(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
12 August 2004 (12.08.2004)

PCT

(10) International Publication Number
WO 2004/067316 A2

(51) International Patent Classification[7]: B60P

(21) International Application Number:
PCT/US2004/002283

(22) International Filing Date: 27 January 2004 (27.01.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/352,260 27 January 2003 (27.01.2003) US
10/391,820 18 March 2003 (18.03.2003) US

(71) Applicant *(for all designated States except US)*: **BENLEE, INC.** [US/US]; 30383 Ecorse Road, Romulus, MI 48174 (US).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: **BUSH, Charles** [US/US]; 300 Marquette, Rochester Hills, MI 48307 (US).

(74) Agents: **POSA, John, G.** et al.; Gifford, Krass, Groh, Sprinkle, Anderson & Citkowski, P.C., 280 N. Old Woodward Ave., Ste. 400, Birmingham, MI 48009 (US).

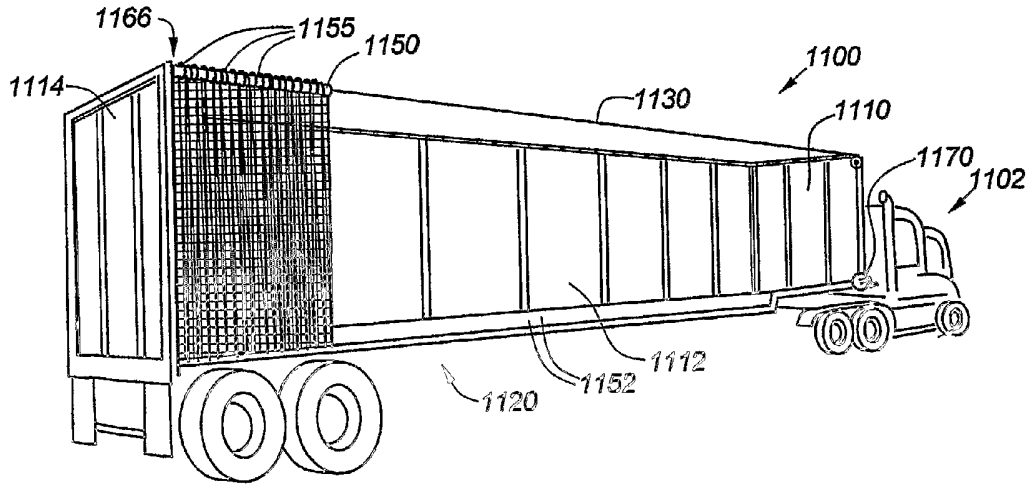
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: TRAILERS PARTICULARLY SUITED TO HAULING CRUSHED AND FLATTENED VEHICLES



(57) Abstract: A hauling trailer particularly suited to the transport of scrap such as crushed and flattened vehicles includes a floor with walls and at least one open side, and a structure for closing off the open side(s) during transport. The structure may be flexible, rigid, or partitioned. According to one preferred embodiment, one or more hydraulic cylinders are used for retracting a wall structure. A trailer according to a different embodiment of the invention broadly includes a floor with walls and one open side, and a hinged door structure that allows one of the long sides of the trailer to be opened and closed for loading and unloading. According to yet a further alternative embodiment, a trailer includes three solid or rigid sides with a fourth side that opens and closes with a drape, though again, two or more sides may also open and close, preferably utilizing the methods and apparatus disclosed herein.

WO 2004/067316 A2

TRAILERS PARTICULARLY SUITED TO HAULING CRUSHED AND FLATTENED VEHICLES

FIELD OF THE INVENTION

This invention relates generally to waste and scrap hauling and, in particular, to a trailer with four sides, at least one of which opens to receive scrap including crushed/ flattened vehicles.

BACKGROUND OF THE INVENTION

The recycling of wrecked cars now represents a substantial business. Such vehicles are first stripped of non-metal parts and hazardous materials, then crushed or flattened to consume less space during transport to a recycling station where they are chipped into small pieces. The small pieces are then sold to be melted down.

Standard flatbed trailers are commonly used to transport the crushed or flattened vehicles. The flattened vehicles are typically loaded on the flatbed in stacks using a fork-lift, and each stack is secured with tie-down chains.

There are disadvantages associated with the use of flatbed trailers, however. For one, when the wrecked vehicles are crushed or flattened, stress is put on various parts such as mirrors and moldings that may become dislodged or loose in transit, resulting in dangerous debris on the highway. Another disadvantage is that if the load has shifted, adjustments should be made to the tie-downs, which are difficult to inspect and secure. Manipulating the chains across the stacks can be unsafe, as the stacks of vehicles are unstable and are prone to slip or tip over.

Various alternative trailers are used to overcome these disadvantages. A common approach is the use of a three-sided trailer of the type disclosed, for example, in U.S. Patent No. 5,599,058. A twelve-inch high retainer wall of solid sheet steel is also provided on the three walled sides around the bottom periphery to prevent any small pieces of debris from falling off the trailer bed on those sides. The open side of the trailer is located on the side of the transport vehicle that will be toward the berm of the road, so that any debris falling in that direction will fall to the side of the road.

In accordance with U.S. Patent No. 5, 876,164, there is provided a device for carrying car frames or the like, comprising a rectangular base member comprising at least one trailer bed, and means for mounting said base member on wheels.

Transverse members are spacedly mounted on the base member and a first vertical protection wall is mounted at a front end of the base member. A second vertical protection wall is mounted on one longitudinal side of the base member, the other longitudinal side being free of vertical protection wall, and a third vertical protection wall is mounted at a rear end of the base member. Support means extend vertically from the transverse member and are aligned along a straight line spaced at an equal distance from the second protection wall. A non-slip member is disposed along the other longitudinal side of the base member, and means for securing a load of car frames are stacked on the transverse members between the support means and the non-slip members.

In accordance with a preferred embodiment, the base member comprises a front trailer bed and a rear trailer bed, the rear trailer bed being articulated to the front trailer bed, the first vertical protection wall being mounted at the front of the front trailer bed, the third vertical protection wall being mounted at the rear of the rear trailer bed, the second vertical protection wall being mounted on the longitudinal left sides of both front and rear trailer beds.

Despite advances of the type described above, the need remains for a trailer with a fourth side that opens and closes. In the United States, this need has increased in urgency due to a recently enacted law requiring that all four sides of car frame haulers be enclosed at least up to the level of the load.

SUMMARY OF THE INVENTION

This invention resides in a hauling trailer, particularly of the type used to transport scrap such as crushed and flattened vehicles. A trailer according to the invention broadly includes a floor with walls and at least one open side, and a mechanism for closing off the open side during transport.

According to one preferred embodiment, one or more hydraulic cylinders are used for retracting a wall structure. The wall structure may be flexible, rigid, or partitioned. The wall structure is preferably retracted by raising and lowering a barrier from a member supported above the open side. To provide greater access to the open side during loading, a separate mechanism is provided for raising and lowering the member independent of the wall structure.

In accordance with this embodiment, a set of permanent, rigid or semi-rigid front, back and side walls extend up from the floor, creating a c-shaped upper edge having two corners and two ends, with the member spanning the two ends. Alternatively, both side wall may be retractable to permit loading and/or unloading from both sides. Retraction is accomplished by moving the barrier between an open position, wherein the bottom edge of the barrier is away from the floor, and a closed position, wherein the bottom edge of the barrier is adjacent the floor.

