(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 743 839 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
17.01.2007 Bulletin 2007/03

(51) Int Cl.:
B65B 55/10 *(2006.01)* ***B65B 9/08*** *(2006.01)*

(21) Application number: **05106500.1**

(22) Date of filing: **14.07.2005**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(71) Applicant: **ASEPTIS, S.L.**
08210 Barberà del Valles (ES)

(72) Inventor: **Quetin, Arnaud**
08037, Barcelona (ES)

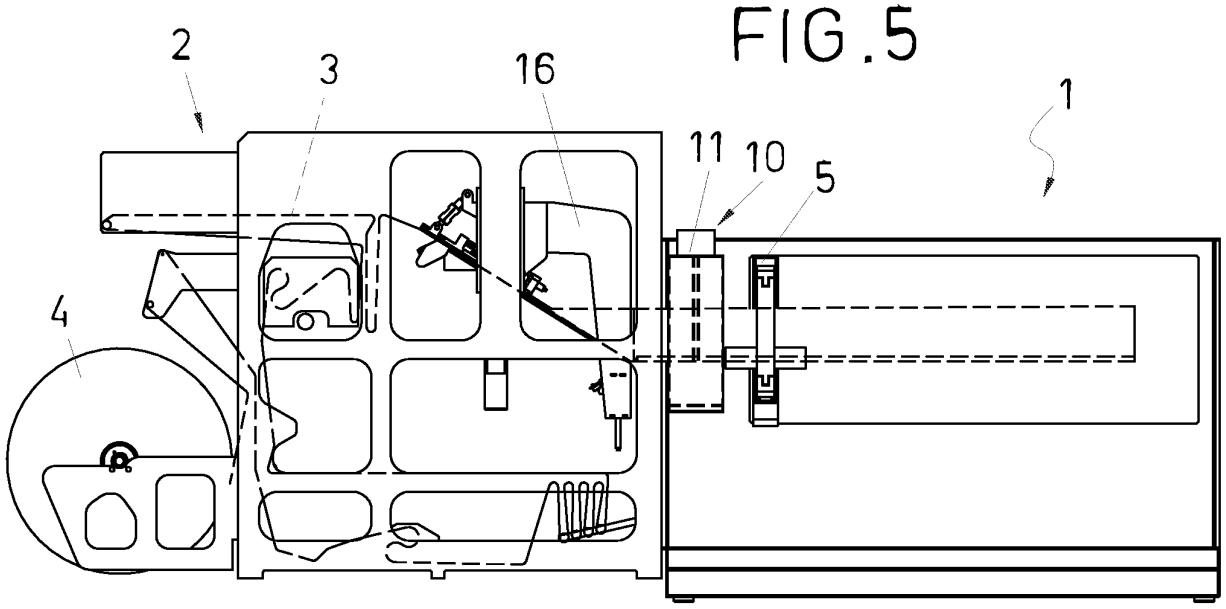
(74) Representative: **Barlocci, Anna**
Zea, Barlocci & Markvardsen Patents
C/Balmes, 30
08007 Barcelona (ES)

(54) **A horizontal packaging machine with film sterilization and method for forming packages from a film**

(57) The machine (1) comprises at least a film welding station (5) forming at least the bottom of the packages and a film sterilizing station (10) arranged upstream the film welding station (5) whereby the film (3) is sterilized before the bottom of the packages is formed. The film sterilizing station (5) comprises a chemical sterilizing unit in which chemical sterilization of the film (3) is performed by means of a sterilizing gas.

By providing such a film sterilizing station (10) upstream the welding station (5), easier access to all points in the package surface is achieved and consequently packages may be more completely and efficiently sterilized.

FIG.5



EP 1 743 839 A1

Description

[0001] The present invention relates to a horizontal packaging machine with film sterilization comprising at least a film welding station for welding the film such as to form at least the bottom of the packages. The invention further relates to a method for forming packages from a film.

