



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.12.2011 Bulletin 2011/49

(51) Int Cl.:
F24C 15/08 (2006.01)

(21) Application number: **10003579.9**

(22) Date of filing: **31.03.2010**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
AL BA ME RS

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(54) **Method for assembling a base for a household appliance**

(57) A method for assembling a rectangular frame (10) forming a base for a household appliance is provided comprising:
(a) producing two elongated frame members (22) by metal forming;

(b) bending the two elongated (22) frame members along a bending line in order to form two L-shaped frame halves (18a, b); and
(c) combining the two L-shaped frame halves (18a, b) to form the rectangular frame (10).

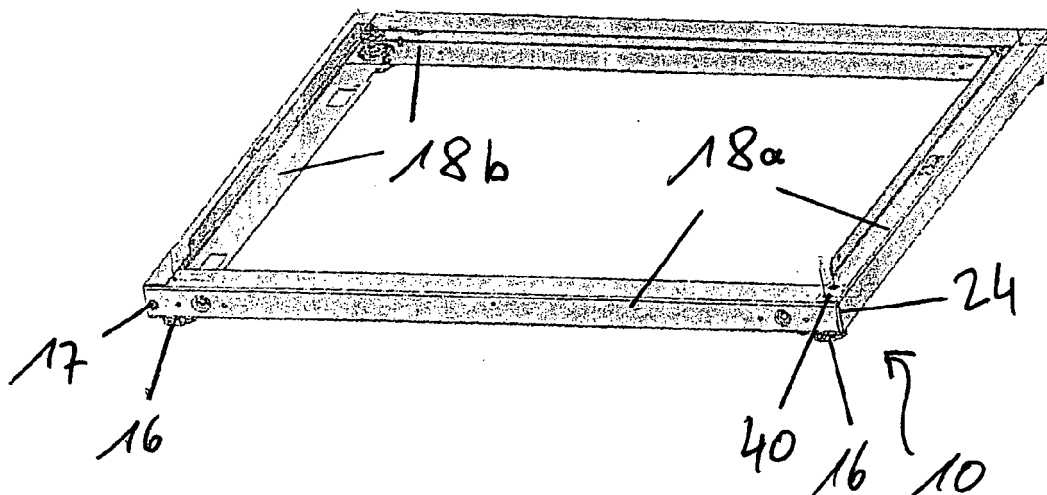


Fig. 2

Description

[0001] The present invention relates to a method for assembling a rectangular frame forming a base for a household appliance and to such a frame.

[0002] Household appliances known in the art like, for example, household ovens usually are standing on a base or plinth with a rectangular footprint comprising apertures for receiving feet being adjustable in height. An example for such a base for a household oven is shown in Fig. 1. Known frames forming a base for a household appliance are often assembled through combining a rear panel with a U-shaped front element. The U-shaped front element can be formed by bending an elongated frame member. For the metal forming of such an elongated frame member and the rear panel two different forming tools are needed.

[0003] It is an object of the present invention to provide a rectangular frame forming a base or plinth for a household appliance such like an oven as well as a method for assembling such a rectangular frame where production costs are reduced and the production logistics is simplified.

[0004] In accordance with the present invention the above objects are solved by a method for assembling the rectangular forming a base for a household appliance where two elongated frame members are metal-formed and then bent along bending lines in order to form two L-shaped frame halves. The two L-shaped frame halves are combined to form the rectangular frame. The rectangular frame forming a base for a household is hence formed by two frame members, which are made in one piece each and which are mounted together so as to provide for the rectangular form, where the two frame members are L-shaped frame halves.

[0005] On the one hand, the method of the present invention as well as the frame according to the present invention have the advantage that due to the fact that two identical metal-formed elongated frame members can be used to assemble the frame, only one metal forming tool is necessary to manufacture these elements. On the other hand, production logistics is simplified, since only one type of frame element needs to be provided for producing a frame.

[0006] Preferred embodiments of the present invention are defined in the dependent claims.

[0007] In a first preferred embodiment, the two elongated frame members are identical in construction.

[0008] In a further preferred embodiment, bending joints (which can include notches or grooves in order to thin the material in this area) are provided in the area of the bending lines for facilitating the bending, so that the bending can be done by hand.

