

March 6, 1962

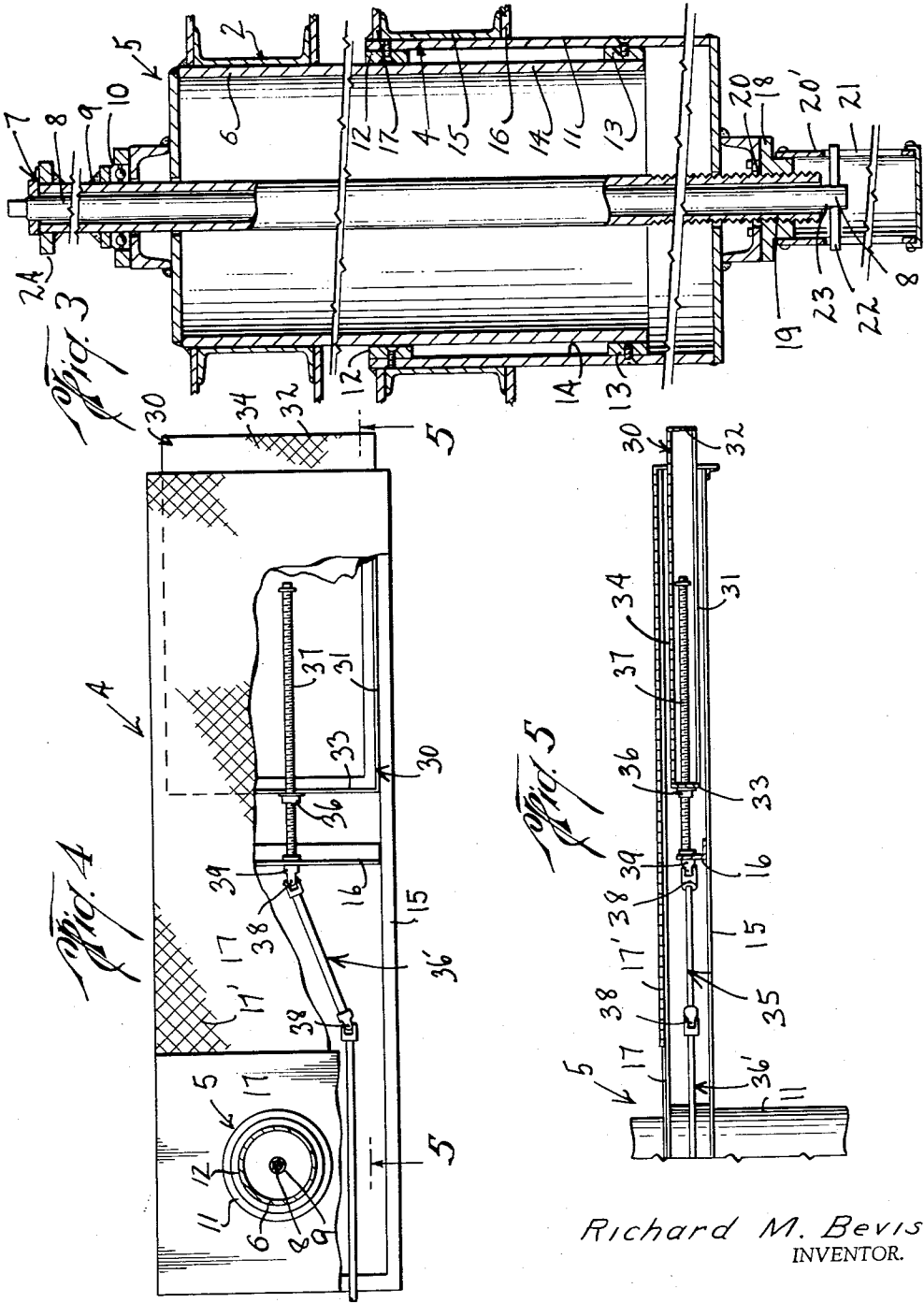
R. M. BEVIS

3,023,831

LOADING PLATFORM

Filed Sept. 10, 1958

6 Sheets-Sheet 2



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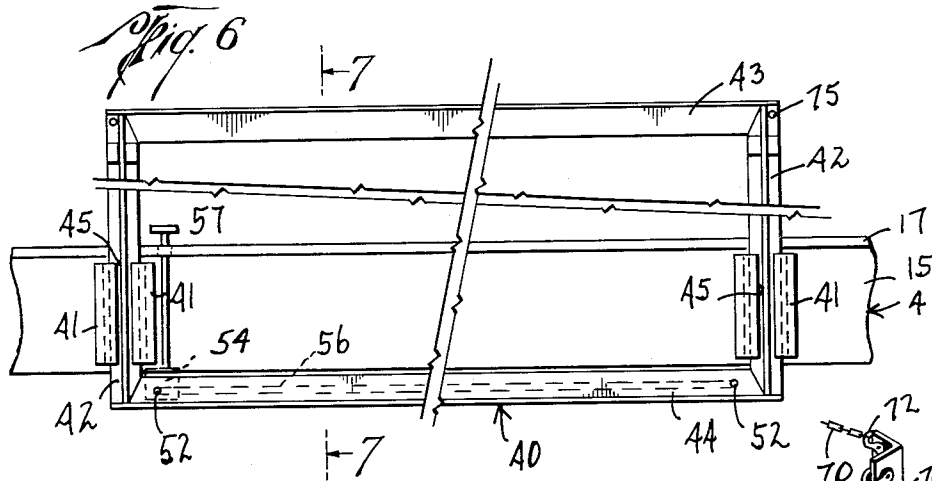
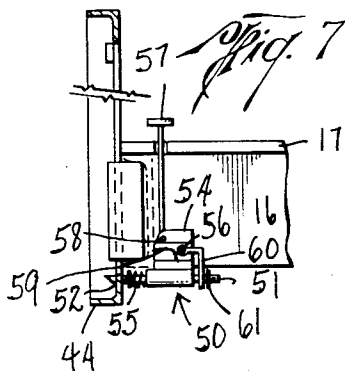
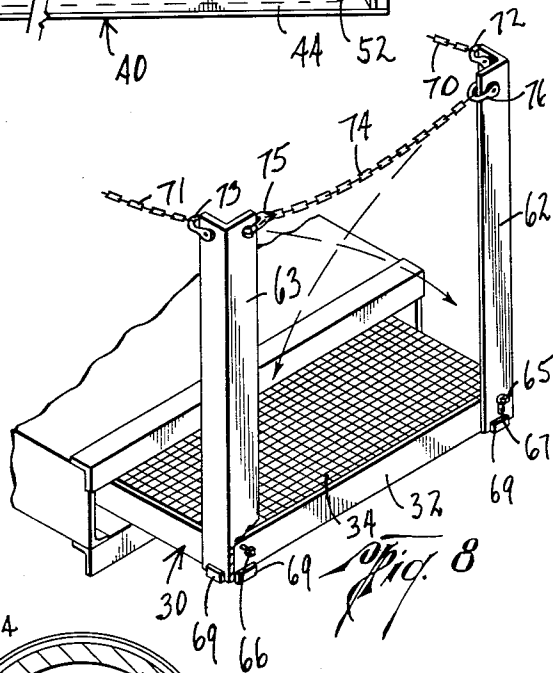
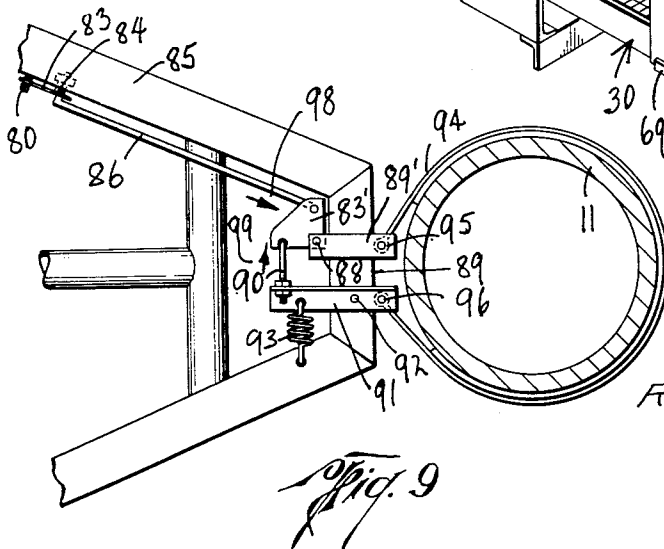
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R. M. BEVIS
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6 Sheets-Sheet 3



