METHOD FOR MANUFACTURING FOOD WRAPPING PROVIDED WITH AN EAS-TYPE ANTI-THEFT DEVICE, PRODUCTION LINE FOR CARRYING OUT SAID METHOD AND WRAPPING THUS OBTAINED

Fig. 1

A method for manufacturing food wrapping comprises a step of unwinding a strip of printable material from a first reel, a step of printing and drying the strip, a step of applying RFID tags to the back of the strip of printable material, so as to be hidden by the print, a step of joining a tubular strip of material onto the back of the strip of printable material so as to obtain a laminate, and a step of longitudinally cutting the tubular strip. Transverse and longitudinal cuts produce wrapping formed by a laminate consisting of a sheet portion (40) of printed material and a film (41) of food-grade material, with RFID tags (20) arranged in between. A production line comprising an apparatus (5) for applying RFID tags including a plurality of labellers (12) displaceable within the width of the strip of printable material is also described.
"Method for manufacturing food wrapping provided with an EAS-TYPE anti-theft device, production line for carrying out said method and wrapping thus obtained"

Field of the invention

The present invention relates to a method for manufacturing food wrapping provided with an EAS anti-theft device and a production line for implementing said method. The invention also relates to the wrapping thus obtained, in particular sheets of paper joined to a film of food-grade plastic provided with flaps.

Prior art

EAS (Electronic Article Surveillance) devices refer to the category of devices which are designed to prevent shoplifting in public trading premises, these devices usually being arranged on tags or labels and being intended to be detected by acoustic or luminous systems located at the exit of the premises. Various types of electronic surveillance devices exist: i.e. of the magnetic, magnetostrictive, radiofrequency or microwave type. All of these emit electromagnetic energy and therefore interfere with electronic apparatus situated at an entrance of the trading premises and designed to detect the passage of a stolen article.

Among the various systems, radiofrequency systems are those which interfere the least owing to their limited power and very low frequency range of between 1.75 MHz and 9.5 MHz, more commonly 8.2 MHz, which can be easily screened. Source tagging refers to the application or fixing of an EAS device, performed by the supplier or manufacturer, either during manufacture of the wrapping or directly on the product itself at the production plant, instead of at the retail sales outlet. Source tagging frees the retailer from the need to apply the EAS device and reduces the delay between reception of the merchandise and placing of the merchandise on sale. The greatest advantage for the supplier is the possibility of maintaining unaltered the aesthetic
appearance of the wrapping, within which the EAS device is concealed and from which, therefore, it is difficult to remove.

With regard, for example, to merchandise which is normally wrapped at the "gastronomy" counter of trading premises, it should be pointed out that said merchandise is usually inserted inside paper bags and handed over to the customer after attaching a label showing the price, weight and other information. Owing to the typical size of the bags, as well as the nature of the contents, which are often very supple, they may be easily hidden by the customer, who is able to place them, for example, inside the pockets of clothing or inside bags for carrying personal items.

Shoplifting involving the abovementioned food articles could be prevented by placing an anti-theft label on the bag containing the article.

However, it can be easily understood that the application of a conventional anti-theft label on the outside of the bag would give rise to the following problem: potential shoplifters could attempt to remove the anti-theft label from the wrapping of the food article, should the label be readily identifiable or recognizable.

Many patents have attempted to deal with the abovementioned problem.

Among these, the patent US 5,790,029 describes EAS labels which are applied to an article to be protected by fixing or gluing the label seat or support to the outer surface of the article. The cited patent describes how it has been attempted to make incorporation of EAS labels in various types of articles less visible and that these alternative solutions are perhaps most difficult to realize in the case of articles which contain foodstuffs or medicine. One proposition is to wrap an EAS label inside a flexible sealed sachet, and to place this sachet, together with the EAS label inside it, inside an article which contains
foodstuffs or medicine. However, this EAS label inside a sealed sachet is not suitable for use in wrapping which is prepared at the time of sale, since it would be easily identifiable separable therefrom.

