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(54) **A board and a method for manufacturing thereof**

(57) A board (100) comprising a panel (101) mounted within a frame (110). The frame (110) comprises frame members (111-114) connected with each other by means

of connectors (115) of a variable configuration, which in a locked configuration are tightly coupled with the frame members (111-114) and in an unlocked configuration are movable with respect to the frame members (111-114).

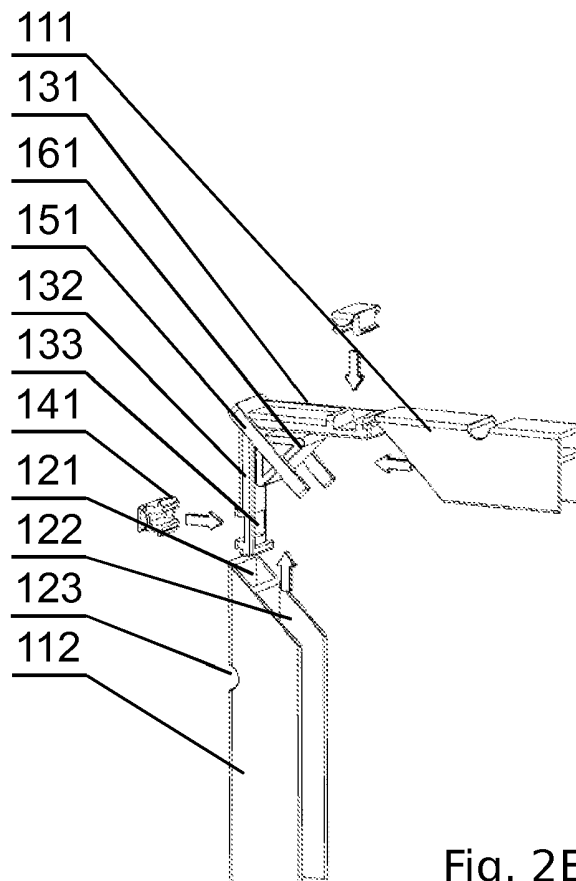


Fig. 2B

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Description

[0001] The present invention relates to office boards, such as hard surface boards, e.g. whiteboards, or soft surface boards, e.g. cork boards or textile-surface boards.

[0002] One common problem related to office boards, in particular whiteboards, is the wear of the board panel. For example, when writing on a whiteboard, special marker pens should be used, which are easy to dry-wipe. However, after prolonged use, the surface of the panel becomes rough and the markings become harder to dry-wipe. In case an inappropriate marker pen is used to write on the panel, cleaning of the panel may require using a special cleaning solvent fluid, which may remove the writing, but may also cause wear of the panel surface. Therefore, after some time the surface of the panel becomes hard to erase and the board is replaced with a new one.

[0003] A US patent No. US7195491 discloses a whiteboard of a typical construction. The board comprises a frame with a stand, on which a writing panel is installed. The frame comprises joint frame members and can be equipped with holders for holding the board on a wall.

[0004] The frames of the known boards are joint permanently, for example by soldering, welding, or gluing, such as to efficiently hold the writing panel in appropriate position. In case the panel surface wears out, the whole board has to be replaced.

[0005] The aim of the present invention is to provide an office board, for which the costs related to replacement of the board after panel wear-out will be reduced.

[0006] The object of the invention is a board comprising a panel mounted within a frame, wherein the frame comprises frame members connected with each other by means of connectors of a variable configuration, which in a locked configuration are tightly coupled with the frame members and in an unlocked configuration are movable with respect to the frame members.

[0007] The frame members may have a shape of longitudinal profiles, having their ends cut at a 45° angle and having a closed chamber extending along the external edge of the frame, into which the arms of an L-shaped connector can be inserted.

[0008] The external edges of the frame members may have through-holes close to the ends thereof, for coupling with the connector arms in the locked configuration.

[0009] The connector arms may have through-holes, which when the connector arms are placed in the frame members face the through-holes of the frame members and in the locked configuration the connector arms are fixed by means of locking fasteners which pass through the frame member hole and the connector hole.

[0010] The connectors may comprise an inclined protrusion having an envelope resembling the envelope of the inclined edges of the frame members, which after the assembly of the frame separates the inclined edges of the frame members from each other.

