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(54) Title: A TRANSPORT OR SHIPPING CONTAINER COVER ARRANGEMENT

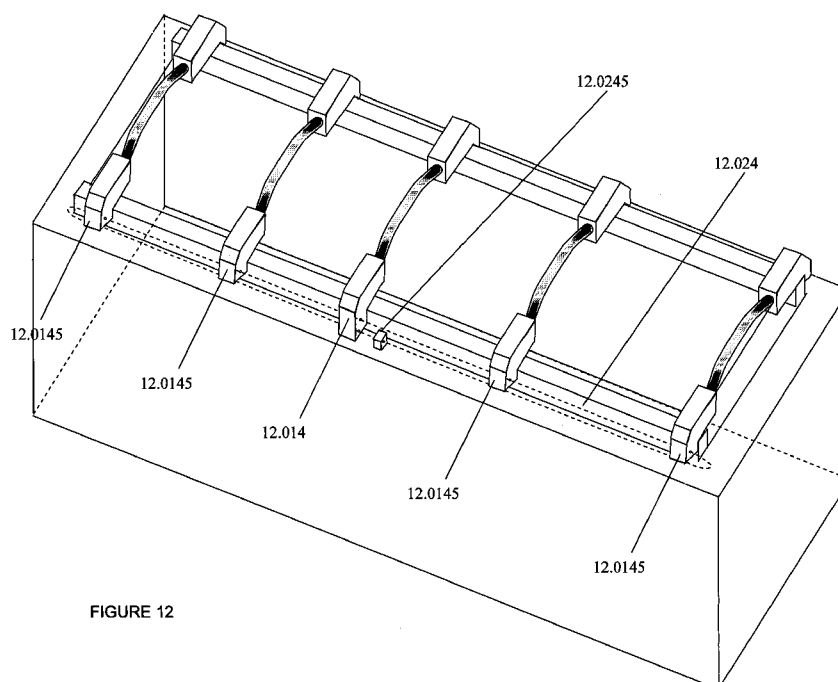


FIGURE 12

(57) Abstract: A container with an aperture occupying a substantial portion of the top of the container, the container having an openable top arrangement, the top being a tarpaulin, the arrangement including first and second (longitudinal) raised parallel rails extending along opposite edges of the aperture, and a plurality of (transverse) support bows, each bow terminating at each end in a runner adapted to cooperate with a corresponding one of the rails, wherein the tarpaulin is attached to each bow assembly.



A Transport or Shipping Container Cover Arrangement

Field of the invention

[001] This invention relates to shipping or transport containers for bulk material such as grain, sand, and the like.

[002] The invention is particularly suited for open top containers with a tarpaulin or cloth-type cover.

Background of the invention

[003] International patent application WO2004052754 discloses a cargo style container with a tarpaulin roof of canvas or the like which is draped over a number of supporting rods and attached to the edges of the container by an oval eyelet and twist latch system as shown in Figure 2B of WO2004052754. The cover is rolled up or draped over one side of the container in the open state. In the closed state, the roof is supported by several roof bows, which are transverse rods bowed upwardly in the centre. The bows extend across the container and terminate on each end on wheels or casters which engage a longitudinal C-section rail. The cover is temporarily attached to the bows. The ends of adjacent bows are connected by pairs of hinged, folding links to obtain an even spacing between the bows.

[004] In this specification, reference to a document, disclosure, or other publication or use is not an admission that the document, disclosure, publication or use forms part of the common general knowledge of the skilled worker in the field of this invention at the priority date of this specification, unless otherwise stated.

Summary of the invention

[005] The present invention provides a container with an aperture occupying a substantial portion of the top of the container, the container having an openable top arrangement, the top being a tarpaulin, the arrangement including first and second (longitudinal) raised parallel rails extending along opposite edges of the aperture, and a plurality of (transverse) support bows, each bow terminating at each end in a runner adapted to cooperate with a corresponding one of the rails, wherein the tarpaulin is attached to each bow assembly.

[006] The container can include a drive arrangement for opening and closing the top arrangement, the drive arrangement including a first torque

application mechanism, a first drive shaft, a torque transfer arrangement, and a first drive pulley wheel driving a first pulley wire adjacent a first rail.

[007] The leading slide can be attached to the first pulley cable .

[008] Adjacent bow and slide assemblies can be connected by a length of tarpaulin.

[009] As each bow/slide assembly moves to the length of tarpaulin away from its successive bow/slide assembly, the said succeeding bow/slide assembly is pulled along the rails by the tarpaulin.

[010] A second drive shaft and a second drive pulley wheel, driving a second pulley wire adjacent to the second rail can be provided to provide balanced pull.

[011] A weather shield can be provided across the front of the aperture, the shield including a raised cover located above the tarpaulin, so that at least the leading bow/slide assembly is located under the cover in the fully closed state.

[012] A drip tray can be located under the cover and the end of the leading bow/slide arrangement so as to collect water which runs off the front of the tarpaulin.

[013] A drain hole can be provided to permit water to drain from the drip tray to the outside of the container.

[014] The drain hole can be located in a side wall of the container.

[015] The drain hole can be located in the front wall of the container.

[016] The floor of the drip tray can slope towards the drain hole.

[017] A valve can be associated with said drip tray and is opened manually or automatically.

[018] The drive arrangement can be driven by a motor.

[019] The motor can be controlled by means of one or more than one of the following: remote control, automatic detection system, RFID detection system.

[020] The system can include a battery means and or a recharge system which includes a photo voltaic or wind generator recharging means.

Brief description of the drawings

[021] An embodiment or embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

[022] Figure 1 is a schematic illustration of a container with an open top adapted for use in an embodiment of the present invention.

[023] Figure 2 illustrates a pulley arrangement adapted for use in an embodiment of the invention.

[024] Figure 3 is a partial view of the top of a container with bows according to an embodiment of the invention.

[025] Figure 4 illustrates detail of a bow slide according to an embodiment of the invention.

[026] Figure 5 is a partial side section view illustrating the front end cover according to an embodiment of the invention.

[027] Figure 6 illustrates details of the end cover and bow.

[028] Figure 7 is a cross-section of a container according to an embodiment of the invention.

[029] Figure 8 is a side view of a container according to an embodiment of the invention.

[030] Figure 9 illustrates an underside view of a tarpaulin for use with cover system.

[031] Figure 10 illustrates another container with a tarpaulin system drive having an endless belt drive.

[032] Figure 11 illustrates a bracket system to prevent lift of bows when cover extended and container on moving vehicle.

[033] Figure 12 illustrates a tarpaulin system will provide restraint against lift due to the container moving on a vehicle.

[034] The numbering convention used in the drawings is that the digits in front of the full stop indicate the drawing number, and the digits after the full stop are the element reference numbers. Where possible, the same element reference number is used in different drawings to indicate corresponding elements.

[035] It is understood that, unless indicated otherwise, the drawings are intended to be illustrative rather than exact representations, and are not necessarily drawn to scale. The orientation of the drawings is chosen to illustrate the features of the objects shown, and does not necessarily represent the orientation of the objects in use.

Detailed description of the embodiment or embodiments

[036] The invention will be described with reference to the embodiments illustrated in the drawings.

[037] Figure 1 is an illustration of a container 1.002 with an open top 1.004. A pair of longitudinal parallel rails 1.006 which run along either side of the opening 1.004 and project upwardly from the rim 1.010 of the container aperture. A plurality of support rods or bows 1.012 span the opening transversely. Each bow terminates in a pair of runners 1.014, 1.016 which, in this embodiment are "L" shaped or flat nylon slide members. The bow is arched upwardly to support a tarpaulin which may be of canvass, woven plastics material or other suitable material. The "L" shaped or flat slides are shaped to cooperate with the rails, and can be manufactured from polyethylene or similar material.

[038] A tarpaulin (shown in figure 9) is attached to each of the runners 1.014, 1.016 on the outside. The tarpaulin can have reinforced eyelets 9.064, 9.070 and 9.072 through which suitable attachment members can be inserted to attach the tarpaulin to the runners. For example, the tarpaulin can be attached by screws and washers, or screws and attachment plates to distribute the load of attachment and wind loads when in use.