The patent US 5,982,284 describes electronic devices of the type in question which may be laminated into a tag or label in order to prevent a theft. US 5,982,284 identifies the problem where, although these electronic protection devices are relatively thin, they nevertheless form a step on the surface receiving them. This step, in addition to making their presence obvious, complicates reading thereof. Therefore, the object of US 5,982,284 is to provide a tag or label such that the edges of the device are concealed within the lamination so as not to reveal the presence of the device, but at the same time prevent the difficulties of reading the variable information printed on the outer surface of the tag or label. In particular, one object of US 5,982,284 is to conceal the step represented by the edge in the outer perimeter of the electronic protection device and also its volume. The problem is solved by a tag or label comprising a flat and thin flexible electronic device arranged between facing sides of two sheet portions and an adhesive substance which fixes the facing sides of the sheet portions to the opposite flat surfaces of the device and to each other, except for an adhesive-free zone, which is varyingly defined. Also in the case of the abovementioned patent, knowing that the EAS label is associated with the price tag, the shoplifter may remove in one go both the label and the tag, throw them away and leave the premises, hiding the unpaid merchandise on himself.

The patent EP 1054369 describes a method for manufacturing sleeves, from a strip, which are intended to surround a product such as a spray can. During the sleeve forming process an adhesive is applied for fixing a anti-theft protection device which, in one embodiment, is located inside the sleeve so that it is not visible. It can be understood that this solution is not suitable for the purchase of merchandise from a "gastronomy" counter.
The patent FR 2762120 describes a sheet or a bag intended to contain an article on sale, incorporating a detectable element made of magnetic material. The element is in the form of a metal wire situated between two layers of paper or between a layer of paper and a layer of polyethylene, which form the sheet or the bag. The magnetic element may be fixed in position by means of a self-adhesive substance or heat weld in a plastic layer and is incorporated during manufacture. The solution is designed to solve the problem of concealing the EAS device inside the packaging, but does not state how the cashier is able to deactivate the protection device when a regular payment is made by a customer.

The patent application US 2009/0096609 describes a method for manufacturing an RFID (radiofrequency identification) label or tag on a wrapping material such as a sheet of plastic. The method comprises the steps of: gravure-printing a protective layer on the inner side of the sheet, a dissolving layer made of water-soluble material on the protective layer and a pattern without water-soluble material in a predetermined zone of the dissolving layer; forming a conductive layer on a surface of the dissolving layer and on the predetermined zone; rinsing the inner side of the sheet using an aqueous solution in order to remove the protective layer from the water-soluble material and the conductive layer with the pattern without the water-soluble printed material in the predetermined zone so as to form an antenna pattern; connecting a chip to a feedback terminal of the antenna so as to form the RFID tag on the inner side of the sheet; and combination of an inner side of the sheet with an inner side of a substrate by means of a coupling agent in order to manufacture the wrapping material using the RFID tag.

It can be understood that this method of manufacturing RFID tags on a sheet has the advantage of applying directly an RFID tag on a sheet; however, this method is complex and not easy to apply in practice.
An undoubtedly simpler method of applying an RFID tag onto a bag is that described in patent application CN101462603. The method comprises gluing a plurality of RFID labels or tags onto a backing strip and applying the latter onto a device for forming wrapping bags so that the backing strip moves in the same direction as the material which forms the bags. It is envisaged that the backing strip of the RFID tags changes direction moving towards the material which forms the bags, and each RFID tag, owing to this change in direction, is detached from the backing strip, is positioned on the material which forms the bags and is then pressed against it so as to be glued at uniform intervals so that each bag is provided with an RFID tag, once the bag has been folded and cut to size.

The complication arising from the additional operations for preparing the roll carrying the RFID tags is evident. Moreover, it is not possible to see or deduce the zone for positioning the labelling system on the production line.

Moreover, the speed of deposition of the labels is low precisely because a multiple application system is not envisaged.

The method of gluing RFID tags to bags, as described in the Chinese patent application CN101462603, could also be applied to the single sheets of paper, but what is not described or is evident is the possibility of positioning along a line for producing laminated paper one or more labelling machines able to apply RFID tags at regular intervals between the two layers of material to be joined together.

At the "gastronomy" counter of trading premises, the amount to be paid is printed on an adhesive label and this is normally applied so as to seal the products acquired by the customer inside a bag. Once it is known that an EAS device, in particular an RFID tag, is present on each bag, it would be easy for the customer with fraudulent intentions to neutralize the surveillance activity in a safety system which envisages this type of protected wrapping, by discarding the bag.
hiding the products acquired at the gastronomy counter of the trading premises in pockets or other bags, and not paying for them at the cash till.