To raise and lower the member independent of the wall structure, the member forms part of a lid structure, and the separate mechanism moves the lid structure between a lowered position, wherein the member spans the two upper ends of the open side, and a raised position wherein the member is lifted up and away from the open side. In one disclosed example, the lid structure is generally c-shaped with two corners and two ends, with the member connecting the two corners of the lid structure and the two ends of the lid structure being hingedly affixed to the two corners of the upper edge. The central section of the lid structure may be closed or opened to permit loading/loading with the lid structure in the lowered position with the open side sealed off.

Yet a further mechanism may be provided for clamping the side edges of the barrier against the edges of the front and back walls when the barrier is in the closed position. Such mechanisms are preferable hydraulically controlled, though pneumatic or electrical devices may alternatively be utilized.

A trailer according to a different embodiment of the invention broadly includes a floor with walls and one open side, and a hinged door structure that allows one of the long sides of the trailer to be opened and closed for loading and unloading.

In this embodiment, the door structure opens centrally, but includes two panels on either side which are respectively hinged to one another, resulting in an articulated structure that provides more clearance. The doors are preferably cross-braced, and are covered with mesh and/or canvas to retain smaller loose components from falling out. The height of the doors may also be adjusted to suit trailers having a lower floor between front and rear axles, and hinged braces are provided to maintain at least the top bridge of the doors in a straight and aligned condition when the doors are closed.

According to yet a further alternative embodiment, a trailer includes three solid or rigid sides with a fourth side that opens and closes with a drape, though again,

two or more sides may also open and close, preferably utilizing the methods and apparatus disclosed herein.

In this further embodiment, the invention utilizes a cable suspended between opposing upper points, with a curtain having upper eyelets journaled thereon, enabling the curtain to open and close so as to permit access to the trailer interior. Although this may be carried out according to the invention with an upper cable that remains affixed, in the preferred embodiments, a winch and pulley system is used to tighten the cable, and to loosen the cable for detachment purposes.

As a refinement, a door composed of structural members is utilized, preferably toward the rear of the trailer, this door-like feature including an upper tube through which the cable extends, enabling the curtain to be retracted onto the tube, and the door folded over the back of the trailer to keep the closure out of the way during access to the trailer bed. The curtain or drape may be made from various materials, including a vertical louvers, chain-link, and the like, though the preferred material is a mesh with small openings similar or identical to that used in commercial tennis net construction.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a simplified perspective view of one preferred embodiment according to the invention;

FIGURE 2 depicts the embodiment of Figure 1 with the barrier removed;

FIGURE 3 shows the embodiment of Figure 1 with the barrier in a raised position;

FIGURE 4 is a drawing which shows how the barrier is preferably further raised through the use of a retractable lid structure;

FIGURE 5 is a simplified cross-section of an alternative embodiment of the invention, illustrating how hinged panels may be used in lieu of a flexible barrier material;

FIGURE 6 is a simplified cross-section illustrating the way in which a rolled barrier sheet may be used with or without a lid structure;

FIGURE 7 shows how a substantially solid and/or rigid barrier may be used;

FIGURE 8 shows the way in which two opposing sides may be simultaneously opened through the use of a gullwing-type mechanism;

FIGURE 9 is a simplified perspective view of a trailer according to the invention in a closed condition;

FIGURE 10 is a simplified perspective view of the trailer of Figure 9 in an open condition;

FIGURE 11 is drawing that shows an alternative embodiment according to the invention;

FIGURE 12 is drawing that shows a further alternative embodiment according to the invention;

FIGURE 13 is an oblique drawing of a trailer with a curtain closing off an elongated side;

FIGURE 14 is a drawing which shows an initial step associated with retracting the curtain;

FIGURE 15 is a drawing which shows yet a further step associated with curtain retraction; and

FIGURE 16 is a drawing which shows the preferred use of a door assembly including an upper tube, allowing the retracted curtain to be folded onto the back wall of the trailer when not in use.

DETAILED DESCRIPTION OF THE INVENTION

Now turning to the drawings, Figure 1 is a simplified, perspective view of an embodiment of the invention, depicted generally at 100. The trailer 100 is pulled by a tractor 102 of any conventional design, utilizing any attachment mechanism such as a king-pin plate, as appropriate.

In the preferred embodiment, the trailer 100 includes a front wall 110, a rear wall 112, and a side wall 114, extending up from a floor 120, as perhaps best seen in Figure 2. This leaves an open side along the length of a trailer, which this invention opens and closes for loading/unloading and transport, respectively. In all embodiments, the side wall 114 may be retractable according to any of the configurations disclosed herein, as opposed to being permanently affixed.

The wall structure used to close the open side in this case comprises a barrier material 130, as seen in Figure 1, which drapes down from a lid structure 132. In the transport condition, shown in Figure 1, the barrier 130 is tied at appropriate points 134 along the floor of the trailer. Any appropriate tie-down mechanism may be used for such purpose. Optionally, hydraulically operated clamps 140 may be used at front and rear to hold the edges of the barrier 130 against the edges of the walls 110 and 112 to prevent wind disturbances during travel.

The lid structure 132 in this embodiment is opened and closed using front and rear hydraulic cylinders, only the forward one of which is visible at 150. The lid structure 132 is hinged at points 152 and 154, and is preferably constructed utilizing relatively lightweight cross-bracing as opposed to more heavy solid structures. Associated with the lid structure 132 are a series of rotatably driven wheels 160, each coupled to straps 162, such that by rotation thereof, the barrier 130 may be raised and lowered.

The raised condition is depicted in Figure 3, wherein the barrier material 130 has been drawn up and is now in closer proximity to the lid structure 132. While the condition shown in Figure 3 may be useful for some loading purposes, in the preferred embodiment, the front and rear hydraulic cylinders 150 are instead extended to raise the lid structure higher above the open side, thereby permitting scrap in the form of crushed and flattened vehicles, and the like, to be loaded by forklift through the open side without any interference with the wall structure in general or barrier material in particular. The raising the of the barrier material 130 using rotatably driven straps 162 may occur before or during the raising of the lid structure.

Although a flexible material such as a tarpaulin or vinyl sheet may be used as the barrier material, hinged panels or even large solid panels may be used instead, as will now be described. In Figure 5, for example, a plurality of hinged panels 502 may be used raised and lower using a pulley 504 coupled to a strap 506 much like the design utilizing a flexible sheet material for the barrier. In addition, although a lid structure may be used to bring the retracted barrier material that much higher than the open side, this is actually not necessary to each embodiment of the invention, in the sense that the mechanism used to raise and lower the barrier may simply permanently span the top edge of the open side. Accordingly, this is depicted with broken lines 510 and 610 in Figures 5 and 6. Figure 6 also shows how the barrier material may

itself simply be rolled onto an elongated roller without the use of straps. As with the embodiments set forth above, either a flexible sheet material or hinged or partitions may be used for such purpose.

Figure 7 illustrates the way in which a substantially solid walls structure 702 in conjunction with a hinged lid 704. Figure 8 shows the way in which a gullwing design located more or less centrally down the length of the trailer may be used to open up barriers on both sides, thereby enabling loading/unloading from different directions. A disadvantage of the design of Figure 8 is that it makes it more difficult to remove the contents of the trailer using a grappling hook, as is now the case. Nevertheless, all of the embodiments herein may further include a top cover, either permanently, semi-permanently or retractably affixed to the open top of the trailer, whether or not a lid structure is utilizing.

