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(57) -A method to place sleeves around objects comprises the following operations: a)-the objects (04) are translated and distanced (S4) along a first path (P1); b)-the sleeves (M4) are translated in a tubular configuration along a second tubular path (P2) having a first segment (P2-CD) inclined and converging towards and along the first path (P1) in proximity a zone (Z1) where the sleeves are inserted; c)-in proximity to the sleeves

insertion zone (Z1) the sleeves (M4) are inserted in an open tubular configuration in the translation path of the objects and around the objects (O4), making a portion of the sleeves pass (M4s) through the spaces (S4); d)-the sleeves (M4) are then translated longitudinally downstream in an open tubular configuration and arranged around the objects with a relative longitudinal movement between sleeves and objects, until the arrangement of the sleeves around the objects is obtained.



Description

[0001] -The present invention relates to a method to place sleeves around objects, as a means to pack the objects and/or to construct a warranty seal, in which these sleeves can be formed with plastic material and/or composite material and/or material of other nature, in which said material can have the characteristics of extendable or non-extendable or heat shrinking or elastic material, or other type of material, and in which the objects to be packed can be of monolithic type or other type, as for example batches of products in groups, batches of bottles or cans or vases or boxes, etc.

Backgrounds of the Invention

[0002] -Today, see US-4.872.302, to pack objects inside a sleeve, a tube is formed and then welded at the ends of the respective package, hence obtaining tension on the package.

[0003] -These systems present a series of problems.

[0004] -A first problem is due to the fact that longitudinal and transversal welding methods are necessary.

[0005] -A second problem is due to the fact that the welds performed under tension are sometimes defective and can break.

[0006] -A third problem is due to the fact that packaging, constructed using this method has undesirable aesthetic welding effects.

Scope of the Invention

[0007] -The scope of this invention is to resolve the above-mentioned problems.

[0008] -The invention, which is characterized by the claim, resolves the problem to create a method to place sleeves around objects, in which the method is characterized by the fact that it includes the following operations: **a)**-the objects are translated in single succession and distanced to determine spaces between them, from upstream to downstream, along a first objects translation path comprising a sleeves insertion zone; **b)**-the sleeves are translated in single succession in an open tubular configuration, from upstream to downstream, with the front head open towards downstream, along a second tubular path for sleeve translation that presents a first tubular translation segment inclined and convergent, from upstream to downstream, towards and along the first object translation path and intersecting the first object translation path in proximity of the said sleeves insertion zone; **c)**-in proximity to the sleeves insertion zone, the sleeves are inserted in an open tubular configuration in the translation path of the objects and around the objects, making a portion of the sleeves pass through the spaces between two following objects; **d)**-the sleeves are then translated longitudinally downstream in an open tubular configuration and arranged around the objects with a relative longitudinal movement between sleeves and ob-

jects, until the arrangement of the sleeves around the objects is obtained.

[0009] -Furthermore, the present invention relates to a method of the above type where elastic sleeves are used, in which the method is characterized by the fact that the following operations are performed: **a)**-the objects are translated in single succession and distanced to determine the spaces between them, from upstream to downstream, along a first objects translation path extending longitudinally and comprising a sleeve insertion zone; **b)**-the expanded and under tension elastic sleeves are translated in single succession in an open tubular configuration, from upstream to downstream, with the front head open towards downstream, along a second tubular path for sleeve translation that presents a first tubular translation segment inclined and convergent, from upstream to downstream, towards the first object translation path and intersecting the first object translation path in proximity of the sleeves insertion zone; **c)**-in proximity to the sleeves insertion zone, the expanded and under tension elastic sleeves are inserted in an open tubular configuration in the translation path of the objects and around the objects, making a portion of the sleeves pass through the spaces between two following objects; **d)**-the expanded and under tension elastic sleeves are then translated longitudinally downstream in an open tubular configuration and arranged around the objects with a relative longitudinal movement between sleeves and objects, until the arrangement of the sleeves around the objects is obtained.

