Dec. 3, 1968 R. W. CONNER 3,413,671

GANGWAY

Filed Feb. 28, 1967 2 Sheets-Sheet 1

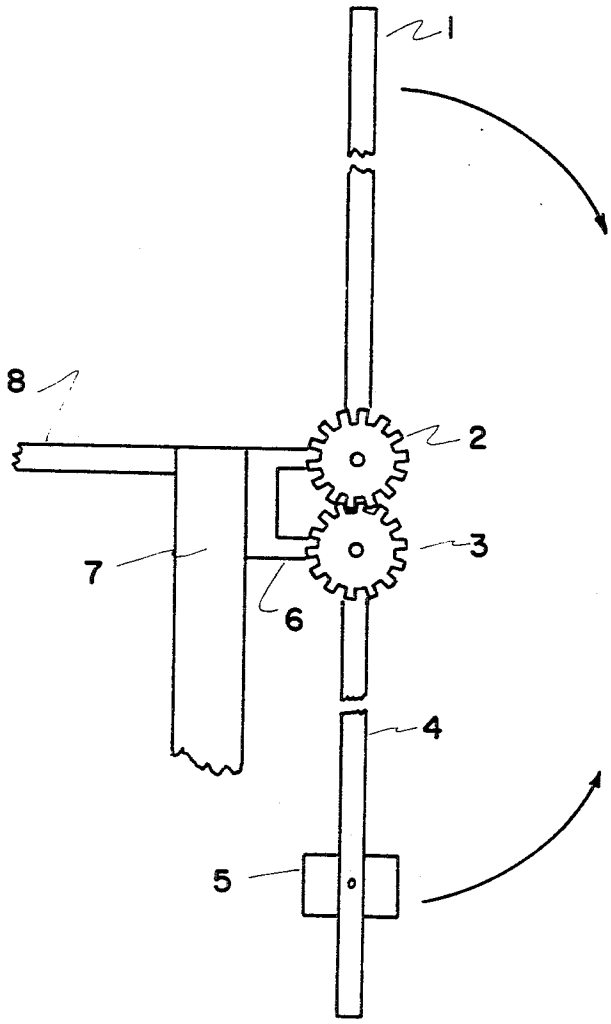


FIG. 1

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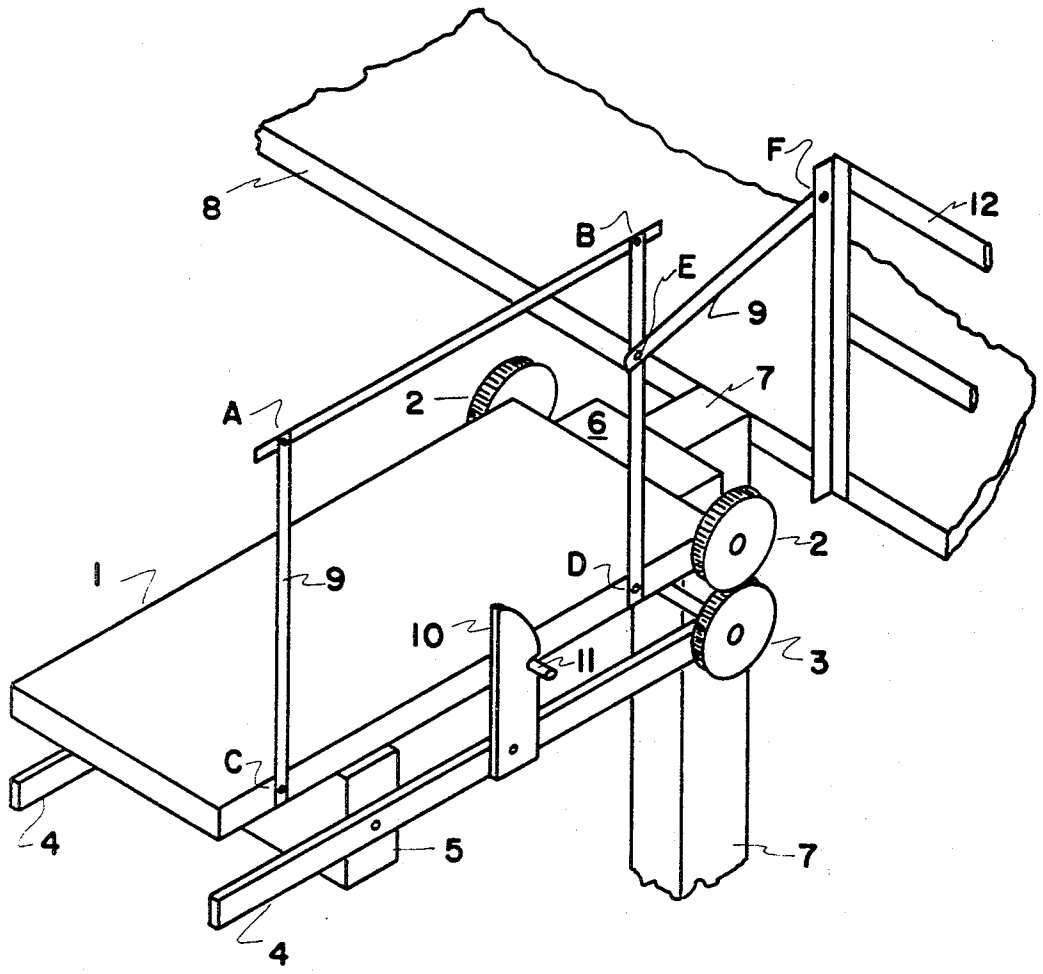