[0011] The connectors may comprise a reinforcing

member shaped as a right-angled triangle, the legs of which extend in parallel to the connector arms.

[0012] The frame members can be made of a material having hardness higher than the hardness of the material the connectors are made of.

[0013] The board may comprise at least two sets of connectors having different appearance of their external surface.

[0014] Another object of the invention is a method for manufacturing of boards with a panel placed in a frame comprising frame members, wherein the panel of the board is mounted within the frame comprising frame members, which are joined by connectors having variable configuration, which in the locked configuration are tightly coupled with the frame members and in the unlocked configuration are movable with respect to the frame members.

[0015] The object of the invention is shown by means of exemplary embodiment on a drawing, in which:

Fig. 1 shows the general construction of the board according to the invention.

Fig. 2A, 2B show an exemplary assembly drawing of the left and right top corner of the board frame.

Fig. 3 shows an exemplary drawing of a corner of the assembled board frame.

Fig. 4 shows a manufacturing line for carrying out the method according to the invention.

Fig. 1 shows generally the construction of the office board according to the invention. The board 100 comprises a panel 101 mounted in a frame 110, which can be positioned on a stand 102 or installed on a wall by hangers. The panel 101 may be constructed of a particle board overlaid on a steel sheet covered by a dry-erase coating. It can be also constructed of a soft board with a cork or textile surface. The board frame 110 comprises frame members 111-114 joined by connectors 115, as shown in more details on Fig. 2. The connectors 115 have a variable configuration. In a locked configuration, the connectors 115 are tightly coupled with the frame members 111-114, holding the frame members still during use of the board. In an unlocked configuration, the connectors 115 are movable with respect to the frame members 111-114, allowing dismounting of the frame 110 and replacement of the panel 101.

Figs. 2A, 2B present exemplary assembly drawings of the left and right top corner of the board frame, with the connectors 115 in the unlocked configuration. The frame members 111-114 are made of longitudinal profiles, the ends of which are cut to 45° and which comprise a closed chamber 121 extending along the external edge of the frame and an open chamber 122 extending along the internal edge of the frame. The edge of the panel 101 is placed in the open chamber 122. Preferably, the frame members 111-114 are made of metal, preferably alumi-

num. The body of the connector 115 has a shape of a letter L with equal arms 131, 132, which have a cross-section close to the cross-section of the closed chambers 121 of the frame members 111-114 and to which the arms 131, 132 are inserted during assembly of the frame 110. In the external edge of the frame members 111-114, close to the ends thereof, there are through-holes 123. There are also through-holes 133 close to the ends of the connector arms 131, 132, which when the connector is inserted into the frame member 111-114 face the holes 123. Then, locking fasteners 141 can be inserted to the holes 123, 133 to lock the connector 115 in the frame member 111-114, as shown in Fig. 3. Therefore, Fig. 3 shows the locked configuration of the connectors 115, wherein the connectors are tightly coupled with the frame members 111-114 and the frame 110 tightly holds the panel 101. When the panel 101 is damaged, the frame 110 can be easily dismounted by taking out the fasteners 141 from the openings 123, 133, which will switch the connectors to the unlocked configuration, wherein the connectors 115 are movable with respect to the frame members 111-114, and therefore allow dismounting of the frame 110 and replacement of the panel 101.

[0016] The connectors 115 may comprise an inclined protrusion 151 having an envelope resembling the envelope of the inclined edges of the frame members 111-114, which after the assembly of the frame constitutes a spacer between the neighboring frame members, thereby leveling possible small differences in the length of individual frame members and allowing tight coupling between the connector and the frame members. The connectors 115 and the fasteners 141 are preferably made of a plastic having hardness lower than the hardness of the material of which the frame members 111-114 are made. In the assembly set for the board, a plurality of sets of connectors 115 and fasteners 141 may be provided, having different colors or patterns, allowing the user of the boards to apply different marking to different boards.

[0017] Moreover, the connectors 115 may comprise a reinforcing member 161 shaped as a right-angled triangle, the legs of which extend parallel to the arms 131 of the connector 115, and which after the frame 110 is assembled, fit into the open chambers 122 of the frame members 111-114. The reinforcing member 161 reinforces the connector 115 and presses the corner of the panel 101, thereby leveling possible imprecision in the dimensions of the panel and holding still the panel 101 in the frame 110.

