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(54) **A METHOD FOR INTERCONNECTING FLASHING MEMBERS AND A FLASHING ELEMENT WITH A SEAM**

(57) A method for interconnecting flashing members of a flashing element for use between a roof window and a surrounding roof structure as well as such a flashing element is disclosed. In the flashing element a first and a second flashing member are each provided with a hem defined by an edge section, which has been folded so that a hem pocket is present between the edge section and an adjacent section. A free edge of the edge section

of the first flashing member is arranged in the hem pocket of the second flashing member, and a free edge of the edge section of the second flashing member is arranged in the hem pocket of the first flashing member thereby forming a lock seam. A local locking depression is formed at the seam, thereby deforming the material of both flashing members and preventing them from moving in relation to each other.

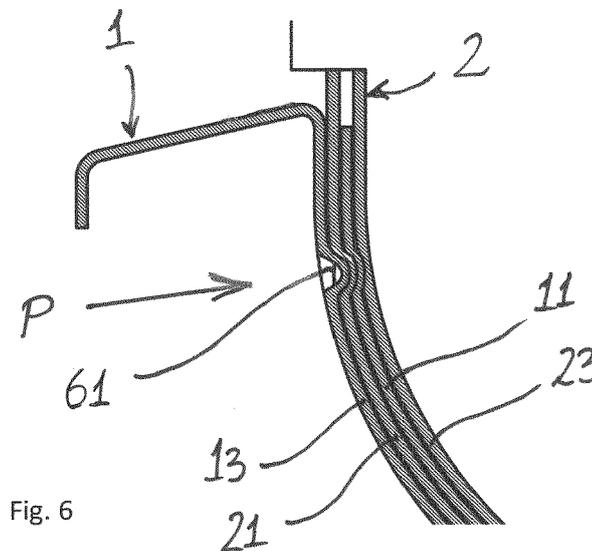


Fig. 6

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Description

5 [0001] The present invention relates to a method for interconnecting flashing members of a flashing element for use between a roof window and a surrounding roof structure, where a first flashing member and a second flashing member are each provided with a hem, where a free edge of an edge section of the first flashing member extending along its hem fold is arranged in the hem pocket of the second flashing member, and a free edge of an edge section of the second flashing member extending along its hem fold is arranged in the hem pocket of the first flashing member thereby forming a seam where the two edge sections extend in substantially parallel planes. The invention further relates to a flashing element with such a seam.

10 [0002] A seam of the type described above is known under many different names in different parts of the world, but in the following the term "lock seam" will be used.

15 [0003] Flashing elements, where flashing members are interconnected by lock seams, are well known and lock seams are known for their structural simplicity, which allows an easy and reliable interconnection with excellent weather tightness. They, however, involve the use of considerable amounts of material. Not only does the overlap at the seam require material, the sheet material used for the flashing members also needs to have sufficient strength to allow the formation of hems, which will not be pulled open when the flashing element is in use, both during handling and under the influence of heavy winds when in the mounted position.

20 [0004] It has been attempted to use other ways of interconnecting flashing members, but many of them have proven unsatisfactory. It has also been attempted to use one-piece flashing elements without seams, but these are less versatile and best suited for being made from polymers, many of which lack the weather resistance of aluminium, which is the material typically used for roof window flashings.

[0005] It is therefore a first object of the invention to provide a method for interconnecting flashing members, which allows a reduction of the material consumption while maintaining the reliability and weather tightness of a traditional lock seam. Preferably the method should be suitable for use with flashing members made from aluminium.

25 [0006] A second object of the invention is to provide a flashing element for a roof window, which can be made using less material and preferably made from aluminium flashing members.

[0007] In a first aspect of the invention the first object is achieved with a method, where a local locking depression is formed at the seam, thereby deforming the material of both the first flashing member and the second flashing member so that they are prevented from moving in relation to each other.

30 [0008] The provision of a local depression at some point along the lock seam and the resulting local fixation of the flashing members in relation to each other has been seen to entail a considerable increase in the strength and stiffness of the seams. It has been observed that the implementation of a local depression at a seam where two aluminium members are interconnected can infer an increase up to 100% of the strength of the seam with regards to the average load that can be endured without the use of a local depression. The local locking of the two flashing members means that other sections of the flashing members are still able to move slightly in relation to each other, which will allow compensation for local deformation caused for example by temperature variations.

35 [0009] In one embodiment, the depression is of a substantially circular or square shape when seen in a direction, which is perpendicular to the planes of the edge sections. Such a depression has a minimal influence on the design of the flashing element and can be made with simple tools. In other embodiments the depression can have an elongate shape, or two or more depressions may be provided at the same seam, particularly if the seam is very long and/or extends in a curved and/or bent plane. Regardless of the design, the depressed area of the seam, i.e. the total area of the one or more local depressions, should have a total length in the length direction of the seam constituting less than one fifth of the length of the seam.

40 [0010] It is noted that the reference to the planes of the edge sections, both above and elsewhere in this text, is intended as a reference to the orientation of the edge sections in their undeformed state.