In order to avoid the economic loss arising from this practice the RFID tag could be applied not to the bag, but to each sheet of paper used for wrapping purposes. Normally, this sheet has standard dimensions and may be of the laminated type, i.e. formed by at least two different layers which are glued together and if necessary provided with flaps for facilitating wrapping.

Summary of the invention

An object of the present invention is therefore to provide a food wrapping in the form of a laminated sheet which can in turn be divided up into sheets or smaller sheet portions of suitable predefined size, each containing an RFID tag concealed inside it, so that any fraudulent removal of the tag produces the consequent breakage of the packaging and the direct exposure of the food article externally.

Another object of the present invention is to provide a laminated sheet provided with RFID labels or tags wound in the form of a reel, characterized by diameters which are substantially uniform over its entire width, namely the labels are uniformly distributed in the reel, avoiding the formation of an irregular thickness. In order to achieve this, the RFID tags must be applied at non-uniform intervals over the entire surface of the laminated article, while ensuring the presence of at least one RFID tag on the individual sheet portions which are formed during unwinding and cutting of the reel.

A further object of the invention is to provide a method for manufacturing food wrapping characterized in that the RFID positioning operations are performed by means of at least one labeller as described in Claim 1.
Yet another object is to provide an apparatus which performs insertion of an anti-theft device of the EAS type in a food wrapping in the form of a foldable sheet portion as defined in the accompanying claims.

Preferably, it is envisaged positioning a plurality of labellers along the line for production of the laminated sheet with RFID tags according to the present invention. More preferably, the labellers are positioned movably so as to solve the problems of thickness created by the application of the tags on the laminated sheet. In fact, in order for a reel of paper provided with RFID labels or tags to have a diameter which is substantially the same along its width the labellers are advantageously displaceable longitudinally and/or transversely with respect to the direction of feeding of the strip of material which forms part of the laminate (for example paper) so that it is possible to apply single RFID tags in different successive positions along the respective sheet portions of the laminate.

Further objects will become clear from the detailed description of the invention below, with reference to preferred embodiments, it being understood, however, that variations are possible without departing from the scope of protection defined by the accompanying claims and with reference to the figures of the accompanying drawings.

**Brief description of the Figures**

Figure 1 is a schematic side view of a line for producing a reel of paper or other flexible material in sheet form, provided with an apparatus for inserting an anti-theft device of the EAS type, in particular an RFID tag;
Figure 2 is a schematic side view, on a larger scale, of an apparatus for inserting RFID tags according to the present invention;
Figure 3 is a schematic front view of Figure 2 of the apparatus for inserting RFID tags according to the present invention, also showing a mechanism for lateral displacement of the machine;
Figure 4 is a schematic view of a part of the strip of paper or other flexible sheet-like material on which the RFID tags are applied; and Figures 5a, 5b are schematic perspective views of two embodiments of a sheet portion for food packaging, provided with an RFID tag according to the invention, one being without (Figure 5a) and one being with (Figure 5a) flaps.

**Detailed description of the invention**

In the following, the term "laminate" or "laminates" is understood as meaning wrapping resulting from joining together of at least two flexible materials, different from each other, in the form of a sheet or strip. The laminates according to the invention are preferably in the form of multiple-layer sheets comprising at least two layers of material chosen from among those which are commonly used in the food packaging sector, typically plastics, paper of varying weight, metals. Typically the RFID tags will be inserted between the at least two layers or sheets.

 Preferably, the wrapping according to the invention is made in the form of a laminate comprising a layer of paper, which forms the outside of the packaging, and a plastic film, in particular a sheet with flaps, as will be seen below, forming the inside of the packaging and located in direct contact with the foodstuff, the RFID tags being inserted between the two sheets.

The process for producing the laminates for food packaging, as shown in Figure 1, which is a schematic side view of a production line according to the invention, envisages processing steps involving a reel, usually of paper, which is unwound, printed on its outer or front side and dried; then a film of food-grade plastic, previously coated with a layer of adhesive, is applied onto the inner side or back of said paper, so as to form a paper/plastic laminate which will be either cut on the production line into portions with given dimensions, so as to form the sheet portions which form the food packaging or wrapping, or wound
onto reels so as to be cut at a later time into sheet portions. The sheet portions thus obtained may be used for wrapping in which the foodstuff is in contact with the plastic film and on the outside of which the printed paper is situated.

