its bending around the product.

Preferred forms of the present invention will now be described by way of example with reference to the accompanying drawings, wherein:

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~~Other advantages and characteristics of the present invention will~~ be better understood with the aid of the description and the attached ~~figures which are:~~

- figure 1 : a schematic drawing of a first design of a packaging insert according to the invention,

- figure 2 : a schematic drawing of part of a conveyor transferring the packaging insert and the unwinding device for the insert material according to the invention,

- figure 3 : a cross sectional view of a package, product and insert installed according to the invention,

- figure 4 : a schematic drawing of a second design for a packaging insert according to the invention,

- figure 5 : a cross sectional view of a package, product and packaging insert according to the invention,

- figures 6a and 6b : schematic drawing of a storage module according to the invention,

- figure 7 : a schematic drawing of another storage module according to the invention,

- figure 8 : some of the possible shapes of packaging inserts of the first type according to the invention,

- figure 9 : some of the possible shapes of packaging inserts of the second type according to the invention.

- figure 10 : a schematic drawing of another design for the application of a packaging insert according to the invention,

- figure 11 : Some of the possible shapes according to the invention,

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- figure 12 : a schematic cross section of another design for using the invention for a packaging insert of the first type.

In the text the term box is used as an equivalent for package as well as for the more generic term container. In the preferred design in particular, one aims to have preformed cardboard boxes.

A first design for utilising the invention is represented in figure 1. Such an insert comes in the shape of a long ribbon destined to surround the product to be packed. In a preferred operating mode, which has the aim of achieving lateral stabilisation, the ribbon 1 is hollowed out, in an area which is to receive the product, to be packed to form a groove 2 while the lateral surfaces 7 which can be seen are destined to come into contact with the side walls of a box or a container. In an operating mode represented in figure 12 the surface 142 of the product which is to come into contact with the receiving area 141 of the packaging insert is hollow. It follows from this that the receiving area 141 of the insert must have the reciprocal shape 143 of that surface 142 of the product in such a manner as to constitute a convenient means of retention. In the same way the reciprocal shape 143 provided on the inner surface of the insert is adapted to the shape 144 of the receiving area.

In order to make better storage possible as well as good insertion into the container the bottom of the ribbon is extended by a reciprocal shape 3 which will fit perfectly into the groove 2. In this manner the inserts according to this mode of operation can be stacked without loss of space and constitute stable piles in the packing areas. The inserts, once cut, can be stored in a container with a lid which compresses the inserts reducing their volume if they are stacked.

This type of storage is shown in figures 6a and 6b. A container 50 is mad of sheet metal with an opening on top. The container 50 has the inserts which are cut to the required size piled in from the bottom up. It should be noted that the first insert 57 sitting on the bottom is compressed to its elastic limit and that the groove 57a receives the reciprocal shape 58a of the following insert 58.

The container 50 receives the inserts in several spaces which are limited by the plates 53 to 55. These plates are arranged in such a manner as to compress the inserts already stored, the inner wall surface having means of fixation in the form of latches 59 which make it possible to maintain the pressure on the stored volume even when charging or discharging the subsequent volume.

Finally, a cover of the top opening makes the compression of the last volume of stored inserts possible and thus to keep at hand in a small space a large number of inserts ready for use.

In a preferred mode of operation the material used for inserts is a polyurethane derivative and the compression ratio of the volume attained is 80 %.

In a preferred operating mode of the present invention the inserts are stored before they are cut to the desired size. Contrary to the preceding method of storage, the ribbon is stored in a roll and is compressed in such a manner as to further reduce the compressed space. In figure 7 a preferred operating mode has been represented with an insert ribbon container prior to the insertion operation of the products to be packed.