45 [0011] The use of local depression is particularly advantageous when interconnecting flashing members of a relatively complex shape, such as for example a side flashing member adapted for extending along a side frame member of a roof window frame in a mounted state and a bottom flashing member adapted for extending along a bottom frame member of a roof window frame. In such flashing elements a part of the seam is often located in a place, which is hard to reach with a tool in the assembled state, and the local depression can then be made at an accessible area of the seam. The optimal location of the depression will depend on the size, shape and material of the flashing members and the intended use of the flashing element, but it may be determined by simple experiments.

50 [0012] It is presently considered advantageous that the local depression(s) is/are made with a depth, which ensures that material on both sides of the hem fold in both flashing members is deformed. This entails a particularly strong fixation of the flashing members in relation to each other.

55 [0013] If the intended use of the flashing element is such that one side of the seam will be hidden in the mounted state, the depression should preferably be made on this side. It is, however, also possible to use the depression as an indication of position on the flashing element, indicating for example where a screw or like fastener should be passed

into the flashing element.

[0014] The depression may be made by punching, which provides a relatively well-defined depression.

[0015] Experiments have shown that a depression made with a tapered punch, having an engagement surface intended for coming into contact with the material of a flashing member and one or more side surfaces extending away from the engagement surface and a smaller diameter at the engagement surface, provides good results. The tapered punch used in the experiments was cone shaped with a circular cross-sectional shape, but it could also have a rectangular, triangular or alternative cross-sectional shape, and the cross-sectional shape can vary along the length of the punch. Likewise, it is to be understood that the engagement surface of the punch does not need to be plane, but could be concave, convex, or adapted for embossing a pattern into the surface of the flashing member, which it comes into direct contact with.

[0016] In one embodiment, which has been found to be suitable for making bottom flashing elements adapted for use at the bottom of a roof window mounted in an inclined roof, the tapered punch has a circular cross-sectional shape where the smaller diameter is approximately 3 mm, the taper angle is 30-60 degrees, and the diameter at the section of the punch, which is at level with the exterior side of the flashing member at the end of the punching, is approximately 4 mm. In other embodiments, the diameter of the tapered punch may vary from 2mm to 4mm.

[0017] A particularly good interconnection may be achieved by angling the punch in relation to the flashing member surface, which is first engaged by the punch. In such cases the punch is preferably inserted at an angle of 45-85 degrees, more preferred 70-80 degrees. An angled direction of insertion of the punch may also make it easier to access the section of the seam, where the depression is to be made.

[0018] Even though it is presently preferred to make the depression by punching after the lock seam has been established, it is also possible to make it in other ways. It is even possible to provide each flashing member with depressions, which are brought into engagement with each other during establishment of the lock seam, in which case a snap-locking engagement between the flashing members may be achieved.

[0019] The invention is not limited to the provision of a single seam, but also applies to flashing elements where two or more hems on one flashing member are interconnected to other flashing members by seams of the kind described above.

[0020] In a second aspect of the invention the second object is achieved with a flashing element where the material of both the first flashing member and the second flashing member is deformed by a local locking depression at the seam, said depression preventing the two flashing members from moving in relation to each other.

[0021] Particularly the invention lends itself to embodiments where the first flashing member is a side flashing member, adapted for extending along a side frame member of a roof window frame in a mounted state, and the second flashing member is a bottom flashing member adapted for extending along a bottom frame member of a roof window frame in the mounted state.

[0022] Advantages and embodiments of the invention described with reference to the first aspect above also applies to the second aspect.

[0023] The invention also applies to flashing elements where the total thickness of the first and the second flashing member at the bottom of the depression in the deformed state varies between 0.8 mm and 1.3 mm.

[0024] In the following the invention will be described in more detail with reference to embodiment shown in the drawing, where

Fig. 1 is a sketch of a bottom flashing member mounted between a roof window frame and a surrounding roof structure, Fig. 2 is a schematic drawing of another embodiment showing the detail marked II in Fig. 1 from the direction marked by the arrow,

Fig. 3 shows the detail marked III in Fig. 2, but slightly more from above,

Fig. 4 shows the detail marked III in Fig. 2 from the direction marked by the arrow,

Fig. 5 shows a cross-section along the line V-V in Fig. 2, but not showing the skirt member,

Fig. 6 shows a cross-section corresponding to the uppermost half of Fig. 5, but showing a different embodiment of the side flashing member,

Fig. 7 is a schematic sketch of a depression in a lock seam according to the invention,

Fig. 8 corresponds to Fig. 6 but showing a different embodiment of the invention,

Fig. 9 corresponds to Fig. 7 but showing the embodiment in Fig. 8,

Fig. 10 is a photo corresponding substantially to Fig. 3 but showing a different embodiment of the invention from a slightly different angle, and

Fig. 11 shows different embodiments of depressions seen from the direction indicated by the arrow XI in Figs 8 and 9.

