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(54) **Device for the insertion of products inside a vertical packaging machine forming tube**

(57) A forming device (10) for vertical type packaging machines comprises a tube (11) designed to collect products to be packaged and to guide the film (14) for the packaging of said products, a product loading device (12) in correspondence with the entry of said tube (11), a transfer device (13) for said film (14), a device (15) for the longitudinal sealing of the film wound around said forming device, and a device for the transverse sealing and cutting (16) of said film (14). It is internally equipped with at least one platform (21), kinematically connected to any appropriate source of motion, inside said tube (11) and which moves from a position close to the entry of said forming tube (10) to a position in correspondence with the exit of said forming tube (10) in order to transfer said products to be packaged towards the bottom of said tube (11) avoiding a direct fall of said products through the entire length of the forming tube (10).

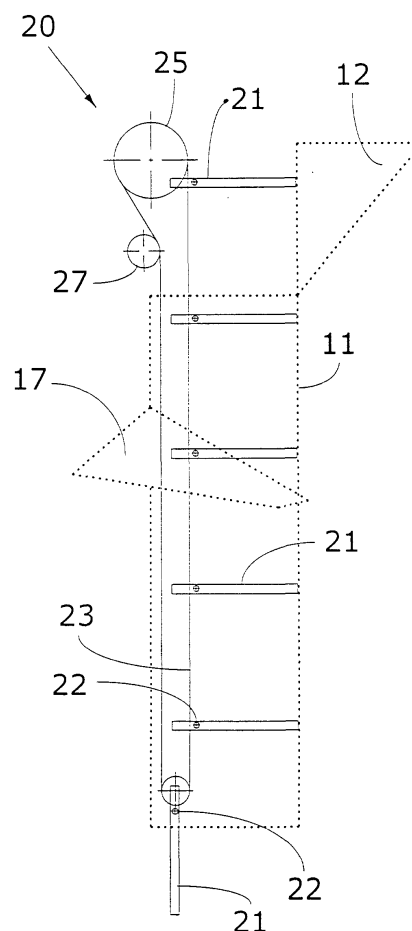


Fig. 4

## Description

### TECHNICAL FIELD

[0001] This invention refers to a device for loading articles inside a vertical packaging machine forming tube.

[0002] Such devices can be advantageously used in the food industry to obtain consistent batches of packages ready to be shipped and marketed.

### BACKGROUND ART

[0003] A vertical packaging machine of the known type generally consists of:

- a supporting frame including protective guards enclosing a packaging unit,
- a movement device which carries the products to the top of the frame,
- an insertion unit that transfers the products from the movement device towards the packaging unit,
- an extraction unit to pick up the packaged products.

[0004] According to a well-known technique, the packaging unit comprises a roller which holds a roll of film, generally made from synthetic material, for example polyethylene, which is unwound by means of an appropriate unwinder and can be wound around a forming tube on which it is continuously sealed.

[0005] The products to be packaged are fed into the forming tube while the sealed film is pulled off the forming tube, retaining the shape of this device.

[0006] A sealing and cutting device is positioned at the exit of the forming tube to seal the flaps at the end of the package and to separate the package from the remaining film still wound around the forming tube.

[0007] Sealing of the end of the package preferably coincides with the upper part of the immediately adjacent package and is performed quickly and efficiently.

[0008] Longitudinal sealing of the film is carried out continuously as the film is wound around the forming tube.

[0009] Sealing and cutting, to separate a package from the previous one, is generally carried out by means of steel blocks with a limited thermal dilation coefficient.

[0010] The packaging machine is also equipped with a device to adjust the sealing speed to the film infeed speed in order to prevent stretching the seal.

[0011] The insertion unit usually differs according to the type and size of the products to be packaged.

[0012] For powder products a screw feeder is used, for granular products a volumetric feeder, for medium-large granular products weighing scales are used, while when each product is packaged individually the feeder consists of an automatic loading device.

[0013] A drawback is represented by the fact that the products, dropped in from the upper part of the forming tube, fall onto the base of the forming tube, in corre-

spondence with the sealing blocks, and may thus be damaged.

[0014] This is particularly the case during the packaging of fragile products or those in relatively long bags which require an appropriately long forming tube.

[0015] Another drawback is represented by the fact that if the volume of the products to be inserted in the forming tube is limited, this would reduce the damage to the products but would also considerably limit the productivity of the packaging machine.

### DESCRIPTION OF THE INVENTION

[0016] The aim of this invention is to provide a device for the insertion of products inside a forming tube, in particular for vertical packaging machines, that can eliminate or significantly reduce the drawbacks mentioned above, thus creating a loading device for a vertical packaging machine former that can place the articles to be loaded inside the forming tube delicately, in such a way as to avoid breakage or crushing of the said articles.