In figure 7 the container consists of two lateral discs 71 and 72 which are crossed by an axle 73 mounted on bearings 73a and 73b. Inside the space formed by the two discs 71 and 72 the axle 73 has a means for holding the ribbon 74. The ribbon 74 shown in figure 7a is rolled up in continuous rolls with the reciprocal shape 3 becoming embedded in the groove 2 of the insert shown in figure 1. In order to make the filling of the container possible one of the discs 71 or 72 is removable. One end of the "insert" is introduced by way of the compression rolls 76 and 77 and is pulled in until it engages on the means of attachment on the axle 73.

In one of the preferred modes of operation the two discs are joined by a circular solid part which has the purpose of keeping the rolled up ribbon compressed inside its container. Such a part is fabricated of steel sheet and is of roughly cylindrical shape with the discs 71 lnd 72 acting as covers.

When reeling the ribbon the bottom of the container has an opening 75 through which the desired length of insert is pulled in in the form of a ribbon. The distribution is ensured by two rolls 76 and 77 which prevent excessive expansion of the ribbon before it leaves the container 70.

For a better understanding of the invention the free end of the ribbon has been represented, which once cut to the desired length will serve as insert. It contains the groove 78 and the reciprocal shape 79. In general an insert according to the invention is designed in such a manner that its cross section is provided with retention shapes for the product. These retention shapes are formed perpendicular to the plane of the length of the insert.

Coming back to figure 1, in a preferred operating mode of the invention, it can be seen that the lower part of the insert which

is destined to come into direct contact with the walls of the packaging container are provided with three cuts 4 - 6 for the purpose of improving the flexibility of the insert which has to bend around the product to be packed. These cuts are made by means of a hot trimming knife in case of polyurethane inserts. In the case of other materials they are made by moulding.

In a preferred operating mode each cut goes across the whole available thickness of the support surface and is in the shape of a T. When the insert is bent at right angles to the cut, its vertical edges separate thus avoiding tears due to too large displacement of material at that point. The horizontal part of the T deforms into an arc producing a hinge.

In figure 2 a packing line has been represented which can be made entirely automatic with the means of the invention. The insert is stored in its container 9 and a length 8 is drawn out in such a manner that it is placed above the packaging area. Cutting devices 11 - 12 for the ribbon operate in such a fashion that they automatically adapt the length of insert drawn from container 9 to the requirements of the box and of the product which present themseves in the packaging area. In one mode of operation the cutters consist of a motorised cutting knife 11 and an anvil 12 on which the bottom of the ribbon rests.

In the packaging area a conveyor belt brings up a box 13 which is kept open by its turndown flaps 14 by means of an automatic device not shown in the drawing but well known to the expert. The box 13 rests on the conveyor belt through gravity and its opening is on top.

Above it the insert is arranged in such a manner that it is ready to enter the box in a good position without supplementary handling. Above the assembly, transported by another means of transfer, not shown but readily arranged for by the expert, a product 15 is brought up which has the general shape of a parallelpiped. It is placed in the groove 8a by gravity in the direction of the arrows designated 15a - 15d.

The depositing can be guided by the handling robot in such a fashion that the output of the line is improved relative to the case where gravity only is used to place the product into the container.

In the case of a product which has symmetric features, the planes defined by the lines 15b, 15c on the one hand and 15d, 15a on the other hand, the insert is cut between the hinges 8b and 8d, these being directions passing into the interior of the box 13.

In this manner the depositing of the product into the groove 8a of the insert 8 instals the product in the insert and pushes the whole into the box without the need for supplementary centering.

When the depositing is completed the surface 8c of the insert comes to rest against the bottom of the box 13 and the surfaces 8e and 8f are in contact with the three lateral walls of the box 13 which has been kept open. The surface 8g of the insert is still vertical, but the insert having left the packaging area, a robot can handle the turndown flap 14a and then the turndown flap 14b in such a manner as to strongly push the upper surface of the product into the continuous groove 8a of the free part of the insert.

At the end of the process the conveyor belt 17 is set in motion and takes away the packed box 13 to the means for sealing the box

which is not shown. Finally a new ribbon is pulled out of container 9 and an empty box is brought up.

