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(54) Method and device for forming packages

(57) The invention relates to a device for forming packages (7,13). The device comprises at least two transverse seam jaws, which are movable relative to each other, for forming a transverse seam (11) constituting a bottom in a first package (7) to be formed and, simultaneously therewith, forming a transverse seam (17) constituting an upper side of a second package (13) to be formed. The transverse seam jaws additionally form two connecting seams (29,31) extending transversely to the transverse seams (11,17), to which connecting seams the two longitudinally extending transverse seams are connected, preferably near the ends thereof. The connected packages (7,13) define a collecting space (35) between said connecting seams (11,17) and said transverse seams (29,31).

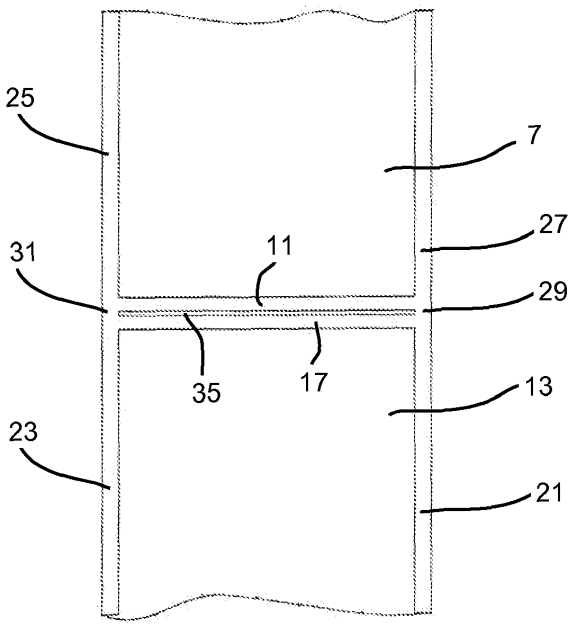

Fig. 2

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Description

[0001] The invention relates to a device for forming packages, which device comprises at least two transverse seam jaws, which are movable relative to each other, for forming a transverse seam constituting a bottom in a first package to be formed and, simultaneously therewith, forming a transverse seam constituting an upper side of a second package to be formed in said second package.

[0002] The invention further relates to a method for forming packages, which method comprises the following step: forming a transverse seam constituting a bottom in a first package and, simultaneously therewith, forming a transverse seam constituting an upper side of a second package to be formed in said second package.

[0003] In the manufacture of packages, such as plastic foil bags, for example, it is known to separate the transverse seams, hereinafter called the bottom seam and the upper seam of the bags, from each other by means of a mechanical knife simultaneously with the welding of said transverse seams so as to provide two separated bags. The longitudinal seams of the plastic foil bags to be formed have already been formed in a previous operation. Just after the welding and cutting of the bag, the bag, in which the bottom seam has just been formed, is filled with a product. This is done by metered deposition of the product via a fall pipe past which the foil packaging material is transported, which fall pipe terminates near the package that has just been partially formed by forming the bottom seam therein. During this filling operation, product residues remain behind on the inner side of the foil packaging material. Furthermore, product may spurt up when the filled bag is being closed, so that product residues can deposit on the inner side of the bag to above the upper seam to be formed.

[0004] For a known knife, the welding jaws are provided with recesses. As a result of the presence of said recess, a part between the bottom seam and the upper seam is not welded (so-called "free skirt"). Product residues from the preceding filling operations remain behind on the inner side of the packaging material in said non-welded parts, which product residues are in contact with the environment, which is undesirable for hygienic reasons, in particular in the case of perishable products. Also in the case of relatively greasy products the presence of product residues remaining behind in the non-welded parts is undesirable. Said product residues may also remain behind in the device, for example on the knife or in the area surrounding the knife or at other places where the product residues fall or leak from the foil packaging material. This means that a substantial cleaning operation is required after use of the device.

[0005] Accordingly it is an object of the present invention to provide a device by means of which the above drawbacks can be obviated.