[0025] A bottom flashing element comprising a first flashing member 1 in the form of a bottom flashing member, second flashing members 2 in the form of side flashing members, and a third flashing member 3 in the form of a skirt member is shown in Fig. 1 covering the gap between the bottom member of the frame 4 a roof window and a surrounding roof structure 5.

[0026] In the following, reference will be made to such a bottom flashing element in order to illustrate the invention, but the skilled person will understand that the invention may also be used on other flashing elements of a flashing assembly. Not least on top flashing elements, which often have strong structural resemblance to the bottom flashing element shown in Fig. 1.

[0027] Turning now to Fig. 2, 3, and 4 corresponding to the detail marked II in Fig. 1, it is seen how a bottom flashing element 1 is connected to a side flashing member 2 in a lock seam 6.

[0028] Each of the flashing members 1, 2 is provided with a hem defined by an edge section 11, 21, which has been folded along a hem fold line 12, 22 so that a hem pocket is present between the edge section and an adjacent section 13, 23 of the flashing member. In the lock seam 6 a free edge 14 of the edge section 11 of the first flashing member 1 extending along its hem fold 12 is located in the hem pocket of the second flashing member 2, and a free edge 24 of the edge section 21 of the second flashing member 2 extending along its hem fold 22 is located in the hem pocket of the first flashing member 1, so that the two edge sections 11, 21 extend in substantially parallel planes.

[0029] In order to strengthen the joint, a local locking depression 61 is formed at the seam on the interior side, which faces the roof window frame 4 in the mounted state.

[0030] As is seen in Fig. 5 the depression 61 has deformed all four layers in the seam, thereby deforming both edge sections 11, 21 as well as both adjacent sections 13, 23 so that the first flashing member and the second flashing member are locally prevented from moving in relation to each other. Here the depression has resulted in a slight displacement of the material of the adjacent section 23 of the second flashing member, which faces the exterior in the mounted state, so that a small projection 62 has been formed on the exterior side of the seam 6. It is, however, not a requirement that all layers of the seam are deformed and the projection on the exterior side may be undesirable for aesthetical reasons or because it takes up space.

[0031] Fig. 6 shows a different embodiment where all four layers are deformed by the depression 61, but where the shape of the exterior side is unaffected. In addition, the side flashing member 2 is of a different design.

[0032] The depression 61 in Fig. 6 is shown in cross-section in Fig. 7. As may be seen, the depression is tapered with a smaller diameter D at the bottom of the depression and side surfaces extending at an angle A of approximately 12 degrees in relation to symmetry axis S . The symmetry axis, which is also the direction P of insertion of the punch (not shown) used for the formation of the depression, is not perpendicular to the interior surface of adjacent section 13 of the first flashing member, but inclined at an angle B of approximately 14 degrees, corresponding to an angling of the punch in relation to the flashing member surface, which is first engaged by the punch of 76 degrees.

[0033] A different embodiment of the invention is shown in Figs 8 and 9. In comparison to the embodiment in Figs 6 and 7 the angle A is smaller, here about 7 degrees, but the angling of the symmetry axis represented by angle B is the same. Furthermore, the depression 61 is considerably deeper so that both the edge sections 11, 21 and adjacent sections 13, 23 of both flashing members 1, 2 are considerably deformed. This provides a very reliable interconnection of the flashing members but also involves the risk of rupturing the material, which will particularly be undesirable in the adjacent section 23 of the side flashing member, which forms the exterior surface of the flashing element.

[0034] Thickness E , shown in Fig. 9, is defined as the thickness of the joint flashing members at the bottom of the depression measured from the exterior side up to the deepest point of the depression. It has been found that in embodiments where the flashing members are made from aluminium with a thickness of 0.5 to 0.8 mm and where the thickness E measures 0.8 to 1.3 mm, the fixation of the flashing members in relation to each other is stronger than in the case where the respective thickness E is larger, without imposing a substantial risk of rupturing the material. This subsequently results in a stronger lock. This also applies to embodiments with a different angle A and/or different shape of punch.

[0035] Moreover, in one embodiment where the diameter of the tapered punch is 4 mm, an increase in the strength of the lock has been observed compared to the case when a tapered punch with a smaller diameter has been used.

[0036] In order to achieve a plane exterior surface without a surface projection 62 as the one shown in Fig. 5, the flashing member forming the exterior surface is arranged against a plane surface when making the depression. Alternatively, if wishing a projection on the exterior surface, the flashing member forming the exterior surface by be arranged against a surface having the desired shape. Regardless if a projection is wanted or not, it may be advantageous to provide backing(s) or support(s) adapted for retaining other parts of the flashing member(s) during the deformation process.

[0037] A still further embodiment of the invention is shown in Fig. 10. Here the depression has a rounded bowl-shape without sharp corners at the bottom, but otherwise it resembles that in Fig. 8 and 9.