In another mode of operation the box or container is brought up in an unexpanded form such as a carton folded flat or a heat shrinking plastic film. This mode of operation which is applicable to any packaging element such as a carton folded flat or a sheet of thermoformable synthetic resin, shows that the packaging process can be automated still further.

In figure3a a closed box has been shown in vertical section which contains a product packed with inserts and according to the process of the invention. The box 18 is closed and the insert 21 completely surrounds the product 19. The groove 21a can be seen which here gives lateral stability in the direction perpendicular to the plane of the figure.

There are three hinges: 22a, b, c. It can be seen that they contain a central part shaped like an arc with a strong curvature and laterally two straight line edges in the mass of the insert which make it possible to avoid transferring the internal stresses due to the strong curvature to the free ends of the insert.

In figure 4 a second mode of operation for placing inserts according to the invention has been shown. Here, a non solid technology is used by inflating beads and insert cushions. For this purpose the inserts are stored in two parts. The first consists of two sheets of flexible material 23, 24. Each sheet can be stored separately from the other on the drums 23a and 24a.

When an adequate length of sheet has been pulled out the two sheets are stuck together. This can be achieved according to the nature of the sheets:

- by heat welding,
- by adhesive,
- by placing rivets or other mechanical connectors.

In figure 4 thermowelding of the sheets is carried out along the two rods 31 - 32 which are separated by a distance L.

The length of sheet pulled out can be different from one sheet to another or from one cushion to the other. In the example shown in figure 4 the length of sheet 24 pulled out, is bigger than that of sheet 23. This arrangement makes it possible to adapt the shape of the cushions to the position which each of them will occupy in the box once packaging is completed.

In the case of cushions with a parallelpiped shape, the edges which are perpendicular to those of figure 4, are produced in the same manner. The expert knows how to adapt these closing operations to all sorts of shapes of cushions.

After closing the last free edge, an inflating agent is introduced which can be a gas, a liquid or a plastic solid which thus constitutes the second part of the inserts according to the invention. For the purpose of chosing his materials the expert knows how to juggle the resistances and relative elasticities of the sheets 23 and 24 and of the inflating agent.

In the preferred mode of operation the inflating agent is a liquid consisting of two bases materials or components. Such an agent is known for example under the name polyurethane foam in situ, either as a unit or in series. In such a system the two components are stored in liquid form and are mixed in proportions which are determined by producing in air a foam cushion in the interior of the space provided

for the two sheets. The gain in storage is 50 to 180 times. In another mode of operation the filling of the cushion is carried out automatically by means of powdered polystyrene in such a manner as to constitute a mass of globules or grains of various shapes. The gain in storage is about 50 times.

In this type of packaging insert according to the invention the insert is continuous. It is produced in the form of a linear chain of successive cushions of various shapes but which are determined by the relative lengths of the sheets pulled out at the top and the bottom 23 and 24. In figure 4 two cushions 29 and 30 are formed which are closed by the double welds 25, 26, 27, 28, 31, 32. The length L separating two successive cushions makes it possible to adapt the chain to the shape of the product to be packaged. Another function of the jointing zones of length L is to produce hinges between two cushions so that they can easily surround the product to be packed.

It can be seen that in this second type of insert which is a two part type, one in the form of sheets and the other in the form of an inflating agent, the packaging process according to the invention is also applicable. Automatisation can be pushed further.

In the figure 5a and 5b a closed box 39 has been represented after packaging with an insert of the second type and according to the process of the invention. Figure 5a is a schematic side view of the box 37 and figure 5b is a central section of figure 5a.

The packaged product 33 is completely surrounded by a chain of 4 cushions 34 - 37. The free ends 34a and 35a of the cushions 34 and 35 can be seen which originate from the cutting off of the chain of cushions utilised in the process according to the invention.

As in the first mode of operation with a solid insert, the cushion 35 is turned down when the box is closed by means of its upper turndown flap.