Figure 9 is a simplified, perspective view of a different embodiment of the invention depicted generally at 900. The trailer 900 is pulled by a tractor 902 of any conventional design, utilizing any attachment mechanism such as a king-pin plate, as appropriate. As with other embodiments, the trailer 900 includes a front wall 910, a real wall 912, and a side wall 914, extending up from a floor 920, as perhaps best seen in Figure 10. This leaves an open side along the length of a trailer, which this invention opens and closes for loading/unloading and transport, respectively.

The wall structure used to close the open side comprises a set of bi-fold doors 930, 932, 934, 936. Portions 930 and 936 are hinged to the rear wall 912 and front wall 910, respectively, using hinges 940 and 946, whereas portions 930 and 936 are hinged to portions 932 and 934 using hinges 942 and 944, respectively. The doors 132 and 134 are fastened together using some form of fastener or latch 950.

In this embodiment, the portions 930, 932, 934, 936 are preferably cross-braced, as shown, and covered with mesh and/or steel grating(s) and/or canvas to retain smaller loose parts from falling out. Also in this embodiment, along the upper edges where the various panels adjoin, hinged 960, 962, 964 are preferably employed to keep at least the upper edge in straight alignment when the panels are closed.

Figure 10 is a drawing which shows the doors in an open condition, also illustrating the way in which the bi-fold nature of the panels allows access to the inner compartment with relatively tight clearances. Note that the braces 960, 962, 964 are now in an up condition, with latch 950 open.

Although a pair of bi-fold doors are shown in the embodiment of Figures 9 and 10, the invention is not limited in this regard, and may use tri-fold doors as shown in Figure 11, or a larger number of articulated panels. In addition, although in the preferred embodiment the panels open centrally, this is not essential either, as the panels may open from one side, as shown in Figure 12.

Figure 13 illustrates, from an oblique perspective, a further alternative embodiment of the invention shown generally at 1100, which is pulled by a tractor 1102 of any appropriate design. Although the trailer 1100 is shown as having a certain configuration and/or dimensions to be gleaned from the illustration, the invention is not limited in this regard, and may be used with any size or type of hauling configuration, regardless of the way in which it is pulled. Also, although the description to follow is directed to a curtain that opens and closes with respect to a single side, will be appreciated that the apparatus and technique may be used for the opposing elongated side or other walls of the container as convenient for loading/ unloading purposes.

Broadly, the trailer 1100 includes cable 1130 suspended between an upper point toward the front wall 1110 of the trailer and an upper point associated with the rear wall 1114. Suspended from this cable 1130 is a curtain 1152, preferably through the use of eyelets 1155. Though not evident in the drawing, preferred embodiments further include attachment devices such as shock cords at the front, rear and/or bottom to hold the curtain 1152 in place, particularly during transport on highways.

Although different materials may be used for the curtain 1152, such as thin vertical slats or louvers, chain or chain-link mesh, or solid fabric such as fiber-reinforced plastics, in the preferred embodiment, a mesh material akin to that used for tennis net construction is used, this offering a practical compromise in terms of weight, and the ability to keep loose components contained while not being susceptible to wind capture.

Although the simplest embodiment may use a fixed cable strung between two upper points on a permanent or semi-permanent basis, with a curtain suspended therefrom, in the preferred embodiment of the invention, additional features are added to facilitate a more convenient and effective retraction of the curtain. For one, the upper end of the cable 1130 is preferably journaled over a pulley 1140, with the

remaining length 1136 of the cable 1130 extending down to a manually-operated winch 1160, enabling the cable to be tightened for greater stability.

The winch 1170 may also be used to loosen the cable, and with the optional addition of a connector comprising, for example, a hook 1132 and eyelet 1134, the cable 1130 may be detached from cable 1136 for stowage purposes. As a further refinement, a structural door comprising an upper tube 1150 and strengthening members 1160 may be provided, enabling the curtain 1152 to be drawn thereon and folded out of the way, as explained in further detail below.

Figure 14, for example, illustrates a first step associated with retracting the curtain 1152 according to this embodiment of the invention. In particular, the curtain is detached as necessary and retracted such that all the eyelets 1155 are now journaled over the tube 1150. When this is done, the cable 1130 may be loosened using winch 1170, as shown in Figure 15, enabling an operator to disconnect the cable at hook 1132 and eyelet 1134. The detached cable 1130 may either be manually dressed or with respect to the retracted curtain 1152 or, a separate winch (not shown) may be used to withdraw some or all of the cable 1130 into the tube 1150.

Once the curtain 1152 and cable 1130 are properly stowed relative to the door structure, it is swung backward on hinge 1166, enabling it to be folded onto the back wall of the trailer, and out of the way, thereby enabling greater access to the cargo area, as shown in Figure 16.

I claim:

1. A trailer for hauling crushed or flattened vehicles, and the like, comprising:

a floor section with wheels thereunder;

front, back and side walls extending up from the floor creating a c-shaped compartment having an open top and an open side; and

a structure for closing off the open side for transport.

2. The trailer of claim 1, wherein:

the c-shaped compartment includes an upper edge having two corners and two ends; and

the structure further includes:

a member spanning the two ends,

a barrier extending down from the member having a bottom edge and two sides edges, and

a mechanism for moving the barrier between an open position, wherein the bottom edge of the barrier is away from the floor, and a closed position, wherein the bottom edge of the barrier is adjacent the floor.

3. The trailer of claim 2, wherein the barrier is a tarpaulin.

4. The trailer of claim 2, wherein the barrier is composed of one or more hinged panels.

5. The trailer of claim 2, wherein the mechanism is operative to raise and lower the barrier with respect to the member.

6. The trailer of claim 2, wherein:

the member forms part of a lid structure; and

the structure further includes a mechanism for moving the lid structure between a lowered position wherein the member spans the two ends of the upper edge, and a raised position wherein the member is lifted up and away from the two ends.

7. The trailer of claim 6, wherein the lid structure has an open central section facilitating loading and unloading from above with the lid structure in the lowered position.

8. The trailer of claim 6, further including a sheet of material to close off the lid structure.

9. The trailer of claim 6, wherein:

the lid structure is generally c-shaped with two corners and two ends; and

wherein the member connecting the two corners of the lid structure and the two ends of the lid structure is hingedly affixed to the two corners of the upper edge.

10. The trailer of claim 2, wherein:

the front and back wall define vertical, parallel, spaced-apart edges extending from the floor to the two ends of the upper edge; and

further including a mechanism for clamping the side edges of the barrier against the edges of the front and back walls when the barrier is in the closed position.

11. The trailer of claim 1, wherein:

one or more of the front, back and side walls are also moveable between an open and a closed position.

12. The hauling trailer of claim 1, wherein:

the structure is a retractable wall structure for closing off the open side during transport.

13. The hauling trailer of claim 12, further including one or more hydraulic cylinders for retracting the wall structure.

14. The hauling trailer of claim 12, further including:

a member supported above the open side; and

a mechanism along the member for retracting the wall structure through raising and lowering.

15. The hauling trailer of claim 14, further including:

a separate mechanism for raising and lowering the member independent of the wall structure.

16. The hauling trailer of claim 2, further including:

a lid structure for closing off the top.

17. The hauling trailer of claim 16, further including:

a mechanism for moving the lid structure between a lowered position wherein the member spans the two ends of the upper edge, and a raised position wherein the member is lifted up and away from the two ends.

18. The trailer of claim 16, wherein the lid structure has an open central section facilitating loading and unloading from above with the lid structure in the lowered position.