BACKGROUND OF THE INVENTION

[0002] Many applications require providing packages made from a film to be sterilized so that the final package, which could comprise the package itself filled with a desired product therein, is under aseptic conditions.

[0003] For this aim, some prior art packaging machines include an aseptic section in which a sterilizing station is operable to aseptically sterilize the packages after they have been formed and prior to their filling.

[0004] A sterilizing station of this type is known from PCT application W09908932 in which packages are placed under a sprayer device where hydrogen peroxide gas is sprayed thereon. Packages are carried to a sterilizing chamber, irradiated with ultraviolet rays and dried by high temperature air. Hydrogen peroxide gas is washed away and removed. Packages are then filled with the desired product and sealed up.

[0005] The sterilization is typically carried out after the package is being formed, that is, once the folded film or sheet material from which packages are made has been welded at least to form the bottom of the package. However, the welding operation may involve wrinkle formation in the bottom of the package, and this could give rise to areas that are not completely exposed to chemical action, such that there is a risk that the package is not sufficiently sterilized.

[0006] This risk is especially relevant in the case of packages such as pouches of the so-called "stand-up" type, in which the bottom of the pouch has a double fold and a curved shape around the welding. Such packages have a double-fold bottom and need to be opened thoroughly in order to expose the whole inner bottom portion, and areas shielded from chemical sterilization may arise very easily.

DESCRIPTION OF THE INVENTION

[0007] The present invention aims to at least reduce the above disadvantage. For this purpose, there is provided a horizontal packaging machine with film sterilization which comprises at least a film welding station for welding the film such as to form at least the bottom of the packages and a film sterilizing station, arranged upstream of the film welding station. The film is therefore sterilized before any sealing or welding operations are performed, for example those required for forming the bottom of the packages.

[0008] Provision of a film sterilizing station for sterilizing the film before the packages are formed facilitates the complete exposure of the film surface to the sterilization chemicals: complete sterilization of all points in the package surface is thus more easily accomplished, and consequently packages are more completely and efficiently sterilized.

[0009] In one embodiment of the invention, the film sterilizing station comprises a chemical sterilizing unit in which chemical sterilization of the film is performed by means of a sterilizing gas, such as for example, hydrogen peroxide. The use of hydrogen peroxide in the gas phase has the advantage that it has a stronger sporecide action and consequently the sterilization is carried out within a shorter period of time. A further advantage is that once the gas has been applied to the film, it may be easily removed therefrom such that waste peroxide is sparsely present after application of the sterilizing gas. Finally, the use of gas allows the sterilizing station to be smaller.

[0010] The sterilizing station comprises a housing that is under negative pressure and it is provided with means for the passage of the film therethrough.

[0011] In one alternative embodiment, said negative pressure is established by a chamber located outside the housing which is connected to a draw duct therein.

[0012] The chemical sterilizing unit comprises means for sterilizing at least a surface of the film intended to form the inner surface of the package.

[0013] Preferably, the machine comprises a filling station and an aseptic section arranged downstream of said welding station. The aseptic section comprises said filling station.

[0014] Still in a further embodiment of the invention, the machine includes a film folding device for folding the film longitudinally. Said film folding device is arranged upstream of the welding station. In this case, the film sterilizing station is arranged between the film folding device and the welding station.

[0015] The machine of the invention may comprise a film unwinding section for unwinding a film from a feed reel. In this case, the film sterilizing station is arranged in said film unwinding section.

[0016] The film may travel through said film sterilizing station either along a substantially straight path or along a wave-like path.

[0017] Both in the case of sterilizing the film in the unwinding section with the film completely unfolded or sterilizing the film between the unwinding section and the welding station, it is possible, according to the invention, to fully sterilize the inner and the outer surface of the film.