Description of the enclosed drawings

[0010] -Ulterior characteristics and advantages of this invention are rendered more evident by the detailed description that follows of some of the preferred forms of realization, represented here only as an example and not restrictive, made with reference to the figures in the enclosed drawings, of which:

- Figure 1 schematically illustrates the method used for this invention;
- Figures 1A, 1B, 1C and 1D are illustrations relative to the section lines 1A-1A, 1B-1B, 1C-1C and 1D-1D of Fig. 1;
- Figures 2, 2A and 2B illustrate alternative object forms.

[0011] -As already mentioned, the present invention has as an object a method to place sleeves around objects, in which the machine system is described in another patent application no. IT-BO-2005.A.000755 filed on the same day as this application and in the name of the same applicant.

Method Regarding Sleeves in General

[0012] -With reference to figure 1, the objects O1, O2,

O3, etc, are translated in single succession and distanced between themselves to determine the spaces S1, S2, S3, S4, etc., from upstream to downstream, with respect to the arrow F1, along a first objects translation path P1 longitudinally extended and along a first operational environment of longitudinal development indicated by the dotted lines of translation of the objects, in which the first path P1 comprises a sleeve insertion zone Z1 further described later.

[0013] -Still with reference to figure 1, the sleeves M1, M2, M3, M4, etc. are translated in single succession in an open tubular configuration, from upstream to downstream, with respect to the arrow F2, with the front head M4a open towards downstream, along a second tubular path P2, see also figures 1A and 1B, viewed as a cross section, which presents a tubular form, i.e. a form in which the sleeves are translated downstream in an open tubular configuration, see also the dotted lines that define the development of the second path of translation of the sleeves.

[0014] -For reasons explained later this second path P2 can be constructed in several segments, P2-AB, P2-BC, P2-CD, P2-DE, P2-EF (see the letters A, B, C, etc, along the dotted lines that define the development of the second path) also explained later, in which the segment P2-CD, here defined as the first tubular translation segment P2-CD, is arranged inclined and convergent to the first object translation path P1, intersecting the first object translation path P1 in proximity of the intersection and sleeve insertion zone Z1 and extending longitudinally around the first object translation path and more particularly around the longitudinal operational environment of the objects translation, see fig. 1B.

[0015] -With this arrangement, in proximity of the intersection and sleeve insertion zone Z1, see sleeve M4 and object O4, the same sleeve M4 is inserted in an open tubular configuration around the object O4, making a portion of the sleeve M4s pass through the space S4 existing between two following objects, O4 and O5, by first inserting the sleeve M4 in the first object translation path P1 without any interference with the object O4 or with the following object O5 and, then, the front part M4a of the sleeve is arranged around the rear part of object O4.

[0016] -Then, using the end tract of segment P2-CD, the sleeve M4 is longitudinally translated downstream in an open tubular configuration arranged around the object O4, i.e. without any interference between the sleeve M4 and the object O4, using a relative longitudinal movement between sleeve M4 and object O4, until the sleeve M4 is arranged around the object O4, hence obtaining the desired arrangement of the sleeve M4 around the object O4, consequently obtaining the above mentioned prefixed scope.

Method Regarding Elastic Sleeves.

[0017] -According to an alternative form of the method object of the present invention, in place of generic

sleeves, elastic sleeves are used, i.e. sleeves constructed in elastic material made by different materials, e.g. plastic, rubber or other material, in which this material presents elastic characteristics to enable elastic expansion and return in a longitudinal and/or transversal sense.

[0018] -Using these elastic sleeves in a similar way to the previously described use, to place the elastic sleeves around objects, the following operations are performed: >-the objects O4 are translated in single succession and distanced S4 between the objects, from upstream to downstream, along the first object translation path P1 longitudinally extended and comprising a sleeve insertion zone Z1; >-the expanded and under tension elastic sleeves M4 are translated in single succession in an open tubular configuration, from upstream to downstream, with the front head open towards downstream, along a second tubular path P2 for sleeve translation that presents a first tubular translation segment P2-CD inclined and convergent, from upstream to downstream, towards the first object translation path P1 and intersecting the first object translation path P1 in proximity of the sleeves insertion zone Z1; >-in proximity to the sleeves insertion zone Z1, the expanded and under tension elastic sleeves M4 are inserted in an open tubular configuration in the translation path of the objects and around the objects O4 making a portion M4s of the sleeves pass through the spaces S4 between two following objects O4, O5; >-the expanded and under tension sleeves M4 are then translated longitudinally downstream in an open tubular configuration and arranged around the objects O4 with a relative longitudinal movement between sleeves and objects, until the arrangement of the sleeves around the objects is obtained.

