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AU

(71) Applicant: OAKMOORE PTY LTD [AU/AU]; 84 Evans

Road, Salisbury, Queensland 4107 (AU).

(72) Inventors: FOWLER, Shane; c/- Oakmoore Pty Ltd, 84

Evans Road, Salisbury, Queensland 4107 (AU). SCHOLL-

HAMMER, Wolfgang; c/- Oakmoore Pty Ltd, 84 Evans

Road, Salisbury, Queensland 4107 (AU). KETTLETY,

Shaun; c/- Oakmoore Pty Ltd, 84 Evans Road, Salisbury,

Queensland 4107 (AU).

(74) Agent: SPRUSON & FERGUSON; GPO Box 3898, Syd-

ney, New South Wales 2001 (AU).

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(54) Title: SLAT ASSEMBLY

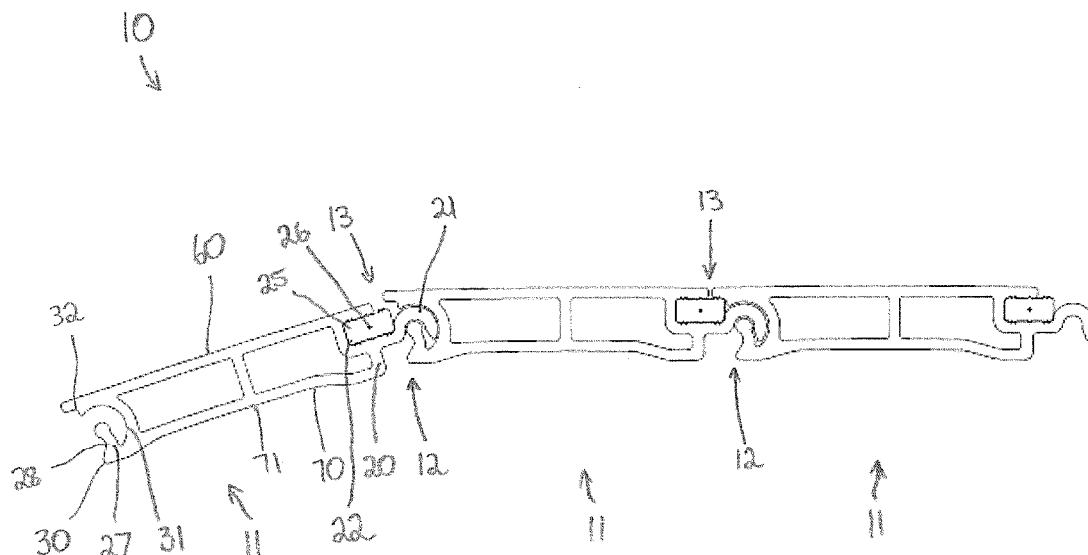


FIG. 6

(57) Abstract: A slat assembly for a roll top cover enables an improved sealing arrangement and reduced frictional forces. The assembly includes: a plurality of successive and interconnected slats, each of the slats comprising opposed and adjoining first and second ends and upper and lower surfaces; and first and second hinge elements disposed at the respective first and second ends of each slat and integral therewith, the first and second hinge elements configured to define a hinge arrangement that facilitates relative pivotal movement between the slats; wherein the slat assembly is operable between extended and retracted positions.

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TITLE
SLAT ASSEMBLY

FIELD OF THE INVENTION

[001] The present invention relates to a slat assembly. In particular, although not exclusively, the invention relates to a slat assembly for inclusion in a roll top cover for operably covering and securing the cargo beds or trays of utility vehicles or pickup trucks.

BACKGROUND TO THE INVENTION

[002] Numerous types of truck bed covers are commonly used over the utility or cargo bed portion of a ute or pickup truck to secure and protect the bed including cargo items disposed therein. In particular, roll top covers generally include a motorized or mechanical drive system for operably covering and uncovering the top of an open cargo bed, truck box or the like by way of an extendable and retractable slat assembly.

[003] Prior art roll top covers can suffer from a number of drawbacks. By way of example, such roll top covers may not be fully weather resistant and/or impervious to moisture and dust. Additionally, the frictional forces that are produced between individual slats during operation (i.e., opening and/or closing) of the roll top cover can be significant so as to make closing and/or opening difficult for a user.

[004] Accordingly, an improved roll cover that overcomes one or more of the above disadvantages is required.

OBJECT OF THE INVENTION

[005] It is an object of the present invention to overcome and/or alleviate one or more of the disadvantages of the prior art or provide the consumer with a useful or commercial choice.

SUMMARY OF THE INVENTION

[006] In one aspect, although not necessarily the only aspect or the broadest aspect, the invention resides in a slat assembly for a roll top cover comprising:

a plurality of successive and interconnected slats, each of the slats comprising opposed and adjoining first and second ends and upper and lower surfaces;

first and second hinge elements disposed at the respective first and second ends of each slat and integral therewith, the first and second hinge elements configured to define a hinge arrangement that facilitates relative pivotal movement between the slats;

wherein the slat assembly is operable between extended and retracted positions.

[007] Suitably, the slat assembly further comprises a sealing member disposed within the first end of each of the slats and configured for underlying a junction defined by the respective first and second ends of the slats adjacent thereto. Preferably, the first end of each of the slats comprises a channel disposed between the upper surface and the first hinge element, the channel configured for receiving and securing the sealing member therein.