[0006] With the device according to the invention, this object is accomplished in that the transverse seam jaws additionally form two connecting seams extending transversely to the transverse seams, to which connecting seams the two longitudinally extending transverse seams are connected, preferably near the ends thereof, with the connected packages defining a collecting space between said connecting seams and said transverse seams.

[0007] The product residues present on the inner side of the foil packaging material are confined in the collecting space, so that they cannot come into contact with the environment. This is advantageous in particular in the case of perishable products to be packaged or in the case of products where extra strict hygiene requirements need to be observed upon packaging thereof. The packages can be removed at a desired location inside or outside the device by removing the entire collecting space, so that the product residues not packaged together with a package can be discharged in a hygienic and clean manner. Furthermore, no fouling of the device will take place owing to the fact that the product residues are being confined. The packages formed by means of the device do not contain any product residues which are in contact with the outside air, which product residues will attract insects, for example in the shop, or become mouldy.

[0008] A very advantageous embodiment of the device according to the present invention is **characterised in that** the transverse seam jaws are made up of a sonotrode and an anvil, which sonotrode and/or which anvil are profiled so that any product residues confined in the collecting space can be guided towards the centre of the collecting space by means of he generated vibration.

[0009] A general advantage of ultrasonic welding compared to welding with heatable tools is that the use of high frequency vibration has the quality of removing any product residues or contaminations from the surface to be welded, as a result of which the surface to be welded is cleaned simultaneously with the heating operation, which ensures a qualitatively good welded seam between the foil layers to be welded together. By using ultrasonic welding for welding the connecting seams and the transverse seams in combination with a specially formed anvil and/or sonotrode, part of the plastic of the foil that has been liquefied by means of said vibration is displaced from the bottom seam and the upper seam as well as from the connecting seams towards the centre of the collecting space. While the liquefied plastic is being guided, any product residues are driven ahead thereof. The welds to be made are spaced a certain distance apart, and the space therebetween provides a possibility of containing the aforesaid collected product residues. In a subsequent operation, the collecting space can be removed, which collecting space, including any product residues contained therein, will be discharged.

[0010] Another embodiment of the invention is **characterised in that** the transverse seam jaws are designed for thermally welding the connecting seams and the transverse seams.

[0011] In this way, too, the product residues present

on the inner side of the foil packaging material are confined in a reliable manner.

[0012] Another embodiment of the invention is **characterised in that** the device comprises a die, by means of which the first package can be separated from the second package after the collecting space has been formed.

[0013] Yet another embodiment of the invention is **characterised in that** the die has the shape of a roman numeral I, comprising two end sections extending parallel to each other, between which a longitudinally extending middle section is located. The dimensions of the die are larger than the dimensions of the collecting space.

[0014] Using a die having such dimensions it can be ensured that the entire collecting space and the product residues that may be present therein will be discharged in a reliable manner.

[0015] Yet another embodiment of the invention is **characterised in that** the parallel end sections of the die are connected to the longitudinally extending middle section of the die via a rounded transition.

[0016] Such a configuration of the die has the advantage that the corners of the welded seams are rounded during the die cutting operation, providing rounded corners rather than sharp corners, which rounded corners practically exclude the risk of people cutting themselves on the package in use. This is advantageous in particular in the case of beverage containers, because a user's face will get near the corner points while the user is drinking.

[0017] Another object of the present invention is to provide a method by means of which the presence of product residues being in contact with the environment on the package is excluded.

[0018] This object is accomplished with the method according to the invention in that two connecting seams extending substantially transversely to the transverse seams are formed, preferably near ends of said transverse seams, simultaneously with the forming of the transverse seams, with the connected packages defining a collecting space between said connecting seams and said transverse seams.

[0019] The product residues present on the inner side of the foil packaging material are confined by means of the collecting space created by the connecting seams, so that said product residues can no longer come into contact with the environment.

[0020] A special embodiment of the method according to the invention is **characterised in that** the packages are separated from each other by removing the collecting space after said collecting space has been formed.

[0021] By removing the collecting space, all the product residues stored in the collecting space are discharged in a reliable manner at a desired position, so that it is ensured that no product residues being in contact with the environment will be present on the packages.

[0022] Finally, the invention relates to a package, such as a bag, for example, formed by means of a device or method as described above.

