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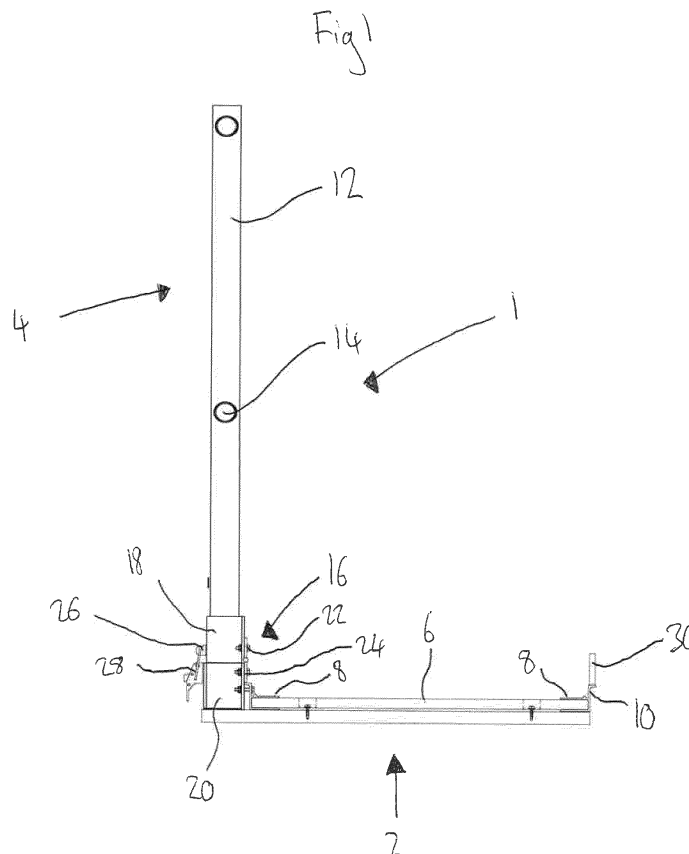
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(54) **WALKWAY SYSTEM**

(57) A walkway (1) system for installation on a roof comprising a tread (2) for a user to walk upon; a handrail (4), wherein the handrail (4) is connected to the walkway (1) by one or more hinges (16), and wherein the handrail

(4) is operable to rotate between two pre-determined limits; and a mounting means, wherein the mounting means is operable to form a connection with at least a portion of a roof.



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Description

[0001] This invention relates to walkways for installation on roofs, and to a combination of such a walkway with a fall restraint system, particularly wherein the fall restraint system comprises a handrail.

[0002] It is known to provide walkways on roofs of commercial buildings in particular. However, in order to prevent the users of such walkways - typically maintenance operatives maintaining roof-mounted equipment, rain-water drainage systems and the like - from falling from the roof, it is generally desired to provide some means for ameliorating the risk of falls.

[0003] One option is to provide a physical barrier at the edge of the roof or along the edge of a walkway. Such barrier systems can be bulky, costly and time consuming to install.

[0004] Use of temporary physical barriers often requires separate handrail systems to be detachably attached to a walkway or the like. Adapting and connecting such handrail systems to walkways requires additional components and fixating means, all of which add weight, time and cost to the installation process and finished system.

[0005] Walkways are often provided with fixings for allowing a detachable connection with a roof. Such detachable connection means will often not provide as robust and/or durable connection as a permanent connection means.

[0006] Detachable systems usually require non-permanent fixation means and so often require bulky and costly additional components.

[0007] It is therefore an aim of the present invention to overcome, or at least mitigate, some of the above mentioned drawbacks.

Summary of the Invention

[0008] According to a first aspect of the invention, there is provided a walkway system for installation on a roof comprising a tread for a user to walk upon; a handrail, wherein the handrail is connected to the walkway by one or more hinges, and wherein the handrail is operable to rotate between two pre-determined limits; and a mounting means, wherein the mounting means is operable to form a connection with at least a portion of a roof.

[0009] As such, by having the handrail for the fall restraint system incorporated in the walkway, it is no longer necessary to provide a separate handrail for such a system, and so it is only necessary to fix a single system to the roof.

[0010] The handrail may comprise vertical supporting members and horizontal handrail members. The supporting members may comprise elongate box sections and the handrail members may comprise elongate tubular sections. The tubular handrail members may be affixed to the support members.

[0011] The handrail may comprise a plurality of hand-

rail sections. Each handrail section may comprise two or more support members and at least one tubular handrail member. Each handrail section may comprise at least two horizontal handrail members, wherein each horizontal member is connected to one or further handrail members by at least one vertical joining member.

[0012] The walkway may comprise a plurality of sections. Each section may be operable to connect to adjacent section. Each section may be substantially the same length or a different length. Each section may comprise a substantially linear or a curved configuration. Providing a walkways comprising of a plurality of systems allows a user to easily install a walkway of a desired length.

[0013] A first pre-determined limit may be dictated by the one or more hinges and a second pre-determined limit may be dictated by the tread. The one or more hinges may be configured to prevent the handrail rotating away from the tread past a first pre-determined limit. The first pre-determined limit may comprise a substantially vertical orientation of the handrail. The one or more hinges may allow the handrail to rotate freely from the first pre-determined limit towards the tread. The handrail may be configured such that the second pre-determined limit comprises a substantially horizontal orientation of the handrail.

[0014] The handrail may be connected to the tread by a substantially permanent means. A first part of the one or more hinges may be connected to the handrail by a substantially permanent means, and a second part of the hinges means may be connected to the tread, or a member permanently connected to the tread, by a substantially permanent means. The one or more hinges may be affixed to the handrail and/or the tread by any suitable means such as rivets, bolts, welding, adhesive or screws.

