APPARATUS FOR TRANSPORTING FLAT GLASS AND THE LIKE

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ABSTRACT

A structure for semi-trailers for transporting large sheets of flat rigid material such as flat glass. A generally A-shaped platform having a central web is secured over a conventional semi-trailer frame. The platform includes a plurality of rigid girders extending from a horizontal top bar downwardly on each side of the truck frame to provide a central sloped support wall. The central web within the wall rests upon the truck frame to support the entire unit. A platform support extends from the lower end of the support wall on each side at a level below the truck frame to provide a floor to support the lower edges of glass sheets which lean against the support wall. Extensible clamping means is provided on each side to clamp a stack of glass sheets against the support wall to hold the stack against movement during transit.

9 Claims, 3 Drawing Figures
APPARATUS FOR TRANSPORTING FLAT GLASS AND THE LIKE

BACKGROUND OF THE INVENTION

This invention relates to a construction for the transportation or hauling of large rigid sheets of material and is particularly useful for transporting from the site of manufacture to the place of installation large sheets or panes of flat glass.

Modern architectural construction and contemporary design has increased the use of very large sheets of flat glass, either as single sheets or as double insulated constructions. Transportation of these large sheets is a significant cost factor affecting the overall installation cost of such sheets, especially because some breakage in transit is often unavoidable. These problems are particularly severe when dealing with extremely large sheets which are now commonly used in construction. Sheets as large as 12 feet in width and as long as 20 feet in length may have to be transported. Because truck transportation is commonly used, a sheet 12 feet in width must necessarily be placed in a position so that its top edge is below the normal minimum overhead roadway clearance of, for example, 13 feet 6 inches. While it is possible to transport such sheets in horizontal positions, such mode of transportation requires extensive crating and packing which reduces the effective payload of the truck and requires added packing cost.

Conventional semi-trailer bodies are unable to transport sheets as wide as 12 feet in vertical position due to the height of the truck bed above the road bed which would place the upper edge of glass above the minimum required clearance. It has been a practice in industry to try to accommodate these large sheets by using under sized truck tires which, while sometimes enabling the load to meet the minimum clearance requirements, increases the transport cost due to tire wear, etc., and is undesirable for safety reasons.

In addition, some specially designed semi-trailer carriers for glass which have been used are quite expensive and necessarily require a high capital investment for a number of such installations which are not constantly in transit but must wait loading at the glass plant and unloading at the site of installation. It is an object of this invention to provide a specially designed structure for hauling large sheets of rigid materials such as flat glass which is simple in design, can be removed when placed upon a conventional semi-trailer frame, and which can be loaded and unloaded upon the semi-trailer frame in full or empty condition to reduce the amount of down time for such semitrailer frames.

SUMMARY OF THE INVENTION

This invention is a specially designed structure which is placed upon a conventional semi-trailer frame which can be used for the transportation of large sheets of flat material such as flat glass. It generally consists of a rigid A-frame which forms a central divider having a pair of outwardly sloped walls. The interior of the sloped walls are provided with a horizontal rigid web which is placed upon the semi-trailer frame member so that the top of the divider or sloped walls is below the minimum required overhead clearance and the bottom of the walls extend below the truck frame but terminate above the road bed by a sufficient distance for proper road clearance. Extending outwardly and slightly upwardly from the bottom of each of the walls is a rigid platform or floor upon which the rigid sheets of glass or the like are supported. The invention further includes a mechanism for clamping the stacks of glass panes or the like in place against the central divider with means for releasably moving the clamps completely away from the stack of glass panes so that they can be unloaded without interference.

Other objects and the advantages of the invention will apparent to those skilled in the art from the following detailed description of a preferred embodiment thereof.

BRIEF DESCRIPTIONS OF THE DRAWINGS

FIG. 1 is a view in elevation of the glass transporting apparatus of this invention, showing in place upon the elongate main frame of a conventional semi-trailer truck;

FIG. 2 is a top view of the structure shown in FIG. 1, and

FIG. 3 is a cross-sectional view of the structure of FIG. 1, taken along line 3—3 of FIG. 1, and showing on an enlarged scale the details of the structure as it would appear with a full load of glass or the like.