[0023] The invention will now be explained in more detail on the basis of an embodiment shown in the appended drawings, in which:

Figure 1 is a schematic front view of the device for forming packages according to the present invention;

Figure 2 is a side view of two packages formed by means of the device according to the present invention;

Figure 3 is a side view of two packages formed by means of the device according to the present invention, which is shown to comprise a die;

Figure 4 is a schematic, larger-scale sectional view of a part of the device according to the invention upon removal of a collecting space.

[0024] Like parts are indicated by the same numerals in the figures.

[0025] Figure 1 shows a device 1 for forming packages. The device 1 comprises two transverse seam jaws 3, 5, which are movable relative to each other, for forming a transverse seam 11 constituting a bottom 9 in a first package 7 to be formed and, simultaneously therewith, forming a transverse seam 17 constituting an upper side 15 of a second package 13 to be formed in said second package 13.

[0026] In the embodiment shown in the figures, the transverse seam jaws 3, 5 are made up of a sonotrode 3 and an anvil 5.

[0027] In the device 1 according to the present invention, the packages 7, 13 are separated from each other at a die cutting position 19 with a vertical spacing corresponding to at least the height of a package 7, 13.

[0028] Using the device 1 according to the present invention, it is possible to form 60 packages per minute, for example, and fill said packages with a product. The upper package 7, seen in figure 1, to be formed is filled with a product in the usual manner after the bottom seam 11 has been formed.

[0029] Using ultrasonically generated vibration, the sonotrode 3 and the anvil 5 of the device 1 according to the invention additionally form two connecting seams 29, 31 extending transversely to the transverse seams 11, 17 near the ends thereof. The packages 7, 13 formed by means of the sonotrode 3 and the anvil 5 are shown in figure 2. The connected packages define a collecting space 35 between the connecting seams 29, 31 and the transverse seams 11, 17.

[0030] In the illustrated embodiment, the connecting seams 29, 31 extend in line with the longitudinal seams 21, 23, 25, 27 formed during a preceding operation (not shown).

[0031] At the cutting position 19 shown in figure 1, the device 1 is provided with a die 37 (figures 3 and 4). The die 37 has the shape of a roman numeral I, which is tilted a quarter turn in the device 1. A die 37 configured in this

way comprises two end sections 39, 41 extending parallel to each other, with a middle section 43 extending in the longitudinal direction of the die 37 present therebetween. The parallel end sections 39, 41 of the die 37 are connected to the longitudinally extending middle section 43 of the die 37 via rounded transitions 45. Such a configuration of the die 37 has the advantage that the corners of the welded seams are rounded during the die cutting operation, providing rounded rather than sharp corners. Such rounded corners rule out the risk of persons cutting themselves when using the package. The dimensions of the die 37 are larger than the dimensions of the collecting space 35 both in longitudinal direction and in transverse direction, so that the entire collecting space 35 will have been removed after a die cutting operation.

[0032] The operation of the device 1 will now be described with reference to figure 4, in which the connecting seams 29, 31 are not visible on account of the selected sectional direction. By welding the connecting seams 29, 31 and the transverse seams 11, 17 ultrasonically, in combination with the use of a specially formed anvil and/or sonotrode, part of the plastic 50 of the foil 52, which has been liquefied by means of the aforesaid vibration and which is shown in solidified state in figure 4, is displaced from the bottom seam and the upper seam and also from the connecting seams (not shown) towards the centre 54 of the collecting space. The liquid plastic causes the dimensions of the collecting space 35 to become smaller, since the solidified plastic parts 50 form part of the transverse seams 11, 17 and the connecting seams 29, 31. While the liquefied plastic is being guided by the profile of the sonotrode 3 and/or the anvil 5, remaining product residues 60 are confined in the collecting space 35. The welds to be made are spaced a certain distance apart, and the space 35 therebetween provides a possibility of containing the collected product residues therein. The collecting space 35 can subsequently be removed by means of the die 37 at a downstream die cutting position 19, which collecting space 35, including the product residues that may be contained therein, are subsequently discharged. The length of the die 37, seen in a direction transversely to the plane of the drawing of figure 4, as well as the width thereof, which is indicated at b in figure 4, are larger than the length and the width of the collecting space 35, so that the collecting space 35 is removed in its entirety, including the product residues 60 contained therein.