[0018] The present invention further relates to a method for forming packages from a film, comprising at least the steps of unwinding the film from a feed reel, chemically sterilizing the film; and forming at least the bottom of the packages by welding the film.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] A particular embodiment of the present inven-

tion will be described in the following, only by way of non-limiting example, with reference to the appended drawings, in which:

Fig. 1 is a front elevational view of a film sterilizing station according to one embodiment of the invention;

Fig. 2 is a side elevational view of the film sterilizing station in Fig. 1;

Fig. 3 is a top plan view of the film sterilizing station in Fig. 1;

Fig. 4 is a side elevational part view of one embodiment of the invention in which the film sterilizing station is fitted in the machine located in the unwinding section;

Fig. 5 is a side elevational part view of a one embodiment of the invention in which the film sterilizing station is fitted in the machine located upstream of the film welding station, between the film folding device and the welding station;

Fig. 6 is a perspective part view of the film sterilizing station of the embodiment in Fig. 4 in which the film sterilizing station is located in the unwinding section;

Fig. 7 is a perspective part view of the film sterilizing station of the embodiment in Fig. 5 in which the film sterilizing station is located between the film folding device and the welding station; and

Fig. 8 is a top plan view of a horizontal packaging machine having a film sterilizing station according to the embodiment in Figs. 5 and 7.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0020] The drawings show two embodiments of a horizontal packaging machine according to the invention differing from each other in the position of the sterilizing station in the machine.

[0021] In the figures, the horizontal packaging machine has been indicated generally at 1 and it comprises an unwinding section 2 for unwinding a film 3 from a feed reel 4, a film welding station 5 that performs the welding of the film 3. A film folding device 16 is provided downstream the unwinding section 2.

[0022] A film sterilizing station 10 is further provided in the packaging machine 1 shown in the figures. The film sterilizing station 10 is generally placed upstream the film welding station 5 and it serves the purpose of sterilizing the film 3 before the bottom of the packages is formed.

[0023] Said film sterilizing station 10 comprises a chemical sterilizing unit in which chemical sterilization of the film is performed by means of a sterilizing gas. In the embodiment shown in the figures, the sterilizing gas is hydrogen peroxide in the gas phase. Gas hydrogen peroxide is used for sterilizing the film 3 since it has been found its physical properties are notably advantageous for sterilization.

[0024] As it may be seen from figures, particularly figs. 1 to 3, the film sterilizing station 10 comprises a housing 11 which is provided with inlet and outlet grooves for enabling the passage of the film 3 therethrough. The film 3 may travel through said film sterilizing station 10 along a substantially straight path or a wave-like path.

[0025] The housing 11 is under negative pressure for operator's safety. Negative pressure may be established either within the housing 11 of the film sterilizing station 10 itself or from a chamber (not shown) located outside the housing 11 and connected to a draw duct therein.

[0026] The housing 11 is provided with gas nozzles 12 for injecting the hydrogen peroxide gas to the film 3 as it passes through the inside of the housing 11 as shown in Fig. 1. The gas nozzles 12 are connected to a hydrogen peroxide source through a corresponding tube 13. The housing 11 is also provided with a pivotable door 14 with a handle 14a which may be opened for accessing the film 3 therein.

[0027] In the particular embodiment shown in figs. 4 and 6 of the drawings, the film sterilizing station 10 is fitted in the machine 1 in the unwinding section 2. As the film 3 is unwound from the feed reel 4 in the unwinding section 2, it passes through a number of alternated rollers 15, as shown in fig. 6, within the housing 11 of the film sterilizing station 10 where it is chemically sterilized.

[0028] In the embodiment shown in figs. 5 and 7 of the drawings, the film sterilizing station 10 is fitted in the machine 1, between the film folding device 16 and the welding station 5.

[0029] The common feature in both embodiments is that the film sterilizing station 10 is located in the machine 1 upstream the welding station 5 in which at least the bottom of the packages are formed by welding the film 3.