[0017] This is achieved by means of a product insertion device for a vertical packaging machine former, with the features described in the main claim.

[0018] The dependent claims describe particularly advantageous embodiments of this invention.

[0019] The former on which the device as per this invention is fitted generally comprises:

- a casing designed to contain the products to be packaged and to form the tube of packaging film made from synthetic material,
- a packaging film transfer device,
- a pair of devices for the respective operations of longitudinal and transverse sealing of the film.

[0020] In accordance with the invention, inside the forming tube is at least one platform, kinematically connected to any appropriate source of motion, said platform moving from a position close to the entry of the forming tube to a position in correspondence with the exit of the forming tube in order to carry products to be packaged towards the bottom of the forming tube instead of the products being dropped into the forming tube.

[0021] According to the invention, said at least one mobile platform is equipped with a fixing device designed to keep it in the product pick-up position during the working or descent phase from the entry to the exit of the forming tube.

[0022] The kinematic connection to the source of motion can be achieved by means of a double chain or a double toothed belt on which an edge of the platform can be hinged, the edge being temporarily constrained to said fixing device.

[0023] Said fixing device preferably consists of a single or double chain, or of a single or double toothed belt, connected to any appropriate source of motion and

equipped with housings for pins that can be constrained to the platform in correspondence with the entry of the forming tube and unconstrained in correspondence with its exit.

**[0024]** According to one embodiment of this invention, said kinematic connection, both for the platform and for the fixing device, consists of ball screws.

**[0025]** The shape of the platform is appropriate to the products to be conveyed; it may in fact have a flat support surface for relatively large-sized products, or a slightly concave shape towards the entry of the forming tube for granular or powder products.

## DESCRIPTION OF THE DRAWINGS

**[0026]** Other features and advantages of the invention will become evident on reading the following description of one embodiment of the invention, given as a non-binding example, with the help of the enclosed drawings, in which:

- figure 1 is a schematic front view of a forming tube for vertical type packaging machines;
- figure 2 is a schematic side view of the forming tube according to fig. 1;
- figure 3 is a schematic front view of a forming tube as per fig. 1 equipped with a product insertion device according to this invention; and
- figure 4 is a schematic side view of the forming tube according to fig. 3.

## DESCRIPTION OF A FORM OF EMBODIMENT

**[0027]** In figures 1 and 2, reference number 10 indicates in general a forming tube in particular for vertical packaging machines.

**[0028]** The forming device 10 comprises a tube 11, a product insertion device 12 at the entry of the tube, a piece of metal sheeting 17 appropriately shaped in order to wrap the tube 11 with a film of synthetic material 14 unwound from a roll (not shown in the figures), a pair of pulling devices 13 for the said film 14 wound around the forming device 10, a device for the longitudinal sealing of the film, and a device for the transverse sealing and cutting 16 of the film 14.

**[0029]** Traditionally, the products are inserted in the inserter device 12, and drop into the forming tube, coming to rest in the area in which the two transverse sealing blocks 16 operate and which, by their action, create the base of the package being formed and, at the same time, the top of the already filled package immediately below the blocks 16.

**[0030]** In accordance with a first embodiment of this invention, schematically represented in figures 3 and 4, a product insertion device 20 is present inside the tube 11 of the forming device 10.

**[0031]** The product insertion device 20 according to this embodiment comprises a number of platforms 21

positioned inside the tube 11 which move respectively from a position close to the entry of the forming device 10 to a position in correspondence with the exit of the said forming device 10 in order to transfer the products to be packaged 20 towards the bottom of the tube 11 avoiding a direct drop.

**[0032]** As shown in the figures, there can be more than one platform 21 and these can be hinged, in correspondence with an appropriate pin 22 to a double chain 23, 24 of a movement device driven by an appropriate motor (not shown), which comprises a pair of pulleys 25, 26 and a chain tightener 27.

**[0033]** During the working phase, consisting of the collection of products coming in this case from a hopper 12 and of their descent inside the forming tube 10, each platform 21 remains substantially transversal with respect to the longitudinal axis of the tube 11 thanks to the action of a fixing device designed to temporarily constrain the edge of each platform 21 opposite to the edge hinged to the double chain 23.

**[0034]** Near the entry, the forming tube 10 is equipped with a positioning unit (not shown in the figures) which can consist of a spring mechanism and stops that act on the platforms in order to block them in the product loading position transversal to the direction of movement.