FIG. 2

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GANGWAY

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ABSTRACT OF THE DISCLOSURE

A retractable gangway to provide access from a loading dock to a railroad tank car wherein the platform portion and counterweight converge. The gangway retracts to a vertical position when not in use.

Background of the invention

The present invention relates to a gangway which may be attached to a railroad tank car loading dock or the like.

In the loading of railroad tank cars, these tank cars generally are rolled into position on tracks running parallel to a loading dock. There is generally a walkway on top of the loading dock at substantially the same height as the tank cars and numerous pipes and conduits underneath the walkway for transporting fluids from storage areas to the tank cars. These walkways, as are the loading docks, are generally parallel to the tracks and do not come into contact with the tank cars. In loading a tank car it is desirable for the workmen to have access from the walkway on top of the loading dock to the top of the tank car and for this purpose various gangways have been devised to bridge the space between the walkway and the tank car. However, in order to permit tank cars and other traffic to move freely along the tracks alongside the loading dock, it is necessary that these gangways be retractable. One of the most common retractable gangways now in use consists of a platform which is pivoted at a point intermediate the ends thereof and having a counterweight on one end of the platform. Such a gangway operates in seesaw fashion so that a workman desiring to use the gangway merely pushes the non-weighted end of the platform downward toward a tank car while the weighted end of the platform swings upward and away from the tank car. When the workman has finished using the gangway, he merely steps off the platform and the counterweight brings the platform to a vertical position so as to no longer extend over and interfere with movement of tank cars on the tracks. While such a gangway is of simple construction, it suffers the serious disadvantage that the counterweighted end of the gangway must swing under the loading dock, and therefore, any piping under the walkway must be specially designed to avoid the counterweighted end of the platform. Hydraulically controlled gangways have also been constructed which do not interfere with piping under the loading dock walkway; however, these hydraulically controlled gangways are undesirable in that they are expensive to build and expensive to maintain.

Summary

It is thus an object of the present invention to provide a gangway suitable for attachment to railroad tank car loading docks. It is a further object of the present invention to provide a retractable gangway for a railroad tank car loading dock which is of simple construction and which will not interfere with piping underneath the walkway of the loading dock. Additional objects will become apparent from the following description of the present invention.

The present invention in one of the embodiments is a gangway for attachment to a structure comprising a platform having at least one first spur gear fixedly attached thereto at one end of said platform such that substantially all of said platform extends away from the axis of said first spur gear, said platform being substantially parallel to a plane containing the axis of said first spur gear, said first spur gear being meshed with at least one second spur gear, said second spur gear being fixedly attached substantially to one end of a frame extending away from the axis of said second spur gear, said frame having a counterweight secured thereto at a distance from the axis of said second spur gear, both said platform and said frame being rotatably attached to a member or members adapted to be mounted on said structure, said platform being rotatably attached to said member or members so as to rotate about the axis of said first spur gear and said frame being rotatably attached to said member or members so as to rotate about the axis of said second spur gear, said first spur gear being meshed with said second spur gear such that said frame will extend substantially vertically downward when said platform extends substantially vertically upward.