[0033] Alternatively, the die 37 may not form part of the device 1, in which case the step of removing the collecting space 35 is carried out outside the device 1.

[0034] It is also possible, of course, to design the transverse seam jaws 3, 5 such that the connecting seams and the transverse seams are welded by means of thermal energy rather than by means of ultrasonic energy.

Claims

1. A device for forming packages, which device comprises at least two transverse seam jaws, which are movable relative to each other, for forming a transverse seam constituting a bottom in a first package to be formed and, simultaneously therewith, forming a transverse seam constituting an upper side of a second package to be formed in said second package, **characterised in that** the transverse seam jaws additionally form two connecting seams extending transversely to the transverse seams, to which connecting seams the two longitudinally extending transverse seams are connected, preferably near the ends thereof, with the connected packages defining a collecting space between said connecting seams and said transverse seams.

2. A device according to claim 1, **characterised in that** the transverse seam jaws are made up of a sonotrode and an anvil, which sonotrode and/or which anvil are profiled so that any product residues confined in the collecting space can be guided towards the centre of the collecting space by means of he generated vibration.

3. A device according to claim 1, **characterised in that** the transverse seam jaws are designed for thermally welding the connecting seams and the transverse seams.

4. A device according to any one of the preceding claims, **characterised in that** the device comprises a die, by means of which the first package can be separated from the second package after the collecting space has been formed.

5. A device according to claim 4, **characterised in that** the die has the shape of a roman numeral I, comprising two end sections extending parallel to each other, between which a longitudinally extending middle section is located.

6. A device according to claim 4 or 5, **characterised in that** the dimensions of the die are larger than the dimensions of the collecting space.

7. A device according to any one of claims 4-6, **characterised in that** the parallel end sections of the die are connected to the longitudinally extending middle section of the die via a rounded transition.

8. A method for forming packages, which method comprises the following steps:

   - forming a transverse seam constituting a bottom in a first package and, simultaneously therewith, forming a transverse seam constituting an

upper side of a second package to be formed in said second package, **characterised in that**
- two connecting seams extending substantially transversely to the transverse seams are formed, preferably near ends of said transverse seams, simultaneously with the forming of the transverse seams, with the connected packages defining a collecting space between said connecting seams and said transverse seams.

9. A method according to claim 8, **characterised in that** the packages are separated from each other by removing the collecting space after said collecting space has been formed.