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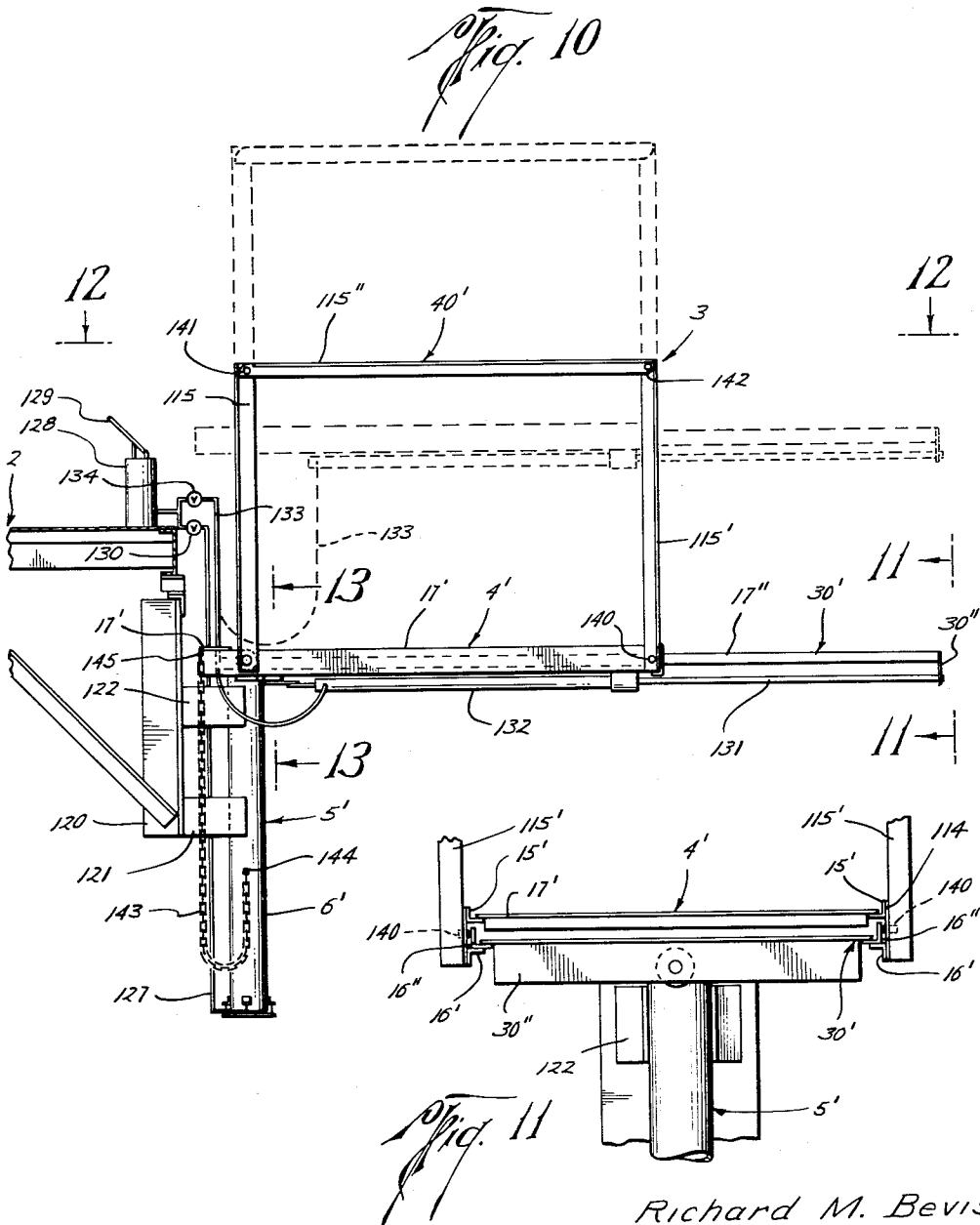
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R. M. BEVIS
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6 Sheets-Sheet 4