Brief description of the figures

FIGURE 1 is a side view of a gangway constructed in accordance with the present invention in a raised position.

FIGURE 2 is an isometric view of a gangway of the present invention in a lowered position and also shows a type of side railing and locking device which may be used with a gangway of the present invention. The same numbers are used in both figures to denote the same elements.

Description of the invention

Reference is now made to FIGURE 1 for an explanation of the operation of the present invention. The gangway shown in FIGURE 1 consists of platform **1** having attached thereto spur gear **2** such that platform **1** does not rotate with respect to spur gear **2**. Meshed with spur gear **2** is spur gear **3** from which extends frame **4** having a counterweight **5** secured thereto, frame **4** being fixedly attached to spur gear **3** so that spur gear **3** and frame **4** do not rotate with respect to each other. Both platform **1** and frame **4** are rotatably attached to member **6** so that platform **1** and frame **4** rotate about the axis of spur gear **2** and the axis of spur gear **3** respectively. Member **6** is then attached to a loading dock having a vertical member **7** and a walkway **8**. While platform **1** and frame **4** are shown as being attached to vertical member **7** through the use of a single member **6**, it is obvious that separate members could be used to attach platform **1** and frame **4** to vertical member **7**. The particular method by which platform **1** and frame **4** are fixedly attached to spur gears **2** and **3** and rotatably attached to member **6** is not a part of the present invention and can be easily accomplished by those skilled in the art. One obvious method is to provide an axle through the spur gear such that the axle does not rotate with respect to the spur gear, and fixedly attaching platform **1** or frame **4** to the axle while providing

member **6** with a bearing or bearings on which the axle may rotate.

In using the gangway, a workman on walkway **8** merely depresses platform **1** of the gangway outwardly of the walkway and downward and in turn frame **4** travels outwardly of the walkway and upward as shown by the arrows. If the gear ratio of spur gear **2** and **3** is 1:1 then platform **1** and frame **4** will meet with both being horizontal as shown in FIGURE 2. The platform will then be in the lowered position and will provide a bridge extending horizontally from walkway **8** on which workmen may travel. When the workman steps off platform **1**, counterweight **5** will pull frame **4** downward and thus force platform **1** upward to the original raised position shown in FIGURE 1 wherein both platform **1** and frame **4** are vertical so as to present no obstacle to objects moving in close proximity to the loading car platform.

In constructing a gangway according to the present invention, only one spur gear is actually needed for attachment to the platform portion and one spur gear for attachment to the frame portion but it is preferred to have two spur gears on the platform portion of the gangway and two on the frame portion of the gangway as shown in FIGURE 2. It is also obvious that as many gears as are desired can be used. When using a plurality of gears on the platform and frame portions of the present invention, these gears must be axially aligned, i.e., all of the gears attached to the platform portion must be axially aligned with each other and all of the gears on the frame portion must be axially aligned with each other. It is preferred that the gear ratio of those gears on the platform portion to those gears on the frame portion be 1:1 and that they mesh in such a manner that the frame portion on which the counterweight is attached extends substantially vertically downward when the platform portion extends substantially vertically upward as shown in FIGURE 1. When the gears are in this ratio and are so meshed, the frame and platform positions of the gangway will meet with both being in the horizontal position so that no stop means is necessary to prevent the platform portion from going downward past a substantially horizontal position under the weight of a workman. By "substantially vertical" is meant vertical or within 30° of the vertical and by "substantially horizontal" is meant horizontal or within 30° of the horizontal. Of course it is obvious that it is not necessary for the frame portion of the gangway to be in a horizontal position when the platform is in a horizontal position for use by workmen and therefor it is not absolutely necessary that the gear ratio of the platform gears to the frame gears be 1:1, but it is preferred that this gear ratio at least be within the range of 0.5:1 to 1.2:1.