[008] In particular embodiments, the second end of each of the slats comprises a step portion configured to contact and abut an upper end portion of the sealing member of the slat adjacent thereto.

[009] In certain embodiments, the sealing member comprises one or a plurality of resiliently deformable ridges disposed thereon.

[0010] Suitably, the first or second hinge element comprises an arcuate hook portion extending outwardly from the respective first or second end of the slats. In regard to such embodiments, the first or second hinge element preferably comprises a reciprocal arcuate channel for slidably and pivotably receiving the hook portion therein.

[0011] In one embodiment, the slat assembly further comprises a stop element for limiting relative pivotal movement of the hook portion in a clockwise and/or anti-clockwise direction within the arcuate channel. Suitably, the stop element extends upwardly from the lower surface of the slat and at

least in part defines the arcuate channel. In this manner, the stop element preferably abuts a portion of the hook portion when the slat assembly is in the extended and/or retracted positions.

[0012] In a second aspect, the invention resides in a roll top cover for operably covering the cargo bed of a vehicle, wherein the roll top cover comprises the slat assembly of the aforementioned aspect.

[0013] Further features of the invention will become apparent from the detailed description below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] To assist in understanding the invention and to enable a person skilled in the art to put the invention into practical effect, preferred embodiments of the invention will be described by way of example only with reference to the accompanying drawings, in which:

FIG. 1 is a top-down perspective view of an embodiment of a slat assembly of the present invention included within a roll top cover suitably installed on a vehicle;

FIG. 2 illustrates a perspective view of the slat assembly of Figure 1 as part of the roll top cover prior to installation on a vehicle; and

FIG. 3 is a side view of an individual slat of the slat assembly of Figure 1;

FIG. 4 illustrates a top-down perspective view of an individual slat of the slat assembly of Figure 1;

FIG. 5 illustrates a bottom-up perspective view of an individual slat of the slat assembly of Figure 1; and

FIG. 6 provides a side view of a number of interconnected slats of the slat assembly of Figure 1.

DETAILED DESCRIPTION OF THE INVENTION

[0015] The present invention relates to a slat assembly of a roll cover for a cargo bed of a vehicle, such as pickup trucks and utility vehicles. Elements of the invention are illustrated in concise outline form in the drawings, showing

only those specific details that are necessary to understand the embodiments of the present invention, but so as not to provide excessive detail that will be obvious to those of ordinary skill in the art in light of the present description.

[0016] In this specification, adjectives such as first and second, top and bottom, upwards and downwards, and the like may be used solely to distinguish one element or action from another element or action without necessarily requiring or implying any actual such relationship or order. Words such as “comprises” or “includes” are intended to define a non-exclusive inclusion, such that a method or apparatus that comprises a list of elements does not include only those elements but may include other elements not expressly listed, including elements that are inherent to such a method or system.

[0017] According to a first aspect, the present invention is defined as a slat assembly for a roll top cover comprising:

a plurality of successive and interconnected slats, each of the slats comprising opposed and adjoining first and second ends and upper and lower surfaces;

a sealing member disposed within the first end of each of the slats and configured for underlying a junction defined by the respective first and second ends of the slats adjacent thereto;

first and second hinge elements disposed at the respective first and second ends of each slat and integral therewith, the first and second hinge elements configured to define a hinge arrangement that facilitates relative pivotal movement between the slats;

wherein the slat assembly is operable between extended and retracted positions.

[0018] Particular advantages of some embodiments of the slat assembly of the present invention include providing an improved sealing arrangement so as to be substantially weather resistant and/or impervious to the ingress of fluids, dust and the like therethrough and into the associated cargo bed of a vehicle. A further advantage resides in the provision of reduced frictional forces that are produced between individual slats during operation of the roll

top cover so as to allow for easier and smoother opening and/or closing thereof.

[0019] Figures 1 to 6 provide a preferred embodiment of a slat assembly 10 of the invention. As illustrated in Figure 1, the slat assembly 10 is configured for being a part of a roll top cover 1 for covering a cargo bed 110 of a vehicle 100. In the embodiment provided, the slat assembly 10 is specifically configured for movement between an open or retracted position and a closed or extended position, as illustrated by Figure 1.

[0020] As can be observed in Figures 1, 2 and 6, the slat assembly 10 is constructed of a plurality of successive and interconnected slats 11. The slats 11 may be made or constructed from any suitable material known in the art, including, but not limited to, metals such as aluminium (e.g., marine grade aluminium) and steel, and polymeric materials, such as plastics (e.g., reinforced plastics). To this end, the slats 11 are preferably of dimensions so as to be appropriately strong as well as light weight for the slat assembly 10 of the present invention. It will be apparent that the slat assembly 10 can include as many slats 11 as are required to cover various sizes of the cargo bed 110, as are known in the art.

[0021] Referring to Figures 3 to 6, each of the slats 11 has a first end 20 and a second end 30 that define a width 15 of the slat 11 therebetween and further define an axis **a**. The slats further include first and second sides 40,50 that define a length 45 of the slat 11 therebetween. In the embodiment provided, the first and second sides 40,50 are both open ended to define a space therebetween. In this manner, each of the sides 40,50 is further capable of engaging a respective drive chain element 300 thereon so as to be operably connected to a drive chain track 401 of a side rail 400. In addition, the first and second sides 40,50 are preferably substantially flattened or planar therealong. Such an arrangement, advantageously acts to reduce or minimise any gap or space between the sides 40,50 of the slat 11 and a respective portion of the side rail 400 when engaged thereto by way of the drive chain element 300 to minimise the likelihood of fluids, dust or the like migrating therebetween and/or splashing from a side rail guttering system 402 and into the cargo bed 110 of the vehicle 100. This is in direct contrast to the

curved side profiles present on prior art slats, which is a known shortcoming thereof.

