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ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI,  
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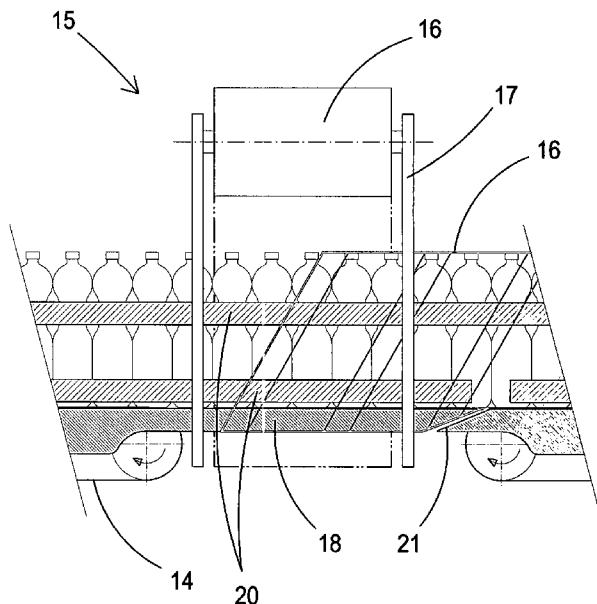
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- (54) **Title:** WRAPPING MACHINE AND METHOD FOR THE FORMATION OF BUNDLES OF PRODUCTS

**Fig. 4**



(57) **Abstract:** A continuous sleeve wrapping machine in elastic film, to which products to be packaged (13) are fed consecutively, individually, or in several rows, comprising a series of consecutive conveyor belts (14), positioned one after another, longitudinally aligned, on which the products advance from a product feeding area (13) to an unloading area of bundles of products (12), the conveyor belts (14) being spaced in a section which envisages at least one binder (15) which spirally wraps transversally to the advance direction of the products (13), supported in this section by fixed rigid underlying guides (18), the guides (18) comprising, at the end of the binder (15), an upward sliding portion (21) which allows the film to be removed from the fixed guides (18) and firmly positioned on the products (13), downstream of the at least one binder (15) and the upward sliding portion (21), there being a cutting group (22) which effects the separation of the long continuous wrapping of the film around the products (13) into a series of bundles (12) having predefined dimensions and number of products. The invention also relates to a method for producing bundles in (extendible) elastic film.

## WRAPPING MACHINE AND METHOD FOR THE FORMATION OF BUNDLES OF PRODUCTS

The present invention relates to a continuous sleeve wrapping machine in elastic film.

The invention also relates to a method for the production of bundles in (extendible) elastic film.

In the field of product packaging, bundles or group of products, of the most varied types, are currently mainly obtained through sleeve wrapping machines which use heat-shrinking wrapping film before being sent to a heat-shrinking oven.

For this type of machine, a 25 g heat-shrinking film is used for each bundle, which must be associated with an oven of about 1,000 KW.

It is therefore necessary to avail of a certain amount of film and a certain weight per bundle, in addition to having the necessary resources for purchasing an oven and the power for its functioning with certain energy consumptions. The cost of each bundle is consequently quite significant due to the above-mentioned factors.

An elastic film would allow some saving, at least with respect to weight per bundle, but for the moment no application is envisaged in which this type of film could be used, which would eliminate the necessity of the heat-shrinking oven.

Furthermore, it must be considered that in current wrapping machines, in order to wrap a group of loose products, i.e. to effect the final packaging, the presence of a manipulator or robot is required. The latter must in fact be able to collect the pack or set of products, selected in the right number and in the final position requested, to be packaged as they advance on a conveyor belt of the selection machine. The manipulator or robot must grasp a group thus composed and move it to the bundler, where the film to be wrapped around it has been laid, before sending it again onto the conveyor belt of the selection and/or advancement machine.

And this takes place both in the case of wrapping machines at the side of and synchronized with the conveyor belt, where the packaging rate is reduced so that the necessary operations can be effected, and also in the case of packs or groups of products already ready to be packaged, which are stacked in a suitable area.

It can be seen that this arrangement implies further investment, activation and maintenance costs, in addition to possible operators for the activation of the manipulator associated with the wrapping machine.

A general objective of the present invention is to solve the above-mentioned drawbacks of the known art in a very simple, economical and particularly functional man-

ner.

Another objective of the present invention is to provide a wrapping machine which can produce bundles in continuous, directly effecting the selection and packaging of the groups of products, with a material such as an elastic film.

Yet another objective of the present invention is to minimize the number of machines necessary for wrapping the final bundle, for example by eliminating the oven and/or the separate machine for selecting or arranging the products in groups.