[0019] -Once having arranged the elastic sleeve around the object it is possible to perform a further following operation, which substantially is allowed to the expanded and under tension elastic sleeves to close (shrink) around the objects, with consequent adhesion of the elastic sleeve material around the walls of the object.

[0020] -According to a preferred but not restrictive exemplificative operational method to close elastic sleeves around objects, see in particular fig. 1 sleeve M2 and object O2, after having arranged a sleeve around an object, see O3-M3, the assembly O3-M3 is translated downstream with the same linear advancement speed for sleeve and object, along an ulterior segment P2-EF, which is used to define a tapered tubular path from upstream to downstream for the sleeves to be able to perform the following operations: >-a first front portion of the sleeve M2a is allowed to shrink at the front over the front face of the object O2 forming a first frontal wall to contain the object O2; >-a central portion of the sleeve M2b is allowed to shrink around the object; >-the rear portion of the sleeve M2c is allowed to shrink at the rear over the rear face of the object, forming a rear wall to contain the object O2.

[0021] -In this context, before the elastic sleeves are

placed around the objects, they may present transversal and/or longitudinal expansions and tensions along the translation direction and furthermore may present, in their non expanded-tension state, a transversal section having an internal perimeter less than the external perimeter of the object around which they will be inserted, to determine closure by elastic return of the sleeves against the external walls of the objects, and thereupon it is preferable to maintain a certain longitudinal and/or transversal elastic shrinking tension enough to squeeze-lock the objects in a transversal-longitudinal manner without deforming the shape of the objects.

[0022] -According to a preferred but not restrictive form of actuation, a flow in succession of objects O1, O2, etc. distanced between themselves S1, S2, etc. are translated along the first object translation path P1, from upstream to downstream, and at the same time to translate along the second tubular translation segment P2-CD, from upstream to downstream, a flow in succession of sleeves M1, M2, etc., to then foresee in the proximity of the intersection zone Z1, a phase relation between objects and sleeves enough to insert in succession the sleeves into the first object translation path P1, using the spaces S1, S2, etc. that follow each other in the intersection zone Z1.

[0023] -Preferably but not restrictive, it is possible to translate the objects O1, O2, O3, etc. with continuous motion and translate the sleeves M1, M2, M3, etc. with variable motion.

[0024] -If requested, e.g. if very long objects are used, the second sleeve translation path P2 can comprise a second tubular translation segment for sleeves P2-DE arranged downstream from the first tubular translation segment P2-CD, along which the sleeves can be longitudinally translated in an open tubular configuration around the objects with relative longitudinal movement between sleeves and objects.

[0025] -With reference to the closure of sleeves around the objects, preferably but not restrictive, the second sleeve translation path P2 can furthermore comprise a third tubular translation segment P2-EF, arranged downstream from the first tubular translation segment P2-CD, along which the sleeves are closed around the objects. -This third tubular translation segment P2-EF can be jointly arranged downstream to the first tubular translation segment P2-CD or adjoining/continuous downstream to the second tubular translation segment P2-DE. -The choice depends for example on the length of the object.

[0026] -For simplicity, the third tubular translation segment P2-EF can comprise a tapered tubular path, from upstream to downstream, to translate the sleeves downstream.

[0027] -With reference to sleeve expansion, the second sleeve translation tubular path P2 can further comprise a forth tubular translation segment P2-AB, arranged upstream of the first tubular translation segment P2-CD, along which P2-AB expands the sleeves transversally.

[0028] -If requested, e.g. if very long sleeves are used a fifth segment P2-BC can be provided, arranged upstream to the first section P2-CD, along which P2-BC translates the expanded-tensioned sleeves from the forth segment P2-AB to the first segment P2-CD.

[0029] -Furthermore, in relation to longitudinal sleeve expansion-tensioning, this tensioning can be performed along the second path P2, arranged upstream of the insertion station Z1.