[0038] The shape of the depression may vary depending on numerous factors such as the material(s) used for the flashing members, the material thickness, and the intended use of the flashing element. Fig. 11 shows a number of different embodiments, where those in details A, B, and C are relatively simple and substantially symmetrical, while those in details D, E, and F are elongate and intended to be arranged with their longer axis extending along the length L of the seam. The depression with the circular shape in detail A is structurally simple and potentially allows a slight rotation of the two flashing members in relation to each other, which is prevented or at least hindered with the other embodiments.

[0039] Details G and H show embodiments, where several smaller depressions are arranged in groups, either forming a row intended to extend along the length L of the seam or being off-set in relation to each other in order to provide alternative properties with respect to stiffness etc.

[0040] The last embodiment in detail I is provided with embossed letters inside the depression and having a complex shape designed to serve as an indication of origin, model, size, or the like. Depending on the overall design of the flashing element, it may be advantageous to provide this kind of depression on a surface, which is visible in the mounted position of the flashing element.

[0041] The depressions in Fig. 11 is shown only by their overall shape and it is to be understood that they may have a rounded shape like in Fig. 10 and/or be cone-shaped like in Fig. 7.

[0042] Table 1 presents an example of test data carried out for two embodiments of a flashing element with and without a local depression. The last column of the table presents the % increase in the strength of the seam when using a local depression based on the average of load measurements. As it can be seen from the table, the case where the flashing members are both of aluminium with a thickness of 0.6 mm and using a local depression improves the strength of the flashing element up to 100% in one of the test samples compared to the respective case of 0.7 mm thickness without a local depression. Test data were not available for a case of 0.6mm thickness of an aluminium element without the local depression, but it is well-known that thicker material leads to higher strength. Hence, the increases in strength shown in Table 1 are the minimum increases that are expected, since these would be even higher if a thicker material with local depression was used.

Table 1. Test data for strength of two embodiments

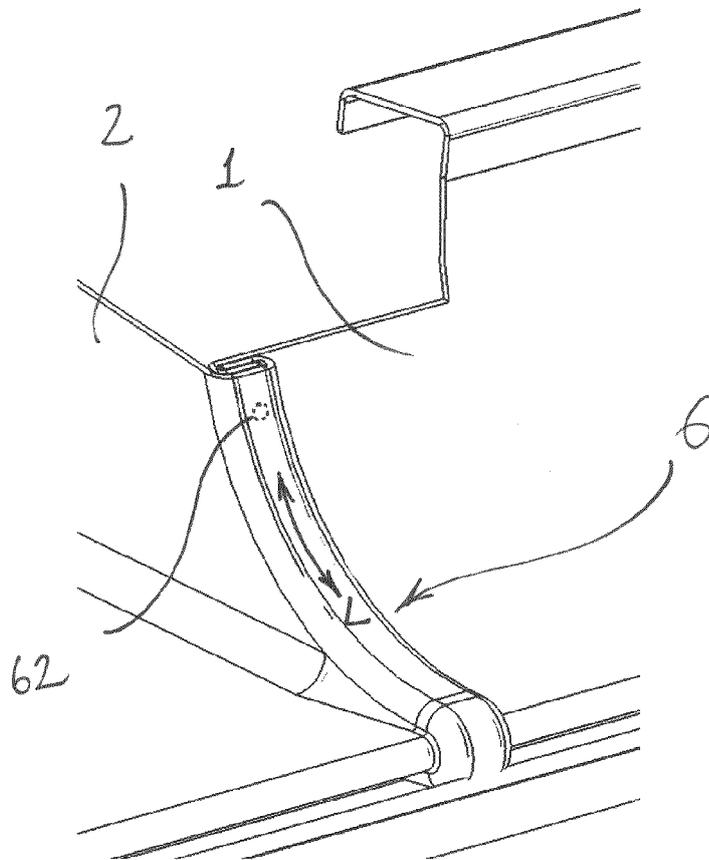
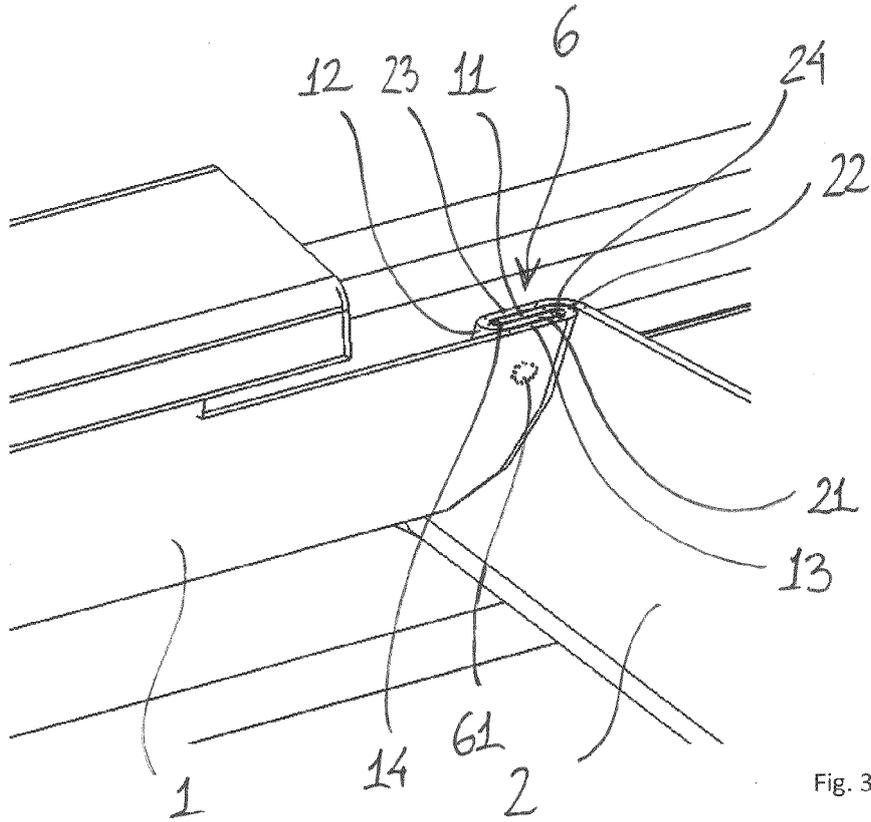
Product number	0.7 mm thickness without local depression		0.6 mm thickness with local depression		% Increase in strength
	Average of load [kg]	Average st.dev.	Average of load [kg]	Average st.dev.	
Test sample 1	6.12	5.22	11.97	8.87	96%
Test sample 2	7.45	6.36	11.97	9.97	61%
Test sample 3	7.09	5.58	10.2	7.4	44%
Test sample 4	7.49	6.77	13	11.5	74%
Test sample 5	8.43	7.35	16.88	13.08	100%
Test sample 6	7.94	7.20	15.84	13.39	96%