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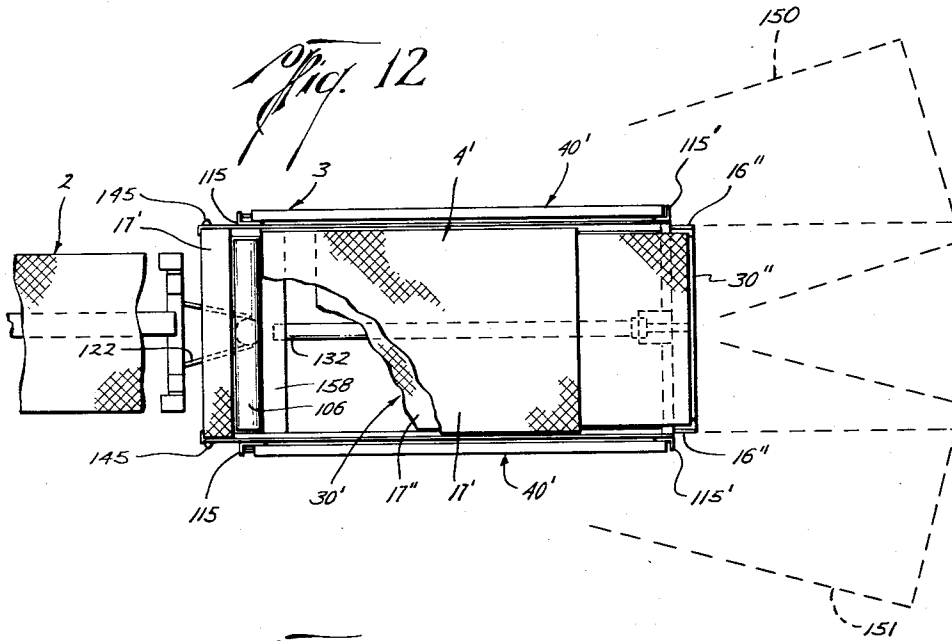
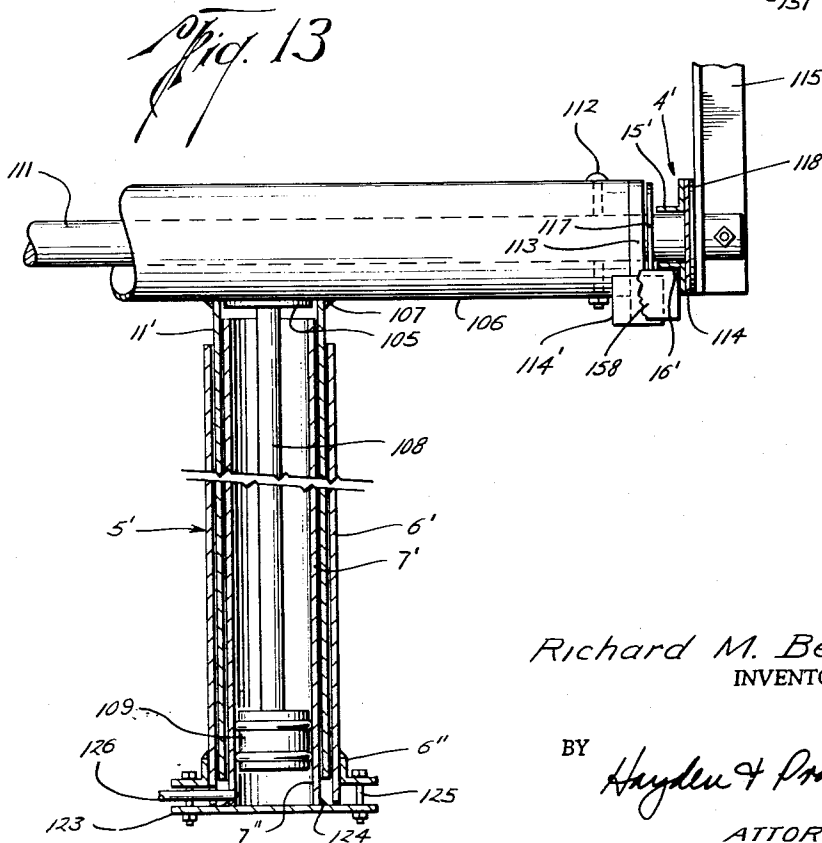
R. M. BEVIS

3,023,831

LOADING PLATFORM

Filed Sept. 10, 1958

6 Sheets-Sheet 5



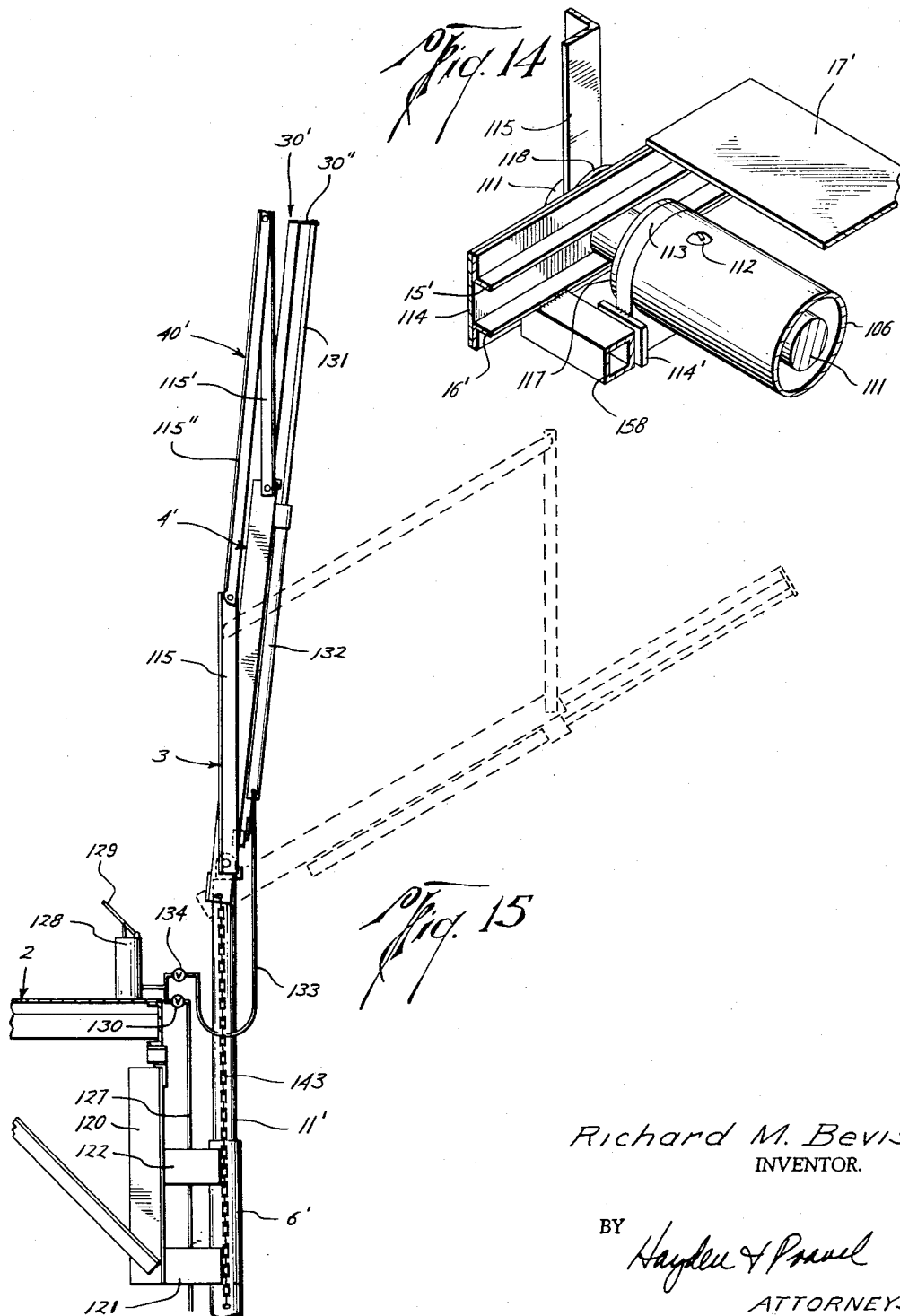
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R. M. BEVIS
LOADING PLATFORM

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6 Sheets-Sheet 6



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3,023,831

LOADING PLATFORM

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Filed Sept. 10, 1958, Ser. No. 760,828

2 Claims. (Cl. 182-82)

The present invention relates to an adjustable deck for use in loading and unloading carriers.

The present application is a continuation-in-part of my prior co-pending application Serial No. 684,254, filed September 16, 1957, for "Loading Platform," now abandoned and all common subject matter is entitled to the filing date of said prior application.

At the present time elevated platforms are provided adjacent railroad sidings at the location where tank cars are to be filled with liquids such as petroleum products and the like. In order for the tank cars to be filled it is necessary for the filling hoses to be manually located relative to the tank car openings to discharge the products therein. Some elevated platforms have a plurality of filling stations therealong; other platforms have only one filling station, and if there is no elevated platform to aid in gaining access to the tank car, the tank car must be climbed at the filling station to gain access thereto.

