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(54) **Apparatus for flood-proofing a garage with a single panel garage door**

(57) The present invention provides an apparatus for flood-proofing a garage with a single panel garage door (1). The apparatus comprises a first sealing member (2) for mounting around a periphery of a lower portion of an inner surface of the garage door (1), a second sealing member (6) and mounting means (4) for mounting the second sealing member (6) around the garage in a co-operative position to the first sealing member (2). Mounting the first sealing member (2) on a suitable position on an inner surface of a garage door (1) and mounting the mounting means (4) and second sealing member (6) in

a cooperative position within the garage allows the garage to be sealed when the garage door (1) is closed. This is achieved as closing the garage door (1) presses the first sealing member (2) into the second sealing member (6), thereby forming a waterproof seal. In a preferred embodiment of the invention the apparatus also comprises a vehicle supporting ramp (5) for positioning on the floor of the garage (3) adjacent the supporting member (4) to prevent the supporting member (4) and second sealing member (6) being damaged as a vehicle enters and leaves the garage.

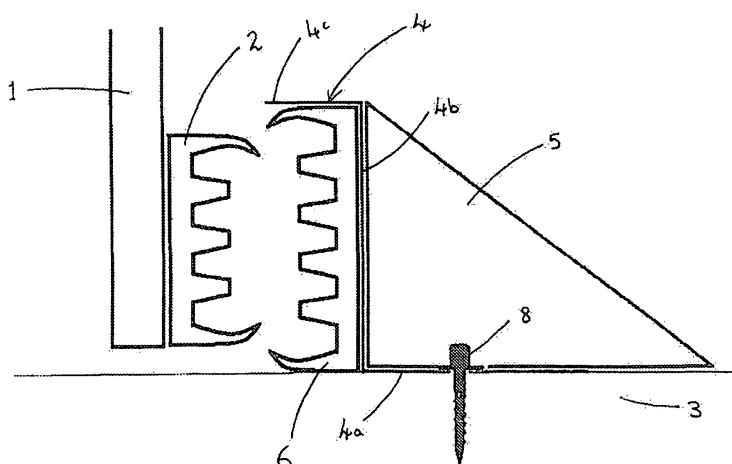


Figure 2

Description

Field of Invention

[0001] The present invention relates to flood-proofing and provides an apparatus for the flood-proofing of garages with single panel doors.

Background to the Invention

[0002] Many houses and commercial and industrial buildings are built in locations that are susceptible to periodic flooding. It is desirable to protect these buildings from flood damage, specifically damage caused by the ingress of water into the buildings. There are known means for protecting the doors and windows of buildings to prevent the ingress of flood water during a flood. However, there are currently no well-known and effective means for flood-proofing conventional garages, particularly conventional garages with single panel doors. Garages are commonly used not only to store cars but also as a store for many other items, which may have substantial value. Furthermore, internal doors leading from garages into the associated building are generally of a lower standard than the building's external doors and thus may allow any flood water in a garage to easily enter the associated building. As a result, it is desirable that the garages of buildings in locations susceptible to flooding are flood-proofed.

[0003] Garages with single panel doors have doors that are formed of a flat panel of material, typically metal, that can be raised from a vertical position to a substantially horizontal position. In the vertical position the garage is closed and the door forms substantially a front wall of the garage. In the horizontal position the door is positioned within the garage, immediately below a roof of the garage. Due to this unique door mechanism the known means for flood-proofing conventional doors and windows can not be used with garages with single panel doors. Therefore there is a need for apparatus that can flood-proof garages with single panel doors.

Summary of Invention

[0004] The present invention provides an apparatus for flood-proofing a garage with an up and over single panel garage door, the apparatus comprising:

a first sealing member for mounting on an inner surface of the garage door, around a periphery of a lower portion of said garage door;
a second sealing member;
mounting means for mounting the second sealing member around the garage in a cooperative position to the first sealing member, the mounting means comprising a supporting member for mounting in a cooperative position to the first sealing member on an upper surface of a floor of the garage and an inner

surface of a lower portion of side walls of the garage; wherein:

when the first sealing member is mounted to a garage door and the second sealing member is mounted in a cooperative position around the garage closing the garage door forms a water-proof seal between the first sealing member and the second sealing member.

[0005] In a simple embodiment of the present invention the first and second sealing members may be a simple rubber seals that when pressed against one another by the closing of the garage door form a simple waterproof seal therebetween. In this manner, closing a garage door fitted with an apparatus according to this embodiment will seal a lower portion of the garage door. However, the first and second sealing members may be formed in any manner that allows a garage to be sealed effectively. For example, as discussed below, the first and second sealing members may comprise interlocking gaskets.