The sheet portions according to the present invention each contain an RFID tag arranged between the paper and the plastic film. The problems associated with the application of said tags arise from the need to modify the food wrapping production line by inserting an apparatus for applying said labels or tags in such a way as not to interfere with the production and maintenance operations of the line which typically travels at very high speeds.

With reference to Figure 1, 1 denotes a reel of printable material, usually paper, 2 denotes an exhaust fan for odours and vapours, 3 denotes a four-colour flexographic printer, 4 denotes a bridge for drying the print in hot air, 5 denotes an apparatus for applying RFID tags on the unprinted inner side or back of the strip 1a of paper, 6 denotes a hot-air drying fan, 7 denotes a unit for spreading adhesive, typically a water-based vinyl glue, on a film - which may be in the form of a tubular strip - of plastic material for food packaging, such as polyethylene or the like, 8 denotes a paper/film joining zone for obtaining the laminate 11, 9 denotes a supply reel or a series of supply reels for the plastic film, 10 denotes a stroboscope for checking alignment of the print, and 11a denotes an end reel of paper of the laminated paper/film type provided with RFID tag. In alternative embodiment, the laminate 11, instead of being wound in the form of reel, may be sent to a cutting station (not shown) for forming a plurality of sheet portions. The reel 9 may be a series of reels which are joined together. The number of reels 9 in the series is equal to the number of sheet portions into which the paper strip 1a will be divided in the direction of its width.

In Figure 2, which is a partial, schematic, side view, on a larger scale, of Figure 1, it is shown the apparatus 5 for inserting RFID tags
according to the present invention. The apparatus 5 for applying RFID tags onto the unprinted inner side of the strip 1a of paper comprises labellers of the known type, for example the Etipack Super 1.3 HS, which are individually denoted by 12 and provided with facing plates 13 for applying the tags to the unprinted inner side of the strip 1a. For this arrangement it is necessary for the sheet 1a to be deviated by the deflector rollers 23 situated downstream of the print drying bridge 4 and upstream of the adhesive spreading unit 7.

This is the best zone along the production line for inserting the apparatus 5 since the labellers do not interfere with the normal activities for maintenance of the rotating mechanisms; nor do they prevent the normal replacement of the print plates or replacement of the reels of paper and polyethylene: this is moreover a fairly spacious zone for being able to house up to six or twelve or even more labellers according to requirements, as will become clear in the remainder of the description. Typically, the arrangement of six labellers, at a distance of 25 cm from each other, in parallel, covers a width of 150 cm, which is the maximum width of the paper strip 1a.

This arrangement is good, but may be improved as regards the aspects illustrated below: the RFID tag has a thickness of about 0.2 mm, i.e. greater, by at least one order of magnitude, than the thickness of the paper, which is equal to 0.02 mm.

If, for space-related reasons, a cutting station is not provided along the production line, the problem arises that the paper/film laminate must be rewound onto reels, after insertion of the RFID tags between one layer and the other of the laminate. It is evident that winding of the laminate provided at regular intervals with RFID tags will produce a reel which has an unequal diameter over its entire width, precisely owing to the presence of RFID tags which are applied substantially always at the same point by one or more labellers.
The RFID labels deposited always at the same point on the reel will inevitably result in zones which are raised at the insertion point, compared to unoccupied zones of the laminate, and will give rise to major irregular zones on the final reel, which may reach the significant length of 10 km of wound product.

The solution to the problem is that of distributing the RFID labels in the most rational manner possible along the strip, so as to avoid puckering on the surface of the reel. This problem is solved by increasing the number of labellers which operate on the strip, so that, instead of one or two or six labellers, twelve labellers may be envisaged. This embodiment is advantageous, but involves an obvious increase in cost of the plant.

A particularly advantageous alternative solution is that of displacing transversely, with respect to the travel path of the strip, the group of six labellers simultaneously. After depositing a first row of six RFID tags, the second row will be deposited staggered relative to the first row at a distance equivalent to the width of the RFID labels. This arrangement is shown in Figure 4.

The longitudinal displacement is less critical since winding up of the strip already per se creates a staggered effect of the tags due to the increase in the diameter of the reel. However it is possible to envisage movement of the labellers both longitudinally and transversely with respect to feeding of the strip, which may be computer-assisted where necessary.