A further objective of the present invention is to accelerate the wrapping operations to the maximum, avoiding movements of the single group or pack to be wrapped in the film.

In view of the above objectives, according to the present invention, a continuous wrapping machine in an elastic film has been conceived, having the characteristics specified in the enclosed claims.

The structural and functional characteristics of the present invention and its advantages with respect to the known art will be even more evident from examining the following description referring to the enclosed drawings which show an embodiment of a continuous wrapping machine in an elastic film produced in accordance with the inven-

tion.

In the drawings:

- figure 1 is a raised schematic side view of a continuous wrapping machine in an elastic film produced in accordance with the invention;
- figure 2 is a schematic plan view of the wrapping machine of figure 1;
- figure 3 is an enlarged sectional view following the traces III-III of figure 1; and
- figure 4 is an enlarged detail of figure 1.

With reference to the figures, these illustrate a schematic view of a continuous wrapping machine in (extendible) elastic film produced according to the invention, indicated as a whole with 11.

The wrapping machine 11, in the example illustrated, produces bundles 12 consisting of a group of loose products, such as bottles 13, grouped into two rows upstream by means of suitable feeding (not shown in the example) which arranges the products.

The wrapping machine 11 comprises a series of consecutive conveyor belts 14, situated one after another, longitudinally aligned and spaced as specified hereafter, on which the products, in the example the bottles 13 in two rows, advance from a feeding area of the bottles 13 to a discharge area of the bundles 12.

In the wrapping machine 11, there is at least one wrapping group, consisting of a binder 15 by means of a roll of elastic film 16, positioned on a frame 17, situated transversally with respect to the advance direction  
5 of the products, i.e. of the two rows of bottles 13. In particular, in the example shown, there are two binders 15, spaced between each other.

No conveyor belt 14 is envisaged in correspondence with this binder 15, and the products (bottles) 13 are  
10 supported on rigid fixed guides 18 and slide forward pushed by the products (bottles) 13 which are behind, positioned on the conveyor belts 14 which rotate continuously.

The conveyor belts 14, longitudinally facing the  
15 fixed rigid guides 18, are preferably inserted in longitudinal notches 19 situated on the guides 18, so as to better exert their advance action on the one hand (upstream), during the sliding on the guides 18 and the withdrawal of the same (downstream), on the other.

20 At the sides, on each part of the conveyor belts 14 and fixed guides 18, longitudinal vertical guiding slides 20 are envisaged, at different heights laterally with respect to the products, which prevent the overturning of the bottles 13 as they move forward.

25 In the example shown, as is more clearly visible in

figure 3, there are five conveyor belts 14 and the bundles 12 consist of six bottles 13, three for each row, one after another.

At the end of the area where the binder 15 is situated, the fixed guides 18 envisage an upward sliding portion 21 for guiding the film arranged on the products 13. When the binder 15, in fact, effects the wrapping, the film 16 covers the products 13 and also wraps the fixed guides 18. The film then runs spirally wound under the fixed guides 18 until it meets the upward sliding portion 21, which allows the withdrawal of the film from the fixed guides 18 and its stable positioning on the bottles or products 13.

It should be noted that in the example, there are two upward sliding portions 21, situated, in the example, downstream of each binder 15, thus determining the end of the film wrapping under the fixed guides 18 of each binder 15.

Then, as they continue to advance, the bottles 13, wrapped in the film 16 spirally wound around them, come into the proximity of a cutting group 22 which separates the long and continuous wrapping on the bottles 13 into a series of bundles 12, such as those shown in the figures. The cutting group 22 consists, for example, of a hot-thread trimmer which identifies the bundle from the con-

tinuous wrapping in arrival.

The arrangement of two binders 15, as in the example shown, advantageously allows the wrapping operation of the bottles to be continuously effected, with no interruption. When the film 16 is about to finish in a binder 15, the second binder 15 is started, which, for a short period of time, effects a second overlapping wrapping on the products 13 until the first film 16 of the first binder has completely run out. The positioning of a new roll of film 16 can be thus effected on the binder 15 where it has run out.

It should also be noted that an elastic film can be advantageously used, which does not require an oven, but only tensioned positioning on the products 13. The weight of the elastic film for each bundle 12 can be around 6.5 g, in the absence of an oven, and with the sole use of energy for the plant of about 12 KW. There is consequently a considerable saving of energy and wrapping material.

The presence of a manipulator or robot for positioning the groups of products on the film 16, is no longer necessary: this operation is effected automatically by the simple advancing of the established rows of products after an arrangement station (not shown).