[0006] The mounting means of the present invention comprises a supporting member for mounting in a cooperative position to the first sealing member on an upper surface of a floor of the garage and an inner surface of a lower portion of side walls of the garage and it is preferable that the second sealing member is mounted on an outer side of the supporting member.

[0007] Preferably the first sealing member is a first interlocking gasket and the second sealing member is a second interlocking gasket and the first and second interlocking gaskets have cooperatively interlocking portions formed such that when the first gasket is pressed against the second gasket (for example, by closing a garage door to which the first interlocking gasket is mounted) the interlocking portions of the first and second gaskets interlock with one another to form a plurality of watertight seals.

[0008] An apparatus according to the present invention comprising a supporting member and first and second interlocking gaskets can be mounted to most garages with single panel doors in order to flood-proof the garage in a simple and easy manner. This can be done by mounting the first interlocking gasket in an appropriate position on the inner surface of the single panel door and mounting the supporting member in an appropriate cooperative position on the floor and side walls of the garage. When mounted properly this results in the first and second gaskets being pressed against one another and thereby forming a plurality of watertight seals when the garage door is closed, thereby flood-proofing the garage. Opening the garage door in a conventional manner will remove the first gasket from the second gasket and thereby break the plurality of watertight seals.

[0009] It will be understood that a supporting member suitable for mounting a second interlocking gasket must be capable of being mounted on the floor and side walls of the garage in a cooperative position to the first inter-

locking gasket. That is, the supporting member must provide a suitable mounting for the second interlocking gasket that allows the second interlocking gasket to be mounted in a position wherein the first interlocking gasket presses against the second interlocking gasket when the single panel door of the garage is closed and this causes the interlocking portions of the first and second interlocking gasket to interlock. In particular, the second interlocking gasket may be mounted such that it has a substantially vertical outward face and extends in a u-shape around a lower portion of the entry to the garage. That is, the second interlocking gasket extends substantially horizontally in an inward direction from the lower portion of the sidewalls of the garage and substantially vertically upwards from the garage floor. The supporting member of the present invention may have any shape or structure that allows it to be mounted to the sidewalls of the garage and the floor of the garage and allow the second interlocking member to be mounted in the manner set out above.

[0010] A supporting member may be formed of L-shaped material. In this case a length of L-shaped material may be mounted to the lower portion of each of the sidewalls and a length of L-shaped material may be mounted to the floor of the garage such that a first flange of each of the lengths of the L-shaped material is fixed to and parallel with the lower portion of the side wall or the floor of the garage and the second interlocking gasket is fixed to a second flange of each of the lengths of the L-shaped material. The lengths of the L-shaped material will be formed such that there is no gap and the second interlocking gasket can be mounted and extend all the way around the lower portion of the garage. The L-shaped material may be formed of structural steel or any other suitable material.

[0011] More preferably a supporting member may be formed of z-section material. In this case the supporting member will be formed and mounted in the same manner as the supporting member formed of L-section described above with the second interlocking gasket mounted on a second flange of the z-section and the additional third flange of the z-section extending along an inner side of the second of the interlocking gasket. In this embodiment it will be understood that it is preferable that the second flange of the z-section is approximately the same width as the second interlocking gasket such that the second gasket completely covers one face of the second flange when mounted thereon and the third flange is immediately adjacent to and extends along an inner side of the second gasket. The z-section may be formed of structural steel or any other suitable material.

[0012] The first and second sealing members may be formed of any material suitable for forming waterproof seals. In a preferred embodiment of the invention the first and second sealing members are substantially formed of rubber or a synthetic alternative.

[0013] First and second interlocking gaskets may have any number of interlocking portions and those portions

may have any shape that allows a waterproof seal to be formed when the first interlocking gasket is pressed against the second interlocking gasket. Preferably the first and second interlocking gaskets each have at least 3 interlocking portions. In a preferred embodiment of the invention the first interlocking gasket has three interlocking portions and the second interlocking gasket has four interlocking portions.

[0014] In order to prevent deformation of the second interlocking gasket or the support member the apparatus of the present invention may comprise a vehicle support ramp. In use a vehicle support ramp is mounted on an inner side of the supporting member. A vehicle support ramp may have any shape and be formed of any material that allows a vehicle to enter a garage and leave a garage without permanently deforming the support member or the second interlocking gasket. In a preferred embodiment a vehicle support ramp is solid, formed of concrete and comprises a triangular prismoidal ramp. In alternative embodiments a vehicle support ramp may be hollow and/or may be substantially formed of metal and/or may have an alternative shape, such as a curved ramp. Furthermore, a vehicle supporting ramp may be formed integrally with the supporting member such that the supporting member and the vehicle supporting ramp are a single component or the vehicle supporting ramp may be formed substantially separate from the supporting member.