[0018] The coupling of the connectors 115 and the frame members 111-114, as shown in Figs. 2A, 2B, should be treated as an exemplary embodiment of the invention. The invention covers also other connectors of variable configuration, which in the locked configuration are tightly coupled with the frame members 111-114, and in the unlocked configuration are movable with respect

to the frame members 111-114. For example, the connectors may be one-part connectors, equipped instead of the hole 133, with a protrusion mounted on a bending arm, which after the connector is inserted into the frame member locks in the hole 123 of the frame member.

[0019] The present invention is not limited to frames connected in the corners at an angle of 45°. Other frames having different corner angles, such as frames connected at an angle of 90°, or frames having a wave-like edge, can be used as well.

[0020] The present invention also covers frames connected in points other than the corners, such as frames with L-shaped frame members, which are connected in the middles of the frame sides.

[0021] Fig. 4 shows a schematic of a manufacturing line for manufacturing the board according to the invention. Panels are manufactured on stations 401-403. On station 401, by means of a plate cutting apparatus, the metal panel plate obtained from a roll is formatted. Next, the cut metal plates are input to a mounting table 402, on which a particle board, precisely cleaned of dust and covered by PUR adhesive, is placed. The metal plate, together with the particle board, is input to a pressing calender 403, which presses the panel by means of rolls, which permanently joins the board with the metal plate. Instead of a particle board, boards of other materials can be used, such as millboards or honeycomb cardboards. Lacquered, ceramic-coated or galvanized metal sheets can be used.

[0022] Stations 404-405 are used to manufacture the frame members. On station 404, by means of a hydro-pneumatic press, long profiles are cut to a desired length corresponding to the side dimensions of the panel, and then on station 405, by means of a milling cutter, holes are made in the profiles, such as holes to lock the connectors.

[0023] Next, on a mounting station 507 the frame members are assembled on the panel and joined with connectors collected from a connectors storage 406. The assembled boards are packed on station 408, wherein by means of a packing robot they are wound with a shrink-wrap plastic foil using a linear welder, which guarantees appropriate protection of the product from external conditions. The products are placed on pallets and wound by a stretch foil. The products such manufactured and protected are ready for storage and transport. The end products may also comprise sole panels, for clients which would prefer to only replace the panels of the boards which were purchased earlier.

Claims

1. A board (100) comprising a panel (101) mounted within a frame (110), **characterized in that** the frame (110) comprises frame members (111-114) connected with each other by means of connectors (115) of a variable configuration, which in a locked configu-

ration are tightly coupled with the frame members (111-114) and in an unlocked configuration are movable with respect to the frame members (111-114).

configuration, which in the locked configuration are tightly coupled with the frame members (111-114) and in the unlocked configuration are movable with respect to the frame members (111-114).

2. The board according to claim 1, **characterized in that** the frame members (111-114) have a shape of longitudinal profiles, having their ends cut at a 45° angle and having a closed chamber (121) extending along the external edge of the frame, into which the arms (115) of an L-shaped connector (115) can be inserted. 5
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3. The board according to claim 2, **characterized in that** the external edges of the frame members (111-114) have through-holes (123) close to the ends thereof, for coupling with the connector arms (131, 132) in the locked configuration. 15
4. The board according to claim 3, **characterized in that** the connector arms (131, 132) have through-holes (133), which when the connector arms (131, 132) are placed in the frame members (111-114) face the through-holes (123) of the frame members (111-114) and in the locked configuration the connector arms (131, 132) are fixed by means of locking fasteners (141) which pass through the frame member hole (123) and the connector hole (133). 20
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5. The board according to claim 2, **characterized in that** the connectors (115) comprise an inclined protrusion (151) having an envelope resembling the envelope of the inclined edges of the frame members (111-114), which after the assembly of the frame (110) separates the inclined edges of the frame members (111-114) from each other. 30
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6. The board according to claim 2, **characterized in that** the connectors (115) comprise a reinforcing member (161) shaped as a right-angled triangle, the legs of which extend in parallel to the connector arms (131, 132). 40
7. The board according to claim 1, **characterized in that** the frame members (111-114) are made of a material having hardness higher than the hardness of the material the connectors are made of (115). 45
8. The board according to claim 1, **characterized in that** it comprises at least two sets of connectors (115) having different appearance of their external surface. 50
9. A method for manufacturing of boards (100) with a panel (101) placed in a frame (110) comprising frame members (111-114), **characterized in that** the panel (101) of the board (100) is mounted within the frame (110) comprising frame members (111-114), which are joined by connectors (115) having variable 55