[0022] As shown in Figures 3 to 6, each of the plurality of slats 11 has a substantially flattened upper surface 60. It will be appreciated that the upper surface 60 of the slats 11 need not necessarily be flattened or planar, but may be, for example, arcuate or domed in shape. An opposed lower surface 70 of the slats 11 further includes a flattened portion 71.

[0023] From Figure 6, the respective first and second ends 20,30 of adjacent slats 11 define a hinge arrangement 12 for operably interconnecting said adjacent slats 11. In this manner, the slat assembly 11 is operable by way of the hinge arrangement 12 to move to the extended position in which the plurality of slats 11 are arranged so as have the respective upper surfaces 60 substantially flush theretogether and thereby define a substantially flattened or planar arrangement of the slats 11 of the slat assembly 10 (i.e., to restrict access to the underlying cargo bed 110), whilst also being operable for relative pivotal movement therebetween so as to attain a substantially curved or circular arrangement of the slat assembly 10, which allows a user access to the cargo bed 110 thereunder (i.e., the retracted position).

[0024] In this regard, each first end 20 comprises a domed or arcuate latch or hook portion 21 that extends radially the length of the slat 11 and axially outwards therefrom. The second end 30 includes a tapered and arcuate channel 31 that also extends radially the length of the slat 11, which is configured for matingly and pivotally receiving the respective hook portion 21 of the adjacent slat 11 therein. Advantageously, this arrangement of the arcuate channel 31 and the hook portion 21 allows for the secure engagement of the plurality of slats 11 theretogether. Further, the hook portion 21 and the arcuate channel 31 being integral with the slat 11 itself provides additional security and strength to the slat assembly 10 itself. Moreover, the mating engagement of the hook portion 21 with its respective arcuate channel 31 allows for the hinge arrangement 12 to be operable at low or reduced frictional forces during movement of the slat assembly 10 between the extended position and the retracted position and vice versa.

[0025] The hinge arrangement 12 is also configured to act as a mechanical hard end stop for the slat assembly 10 and by extension, each

individual slat 11, when in the extended position and the retracted position. In this regard, the second end 20 of each slat 11 includes an abutting element 27 that extends upwardly from the lower surface 70 thereof and that defines in part the arcuate channel 31. During movement of the slat assembly 10 to the extended position, relative upward pivotal movement of the slat 11 translates to clockwise and relative pivotable and sliding movement of the respective hook portion 21 thereof within and into the arcuate channel 31 of the respective adjacent slat 11 until a point at which a distal or free end of the hook portion 21 contacts or abuts a base portion of the abutting element 27 at an end portion of the arcuate channel 31. Conversely, movement of the slat assembly 10 to the retracted position provides for relative downward pivotal movement of the slat 11, which results in anti-clockwise and relative pivotable and sliding movement of the respective hook portion 21 thereof within and out of the arcuate channel 31 of the respective adjacent slat 11 until a point at which a proximal end of the hook portion 21 contacts or abuts a concave stop portion 28 of the abutting element 27.

[0026] As illustrated in Figures 3 to 6, the plurality of slats 11 further include a U-shaped bracket or channel 22 disposed in the first end 20 between the upper surface 60 and the hook portion 21 so as to open axially therefrom. Disposed within the U-shaped channel 22 is a sealing member 25 that is dimensioned and positioned so as to substantially occupy the space defined thereby and extend outwardly therefrom. In the embodiment provided, the U-shaped channel 22, as well as the sealing member 25 disposed and frictionally secured therein, extend substantially the length of the slat 11 so as to provide a sealing arrangement therealong between adjacent slats 11.

[0027] In this manner, the sealing member 25 is shown to abut a proximal end of the adjacent hook portion 21 and extends outwardly or axially from the overlying upper surface 60 to thereby define a stepped arrangement therewith. By virtue of this arrangement, the proximal end of the adjacent hook portion 21 acts to retain the sealing member 25 within the U-shaped channel 22. As can be observed from Figures 3 to 6, the second end 30 of the slat 11 further includes a step portion 32 configured to contact and abut an upper end portion of the sealing member 25 of the respective adjacent slat 11 when in a

substantially parallel and planar arrangement relative thereto (i.e., the extended position).

[0028] The present sealing member 25 advantageously imparts little or no effect on the operational forces required to move the slat assembly 10 between the extended position and the retracted position and vice versa. In this regard, the sealing member 25 simply underlies and abuts a junction 13 defined by the respective first and second ends 20,30 of adjacent slats 11 when the slat assembly 10 is in the extended position rather than also being operably involved in the hinge arrangement 12 therebetween.

[0029] In addition to the above, each sealing member 25 preferably includes one or more resiliently deformable ridges or projections (not shown) on an outer surface thereof to assist in sealing the junction 13 between adjacent slats 11. To this end, the ridges or projections (not shown) are configured to deform so as to tolerate small imperfections (if any) in a surface of the U-shaped channel 22 and the step portion 32 when contacted therewith without compromising the function of the sealing member 25 with respect to effectively sealing the junction 13 between adjacent slats 11.