The problem is further complicated because various size and capacity tank cars are provided, thereby making access to any particular car from a stationary elevated platform difficult unless the tank car happens to be exactly the right length and the right height so that when positioned adjacent the platform, the height thereof permits easy access to the tank car for placing the fittings adjacent the opening in the tank car. Of course, if the tank car is connected with a plurality of other tank cars and the other tank cars in turn positioned along filling stations on the platform, and if the tank cars are of varying lengths, it becomes obvious that the difficulty of connecting the filling hose or pipe adjacent the opening of the tank car is increased, because not only is access to the tank car opening determined by the vertical height of the tank car, but the opening of the tank car may be displaced laterally relative to the filling position on the platform at which the filling pipes are located by reason of the length of the tank car. The only way this problem can be overcome is by disconnecting each of the tank cars and individually spotting them adjacent each filling station. This latter procedure is obviously undesirable for many reasons.

The same problem is encountered in filling various other carriers or cargo handlers and it is not limited to railroad tank cars, particularly where the cargo carriers cannot be manipulated or positioned relative to a discharge filler hose or pipe, such as is the situation with railroad tank cars which cannot be moved about with ease, but are limited in their maneuverability in that they can only be moved either forward or backward on the railroad track.

It is also desirable to provide a loading platform which, while providing easy access to carriers for loading, may be quickly and easily withdrawn from its operative position and located to provide safe clearance for the carrier as it is moved away from the loading platform.

The present invention provides an adjustable deck for use with elevated walkway platforms whereby easy access may be had to railroad tank cars to aid in the filling thereof.

Still another object of the present invention is to provide an adjustable deck for use with elevated platforms including means for adjusting the deck vertically to a predetermined height, and additional means for rotating the deck to any desired position.

Still a further object of the present invention is to provide an adjustable deck and mechanism for use with ele-

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vated walkway platforms wherein a minimum of mechanism is utilized to accommodate movement of the deck relative to the elevated platforms or walkway so that the deck may be adjusted to any desired vertical height, and additional means for rotating the deck to a desired lateral position relative to the platform, and brake means for maintaining the deck in any adjusted position.

Still a further object of the present invention is to provide an adjustable deck and mechanism for use with elevated walkway platforms wherein a minimum of mechanisms is utilized to accommodate movement of the deck relative to the elevated platforms or walkway so that the deck may be adjusted to any desired vertical height, additional means for rotating the deck to a desired lateral position relative to the platform, brake means for maintaining the deck in any adjusted position, and additional means for extending the deck longitudinally to further accommodate the deck to various positions.

Still another object of the present invention is to provide an adjustable deck for use with an elevated walkway platform including a drum or elongated member secured to the platform, a pair of shafts extending longitudinally of said drum, a second drum threadedly secured on said shafts and telescopically fitting said first mentioned drum, a deck secured to said second drum and extending laterally therefrom, said second drum and deck being movable longitudinally relative to said first mentioned drum by rotation of one of said shafts whereby said drum moves along said threaded connection on said shaft, and the other of said shafts cooperating to rotate said second drum and connected deck in a horizontal plane to any desired angular relation relative to the platform or walkway.

A further object is to provide a device for use with a walkway which can be quickly and easily maneuvered to position adjacent a vehicle for loading or unloading thereof and which may be easily and safely moved out of the way when not in use.

Other objects and advantages of the present invention will become more readily apparent from a consideration of the following description and drawings wherein:

FIG. 1 is a partial side elevation view illustrating the present invention on an elevated platform, with two of the devices being illustrated at two different filling or loading stations on an elevated platform or walkway, one of the devices being in a lowered position and the other of the devices being in an elevated position and rotated horizontally relative to the first device;

FIG. 2 is a view on the line 2-2 of FIG. 1 showing a portion of the devices in FIG. 1;

FIG. 3 is a vertical sectional view in enlarged form of the arrangement for accommodating vertical and rotational movement of the deck;

FIG. 4 is a top plan, partially in section, of a portion of the deck, with a portion thereof broken away so that the operating mechanism for the extension of the deck is more clearly illustrated;

FIG. 5 is a sectional view on the line 5-5 of FIG. 4 to more clearly illustrate the actuating mechanism for the extension;

FIG. 6 is an enlarged detail view of one of the hand rails for use with the adjustable deck;

FIG. 7 is a sectional view on the line 7-7 of FIG. 6 showing the mechanism for locking the hand rail in elevated position;

FIG. 8 is a partial isometric view of the end of the adjustable deck showing the extension extended outwardly therefrom and the guard rail for the extension;

FIG. 9 is a sectional view on the line 9-9 of FIG. 1 and in enlarged form illustrating the brake mechanism for the present invention;

FIG. 10 is a side elevational view showing an alternate

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embodiment of the present invention in full line, and in dotted line in the same view illustrating the invention moved to another position;

FIG. 11 is a view on the line 11—11 of FIG. 10 and illustrates the relationship of the deck extension to the deck;

FIG. 12 is a top plan view on the line 12—12 of FIG. 10 illustrating further details of construction of the modification in full line, and showing in dotted line the deck of the present invention rotated to various positions;

FIG. 13 is a view on the line 13—13 of FIG. 10 to illustrate certain structural details for raising and lowering the deck, and for moving it out of the way when not in use;

FIG. 14 is an enlarged isometric view to illustrate an arrangement for supporting the deck for movement; and

FIG. 15 is a side view illustrating in full line the deck of the present invention moved to inoperative position, and showing in dotted line the deck being moved to such position.

In FIG. 1 an elevated walkway is illustrated at 2, and normally such elevated walkways are provided adjacent railroad sidings where tank cars are to be loaded with liquid products of any type. The walkway or platform 2 is a fixed vertical distance above the ground and has secured thereto suitable means (not shown) for extending into tank cars for filling them or for unloading the products therefrom. Two "filling" or "unloading" stations are described and shown and it should be appreciated that any number of such stations may be provided on a single platform. The spacing of the stations is uniform and when more than one station is provided, the station on the platform may or may not be adjacent the tank car opening, since the tank cars vary in length as well as height, thereby necessitating at the present time the disconnecting and "spotting" of each tank car individually adjacent a filling station. Such procedure is disadvantageous and time consuming.

One form of the present invention is illustrated generally at 3 in FIG. 1, and as shown in FIG. 1 may be arranged along the elevated platform at suitable spaced intervals, preferably at the filling stations, whereby access may be had through the use of the present invention to tank cars adjacent the elevated platform 2. In some situations, only one loading station is provided adjacent the platform 2, however, whether one or a plurality of filling stations are provided on the platform 2, the present invention may be used with equal success. Of course, where the tank car is of a vertical height lower than the platform 2, then access to the opening in the tank cars is more difficult, and where a plurality of tank cars are connected together, and if the tank cars are of varying length, it can be appreciated that the opening of the tank car may not coincide with the filling stations provided on the platform, as previously mentioned. The present invention provides the mechanism as illustrated at 3 in FIG. 1 and includes the deck arrangement shown generally by the numeral 4, which deck arrangement is adapted to be lowered and raised relative to the platform 2 and is adapted to be rotated relative thereto, whereby access may be had to tank cars of any height and if the opening of the tank car does not coincide with the filling station, such deck arrangement may be rotated at an angle relative to the platform as more clearly seen in FIG. 2, whereby access to the opening in the tank car may be had.