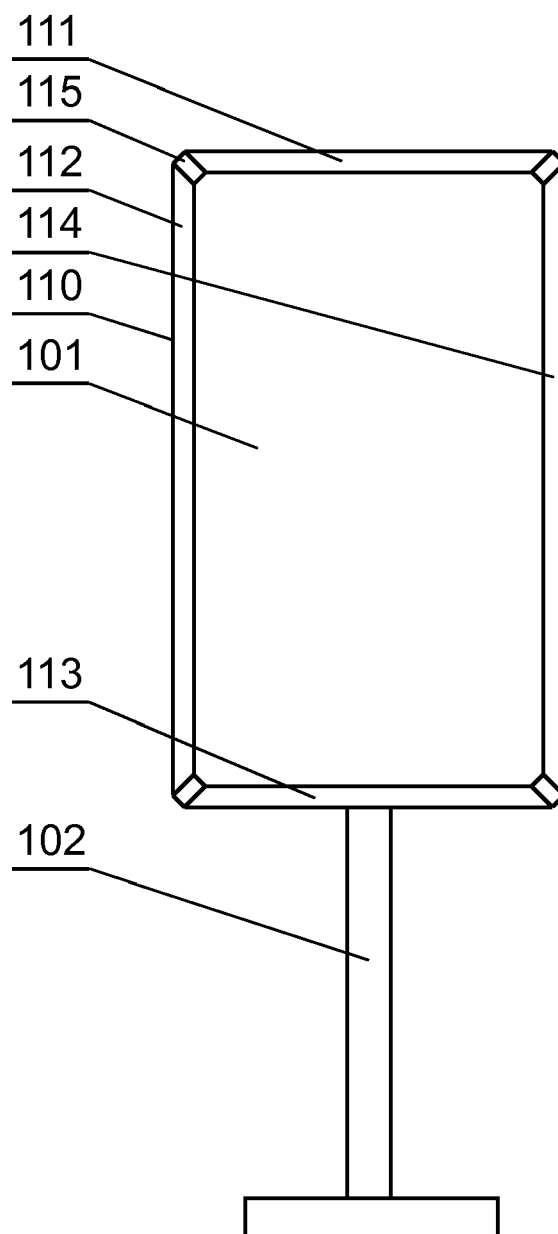
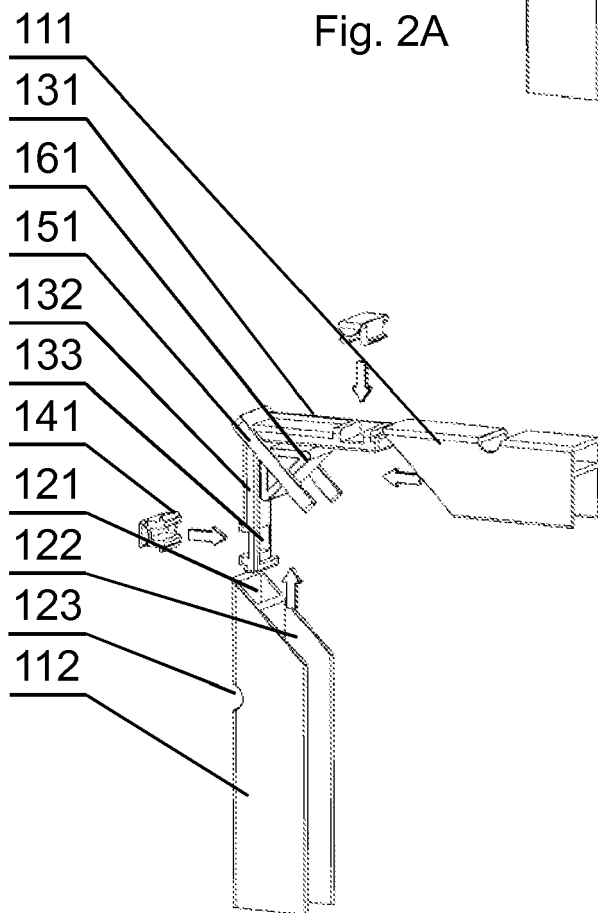
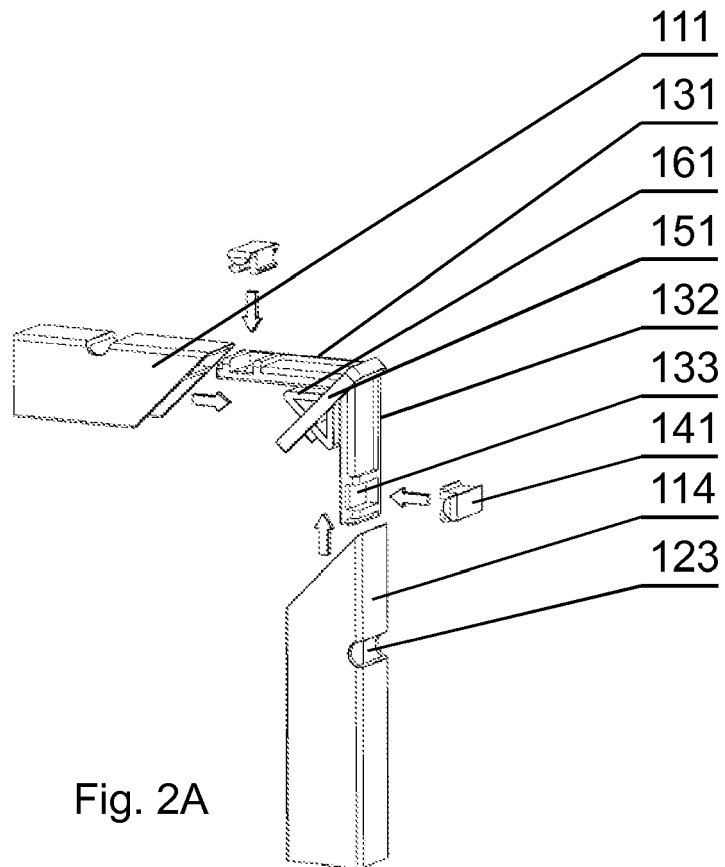