[039] Figure 2 is a partial view illustrating a drive pulley 2.020 and pulley wire 2.024 adapted for moving the bows such as 1.012 and slides such as 1.016 between the open and closed states. A gear box 2.022 and drive shaft 2.018 transfer torque to the drive pulley from a manual handle and gear box (not shown in this figure, but see 8.046 in Figure 8) located lower down the side of the container. As best seen in Figure 8, bearings such as 8.052 support the drive shaft 8.018 between the upper and lower ends of the shaft. A transverse drive coupling shaft 2.054 connects to a second pulley and pulley arrangement associated with the other rail and bow slides such as 1.014 on the other side of the container aperture. Bearings such as 2.056 support the transverse drive coupling shaft.

[040] Figure 3 illustrates a plurality of tarpaulin support bows 3.012 and their associated slides 3.016 mounted on rail 3.006. The pulley wire 3.024 can be seen

running through the slides. As will be described below, in this embodiment, the pulley wire can run freely through all the slides except the first or leading slide and bow (when closing the cover), which is used to pull the following slides and bows.

[041] Figure 4 shows detail of an intermediate slide 4.01 6 which has an upper through hole 4.026 through which the pulley wire 4.024 can run freely. The tarpaulin (not shown) is attached to the face 4.01 7 by any suitable attachment means. A lower through hole 4.027 is also provided for the return of the cable to pass through. The hole 4.027 can be made as a slot to help minimise friction forces which may be developed.

[042] Figure 5 illustrates a cover or weather shield arrangement which includes a cover plate 5.028 which extends across the width of the container aperture and receives the leading bow and slide 5.01 2, 5.01 6 under the cover.

[043] The tarpaulin 5.050 is attached to the slides of the bow in the manner described in relation to Figure 4, and, in addition, the leading edge of the tarpaulin is attached to the bow. For example, the edge of the tarpaulin can be wrapped around the bow and attached to the body of the tarpaulin as shown by way of illustration at 5.040. The attachment 5.040 can be any suitable attachment means including an eyelet and twine arrangement, random nylon hook and eye (VELCRO[™]), welding or plastics and the like. The tarpaulin can have its leading edge trimmed to suit the wraparound on the bow, while enabling the sides to be attached to the slide.

[044] When the tarpaulin is fully closed, the edge of the cover 5.038 extends beyond the leading bow, so the edge of the tarpaulin is under the cover 5.028. A drip tray 5.034 also extends the width of the aperture and has a drain hole 5.032 communicating with the outer wall 5.042 of the container. Reinforcing gussets such as 5.030 can strengthen the cover, and gussets 5.036 do likewise for the drip tray. The drain hole 5.032 can open out through the front face of the container, or if desired can be made to open through a side face. Further, there can be provided a valve which can be opened automatically or manually to allow egress of water.

[045] Figure 6 shows detail of the cover looking towards the front of the container. The cover 6.028 extends across the aperture of the container. The bow 6.01 2 extends between its associated slides such as 6.014 which rest on the corresponding rails, such as 6.006. The tarpaulin 6.050 also extends across the width of the aperture and is attached on each side to the slide such as 6.014 on the upright side. The corner of the slide can be chamfered to avoid a sharp edge and provide a stress gradation for the tension in the tarpaulin. The wire holes 6.024

through the slide are also shown. However, the leading slide is constrained to move with the wire.

[046] The rail 6.006 has an "L" section and is spaced inboard from the side wall. The inverted "L" of the slide seats on the top angle of the rail. Because the slide is made of nylon or other appropriate material, it will slide freely over the rail with low friction.

[047] Figure 7 is a section view of a container according to an embodiment of the invention. The bow 7.012 is attached to its slides such as 7.014 which sit on their associated rails, such 7.006. As can be seen, the outer edges of the slides are within the upright side walls of the container 7.002, and the shape of the rails allows and their location with respect to the container allows for water run off and prevents water ingress.

[048] Figure 8 shows a side view of a container according to an embodiment of the invention.

[049] The container 8.002 has a gear arrangement 8.046 such with an axial socket into which a user can insert a handle to turn shaft 8.018. The shaft 8.018 is supported by a number of bearings such as 8.052. The shaft 8.020 turns a drive gear in gearbox (see 2.022 in Figure 2) to drive pulley wheel 8.020. The pulley wire 8.024 is an endless loop and is looped around idler wheel 8.021 at the front end of the container, the leading slide 8.014 is attached to the pulley wire 8.024 and thus is drawn along the rail 8.006. When the section of tarpaulin between the leading slide and the next successive slide is fully extended, that succeeding slide also begins to slide along the rail 8.006. This process continues until the lead slide reaches the front end of the rail and is located under the cover 8.028. At this point, all the slides and their associated bows are located in their required positions and the tarpaulin is fully extended.

[050] Simultaneously, the second pulley on the other side of the container is driven by the transverse shaft 2.054 and it causes the slides on the opposite side to move together with their associated slides to which they are connected by the corresponding bow.

[051] The container of Figure 8 also includes sampling ports such as 8.060 through which a sampling tube can be inserted to withdraw samples of the material in the container. This is important for sampling grain. The sampling ports have a weatherproof cover, for example a sliding cover with protective sills. The ports can be

of sufficient dimensions to enable a suction tube to be inserted to the bottom of the container.

[052] In use, the length of tarpaulin between pairs of adjacent bows determines the spacing of the bows when the tarpaulin is in the fully closed state. When the leading slide is pulled out, and the length of tarpaulin between it and the next slide (the second slide) is fully extended, the second slide is pulled out until the tarpaulin section between it and the third slide is extended, and so on, until all the slides and their associated bows are spaced along the rails and support the tarpaulin in the required manner. The length of tarpaulin between each pair of bows can be equal. However, the invention also encompasses the case where the length of one or more segments of tarpaulin differ.

[053] As illustrated in Figure 9, the tarpaulin can include fully closed vinyl pockets as attachments 9.066 so that the bow 1.012 can pass through or if desired the attachments can be of the hook and loop type, so that the two sides of the attachments 9.066 can be secured to each other enveloping the bow 1.012.

[054] Illustrated in Figure 10 is a container similar to that described above except that the drive system is made up of a drive pulley 10.046 which can have a handle for manual operation, or a hex head or recess to be driven by a nail gun. Further the drive system includes an endless belt 10.071 joining the drive pulley 10.046 and driven pulley 10.020. The endless belt can be a v-Belt, a toothed belt, or a chain or similar endless belt which can transmit the loads required.

[055] Also illustrated in Figure 10 is retraction cover 10.070, which overlies the retracted cover and the associated bows 1.012, so that when filling of the container is occurring, these components are protected from falling bulk product and loading equipment. This cover 10.070 is located below the corner castings of the container so that they stay within the standard profile of a container.

[056] Preferably the pulleys 10.021 or 8.021, being the idler pulley in the system includes some lateral adjustment of the axis of rotation of the pulley, so that the cable moving the bows 10.012 and end blocks 10.014 can be appropriately tensioned as the cable stretches during use or under atmospheric conditions.

[057] Illustrated in Figure 11 is a mechanism to prevent the extended tarp of the above described embodiments from lifting by means of the air passing over the tarp when the container is in motion on a vehicle such as a train or a truck. The mechanism includes a series of upside down L-shaped brackets 11.072 which are provided at discrete locations along the side of the container upper structure. The

brackets 11.072 are welded in position at locations which will overlie the final location of the blocks 11.014, when the blocks 11.014 no longer moving due to the tarp being fully stretched out over the container opening. The width of the brackets 11.072 is wider than the blocks 11.014 so that if there is some variation of the final resting location of the blocks 11.014, they will still be located under a bracket 11.072.

[058] Illustrated in Figure 12 is another mechanism to prevent the extended tarp of the above described embodiments from lifting during motion or in windy environmental conditions. In figure 12 the central blocks 12.014 are like those described above where there are two holes so that the cable 12.024 can pass through twice. Whereas the blocks 12.0145 on either side of the central block 12.014, have a shorter terminus than the block 12.014, and the cable 12.024 can pass through only once, and corresponds in height to the upper hole on the central block 12.014. This helps to reduce friction and decreases the chance of jamming of the system.

[059] As the bows 12.012 move from right to left in this system as the blocks 12.0145 on the right hand side have shorter terminal legs than the central block 12.014, they will pass over the top of a securing block 12.0245. The securing block 12.0245 has a single hole in it and is secured to the container body so that the top of it clears the bottom of the termini of the blocks 12.0145. The block 12.0245 has the lower segment of the cable 12.024 pass through it and helps to prevent the cable 12.024 from moving in a vertical direction when the container having an extended tarp is in a windy conditions or moving at speed.