[0030] While the embodiments described herein with reference to figs. 1 to 8 refers to a horizontal packaging machine 1 having one film sterilizing station 10, it is to be noted that said film sterilizing station 10 could be a station additional to a first film sterilizing station. In both cases, the film sterilizing station 10 is always located upstream the welding station, in particular, upstream the welding station 5 that forms the bottom of the package. Also in both cases, the film 3 is sterilized by at least one of its inner and outer surfaces. In the embodiments shown in the figures, in which only one film sterilizing station 10 is present in the machine 1, the inner and outer surfaces of the film 3 are sterilized by said film sterilizing station 10. In other embodiments having more than one film sterilizing station, it is sufficient for the film sterilizing station 10 to sterilize the inner surface of the film 3.

Claims

1. A horizontal packaging machine with film sterilization, comprising at least a film welding station (5) for welding the film (3) such as to form at least the bottom of the packages, **characterized in that** it further comprises a film sterilizing station (10), arranged upstream the film welding station (5), whereby the film (3) is sterilized before the bottom of the packages is formed.

2. A horizontal packaging machine as claimed in claim 1, wherein said film sterilizing station (10) comprises a chemical sterilizing unit in which chemical sterilization of the film (3) is performed by means of a sterilizing gas.

3. A horizontal packaging machine as claimed in claim 1, wherein said film sterilizing station (10) comprises a housing (11) having means for the passage of the film (3) therethrough, said housing (11) being under negative pressure.

4. A horizontal packaging machine as claimed in claim 3, wherein negative pressure is established by a chamber located outside the housing (11) which is connected to a draw duct therein.

5. A horizontal packaging machine as claimed in claim 1, wherein said film sterilizing station (10) comprises means for sterilizing at least a surface of the film (3) intended to form the inner surface of the package.

6. A horizontal packaging machine as claimed in any of the preceding claims, wherein it includes a filling station and an aseptic section arranged downstream of said welding station (5) and comprising said filling station.

7. A horizontal packaging machine as claimed in any of the preceding claims, wherein said machine comprises a film folding device (16) for folding the film (3) longitudinally, arranged upstream of the welding station (5), the film sterilizing station (10) being arranged between the film folding device (16) and the welding station (5).

8. A horizontal packaging machine as claimed in any of the preceding claims, wherein said machine (1) comprises a film unwinding (2) section for unwinding the film (3) from a feed reel (4), the film sterilizing station (10) being arranged in said film unwinding section.

9. A horizontal packaging machine as claimed in claims 7 or 8, wherein the film (3) travels through said film sterilizing station (10) along a substantially straight path.

10. A horizontal packaging machine as claimed in claims 7 or 8, wherein the film (3) travels through said film sterilizing station (10) along a wave-like path.

11. A method for forming packages from a film (3), comprising at least the steps of:

    a) unwinding the film (3) from a feed reel (4);
    b) chemically sterilizing the film (3); and
    c) forming at least the bottom of the packages by welding the film (3).