In another operating mode represented in figure 10, the plastic film presents itself in the form of a sleeve of indefinite length and which is welded between areas which are destined to become cushions. Essentially the same principle is used as with the previous cushions by producing a flat zone 120 bordered by two welds 121 and 122 and then a cushion 123 formed by the injection of an inflating agent and closed by a weld 124 the whole repeating according to the needs of the packaging on the line.

Other forms of inserts can be imagined in a manner to permit the adaptation of the invention to all sorts of packaging of simple or multiple products, of a parallelpiped shape or not.

In particular, various possible insert shapes have been represented in figure 8 in cross section with the product installed or not. The first insert 80 contains two grooves 81 and 83 which correspond to reciprocal forms 82 and 84. Such an insert can receive two products side by side. The second insert 85 contains a groove 88 of concave shape which corresponds to the reciprocal shape 87. The product can then have a lower curvature of concave shape.

The third shape 90 does not contain any reciprocal shape on its lower surface (which is however, not exclusive) but contains a groove 91 the bottom of which is provided with two cuts 92 and 93 the purpose of which is to permit small projections of the product to lodge in them without deforming the insert too much.

In figure 9 various possible insert shapes of the second type have been represented in cross section. These are produced as two component cushions with the product installed or not. The first insert 94 has a dumb-bell shape with two lateral cushions 96 and 97 and a connecting part 95 the whole being provided with an inflating agent. As before the chain can be obtained by assembling the two sheets 98 and 99.

The chain 100 contains three cushions 101 - 103 tied together by two thin sections 104 and 105. The whole is filled with a filler.

The insert 106 is a simple cushion of double convex lens shape consisting of two sheets 107a and 107b joined by a weld at 108 and 109.

The insert 110 consists of a chain of cushions 111, 112, ... the sheet 111a being stretched to the maximum and the sheet 111b being thermoformed in such a way as to form a cushion of the general shape of a parallelpiped.

The insert 115 has the same general shape but the welds 113 and 114 of the previous chain are replaced by sections 117 filled with an inflating agent like the actual cushions 116 and 118. Only the differences in volume distinguish the actual cushions (thicker) from their connecting parts (thinner).

In figure 11 a certain number of packaging modes have been represented which are adapted to various situations.

In figure 11a the packaging 130 consists mainly of a heat shrinking sheet which has been installed around the assembly consisting of

the insert 131, 134 and the product to be packed 132. The insert 131, 134 consists of cushions 131 and 134 which are separated or not, packed tightly by the shrinking of the film 132 around the product 133.

In figure 11b the packaging comprises a cardboard box 138 in the interior of which is suspended the assembly of insert 139 - packaged product 137 at heights H1 and H2 from the walls of carton 138. Here, the insert 139 consists of two cushions 140 and 142 joined by a flat section 141. The lateral pressure exercised by the closing of the box maintains the enveloping shape of each cushion around the product. The cushions 140 and 142 remain suspended in the box 138 by means of a blob of adhesive 143 and 144 applied prior to the introduction of the assembly of product and insert.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A packaging insert for maintaining and protecting a product in a container, wherein said insert is produced from plastic material in a continuous generally planar form and is cut to the desired size so as to substantially envelop the product, and wherein its cross- section contains retaining ~~portions~~ means which extend in the direction transverse to the plane of the insert for resisting displacement of the product in the container;

said retaining ~~portions~~ means being defined by at least one groove, said groove or grooves being arranged to receive the product and to hold it laterally, and wherein the insert contains at least one contact surface for contact with the internal surfaces of the container;

wherein the contact surface, which is opposite to an insert surface which has the retaining portions, has a shape generally reciprocal with that of the insert surface so as to allow stacking or rolling of the inserts in storage; and.

wherein the insert is in the form of a continuous ribbon, one side of which is the contact surface which comes into contact with the internal walls of the container, and which has pivoting means which facilitate its bending around the product.

2. The packaging insert according to claim 1, wherein the pivoting means comprises cuts in the material which extend laterally from the contact surface.