[060] The above described drive systems are readily adapted to being motorised, whether a worm gear system, an endless belt, a v-belt, a toothed belt or chain drive is used. By providing an electric motor and an associated battery pack, the drive system can then be activated by means of a switch on the container as the container is on approach to receive a new load of bulk material. Further by utilising a transponder or RFID system or other electronic detection system, the covers can be made to retract on approach to a loader, or if desired, by radio or remote control frequencies, a whole train load can be made to retract and extend automatically when the loading is about to begin or when it has finished, such extension or retraction can be made to occur simultaneously on all containers, or sequentially. If a remote control is utilised, a loading operator can attend to the extension and retraction of the tarp system at the appropriate time for the timely loading and unloading of the containers.

[061] Such an electric motorised system's battery pack will require recharging and this can be done by photovoltaic cells or by wind generators mounted on respective containers.

[062] In this specification, terms indicating orientation or direction, such as "up", "down", "vertical", "horizontal", "left", "right", "upright", "transverse" etc. are not intended to be absolute terms unless the context requires or indicates otherwise. These terms will normally refer to orientations shown in the drawings.

[063] Where ever it is used, the word "comprising" is to be understood in its "open" sense, that is, in the sense of "including", and thus not limited to its "closed" sense, that is the sense of "consisting only of". A corresponding meaning is to be attributed to the corresponding words "comprise", "comprised" and "comprises" where they appear.

[064] It will be understood that the invention disclosed and defined herein extends to all alternative combinations of two or more of the individual features mentioned or evident from the text. All of these different combinations constitute various alternative aspects of the invention.

[065] While particular embodiments of this invention have been described, it will be evident to those skilled in the art that the present invention may be embodied in other specific forms without departing from the essential characteristics thereof. The present embodiments and examples are therefore to be considered in all respects as illustrative and not restrictive, and all modifications which would be obvious to those skilled in the art are therefore intended to be embraced therein.

Claims

1. **A container with an aperture occupying a substantial portion of the top of the container, the container having an openable top arrangement, the top being a tarpaulin, the arrangement including first and second (longitudinal) raised parallel rails extending along opposite edges of the aperture, and a plurality of (transverse) support bows, each bow terminating at each end in a runner adapted to cooperate with a corresponding one of the rails, wherein the tarpaulin is attached to each bow assembly.**
2. **A container as claimed in claim 1, including a drive arrangement for opening and closing the top arrangement, the drive arrangement including a first torque application mechanism, a first drive shaft, a torque transfer arrangement, and a first drive pulley wheel driving a first pulley wire adjacent a first rail.**
3. **A container as claimed in claim 2, wherein a first leading slide is attached to the first pulley cable.**
4. **A container as claimed in claim 1 or claim 2, wherein adjacent bow and slide assemblies are connected by a length of tarpaulin.**
5. **A container as claimed in claim 4, wherein, as each bow/slide assembly moves to the length of tarpaulin away from its successive bow/slide assembly, the said succeeding bow/slide assembly is pulled along the rails by the tarpaulin.**
6. **A container as claimed in claim 2, including a second drive shaft and a second drive pulley wheel, driving a second pulley wire adjacent to the second rail.**
7. **A container as claimed in any one of the preceding claims, including a weather shield across the front of the aperture, the shield including a raised cover located above the tarpaulin, so that at least the leading bow/slide assembly is located under the cover in the fully closed state.**
8. **A container as claimed in claim 7, including a drip tray located under the cover and the end of the leading bow/slide arrangement so as to collect water which runs off the front of the tarpaulin.**
9. **A container as claimed in claim 8, including a drain hole at associated with the drip tray adapted to permit water to drain from the drip tray to the outside of the container.**

10. A container as claimed in claim 9, wherein the drain hole is located in a side wall of the container.

11. A container as claimed in claim 9, wherein the drain hole is located in the front wall of the container.

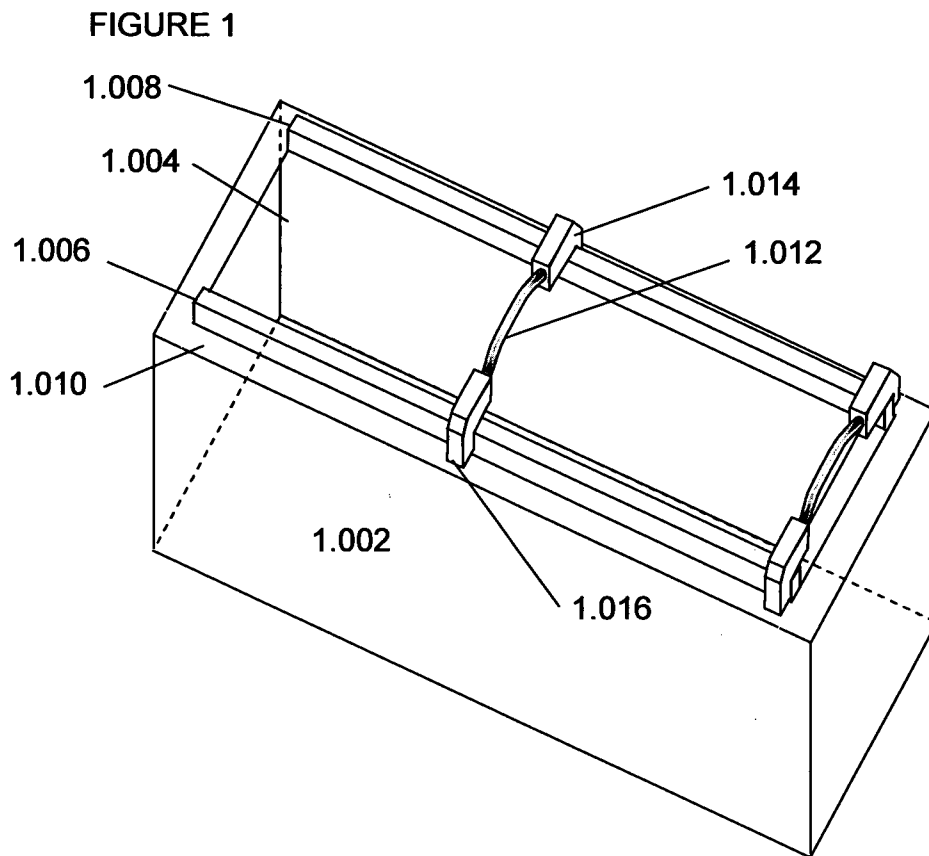
12. A container as claimed in any one of claims 9 to 11, wherein the floor of the drip tray slopes towards the drain hole.

13. A container as claimed in any one of claims 9 to 12, wherein a valve is associated with said drip tray and is opened manually or automatically.

14. A container as claimed in any one of claims 1 to 13, wherein the drive arrangement is driven by a motor.

15. A container as claimed in claim 14, wherein said motor is controlled by means of one or more than one of the following: remote control, automatic detection system, RFID deflection system.

16. A container as claimed in claim 15, wherein said system includes a battery means and or a recharge system which includes a photo voltaic or wind generator recharging means.