[0015] A post socket may be used to connect the handrail to the tread. A post socket may be disposed above a socket base. The socket base may be welded near to or at a lateral edge of the tread. The post socket and socket base may be connected by a hinge. The hinge may comprise two leaves, wherein a first leaf is connected to the post socket and a second leaf is connected to the socket base. The hinge knuckle and pin may be substantially aligned along a plane where the post socket and socket base abut.

[0016] The post sockets may be configured such that a portion of a vertical support member of the handrail may be received. The support members may be detachably or permanently connected with the post socket. In embodiments where a detachable connection is provided between the support members and the post socket, an advantage may be the ability to easily replace sections of handrail in the event of damage, wear and tear or up-graded handrail sections. Detachable connection means may comprise any suitable means such as screws, nuts and bolts or the like. Permanent connections means may comprise welding, rivets or the like.

[0017] The tread may be substantially elongate between first and second points along a first direction, and

then elongate along a second direction different to the first direction between second and third points. The tread may be substantially linear.

[0018] The one or more hinges may be disposed near to or at a first lateral edge of the tread. The tread may comprise a second lateral edge opposing the first lateral edge. The tread may comprise a plurality of slats, wherein the slats extend from the first lateral edge to the second lateral edge.

[0019] The one or more hinges may be configured such that the handrail can only rotate about a single axis. The single axis may be substantially parallel to the longitudinal axis of the tread.

[0020] The handrail may be operable to fold in towards the tread. The handrail may be operable to fold in towards and abut a portion of the tread near to or at a second lateral edge, wherein the second lateral edge opposes the first lateral edge. In this way, the second lateral edge of the tread may provide the second pre-determined limit.

[0021] The one or more hinges may comprise a first retaining means operable to non-permanently affix the handrail in a substantially vertical orientation. The first retaining means may comprise a cooperating retaining pin and a latch. The latch may be operable to extend over the retaining pin when the handrail is in a vertical orientation. The latch may be operable to be secured over the retaining pin such that the handrail is prevented from rotating back towards the tread. The latch may comprise a lever mechanism in order to secure it over the retaining pin. Any suitable retaining means may be used to detachably secure the handrail in an upright configuration.

[0022] The walkway may comprise one or more second retaining means disposed near to or at the second lateral edge. The second retaining means may comprise a latch, or the like.

[0023] The one or more second retaining means disposed near to or at the second lateral edge may be operable to form a detachable connection with the handrail. The second retaining means may be operable to move between a connection position and a release position. In the connection position, the second retaining means may be operable to prevent the handrail from rotating away from the tread. The second retaining means may comprise a biasing means configured to bias the second retaining means towards the connection position. The second retaining means may be operable to be moved to the release position by hand, or any other suitable means.

[0024] When the handrail is connected to the retaining means, the walkway may be in a configuration suitable for storage or transportation. The retaining means may allow the handrail to be folded down and secured in place in certain conditions, such as during high winds.

[0025] The walkway may comprise a mounting means. The mounting means may be operable to form a connection with at least a portion of a roof. The mounting means may be operable to form a connection with a top surface of a roof, such as a slanted roof, a flat roof, or any other suitable type of roof. The mounting means may be oper-

able to form a detachable or permanent connection with a roof. The walkway may comprise a plurality of mounting means disposed at regular, or irregular, intervals along a substantial length of the walkway.

[0026] The mounting means may be disposed beneath the tread. The mounting means may be affixed to the tread by any suitable means. The connection between the mounting means and the tread may be substantially permanent. The mounting means may comprise a first end and a second end, wherein the first end is affixed to the tread and the second end is operable to form a connection with a portion of a roof. The walkway may be configured such that when affixed to a roof, the tread is disposed on top of and/or above the surface of the roof.

[0027] The mounting means may be operable to form a connection with a roof by any suitable means such as welding, rivets, nuts and bolts, pins, clips, clamps or an adhesive. The mounting means may be configured to form a connection with different roof materials and structures, and a suitable connection means may be selected based on the roof configuration. The mounting means may comprise a clip, clamp or the like, operable to form a connection with a portion of a roof without further components.

[0028] A substantially permanent connection means between the mounting means and the roof may provide a more robust walkway system, providing more stability for a user. The mounting means may be configured to cooperate with the roof on which the walkway is to be installed without requiring any substantial modifications to the handrail or tread.

[0029] According to a second aspect of the invention, there is provided the walkway of the first aspect of the invention, installed on a roof.

[0030] Providing a walkway according to the invention means less material is used and fewer products need to be bought in order to provide a safe walkway on a roof. Only the mountings required to mount the walkway to the roof are required; there is no need for a separate set of mountings for the handrail.

[0031] There now follows, by way of example only, description of an embodiment of the invention described with reference to the accompanying drawings, in which:

Figure 1 shows a transverse cross section through a walkway in accordance with an embodiment of the invention;

Figure 2 shows a transverse cross section through the walkway of Figure 1 wherein the handrail is in a different configuration;

Figure 3 shows a transverse cross section through section A of the walkway of Figure 1;

Figure 4 shows a side elevation of the walkway of Figure 1;

Figure 5 shows a perspective view of the walkway in accordance with an embodiment of the invention; and

Figure 5 shows a perspective view of the walkway in accordance with a further embodiment of the invention.

[0032] The accompanying drawings show a walkway 1 that can be permanently installed on a roof, where it is desired to reduce the likelihood of a user of the walkway falling and injuring themselves. The walkway 1 comprises a tread 2 and a plurality of handrail sections 4.