In FIG. 1, an operating mechanism as shown generally at 5 is provided for raising and lowering the deck structure 4, such mechanism being illustrated in more detail in FIG. 3. In FIG. 3 the platform 2 is shown as having secured thereto the elongated drum or member 6. Extending longitudinally of the drum or member 6 is the shaft means denoted generally by 7 and shown as including the inner shaft 8 and the outer shaft 9, which shaft means is supported by the bearing means 10 on the elon-

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gated drum or member 6. The bearing means 10 accommodates relative rotation of the shafts 8 and 9, as well as accommodating rotation of the shafts relative to the elongated drum or member 6 through which they extend.

A second drum or member 11 is shown as telescopically fitting about the member 6, and if desired, may be slidably supported on the member 6 by means of the bearing surfaces 12 and 13 which are secured to and extend annularly about the inner periphery 14 of the drum or second member 11. The deck illustrated generally at 4 is shown as being secured by any suitable means such as welding or the like to the second drum 11 and includes suitable structural members 15, 16 and top 17 for forming a deck which extends laterally from the elongated drum 11.

The drum 11 is provided with a bushing 18 at its lower end, which bushing is provided with a threaded surface as shown at 19. The outer member 9 is also provided with a threaded surface 20 which extends along its lower end for a substantial distance as shown in FIG. 3 of the drawings, and is adapted to engage with the threaded surface 19 on the bushing 18 connected to the second drum 11. Depending from the bushing 18 is an extension 20' which is provided with a slot 21 therein. A cross bar 22 is connected in the lower end 23 of the inner member 8 and fits in the slot 21 of extension 20'.

A surface as shown at 24 at the top end of shaft 9 may be engaged by any suitable means such as a wrench or the like, whereupon the outer shaft 9 may be rotated. Rotation of the shaft 9 causes the second drum 11 to move longitudinally of the first drum 6 on the threaded surface 20 of shaft 9, thereby causing the deck 4 extending laterally therefrom to be elevated or lowered. It should be noted that the inner shaft 8 maintains its fixed position relative to shaft 9 as shown in the drawings, so that rotation of shaft 9 merely moves the drum 11 and the deck 4 connected thereto up and down relative to the drum 6 connected to the stationary platform 2. The inner shaft 8 serves to maintain the drum 11 in a longitudinally movable but non-rotatable position relative to the shaft 9, which shaft 8 may be used to inhibit turning of the drum 11 when the shaft 9 is rotated to effect a vertical adjustment thereof. The shaft 8 also serves as a means for rotating the drum 11 and connected deck 4 in a horizontal plane as will be more fully described hereinafter.

The deck 4 is more clearly illustrated in FIG. 4 of the drawings, the numeral 17 representing the top surface of the deck arrangement 4 with the members 15 and 16 representing structural members which are connected together by any suitable means such as welding or the like to form a unitary structure. The operating mechanism is shown at 5 in FIG. 5 and as previously mentioned, the deck 4 is operatively secured to the operating mechanism 5 and extends laterally from drum 11. If desired, the surface 17 may assume the form of a solid plate which is secured to longitudinal member 15 and cross member 16 to form a unitary deck structure 4. The deck 4 is secured about the drum 11 and deck plate or top 17 may also include a portion thereof which is formed of foraminated metal material as shown at 17', whereby drainage of water from the deck 4 will readily occur.

The deck 4 extends laterally from the drum 11 a suitable distance, and if desired, an extension as illustrated generally at 30 may be provided in association therewith to in effect make the deck 4 longer where necessary.

The extension 30 is more clearly illustrated in FIG. 5 and is formed in any suitable manner to provide rigid, sturdy arrangement. If desired, it may be formed of structural members as shown at 31, 32 and 33, which are all connected together by welding or the like and are provided with the foraminated top 34 secured thereto to form a unitary structure.

It will be noted that the extension 30 is telescopically received within the frame formed by side members 15

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and central brace members 16 of deck 4 and is adapted to be moved outwardly relative to the end of members 15 by means of the arrangement illustrated generally by the numeral 35. The means 35 includes a bushing 36 which is provided with threads and secured to one end of the extension 30 as shown in FIG. 5 of the drawings. A shaft 36' is provided with a threaded area 37 on the end thereof for engaging with the threaded area on the bushing 36 so that rotation of the shaft 36' causes the bushing 36 and connected extension 30 to move along the threaded area 37 of the shaft 36'. It will be noted that the shaft 36' is formed of a plurality of sections which may be connected together by the universal joints shown at 38 at intervals therealong and is held in a non-movable relationship relative to the deck 4, including the extension 30, by means of the rotatable bushing 39 which is positioned on the member 16 of the frame of the main deck 4. Thus, as the rod 36' is rotated, the universal joints 38 therein accommodate rotation thereof and the rotatable bushing 39 permits rotational, but non-longitudinal movement of the shaft 36' relative to the extension 30, whereupon rotation of the shaft 36' moves the extension 30 along the threaded area 37 of shaft 36' and outwardly and longitudinally relative to the end of the top 17 of the deck 4.

The deck structure 4 includes guard rails which are shown in FIG. 1 and represented generally by the numeral 40 and are illustrated in more detail in FIGS. 6, 7 and 8. The guard rail is shown in elevated position in the left hand side of FIG. 1 and in lowered, or retracted position in the right hand side of FIG. 1. The guard rail 40 is provided on each side of the deck 4 to inhibit anyone from falling from the deck when walking on the top 17 to gain access to the tank cars by means of the present invention.

To this end, the bracket means 41 are provided in spaced relation and on each side of the deck mechanism 4 and the guard rail 40 may be formed of any suitable material such as angle iron or the like, including the end portions 42 and the top and bottom portions 43 and 44 respectively, which are secured together in any suitable manner. The rib of the angle iron on the end portions is received in the opening 45 in each of the brackets 41 to accommodate sliding movement of the guard rail 40 through the brackets 41, either to an elevated or retracted position.

For example, if it is desired to elevate the guard rails 40, the upper portion 43 thereof may be grasped and the guard rail 40 manually raised to the position shown in FIG. 6 of the drawings. This will elevate the guard rails to its uppermost height so that it will be in a position shown as illustrated at 48 in FIG. 1 of the drawings. In order to maintain the guard rail in such position, a lock mechanism as illustrated generally at 50 is provided, which is adapted to automatically engage and lock the guard rail 40 in raised or elevated position 48. The lock mechanism 50 is mounted on the nether side of the deck 4 at spaced intervals therealong so as to engage in the openings 52 when the guard rail 40 is raised. The lock mechanism 50 includes the bracket 54 which is secured to the bottom of the deck 4 and is shown in FIG. 7 as being fixed to lateral beams 16. A pin or plunger 51 is longitudinally movable through the housing or bracket 54 and a spring 55 surrounding one end of pin 51 normally tends to urge the pin 51 forwardly out of the bracket or housing 54 so that it tends to move into engagement with the openings 52 when aligned therewith.