3. The packaging insert according to claim 2, wherein each cut extends across the width of the insert and, in the longitudinal section of the insert, each cut has the shape of a T.

4. The packaging insert according to claim 1, wherein the groove has means for receiving fragile projections of the product in contact with the insert.

5. The packaging insert according to claim 1, wherein

the groove, and the reciprocal shape of the contact surface extend the length of the insert.

6. A container comprising the packaging insert according to any one of claims 1 - 5, and having an axle which can move between two discs which are enclosed by a solid cylindrical drum which retains the rolled-up insert in a compressed state, and further comprises a means for unrolling a length of the insert on demand.

7. A container comprising the packaging inserts according to any one of claims 1 - 5, which have been cut ready for use into predetermined lengths, said container having several sectors which are filled with a plurality of compressed packaging inserts, and which are maintained in this compressed state by means of one or more covers held in place by attachment means.

8. A packaging insert as hereinbefore described with reference to and as shown in the accompanying drawings No's 1, 2, 3, 8 and 12.

9. A container as hereinbefore described with reference to and as shown in the accompanying drawings No's 6 and 7.

DATED this 13th day of February 1992

BULL S.A.
Patent Attorneys for the
Applicant:

F.B. RICE & CO.

FIG. 1

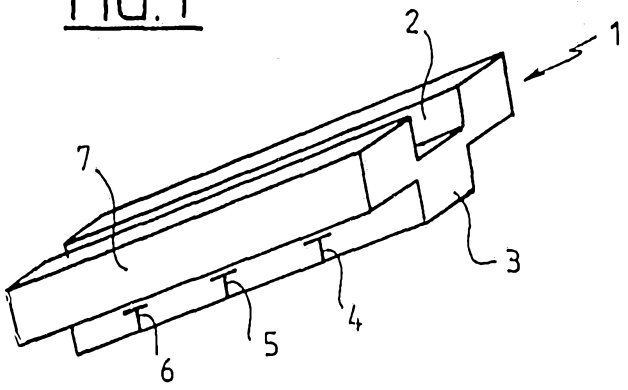
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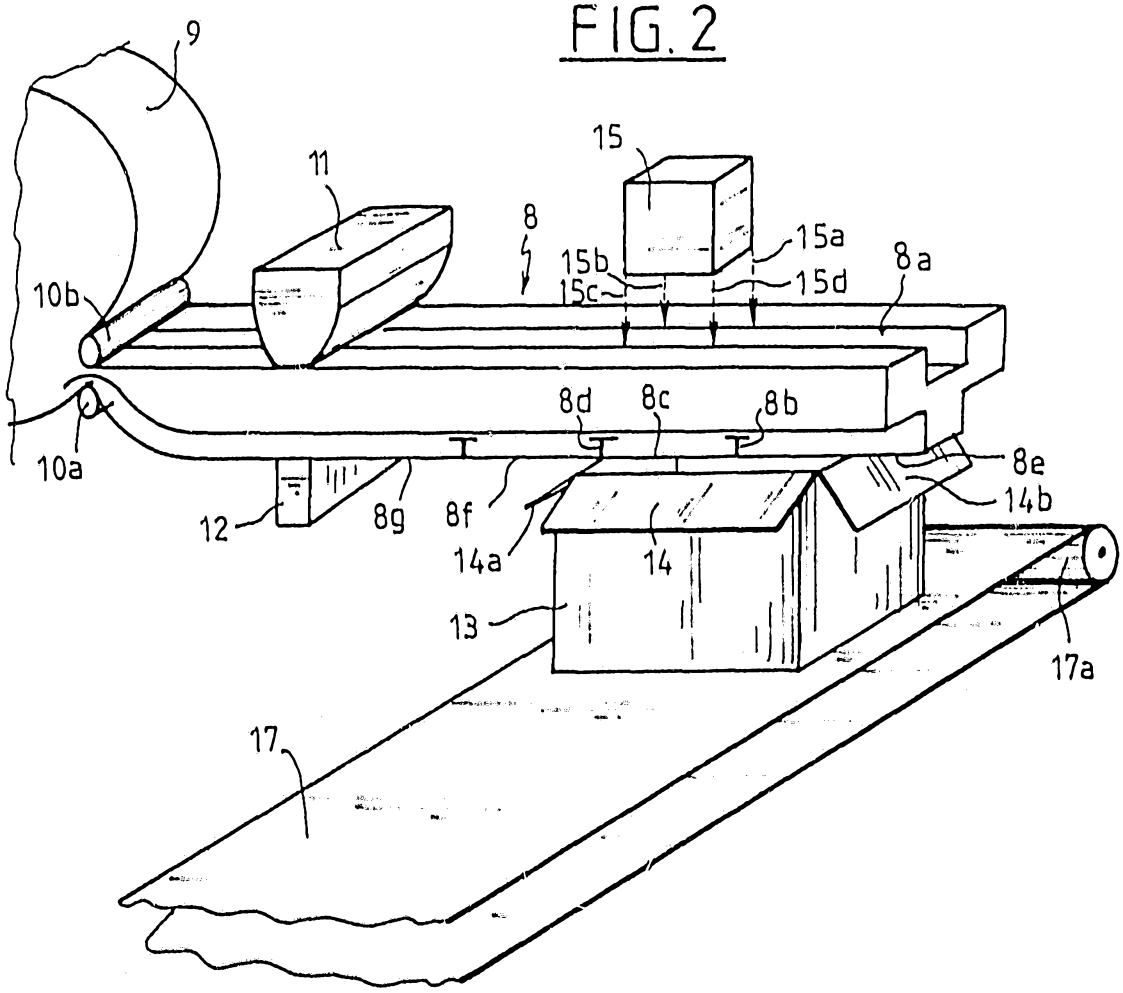
FIG. 2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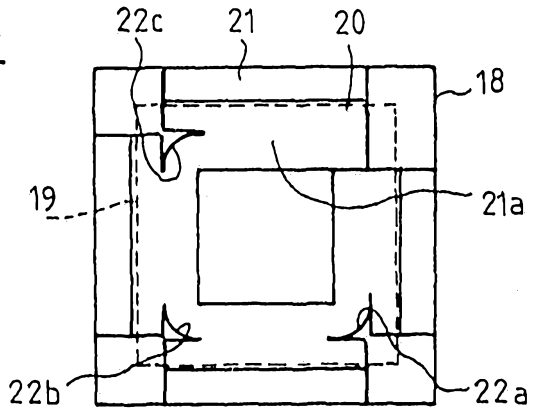
17a