[0009] Advantageously, the elongated frame members comprise self-locking latching members for snap-in locking, when the bending of the elongated frame members reaches an angle of 90° and where the self-locking latching members keep the frame halves in the L-shaped

form when locked. By use of these features the forming of the L-shaped frame halves out of the semi-finished members is simplified. As soon as through the bending of the elongated frame members an L-shaped form is reached (which means two arms of the formerly elongated frame member are now enclosing an angle of 90°), the self-locking latching members are snapping-in in a locking position by engaging each other so that through the locking the L-shape is maintained against further forward or backward bending.

[0010] Preferably, the semi-finished elongated frame members have a U-shaped cross-section or include such a U-shaped cross-section area. Such a U-shaped cross-section increases the stability of the assembled frame. The frame members are produced by metal forming in a way so that the two arms of the U remain in a horizontal orientation in a household appliance that is equipped with a rectangular frame forming a base according to the present invention. In a further preferred embodiment the bending of the elongated frame members and the assembly of the two L-shaped frame halves is done such that the extensions or arms of the U-shaped area are directed versus the interior of the assembled rectangular frame. In other words, the mid-section of the U-profile or U-shaped area is forming the outside of the plinth or base. The upper and lower extensions of the U-shaped area of the cross-section are forming an upper flange-like horizontal area of the base and a lower horizontal area receiving the feet of the household appliance, respectively.

[0011] In order to make the bending of such a U-shaped elongated frame member possible respective cuts near the vertical (with respect to a household appliance equipped with such a frame and standing on the floor) bending line can be provided so that an overlapping of the extensions of the U-shaped area is possible within the region of the bending.

[0012] In further preferred embodiments of the present invention the self-locking members are provided in these extensions of the U-shaped cross-section. This means, the locking members that are provided for engaging into a locked position, when the bending of the elongated frame members reaches a 90° shape can be provided on both sides equally spaced from the bending line in e.g. the upper extension. The respective self-locking latching members can comprise an aperture and an elevation provided in these areas of the extension, which are moving to an overlapping position during the bending process. The self-locking is reached as soon as such an elevation snaps into the opening of the corresponding aperture.

[0013] After forming of the two L-shaped frame halves these two halves are combined to form the rectangular frame building the base for the household appliance. This assembly step can be performed by simply screwing the two L-shaped frame halves together. Of course the frame can also be quadratic.

[0014] A preferred embodiment of a frame according to the present invention as well as a method for assembling

such a frame is described below by reference to the drawings, in which:

- Fig. 1 is a perspective view of a prior art rectangular frame;
- Fig. 2 is a perspective view of a rectangular frame according to the present invention;
- Fig. 3 is a perspective view of a metal-formed elongated frame member prior to the bending process;
- Fig. 4 is an enlarged perspective view onto the area of the elongated frame member of Fig. 3 comprising a bending joint;
- Fig. 5 is an enlarged perspective from above onto the right front edge of the frame of Fig. 2; and
- Fig. 6 is an enlarged perspective view from below onto the right front edge of the frame of Fig. 2, where the foot shown in Fig. 2 is removed.

[0015] Fig. 1 shows a prior art rectangular frame 10 forming a base for a household oven. Frame 10 consists of a rear panel 12 and a U-shaped front element 14. A household appliance like an oven is equipped with such a frame 10 in a way that it finally stands on the frame forming the base, which means in the perspective of Fig. 1 the household appliance (not shown here) would be on top of the frame. Frame 10 is equipped with four feet 16, which are adjustable in height.

[0016] Fig. 2 shows a rectangular frame according to the present invention. Instead of using a U-shaped front element and a rear panel, frame 10 of Fig. 2 is assembled by mounting two L-shaped frame halves 18a, 18b together so as to form the rectangular frame 10. This mounting is done by screwing together the two frame halves 18a, b with screws 17. Frame halves 18a, b are identical in construction and are produced by bending two elongated frame members into a L-shape which leads to some overlapping areas 40 near bending joints 24 in the edges of the L-shaped frame halves 18a, b.