FIGURE 2 is an isometric view of the type gangway of FIGURE 1 in a lowered position and also shows side railing **9** and a locking device **10** which are desirable features of a gangway constructed in accordance with the present invention. For the purposes of illustration, only one side railing **9** has been shown but obviously a second side railing could be placed on the opposite side of platform **1**. These side railings are desirable from a safety standpoint as they provide protection for men working on the platform while the locking device **10** serves to lock the platform in a horizontal position even though a workman has stepped off the platform. The particular locking device used to hold the platform in a horizontal position is not a part of the present invention and can be easily constructed by one skilled in the art. Preferably, these locking devices are self-engageable as the platform is placed in the lowered position. When the gangway of the present invention is constructed as shown in FIGURE 2 such that both the platform and the frame are horizontal when the gangway is in a lowered position, locking device **10** may be mounted on frame **4** so as to engage a pin **11** or the like on platform **1**. This prevents platform **1** from rotating away from frame **4** and thus keeps platform **1** in a horizontal position when there is no weight on platform **1**.

It is preferred that any side railings provided for the platform of the gangway of the present invention be foldable so that they are essentially coplanar with the platform portion when the gangway is raised, i.e., when the platform is vertical. The particular configuration of these side railings is not a part of the present invention and they may be easily constructed by one skilled in the art. However, the particular side railing **9** shown in FIGURE 2 may be used wherein the vertical and horizontal members pivot at all connecting points, A, B, C, D, E, and F. Point F is the point of connection of the side railing **9** with a side railing **12** of the tank car loading dock but this connection could be to any fixed object other than side railing **12**.

The platform portion of the gangway of the present invention may be of various shapes and sizes. However, it is preferred that the platform portions be rectangular in shape as shown in FIGURE 2. The platform may be constructed so as to have a solid surface or may be comprised of a framework having a grate for a surface. The frame portion of the present invention on which the counterweight is attached may have various shapes and configurations. It may be comprised of two coplanar parallel bars extending perpendicular to the axis of the gear or gears to which it is attached and having a counterweight suspended between these bars as shown in FIGURE 2 or it could consist of a single structural member (such as an I-beam) extending perpendicularly from the axis of the gear or gears and having a counterweight attached thereto at some point from the axis. Generally these frames will be constructed so that the counterweight is adjustable to various positions on the frame.

Although the gangways of the present invention have been illustrated and described in relation to a railroad tank car loading dock, these gangways may be used to advantage on other structures wherein it is desirable to have a retractable gangway. For example, the gangway of the present invention could be used in connection with a doorway in the side of a building where the doorway is substantially above ground level. Such elevated doorways are common in warehouses wherein trucks are loaded and unloaded. In such cases the platform portion of the gangway can also serve as a door for the doorway when the gangway is in a raised position.

What is claimed is:

1. A gangway for attachment to a structure comprising a platform having at least one first spur gear fixedly attached thereto at one end of said platform such that substantially all of said platform extends away from the axis of said first spur gear, said platform being substantially parallel to a plane containing the axis of said first spur gear, said first spur gear being meshed with at least one second spur gear, said second spur gear being fixedly attached substantially to one end of a frame, extending away from the axis of said second spur gear, said frame having a counterweight secured thereto at a distance from the axis of said second spur gear, both said platform and said frame being rotatably attached to a member or members adapted to be mounted on said structure, said platform being rotatably attached to said member or members so as to rotate about the axis of said first spur gear and said frame being rotatably attached to said member or members so as to rotate about the axis of said second spur gear, said first spur gear being meshed with said second spur gear such that said frame will extend substantially vertically downward when said platform extends substantially vertically upward.

2. The gangway of claim **1** wherein said gangway has a locking means to secure and hold said platform in a lowered position.

3. The gangway of claim **1** wherein said platform has attached thereto side railings which will fold to be sub-

stantially coplanar with said platform in the raised position.

4. The gangway of claim 1 wherein there are two first spur gears and two second spur gears, said first spur gears being in axial alignment with each other, said second spur gears being in axial alignment with each other, one of said first spur gears meshing with one of said second spur gears, and the other of said first spur gears being meshed with the other of said second spur gears, all of said gears being substantially the same size.

5. The gangway of claim 1 wherein said platform is substantially rectangular.

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