[0015] It is also preferable that the apparatus of the present invention prevents a portion of the second sealing member that is mounted adjacent the floor of a garage from being squashed or otherwise deformed by a vehicle entering or leaving the garage. This may be achieved by having a portion of a supporting member extending over an inner side of the second gasket, for example a flange of a z-shaped supporting member. However, the apparatus may comprise alternative protective means. For example a vehicle supporting ramp may extend over the inner side of the second sealing member. This may be possible if a second sealing member is substantially mounted in a recess formed in a vehicle supporting ramp.

[0016] In order to allow most vehicles to easily enter and leave a garage fitted with the apparatus of the present invention it is preferable that any vehicle support ramp has a height of 50mm or less. Similarly, the portion of any supporting member that is mountable to the garage floor and the corresponding portion of the second sealing member should also have a height of 50mm or less. In order to preserve the width of the garage opening as much as possible it may also be preferable that portions of the supporting member and the second sealing member that are mountable to the lower portion of the sidewalls of the garage extend inwards from the sidewalls of the garage by a distance of 50mm or less when they are mounted thereto.

[0017] As will be readily appreciated, when the apparatus of the present invention is mounted to a garage and its door and the door of the garage is closed the lower

portion of that garage will be substantially watertight. Thus when water, for example flood-water, acts on the outer side of the lower portion of the garage door it can not enter the garage. However, if there is a significant height of water it will apply a substantial force to the garage door. The magnitude of this force is dependent upon the height of the water. If a garage door is completely watertight when the height of the water exceeds a threshold height the force generated by the mass of water acting on the door may deform the door. If a garage door is deformed it is inevitable that it will no longer be watertight and the water will enter the garage. The specific height threshold will depend upon, amongst other factors, the specific construction of the garage and the garage door.

[0018] Obviously, it is preferable that the door of the garage is not deformed under the action of floodwater. Therefore, it is preferable that only a lower portion of the garage door is made watertight such that if water exceeds the height of the lower portion it will simply enter the garage without deforming the garage door. In order for this to happen only the lower portion of a garage door and garage should be fitted with the apparatus of the present invention and the height of the lower portion of the garage door must be less than the threshold height discussed immediately above. Preferably, the height of the lower portion is just less than the threshold height for any specific garage door. In preferred embodiments of the present invention the height of the lower portion of the garage door extends no more than 700mm, and preferably less than 600mm, above the floor of the garage. As will be readily appreciated, the lower portion of the side-walls of the garage will be substantially the same height as the lower portion of the garage door.

[0019] Advantageously, if the first and second sealing members comprise interlocking gaskets at least one of the first gasket and the second gasket comprises flexible outwardly extending outer portions that are formed outside the interlocking portions such that when the first gasket is pressed against the second gasket said outer portions of a first or second gasket deform inwards against an outer side of either an interlocking portion or an outer portion of the other of the first or second gasket. Preferably, both the first and second gaskets comprise outer portions. Outer portions may be formed in any manner apparent to the person skilled in the art. Outer portions may preferably have a greater depth than the interlocking portions of the first and second interlocking gaskets in order to ensure their deformation when the first gasket is pressed into the second gasket. In a preferred embodiment of the invention the first and second gaskets both have outer portions and those outer portions comprise flaps formed of the same material, and unitary with, the body of the gaskets, the flaps being curved slightly inwards to ensure that they deform inwards. In this embodiment the second gasket may be wider than the first gasket such that when the first gasket is pressed into the second gasket the outer portions of the second gasket extend around the outer portions of the first gasket.

[0020] Advantageously, a second gasket is wider than a first gasket such that when the first gasket is pressed into the second gasket the second gasket extends around the first gasket. However, it is also possible that first and second gaskets have substantially the same width or that the first gasket is wider than the second gasket such that when the first gasket is pressed into the second gasket, the first gasket extends around the second gasket.

[0021] The present invention also includes a garage with a single panel door having an apparatus according to the present invention attached thereto.

[0022] Further details and aspects of the present invention will be apparent from the preferred embodiment of the invention shown in the drawings and discussed below.

Drawings

[0023]

Figure 1 is a schematic drawing of a garage door having a first interlocking gasket of a preferred embodiment of the present invention attached thereto; Figure 2 is a schematic cross-section through line A-A of the garage door of Figure 1 and a garage floor having a supporting member, vehicle supporting ramp and second interlocking gasket of the preferred embodiment of the invention mounted thereon; Figure 3 is a schematic cross-section through line B-B of the garage door of Figure 1 and a sidewall of a garage having a supporting member and second interlocking gasket of the preferred embodiment of the invention mounted thereto; and Figure 4 is a schematic cross-section of the first and second interlocking gaskets of the preferred embodiment of the present invention when the first interlocking gasket is pressed into the second interlocking gasket.

