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(54) **Device for connecting building boards**

(57) The invention relates to a device for connecting building boards comprising an at least partially flat top plate, including a first planar flange and a second planar flange, each of said planar flanges extending outward in a substantially horizontal plane, at least one bottom tab extending downwardly from a bottom surface of said top plate and at least one spring leaf, a first end of the spring leaf is connected to said tab, and a second end of the

spring leaf comprises a breakable jam. The invention further relates to a kit of parts comprising a device according to the invention a building board comprising a slot to receive a planar flange of the device. Preferably the building board is a wood fiber filled PVC deck board. The invention also relates to a kit of parts according to the invention, further comprising a support joist with mounting tabs to receive the spring clips

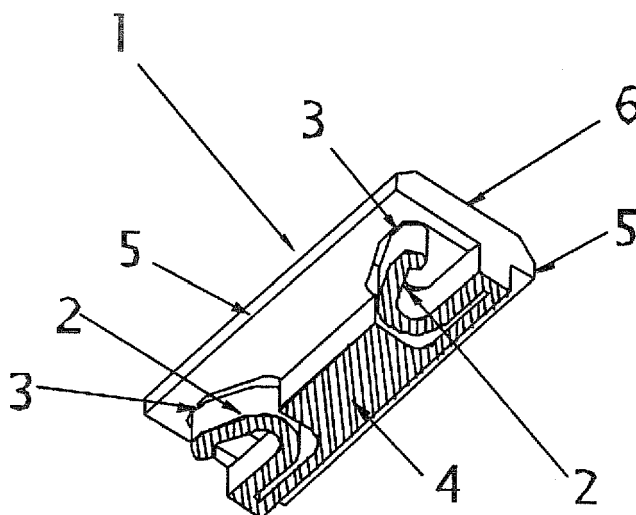


Fig. 1

Description

[0001] The invention relates to a device for connecting building boards.

[0002] Conventional building boards and in particular deck boards as described e.g. in W02008/105012 typically include horizontal floors raised above the ground and supported by an underlying structure. Deck boards are generally placed side by side during construction of a deck, on top of a supporting structure such as joists. Other structures utilizing similar flooring techniques include boat docks, ramps, stairs, landings, bridges, platforms and for structures for surrounding or enclosing swimming pools and hot tubs.

[0003] Typically, decks are constructed to withstand exposure to the elements and are often constructed from pressure treated wood, plastic or, more recently, wood fiber filled plastics also referred to as Wood Plastic Composites (WPC) and in particular PVC. Whether the deck boards, which form the flooring of the deck, are comprised of wood or plastic or other material, the substructure is typically formed of commonly available pressure treated lumber or alumina profiles. The substructure is formed with joists and headers optionally attached to posts. The deck boards are typically fixed transversely across the joists to the substructure, in a generally parallel relationship, by way of nails or screws, driven through the upper surface of the deck board into the joist below.

[0004] This manner of attaching deck boards to the substructure presents several disadvantages. If nails or screws are used, they typically cause discoloration of the surrounding wood surface over time. In addition, in driving the nail through the wood or plastic deck board, the surface of the board is often marred during hammering, causing unsightly dents and scratches to the top surface of the board. Both the discoloration of the wood and mar-
ring of the surface are of particular concern when exotic hardwoods are used.

[0005] In addition, nails have a tendency to work themselves loose from the board over time, projecting upward from the board's surface. Not only is this aesthetically unpleasing, it causes the deck board to loosen against the joist and also constitutes a safety hazard, particularly to individuals walking over the deck surface barefoot. In addition, both nails and screws are prone to rusting over time, causing failure to the attachment. Removal of one or more deck boards entails prying the nails loose, which is both time consuming and causes damage to the surface of the board.

[0006] Since decks are constantly exposed to outside environmental conditions, the deck boards are exposed to extremes of both temperature and humidity. Both plastic and wooden deck boards will shrink and expand in response to temperature changes, and wooden deck boards will also shrink and expand as the moisture content of the board increases or decreases. Deficiencies in the attachment means in the prior art often cause attach-

ment devices to loosen over time or to cause the deck boards to warp or crack because the attachment device does not provide for movement along with the board as it expands or contracts.