[0030] -Lastly, referring to the objects, these can be consist of batches of products grouped together, e.g. batches of bottles/cans/etc., see fig. 2, and could also foresee that each object-batch-group carries associated at least one rigid layer against one of its faces, see for example fig. 2A, used to form a bottom panel-support, or even two or more layers, in which one or more layers can present an external perimeter, basically equal to the external perimeter of the face of the object-batch-group on which it is arranged to maintain the geometrical form of the object-batch-group after sleeve shrinkage. -In the place of layers it is possible to foresee the use of trays, see fig. 2B.

[0031] -The description of the methods to place sleeves around objects is given purely as an example and is not to be considered a restriction, therefore it is evident that all modifications or variants can be applied to the methods suggested by practical use and employment and however within the capacity range and/or the scope of the following claims.

[0032] -In this context, the following claims also form a complementary part for the above significant description.

Claims

1. A method to place sleeves around objects **characterized by the fact** to comprises the following operations: **a)**-the objects (O4) are translated, in single succession and distanced to determine the spaces (S4) between the objects, from upstream to downstream, along a first object translation path (P1) longitudinally extended and comprising a sleeve insertion zone (Z1); **b)**-the sleeves (M4) are translated in single succession in an open tubular configuration, from upstream to downstream, with the front head open towards downstream, along a second tubular path (P2) for sleeve translation that presents a first tubular translation segment (P2-CD) inclined and convergent, from upstream to downstream, towards and along the first object translation path (P1) and intersecting the first object translation path (P1) in proximity of the said sleeves insertion zone (Z1); **c)**-in proximity to the sleeves insertion zone (Z1), the sleeves (M4) are inserted in an open tubular configuration in the translation path (P1) of the objects and around the objects (O4) making a portion (M4s) of the sleeves pass through the spaces (S4) between

two following objects (04, 05); d)-the sleeves (M4) are then translated longitudinally downstream in an open tubular configuration and arranged around the objects with a relative longitudinal movement between sleeves and objects, until the arrangement of the sleeves around the objects is obtained.

2. Method according to claim 1, **characterized by the fact that** elastic sleeves are used, and **by the fact that** the following operations are performed: **a)**-the objects (04) are translated in single succession and distanced to determine the spaces (S4) between them, from upstream to downstream, along a first object translation path (P1) longitudinally extended and comprising a sleeve insertion zone (Z1); **b)**-the expanded and under tension elastic sleeves (M4) are translated in single succession in an open tubular configuration, from upstream to downstream, with the front head open towards downstream, along a second tubular path (P2) for sleeve translation that presents a first tubular translation segment (P2-CD) inclined and convergent, from upstream to downstream, towards the first object translation path (P1) and intersecting the first object translation path (P1) in proximity of the sleeves insertion zone (Z1); **c)**-in proximity to the sleeves insertion zone (Z1), the expanded and under tension elastic sleeves (M4) are inserted in an open tubular configuration in the translation path of the objects and around the objects (04) making a portion (M4s) of the sleeves pass through the spaces (S4) between two following objects (04, 05); **d)**-the expanded and under tension elastic sleeves (M4) are then translated longitudinally downstream in an open tubular configuration and arranged around the objects (04) with a relative longitudinal movement between sleeves and objects, until the arrangement of the sleeves around the objects is obtained.
3. Method according to claim 2, **characterized by the fact that** after the operation **d)** a further operation **e)** is provided in which the expanded and under tension elastic sleeves are allowed to close around the objects.
4. Method according to claim 3, **characterized by the fact that** the operation **e)** in which the expanded and under tension elastic sleeves are allowed to close around the objects comprises the following operations: **e1)**-a first front portion (M2a) of the sleeve (M2) is allowed to shrink at the front over the front face of the object (02) forming a first frontal wall to contain the object (02); **e2)**-a central portion (M2b) of the sleeve (M2) is allowed to shrink around the object (02); **e3)**-the rear portion of the sleeve (M2c) is allowed to shrink at the rear over the rear face of the object (02), forming a rear wall to contain the object.