The rod 56 extends between the lock mechanisms 50 for releasing the lock mechanisms when it is desired to lower the guard rail 40. To this end, a single foot operated pedal 57 extends upwardly through the top 17 of the deck mechanism 4 and is engaged at its lower end 58 with the rotatable crank members 59 on each of the spaced locks 50. The rod 56 is connected to the rotatable member 59 so that downward movement of the pedal

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57 acts against the tension in spring 55 to compress it and to rotate the members 59 and the connected rod 56. When the rod 56 is rotated the element 60 which is secured thereto engages the washer 61 on the pin 51, thereby moving it rearwardly of the housing 54 and out of the opening 52 in member 44 of rail 40 so as to disengage the lock mechanisms 50 from the openings 52 so that the guard rails 40 may be lowered. Thereafter, the spring 55 will move to its original position to urge 51 forwardly and projecting out of 54. When the guard rail 40 is again raised, the lower member 44 will engage the tapered end of pin 51 and move it inwardly until openings 52 in member 44 coincide with the pins 51, whereupon the pin will move out into locking engagement with 44 to hold the guard rail up.

When the extension 30 shown in FIG. 8 is moved outwardly relative to the main deck 4, the angle irons 62 and 63 may be used in combination with the rail 40 to form a guard rail for such extension. The members 62 and 63 are connected to the extension 30 by means of the pins 65 and 66 respectively, which extend through the slot 67 and 68 (not shown) of each of members 62 and 63 respectively.

Members 62 and 63 are normally in a lowered position on the end 32 of the extension 30 and when it is desired to place them in use, they are elevated by pivoting them about the pins 65 and 66, respectively, and the slot 67 and 68 for each of the pins 65 and 66 permits each of the members 62 and 63 to be raised so that they can then be set down into the clamps 69 which are secured to the extension 30 and which hold each of the members 62 and 63 in a substantially vertical relationship. The chains 70 and 71 may be connected by any suitable means such as the hooks 72 and 73 to the upper ends of the members 62 and 63 respectively. Similarly, the chain 74 may be connected by any suitable means such as the hook 75 and 76 between the members 62 and 63.

Snap hooks (not shown) may be provided on the ends of the chains 70 and 71 for engaging with the openings 75 on the end of the guard rails 40 whereby the guard rail is in effect extended to the end of extension 30 as shown in FIG. 8.

In FIG. 9 a brake mechanism is illustrated for maintaining the deck 4 in a predetermined position relative to the platform 2. A rod 80 extends downwardly from the platform 2 and is provided with a foot actuated lever 81 at its upper end as shown in FIG. 1. It is connected at its lower end to a plate 83 which is pivotally connected by means of the pin 84 to the frame 85 and also pivotally connected to the plate 83 above the pin 84 is the rod 86. The rod 86 extends forwardly to be connected to the plate 83' which is similar in construction to the plate 83, the plate 83' being in turn pivotally connected at 88 on extension 89' secured on the forward portion 89 of the frame 85. The hook 90 is also pivotally secured to the plate 83' and is connected to the rod 91 which is pivotally connected at 92 to the portion 89 of the frame. The rod 91 is maintained in a predetermined position by means of the spring 93 connected to the rod 92 at one of its ends and to the frame 85 at its other end. It will be noted that a brake-band as illustrated at 94 extends about the second drum 11 and is connected at one end to the frame 85 as shown at 95 and at its other end as shown at 96 to the bar 91.

When the foot lever 81 is depressed, the rod 80 is moved downwardly, thereby pivoting the crank 83 about the pivot 84. This in turn moves the rod 86 in the direction indicated by the arrow 98 so as to rotate the crank 83' about the pivot 88.

When this occurs the member 90 is moved in the direction indicated by the arrow 99 and plate or rod 91 is pivoted about pivot 92 and against the tension of spring 83 so as to expand the brake-band 94 away from drum 11. This releases the brake-band 94 from engagement with the second drum 11 and thereafter the drum 11 may be

rotated by turning the outer shaft 9. Thus, the deck 4 may be positioned angularly relative to the platform 2 in any desired position.

While it is believed that the operation and construction of the present invention is apparent by reason of the foregoing detailed description, to further describe and amplify, it will be assumed that the present invention is mounted on a stationary platform 2, as shown in FIG. 1. As previously mentioned, the member 6 is secured to the stationary platform 2, and the member 11 is longitudinally movable relative to the member 6 so as to adjust the deck mechanism 4 to any desired vertical height. The second drum or member 11 is supported on the outer shaft 9 and when the outer shaft 9 is rotated, the threaded area on the outer shaft in engagement with the threaded area on the second drum 11 as shown in FIG. 3 causes the second drum to move along such threaded area on the shaft 9. The shaft 9 may be rotated by any suitable mechanism, it being contemplated that a suitable wrench or handle as illustrated at 100 may be used for rotating outer shaft 9 and for rotating the inner shaft 8. Of course, a different size wrench would have to be used for each shaft. Not only can the deck 4, which is secured to the second drum 11 and extends laterally therefrom, be moved vertically relative to the stationary platform 2, but it can be moved in a horizontal plane to any desired angular relationship relative to the stationary platform 2 as illustrated at 101 and 102 in FIG. 2.

For the purpose of description, it will be assumed that the present invention illustrated generally at 3 is in a completely retracted position and in alignment with the platform 2. The operator, to manipulate the invention would, first of all, depress the brake pedal 81 so as to release the brake-band 94, as previously mentioned and described in detail with regard to FIG. 9. When this occurs the shaft 8 could then be rotated so that the deck 4 could be moved out from under the platform 2 and into a desired operative position. When approximately the desired angular relationship of the deck 4 relative to the stationary platform 2 has been reached, the brake pedal 81 may be released, whereupon the brake-band 94 re-engages the second drum or member 11 and retains it in the angular relationship relative to the platform 2.

The deck 4 may now be adjusted to any vertical height so as to adjust it at the proper location relative to the opening in the tank car. To accomplish this, the outer shaft 9 may be rotated whereupon the drum 11 and the connected deck 4 are moved vertically relative to the platform 2 and longitudinally relative to the drum 6 which is secured to the platform 2. When the deck 4 has been adjusted to the desired vertical height, the operator may walk along the top 17 and grasp the top 43 of the guard rail 40 and raise it to the position shown in FIG. 6 and in FIG. 1, as shown at 48. When the guard rail 40 is raised, the pin 51 by reason of the spring tension 55 automatically snaps into the opening 52 in the lower member 44 of the guard rail 40, thereby maintaining it in elevated relationship. If it is desired to move the extension 30 outwardly relative to the top 17 of the main deck 4, the hand wheel 103 may be rotated so as to in turn rotate the flexible shaft 104 connected therewith. The flexible shaft is connected at its lower end to the shaft 36' whereupon the shaft 36' is rotated and such rotation in turn effects relative movement between the extension 30 and the top 17 of the main deck 4 as previously described herein. When extension 30 is moved outwardly, deck 4 is in effect lengthened. The members 62 and 63 may be then raised from their lowered position and raised and positioned in the clamps 69 on the end of the extension 30 and the chains 70, 71 and 74 then positioned by means of the snap hooks so that the chain 74 will extend between the members 62 and 63 and the members 70 and 71 will extend from the members 62 and 63 to the holes 75 in the end of each of the guard rails 40.

The invention is now ready for use and ready to accom-

modate the operator for positioning the filling or discharge hoses or pipes and connections into the tank car for filling or emptying thereof.

