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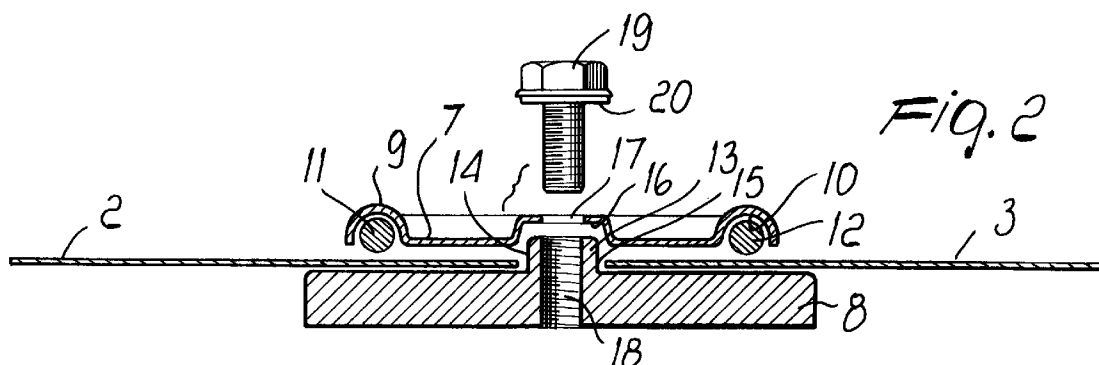
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**(54) Device for joining and sealing channels or gutters**

(57) The device (1) for mutually joining two consecutive channel or gutter segments (2,3) has two brackets (7,8), the configuration whereof, in a longitudinal cross-section, is the same as the transverse cross-section of the channel or gutter segments (2,3) to be joined. The brackets (7,8) are arrangeable respectively on the inside and on the outside of the segments (2,3) so as to be close to them and straddle them. At least two longitudinal gasket seats (9,10) are formed in at least one (7) of the brackets. The seats (9,10) extend substantially along the entire length of the bracket (7,8), and are

spaced so that, during use, one seat (9) faces one channel or gutter segment (2) and the other seat (10) faces the adjacent segment (3). The device (1) also comprises a sealing gasket (11,12) in each seat (9,10) and a fixing device (18,19,20) for mutually fixing the brackets (7,8) above and around an end portion of each of the two segments (2,3), which are thus kept spaced so that sliding of the segments (2,3) with respect to the brackets (7,8) can occur during thermal contraction or expansion of the segments (2,3).



*Fig. 2*

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## Description

The present invention relates to a device for joining and sealing consecutive channels or gutters along the pitches of buildings.

It is known that according to the most advanced techniques, the joining of channels or gutters made of sheets of metal or of metal alloys, which can have lengths of 4, 6, 8 meters or more, has been performed for some time by providing an overlap portion, where silicone is applied and where a certain number of rivets, in turn covered with silicone, is provided. However, this type of joining is a long, expensive, and uncertain process, since the silicone that covers the rivets cracks and peels off in the course of time. Moreover, during installation, if the surfaces in mutual contact are not thoroughly clean, or if they are wet, for example because of bad weather, it is necessary to wait for them to dry, or it is necessary to apply heat to perform drying artificially, and this makes the entire installation operation even more expensive.

Finally, it is necessary to provide expansion joints to allow thermal expansion and contraction, which in addition to constituting interruptions in the continuity of the channel or gutter, entail specific machining operations that increase production costs.

A principal aim of the present invention is to provide a joining device that requires no machining of the sheet metal, such as punching or perforation to insert the rivets or to produce expansion joints, thus avoiding high production costs and the risk of water leaks.

Another object of the present invention is to provide a joining device that allows both thermal expansion and thermal contraction of the joined channel or gutter portions, in order to avoid unwanted deformation or splashing of the channels for draining rainwater.

Another object of the present invention is to provide a new joining device that is capable of ensuring watertightness between one portion and a consecutive adjacent portion of a channel or gutter, without requiring the use of silicone.