[0030] It will be appreciated that the sealing member 25 may comprise any suitable material known in the art, including rubber materials of a suitable grade and shore hardness. Preferably, the material to be used for the sealing member 25 demonstrates adequate levels of fluid and/or chemical resistance as well as frost and heat resistance. Additionally, the material to be used for the sealing member 25 suitably demonstrates a requisite level of flammability and UV resistance as typically required for automotive applications. The sealing member 25 is substantially rectangular in shape and preferably includes one or more reinforcing elements 26, such as reinforced metal particles (e.g. rods, particle strands, etc.) for adding a desired level of rigidity to the sealing member 25. Additionally, the reinforcing elements 26 preferably act to reduce any variance in length of the sealing member 25 produced by, for example, temperature changes. The reinforcing elements 26 also suitably minimise the likelihood of the seal member 25 stretching as part of the cutting and assembly process for the slat assembly 10 described herein.

[0031] In addition to contributing to the overall security of the slat assembly 10, the hinge arrangement 12 also contributes to the fluid and dust

proofing thereof. By way of example, in the unlikely event that any fluid, dust or the like were to negotiate past the sealing member 25, this foreign material would then be required to traverse, not one, but two upwardly curved profiles or portions of the hook portion 21 at respective proximal and distal ends thereof. It would be appreciated, that in such a situation, then the fluid, dust or the like would travel radially towards the respective first and second sides 40,50 of the slats 11 and into an adjacent side rail guttering system 402. As a result of this arrangement, there is no direct pathway for fluid, dust or the like to migrate from outside of the slat assembly 10 through the hinge arrangement 12 and into the cargo bed 110 of the vehicle 100.

[0032] The above description of various embodiments of the present invention is provided for purposes of description to one of ordinary skill in the related art. It is not intended to be exhaustive or to limit the invention to a single disclosed embodiment. As mentioned above, numerous alternatives and variations to the present invention will be apparent to those skilled in the art of the above teaching. Accordingly, while some alternative embodiments have been discussed specifically, other embodiments will be apparent or relatively easily developed by those of ordinary skill in the art. The invention is intended to embrace all alternatives, modifications, and variations of the present invention that have been discussed herein, and other embodiments that fall within the spirit and scope of the above described invention.

CLAIMS

1. A slat assembly for a roll top cover comprising:

a plurality of successive and interconnected slats, each of the slats comprising opposed and adjoining first and second ends and upper and lower surfaces; and

first and second hinge elements disposed at the respective first and second ends of each slat and integral therewith, the first and second hinge elements configured to define a hinge arrangement that facilitates relative pivotal movement between the slats;

wherein the slat assembly is operable between extended and retracted positions.
2. The slat assembly of Claim 1, further comprising a sealing member disposed within the first end of each of the slats and configured for underlying a junction defined by the respective first and second ends of the slats adjacent thereto;
3. The slat assembly of Claim 2, wherein the first end of each of the slats comprises a channel disposed between the upper surface and the first hinge element, the channel configured for receiving and securing the sealing member therein.
4. The slat assembly of Claim 2 or Claim 3, wherein the second end of each of the slats comprises a step portion configured to contact and abut an upper end portion of the sealing member of the slat adjacent thereto.
5. The slat assembly of any one of Claims 2 to 4, wherein the sealing member comprises one or a plurality of resiliently deformable ridges disposed thereon.

6. The slat assembly of any one of the preceding claims, wherein the first or second hinge element comprises an arcuate hook portion extending outwardly from the respective first or second end of the slats.

7. The slat assembly of Claim 6, wherein the first or second hinge element comprises a reciprocal arcuate channel for slidably and pivotably receiving the hook portion therein.

8. The slat assembly of Claim 6 or Claim 7, further comprising a stop element for limiting relative pivotal movement of the hook portion in a clockwise and/or anti-clockwise direction within the arcuate channel.

9. The slat assembly of Claim 8, wherein the stop element extends upwardly from the lower surface of the slat and at least in part defines the arcuate channel.

10. The slat assembly of Claim 8 or Claim 9, wherein the stop element abuts a portion of the hook portion when the slat assembly is in the extended and/or retracted positions.

11. A roll cover assembly for operably covering the cargo bed of a vehicle, wherein the roll cover comprises the slat assembly of any one of Claims 1 to 10.