19. The trailer of claim 16, further including a sheet of material to close off the lid structure.

20. The trailer of claim 16, wherein the lid structure is generally c-shaped with two corners and two ends, with the member connecting the two corners of the lid structure and the two ends of the lid structure being hingedly affixed to the two corners of the upper edge.

21. The trailer of claim 1, wherein the structure includes:

one or more articulating doors that may be opened for loading the trailer and closed to cover the open side.

22. The trailer of claim 21, including a pair of side-by-side bi-fold doors.

23. The trailer of claim 21, wherein each doors is constructed using an outer frame filled in with mesh, flexible material, or both.

24. The trailer of claim 21, wherein:

the floor includes a central deeper portion; and

the height of the doors is variable to accommodate the deeper portion.

25. The trailer of claim 21, further including a brace where the doors meet to keep the doors in substantially straight alignment when closed.

26. The trailer of claim 1, wherein:

the front wall has an upper point defining a forward, upper corner of the open side, and the back wall has an upper point defining a rearward, upper corner of the open side; and

the structure includes:

a cable spanning the upper forward and rearward points; and

a curtain suspended from the cable, the curtain having a retracted condition wherein the interior is accessible through the open side for trailer loading and unloading, and an expanded condition wherein the open side is closed off for transport.

27. The trailer of claim 26, wherein the curtain is a flexible mesh curtain.

28. The trailer of claim 26, further including a winch for maintaining the cable in a taut condition.

29. The trailer of claim 26, further including a hinged structure having a rigid upper member enabling the curtain to be retracted onto the member and the structure folded out of the way for improved access to the interior of the trailer.

30. The trailer of claim 29, wherein the rigid, upper member is a tube into which the cable extends.

31. The trailer of claim 30, further including a mechanism for drawing the cable into the tube.

32. The trailer of claim 29, wherein the hinged structure folds onto the rear wall of the trailer.

33. The trailer of claim 26, wherein the cable further includes a connector enabling the cable to be disconnected in a non-taut condition.