Claims

1. A method for interconnecting flashing members (1,2,3) of a flashing element for use between a roof window (4) and a surrounding roof structure (5), where a first flashing member (1) and a second flashing member (2) are each provided with a hem, said hem being defined by an edge section (11,21) of the flashing member, which has been folded along a hem fold line (12,22) so that a hem pocket is present between the edge section and an adjacent section (13,23) of the flashing member, and where a free edge (14) of the edge section (11) of the first flashing member (1) extending along its hem fold line (12) is arranged in the hem pocket of the second flashing member (2), and a free edge (24) of the edge section (21) of the second flashing member (2) extending along its hem fold line (22) is arranged in the hem pocket of the first flashing member (1) thereby forming a seam (6) where the two edge sections (11,21) extend in substantially parallel planes, **characterized in that** a local locking depression (61) is formed at the seam (6), thereby deforming the material of both the first flashing member (1) and the second flashing member (2) so that they are prevented from moving in relation to each other.
2. A method according to claim 1, where the local locking depression (61) is of a substantially circular or square shape when seen in a direction, which is perpendicular to the planes of the edge sections (11,21) in their undeformed state.
3. A method according to claim 1 or 2, where the local locking depression (61) is made with a depth, which ensures that material on both sides of the hem fold line (12,22) in both flashing members (1,2) is deformed.

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4. A method according to one or more of the preceding claims, where the local locking depression (61) is made by punching.
5. A method according to claim 4, where a tapered punch is used, where said punch having an engagement surface intended for coming into contact with the material of a flashing member (1,2) and one or more side surfaces extending away from the engagement surface, and where said punch has a smaller diameter at the engagement surface.
6. A method according to claim 5, where the smaller diameter of the tapered punch is approximately 2 mm, where the taper angle is 30-60 degrees, and where the tapered punch has a diameter of approximately 4 mm at a distance from the engagement surface.
7. A method according to one or more of the preceding claims, where the punch is inserted at an angle of 45-80 degrees, more preferred 70-80 degrees, to the flashing member surface, which is first engaged by the punch.
8. A method according to one or more of the preceding claims, where two or more hems on one flashing member (1,2,3) are interconnected to other flashing members (1,2,3) by seams of the kind described in claim 1.
9. A flashing element comprising a first flashing member (1) and a second flashing member (2) each provided with a hem, said hem being defined by an edge section (11,21) of the flashing member (1,2), which has been folded along a hem fold line (12,22) so that a hem pocket is present between the edge section and an adjacent section (13,23) of the flashing member,
where the first flashing member (1) and the second flashing member (2) are interconnected in a seam (6), where a free edge (14) of the edge section (11) of the first flashing member (1) extending along its hem fold line (12) is located in the hem pocket of the second flashing member (2), and a free edge (24) of the edge section (21) of the second flashing member (2) extending along its hem fold line (22) is located in the hem pocket of the first flashing member (1), and where the two edge sections (11,21) extend in substantially parallel planes,
characterized in that the material of both the first flashing member (1) and the second flashing member (2) is deformed by a local locking depression (61) at the seam (6), said local locking depression preventing the two flashing members (1,2) from moving in relation to each other.
10. A flashing element according to claim 9, where the first flashing member is a side flashing member (2) adapted for extending along a side frame member of a roof window frame in a mounted state and the second flashing member is a bottom flashing member (1) adapted for extending along a bottom frame member of a roof window frame in the mounted state.
11. A flashing element according to claim 9, where the total thickness of the first and second flashing member in the deformed state at the bottom of the depression, measured from the exterior side of the flashing element up to the deepest point of the depression, is 0.8 - 1.3 mm.