[0033] The tread 2 comprises a plurality of metal (typically extruded aluminium) slats 6. Optionally, the slats 6 are held between a pair of toe guards 8, again typically formed of extruded aluminium. The toe guards 8 run along each lateral edge along the length of the walkway 1 and engage with end regions of slats 6. A vertical portion 10 is provided at both sides of the tread 2, which provides an edge to alert a user that they are approaching the edge of the walkway 1.

[0034] Each handrail section 4 is pivotally connected to the tread 2. Each handrail section 4 may be connected to the tread 2 near to or at any suitable lateral edge region. In the embodiment shown, each handrail section 4 is connected adjacent to and outboard from a toe guard 8.

[0035] Each handrail section 4 comprises two support members 12 and a handrail 14. The handrail 14 is connected to the support members 12, and the support members 12 are connected to the tread 2. The handrail 14 and support members 12 typically comprise extruded aluminium. The support members 12 typically comprise an elongate box section and the handrail 14 typically comprises an elongate tubular section.

[0036] Each handrail section 4 may comprise more than two support members 12 wherein, in use, each support member is arranged substantially vertically. The handrail 14 comprises two substantially horizontal portions spaced apart from each other and connected at each end. A single elongate member may be bent to form the substantially rectangular shape of the handrail 14, or a plurality of elongate members may be affixed to adjacent members and arranged into a rectangular shape.

[0037] In the embodiment shown, a lower portion of the support member 12 is received by a post socket 18. The post socket 18 is disposed above a socket base 20. The socket base 20 comprises a planar top surface such that it may support the base of the post socket 18.

[0038] The socket base 20 is affixed to the tread 2 by a substantially permanent means, such as welding. The support members 12 are affixed to post sockets 18 by any suitable means such as welding, rivets, screws, bolts or the like.

[0039] The post socket 18 and socket base 20 are connected by a hinge 16. The hinge 16 provides a hinged connection between the handrail 4 and the tread 2. The hinge 16 comprises a first leaf 22 and a second leaf 24.

The first leaf 22 is connected to the post socket 18 and the second leaf 24 is connected to the socket base 20. The hinge knuckle and pin are disposed and aligned substantially along the plane wherein the base of the post socket 18 and top surface of the socket base 20 abut. The first leaf 22 and second leaf 24 are affixed to the post socket 18 and socket base 20 by a substantially permanent means typically comprising welding, rivets or nuts and bolts.

[0040] The hinge 16 is disposed substantially at an in-board region of the support member 12 and arranged such that the handrail 4 may rotate in towards the tread. The handrail 4 may rotate so far such that a portion of the handrail 4 abuts a portion of the tread 2. The hinge 16 is arranged such that the handrail 4 may only pivot about a single axis of rotation. Any suitable pivoting or hinged means may be used such that the handrail 4 is operable to fold in towards the tread 2.

[0041] The hinge 16 is non-extensible such that the handrail 4 is prevented from rotating outwards past a pre-determined limit, wherein in the embodiment shown, the handrail 4 is prevented from rotating away from the tread 2 past a vertical orientation. The pre-determined limit may comprise the handrail 4 orientated substantially vertically and/or the handrail 4 being substantially perpendicular to the tread 2.

[0042] A retaining pin 26 and a latch 28 are disposed on an opposing side of the handrail 4 to the hinge 16. In the embodiment shown, the retaining pin 26 is affixed to the post socket 22, and the latch 28 is affixed to the socket base 24. The retaining pin 26 and latch 28 provide a detachable securing means, wherein when connected, the handrail 4 is prevented from pivoting about the hinge 16.

[0043] The retaining pin 26 and latch 28 are arranged such that the latch 28 can extend over the retaining pin 26 when the support member 12 is in a substantially vertical orientation. The latch 28 comprises a levered mechanism such that the latch 28 can be secured tightly over the retaining pin 26, and secures the handrail 4 in a vertical orientation. The levered mechanism also allows a user to detach the latch 28 from the retaining pin 26. The latch 28 may comprise any suitable tightening means operable to secure the connection between the latch 28 and the retaining pin 26.

[0044] The walkway 1 comprises at least one retaining clip 30. The retaining clip 30 is disposed on the lateral edge opposing the handrail 4. The retaining clip 30 is configured such that when the handrail 4 rotates towards and abuts a region of the tread 2, the retaining clip 30 forms a detachable connection with the handrail 4. The retaining clip 30, when connected to the handrail 4, prevents the handrail 4 from rotating or pivoting about the hinge 16.

[0045] The retaining clip 30 comprises a biasing means, typically a spring. The biasing means is configured such that the retaining clip 30 is biased to maintain a connection with the handrail 4 but may easily be dis-

connected by a user.

[0046] Figure 5 and 6 illustrate example means by which the walkway 1 may be mounted or affixed to a roof.

[0047] The walkway 1 comprises mounting means for providing a substantially permanent connection to a roof. In one embodiment, as illustrated in Figure 5, the mounting means 32 comprise a rectangular portion 34 with fixing plates 36, 38 disposed at opposing ends.

[0048] The rectangular portion 34 increases the distance between the surface of the roof and the underside of the tread 2. This reduces the risk of the tread 2 abutting and damaging portions of the roof. In some embodiments the rectangular portion 34 on each mounting means 32 comprises substantially the same length. In other embodiments at least one mounting means 32 comprises a substantially different length to at least one other mounting means 32. Varying lengths of mounting means 32 may allow the tread 2 to remain substantially level across the entire length even when the surface of a roof is uneven.