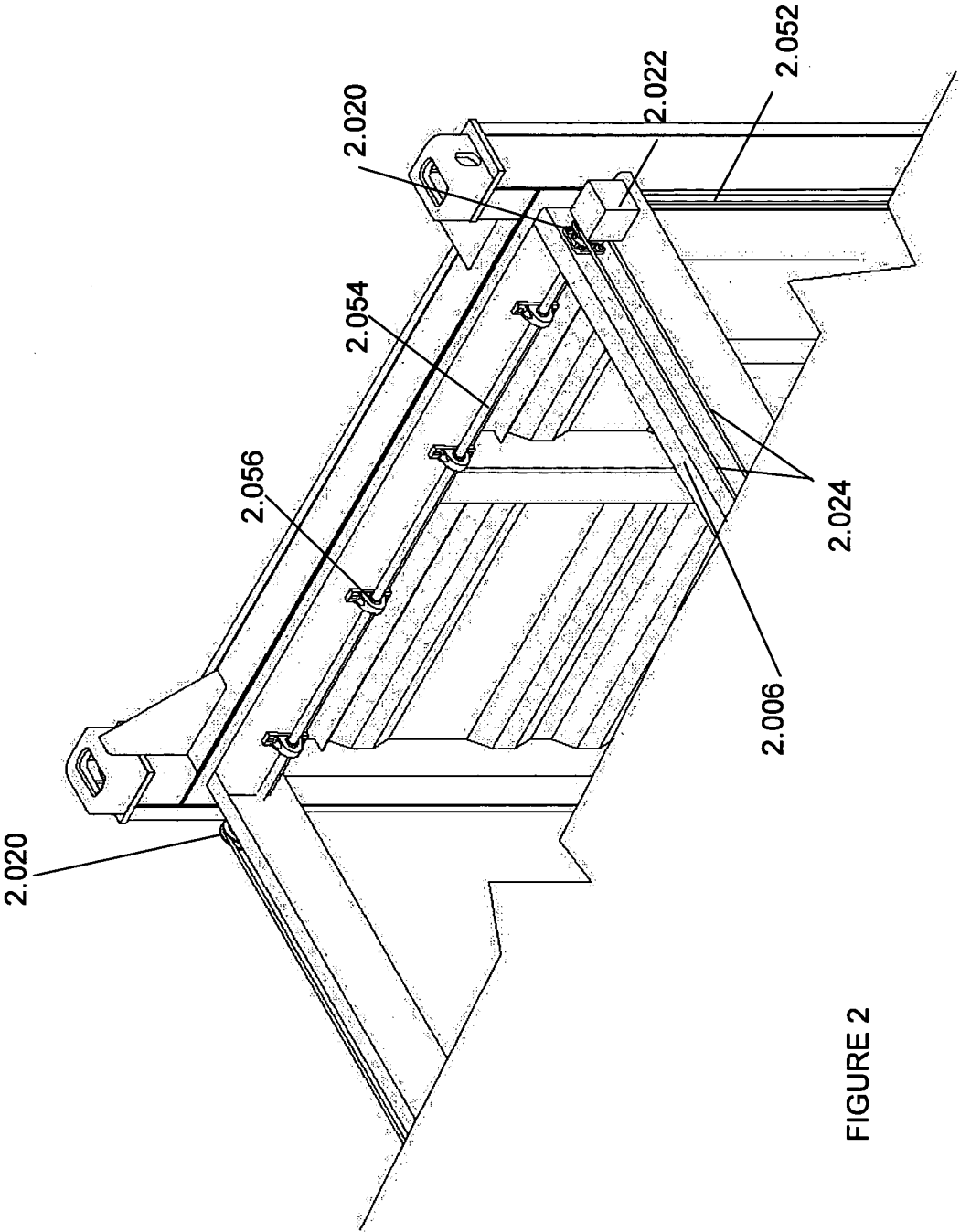
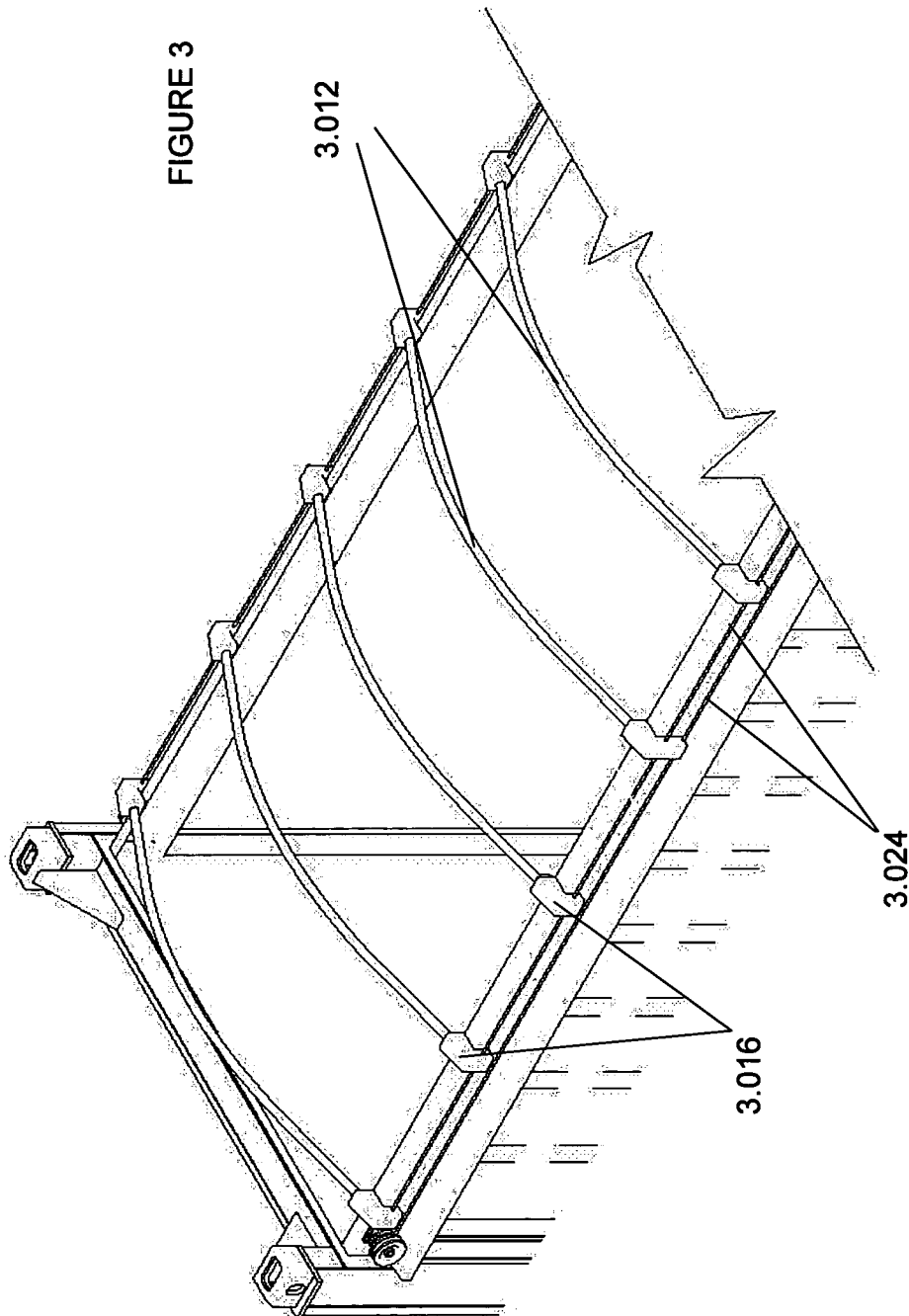