When the operation is completed, the procedure above described may be reversed. The chains 70, 71 and 74 will be disconnected, the members 62 and 63 will be raised out of the clamp 69 and then lowered as indicated by the arrows in FIG. 8 to rest on the extension 30. The hand wheel 103 may be operated to retract the extension 30 into deck 4. The pedals 57 depressed so as to retract the pins 51, whereupon guard rails 40 can be lowered.

The pedal 81 can then be depressed and inner shaft 8 rotated so as to rotate the deck 4 into its retracted position, below the stationary platform 2. It seems obvious that structural variations may be provided to accomplish the objects of the present invention, without departing from the scope hereof.

FIGS. 10-15 inclusive illustrate an alternate modification of the present invention.

Attention is directed to FIG. 10 wherein an operating mechanism is illustrated generally by the numeral 5' for raising and lowering the deck structure designated generally by the numeral 4', such operating mechanism being shown in more detail in FIG. 13. In FIG. 10 the stationary platform 2 is shown as having secured thereto by any suitable means as will be more fully discussed hereinafter, the elongated drum or member 6'; as more clearly illustrated in FIG. 13, a shaft means 7' extends longitudinally of the elongated drum 6'.

A second drum or member 11' is telescopically mounted relative to the elongated drum 6' and a slidable fit is formed therebetween for relative longitudinal movement therebetween. The second drum 11' is secured by any suitable means to the deck 4', the deck 4' including suitable structural members 15' and 16' and 114 longitudinally extending on each side of the deck as well as the top 17' which extends between the side members 15' and laterally from the elongated drum 11', all as more clearly illustrated in FIGS. 11 and 13 of the drawings.

The drum 11' is supported on the hollow shaft means 7' by reason of the enlargement 105 which abuts the cross-member 106 which cross-member is welded to the upper end of the second drum 11' as illustrated at 107. The enlargement 105 is, in turn, connected to the elongated rod 108 which extends longitudinally of the shaft 7' as shown in FIG. 13 of the drawings and is provided with a piston 109 at one end thereof. The piston 109 is provided with seals whereby it can be moved by fluid pressure.

The arrangement of the support or abutting plate 105 relative to the drum 11' and deck 4', and the connection between the enlargement 105 and the piston 109, effects longitudinal movement of the drum 11' relative to the drum 6' so as to adjust the deck 4' connected to the second drum 11' to a desired vertical position, as will be more fully described hereinafter. Such arrangement also accommodates relative rotation between drums 6' and 11' and between shaft 7' and drum 11'.

The modification of the invention illustrated in FIGS. 10-15 inclusive is constructed and arranged so that it may be retracted to a position so as to provide ample clearance for the passage of vehicles such as tank cars when the device is not in use. This position is illustrated more clearly in FIG. 15 of the drawings.

In order to accomplish this function, the member 106 which is secured to the second drum 11' at the upper end thereof is shown as being hollow as illustrated in FIGS. 13 and 14 of the drawings. A rod or member 111 extends longitudinally of the member 106 and projects from each end thereof. The member 111 is secured against rotation relative to the member 106 by any suitable means such as the bolts 112 which extend through each of the members to hold them together as shown in FIG. 13. A plate 113 is secured at each end of the member 106 through which the rod or member 111 projects,

the plate 113 also having a stop member 114' secured thereto for positioning the deck 4' when it is lowered to operative position as will be discussed in more detail hereinafter.

The structural members 15' and 16' may be formed of any suitable material such as angle iron or the like, and are joined together in spaced relation by reason of the connecting member 114 as shown in FIG. 13 of the drawings. The rod 111 extends in the space between the members 15' and 16' and through the connecting member 114, such member 114 being rotatable relative to the rod 111. The rod 111 is fixed to each of the upwardly extending members 115 of the guide rail designated generally at 40'.

Additionally, a washer 117 is provided on one side of the structural members 15', 16' and 114 of the deck 4', and a washer 18 is provided on the other side as shown in FIG. 13 of the drawings to accommodate relative rotation between the structural members aforementioned and the rod 111 as the deck mechanism 4' is pivoted to inoperative position as shown in FIG. 15 of the drawings.

The drum 6' may be secured to the stationary platform 2 by any suitable means and as illustrated in FIG. 2 of the drawings, it will be noted that the vertically extending brace 120 which supports the platform 2 in an elevated position is provided with any suitable form of bracket means 121 and 122 which are connected to the drum 6' and to the brace 120 respectively by any suitable means such as welding or the like.

The drum 6' may be of any suitable size and length to perform its intended function and is provided with an annular skirt 6'' adjacent one end thereof which is secured to the drum 6' by any suitable means such as welding or the like. The lower end 7'' of the hollow shaft means 7' terminates adjacent the lower end of the drum 6' and is supported on the plate 123 by any suitable means such as weld 124 or the like. The plate 123 in turn is secured to the circumferentially spaced members 6'' of drum 6' by any suitable means such as bolts 125 which are engaged with the plate 123 and members 6'' whereby the shaft 7' and the elongated drum 6' are secured in the position illustrated in FIG. 13 of the drawings.

It will be noted that the shaft 7' is spaced relative to the drum 6' as shown in FIG. 13 of the drawings to provide an annular space for telescopically and slidably receiving the second drum 11' therebetween as shown in FIG. 13 of the drawings. A passage 126 communicates with the interior of the shaft 7' below the piston 109 whereby fluid pressure may be supplied so as to move the piston longitudinally of the shaft 7' whereby the plate 105 acts against the member 106 which is connected to and is a part of the drum 11' so as to move the drum 11' vertically relative to the elongated drum 6'. This effects vertical adjustment of the deck 4' which is carried on the drum 11' by means of the shaft or rod 111 extending longitudinally of the member 106. The passage 126 is connected by means of the hose represented at 127 to the reservoir 123 whereby fluid pressure from the reservoir by means of the pump 129 may be conducted through the valve 130 and line 127 to act on the piston 109 to move the deck 4' vertically relative to the platform 2 as illustrated in the drawing.

The deck 4' extends from the drum 11' a suitable distance, and if desired, an extension as illustrated generally at 30' may be provided in association therewith to in effect make the deck 4' longer where necessary.

As shown in FIG. 11, the extension 30' is slidably supported on the lower structural member 16', which member 16' extends along each side and below the member 15' as shown in FIG. 11. The extension 30' may be formed in any suitable fashion, and as illustrated in FIGS. 10 and 11 angle iron 16'' is provided along each side of the extension and supports a top 17' of any suitable construction thereon, which top extends between the

side members 16' and the full length of the extension 30'. A downwardly depending member 30'' at the forward end of the extension 30' is connected to a piston rod 131, which piston rod is in turn secured to a piston in the hydraulic cylinder 132. A hose 133 communicates with the cylinder 132 and with the reservoir 128 through the valve 134 so that fluid pressure may be supplied to the cylinder 132 to extend the extension 30' when desired.

The guard rail arrangement illustrated generally by the numeral 40' is provided with the vertical members 115 on each side of the deck 4' which are fixed to the rod 111. Vertically extending members 115' are provided adjacent the forward end of the deck 4' and are pivotally secured to the plate 114 which connects the structural members 15' and 16', such pivotal connection being illustrated at 140 in FIG. 11. Also, the horizontally extending upper members 115'' of the guard rail 40' are pivotally connected as illustrated at 141 and 142 to the upper ends of the members 115 and 115', respectively.