DESCRIPTION OF A PREFERRED EMBODIMENT

As best seen in FIGS. 1 and 3, a conventional truck frame 10 is shown, having a rigid box frame 11 extending from the fifth wheel 12 to the rear tires 13 which support the frame by conventional suspension means which are generally shown in FIG. 3. Details of this suspension and a fifth wheel hookup are considered to be conventional and do not form a part of this invention.

Referring especially to FIG. 3, the apparatus of this invention includes a central divider 14 which includes a pair of sloped walls 15 and 16 joined at their top ends to a horizontal rigid bar or pipe 17. From the horizontal bar 17, the two sloped walls 15 and 16 extend downwardly and outwardly and terminate at a level well below that of the box frame 11 of the truck semi-trailer. The sloped walls 15 and 16, as seen in FIGS. 1 and 2, are each made up of a plurality of rigid girders 18 whose upper ends can be rigidly attached as by welding or in a rigid fitting to the bar 17. Each girder 18 is attached to its opposite number by a rigid web or strut 19 which is welded or otherwise secured in horizontal position, as shown in FIG. 3, such that, when the entire divider is placed over the box frame 11 of the truck, the web 19 rests snugly upon the box frame 11 and there is little or no provision for horizontal movement of the box frame 11 between the two walls 15 and 16. As shown in the drawings, the two walls 15 and 16 each include six girders 18 placed in a common sloping plane and each pair of opposed girders 18 is secured to a horizontal web 19; however, other such combinations of girders 18 and webs 19 could be provided to form the same functions, depending upon the size of the material being transported, etc.

At the lower ends of the girders 18 is an outwardly and upwardly extending platform 20 which provides a floor or support area for the edges of the stacked glass sheets or the like. The platform 20 may consist of a series of short beams 21 extending from each of the girders 18, as best seen in FIG. 1, which may be tied together by one or more transverse rigid elements 22. A
sheet floor can be placed upon the upper surfaces of the beams 21 and a resilient layer such as plywood or like material can be placed upon these beams 21 to cushion the edges of the glass resting thereon. As best seen in FIG. 3, a single sheet of rigid metal 23 can extend below the beams 21 as a subfloor to merely keep road dirt off the load. This sheet 23 can be curved to meet the bottom surfaces of the beams 21 or can be generally planar and secured to the spacer angle 24 as shown. Additional sheet metal skirts 25a can be attached to the inner sides of the girders 18 to rigidify the structure and to keep road dirt off the load.

As thus far described, the structure which includes the rigid A-frame of the girders 18 and webs 19 and their horizontal joining elements can be freely placed upon the box frame 11. If desired, it can be firmly attached to the box frame 11 as by welding or other means, but can also be releasably attached so that the unit can be separately loaded or unloaded aside from the semi-trailer which can be used in hauling other such structures during that period. The structure as described is designed so that its maximum vertical height, that is, the height of the pipe or bar 17, is below the minimum clearance requirement for roadways. Because the positions of platform 20 is well below the level of box frame 11, a substantial load height can be accommodated within this required roadway clearance. As shown in FIG. 3, smaller glass sheets below the level of the bar 17 can easily be accommodated while larger glass sheets, also shown schematically in that figure, can be accommodated as long as their maximum height is below the minimum required clearance.

A clamping mechanism to keep stacks of glass sheets and the like in close contact with the sloped wall 15 or 16 consists of a plurality of extensible clamping members 25 which, in this embodiment, are designed to telescope to accommodate variations in load height. The member 25 consists of a lower tube 26 into which slides an upper tubular arm 27, each of which is provided with a spaced apart series of adjusting holes 28 which can be selectively aligned to effectively control the length of the member 25. The lower end of the lower tube 26 is pivotally attached on an appropriate fitting near the outer edge of the platform 20 while the upper ends of the tubular arms 27 are secured as by welding to a horizontally extending rigid member 29 which has an inner face which rests against the outermost sheet of glass or the like. The rigid member 29 can also be pivotally attached to the upper ends of the upper arms 27 so that it can rotate through a limited angle so that its flat face will always bear in planer contact with outer surface of the outer sheet of glass.