In this way the wrapping rate is also optimized,

which can be constant, with no interruption.

Finally, at the end of the conveyor belts 14, there is a discharging area of the bundles 12, consisting, for example, of a rotating table 23 situated at the end of a  
5 final conveyor belt 24, which receives the single bundle 12 and sends it to its correct position, for example onto pallets 25.

The objective mentioned in the preamble of the description has therefore been achieved.

10 The forms of the structure for producing a continuous sleeve wrapping machine in elastic film of the invention, as also the materials and assembly modes, can naturally differ from those shown in the drawings for purely illustrative and non-limiting purposes.

15 The protection scope of the invention is therefore delimited by the enclosed claims.

## CLAIMS

1. A continuous sleeve wrapping machine in elastic film, to which products to be packaged (13) are fed consecutively, individually, or in several rows, comprising  
5 a series of consecutive conveyor belts (14), positioned one after another, longitudinally aligned, on which said products advance from a product feeding area (13) to an unloading area of bundles of products (12), said conveyor belts (14) being spaced in a section which envisages at  
10 least one binder (15) which spiral wraps said products (13), transversally to the advance direction, supported in this section by fixed rigid underlying guides (18), said guides (18) comprising, at the end of the binder (15), an upward sliding portion (21) which allows the  
15 film to be removed from the fixed guides (18) and firmly positioned on the products (13), downstream of said at least one binder (15) and said upward sliding portion (21), there being a cutting group (22) which effects the separation of the long continuous wrapping of the film  
20 around the products (13) into a series of bundles (12) having predefined dimensions and number of products.

2. The sleeve wrapping machine according to claim 1, characterized in that it comprises two binders (15), spaced between each other, and two respective upward  
25 sliding portions (21) at the outlet of the respective

binder (15).

3. The sleeve wrapping machine according to claim 1 or 2, characterized in that longitudinal vertical guiding slides (20) are longitudinally envisaged, which prevent  
5 the overturning of the products (13) moving forward on the conveyor belts (14) and on the fixed guides (18).

4. The sleeve wrapping machine according to one or more of the previous claims, characterized in that said fixed rigid guides (18) comprise longitudinal notches (19) for  
10 the sliding of the conveyor belts (14).

5. A method for the formation of bundles (12) of products fed on consecutive conveyor belts (14), positioned one after another, longitudinally aligned, on which said products advance from a product feeding area (13) to an  
15 unloading area of bundles (12) of products, said conveyor belts (14) being spaced in a section where there is at least one binder (15), which, in subsequent phases, comprises: a phase in which said binder wraps said products according to a continuous spiral, transversally to the  
20 advance direction of the products (13), whereas the products (13) advance supported in this section by underlying fixed rigid guides (18), a phase in which the film wrapped around said products (13) in a continuous spiral, at the end of the binder (15), is extracted by means of  
25 an upward sliding portion (21) situated in said guides

(18) to allow the film to be removed from the fixed guides (18) and firmly positioned on the products (13), a phase in which, downstream of said at least one binder (15) and said upward sliding portion (21), the film wrapped in a continuous spiral around the products is cut by means of a cutting group (22) in order to effect the separation of the long continuous wrapping of the film around the products (13) into a series of bundles (12) having pre-defined dimensions and number of products.