FIG.1

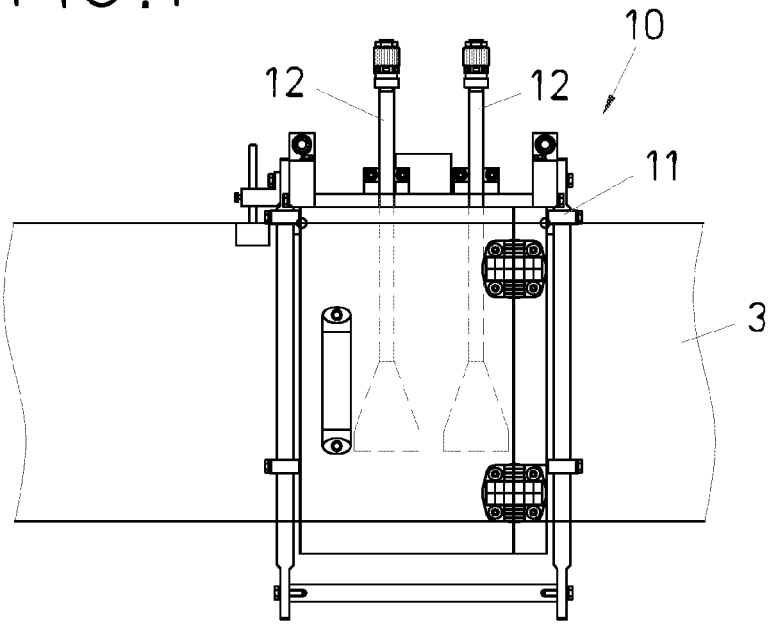


FIG.2

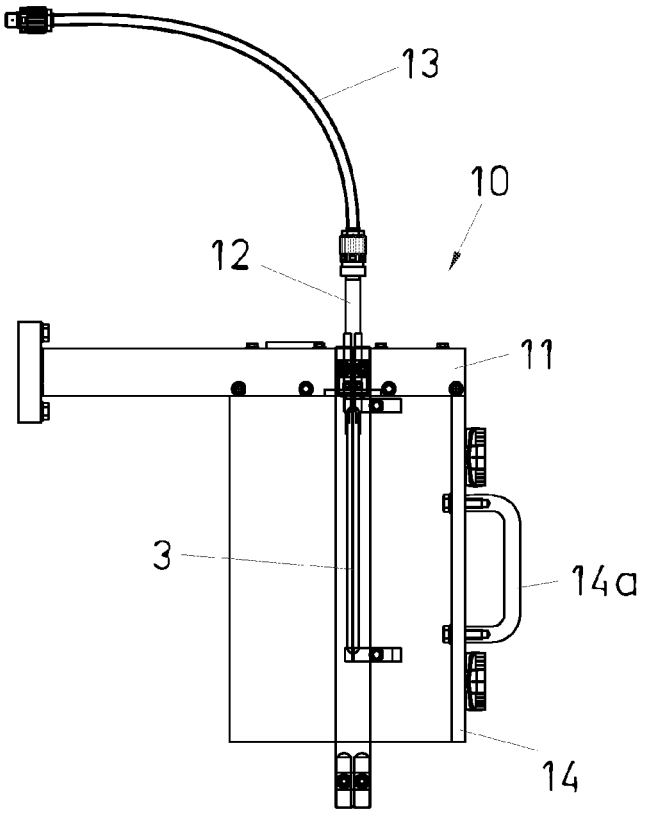


FIG.3

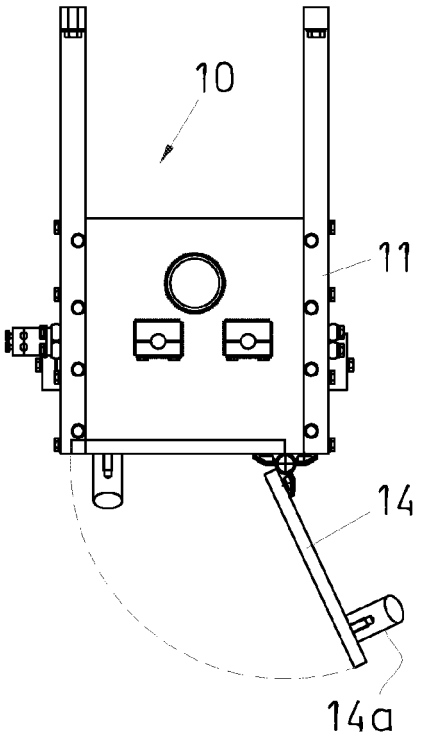