As can be readily visualized in FIG. 1, the entire clamping mechanism including the extensible members 25 and the horizontal member 29 can be rotated outwardly and downwardly to drop entirely out of the way of the load for unloading purposes. As also is seen in FIG. 1, two such clamping frames can be provided side by side so that if shorter sheets of glass are being transported, each such frame on each side of the truck can be individually clamped or unclamped to permit access to the forward or rear part of the bed.

Referring again to FIG. 3, means are provided to hold the clamping frame in closed position against the stack of glass sheets or the like to prevent them from swaying or otherwise losing contact with the sloped wall 15 or 16 if the carrier should tilt on a road grade, etc. In the embodiment described, the clamping means is held in place by a tension cable 30 which has one end secured to a bracket 31 on the platform 20 and its other end reaved through a wind up mechanism such as a ratchet winch 32. On each end of the rigid members 29, as best seen in FIGS. 2 and 3, a loop of chain 33 is loosely secured and a ring 34 through which the cable 30 is strung is attached to the chain 33. As seen in FIG. 3, with the cable 30 strung as shown, when it is tensioned by the winch 32, an inward and downward force is exerted upon the clamp frames to press the stack of glass sheets or the like firmly upon the adjacent sloped walls 15 or 16. Because the contact from the face of the rigid member 29 is extended along a substantial area of the outer surface of the stack, considerable force may be maintained on the stack without breakage. Indeed, while individual sheets can be packaged or boxed and carried by the structure of this invention, it has been found that bare glass sheets closely stacked can be satisfactorily transported without breakage using the clamping mechanism thus described.

The length of the clamping members 25 should be adjusted to make contact with the stack somewhere between their upper edges and the midpoint thereof, depending upon the height of the glass. If desired, a wedge or other stop member (not shown) can be placed on the floor 20 external of the outer most sheet to assure against movement of the lower portion of the stack. As seen best in FIG. 2, four such cable arrangements are shown attached to the ends of the rigid members 29, conceivably, on very long loads, more cable arrangements can be provided and each can have its own individual winch 30 or each can be reved on a common winch drum driven by a common motor or crank.

It will be seen that the aforesaid described preferred embodiment has great advantage particularly in the transport of very large sheets of flat glass. Because the lower edges of the sheets are supported well below the level of the normal semi-trailer bed, sheets as large as 12 feet can be transported with sufficient road clearance but with insufficient height to interfere with the normal minimum overhald road clearance. In addition, the clamping mechanism can be quickly activated and deactivated and will swing entirely out of the way of the load to permit ready access for loading or unloading. Finally, because the entire structure is unitary, it can be remotely placed upon a truck semi-trailer bed and loaded and unloaded as a unit by means of a conventional crane which picks the entire unit off the bed.

Various other modifications and advantages of this preferred embodiment will be apparent to those skilled in the art and may be made without departing from the spirit and scope of the following claims.

1 claim:

1. A structure for supporting stacks of flat rigid sheet material upon a semi-trailer having a rigid main frame extending lengthwise of the semi-trailer, said structure comprising a generally A-shaped platform having a pair of sloped support walls extending downwardly to terminate below the level of said trailer rigid main frame, said support walls joined at their top edges and at an intermediate position by a rigid internal web which rests upon said main frame to support the entire structure, each of said support walls extending from their upper
intersecting edges downwardly and outwardly to terminate at a level below said main frame to provide a central sloped divider, a rigid platform extending outwardly and slightly upwardly from the lower edges of each of said support walls to provide a floor on each side of the divider to support the lower edges of a stack of such rigid sheets at a level below said truck frame, at least two elongate clamping members having a lower end pivotally secured to said rigid platform and extending upwardly along but spaced from the adjacent support wall, and means for securing the upper ends of said clamping members relative to said support wall to prevent movement of such rigid sheets away from said wall, said securing means including a tension line having one end secured to said platform on one side of said wall and extending through guide means secured to the upper ends of a pair of opposed clamping members and thence downwardly to said opposed platform opposite the secured end thereof, and means for winding said line on said opposed platform to exert an inward and downward force upon said clamping members.