5. Method according to claim 3 or 4, **characterized by the fact that** the operation **e)** occurs translating the preformed sleeve-object (02-M2) assembly downstream.
6. Method according to a claim from 2 to 5, **characterized by the fact that** these expanded and under tension elastic sleeves (M4) present transversal expansion and tension with respect to their translation direction.
7. Method according to a claim from 2 to 6, **characterized by the fact that** these expanded and under tension elastic sleeves (M4) present longitudinal expansion and tension with respect to their translation direction.
8. Method according to a claim from 2 to 7, **characterized by the fact that these** elastic sleeves, in their non expanded-tension state, have a transversal section having an internal perimeter less than the external perimeter of the object around which they will be inserted.
9. Method according to a claim from 2 or 8, **characterized by the fact that** these elastic sleeves present predetermined dimensions and/or predetermined elastic characteristics selected in relation to the object to be covered to determine closure by elastic return of the sleeves against the external walls of the objects and to maintain a certain elastic shrinking tension, enough to squeeze the objects without deforming their shape.
10. Method according to a claim from 1 to 9, **characterized by the fact that** a flow in succession of objects (01, 02, etc.) distanced between themselves (S1, S2, etc.) are translated along the first object translation path (P1), **by the fact that** a flow in succession of sleeves (M1, M2, etc.) are translated along the second tubular translation segment (P2-CD), and **by the fact that** it is provided in the proximity of the intersection zone (Z1) a phase relation between the translation of objects and sleeves enough to insert in succession the sleeves into the first object translation path (P1) using the spaces (S1, S2, etc.) between the objects (04, 05) that follow each other in the intersection zone (Z1).
11. Method according to claim 10, **characterized by the fact that** it provides to translate the objects (01, 02, 03, etc.) with continuous motion and translate the sleeves (M1, M2, M3, etc.) with variable motion.
12. Method according to a claim from 1 to 11, **characterized by the fact that** the second sleeve translation path (P2) comprises a second tubular translation segment (P2-DE) arranged downstream from the

- first tubular translation segment (P2-CD), and **by the fact that** along the second tubular translation segment (P2-DE) the sleeves are longitudinally translated in an open tubular configuration around the objects with relative longitudinal movement between sleeves and objects. 5
13. Method according to a claim from 1 to 12, **characterized by the fact that** the second sleeve translation path (P2) further comprises a third tubular translation segment (P2-EF) arranged downstream from the first tubular translation segment (P2-CD), and **by the fact that** along the said third tubular translation segment (P2-EF) the sleeves are closed around the objects. 10
14. Method according to claim 13, **characterized by the fact that** the third tubular translation segment (P2-EF) is arranged after the first tubular translation segment (P2-CD). 20
15. Method according to claim 13, **characterized by the fact that** the third tubular translation segment (P2-EF) is arranged after the second tubular translation segment (P2-DE). 25
16. Method according to claim 13, **characterized by the fact that** the third tubular translation segment (P2-EF) defines for the sleeves a tapered tubular path from upstream to downstream. 30
17. Method according to one of the claims from 1 to 16, **characterized by the fact that** the second sleeve translation tubular path (P2) further comprises a forth tubular translation segment (P2-AB), arranged upstream of the first tubular translation segment (P2-CD), and **by the fact that** along the forth tubular translation (P2-AB) the sleeves are expanded transversally. 35
18. Method according to one of the claims from 1 to 17, **characterized by the fact that** the second sleeve tubular translation path (P2) further comprises a fifth segment (P2-BC) arranged upstream to the first section (P2-CD), and **by the fact that** along the fifth segment (P2-BC) the expanded-tensioned sleeves are translated from the fourth segment (P2-AB) to the first segment (P2-CD). 40
19. Method according to one of the claims from 1 to 18, **characterized by the fact that** along the second path (P2) and upstream of the insertion station (Z1) the sleeves are stretched longitudinally. 45
20. Method according to one of the claims from 1 to 19, **characterized by the fact that** the objects are batches. 50
21. Method according to one of the claims from 1 to 20, **characterized by the fact that** each object carries at least one associated rigid layer placed against a face of the object. 55
22. Method according to one of the claims from 1 to 21, **characterized by the fact that** each object carries at least one associated rigid layer placed against a face of the object and **by the fact that** the rigid layer presents an external perimeter basically equal to the external perimeter of the face of the object on which it is arranged.
23. Method according to one of the claims from 1 to 22, **characterized by the fact that** each object is arranged into a tray.