[0049] A first fixing plate 36 is operable to be affixed to an underside of the tread 2. The first fixing plate 36 may be affixed to one or more slats 3, the toe guard 4 or any other suitable region of the walkway. The first fixing plate 36 is typically affixed to the walkway by screws, bolts, rivets, an adhesive, welding or any other suitable means. In other embodiments, the rectangular portion 34 is directly connected to the tread 2.

[0050] A second fixing plate 38 is disposed at an opposing end of the affixing means 30 to the first fixing plate 36. The second fixing plate 38 is configured such that it is operable to form a substantially permanent connection to a portion of a roof. The second fixing plate 38 is operable to be affixed to a portion of a roof by any suitable means such as, screws, bolts, rivets, adhesive, welding or any other suitable means.

[0051] In some embodiments, as illustrated in Figure 6, seam clips 40 may be used to affix the walkway 1 to a roof. In such embodiments, the seam clips 40 are configured to form a connection with cooperating features of the roof.

[0052] A person skilled in the art will understand that there are many alternative methods of affixing such a walkway 1 to a roof.

Claims

1. A walkway system for installation on a roof comprising:

a tread for a user to walk upon;
a handrail, wherein the handrail is connected to the walkway by one or more hinges, and wherein the handrail is operable to rotate between two pre-determined limits; and
a mounting means, wherein the mounting means is operable to form a connection with at

least a portion of a roof.

2. A walkway system as claimed in any previous claim wherein a first pre-determined limit is dictated by the one or more hinges.
3. A walkway system as claimed in claim 2, wherein the handrail is operable to fold in towards the tread from the first predetermined limit.
4. A walkway system as claimed in any of claims 2 to 4, in which a second pre-determined limit is dictated by the tread.
5. A walkway system as claimed in claim 4, wherein the first pre-determined limit comprises a substantially vertical orientation of the handrail, and the second pre-determined limit comprises a substantially horizontal orientation of the handrail.
6. A walkway system as claimed in any previous claim wherein the one or more hinges are disposed near to or at a first lateral edge of the walkway and the handrail is operable to fold in towards and abut a portion of the tread near to or at a second lateral edge, wherein the second lateral edge opposes the first lateral edge.
7. A walkway system as claimed in claim 6, wherein the walkway comprises one or more retaining means disposed near to or at the second lateral edge operable to form a detachable connection with the handrail.
8. A walkway system as claimed in any previous claim wherein the one or more hinges comprise a retaining means operable to non-permanently affix the handrail in a substantially vertical orientation.
9. A walkway system as claimed in any previous claim wherein the one or more hinges are configured such that the handrail can only rotate about a single axis.
10. A walkway system as claimed in any previous claim wherein the mounting means is operable to form a substantially permanent, or a detachable, connection with a roof.
11. A walkway system as claimed in any previous claim wherein the walkway comprises a plurality of mounting means disposed along a substantial length of the walkway.
12. A walkway system as claimed in claim 11 wherein the plurality of mounting means are disposed at regular, or irregular, intervals along a substantial length of the walkway.

13. A walkway system as claimed in claim 11 or claim 12, wherein each mounting means is operable to form a connection with a top surface of a roof.
14. A walkway system as claimed in any previous claim 5 wherein the walkway is configured such that when affixed to a roof, the tread is disposed on top of and/or above the surface of the roof.
15. A walkway as claimed in any previous claim, installed 10 on a roof.