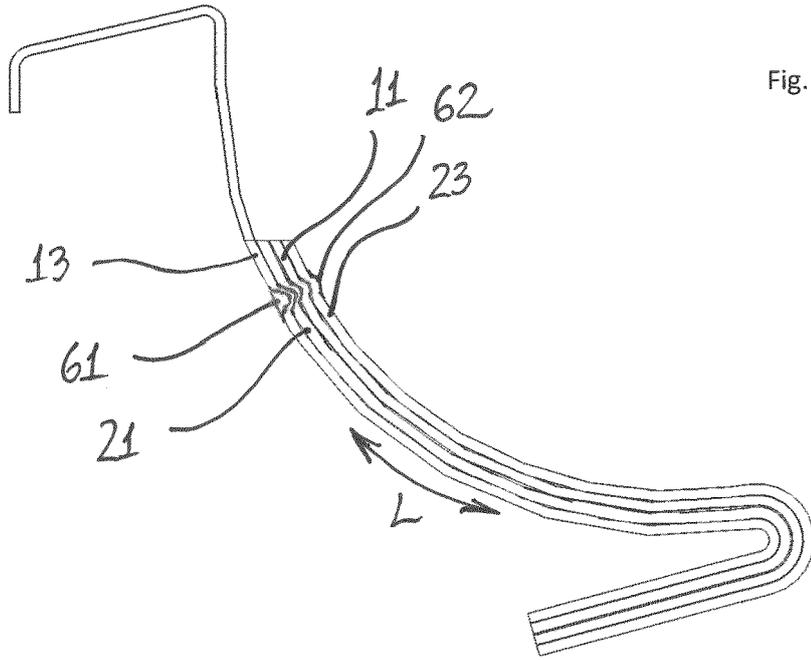


Fig. 5

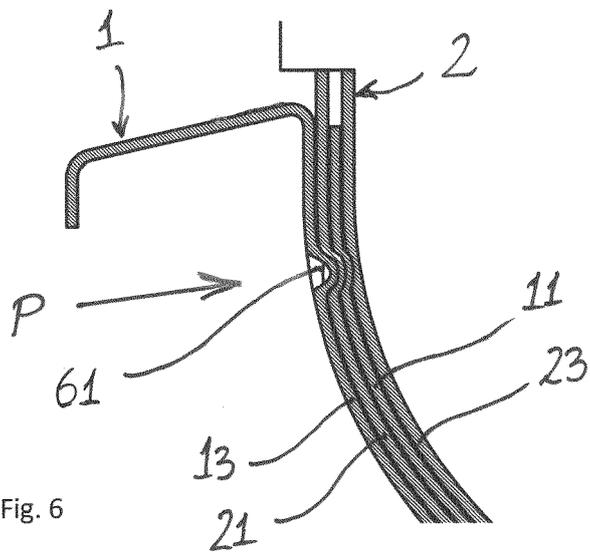


Fig. 6

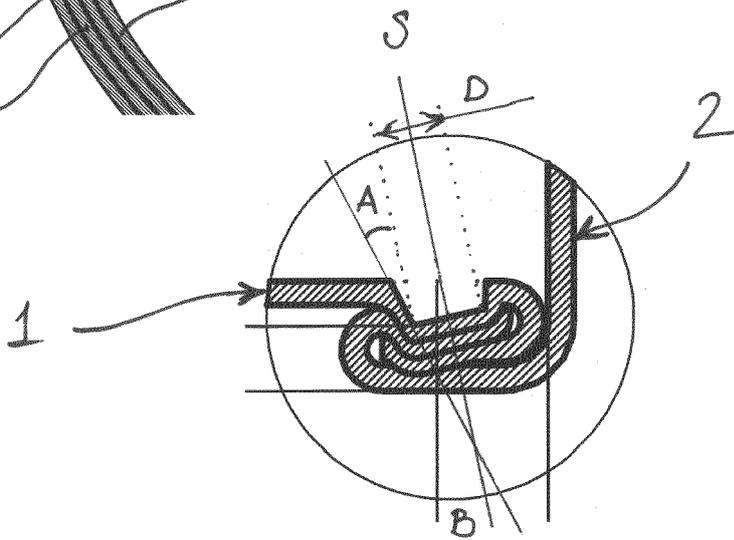


Fig. 7

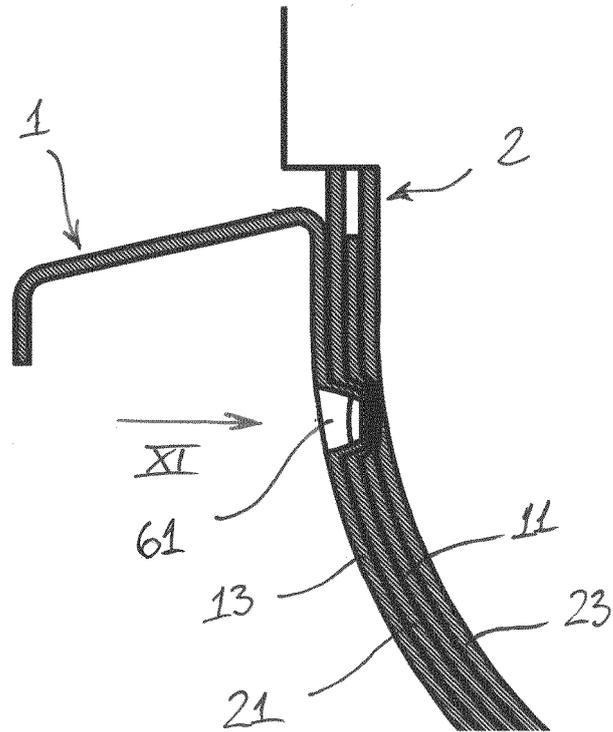


Fig. 8

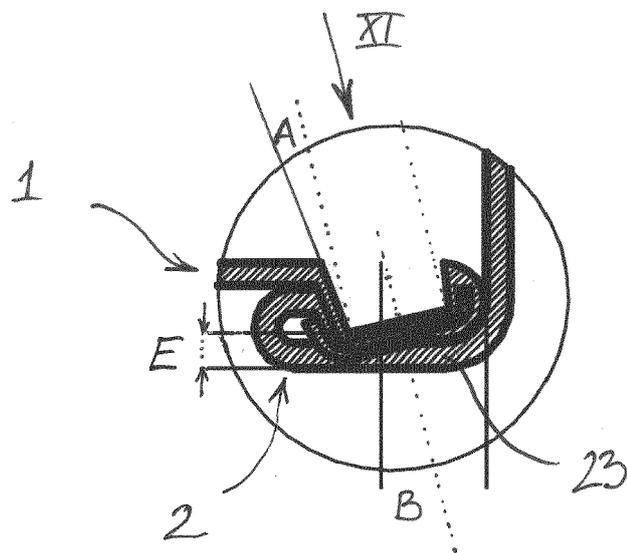


Fig. 9

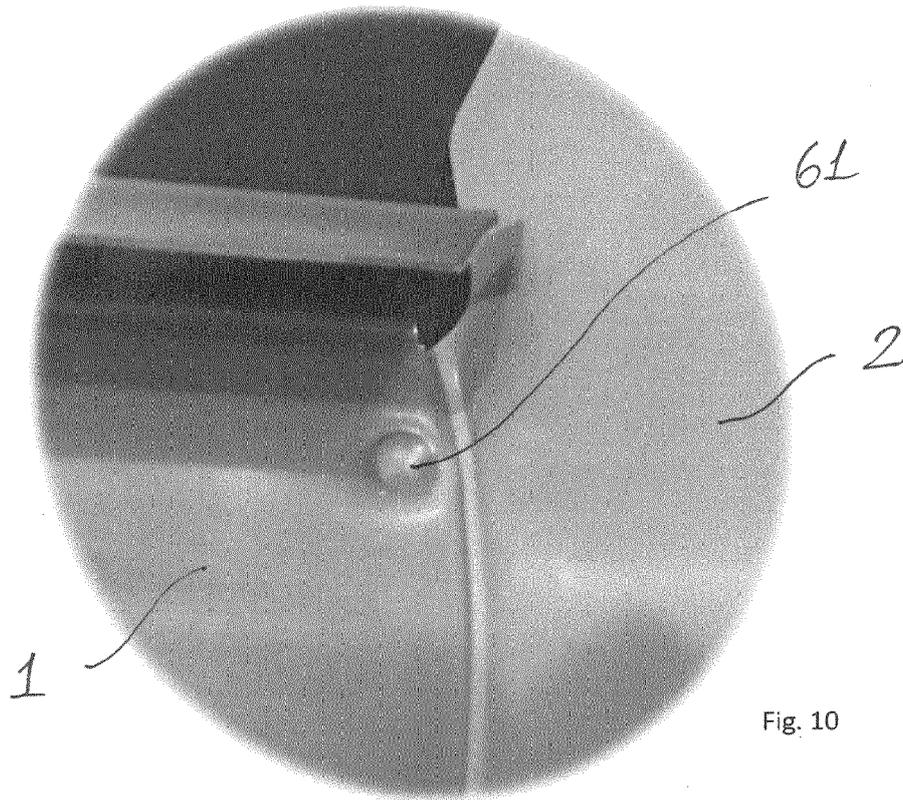


Fig. 10

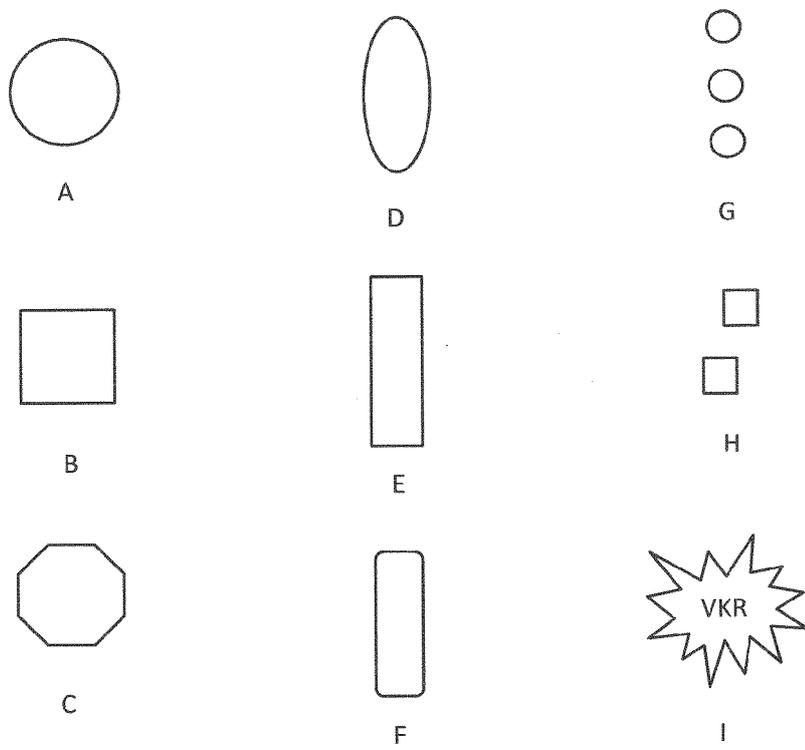


Fig. 11



EUROPEAN SEARCH REPORT

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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 (IPC)	
Y	DE 39 04 174 A1 (HANDEL & MACK GMBH & CO KG [DE]) 16 August 1990 (1990-08-16) * column 4, line 64 - column 5, line 8; figure 2 *	1-11	INV. B21D39/02 E04D13/147	
Y	EP 2 947 220 A1 (ROTO FRANK AG [DE]) 25 November 2015 (2015-11-25) * column 7, lines 42-47; figure 4 *	1-11		
Y	US 1 502 112 A (MOORMAN CHARLES L) 22 July 1924 (1924-07-22) * page 2, lines 4-25; figures 3-5 *	1-11		
Y	JP H03 189017 A (MITSUBISHI ELECTRIC CORP) 19 August 1991 (1991-08-19) * figures 1-2 *	1-11		