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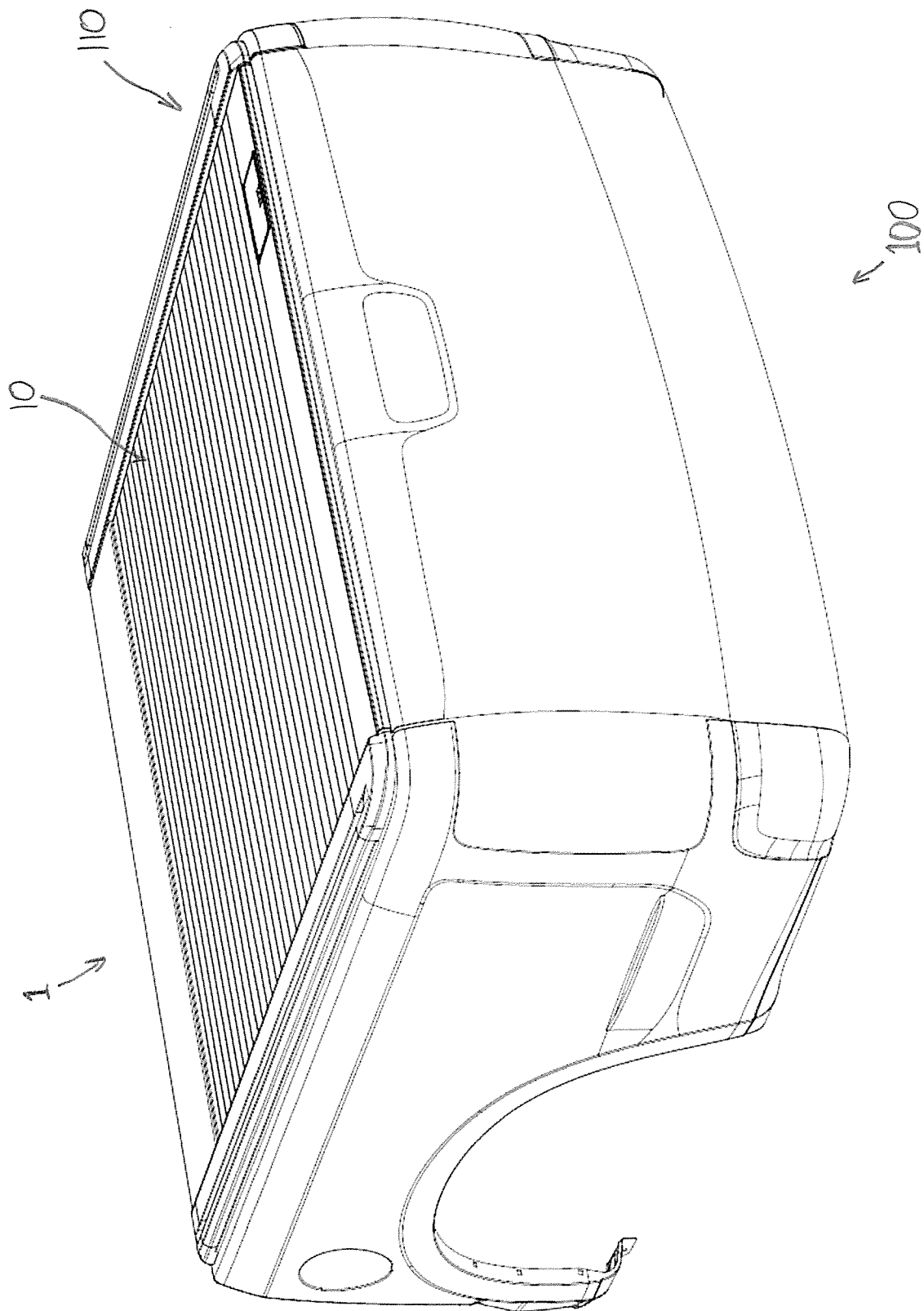