[0017] Fig. 3 shows an elongated member 22, which is to be seen as a pre-product of one of the frame halves 18a, 18b of Fig. 2 prior to the bending process. Elongated member 22 includes the bending joint 24 facilitating the bending along a vertical bending line lying within the bending joint 24. By bending such an elongated member 22 the L-shaped frame halves 18a and 18b of Fig. 2 are obtained.

[0018] The area around the bending joint 24 of elongated member 22 of Fig. 3 (prior to the bending step) is shown in an expanded view in Fig. 4. As can be seen in Fig. 4, elongated member 22 has approximately a U-shaped cross-section along the entire elongation. The U-shaped cross-section comprises a mid-section 34 and

a lower extension 32a as well as an upper extension 32b. Both extensions are parallel with respect to each other and normal to the mid-section 34. The bending will be done in a way so that both ends of the elongated member 22 will be bent towards the viewer so as to form one of the L-shaped frame halves 18a, 18b. Cuts 26a and 26b are formed into the lower and upper extension 32a, 32b so that such a bending within the bending joint 24 can be performed. It should be noted that although the profile of elongated member 22 on the right-hand side and on the left-hand side of the bending joint 24 is U-shaped, there are some differences with respect to the dimensions. One important difference is the length and the position of the respective mid-section 34 relative to the extensions 32a and 32b. Since during the bending an overlapping area 40 (see also Fig 2) of the upper and lower extensions 32b, 32a in the area of the bending joint 24 is created, the length and / or position of the mid-section 34 on both sides of the bending joint 24 has to be chosen in a way so that the respective extensions 32, 32b are free to overlap.

[0019] In addition an aperture 30 is provided in the upper extension 32b on the right-hand side of the bending joint 24, whereas a respective elevation 36 is stamped into the upper extension 32b on the left-hand side of the bending joint 24. Of course, the aperture 30 and the elevation 36 can also be provided in addition (as shown) or alternatively in the lower extension 32a. As will be shown in Figs. 5 and 6 aperture 30 and elevation 36 are dimensioned and positioned such that they act as self-locking latching members for snap-in locking, when the bending of the elongated frame member 22 reaches an angle of 90°.

[0020] In addition, the lower extension 32a has openings 38a, 38b which will overlap to one single opening after bending for receiving the foot 16 shown in Fig. 2.

[0021] Figs. 5 and Fig. 6 are enlarged perspective views onto the bended L-shaped frame half 18a from above (Fig. 5) and below (Fig. 6). As can be seen in Fig. 5, the upper extension 32a of the formerly straight elongated member now defines (due to the bending) the overlapping area 40 near the bending joint 24 in the edge of the frame half 18a. The elevation 36 of elongated member 22 has now snapped into the aperture 30 so as to reach an engaging locking position between these two self-locking latching members keeping the frame half in the L-shaped form as soon a bending angle of 90° is reached. As can be seen from Fig. 6, also in the lower extension 32a of the elongated member 22 in (now, after bending forming the frame half 18a) such self-locking latching members are provided comprising a further elevation 36 and aperture 30, which are now in locking position, too, so as to further improve the stability of the rectangular frame 10.

List of reference signs

[0022]

10 frame
 12 rear panel
 14 front element
 16 foot
 17 screw
 18a, b frame half
 20 flange section
 22 elongated member
 24 bending joint
 26a, b cut
 28a, b overlapping area
 30 aperture
 32a lower extension
 32b upper extension
 34 midsection
 36 elevation
 38a, b opening
 40 overlapping area

Claims

1. Method for assembling a rectangular frame (10) forming a base for a household appliance comprising:
 - (a) producing two elongated frame members (22) by metal forming;
 - (b) bending the two elongated (22) frame members along a bending line in order to form two L-shaped frame halves (18a, b) ; and
 - (c) combining the two L-shaped frame halves (18a, b) to form the rectangular frame (10).
2. The method of claim 1, wherein the two elongated frame members (22) are identical in construction.
3. The method of claim 1 or claim 2, wherein bending joints (24) are provided in the area of the bending lines so as to facilitate the bending.