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**Fig. 1**

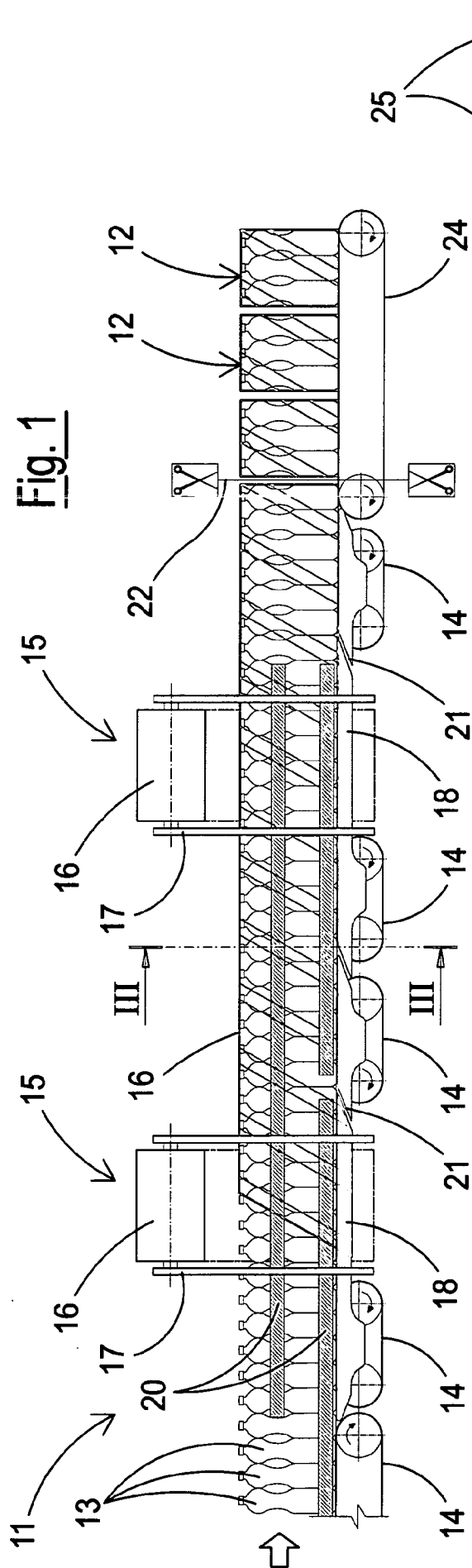


Fig. 2

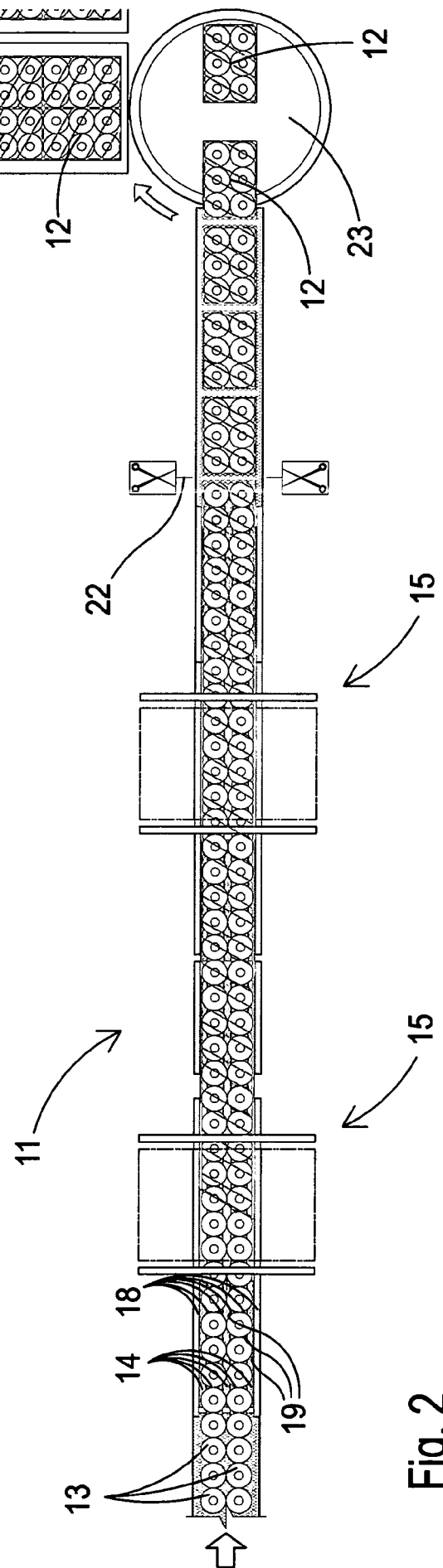


Fig. 3

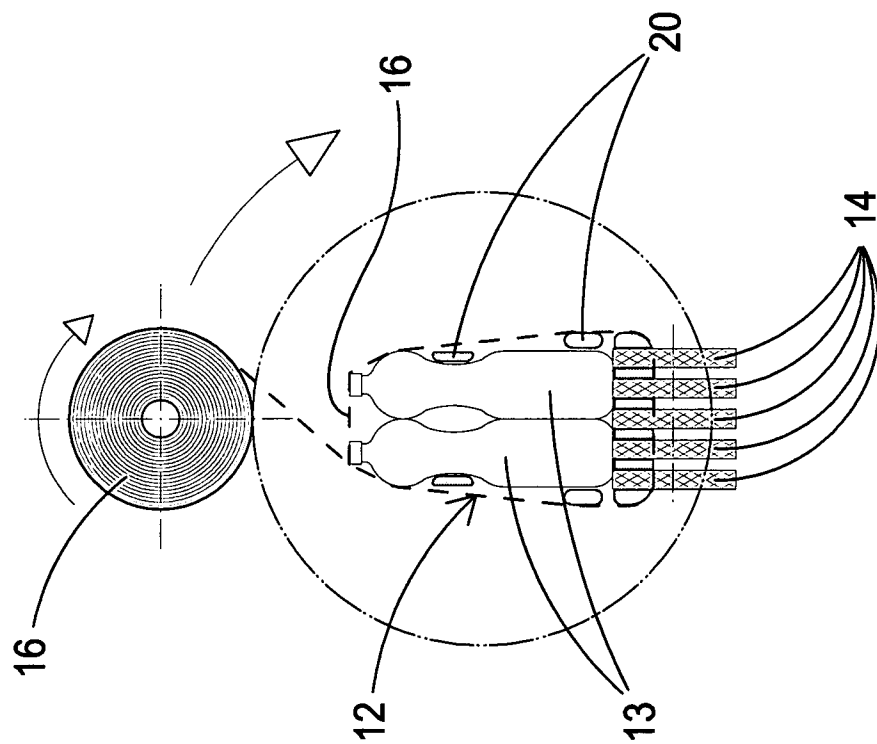
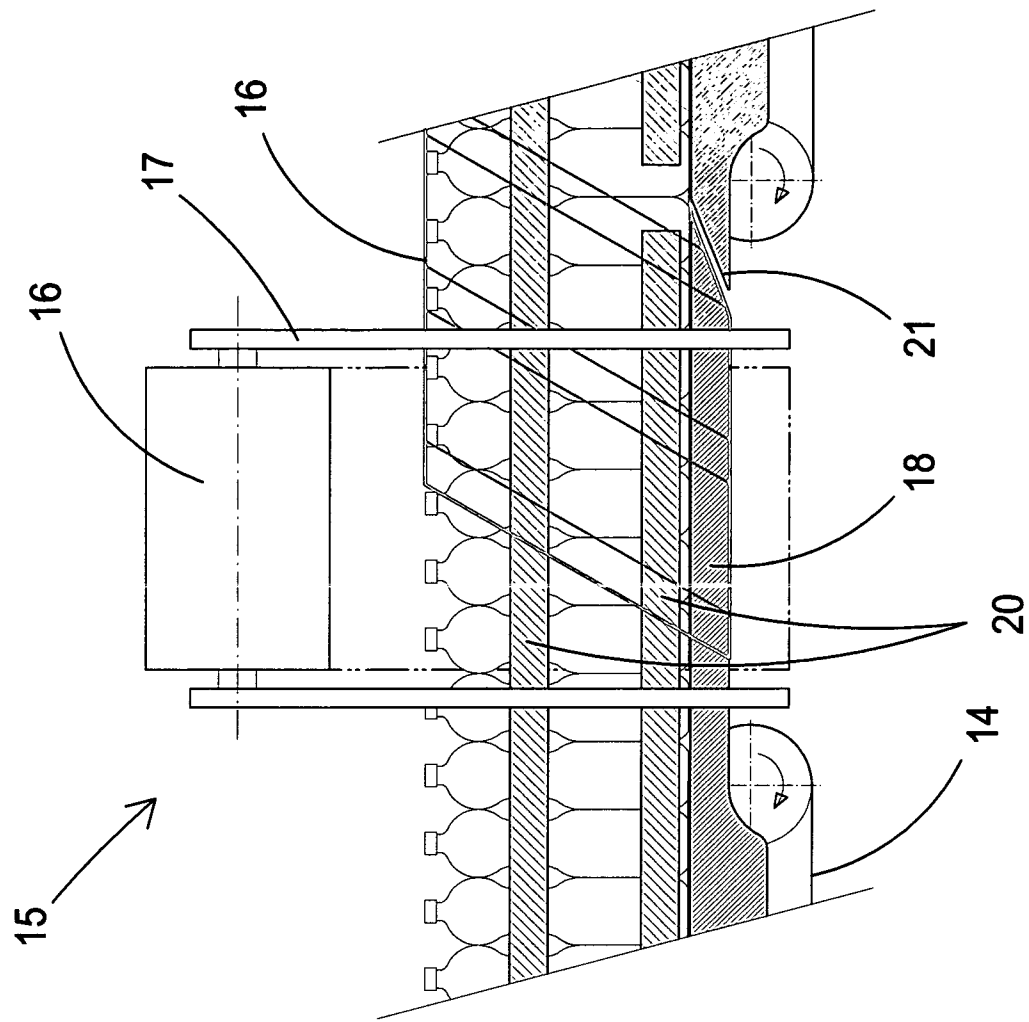


Fig. 4



# INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER  
INV. B65B11/00 B65B21/24  
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)  
B65B

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.

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International application No

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| C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT |                                                                                                                                 |                       |
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International application No

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