[0024] Figure 1 is a schematic of a garage door 1 having a first interlocking gasket 2 of a preferred embodiment of the apparatus of the present invention attached thereto. The first interlocking gasket 2 is mounted to an inner side of the garage door 1. Specifically, the first interlocking gasket 2 is mounted along a lower side of the garage door 1 and along a lower portion of the sides of the garage door. The upper end of the lower portion of the garage door 1 is approximately 600mm from the lower edge of the garage door.

[0025] Figure 2 is a schematic cross-section through line A-A of the garage door 1 of Figure 1 and a garage floor 3 having a supporting member 4, vehicle supporting ramp 5 and second interlocking gasket 6 of the preferred embodiment of the invention mounted thereon. The garage door 1 is shown in a position where it is slightly ajar (i.e. the garage door has been opened a small distance) such that the first interlocking gasket 2 is positioned a

small distance from the second interlocking gasket 6. When the garage door 1 is in the closed position the first interlocking gasket 2 is pressed into second interlocking gasket 6, as shown in Figure 4.

[0026] The vehicle supporting ramp 5 is formed of concrete and has a maximum height of approximately 50mm. The supporting member 4 is formed of z-section steel. A first outer plane 4a is mounted to the garage floor 3 by means of a plurality of mounting bolts 8 that extend through the first outer plane 4a and into the garage floor. The second interlocking gasket 6 is mounted in a substantially vertical position on a central plane 4b of the supporting member 4. The central plane 4 is positioned immediately adjacent a vertical face of the vehicle supporting ramp 5 such that the vehicle supporting ramp can prevent deformation of the supporting member. A second outer plane 4c of the supporting member 4 extends in a plane that is substantially parallel to the first outer plane 4a but extends in the opposite direction such that it extends over an upper end of the second interlocking gasket 6. In this manner the second outer plane 4c protects the upper end of the second interlocking gasket 6 from deformation, such as that which might be caused by a vehicle entering a garage and driving over the supporting member 4 and vehicle supporting ramp 5.

[0027] Figure 3 is a schematic cross-section through line B-B of the garage door 1 of Figure 1 and a sidewall 7 of a garage having a supporting member 4 and second interlocking gasket 6 of the preferred embodiment of the invention mounted thereto. As in Figure 2, the garage door 1 is shown a position where it is slightly ajar (i.e. the garage door has been opened a small distance) such that the first interlocking gasket 2 is positioned a small distance from the second interlocking gasket 6.

[0028] The supporting member 4 is formed and mounted in substantially the same manner along the sidewall 7 of the garage as it is along the garage floor 3 with the exception that there is no vehicle supporting ramp 5 on the sidewall 7 of the garage. There is no need for the supporting member 4 to be protected by a vehicle supporting ramp 5 on the sidewall 7 of the garage as no vehicle will ever (intentionally) impact this portion of the apparatus of the present invention. The only force that will be applied to the portion of the apparatus mounted on the sidewall 7 of the garage is the force applied by closing the garage door 1 such that the first interlocking gasket 2 is pressed into the second interlocking gasket 6, the supporting member 4 is strong enough to resist deformation as a result of this force.

[0029] As can be seen most clearly in Figure 4, the first interlocking gasket 2 has three central interlocking portions 9 and two flexible outwardly extending outer portions 10. The second interlocking gasket 6 has cooperatively formed central interlocking portions 11 and also has two flexible outwardly extending outer portions 12. The central interlocking portions 9, 11 are cooperatively formed such that when the first interlocking gasket 2 is pressed into the second interlocking gasket 6 the inter-

locking portions are pushed into one another in the manner shown in Figure 4. The first and second interlocking gaskets 2, 6 are formed of a resilient elastic material, such as rubber or a synthetic alternative. As a result, the first and second interlocking gaskets 2, 6 slightly deform when they are pressed into one another. This results in a plurality of watertight seals being formed where the interlocking portions 9, 11 are in contact with one another. Having a plurality of watertight seals provides better flood-proofing than would be provided by a single watertight seal, as might be provided by a single gasket mounted around the garage door 1 in alternative apparatus for flood-proofing a garage. It is to be understood that the shape of the interlocking portions 2, 6 shown in the Figures is merely an exemplary embodiment. The interlocking portions 2, 6 may have any shape that allows a plurality of watertight seals to be formed when the garage door 1 is closed and the first interlocking gasket 2 is pressed into the second interlocking gasket 6 and that does not hinder the normal opening and closing of the garage door 1.