FIG.3



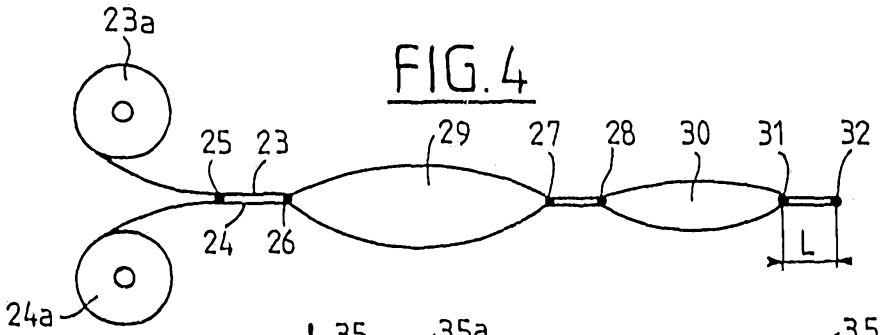


FIG.4

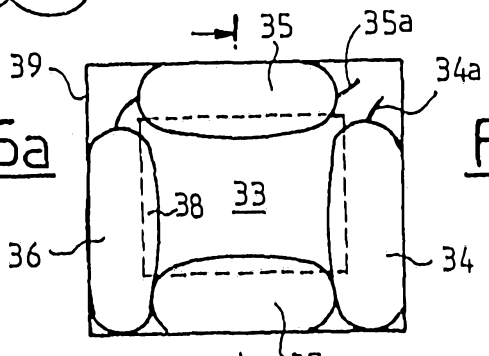


FIG.5a

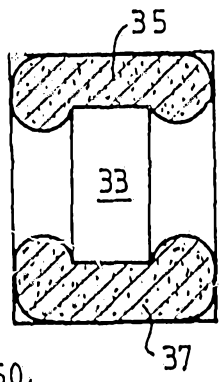


FIG.5b

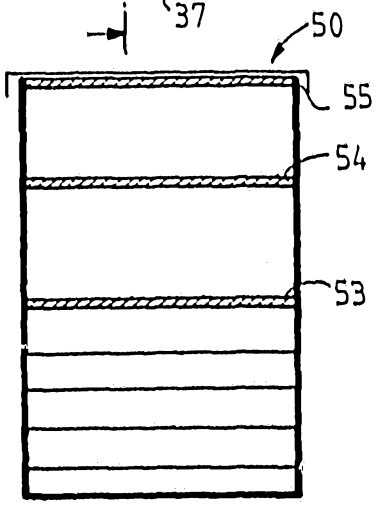


FIG.6a

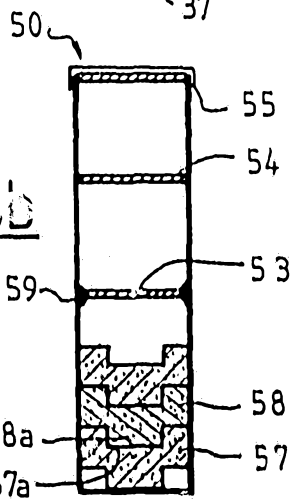


FIG.6b

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FIG.7a