With this aim, these and other objects in view, there is provided a device for mutually joining two consecutive channel or gutter segments, according to the present invention, which comprises: two brackets, having a longitudinal cross-sectional configuration which is substantially the same as the transverse cross-section of the channel or gutter segments to be joined, said brackets being locatable respectively on the inside and on the outside of said segments whereby to close and straddle said segments, at least two longitudinal gasket seats being formed in at least one of the brackets, said seats extending substantially along the entire length of said at least one bracket and being spaced whereby, during use, one of said seats faces one segment and another one of said seats faces an adjacent segment, a sealing gasket being provided in each seat; and means for mutually fixing said brackets above and around an end portion of said two segments, for spacing said seg-

ments and allowing mutual sliding of said segments with respect to said brackets.

Further characteristics and advantages of the present invention will become apparent from the following detailed description of some practical embodiments thereof, given only by way of non-limitative example with reference to the accompanying drawings, wherein:

figure 1 is a perspective view, with parts shown in cross-section, of a device for joining two consecutive channel segments;

figure 2 is an enlarged-scale transverse sectional view of the joining device of figure 1;

figure 3 is a transverse sectional view, similar to figure 2, but according to another embodiment; and

figure 4 is a transverse sectional view, similar to figure 2, but related to yet another embodiment.

In the accompanying drawings, identical or similar parts or components have been designated by the same reference numerals.

Initially with reference to the embodiment of figures 1 and 2, it is evident that a device 1 for mutually joining two consecutive channel or gutter segments 2 and 3, which have the same broken-line configuration in transverse cross-section, i.e., have for example a bottom 4 and two side walls or borders 5 and 6 that are slightly flared, is constituted by two relatively wide brackets 7 and 8 that have, in a longitudinal cross-section, a configuration that is substantially identical and equal in extension with respect to the configuration of the transverse cross-section of the channel or gutter segments 2 and 3 to be joined. The brackets 7 and 8 are adapted to be arranged face to face, close to the end portions of the segments 2 and 3 and so as to straddle them, with the bracket 7 arranged on the inside and the bracket 8 arranged on the outside.

The inside bracket 7 is affected, along its longitudinal edges, by two uninterrupted recesses 9 and 10 that constitute the seat for accommodating a respective rubber gasket 11 and 12 which has, for example, a round cross-section and is of the O-ring type; the outside bracket 8, at the face directed towards the segments 2 and 3, is instead smooth and has an intermediate raised portion 13 that delimits two shoulders 14 and 15: one is directed towards the segment 2 and the other one is directed towards the segment 3. The gaskets 11 and 12 are spaced from one another so as to slidably engage, during use, the end portion of a respective segment 2 and 3.

Along its intermediate region, the inside bracket 7 is provided with a female longitudinal recess 16 that receives the raised portion 13 of the outside bracket 8 and mates therewith. At preset spaced points, the recess 16 has through holes 17 located at a respective threaded hole 18 in the underlying raised portion 13 to screw therein a respective fixing bolt 19 with the interposition of a sealing gasket 20.

In order to join two channel segments 2 and 3, the operator prepares the device 1 so that the bolts 19 are inserted in position but not fully tightened, so as to provide a certain play or gap between the brackets 7 and 8, then slides the segment 2 between the brackets until it abuts against the shoulder 14, and then causes the segment 3 to abut against the shoulder 15. Before tightening the bolts 19, he checks that the final positioning of the two segments 2 and 3 with respect to the raised portion 13 is correct; in other words, in the cold season he will have to take into account, optionally with the aid of an appropriate instrument and/or nomogram, the thermal expansions of the specific material of which the segments 2 and 3 are made, and therefore he will have to keep their ends relatively further apart from the respective shoulders 14 and 15 than in the warm season. After the correct positioning of the segments in the device 1, the bolts are tightened fully, so that the gaskets 11 and 12 ensure the tightness of the joint and at the same time the segments 2 and 3 can expand and contract, according to the environmental conditions, with no risk of deformation once installed.

The width of the brackets 7 and 8 must of course be such as to ensure, with an adequate safety margin, that the necessary relative movements between the device 1 and the segments 2 and 3 caused by thermal expansion/contraction can occur.

It is evident that the segments 2 and 3 are not machined in any way, and that the installer does not have to perform complicated or expensive operations. Furthermore, at least the bracket 7 can be obtained by profiling instead of by pressing, which is a more expensive operation.