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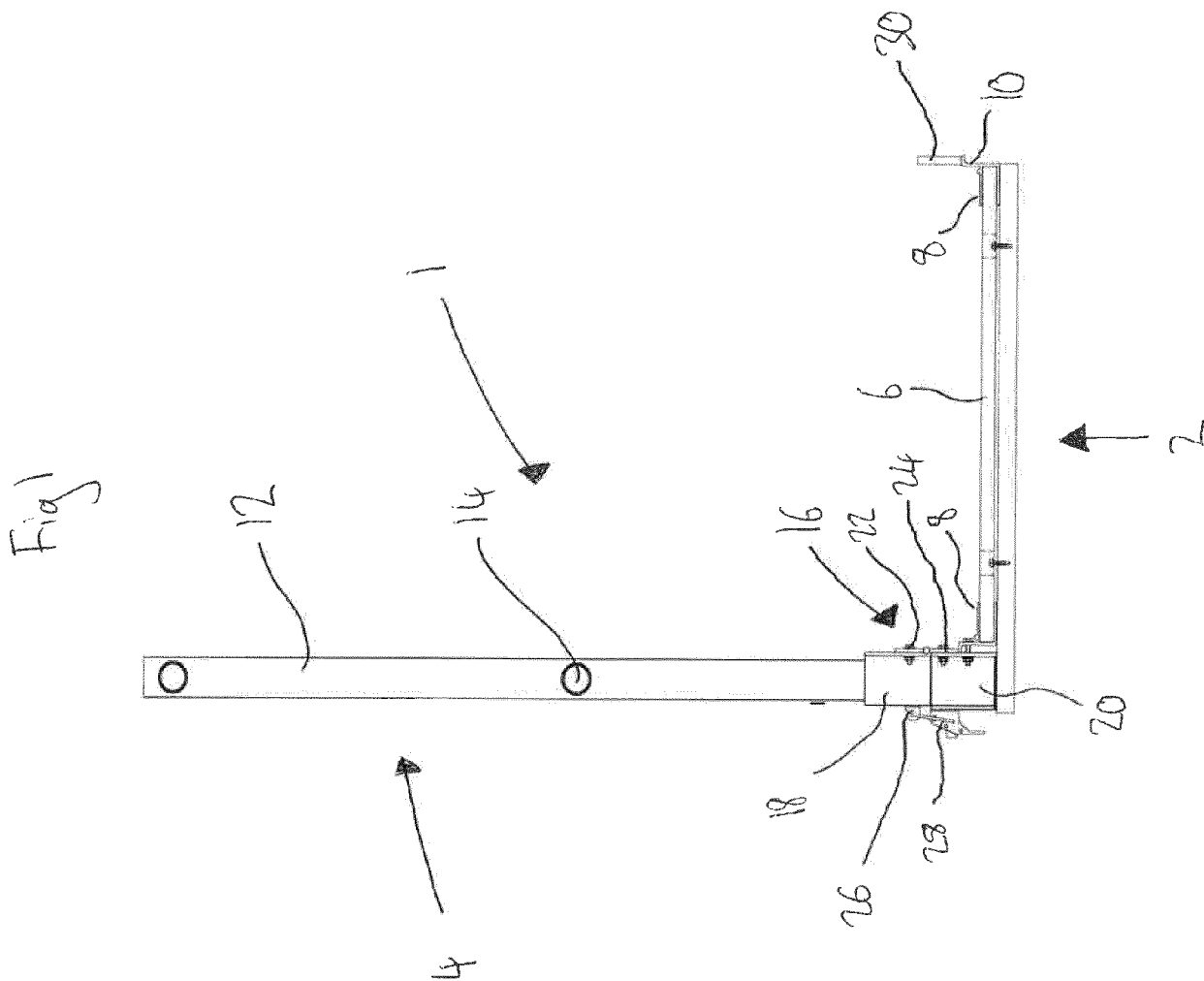