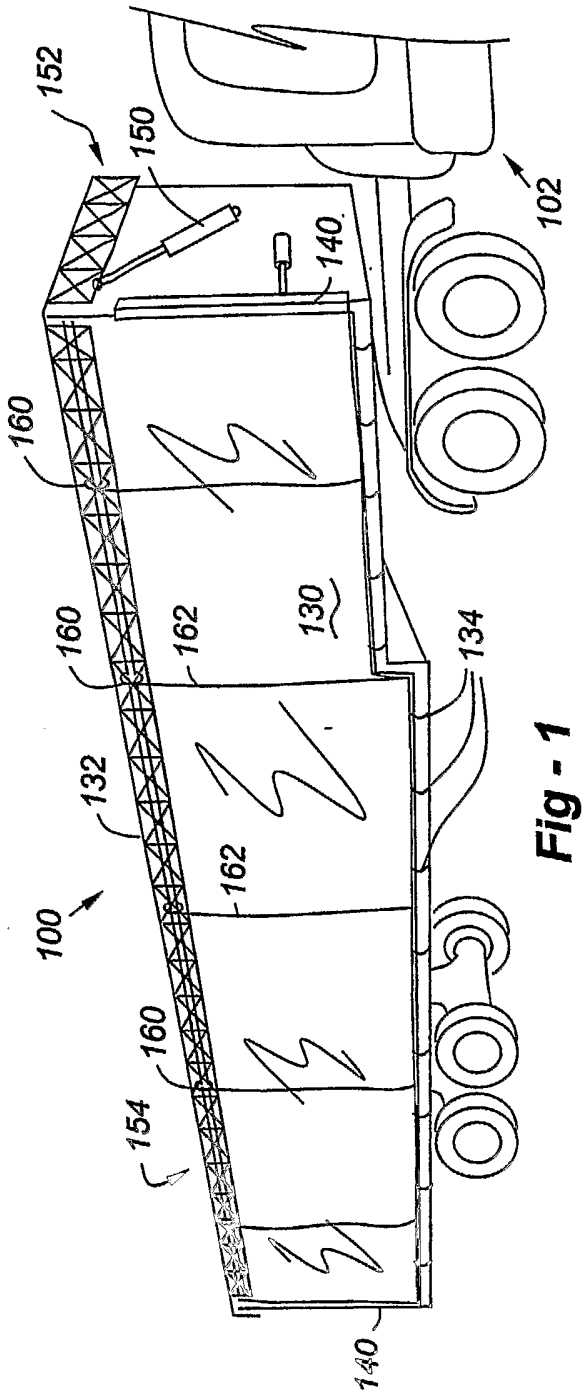

152
150
140
102
160
160
162
130
134
132
162
100
160
154
140

Fig - 1

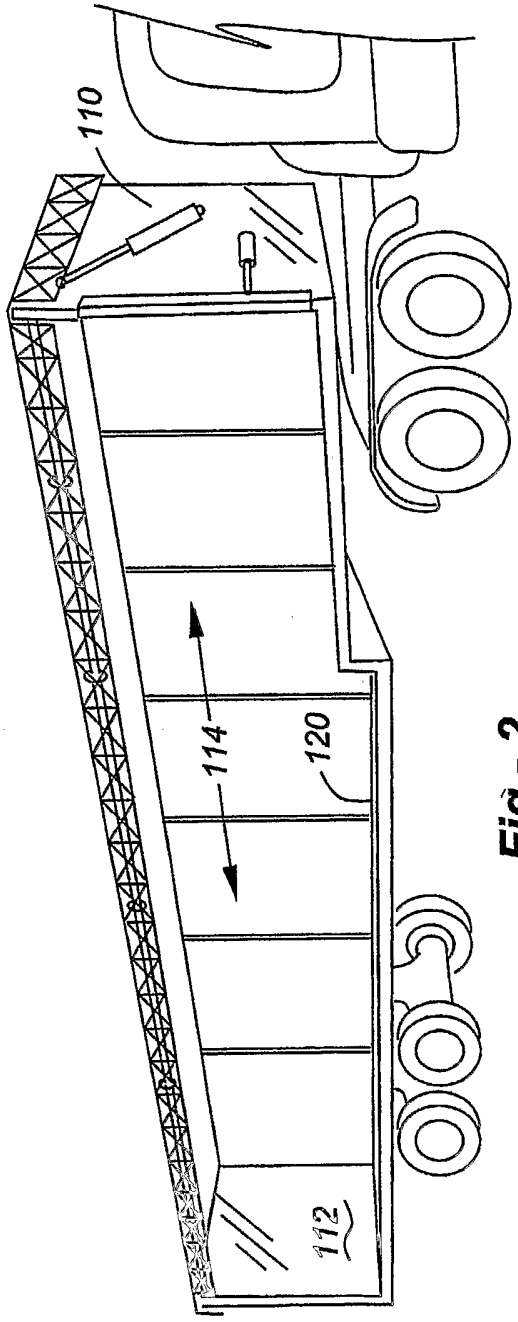

110
114
120
112

Fig - 2

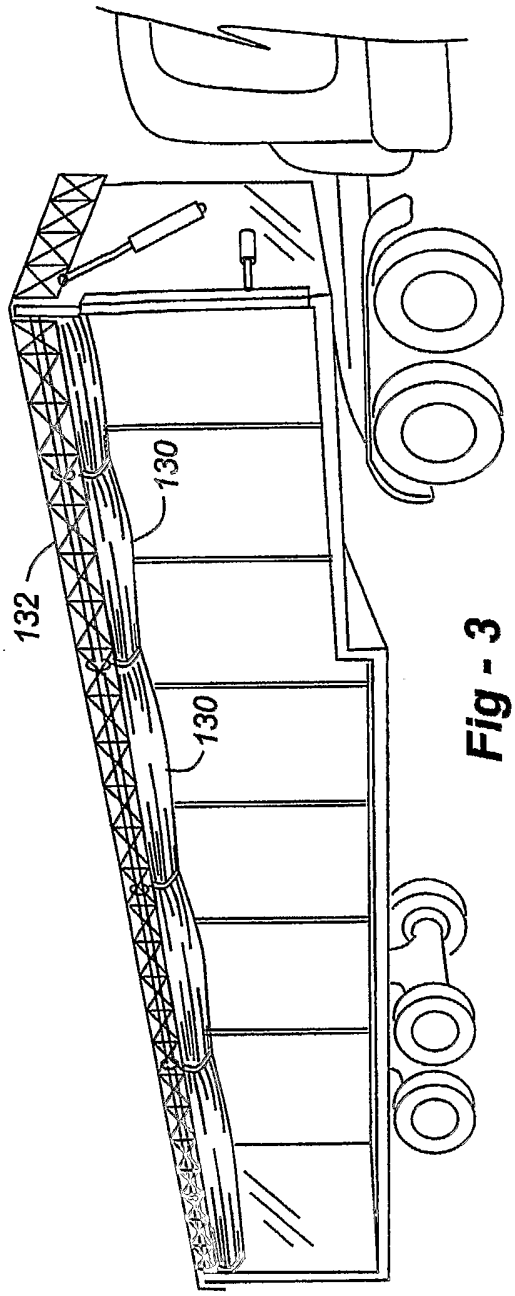


Fig - 3

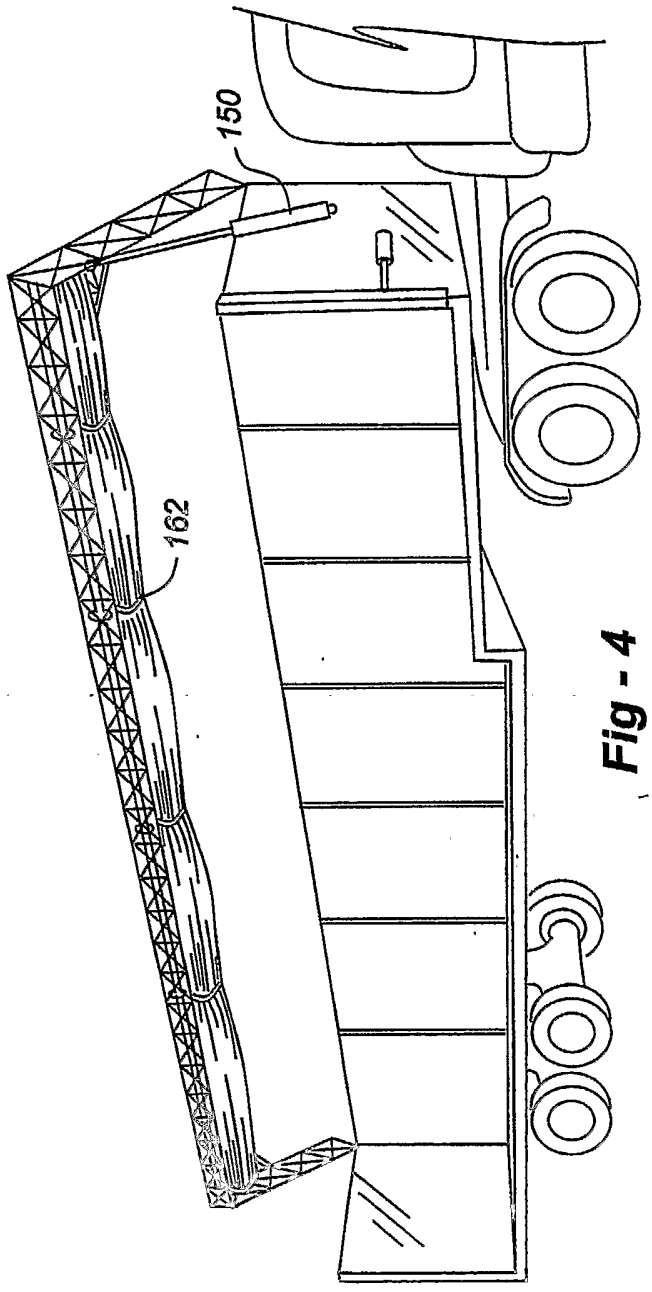


Fig - 4

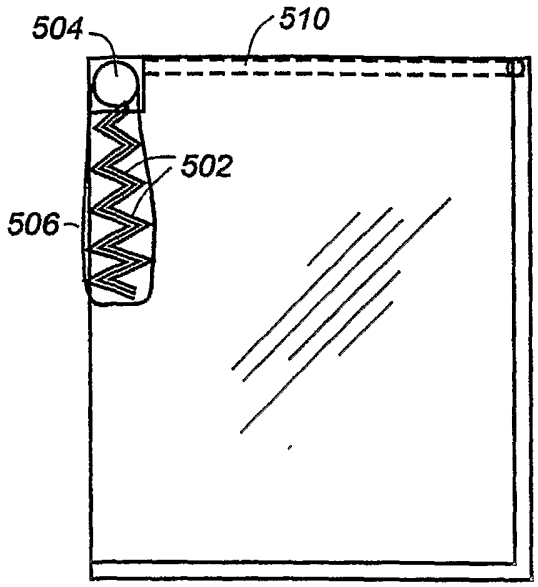