In the embodiments of figures 3 and 4, both the inside bracket 7 and the outside bracket 8 are obtained by pressing instead of by profiling, like the bracket 7 of figure 2. The threaded hole 18 is furthermore a blind hole instead of a through hole.

Figure 3 shows the use of gaskets 11a and 12a with a double fluted surface for contact with the channels 2 and 3 for better grip.

It is clearly evident that the outside bracket 8 can also be made of a suitable moldable plastic material, for example nylon reinforced with glass fibers, which also has antifriction properties that facilitate the sliding of the segments 2 and 3, since it is substantially protected against ultraviolet rays and is therefore not subject to quick aging.

The joining device described above is susceptible of numerous modifications and variations within the scope of the protection defined by the appended claims.

Thus, for example, seats and respective gaskets might be provided, as an alternative or as an addition, in the outside bracket 8 as well. Furthermore, the mutual fixing of the inside bracket and of the outside bracket can also be ensured by means other than the bolts 19, for example by suitable clamps.

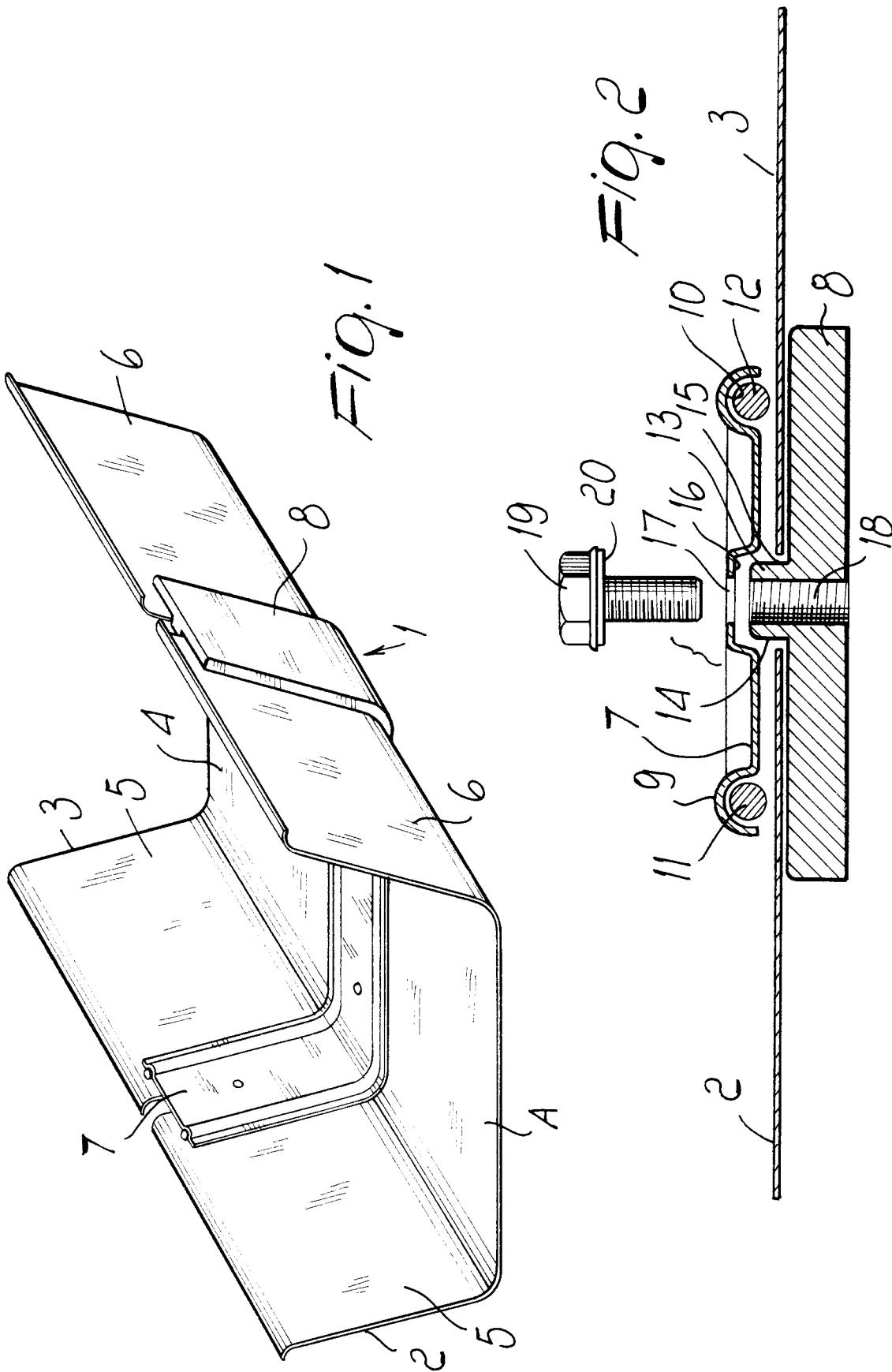
Furthermore, the continuous shoulders 14 and 15 might be replaced with discontinuous locators.