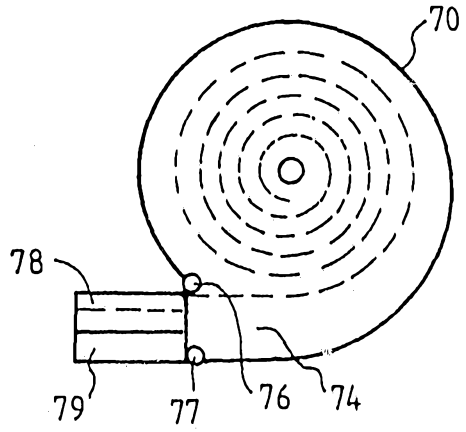

FIG.7b

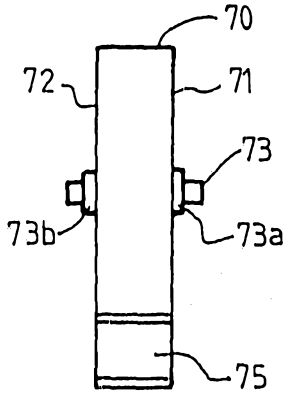

FIG.8

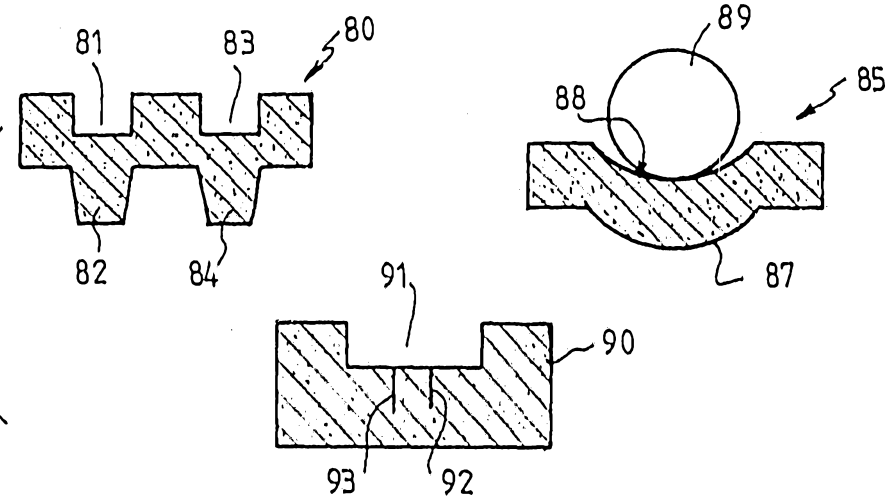

FIG.9

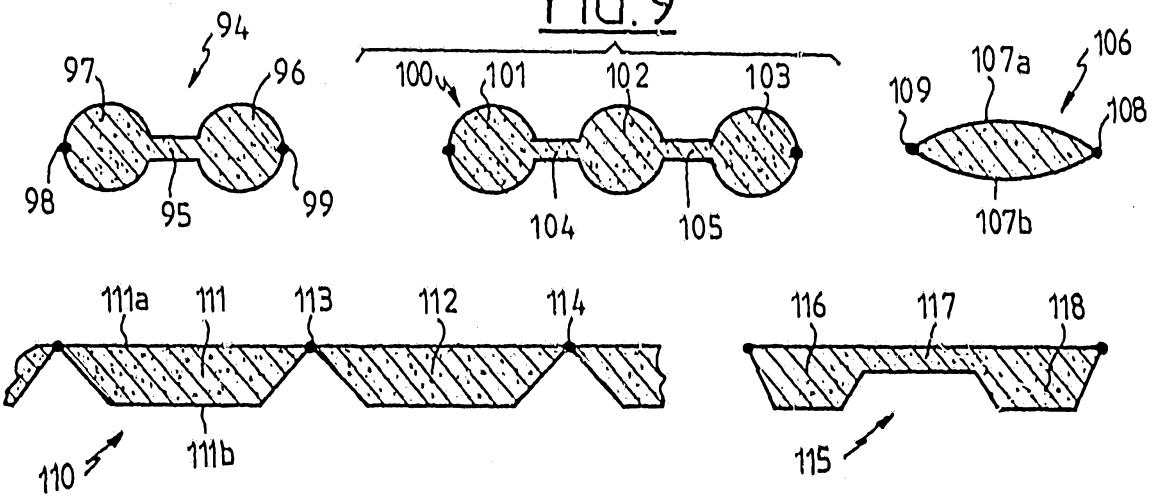

FIG. 10

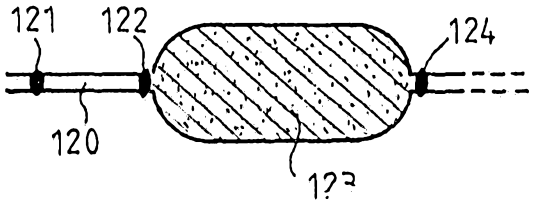

FIG. 11a

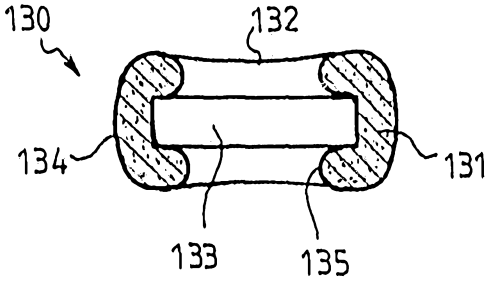

FIG. 11b

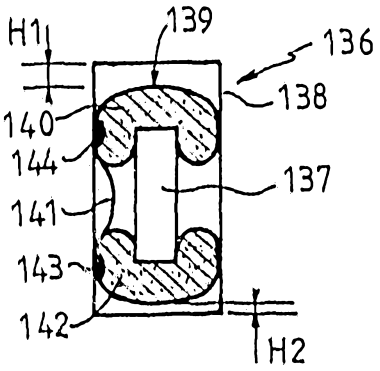

FIG. 12