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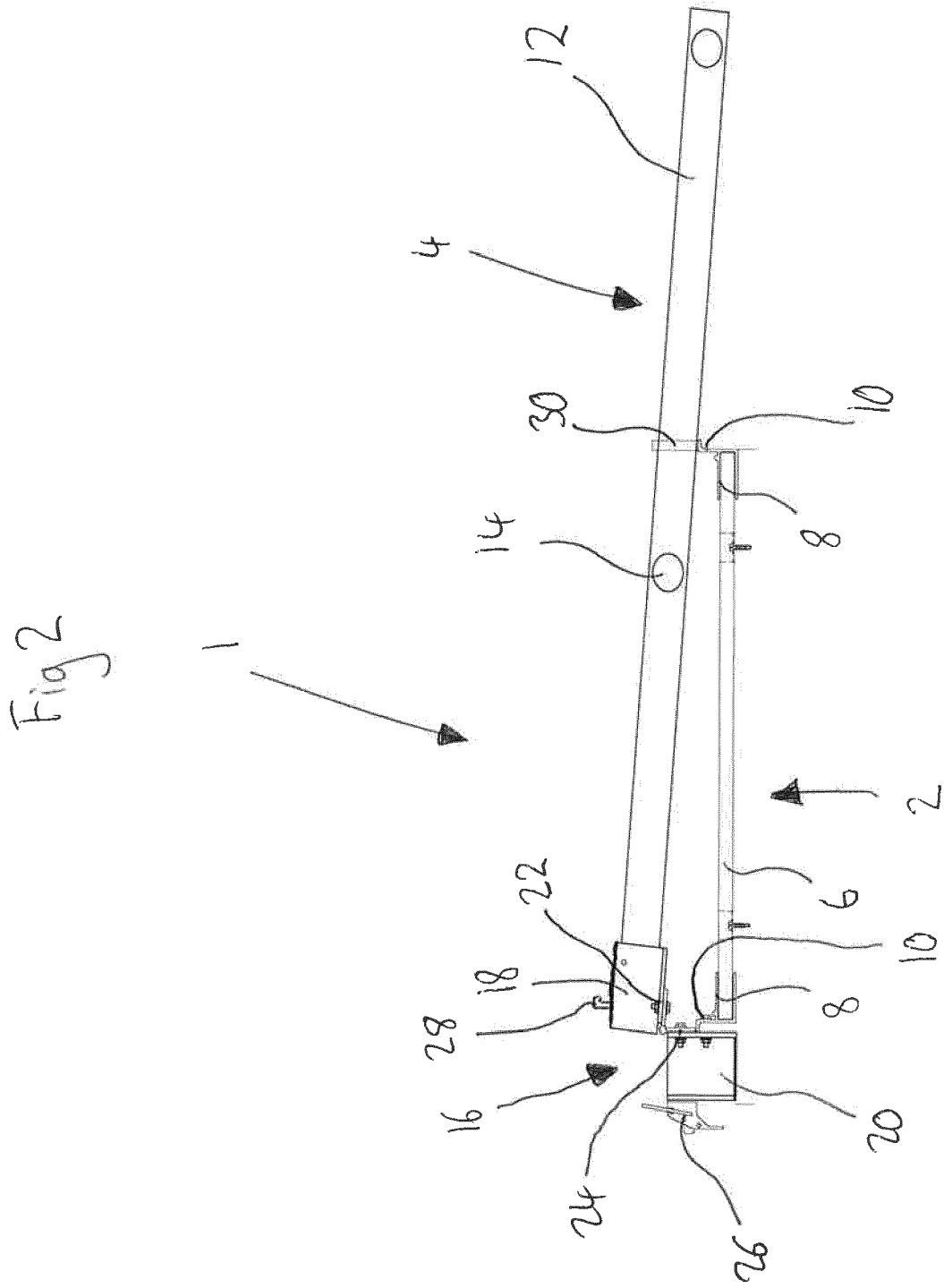
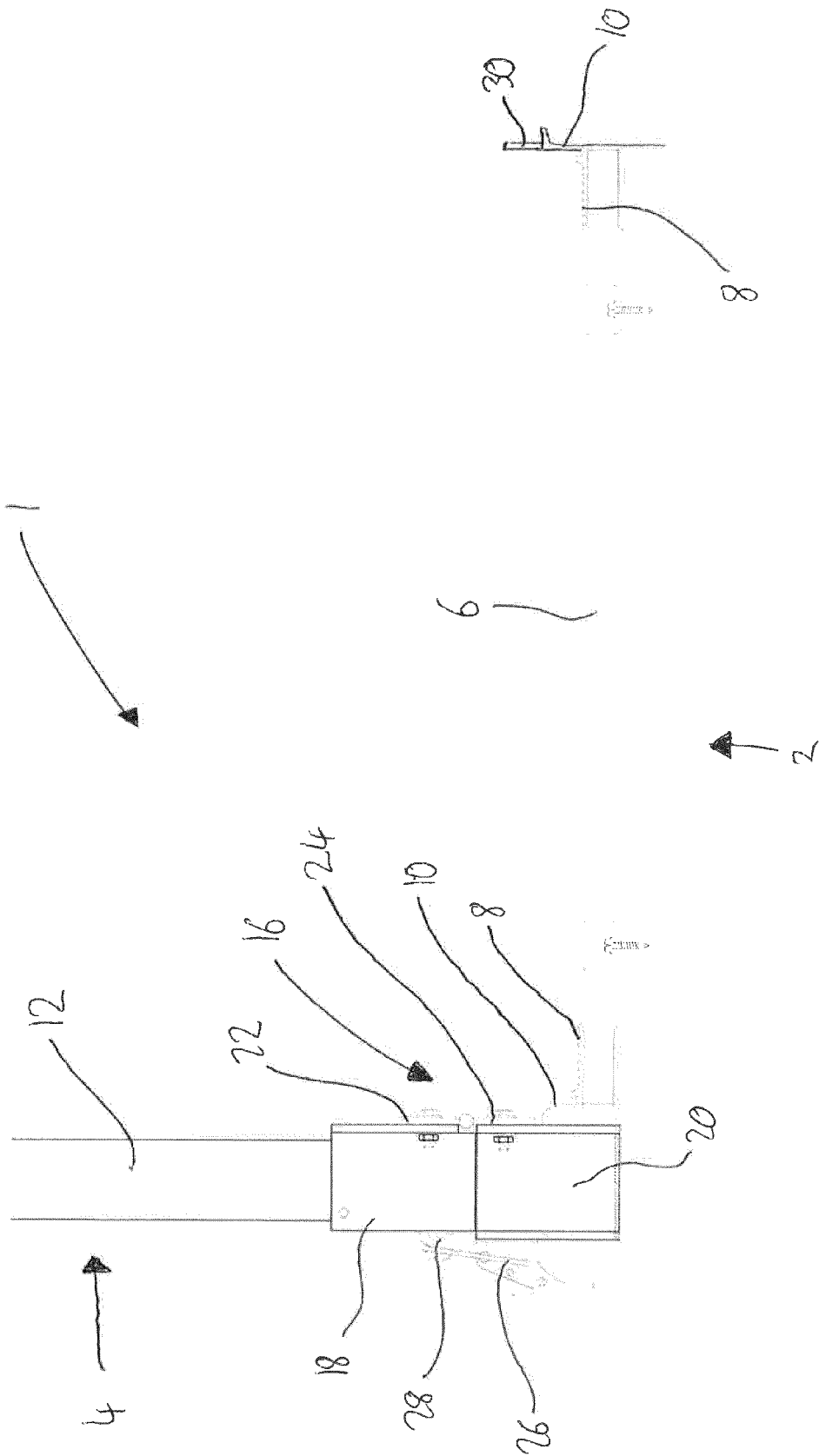