[0007] To avoid the difficulties presented by attachment devices as described above, a device for connecting building boards was described in US20050063771 that comprises an at least partially flat top plate, including a first planar flange and a second planar flange. Each of said planar flanges extends outward in a substantially horizontal plane. These planar flanges fit into slots provided into the sides of adjacent deck boards. Generally several of these devices are used to connect two building boards, whereby the devices typically are positioned above the underlying joist. At least one bottom tab extends downwardly from a bottom surface of the top plate. Bottom tabs typically rest upon the upper surface of the underlying joist. The known device for connecting building boards further comprises at least one spring leaf. A first end of the spring leaf is connected to said bottom tab. The at least one spring leaf of said device provides for expansion and contraction of the boards after installation, and in particular, provides for post-installation expansion of adjoining deck boards.

[0008] However, after mounting of the building boards, the building boards should be equally spaced. This requires that during mounting all boards should be subjected to equal forces to equally compress the leaf springs of all the devices used to connect two adjacent building boards. This is difficult and requires skilled persons.

[0009] The object of the invention is to provide a device for connecting building boards of the above type and which is so simple to mount that unskilled person can carry out the mounting.

[0010] According to the invention this object is reached in that a second end of the spring leaf is connected with the top plate (6) by a breakable jam (3). The breakable jam breaks when the boards expand due to water absorption or temperature rise and that does not break under forces practiced during installation of building boards. The provision of a breakable jam at the second end of the spring leaf, connected with the top plate, allows an unskilled person to install building boards equally spaced just by pressing a second building against a number of devices according to the invention that are placed in a slot provided in the side of an adjacent first building board.

[0011] A breakable jam is understood to be a connection between the second end of a spring leaf and the top plate that does not break under a force practiced during installing of building boards, but that breaks when the boards expand due to water absorption or temperature rise. Depending on the material of the device of the invention, a skilled person may easily determine the dimensions of the connection between the second end of the spring leaf and the top plate that allow equally spaced installation of building board without breaking the jam and that still allow breaking of the jam under forces caused by expansion of the boards. The spring leaf be-

comes a spring element only when the jam is broken.

[0012] The breakable jam at the second end of the spring breaks when the boards expand due to water absorption or temperature rise. This allows the boards to expand, whereby the spacing between adjacent the boards is controlled by the springs such that all the spacing between the boards remain equal, or become again equal when all breakable jams are broken by the expansion of the boards.

[0013] A further advantage of the device according to the invention is that building boards can expand and shrink freely in their length direction as well and that an easy replacement of a single board is possible.

[0014] According to the invention, the breakable jam is connected with the top plate. This feature allows an easy control of the force required to break the jam. Elements that collapse under expansion due to swelling of wood are known from US20040182034. However once collapsed, they lose their spring function, which causes loose lying building boards with different spacing in between. An advantage of the breakable jam of the invention is that once broken, the spring leaves remain a guarantee for equally spaced building boards.

[0015] In another embodiment, at least a part of the bottom plate further comprises a fastener for connecting the device to a support member. Preferably the fastener comprises a fastening aperture. This allows an easy connection of the device according to the invention to the underlying joist.

[0016] In another preferred embodiment, the fastener for comprises spring clips. The spring clips allow an easy connection with an underlying joist comprising mounting tabs.

[0017] The invention further relates to a kit of parts comprising a device according to the invention a building board comprising a slot to receive a planar flange of the device. Preferably the building board is a wood fiber filled PVC deck board.

[0018] The invention also relates to a kit of parts according to the invention, further comprising a support joist with mounting tabs to receive the spring clips.

[0019] The invention will now be explained in greater detail by means of the enclosed drawings, wherein the drawings depict:

Figure 1: A perspective bottom up view of a first embodiment of a device according to the invention;

Figure 2: A perspective top down view of the first embodiment of the device according to the invention;

Figure 3: A perspective bottom up view of a second embodiment of the device according to the invention

Figure 4: A perspective top down view of the second embodiment of the device according to the invention;

Fig. 5: Top view of the first embodiment of the invention including a fastener for connecting the device to a support member.

Fig. 6: Top view of a second embodiment of the invention including a fastener for connecting the de-

vice to a support member.