With this operating mode it is possible to obtain a fairly consistent radial displacement of the RFID labels which, when wound onto the end reel with the increasing radius of the latter, will result in positioning of the labels which is not superimposed as the diameter of the reel increases.
Figure 3, which is a schematic front view of Figure 2, shows a preferred arrangement of the apparatus 5 where six labellers 12 are positioned for insertion of RFID tags according to the present invention. As shown, the plates 13 are positioned, all aligned, in the direction of the width of the paper strip 1a.

With reference to Figure 3, this shows the group of six labellers 12 mounted on a labeller carriage 14 slidable within a frame 15. The labeller carriage 14 is mounted on upper guides 16 and lower guides 17. The same guides are provided with (four in the embodiment shown) separate actuator carriages denoted by 18a, 18b, 18c and 18d. Each actuator carriage 18a, 18b, 18c and 18d is, in turn, provided with a plurality of pneumatic pistons which are faster than hydraulic pistons (three in number in the embodiment shown) denoted generally by 19.

In the position shown in Figure 3 the pneumatic pistons 19 of the first actuator carriage 18a, i.e. the one closest to the labeller carriage 14, are able to displace to the right in the figure the carriage 14 by a travel distance equal to that of their rods. Thereafter, it will be the actuator carriage 18b which pushes to the right the actuator carriage 18a together with the labeller carriage 14. In this way, with each displacement of the labeller carriage 14, a row of labels, denoted by 20, will be applied onto the strip of paper 11 shown in Figure 4. Each label, from one row to another of the sheets, will be displaced by a distance equal to the distance of the actuators, within the dimensions of the sheet 22 into which the strip of paper 11 will be cut. It can be seen that, in the arrangement adopted where four actuator carriages 18a, 18b, 18c and 18d are used, a sequence of movements of the pneumatic pistons to the right and to the left is possible so as to achieve uniform application of the RFID tags.

Figure 4 is a schematic view of a part of the strip of paper 1a on which the RFID tags are applied. Each sheet portion, denoted by 40 and incorporating a tag 20, is defined by transverse lines a and longitudinal lines b, in the direction of the width and the length of the
strip of paper 1a, respectively. Owing to their distributed arrangement on the strip 1a, the tags 20, which have a thickness greater than that of the strip 1a, will not form raised zones which would result in the formation of a discontinuous diameter of the end reel 11a of laminate, in the direction of its width.

Figures 5a and 5b show two different embodiments of a laminated sheet portion for food packaging, provided with an RFID tag according to the invention, obtained by means of the application of a strip of food-grade plastic. A first embodiment, without flaps, is obtained by joining a sheet of plastic material (Figure 5a). A second embodiment, provided with flaps 42, 43, is obtained from a tubular strip, the sheet or the tubular strip being wound onto the reel 9.

In addition to the sheet 40 provided with tag 20 in the apparatus 5, the laminated sheet portion consists of a film of polyethylene or the like obtained from the sheet or from the tubular strip supplied by the respective reel 9, with a width equal to the width of the sheet portion. The flaps 42, 43 are obtained by means of longitudinal cutting of a single side of the tubular strip in a position of the production line upstream of the end reel 11a. For this purpose a number of devices (not shown) for longitudinally cutting the tubular strip of polyethylene, corresponding to the number of rows of laminated sheet portions to be obtained, will be provided. The flaps 42, 43, already known in this type of packaging and for this reason not further described in detail, are intended to create a wrapping with improved characteristics for wrapping the food product. The present invention improves this wrapping with the addition of the tag 20 arranged between the non-cut side 41 of the film portion and the sheet portion 40 to which the non-cut side 41 is attached.

**Operation**

Operation of the production line according to invention is now described. The strip 1a is unwound from the reel, conveyed by means of
the rollers 35 into the printing zone 3 where, on its outer side, the print is applied by means of the flexographic system using water-based colours. Then the printed strip passes into the drying zone 4 and is driven by the rollers 23 so that the labellers 12 apply tags 20 onto the unprinted inner side of the strip.

From the zone of the reel 9 the tubular strip of polyethylene film is simultaneously unwound and in the zone of the adhesive spreading unit 7 is spread on one side with water-based vinyl glue.