Fig 3



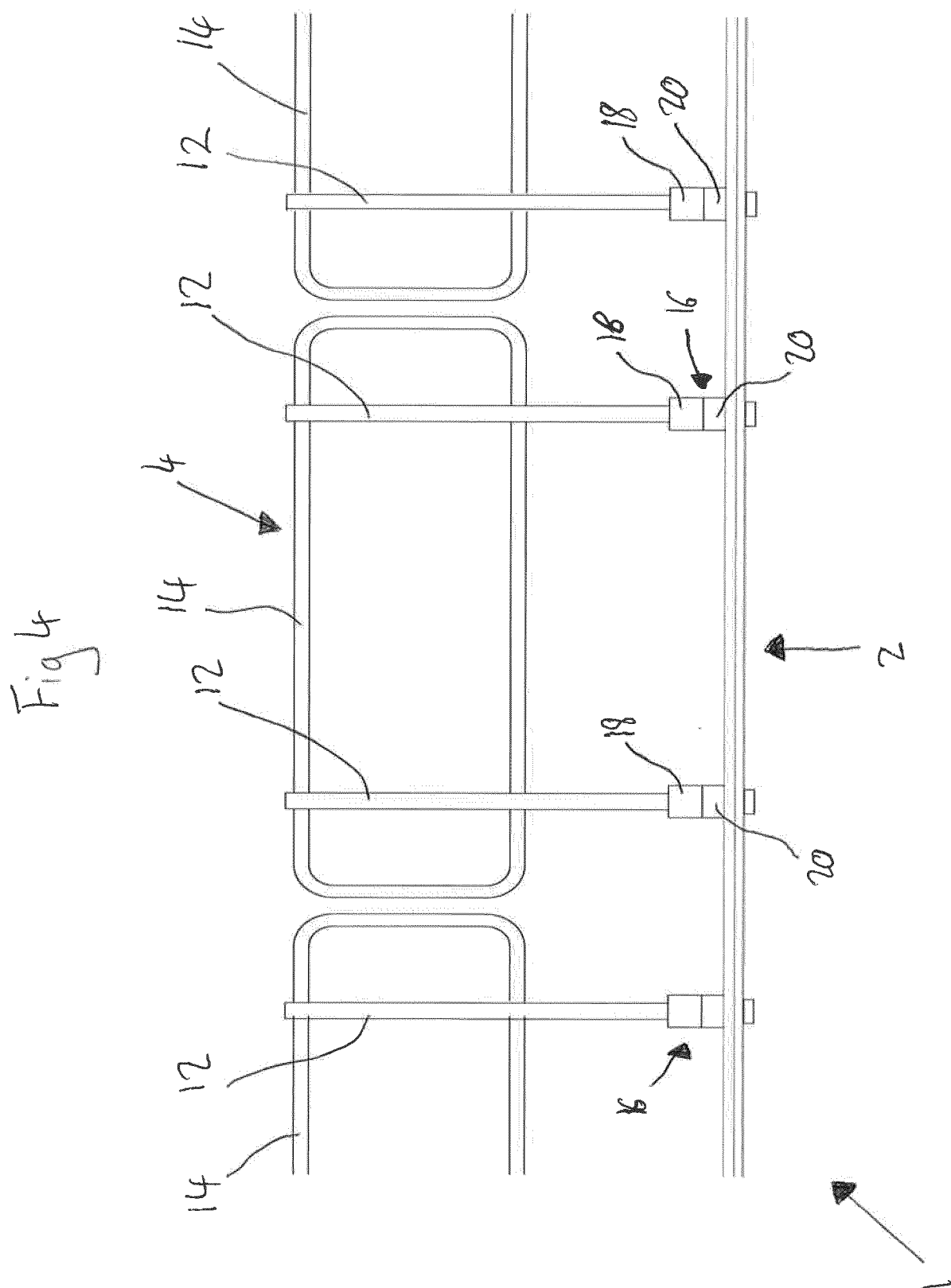
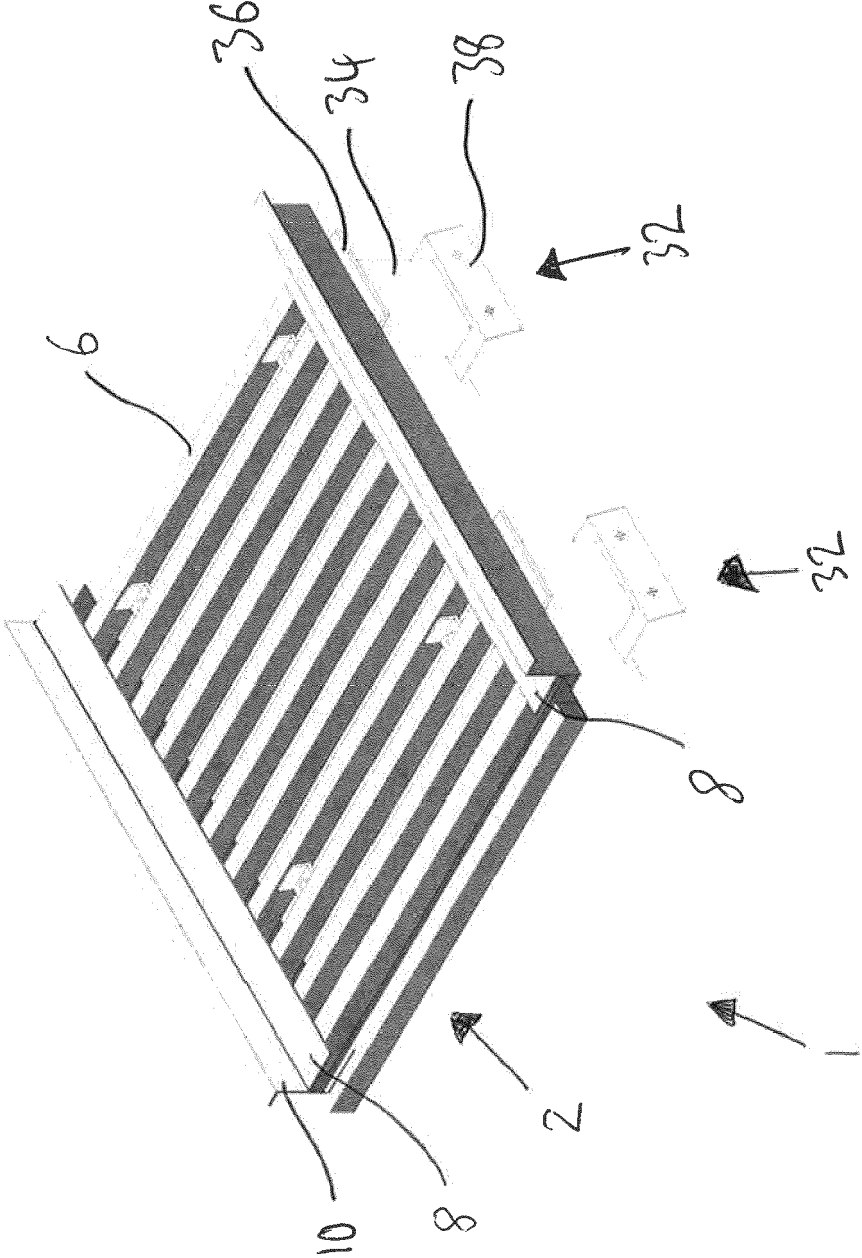
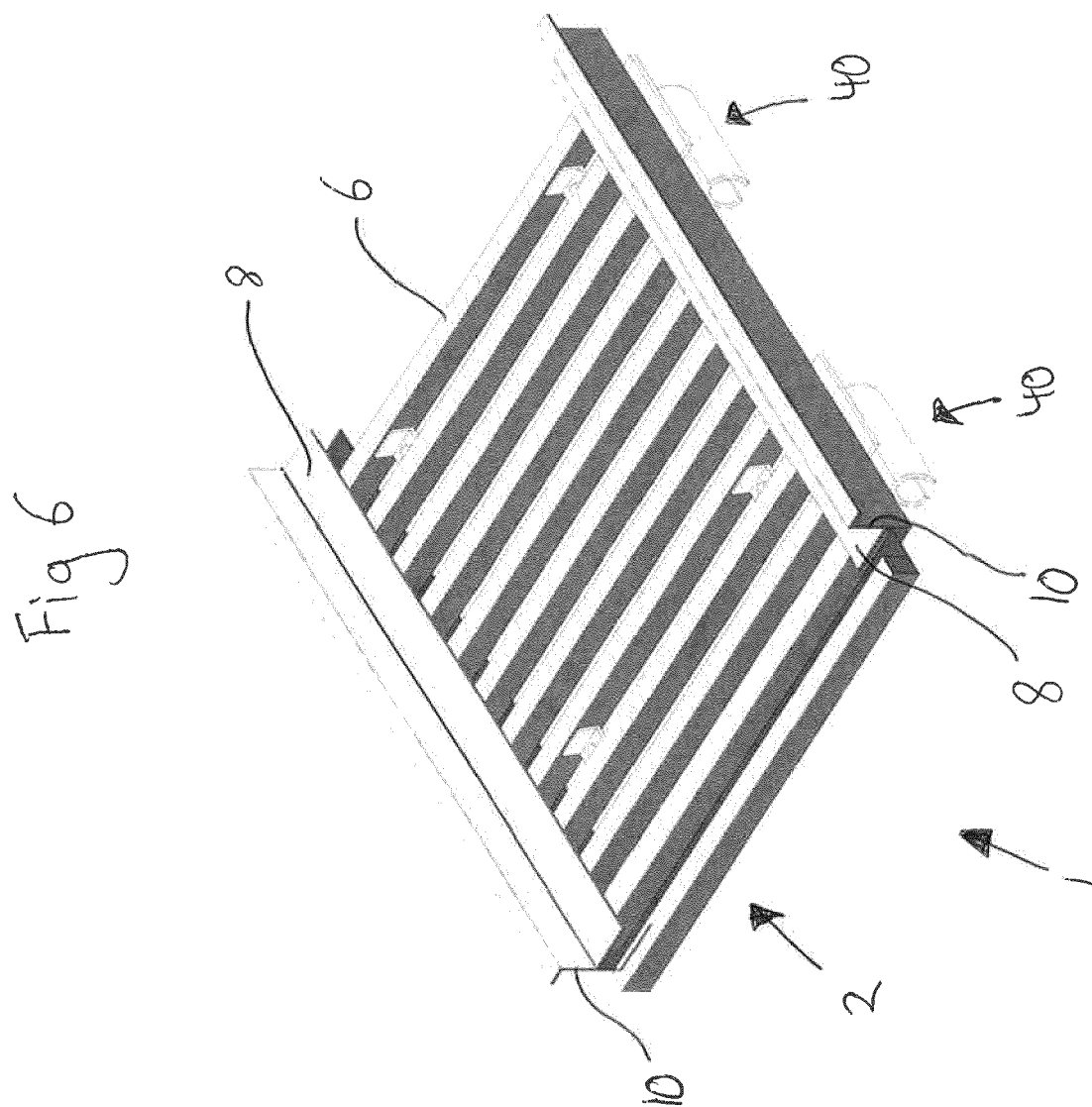