**[0035]** Near the exit, the forming tube 10 is equipped with a release device (not shown) designed to release the pin 22 so that the platform 21 is parallel to the infeed direction of the chains 23, 24.

**[0036]** The platform then moves back up along the wall of the tube 11 to return to the starting position.

**[0037]** Each platform 21 may have a concave shape towards the entry of the forming tube 10 if the products are granular or in powder.

**[0038]** The invention as described above refers to a preferred embodiment.

**[0039]** It is however clear that numerous variations are possible, within the framework of technical equivalents.

**[0040]** By way of example, according to embodiments not shown in the drawings but all easily understandable to an expert technician, the platforms 21 can be moved by means of ball screw mechanisms or by toothed belts.

**[0041]** Moreover, the embodiment described above foresees that the platforms 21 are continually returned to their starting position and that the packaging device therefore functions on a continuous basis.

**[0042]** Simplified embodiments are nevertheless foreseen, whereby the insertion device consists of a single platform that is loaded with the products at the entry of the forming tube and then descends inside the said tube by means of appropriate mechanical means easily understandable to a less expert technician, for example by means of a mechanism equipped with pneumatic or hydraulic actuators, or a worm screw mechanism.

**[0043]** In these cases, the end part of the forming tube is equipped with a release device that frees the platform which rotates around a horizontal pin and allows the

products to drop a very short distance onto the bottom of the package in order to ensure that the products are not damaged.

**[0044]** The platform moves back up and once it reaches the entry of the forming tube it is returned to the loading position and blocked.

## Claims

1. A forming device (10) for vertical type packaging machines, comprising a tube (11) designed to collect products to be packaged and to guide the film (14) for the packaging of said products, a product loading device (12) in correspondence with the entry of said tube (11), a transfer device (13) for said film (14), a device (15) for the longitudinal sealing of the film wound around said forming device, and a device for the transverse sealing and cutting (16) of said film (14), **characterised in that** the forming device is internally equipped with at least one platform (21), kinematically connected to any appropriate source of motion, inside said tube (11) and which moves from a position close to the entry of said forming tube (10) to a position in correspondence with the exit of said forming tube (10) in order to transfer said products to be packaged towards the bottom of said tube (11) avoiding a direct fall of said products through the entire length of the forming tube (10).

2. A forming device (10) according to claim 1, **characterised in that** said platform (21) is equipped with a stop designed to maintain said platform (21) in the loading position for said products during the working or descent phase from said entry to said exit.

3. A forming device (10) according to one of the claims 1 and 2, **characterised in that** it presents a fixing unit, attached inside said tube (11) close to said entry, designed to fix said stop to said respective platform (21).

4. A forming device (10) according to any of the previous claims, **characterised in that** it presents, inside said tube (11) and close to said exit, a release device designed to release said platform (21) so that the products can drop a very short distance onto the lower part of the package being formed.

5. A forming device (10) according to one of the previous claims, **characterised in that** said platform (21) presents a concave surface towards said entry for the collection and transfer of said products to be packaged.

6. A forming device (10) according to the previous claims, **characterised in that** it presents, inside

said tube (11) and close to said entry, a movement device designed to position said at least one platform (21).

7. A forming device (10) according to claim 6, **characterised in that** said kinematic connection of said platform (21) to said source of motion is achieved by means of a pair of chains (23, 24).

8. A forming device (10) according to one of the previous claims, **characterised in that** said at least one platform (21) is hinged by means of a pin (22) to the transfer mechanism.

9. A forming device (10) according to claim 8, **characterised in that** said kinematic connection of said platform (21) to said source of motion is achieved by means of two toothed belts.

10. A forming device (10) according to claim 8, **characterised in that** said kinematic connection of said platform (21) to said source of motion is achieved by means of ball screws.