Fig. 1



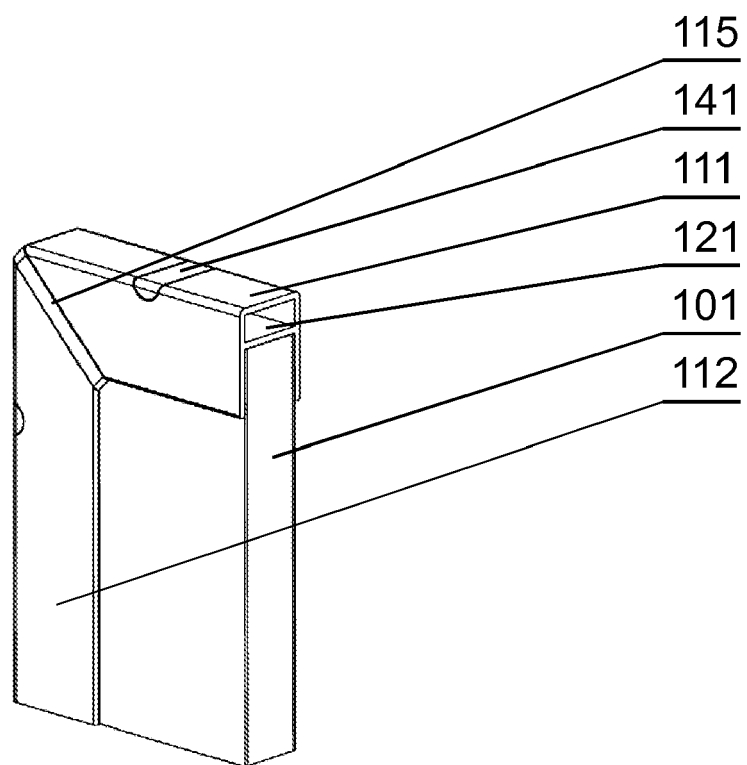


Fig. 3

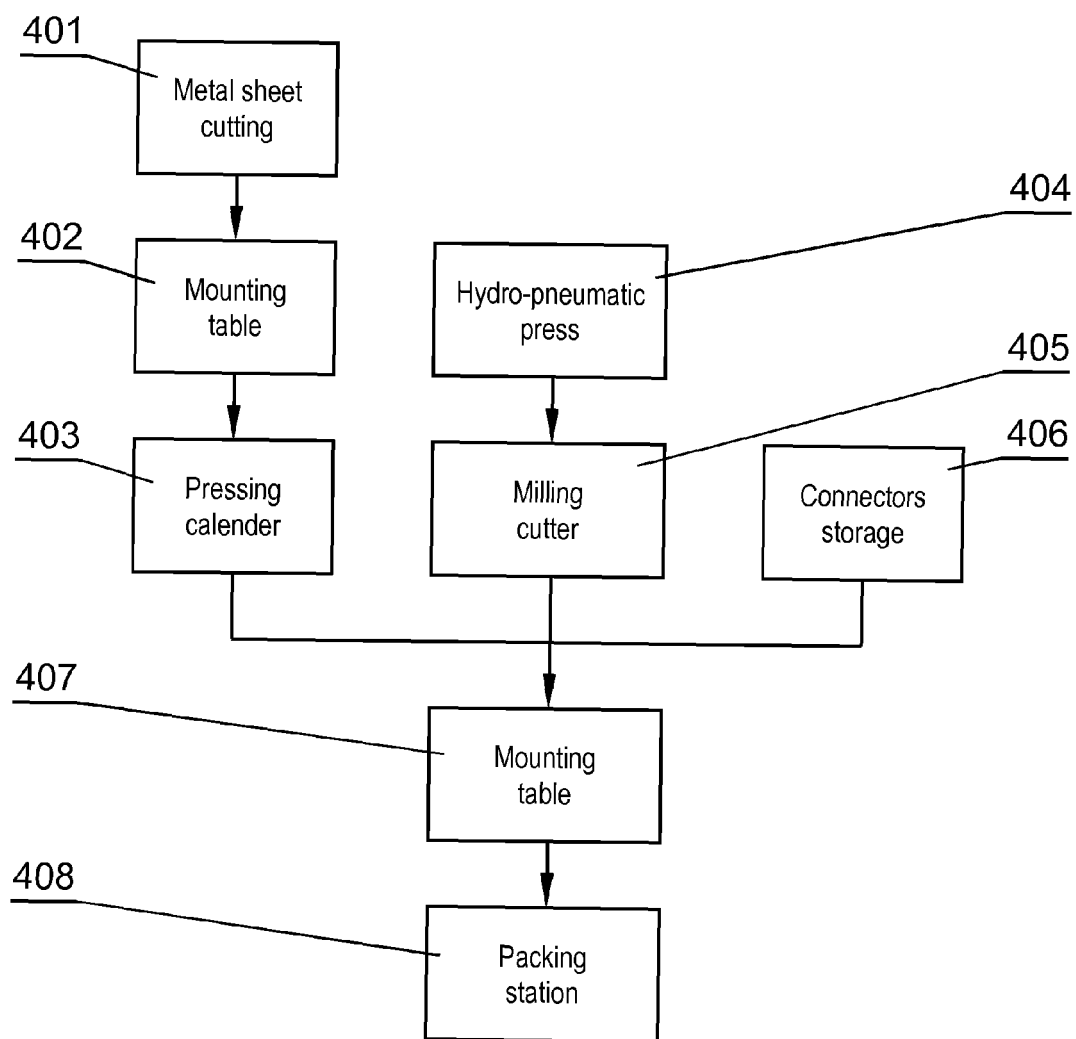


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 11 46 1519

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2006/216686 A1 (MCCOMB HEATHER [US] ET AL) 28 September 2006 (2006-09-28) * page 1, paragraph 14 - page 2, paragraph 24; figures 1-4 *	1-3,6-9	INV. B43L1/04
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			TECHNICAL FIELDS SEARCHED (IPC)
			B43L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 23 September 2011	Examiner Kelliher, Cormac
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 46 1519

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The members are as contained in the European Patent Office EDP file on
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23-09-2011

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REFERENCES CITED IN THE DESCRIPTION

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