[0030] The flexible outer portions 10, 12 of the first interlocking gasket 2 and the second interlocking gasket 6 improve the sealing between the gaskets. In particular, as can be seen best in Figures 2 and 3, the flexible outer portions 10, 12 extend outwards from each gasket 2, 6 further than the interlocking portions 9, 11 of the gaskets. Furthermore, the first interlocking gasket 2 is narrower than the second interlocking gasket 6. This results in the flexible outer portion 10 of the first interlocking gasket 2 being deformed inwards by the second interlocking gasket 6 when the first interlocking gasket 2 is pressed into the second interlocking gasket 6. The flexible outer portion 10 is deformed inwards until it impinges upon an interlocking portion 11 of the second interlocking gasket 6. This acts to provide a further waterproof seal between the first interlocking gasket 2 and the second interlocking gasket 6. When the first interlocking gasket 2 and the second interlocking gasket 6 are pressed together the outer portion 12 of the second interlocking gasket 6 extends around outer sides of the first interlocking gasket 2 in the manner shown in Figure 4.

[0031] The apparatus of the present invention ensures that a lower portion of the garage door 1 is automatically sealed when the door is closed. In particular, closing the garage door 1 presses the first interlocking gasket 2 into the second interlocking gasket 6 thereby providing a plurality of watertight seals around the lower portion of the garage door 1. The presence of the apparatus does not otherwise affect the normal operation and use of the garage. The garage door 1 can still be easily opened and closed in a conventional manner. Furthermore, as the height of the vehicle supporting ramp 5 and supporting member 4 is only 50mm, vehicles can still easily enter and leave the garage.

Claims

1. Apparatus for flood-proofing a garage with an up and over single panel garage door (1), the apparatus comprising:

a first sealing member (2) for mounting on an inner surface of the garage door (1), around a periphery of a lower portion of said inner surface; a second sealing member (6); and mounting means (4) for mounting the second sealing member (6) around the garage in a co-operative position to the first sealing member (2), the mounting means (4) comprising a supporting member for mounting in a cooperative position to the first sealing member (2) on an upper surface of a floor (3) of the garage and an inner surface of a lower portion of the side walls (7) of the garage; wherein:

when the first sealing member (2) is mounted to a garage door (1) and the second sealing member (6) is mounted in a cooperative position around the garage closing the garage door (1) forms a waterproof seal between the first sealing member (2) and the second sealing member (6).

2. Apparatus according to claim 1, wherein the second sealing member (6) is mounted on an outer side of the supporting member (4) such that closing the garage door (1) presses the first sealing member (2) against the second sealing member (6).
3. Apparatus according to claim 2, wherein the first sealing member (2) is a first interlocking gasket, the second sealing member (6) is a second interlocking gasket and the first and second interlocking gaskets (2, 6) have cooperatively interlocking portions (9, 11) formed such that when the first gasket (2) is pressed against the second gasket (6) the interlocking portions (9, 11) interlock with one another to form a plurality of watertight seals.
4. Apparatus according to claim 3, wherein the first and second gaskets (2, 6) have at least 3 interlocking portions (9, 11).
5. An apparatus according to claim 3 or claim 4, wherein at least one of the first gasket (2) and the second gasket (6) comprises flexible outwardly extending outer portions (10, 12) that are formed outside the interlocking portions (9, 11) such that when the first gasket (2) is pressed against the second gasket (6) said outer portions (10, 12) of a first or second gasket (2, 6) deform inwards against an outer side of either an interlocking portion (9, 11) or an outer portion (10, 12) of the other of the first or second gasket (2, 6).

6. An apparatus according to claim 5, wherein both the first and second gaskets (2, 6) comprise outer portions (10, 12).

7. An apparatus according to claim 6, wherein the second gasket (6) is wider than the first gasket (2) such that when the first gasket (2) is pressed into the second gasket (6) the outer portions (12) of the second gasket (6) extend around the outer portions (10) of the first gasket (2).

8. An apparatus according to any of claims 3 to 6, wherein the second gasket (6) is wider than the first gasket (2) such that when the first gasket (2) is pressed into the second gasket (6) the second gasket (6) extends around the first gasket (2).

9. Apparatus according to any of claims 1 to 8, wherein the supporting member (4) is formed of z-section and wherein:

a first outer plane (4a) of the z-section is mountable to the side walls (7) and floor (3) of the garage, the second sealing member (6) is mounted on a central plane (4b) of the z-section and a second outer plane (4c) of the z-section extends along an inner side of the second sealing member (6).

10. Apparatus according to any of claims 1 to 9, wherein the support member (4) is formed of metal.

11. Apparatus according to any of claims 1 to 10, wherein the supporting member (4) when mounted to the floor (3) and side walls (7) of a garage extends upwards from the floor (3) and inwards from the side walls (7) by a distance of 50mm or less.