FIG.4

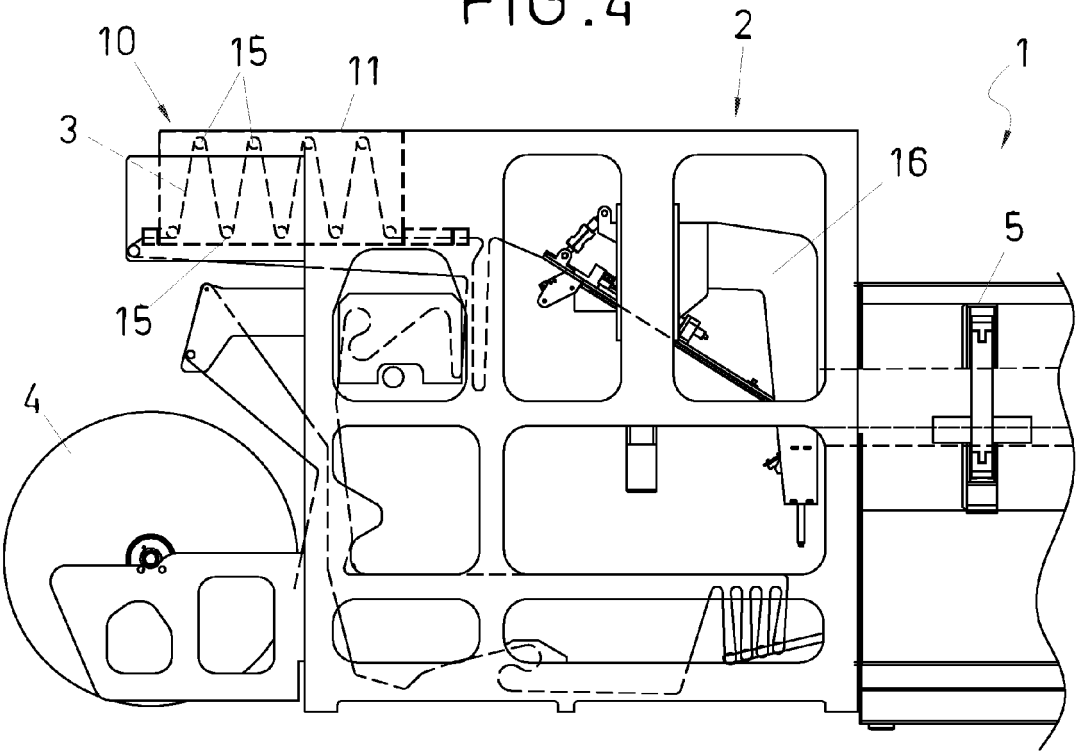


FIG.5

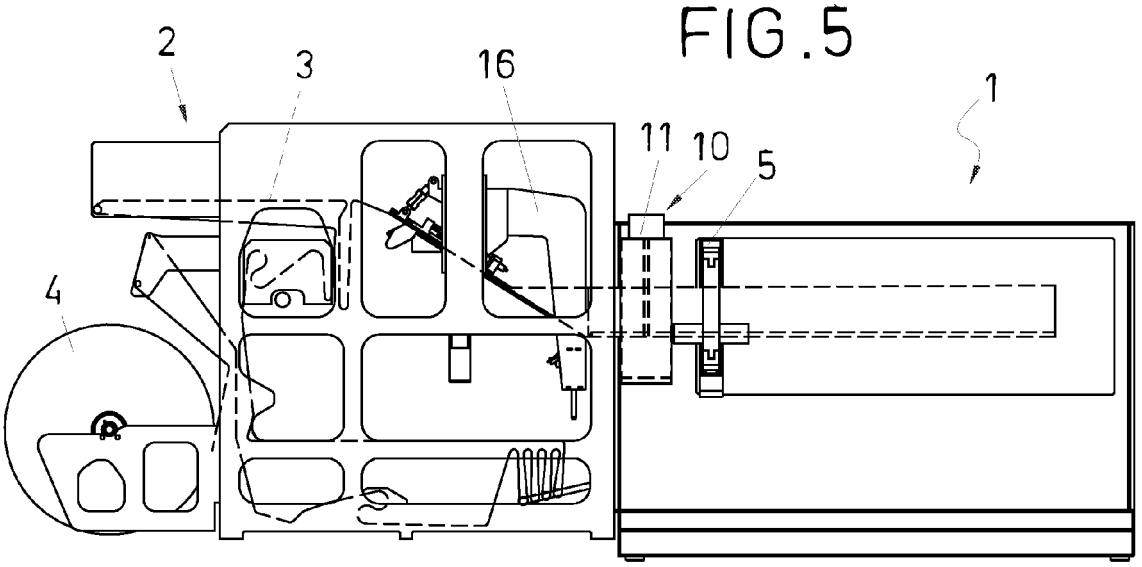


FIG.6