4. The method of anyone of the preceding claims, wherein the elongated frame members (22) comprise self-locking latching members (30, 36) for snap-in locking when the bending of the elongated frame members (22) reaches an angle of 90° and where the self-locking latching members (30, 36) keep the frame halves (18a, b) in the L-shaped form when locked.
5. The method of anyone of the preceding claims, wherein the elongated frame members (22) have a cross-section comprising a lower and an upper extension (32a, b) being parallel to each other, and a midsection (34) which is in between the upper and the lower extension (32 a, b).
6. The method of claim 5, wherein the midsection (34) and the two extensions (32a, b) define a U-shaped section of the cross-section of the elongated member (22).
7. The method of claim 6, wherein the bending line is parallel to and lies in the midsection (34) of the U-shape.
8. The method of claim 7, wherein the bending of the elongated frame members (22) and the assembly of the two L-shaped frame halves (18a, b) is done such that the extensions (32a, b) of the U-Profile are directed versus the interior of the assembled rectangular frame (10) and adjacent areas of each extension (32a, b) both-sided the bending line are defining an overlapping area (40) after the bending.
9. The method of anyone of claims 5 to 8, when depending from claim 4, wherein the self-locking members (30, 36) are provided in the overlapping area (40) of the upper and / or lower extensions (32a, b).
10. The method of claim 9, wherein the self-locking latching members (30, 36) comprise an aperture (30) and an elevation (36) which are located on both sides equally spaced from the bending line such that the elevation (36) snaps into the aperture (30) for self-locking latching.
11. The method of anyone of the preceding claims, wherein the household appliance is an oven.
12. Rectangular frame (10) forming a base for a household appliance, wherein the frame is formed by two frame members (18a, b) which are made in one piece each and which are mounted together so as to provide for the rectangular form;
characterized in that
 the two frame members (18a, b) are L-shaped frame halves

13. Frame according to claim 12, **characterized in that** the two frame halves (18a, b) are identical in construction.
14. Frame according to claim 13, **characterized in that** each L-shaped frame half (18a, b) comprises a bending line in the apex of the right angle of the L. 5
15. Frame according to claim 14, **characterized in that** each L-shaped frame half (18a, b) comprises self-locking latching members (30, 36) which are snap-in locked in order to keep the frame half in the L-shaped form. 10