FIGURE 2



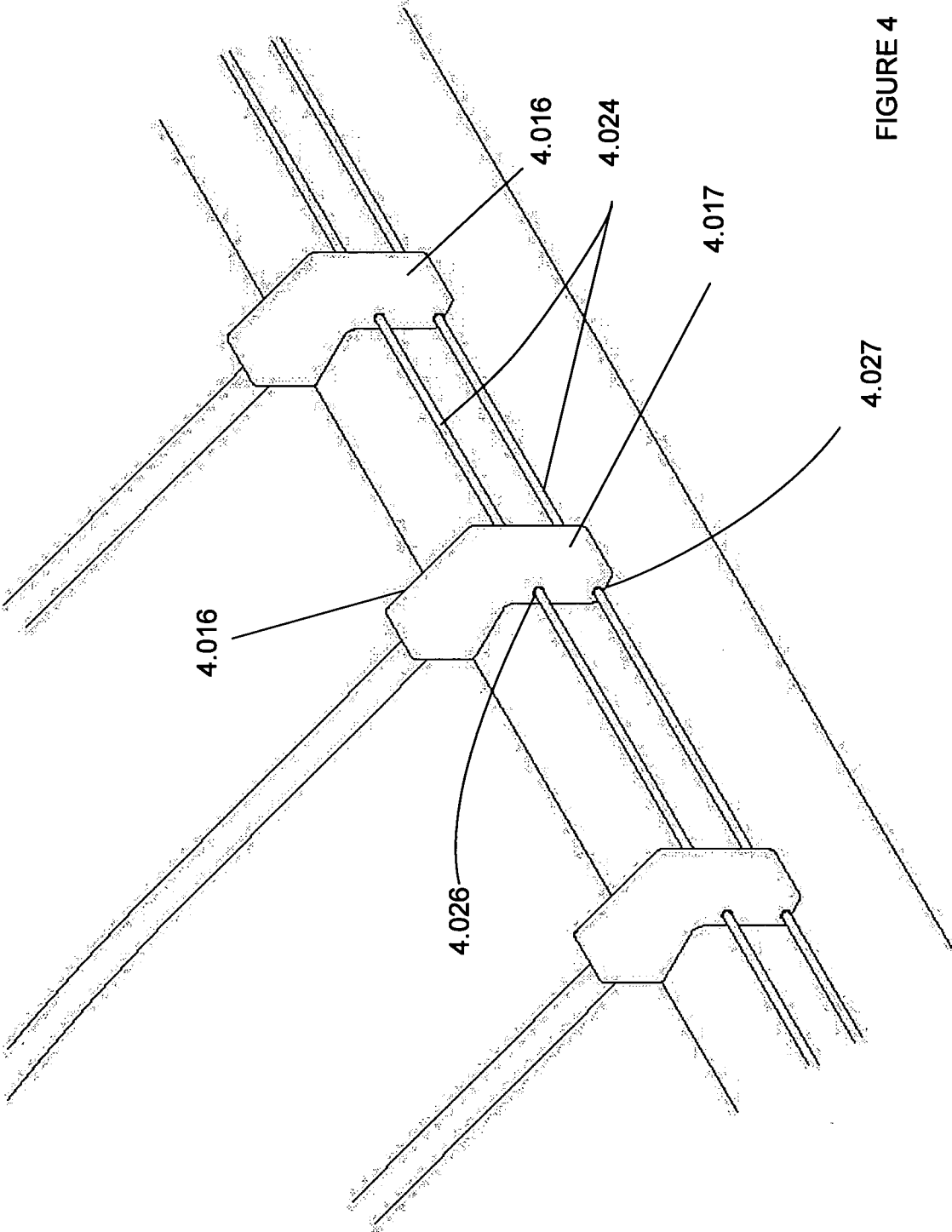


FIGURE 4

FIGURE 5

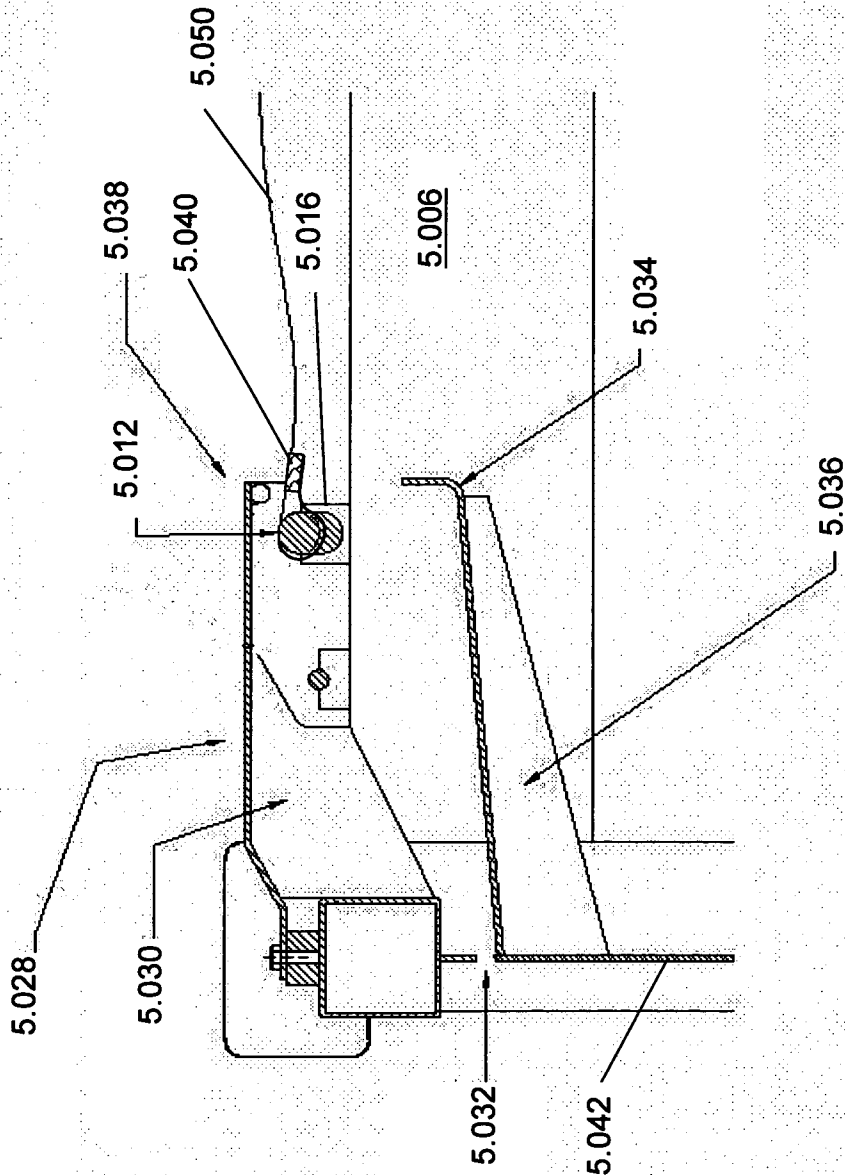