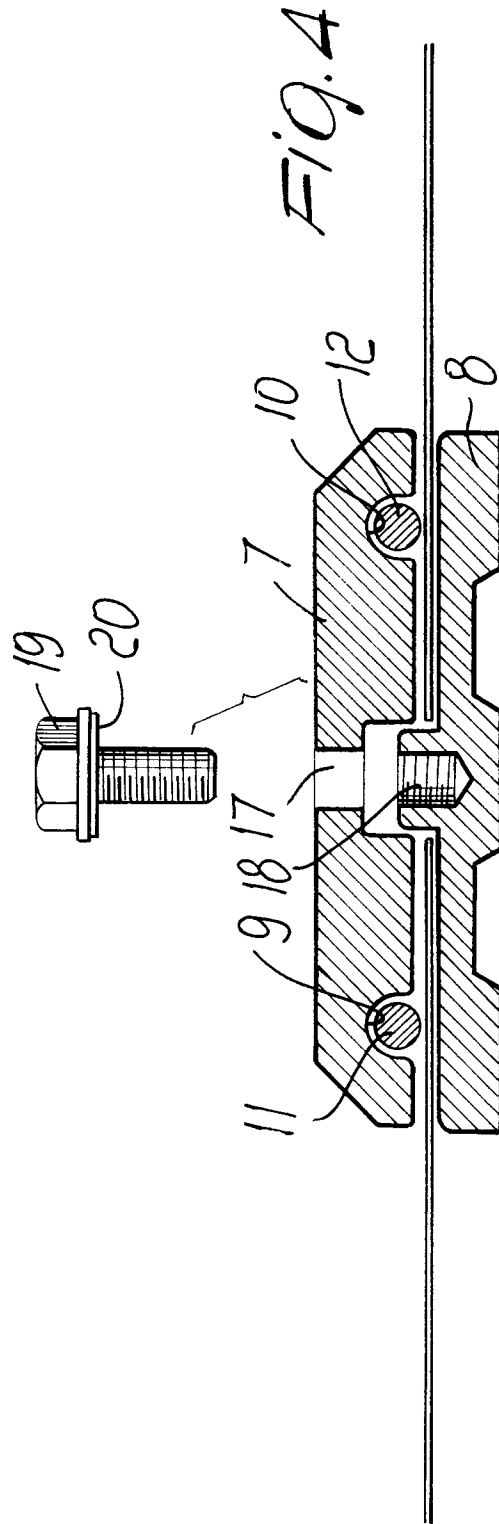
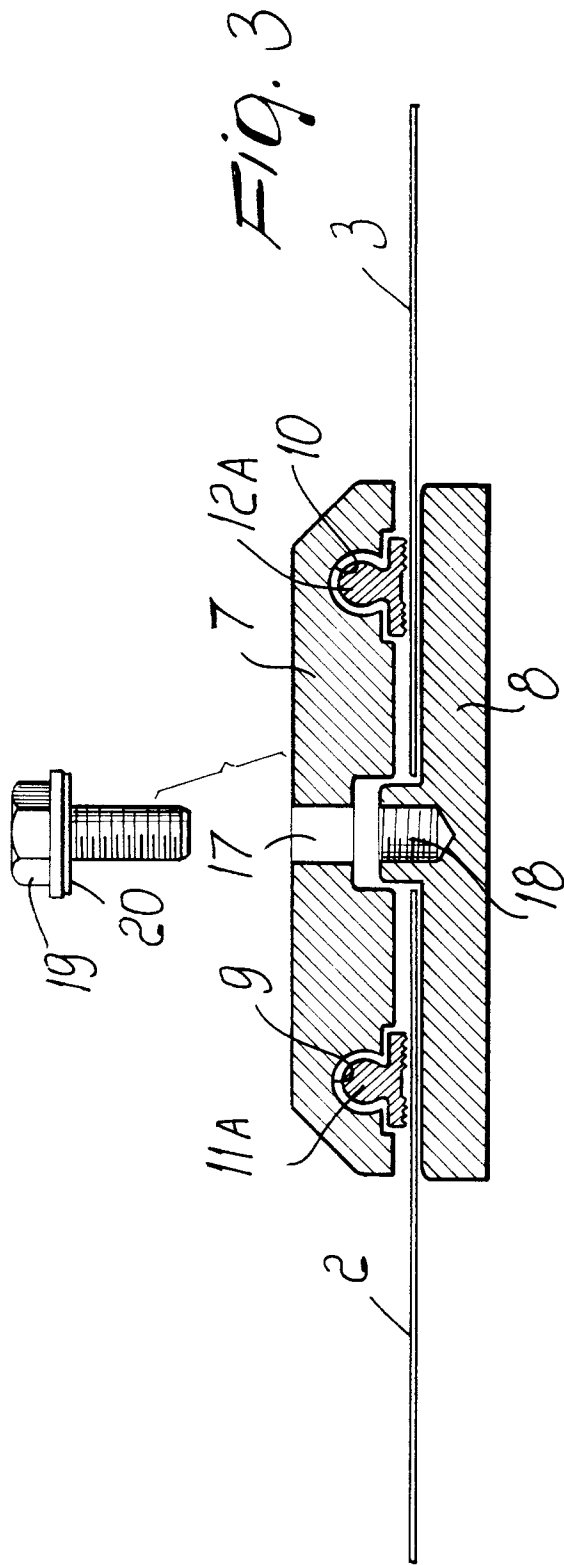
The materials and the dimensions may be various according to the requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