10. A package, such as a bag, for example, formed by using a method as defined in claim 8 or 9.

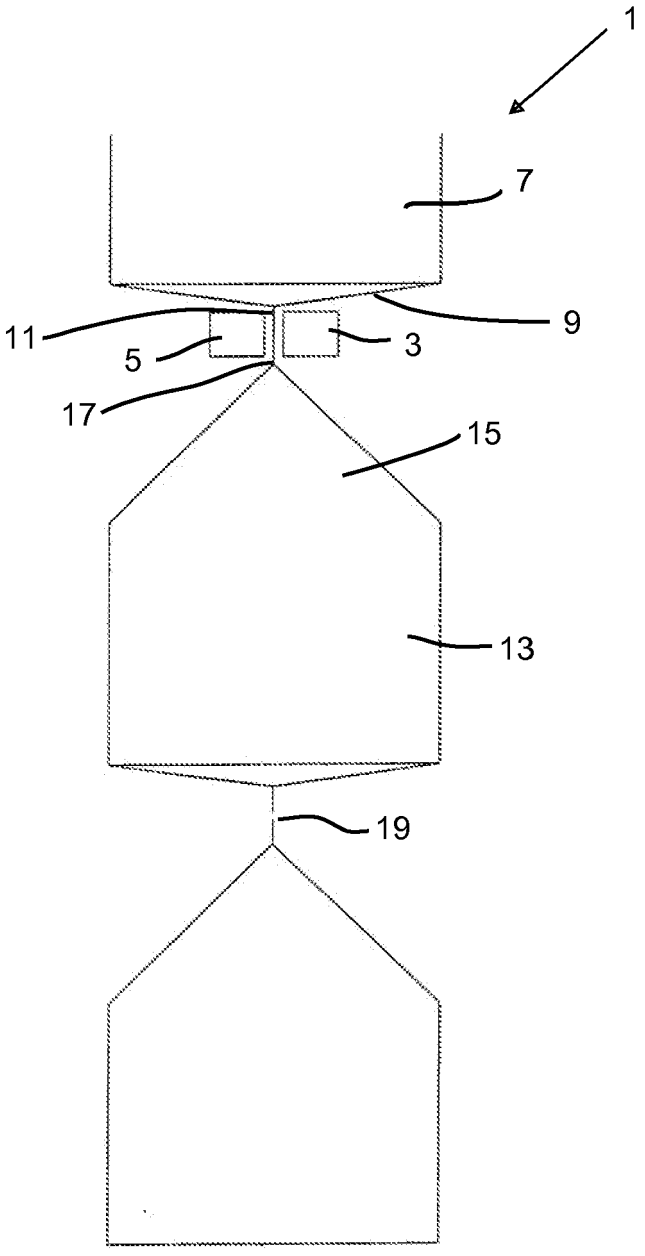

Fig. 1

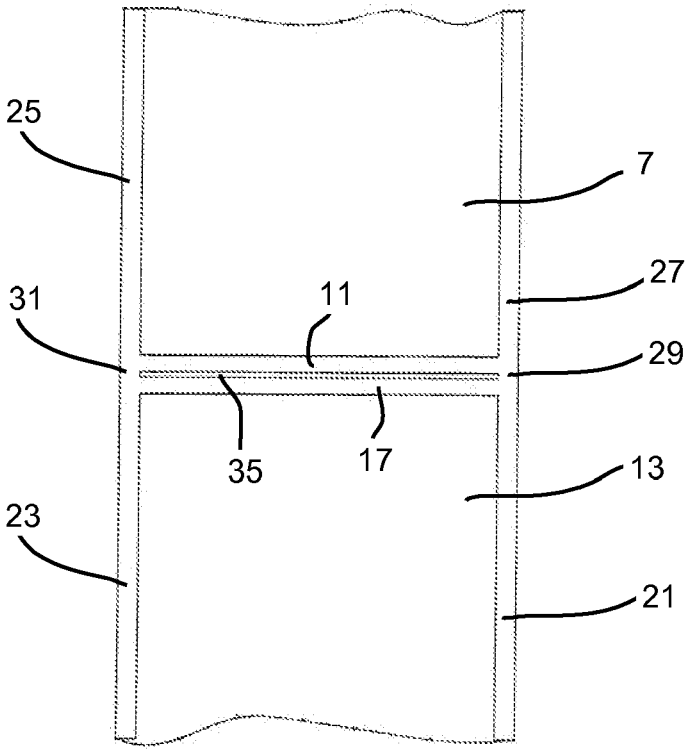

Fig. 2

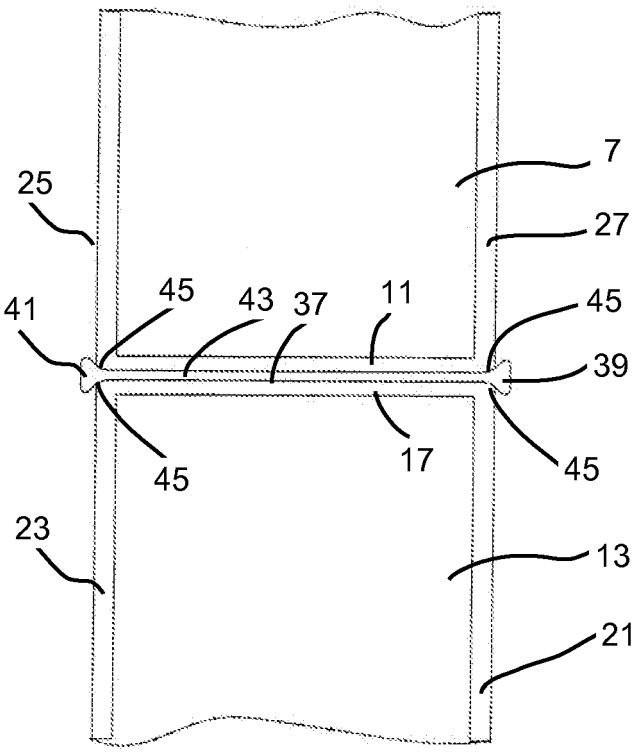

Fig. 3

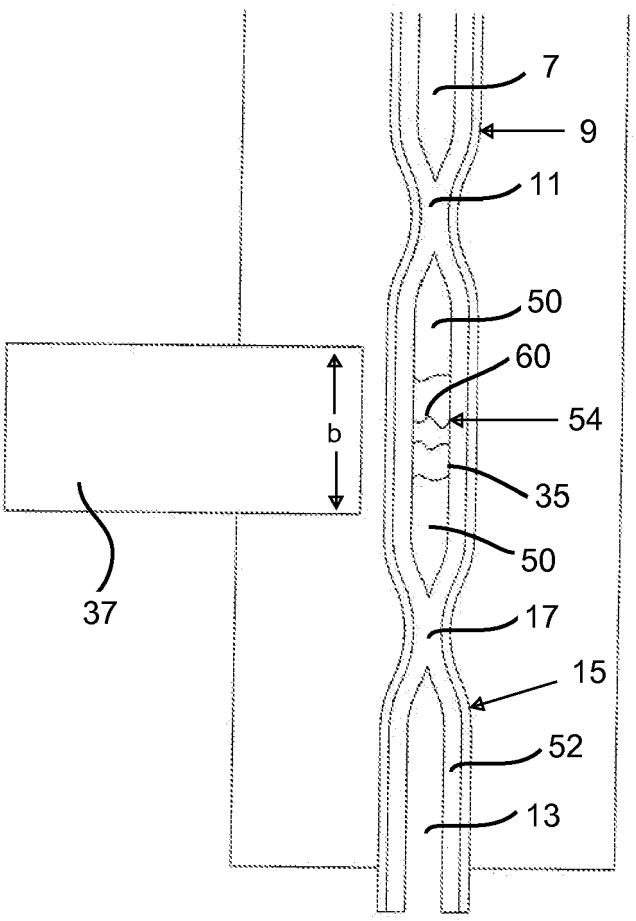

Fig. 4

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PARTIAL EUROPEAN SEARCH REPORT

under Rule 62a and/or 63 of the European Patent Convention. This report shall be considered, for the purposes of subsequent proceedings, as the European search report

Application Number
EP 10 18 6575

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 5 067 302 A (BOECKMANN HUGO [US]) 26 November 1991 (1991-11-26) * the whole document * -----	1,8	INV. B65B51/30 B65B61/06 B65D75/40
A	US 3 199 756 A (DAVY ROBERT E) 10 August 1965 (1965-08-10) * the whole document * -----	1,8	ADD. B65B9/20

TECHNICAL FIELDS SEARCHED (IPC)

B65B

INCOMPLETE SEARCH

The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC so that only a partial search (R.62a, 63) has been carried out.

Claims searched completely :

Claims searched incompletely :

Claims not searched :

Reason for the limitation of the search:

see sheet C

1

Place of search	Date of completion of the search	Examiner
Munich	1 March 2011	Schelle, Joseph

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
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& : member of the same patent family, corresponding document

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INCOMPLETE SEARCH SHEET C

Application Number
EP 10 18 6575

Claim(s) completely searchable:
1-9

Claim(s) not searched:
10

Reason for the limitation of the search:

Article 84 EPC, taken in combination with Rule 43(1) and (3) EPC, requires that any independent claim must contain all the technical features essential to the definition of the invention.
Claim 10, however, lacks any structural feature whatsoever.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 18 6575

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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01-03-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5067302 A	26-11-1991	NONE	
US 3199756 A	10-08-1965	NONE	

EPO FORM P0459

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