Fig. 7: Perspective view showing deck board, a first device according to the invention and underlying joist.

Fig. 8: Perspective view showing deck board, a second device according to the invention and underlying joist.

[0020] Figure 1 shows a bottom up view device according to the invention (1), comprising an at least partially flat top plate (6), including a first planar flange (5) and a second planar flange (5), each of said planar flanges extending outward in a substantially horizontal plane, a bottom tab (4) extending downwardly from a bottom surface of said top plate (6) and two spring leaves (2), the first ends of the spring leaves are connected to said tab (4) and the second ends of the spring leaves are connected to the top plate (6) via breakable jams (3).

[0021] Figure 2 shows top down view of the device according to the invention (1), comprising an at least partially flat top plate (6), including a first planar flange (5) and a second planar flange (5), each of said planar flanges extending outward in a substantially horizontal plane, a bottom tab (4) extending downwardly from the bottom surface of said top plate (6) and two spring leaves (2). One of the spring leaves is visibly connected with a breakable jam (3) to the top plate (6).

[0022] Figure 3 shows a bottom up view of a further embodiment of the device according to the invention (1), comprising an at least partially flat top plate (6), including a first planar flange (5) and a second planar flange (5), each of said planar flanges extending outward in a substantially horizontal plane, a bottom tab (4) extending downwardly from a bottom surface of said top plate (6) and two spring leaves (2), the first ends of the spring leaves are connected to said tab (4) and the second ends of the spring leaves have breakable jams (3) connected to the top plate (6), one of which is not visible in Fig.3.

[0023] Figure 4 shows top down view of the device according to the invention (1), comprising a flat top plate (6), including a first planar flange (5) and a second planar flange (5), each of said planar flanges extending outward in a substantially horizontal plane, a bottom tab (not visible) extending downwardly from the bottom surface of said top plate (6) and two spring leaves (2). The spring leaves are visibly connected with a breakable jam (3, only one shown) to the top plate (6).

[0024] Fig. 5 shows a top view of the first embodiment of the invention (1) wherein the bottom surface is provided with a fastener (8) for connecting the device to a supporting joist (not shown). The fastener further comprises a fastening aperture (9) and four spring clips (10).

[0025] Fig. 6 shows a top view of a second embodiment of the invention including wherein the bottom surface is provided with a fastener (8) for connecting the device to a supporting joist (not shown). The fastener further comprises a fastening aperture (9) and four spring clips (10), to connect the device according to the invention to the

supporting joist.

[0026] Fig. 7 shows a perspective view of a deck board (11), connected via a first device according to the invention (1) to a support joist (12). One planar flange fits into a slot (13) provided into the side of the deck board (11). Two spring clips (10) are shown, which connects the fastener to mounting tabs (7) of the support joist (12).

[0027] Fig. 8 shows a perspective view of a deck board (11), connected via a second device according to the invention (1) to a support joist (12). One planar flange fits into a slot (13) provided into the side of the deck board (11). Two spring clips (10) are shown, which connects the fastener to mounting tabs (7) of the support joist (12).

Claims

1. A device for connecting building boards (1) comprising an at least partially flat top plate (6), including a first planar flange (5) and a second planar flange, each of said planar flanges extending outward in a substantially horizontal plane, at least one bottom tab (4) extending downwardly from a bottom surface of said top plate (6) and at least one spring leaf (2), a first end of the spring leaf is connected to said tab (4), **characterized in that** a second end of the spring leaf is connected with the top plate (6) by a breakable jam (3) that breaks when the boards expand due to water absorption or temperature rise and that does not break under forces practiced during installation of building boards.
2. A device according to claim 1 or 2, wherein at least a part of the bottom plate further comprises a fastener (8) for connecting the device to a support member.
3. A device according to claim 3, wherein the fastener comprises a fastening aperture (9).
4. A device according to claim 1 or 2, wherein the fastener comprises spring clips (10).
5. Kit of parts comprising a device according to any of the preceding claims and a building board comprising a slot (13) to receive a planar flange of the device.
6. Kit of parts according to claim 6, wherein the building board is a Wood Plastic Composite, preferably a wood fiber filled PVC deck board.
7. Kit of parts according to claim 6 or 7, further comprising a support joist (12) with mounting tabs (7) to receive the spring clips (10).