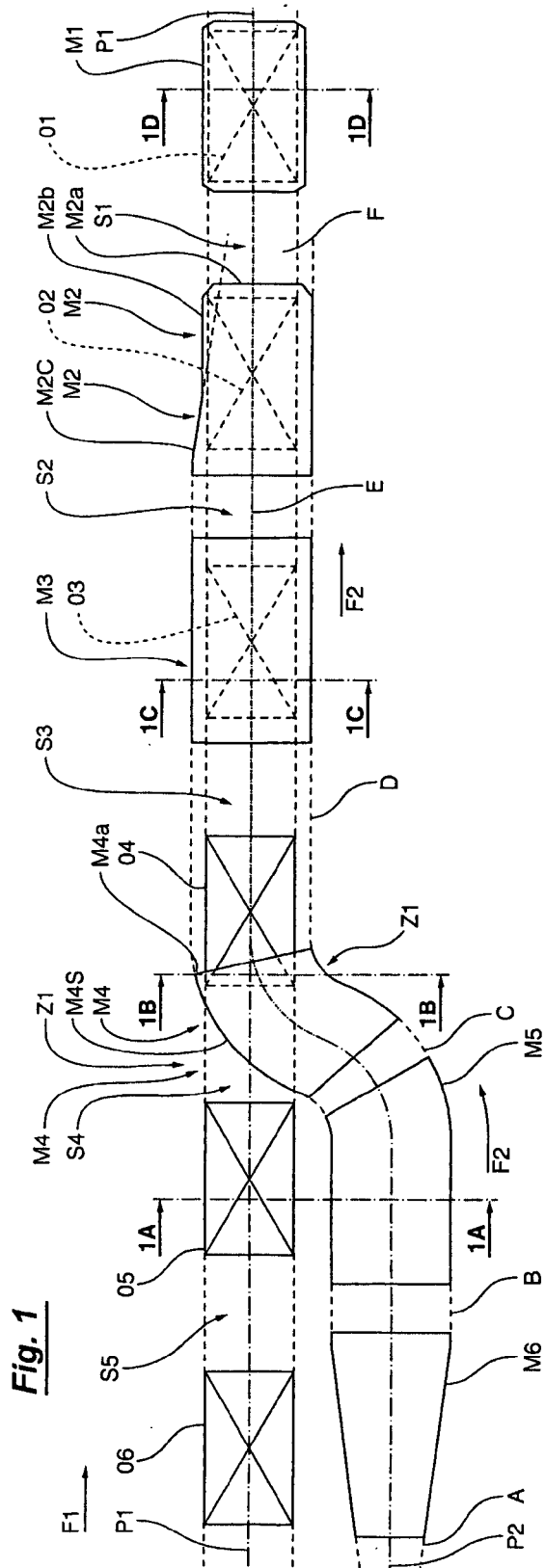


Fig. 1A

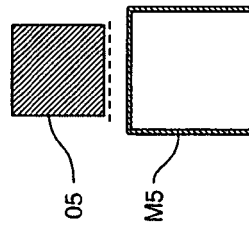


Fig. 1B

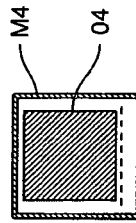


Fig. 1C

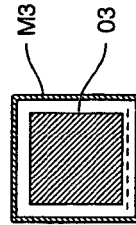


Fig. 1D

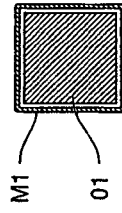


Fig. 2

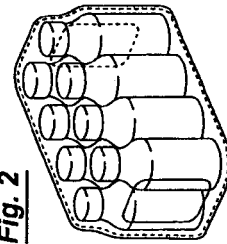


Fig. 2A

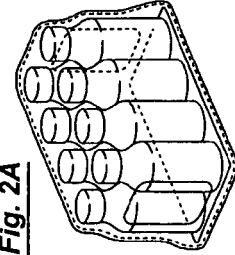
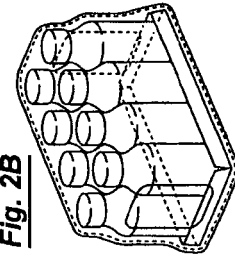


Fig. 2B





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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 March 2007	Examiner Jagusiak, Antony
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			

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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