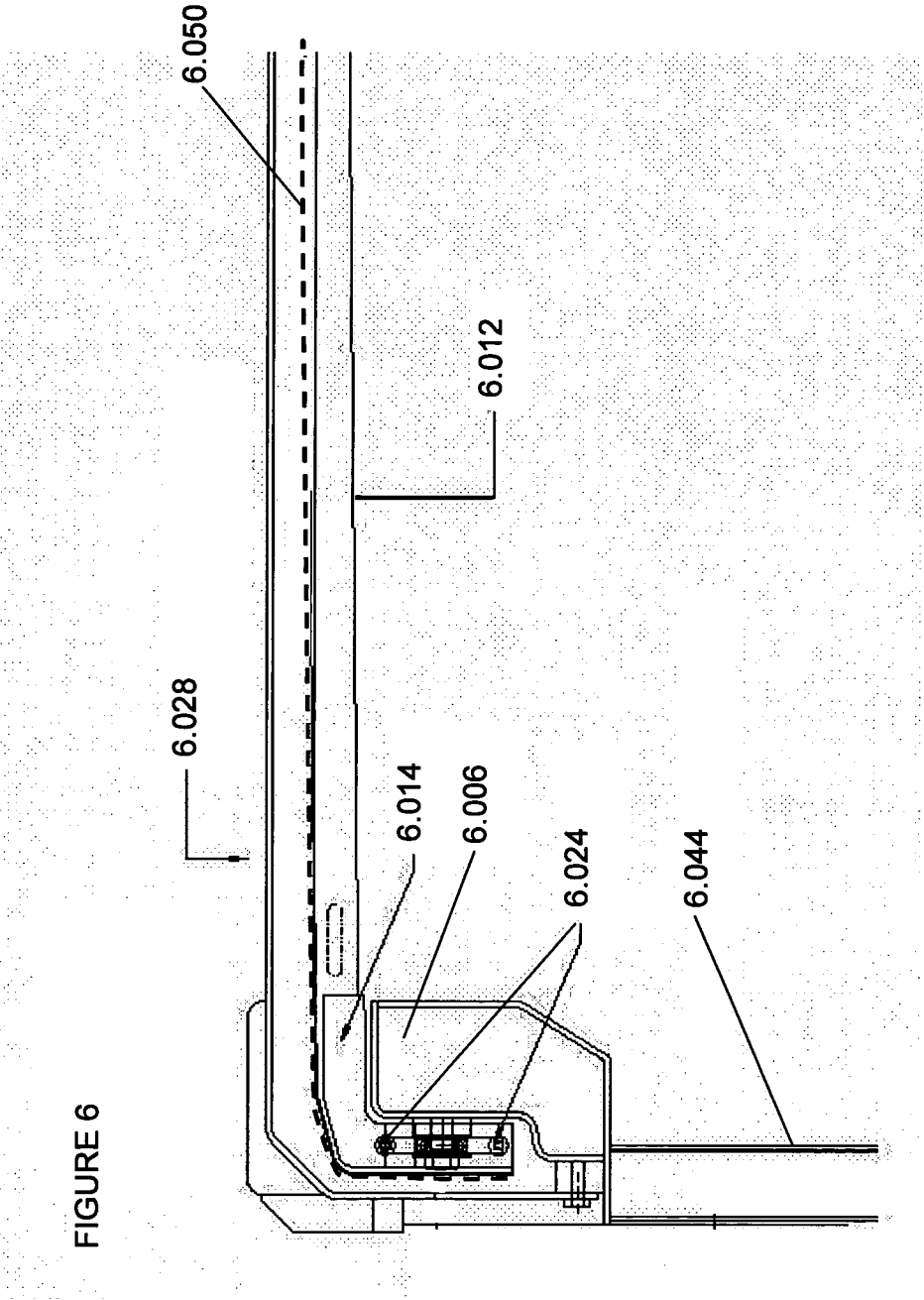
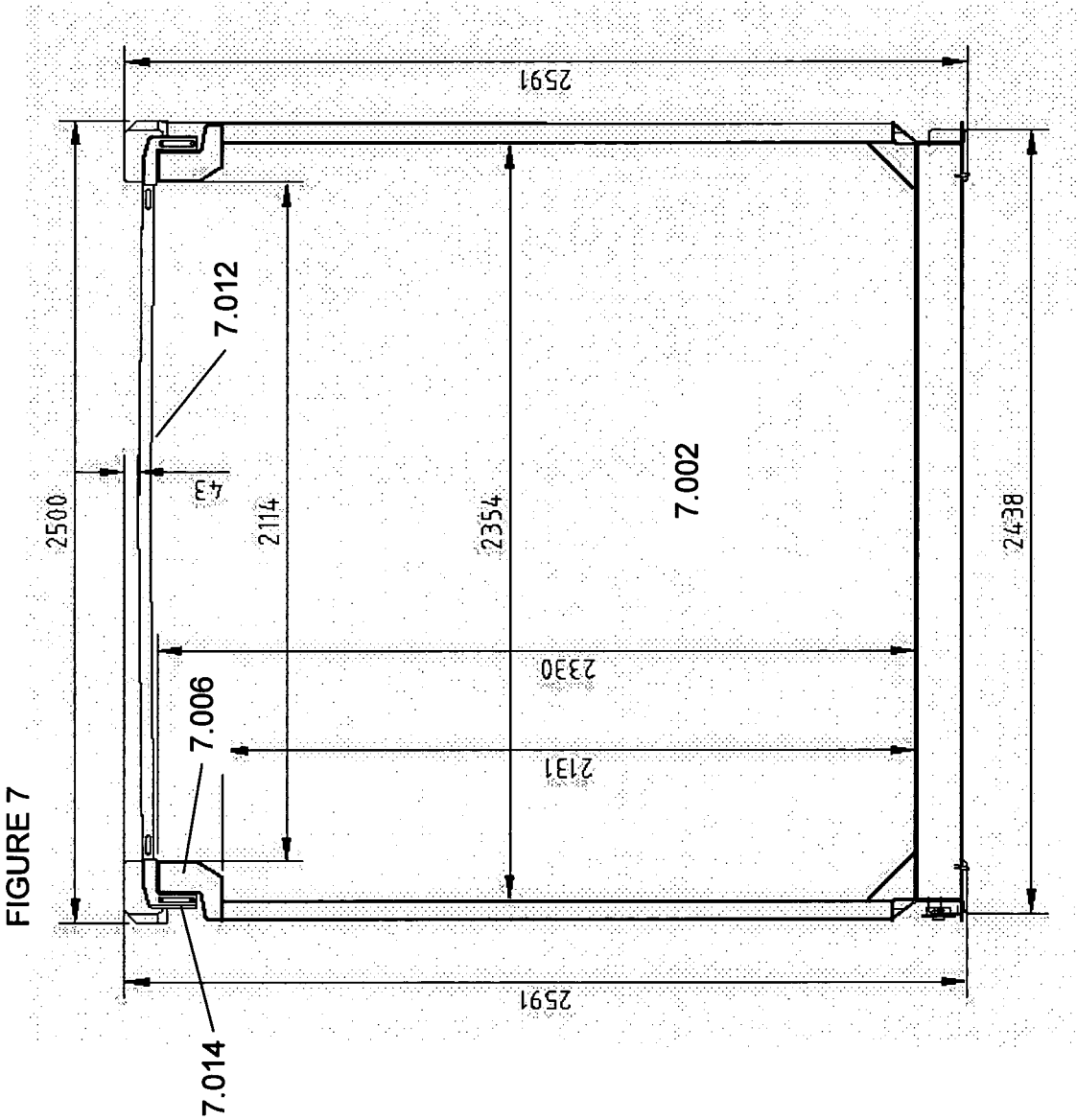