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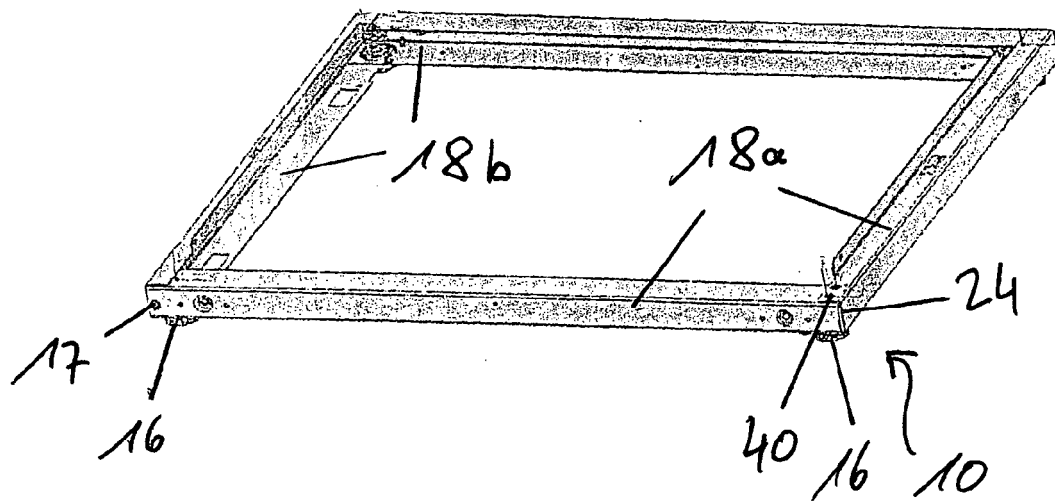
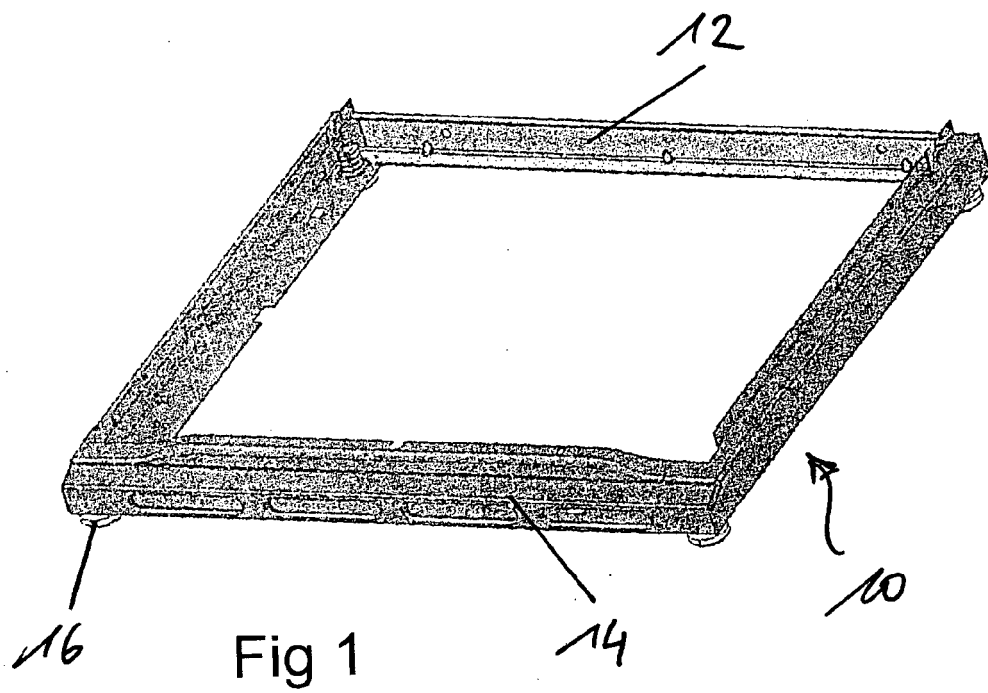
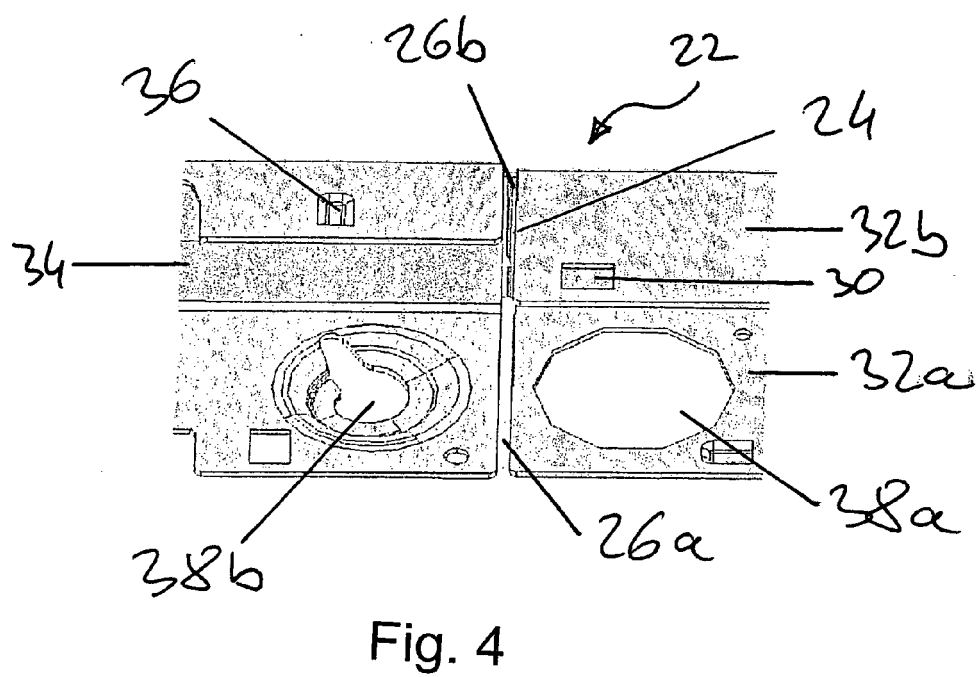
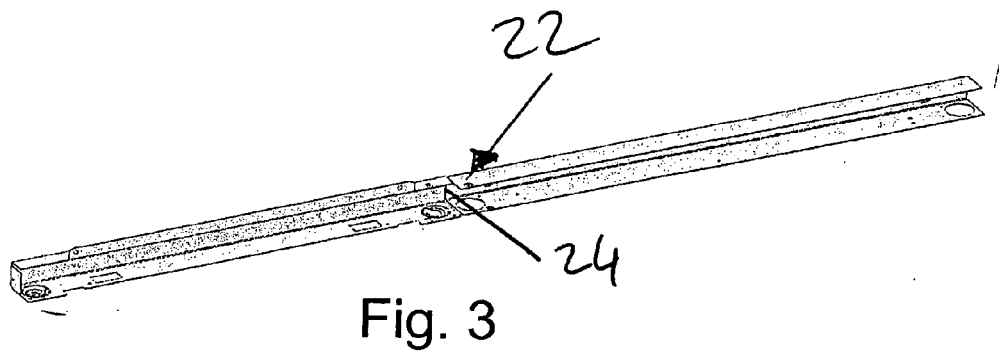
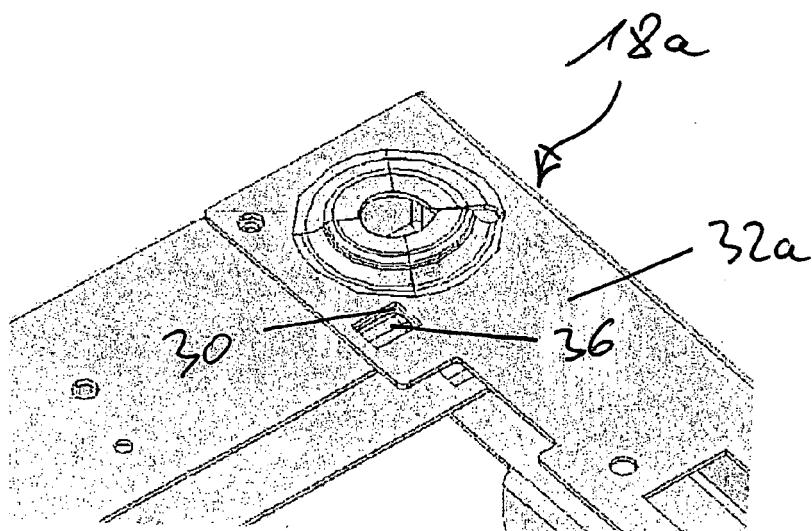
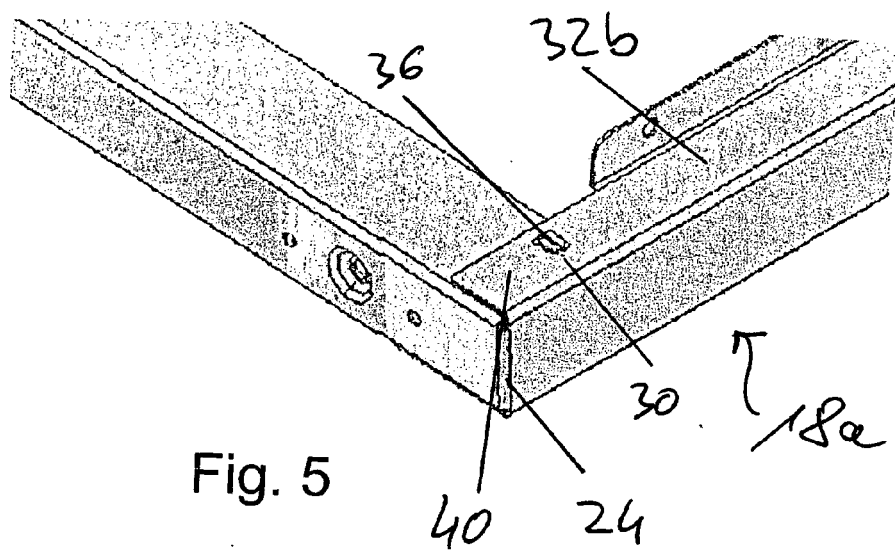


Fig. 2







EUROPEAN SEARCH REPORT

Application Number
EP 10 00 3579

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		26 January 2011	Verdoodt, Luk
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			

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EPO FORM 1503 03.82 (P04C01)

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

EP 10 00 3579

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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