2. The structure of claim 1 wherein said rigid platform extends from said support wall at right angles thereto.

3. The structure of claim 1 wherein said central sloped divider formed by said walls comprises a plurality of rigid beams spaced along the length of said trailer frame with each wall having at least two beams in a sloped plane which intersects the plane of the opposite wall to form said sloped divider, a rigid beam extending horizontally along the top ends of said wall beams and secured thereto and with said rigid internal wall comprising a horizontal strut secured between opposed beams to provide a horizontal support for said structure.

4. The structure of claim 3 wherein the length of said strut between said wall beams is substantially equal to the transverse width of said trailer rigid frame.

5. The structure of claim 3 wherein the lower ends of said beams in each wall are joined by a horizontally extending member forming a pair of said platform.

6. The structure of claim 1 wherein said clamping members are extensible in length.

7. The structure of claim 1 wherein the upper ends of said clamping members are secured to a rigid horizontal brace extending parallel to said support wall and having a generally planar surface on the side thereof facing said wall to make contact with the outermost rigid sheet when said clamping member is secured in place relative to said support wall.

8. Apparatus for supporting stacks of rigid sheet material upon a semi-trailer having a rigid frame member extending lengthwise of the semi-trailer, said apparatus comprising a rigid A-frame including a plurality of rigid beams secured at their upper ends to a rigid horizontal element, said beams extending downwardly and outwardly to form a pair of sloped walls to support such stacks of material, an intermediate horizontal rigid web extending between said walls, said web supporting said sloped walls in a centrally generally vertical position with their lower ends terminating at a level below the main frame when placed upon the rigid frame member, a rigid platform extending outwardly and slightly upwardly from the lower ends of each of said support walls to provide a floor on each side of the apparatus to support the lower edges of stacks of such rigid sheet material, and means for releasably clamping the outer surface of such stacks of rigid sheet material against movement away from said sloped walls, said clamping means including a plurality of elongate clamping members on each side of the apparatus with their lower ends pivotally secured to said rigid platforms for swinging movement toward and away from said sloping walls, a rigid horizontal brace extending to the upper ends of said pivoted members on each side of the apparatus and parallel to said sloped walls to form a swinging clamp frame at least one tension line, means for securing opposite ends of said tension line to said platforms on opposite sides of the rigid frame member, guide means secured to the upper ends of said horizontal braces, said tension line extending through said guide means, and means for tightening said tension line to exert an inward and downward force on said clamping members.

9. Apparatus for supporting stacks of sheet material upon a semi-trailer having a rigid frame member extending lengthwise of the semi-trailer, said apparatus comprising a rigid A-frame including a plurality of rigid members secured together at their upper ends, said members extending downwardly and outwardly to form a pair of sloped walls to support such stacks of material, an intermediate horizontal rigid web extending between said walls, said web supporting said sloped walls in a generally vertical position with their lower ends terminating at a level below the trailer frame when placed upon the rigid frame member, a rigid platform extending outwardly and slightly upwardly from the lower edges of each of said support walls to provide a floor on each side of the apparatus to support the lower edges of stacks of such sheet material, and means for releasably clamping the outer surface of such stacks of sheet material against movement away from said sloped walls, said clamping means including a plurality of elongate clamping members on each side of the apparatus with their lower ends pivotally secured to said rigid platforms for swinging movement toward and away from said sloping walls, and means for securing the upper ends of opposed clamping members against movement away from said sloped walls, said securing means including a tension member having its ends secured to said rigid platforms on opposite sides of the rigid frame member, guide means secured to an upper portion of opposed clamping members, said tension line extending through said guide means, and means for tightening said tension line to exert an inward and downward force on said clamping members.

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