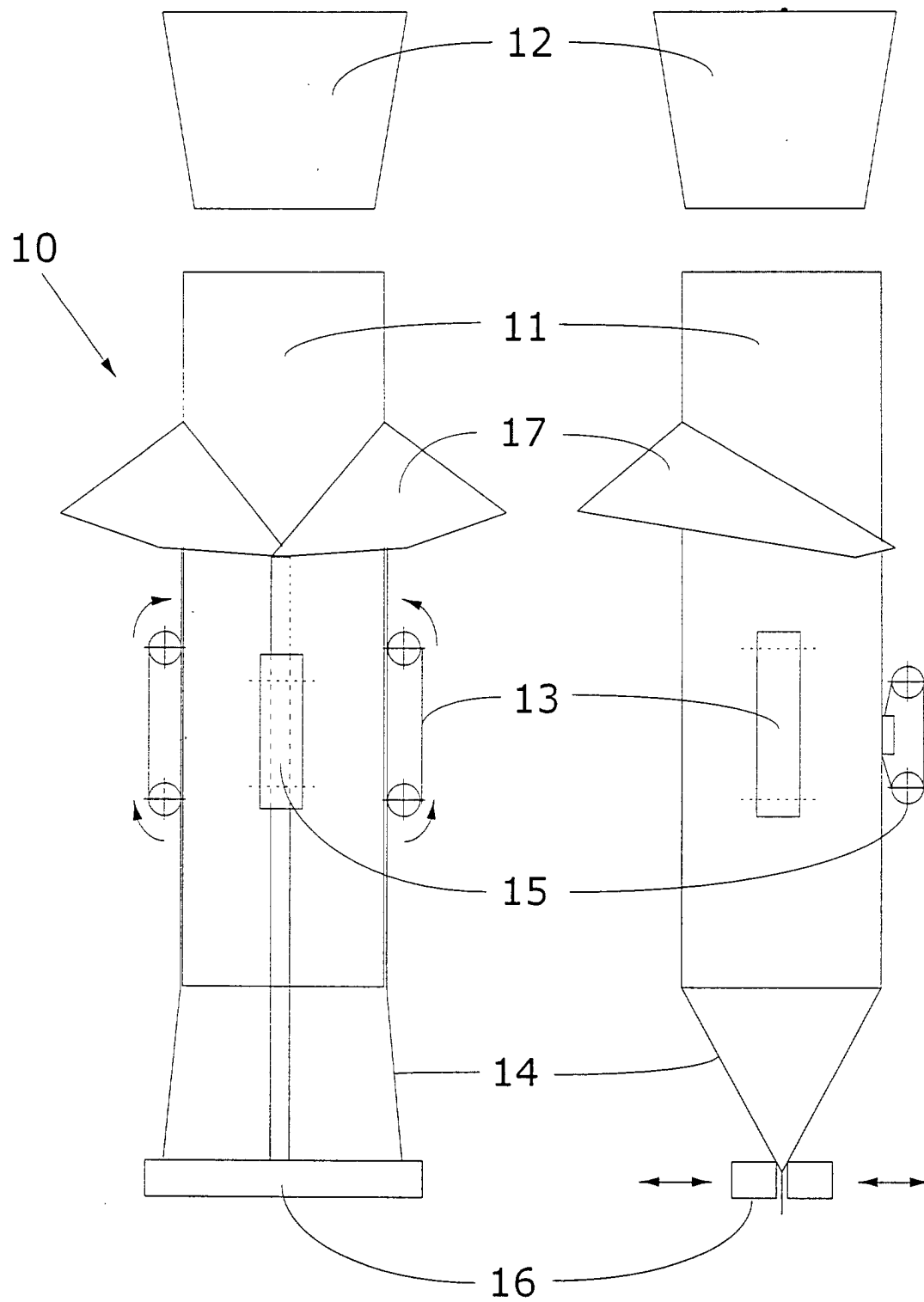


Fig. 1

Fig. 2

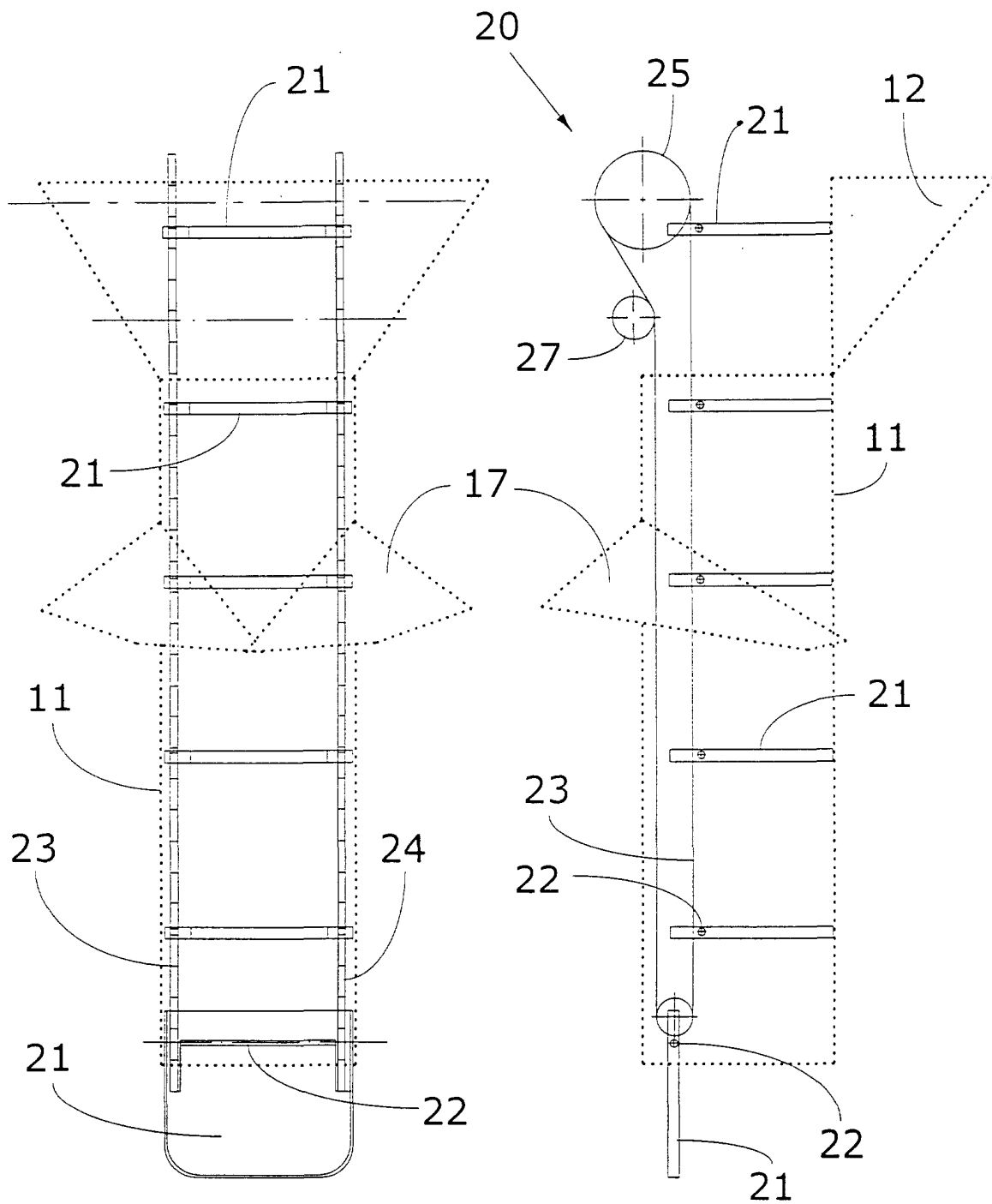


Fig. 3

Fig. 4



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# PARTIAL EUROPEAN SEARCH REPORT

Application Number

which under Rule 45 of the European Patent Convention shall be considered, for the purposes of subsequent proceedings, as the European search report

EP 01 10 5501

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                             |                                  |                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Citation of document with indication, where appropriate, of relevant passages               | Relevant to claim                | CLASSIFICATION OF THE APPLICATION (Int.Cl.7) |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CH 652 085 A (ILAPAK)<br>31 October 1985 (1985-10-31)<br>* the whole document *             | 1-4, 6, 8                        | B65B9/20                                     |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | US 4 722 373 A (ROOVERS)<br>2 February 1988 (1988-02-02)<br>* column 2-4; figures 1,2 *     | 1, 2, 5-9                        |                                              |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | FR 2 348 855 A (BOULANT & CIE)<br>18 November 1977 (1977-11-18)<br>* claim 1; figures 1-7 * | 1                                |                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                             |                                  | TECHNICAL FIELDS SEARCHED (Int.Cl.7)         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                             |                                  | B65B                                         |
| INCOMPLETE SEARCH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                             |                                  |                                              |
| <p>The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC to such an extent that a meaningful search into the state of the art cannot be carried out, or can only be carried out partially, for these claims.</p> <p>Claims searched completely :</p> <p>Claims searched incompletely :</p> <p>Claims not searched :</p> <p>Reason for the limitation of the search:</p> <p>see sheet C</p>                                                                                                    |                                                                                             |                                  |                                              |
| Place of search                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                             | Date of completion of the search | Examiner                                     |
| THE HAGUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                             | 9 January 2002                   | Grentzius, W                                 |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>&amp; : member of the same patent family, corresponding document</p> |                                                                                             |                                  |                                              |

EPO FORM 1503 03/02 (P04007)



European Patent  
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**INCOMPLETE SEARCH  
SHEET C**

Application Number  
EP 01 10 5501

Claim(s) searched completely:

1-9

Claim(s) not searched:

10

Reason for the limitation of the search:

It is not understandable from claim 10 how the platform is connected to the source of motion. 'Ball screws' are not well-defined constructional elements suitable for this purpose. Furthermore, there is nothing in the description to explain or illustrate those technical features.

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 10 5501

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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09-01-2002

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