FIG. 1

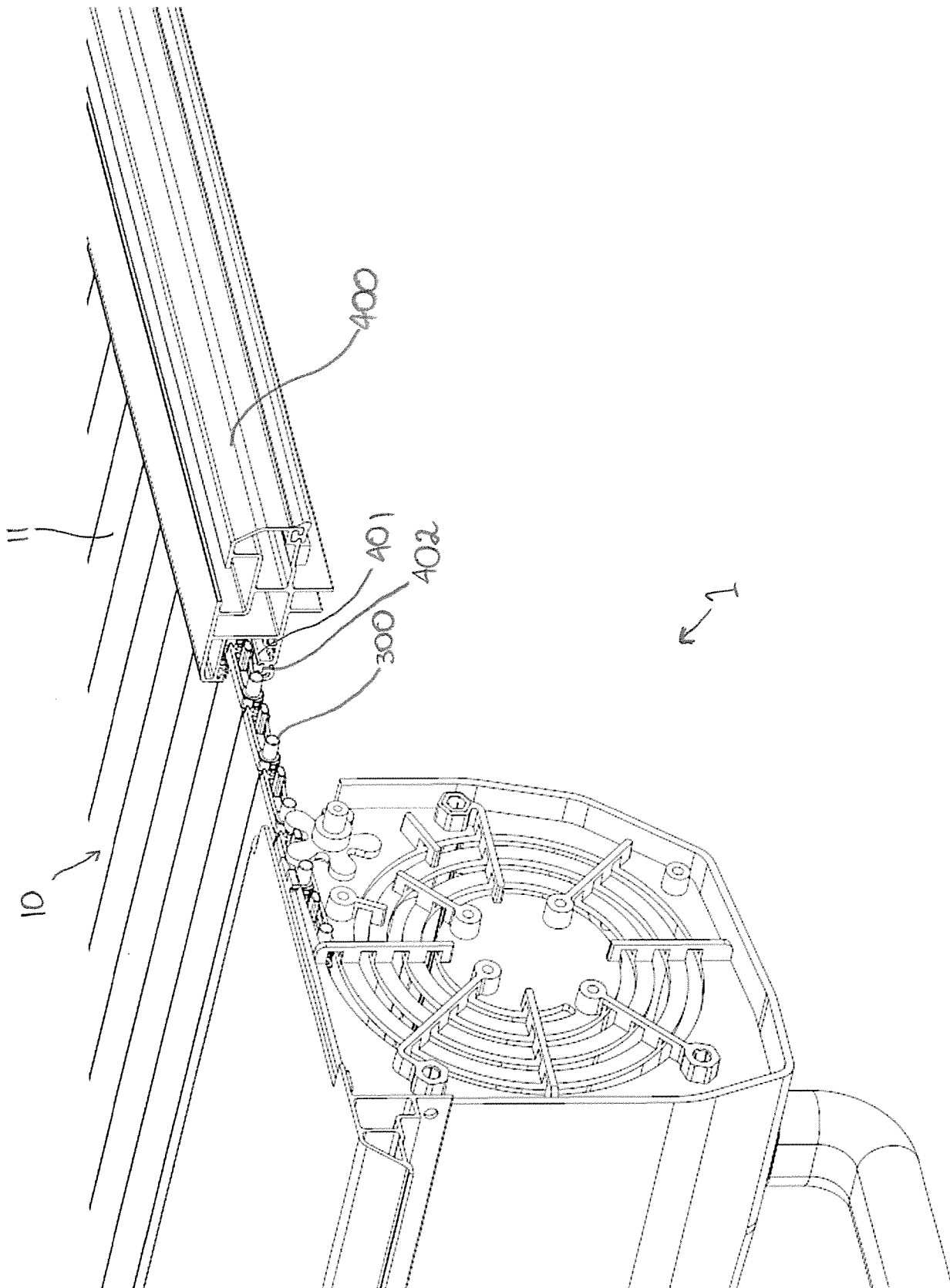


FIG. 2

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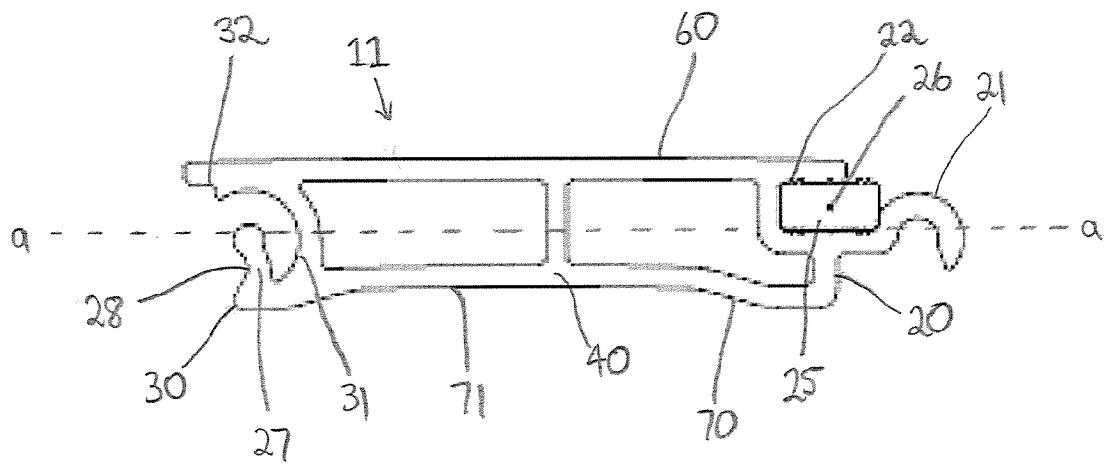