FIGURE 6





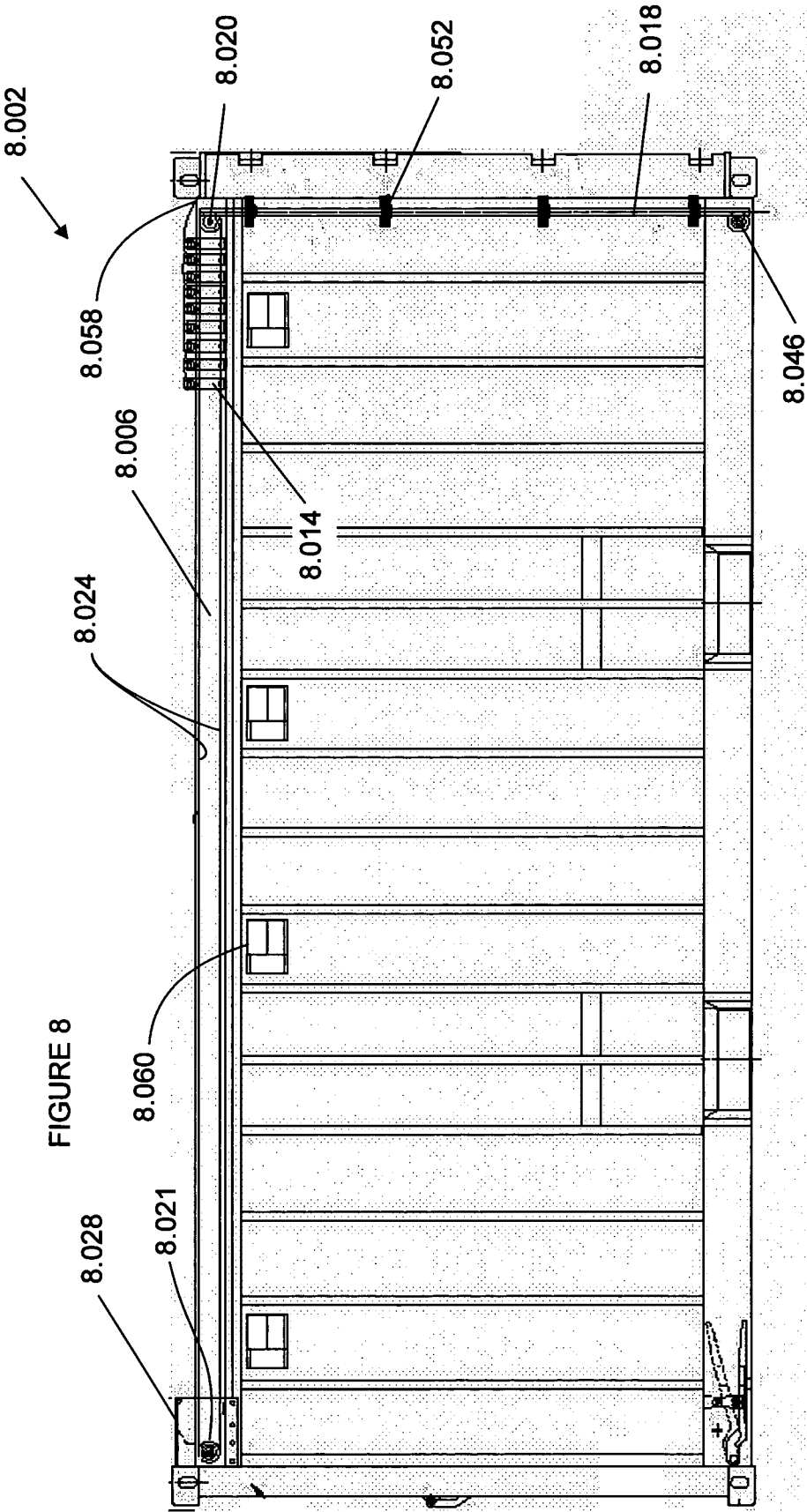
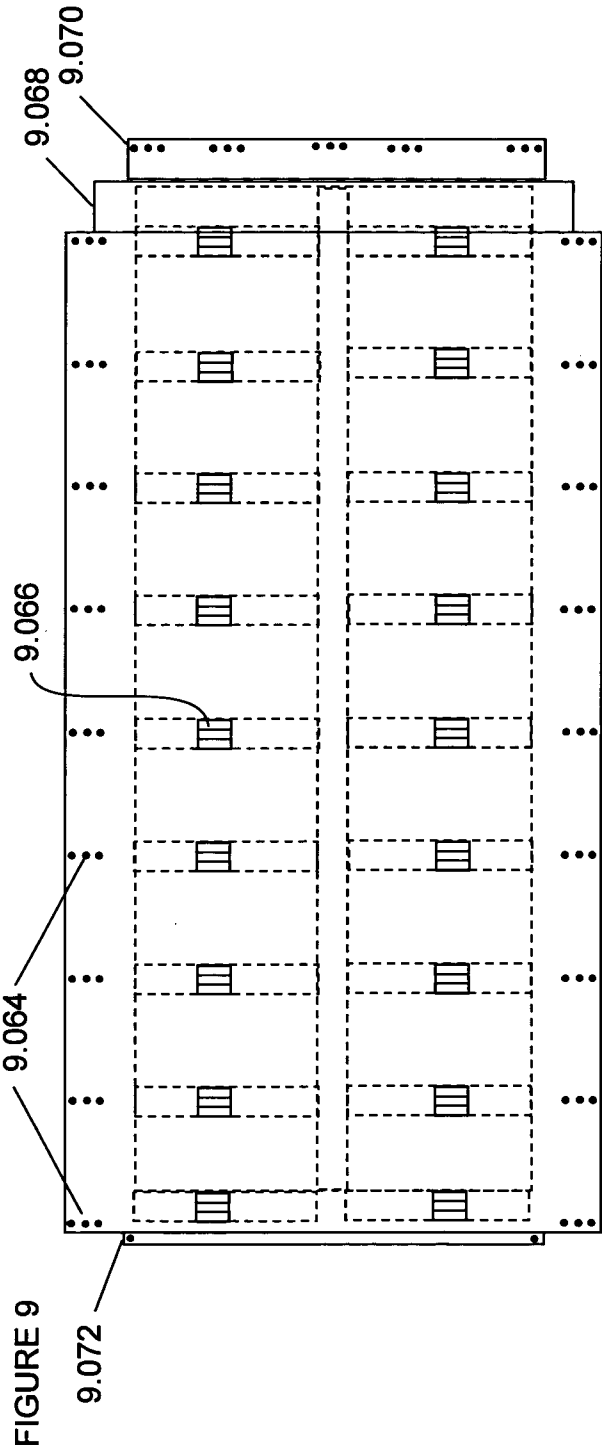