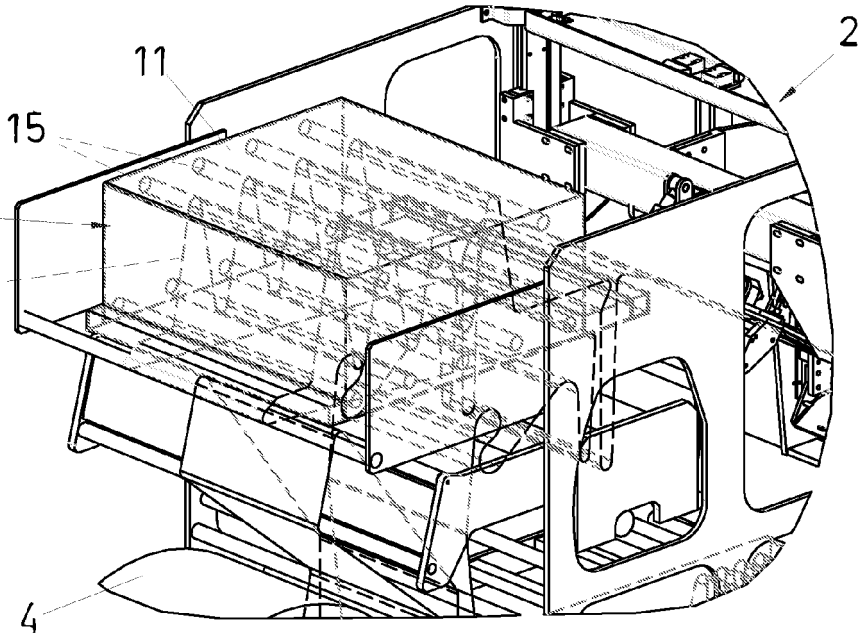


FIG.7

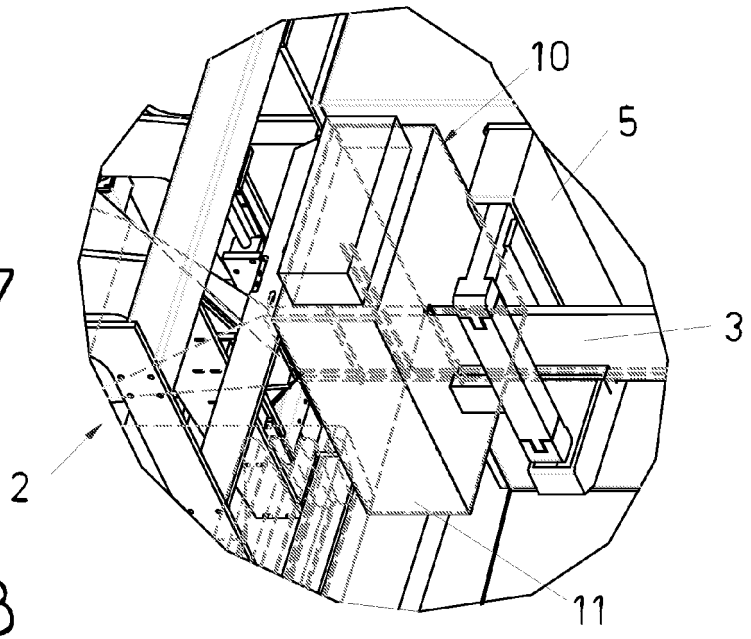
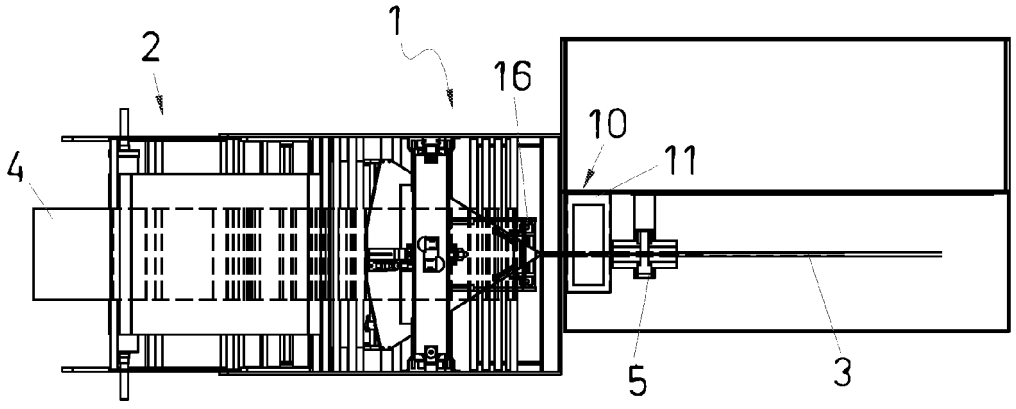