Y	US 425 002 A (L. L. SAGENDORPH) 8 April 1890 (1890-04-08) * figures 1-4 *	1-11		
Y	GB 927 980 A (SVENSKA FLAECTFABRIKEN AB) 6 June 1963 (1963-06-06) * page 1, lines 30-35; figures 1-2 *	1-11		TECHNICAL FIELDS SEARCHED (IPC)
Y	JP S63 101030 A (OKUCHI KENSAN KK; SAKANAMI TOKUSHU ROLL KK) 6 May 1988 (1988-05-06) * figures 1-3 *	1-11		B21D E04D
Y	JP S61 148427 U (UNKNOWN) 12 September 1986 (1986-09-12) * figures 5-6 *	1-11		
Y	CA 648 737 A (R C MAHON COMPANY) 18 September 1962 (1962-09-18) * figure 5 *	1-11		
	----- -/--			
The present search report has been drawn up for all claims				
Place of search The Hague		Date of completion of the search 24 June 2019	Examiner Demeester, Jan	
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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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 (IPC)
Y	US 2006/265970 A1 (HOFFMAN KENNETH S [US]) 30 November 2006 (2006-11-30) * figures 4A-4B * -----	1-11	
			TECHNICAL FIELDS SEARCHED (IPC)
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 24 June 2019	Examiner Demeester, Jan
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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ON EUROPEAN PATENT APPLICATION NO.

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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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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 3904174 A1	16-08-1990	NONE	
EP 2947220 A1	25-11-2015	DE 102014007702 A1 EP 2947220 A1 PL 2947220 T3	26-11-2015 25-11-2015 30-05-2018
US 1502112 A	22-07-1924	NONE	
JP H03189017 A	19-08-1991	NONE	
US 425002 A	08-04-1890	NONE	
GB 927980 A	06-06-1963	BE 612349 A FR 1310227 A GB 927980 A	24-06-2019 06-03-1963 06-06-1963
JP S63101030 A	06-05-1988	JP H0763773 B2 JP S63101030 A	12-07-1995 06-05-1988
JP S61148427 U	12-09-1986	NONE	
CA 648737 A	18-09-1962	NONE	
US 2006265970 A1	30-11-2006	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82