FIGURE 8



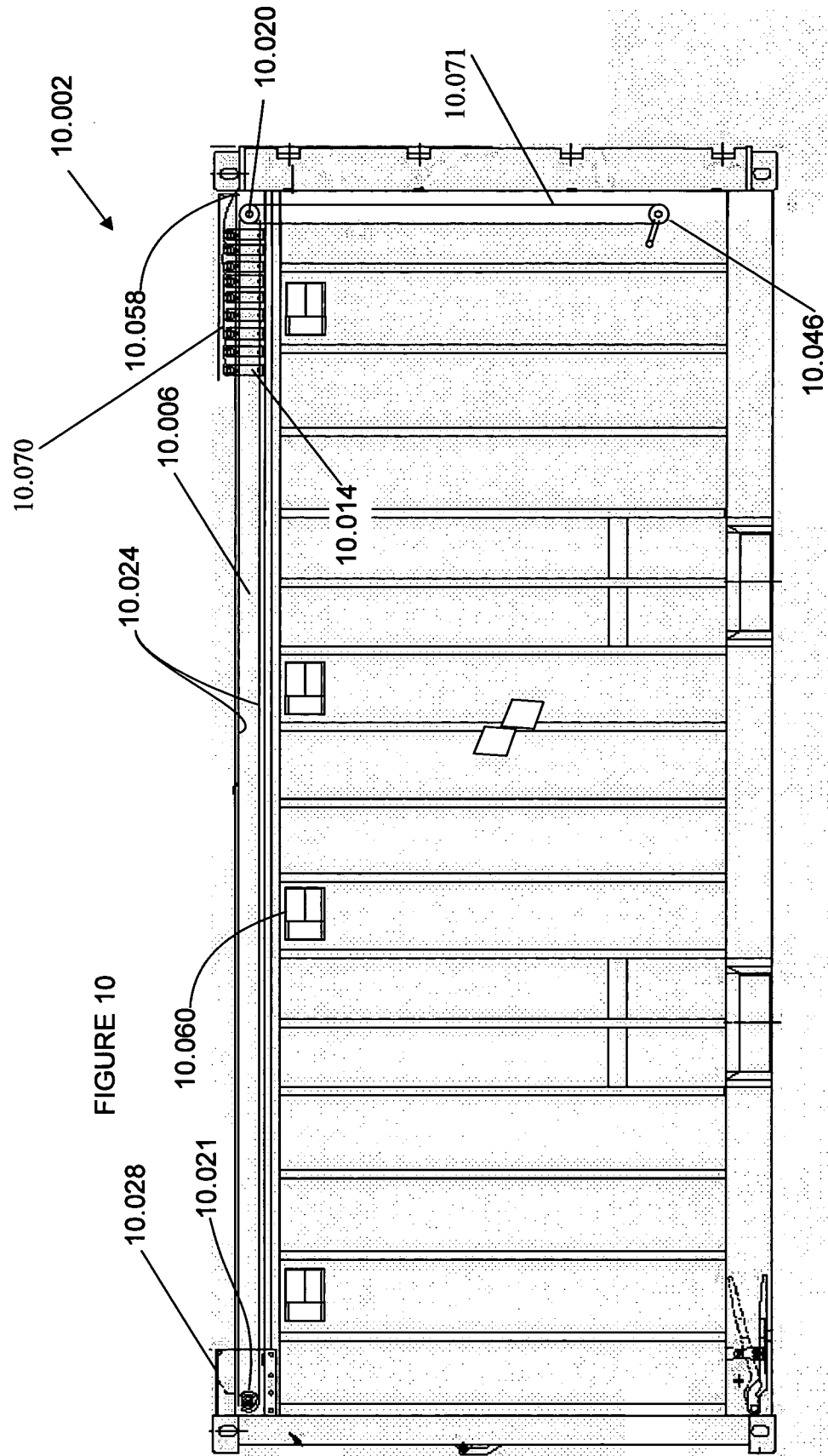


FIGURE 10

11/12

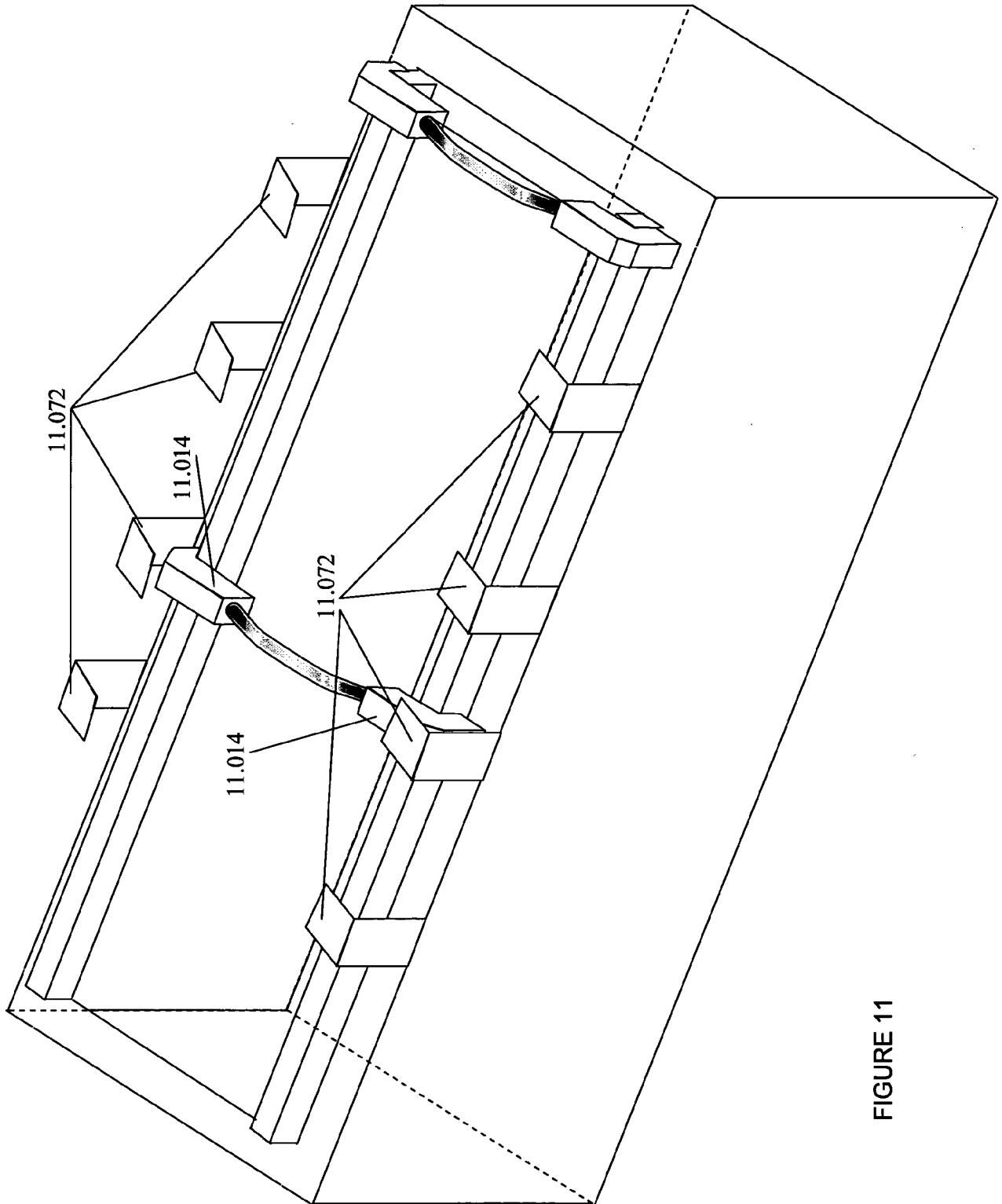


FIGURE 11

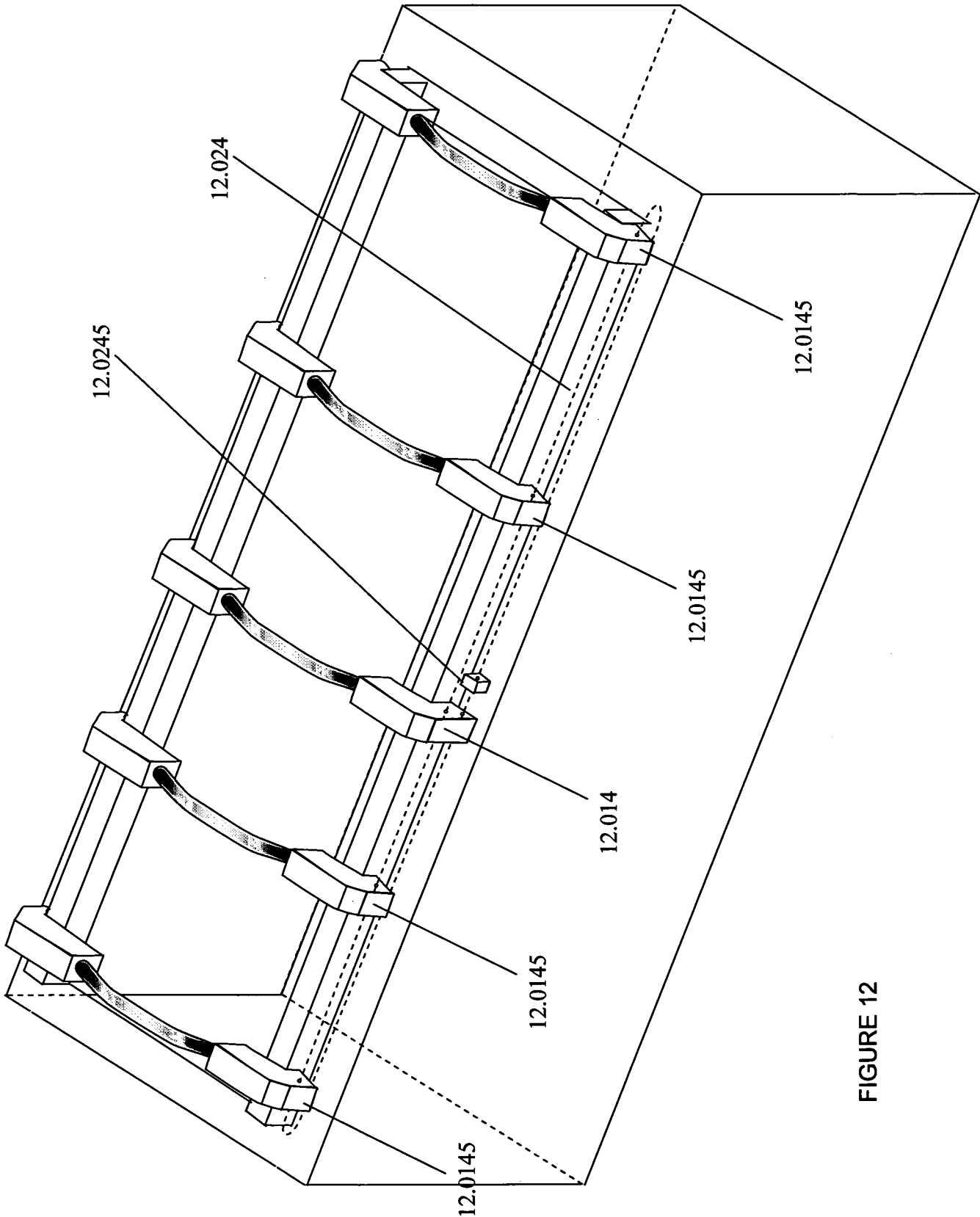


FIGURE 12

INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

B60P 7/04 (2006.0 1)

B61D 39/00 (2006.0 1)

B65D 85/12 (2006.0 1)

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)

WPI, EPDOC: IPC B60P 7/04, B61D 39/00, B65D 88/12 & keywords (cover, move, rail, motor, weather, drip_tray) and like terms. Google Patents and ESPACE with similar keywords.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	U S 4285539 A (COLE) 25 August 1981 see figures 1 & 3	1, 4, 5
Y	see figures 1 & 3	7-13
X	U S 5429408 A (HENNING et al) 4 July 1995 see figures 3-5 and 12; claim 1	1-6
Y	see figures 3-5 and 12; claim 1	7-13
Y	U S 3326598 A (K UNSCH) 20 June 1967 see column 1, lines 60-67; figure 1, item 16	7-13



Further documents are listed in the continuation of Box C



See patent family annex

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Date of the actual completion of the international search

3 September 2010

Date of mailing of the international search report

09 SEP 2010

Name and mailing address of the ISA/AU

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2010/000801

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4 162 100 A (MUSCILLO) 24 July 1979 see column 4, lines 52-61; figures 1 & 2, item 54	7-13
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Y	FR 2850090 A1 (MATEX) 23 July 2004 figures 1 & 2	8, 9
Y	US 6435595 B1 (CHENOWETH) 20 August 2002 see column 5, lines 9-1.6	14, 15
Y	US 2005/0257827 A1 (GAUDIANA et al) 24 November 2005 see paragraphs [0016], [0244], [0368] and [0369]	16

INTERNATIONAL SEARCH REPORT

Information on patent family members

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This Annex lists the known "A" publication level 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.

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Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

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