12. Apparatus according to any preceding claim, further comprising a vehicle supporting ramp (5) for mounting on an inner side of a portion of the supporting member (4) that is for mounting along the upper surface of the floor (3) of the garage.

13. Apparatus according to claim 12, wherein the vehicle supporting ramp (5) has a height of 50mm or less.

14. An apparatus according to any preceding claim, wherein the lower portion of the garage door (1) and the lower portion of the side walls (7) of the garage extends no more than 700mm above the floor (3) of the garage.

15. A garage with a single panel door (1) having an apparatus according to any preceding claim mounted thereto.

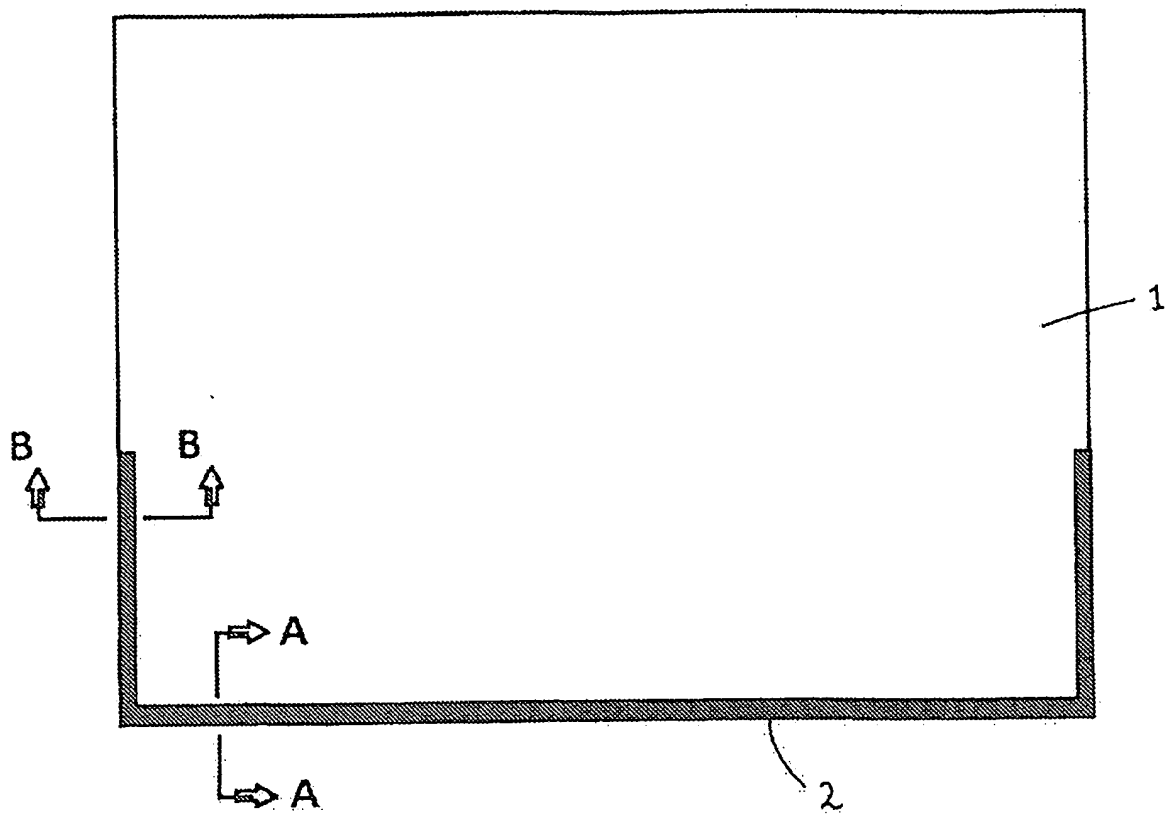


Figure 1