The strip 1a with the RFID labels or tags 20 is laminated in the paper/film joining zone 8 together with the strip of polythene over which glue has already been spread. At this point of the manufacturing process the laminated film undergoes an optical check in the zone 10 for print alignment by means of a stroboscope. The laminate 11 is then rewound onto the reel 11a, after any longitudinal cutting of one side of the tubular strip when a strip, and not a sheet of polyethylene, is used, as described above.

It is possible to envisage a further cutting zone (not shown) where the laminate 11 is cut, if necessary with successive cutting steps so as to obtain the final dimensions of the sheet portion with the tag concealed between the paper and the polyethylene film. In this way, after the foodstuff has been wrapped with the sheet portion, any tampering in order to remove the tag will result in the foodstuff falling out in a highly inconvenient manner, thereby discouraging any shoplifting attempt.

The particular embodiments described here do not limit the content of this application which covers all the variants of the invention which will be evident for the person skilled in the art.
CLAIMS

1. Method for manufacturing food wrapping comprising a step of unwinding a strip of printable material from a first reel, a step of printing the strip of printable material on its front side, a step of drying the strip, a step of joining a sheet or a tubular strip of food-grade material to the back of the strip of printable material in the direction of feeding thereof so as to obtain a laminated strip and an optional step of longitudinally cutting the tubular strip of food-grade material, characterized in that it is provided, between the drying step and the joining step, a step of applying RFID tags by means of at least one labeller to the back of the strip of printable material in positions such that at least one RFID tag is hidden by the print in one wrapping, when the wrapping is obtained in a subsequent step involving cutting of the laminated strip into sheets.

2. The method according to Claim 1, characterized in that said subsequent step of cutting the laminated strip into sheets is performed immediately after the step of longitudinally cutting the tubular strip of food-grade material.

3. The method according to Claim 1, characterized in that it further comprises a step of winding the laminated strip onto a second reel or end reel after the step of longitudinally cutting the tubular strip of food-grade material.

4. The method according to Claim 3, characterized in that said subsequent step of cutting the laminated strip into sheets is performed immediately after the step of unwinding of said second reel or end reel.

5. A production line for carrying out a method for manufacturing food wrapping, comprising a reel (1) with a strip (1a) of printable material, an exhaust fan (2) for odours and vapours, a four-colour flexographic printer (3), a print drying station (4), a lamination station
including a unit (7) for spreading an adhesive substance on at least one strip of food-grade material and a roller joining zone (8) for obtaining a laminated strip (11) on an end reel (11a), characterized in that an apparatus (5) for applying RFID tags (20) onto the unprinted back of the strip (1a) of printable material is provided between the print drying station (4) and the downstream lamination station.

6. The production line according to Claim 5, characterized in that the apparatus (5) for applying RFID tags (20) comprises at least one labeller (12) provided with plates (13) for applying the RFID tags (20).

7. The production line according to Claim 5, characterized in that the apparatus (5) for applying RFID tags comprises a plurality of labellers (12) positioned in a fixed manner so that their plates (13) are arranged side-by-side within the width of the strip of printable material.

8. The production line according to Claim 5, characterized in that the apparatus (5) for applying RFID tags comprises a plurality of labellers (12) positioned in a movable manner so that their plates (13) are displaceable within the width of the strip of printable material.

9. The production line according to Claim 8, characterized in that the plurality of labellers (12) is mounted on a labeller carriage (14) slidable inside a frame (15) on upper guides (16) and lower guides (17), the said guides being provided with separate actuator carriages (18a, 18b, 18c, 18d), each being provided with a plurality of pneumatic pistons (19) capable of moving the labeller carriage (14) and any actuator carriages (18a, 18b, 18c, 18d) arranged in between.

10. Food wrapping comprising a sheet portion (40) of printed material on its front side and a film (41) of food-grade material joined by means of an adhesive substance to the back of the sheet portion (40) of printed material, characterized in that an RFID label or tag (20) is
positioned between the sheet portion (40) of printed material and the film (41) of food-grade material.

11. Food wrapping, characterized in that the film (41) of food-grade material is provided with flaps (42, 43).
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. B65D65/18 B31B1/90

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

B65D B31B G08B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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**Further documents are listed in the continuation of Box C.**

**See patent family annex.**

**Date of the actual completion of the international search**

14 November 2011

**Date of mailing of the international search report**

24/11/2011

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2

NL - 2280 HV Rijswijk

Tel. (+31-70) 340-2040,

Fax. (+31-70) 340-3016

Bevilacqua, Vincenzo
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