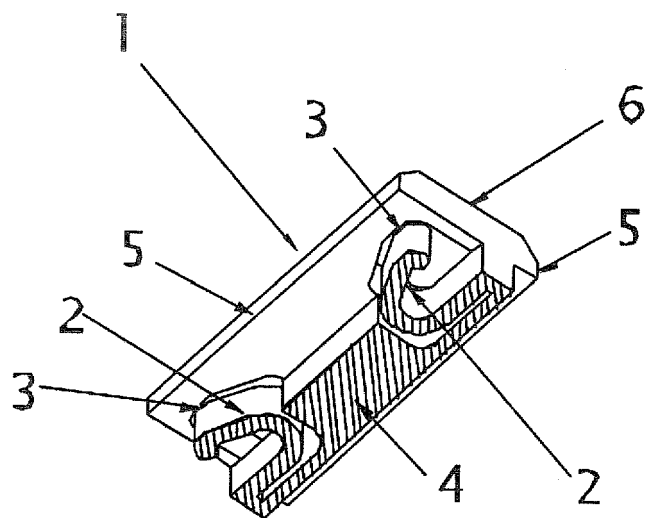


Fig. 1

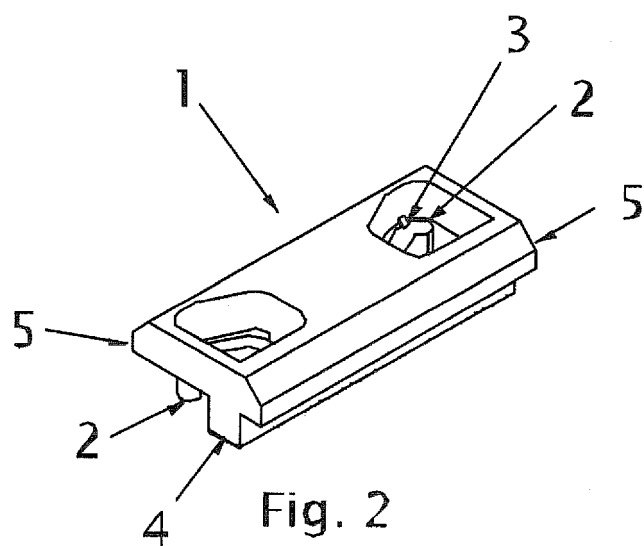


Fig. 2

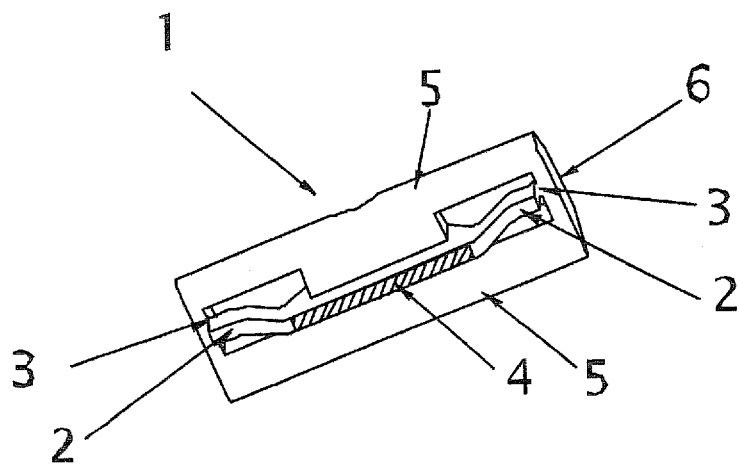


Fig. 3

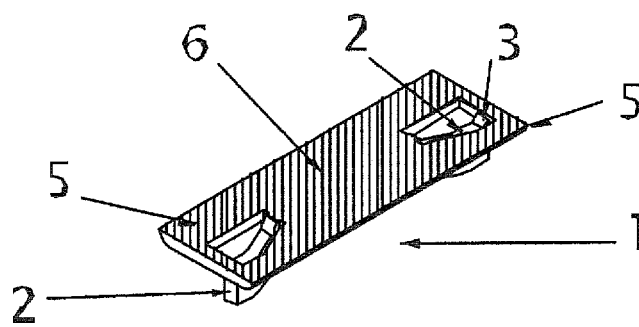


Fig. 4

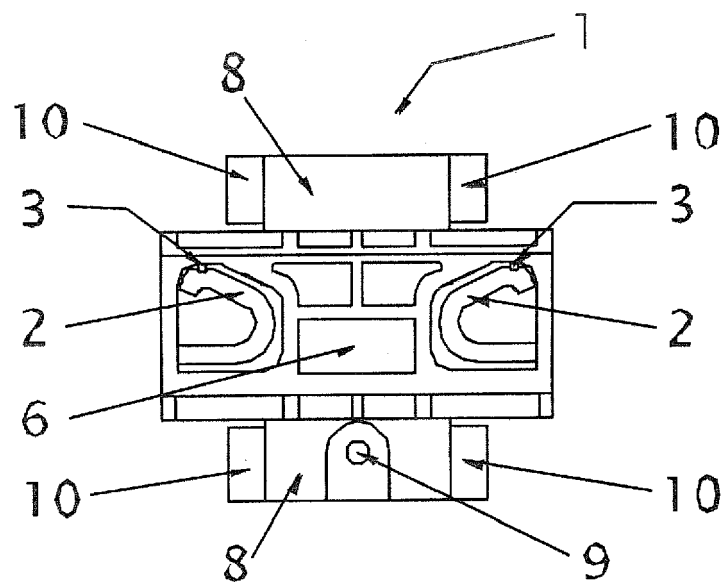


Fig. 5

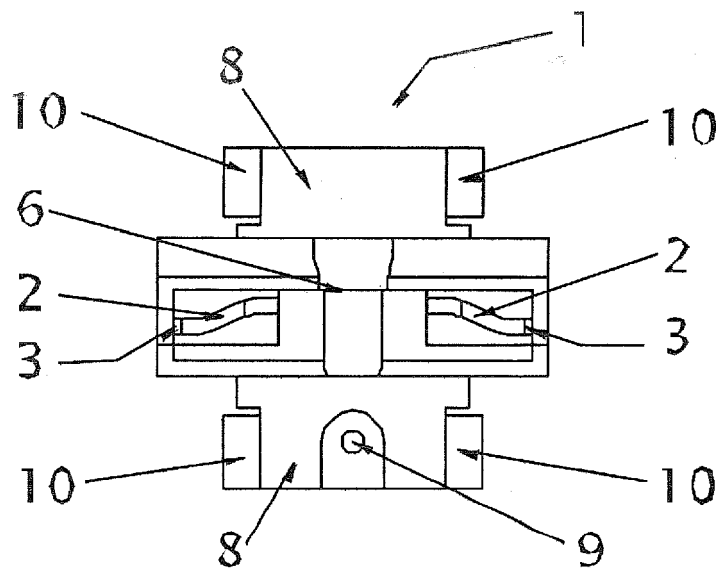


Fig. 6

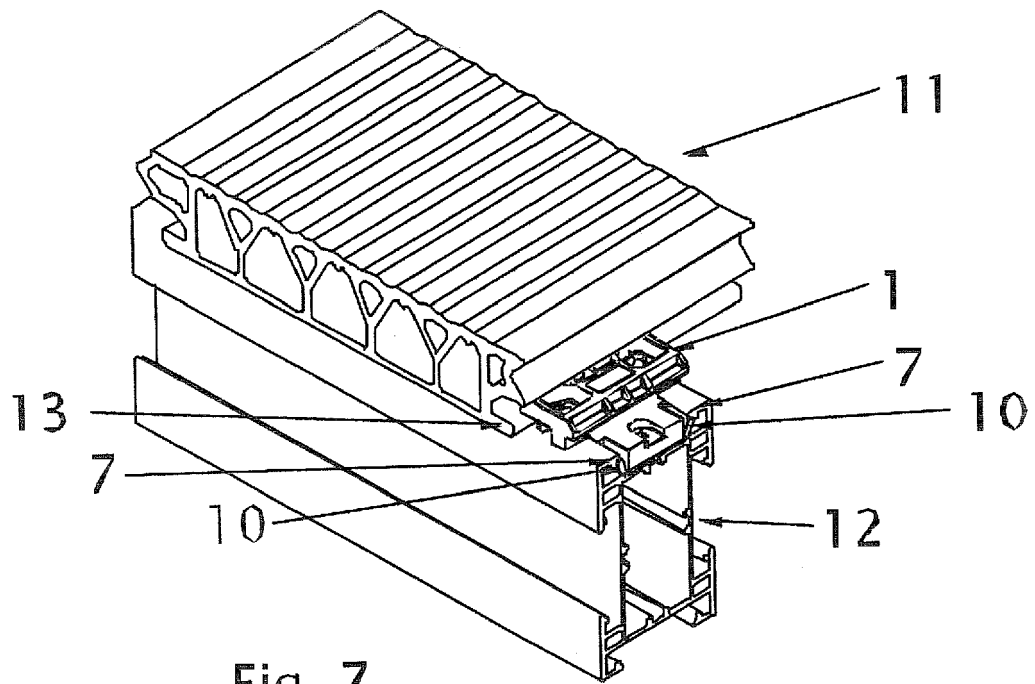


Fig. 7

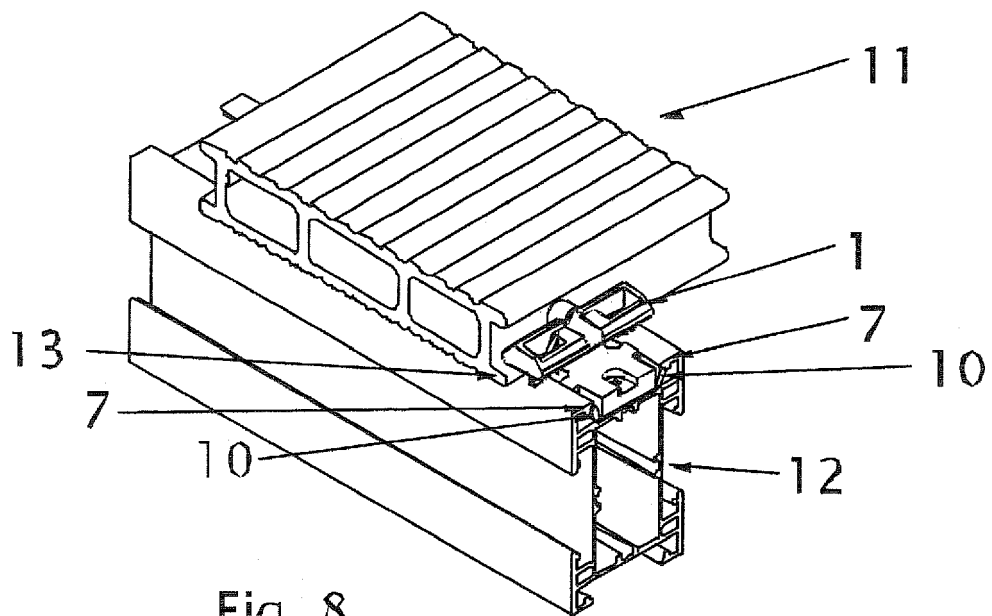


Fig. 8



EUROPEAN SEARCH REPORT

Application Number
EP 11 15 1968

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 2005/063771 A1 (HARRIS G STEVEN [US]) 24 March 2005 (2005-03-24) * paragraph [0003]; figures 1,6,10,11 * -----	1-7	INV. E04F15/02
A	US 2004/182034 A1 (EBERLE HARRY W [LB] EBERLE III HARRY W [US]) 23 September 2004 (2004-09-23) * figures 4A,4B,18-20 * -----	1-7	
A	WO 2008/105012 A1 (ETERNO IVICA SRL [IT]; FAVERO GABRIELE [IT]) 4 September 2008 (2008-09-04) * figure 11 * -----	4,7	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 3 May 2011	Examiner Fournier, Thomas
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EPO FORM 1503 03 82 (P04C01)

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

EP 11 15 1968

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03-05-2011

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US 2004182034 A1	23-09-2004	US 2004184878 A1	23-09-2004
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REFERENCES CITED IN THE DESCRIPTION

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- US 20050063771 A [0007]
- US 20040182034 A [0014]