FIG.8



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 10 6500

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	EP 1 172 295 A (VOLPAK, S.A) 16 January 2002 (2002-01-16) * abstract; figure 2 *	1-11	B65B55/10 B65B9/08
Y	EP 0 310 900 A (ROBY TEKNIK AB) 12 April 1989 (1989-04-12) * column 2, line 49 - column 3, line 12 * * column 6, line 51 - column 7, line 21; figures 1,2 *	1-11	
Y	US 2002/119074 A1 (MCGOWAN, JAMES E) 29 August 2002 (2002-08-29) * paragraph [0004] *	3,4	
Y	US 3 513 627 A (EUGENE F. DOUCETTE ET AL) 26 May 1970 (1970-05-26) * column 3, lines 3-75; figures 1,4 *	10	
A	US 2004/081579 A1 (BJERBORN THOMAS) 29 April 2004 (2004-04-29) * claim 1 *	1	TECHNICAL FIELDS SEARCHED (IPC)
A	US 5 569 438 A (HILMERSSON ET AL) 29 October 1996 (1996-10-29) * column 4, lines 25-50; figure 2 *	1	B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	22 December 2005	Schelle, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 10 6500

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

22-12-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1172295 A	16-01-2002	AU 6443600 A	05-03-2001
		WO 0110715 A1	15-02-2001
		ES 2156563 A1	16-06-2001
EP 0310900 A	12-04-1989	AU 2353388 A	13-04-1989
		CA 1315952 C	13-04-1993
		CN 1033968 A	19-07-1989
		DE 3876366 D1	14-01-1993
		DE 3876366 T2	01-04-1993
		ES 2035902 T3	01-05-1993
		JP 1124529 A	17-05-1989
		JP 2719361 B2	25-02-1998
		KR 9210795 B1	17-12-1992
		SE 459083 B	05-06-1989
		SE 8703903 A	10-04-1989
		SG 2993 G	12-03-1993
		US 5011664 A	30-04-1991
		US 5114671 A	19-05-1992
US 2002119074 A1	29-08-2002	CA 2430616 A1	01-08-2002
		EP 1347786 A1	01-10-2003
		JP 2004517689 T	17-06-2004
		MX PA03005317 A	25-09-2003
		WO 02058746 A1	01-08-2002
US 3513627 A	26-05-1970	NONE	
US 2004081579 A1	29-04-2004	NONE	
US 5569438 A	29-10-1996	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 9908932 A **[0004]**