Fig - 5

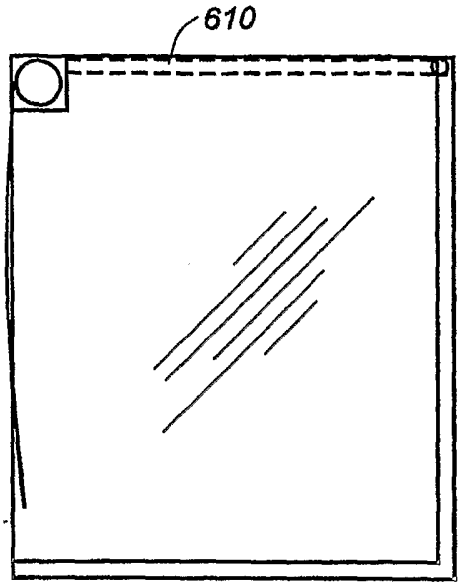


Fig - 6

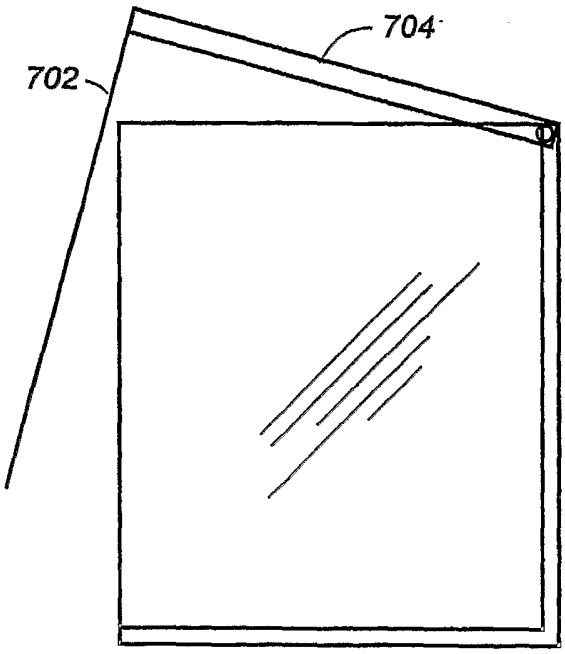


Fig - 7

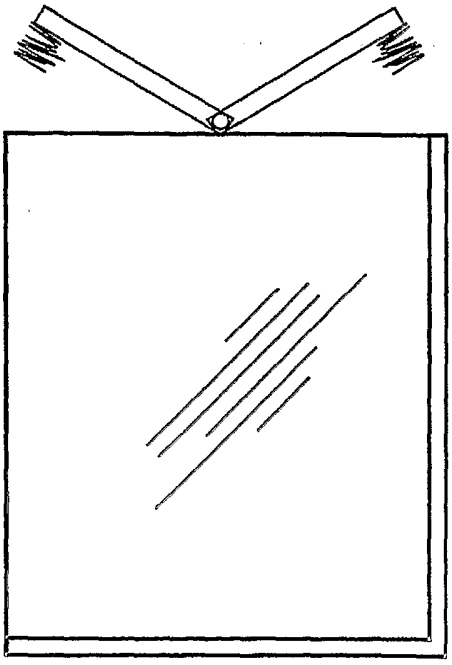


Fig - 8

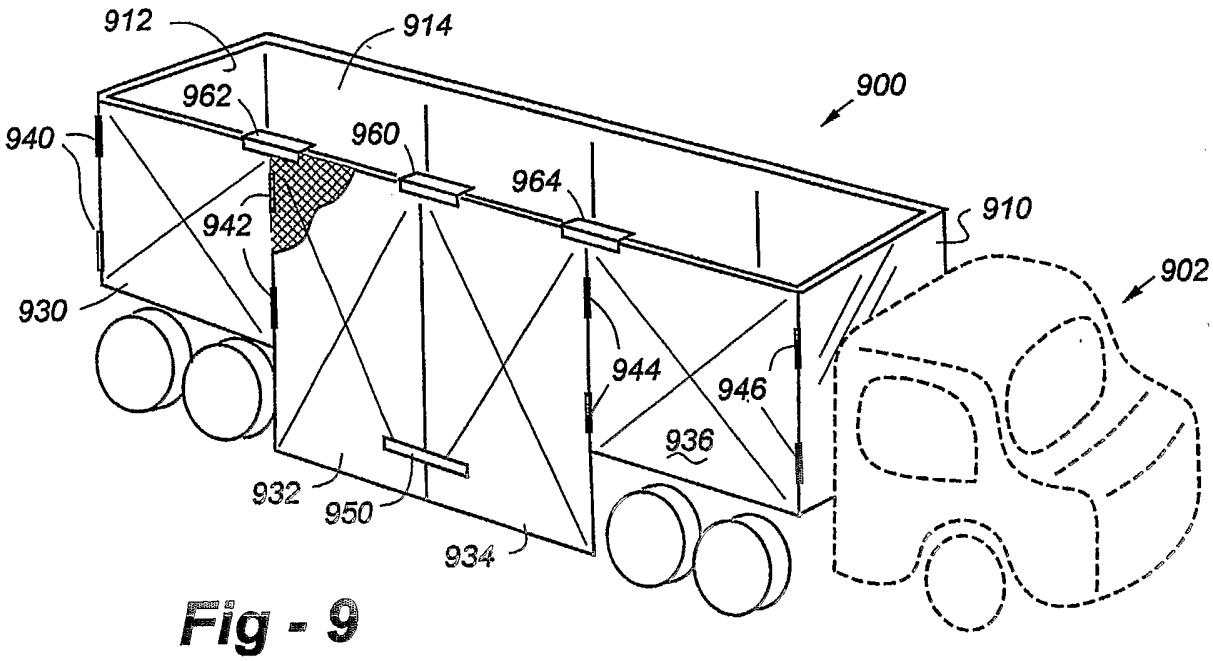

912
914
962
900
940
960
964
910
942
902
930
944
946
936
932
950
934

Fig - 9