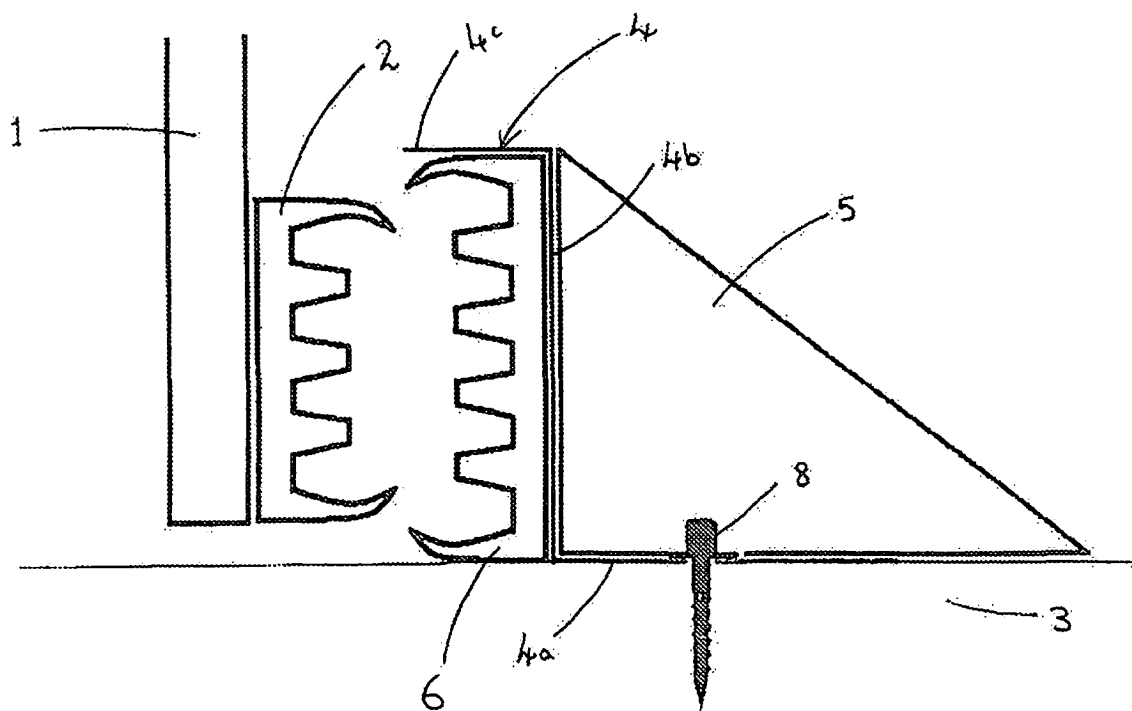


Figure 2

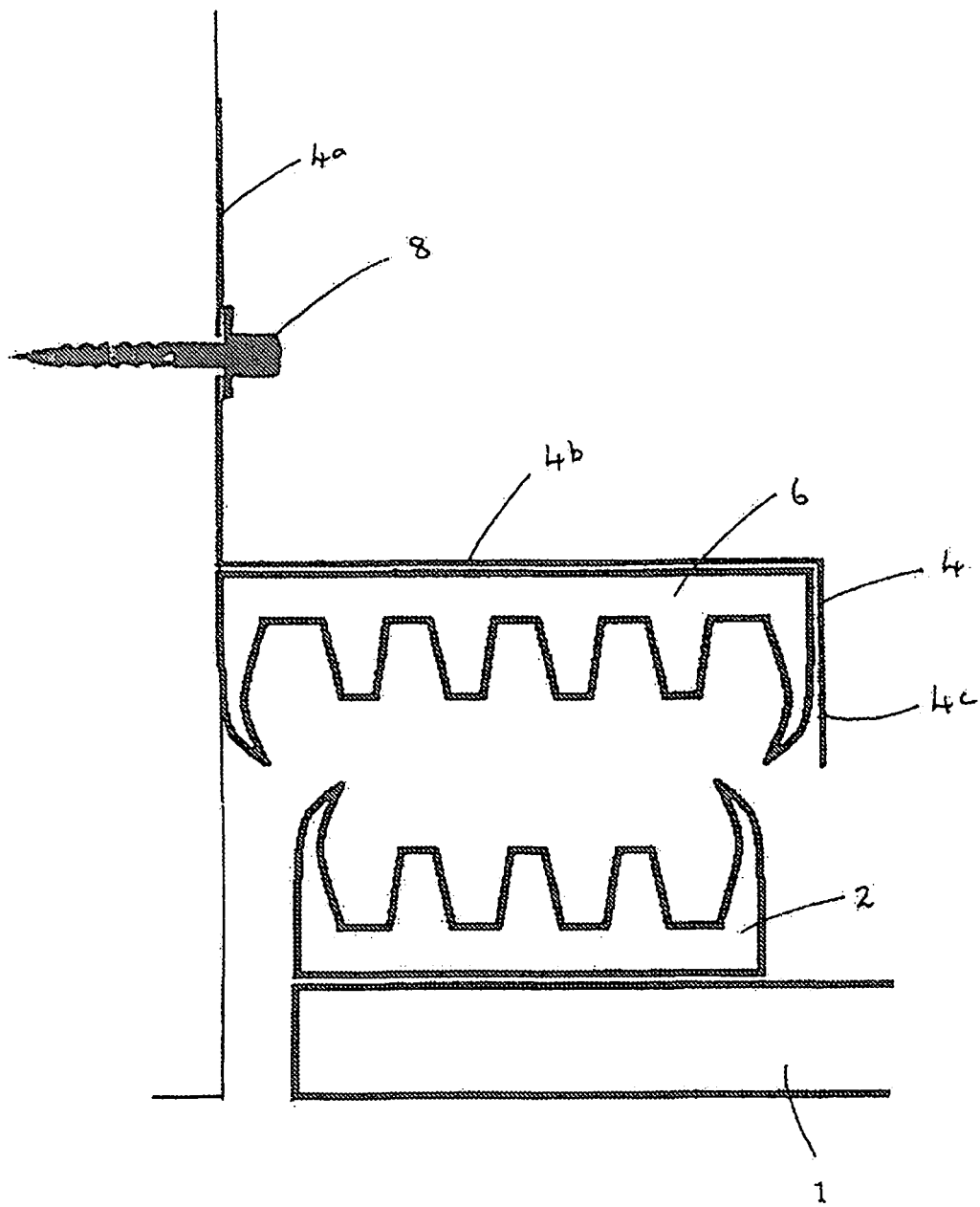


Figure 3

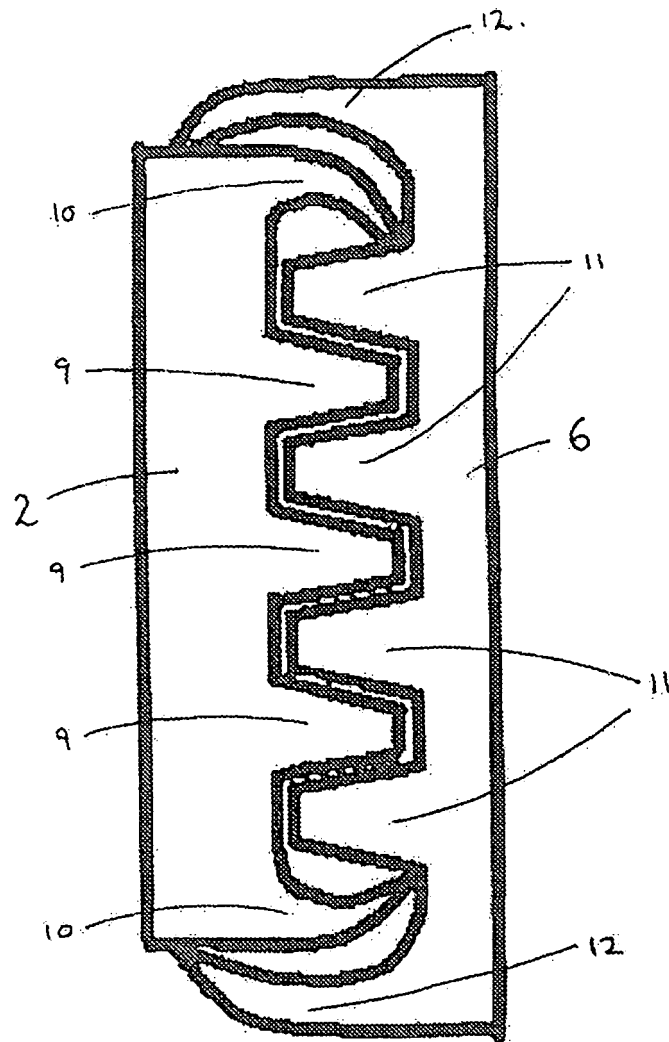


Figure 4



EUROPEAN SEARCH REPORT

Application Number
EP 12 00 4510

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 6 061 967 A (JUDDS RAYMOND E [US]) 16 May 2000 (2000-05-16) * column 3, line 52 - column 4, line 32; figures 1, 3-6 *	1-3,8, 10-13,15	INV. E06B7/23 E06B3/70
X	EP 0 318 130 A1 (SLATER JAMES T [US]; MCCONNELL MICHAEL J [US]) 31 May 1989 (1989-05-31) * column 3, line 14 - column 4, line 20; claim 1; figures 1, 2 *	1,12,13, 15	
X	EP 1 559 863 A2 (BALLAN S P A [IT]) 3 August 2005 (2005-08-03) * paragraphs [0044], [0067] - [0073]; claim 1; figures 1, 2, 3, 9, 10, 12-19 *	1,15	
X	GB 2 216 162 A (MILNER JOHN MICHAEL) 4 October 1989 (1989-10-04) * page 6, paragraph 2; figures 1, 2, 10, 13 *	1,15	
A	US 2006/283087 A1 (BAXTER STEPHEN M [US] BAXTER STEPHEN MARSHALL [US]) 21 December 2006 (2006-12-21) * paragraphs [0037] - [0039]; figure 1 *	1-15	TECHNICAL FIELDS SEARCHED (IPC) E06B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 17 May 2013	Examiner Weißbach, Mark
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

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EPO FORM 1503 03/82 (P04C01)

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

EP 12 00 4510

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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17-05-2013

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