## Claims

1. Device for mutually joining two consecutive channel or gutter segments, which comprises: two brackets, having a longitudinal cross-sectional configuration which is substantially the same as the transverse cross-section of the channel or gutter segments to be joined, said brackets being locatable respectively on the inside and on the outside of said segments whereby to close and straddle said segments, at least two longitudinal gasket seats being formed in at least one of the brackets, said seats extending substantially along the entire length of said at least one bracket and being spaced whereby, during use, one of said seats faces one segment and another one of said seats faces an adjacent segment, a sealing gasket being provided in each seat; and means for mutually fixing said brackets above and around an end portion of said two segments, for spacing said segments and allowing mutual sliding of said segments with respect to said brackets.
2. Device according to claim 1, characterized in that said fixing means comprise screw means, a through hole in one bracket, and a corresponding threaded hole in the other bracket.
3. Device according to claim 1, characterized in that said fixing means comprise clamp means.
4. Device according to any one of the preceding claims, characterized in that one of the brackets has at least one intermediate raised portion that constitutes an abutment-location element for the seating of the end portions of the segments between the brackets, the other bracket being provided with a recess for accommodating and engaging said raised portion.







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# EUROPEAN SEARCH REPORT

Application Number  
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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                      |                                                |                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-----------------------------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Citation of document with indication, where appropriate, of relevant passages                                        | Relevant to claim                              | CLASSIFICATION OF THE APPLICATION (Int.Cl.6)                    |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | FR-A-2 251 684 (FORNELLS SA) 13 June 1975<br>* the whole document *                                                  | 1-3                                            | E04D13/00                                                       |
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| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | GB-A-1 603 819 (WAVIN BV) 2 December 1981                                                                            |                                                |                                                                 |
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| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                      |                                                | <b>TECHNICAL FIELDS SEARCHED (Int.Cl.6)</b><br><br>E04D<br>F16J |
| Place of search<br>BERLIN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                      | Date of completion of the search<br>7 May 1996 | Examiner<br>Hoffmann, M                                         |
| <b>CATEGORY OF CITED DOCUMENTS</b><br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                                                      |                                                |                                                                 |

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