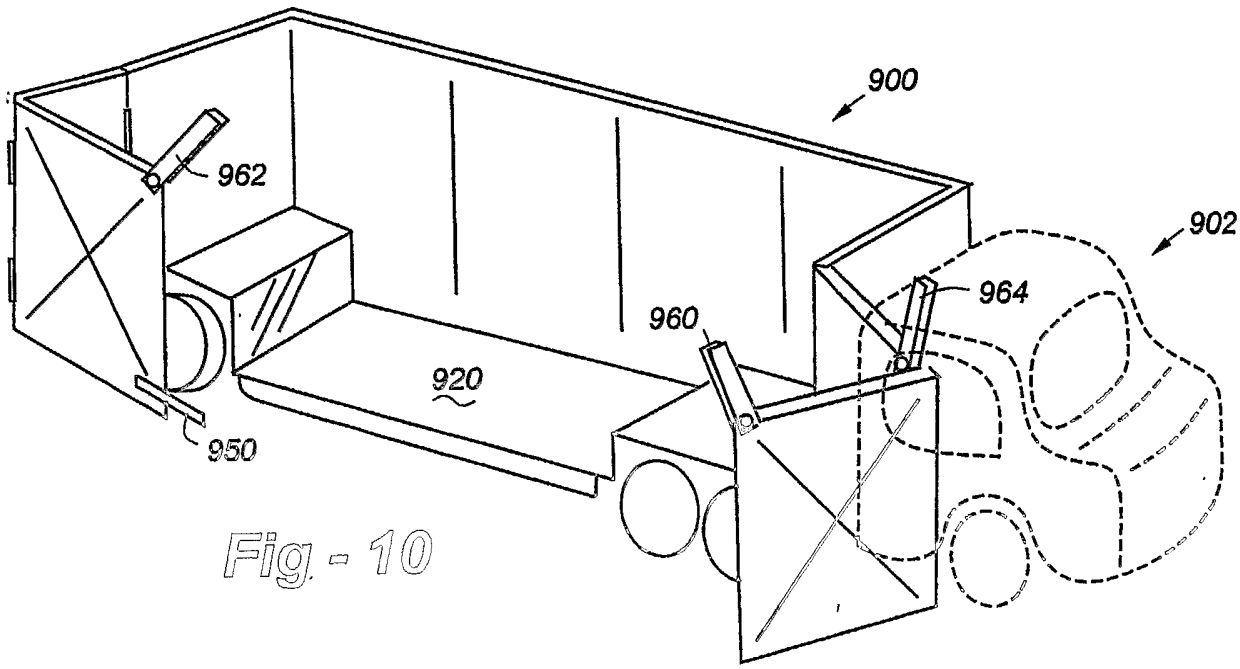

900
962
902
964
960
920
950

Fig - 10

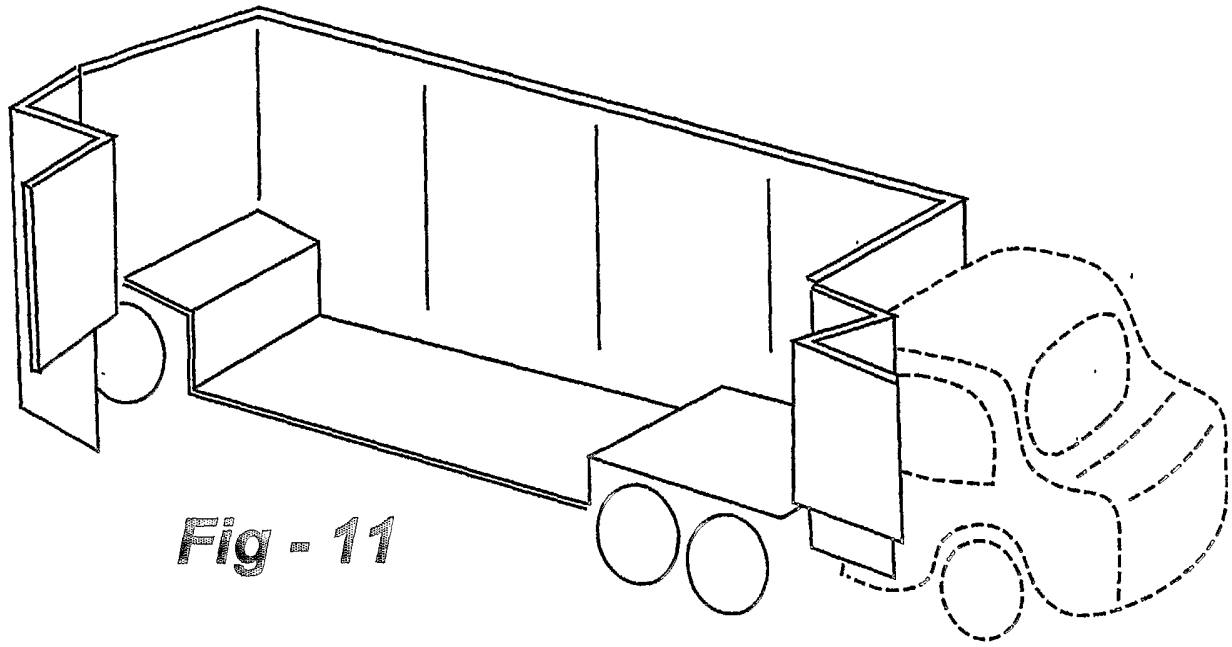


Fig - 11

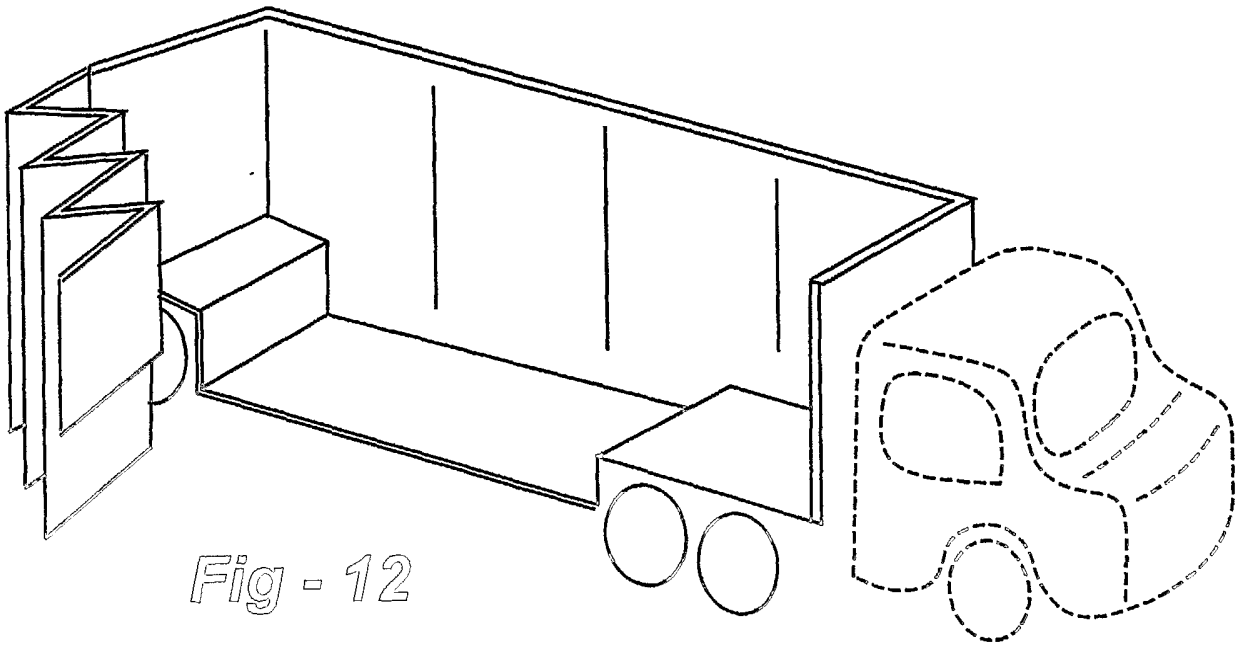


Fig - 12

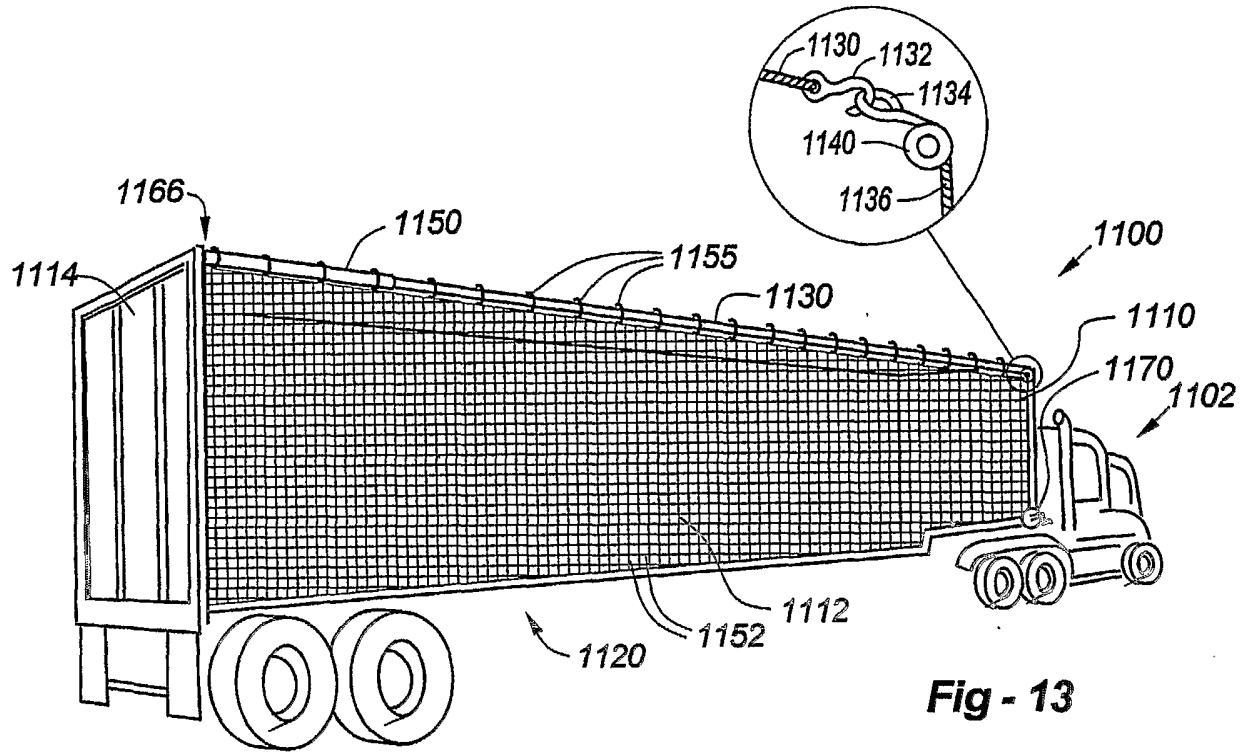

1130
1132
1134
1140
1136
1166
1150
1155
1130
1100
1114
1110
1170
1102
1112
1152
1120