FIG. 3

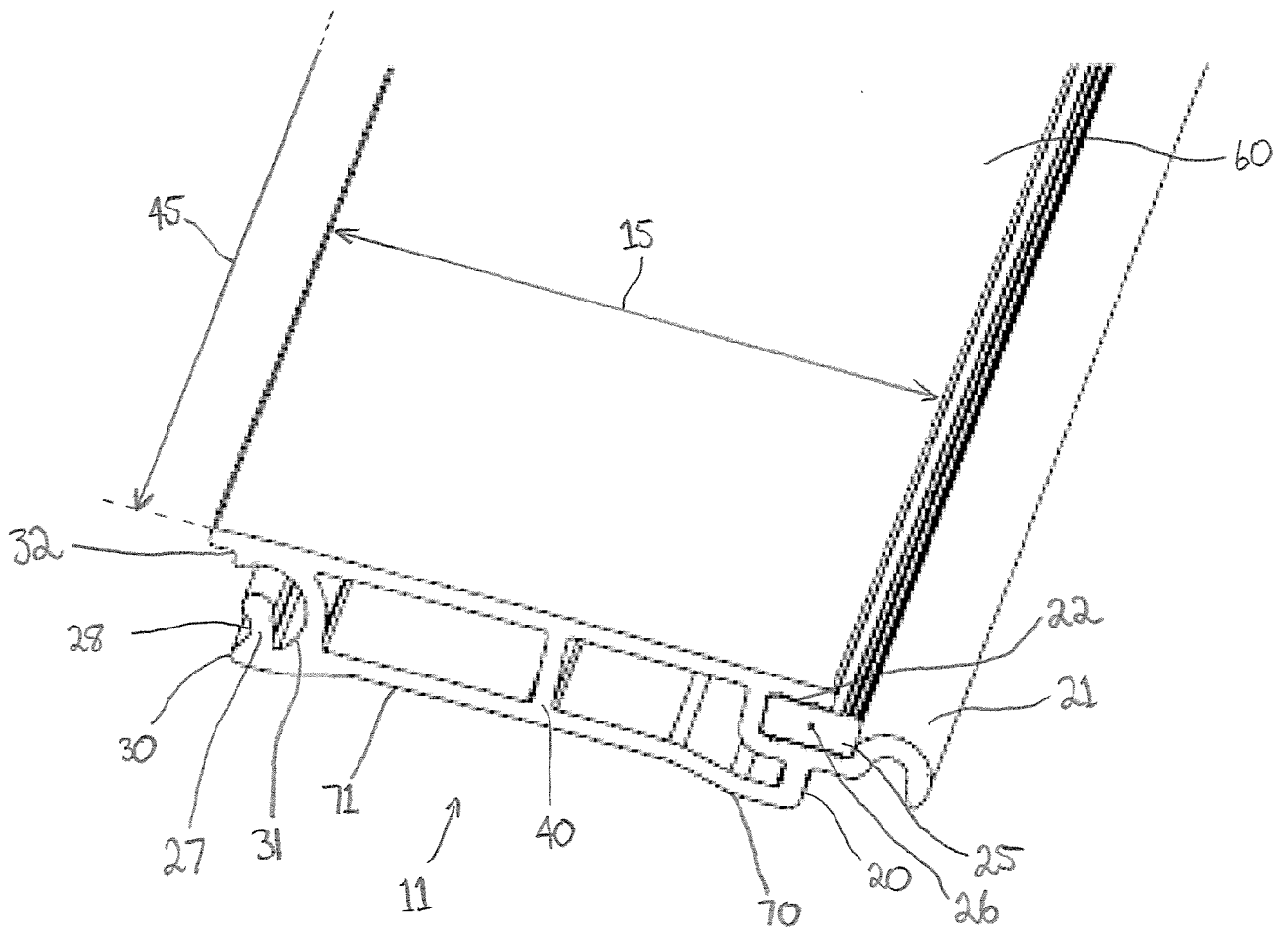


FIG. 4

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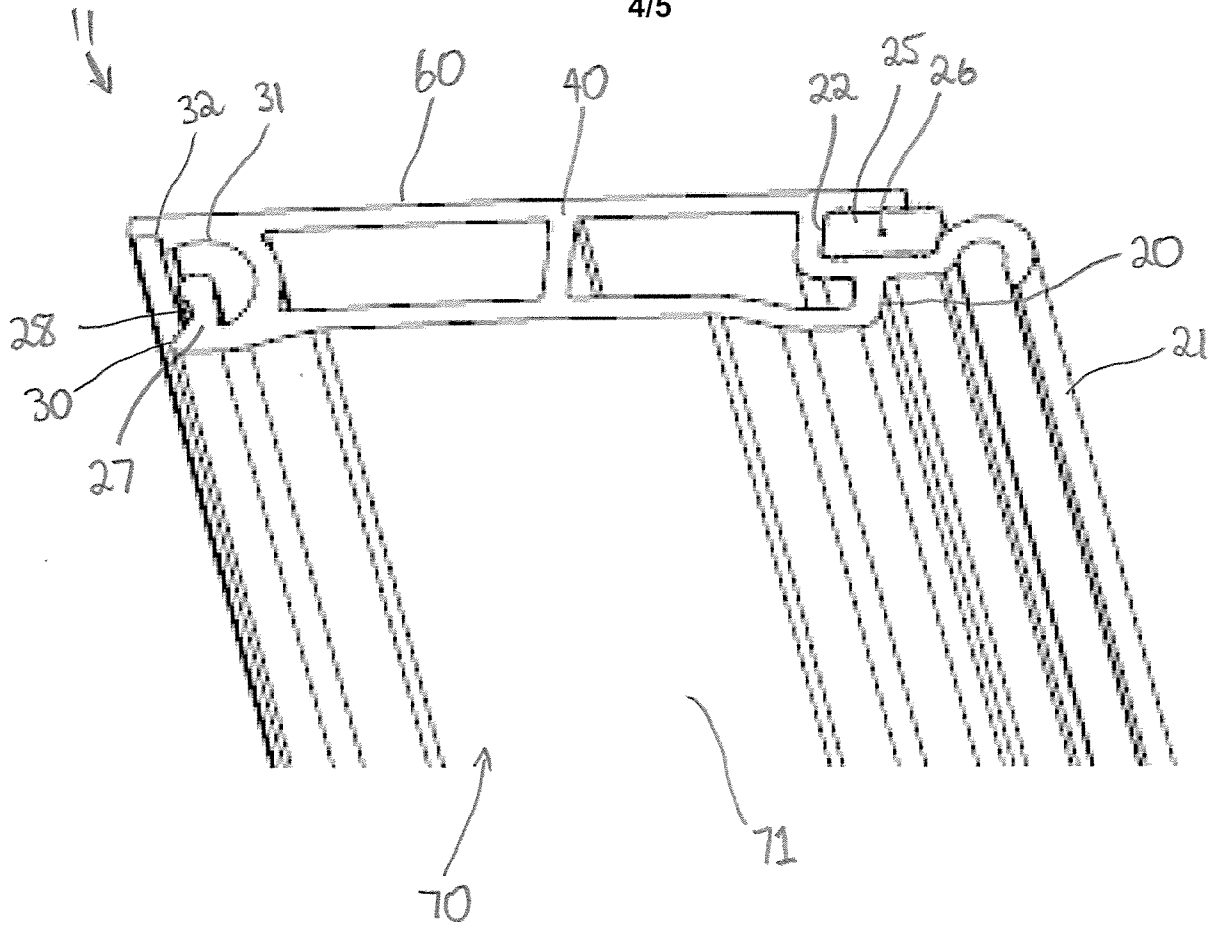