Fig 5







EUROPEAN SEARCH REPORT

Application Number
EP 20 17 5688

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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)
X	GB 2 322 899 A (AUS STRUCT SERVICES PTY LTD [AU]) 9 September 1998 (1998-09-09) * page 4, line 1 - page 5, line 16; figures 1-5 *	1-4,9-15	INV. E04G21/32 E04G3/26 E04G5/04
X	US 2015/008298 A1 (FONTAINE SCOTT [US]) 8 January 2015 (2015-01-08) * paragraphs [0032], [0035]; figure 3 *	1-4,8-15	
X	EP 0 005 667 A1 (GRP ENTR COUVERTURE AMELI [FR]) 28 November 1979 (1979-11-28) * page 4, line 30 - page 5, line 30; figures 1,4,7 *	1-5,8-15 6,7	
X	DE 27 06 140 A1 (BAUER GUENTER) 17 August 1978 (1978-08-17) * figures 1,4 *	1-5,8-15 6,7	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04G E04D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 30 September 2020	Examiner Leroux, Corentine
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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

EP 20 17 5688

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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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30-09-2020

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2322899 A	09-09-1998	NONE	
US 2015008298 A1	08-01-2015	US 2012267594 A1 US 2015008298 A1	25-10-2012 08-01-2015
EP 0005667 A1	28-11-1979	EP 0005667 A1 FR 2426130 A1	28-11-1979 14-12-1979
DE 2706140 A1	17-08-1978	NONE	

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EPO FORM P0459

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