Fig - 13

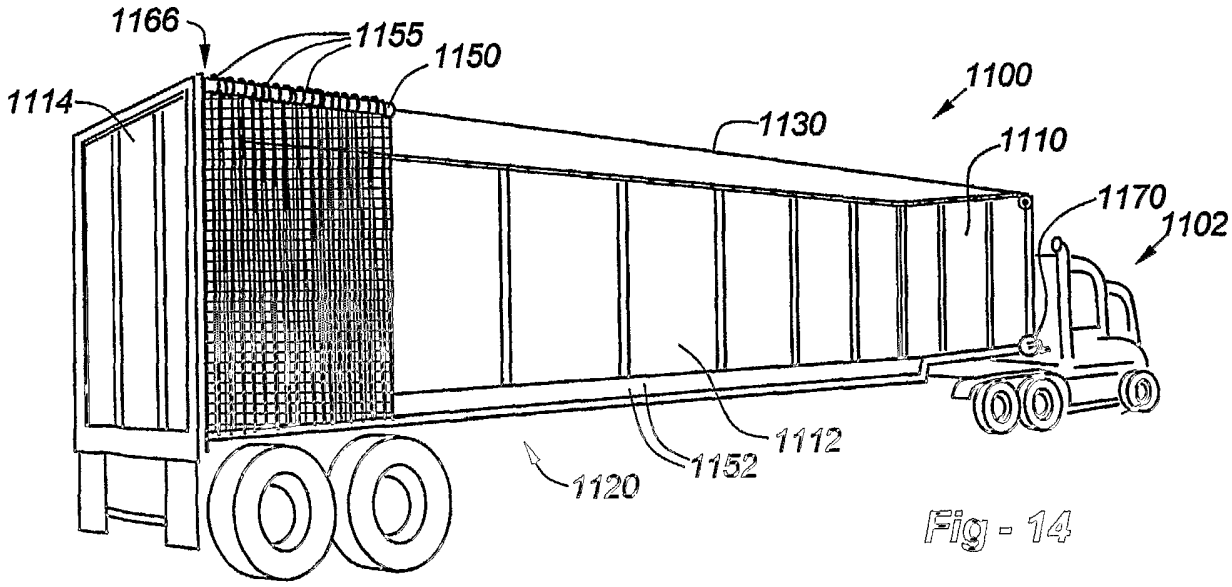

1166
1155
1150
1100
1114
1130
1110
1170
1102
1112
1152
1120

Fig - 14

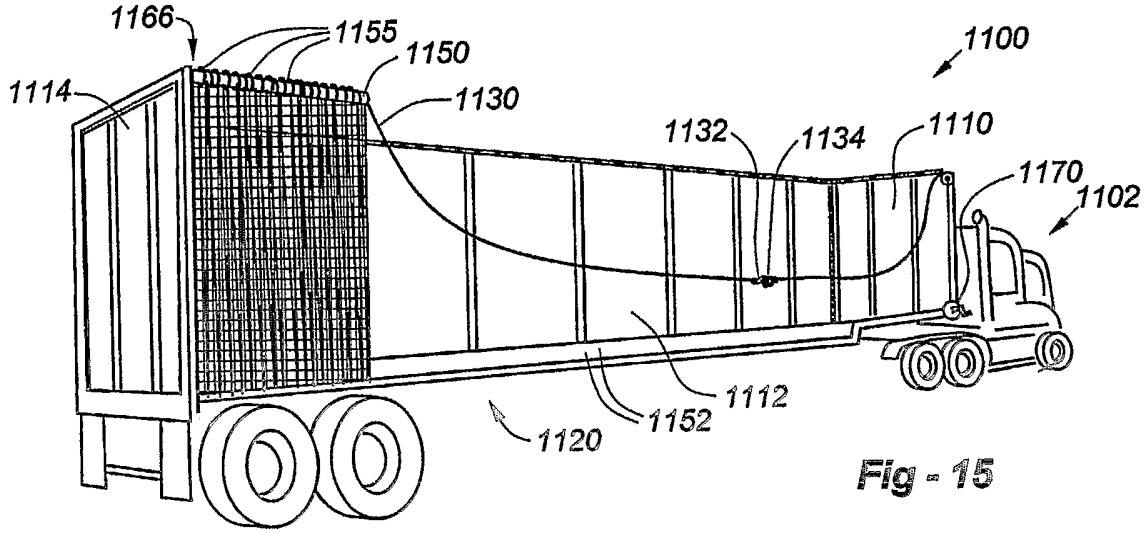

1166
1155
1150
1114
1130
1100
1132
1134
1110
1170
1102
1112
1152
1120

Fig - 15

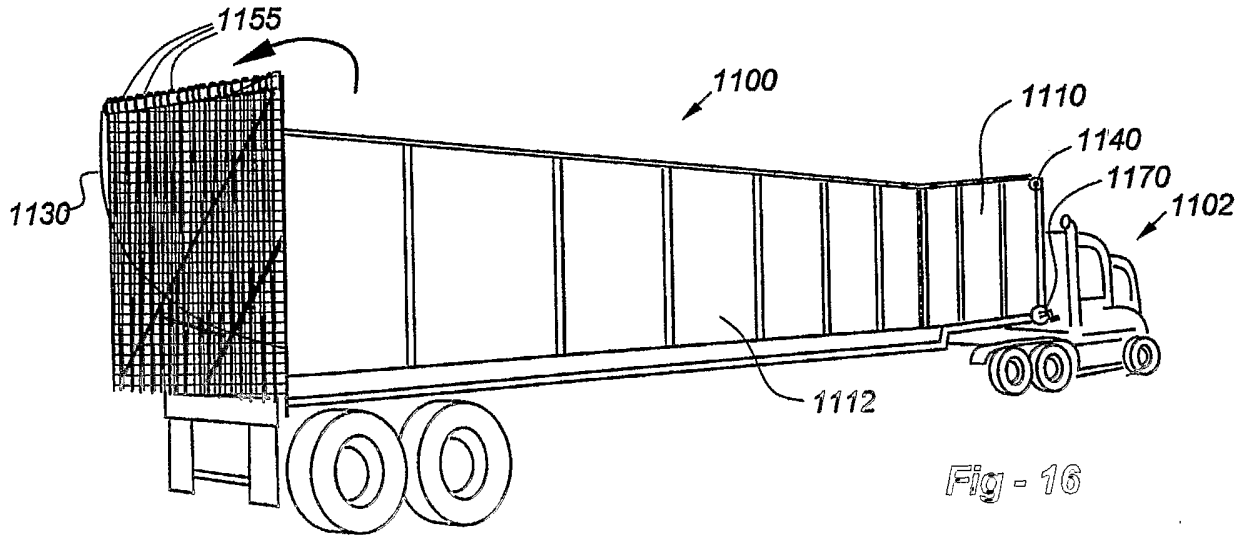

1155
1100
1110
1140
1170
1130
1102
1112

Fig - 16