FIG. 5

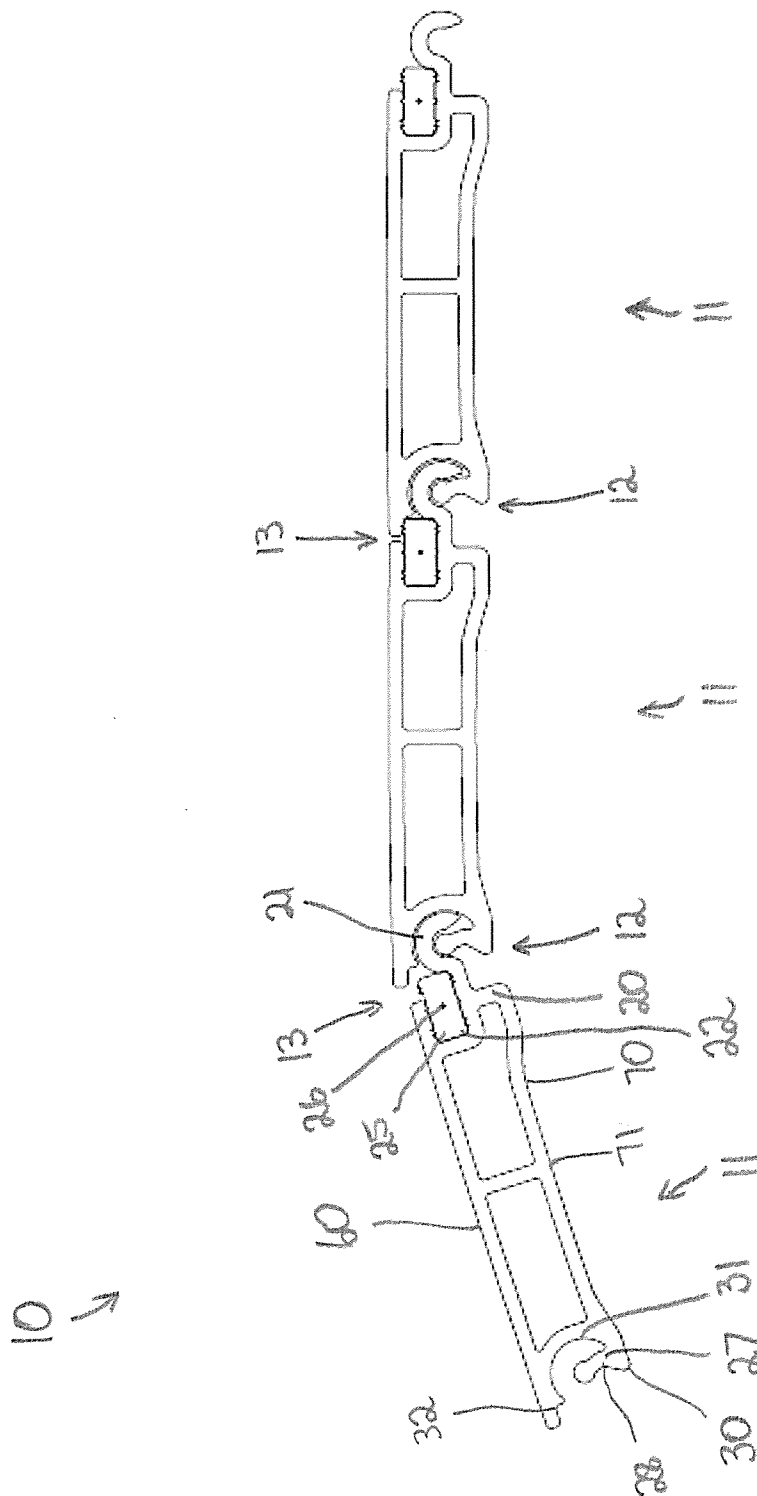


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2019/050497

A. CLASSIFICATION OF SUBJECT MATTER

E06B 9/15 (2006.01) B60J 7/04 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PATENW: IPC/CPC - E06B2009/1522, E06B2009/1538/LOW, B60J7/04/LOW, B60J5/08 and keywords (seal+, connect, hook, arc, channel, passage and like terms)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	



Further documents are listed in the continuation of Box C



See patent family annex

* "A"	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E"	earlier application or patent but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search
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Name and mailing address of the ISA/AU

AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
Email address: pct@ipaustalia.gov.au

Authorised officer

Darcy Corbett
AUSTRALIAN PATENT OFFICE
(ISO 9001 Quality Certified Service)
Telephone No. +61262832348

INTERNATIONAL SEARCH REPORT		International application No.
C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		PCT/AU2019/050497
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 8544934 B2 (MAIMIN et al.) 01 October 2013 Col. 4 line 65 – Col. 5 line 8; Figures	1, 6-11
X	US 4972894 A (MACHILL) 27 November 1990 Figures 1, 5	1-3, 6, 7
X	JP H11152972 A (SANWA SHUTTER CORP.) 08 June 1999 & Machine Translation via Google Patents Figure 9	1-5
X	US 4979553 A (LOWRY, III et al.) 25 December 1990 Figures 1, 3-6	1-3, 6, 7

Form PCT/ISA/210 (fifth sheet) (revised January 2019)

INTERNATIONAL SEARCH REPORT		International application No.	
Information on patent family members		PCT/AU2019/050497	
This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.			
Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	Publication Date	Publication Number	Publication Date
US 8544934 B2	01 October 2013	US 2013106133 A1	02 May 2013
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US 4979553 A	25 December 1990	US 4979553 A	25 Dec 1990
End of Annex			
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001. Form PCT/ISA/210 (Family Annex)(revised January 2019)			