While it is believed that the functioning of the various components of the present invention is apparent by reason of the foregoing detailed structural description, to further amplify, the function of the modification illustrated in FIGS. 10-15 as it moves to various positions will now be described.

Attention is first of all directed to FIG. 10 of the drawings wherein the lowermost position of the deck 4' relative to the platform 2 is illustrated. When the deck 4' is in this position, the components of the operating mechanism 5' will assume the relative position as illustrated in FIG. 13 of the drawings. In this position the drum 11' is in its lowermost position relative to the drum 6' and the guard rail 40' is in operative position as shown in full line in FIG. 10. If it is desired to elevate the deck 4' relative to the stationary platform 2, valve 130 in conduit 127 may be opened, and valve 134 closed so that when the pump 129 is manually operated, fluid pressure will pass to the hollow shaft 7' to act on the piston 109 to move the drum 11' and connected deck 4' upwardly. As previously mentioned, the drum 11' is slidable relative to the drum 6', and it is also rotatable relative to the drum, and if it is desired to rotate the deck 4' horizontally to various positions, such rotation may be accomplished manually by grasping the upper members 115'' of the guard rail 40' to swing the deck 4' in a horizontal plane to various positions as illustrated at 150 and 151 in FIG. 12. Additionally, if it is desired to extend the deck 4', the valve 130 may be closed so as to retain the deck 4' in a desired vertical relationship, and valve 134 may thereupon be open and fluid passed through the conduit 133 to act on the piston in cylinder 132 so as to extend the extension 30' as shown in FIG. 10 of the drawings.

From the foregoing description, it can be appreciated that the deck 4' can be moved up to a plurality of vertical positions, as desired, and retained in such position by locking the fluid which acts on the piston 109 by closing valve 130. Furthermore, the extension 30' can be locked in any desired extended position by closing valve 134 while various loading or unloading operations are carried on by means of the platform. The raising of the deck 4' does not change the guard rail 40', except as noted hereinafter, and the guard rail 40' will remain in operative position during all normal vertical positions of the deck 4'.

The extent of the vertical adjustment of the deck 4' is limited by the length of the connection, or piston rod 108, as well as the length of the cylinders 11' and 6'. It seems obvious that such modifications, as necessary, to provide for various units to accommodate any desired amount of relative vertical movement or adjustment may be provided.

The chain 143 is connected as shown at 144 to the drum 6' and is connected as shown at 145 adjacent the

rear of the deck and spaced from the pivotal connection of the deck 4' and drum 11'. The chain 143 will assume the position illustrated in FIG. 10 in full line when the deck 4' is at its lowermost position. The length of the chain 143 is such that when the piston 109 has been moved to its uppermost position in the shaft 7', the chain 143 will become tightened as shown in FIG. 15 of the drawings. The chain does not interfere with normal operation of the device, and its length is such that the pivoting action starts shortly before the piston 109 reaches its uppermost position in shaft 7'; therefore, when travel of the piston 109 is completed to its uppermost position, the chain will tighten and deck 4' pivot upwardly. Tightening of the chain 143 causes the deck 4' to pivot or be pulled about the member 106 and the member 111 to the vertical position illustrated in FIG. 15. The vertical members 115 are, as previously discussed, secured or fixed to the rod 111 and do not pivot or rotate relative thereto; however, the members 115'', as well as the members 115' of the guard rail 40' pivots so as to assume the position shown in full line view in FIG. 15 of the drawings. If desired, the extension 30' may be retracted relative to the deck 4' by opening valve 134 so that the extension 30' by gravity forces the fluid through the line 133 back into the reservoir 128.

When it is desired to lower the platform 2 to operating position, valve 130 can be opened so that the fluid in the shaft 7' is allowed to flow back to the reservoir 128, whereupon the deck 4' moves to its initial position as previously described. As the deck 4' pivots downwardly from the position shown in FIG. 15 towards its normally laterally extending position relative to the drum 11', the cross-member 158 on the nether side of deck 4' abuts the stop 114' so as to position the deck 4' horizontally and laterally extending relative to the drum 11', as shown in FIG. 14 of the drawings.

The modification described in FIGS. 10-15 provides drums which are movable relative to each other for accommodating movement of a connected deck in a desired manner. The shaft means which extend through one of the drums is, in the modification, mounted in a fixed position relative to that drum, since the relative movement between the drums is effected by a hydraulic in lieu of a mechanical means.

In addition to the vertical movement of the deck accomplished by reason of the modification shown in FIGS. 10-15, an additional desirable movement is provided in that the deck may be swung upwardly out of the way with a minimum of effort so that the vehicle adjacent the deck can move thereby without danger of tearing off or pulling the deck 4' off the platform 2'. Thereafter, the deck can be with a minimum of effort relocated for use as desired.

Broadly the invention relates to an adjustable deck for use with a stationary platform.

What is claimed is:

1. An adjustable deck for use with elevated stationary platforms for loading and unloading tank trucks and railroad tank cars comprising a deck structure, means supporting said deck structure relative to the elevated stationary platform, said support means including a brace and bracket means connected to the elevated stationary platform, a drum connected to said bracket and brace

means and extending vertically, a piston and piston rod in said drum, said piston rod abutting and supporting said deck structure, an extension slidably supported on said deck structure, fluid conducting means connected to said drum for supplying fluid to raise and lower said piston and piston rod and deck structure supported thereon relative to said elevated stationary platform, and said piston and piston rod rotatable in said drum whereby said deck structure may be rotated horizontally about said drum and relative to said elevated stationary platform to position the deck structure for loading and unloading operations on tank trucks and railroad tank cars, means connected to said support below said deck structure and connected to said deck structure at a position spaced rearwardly of the abutting of said deck structure and piston rod whereby elevation of said deck structure above a predetermined amount will cause it to pivot upwardly about said drum and piston rod to position said deck structure for clearance of the tank trucks and railroad tank cars.

2. An adjustable deck for use with elevated stationary platforms for loading and unloading tank trucks and railroad tank cars comprising a deck structure, means supporting said deck structure relative to the elevated stationary platform, said support means including a brace and bracket means connected to the elevated stationary platform, a drum connected to said bracket and brace means and extending vertically, a piston and piston rod in said drum, said piston rod abutting and supporting said deck structure, an extension slidably supported on said deck structure, fluid conducting means connected to said drum for supplying fluid to raise and lower said piston and piston rod and deck structure supported thereon relative to said elevated stationary platform, and said piston and piston rod rotatable in said drum whereby said deck structure may be rotated horizontally about said drum and relative to said elevated stationary platform to position the deck structure for loading and unloading operations on tank trucks and railroad tank cars, means connected to said support below said deck structure and connected to said deck structure at a position spaced rearwardly of the abutting of said deck structure and piston rod whereby elevation of said deck structure above a predetermined amount will cause it to pivot upwardly about said drum and piston rod to position said deck structure for clearance of the tank trucks and railroad tank cars, cylinder means mounted beneath said deck, a piston and piston rod in said cylinder, said piston rod being connected to said extension and fluid conducting means connected to said cylinder for supplying fluid to move said piston and piston rod connected therewith to effect movement of said extension relative to said deck.

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