United States Patent

Sweger

[15] **3,670,663**

[45] **June 20, 1972**

[54] DEVICE FOR AUTOMATICALLY LATCHING A CONTAINER TO A RAILWAY CAR OR THE LIKE AND FOR AUTOMATICALLY UNLATCHING IT THEREFROM

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[22] Filed: **April 30, 1968**

[21] Appl. No.: **725,363**

[52] **U.S. Cl.** .....**105/366 C,** 105/366 D, 248/119 R

[51] **Int. Cl.** **B60p 7/08,** B65j 1/22

[58] **Field of Search** 105/366; 248/119, 361; 296/35.1; 292/74

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Primary Examiner—Drayton E. Hoffman
Attorney—Robert R. Lockwood

[57] **ABSTRACT**

A container fitting is automatically latched to a railway car or the like as a direct result of lowering the container thereon, is held in latched position against the action of any usual forces likely to be encountered by the car in transit, and is automatically unlatched when the container is lifted from the car by a force sufficient to overcome the force of gravity acting on the container and the force of a spring maintaining the latched condition at each corner of the container.

34 Claims, 16 Drawing Figures

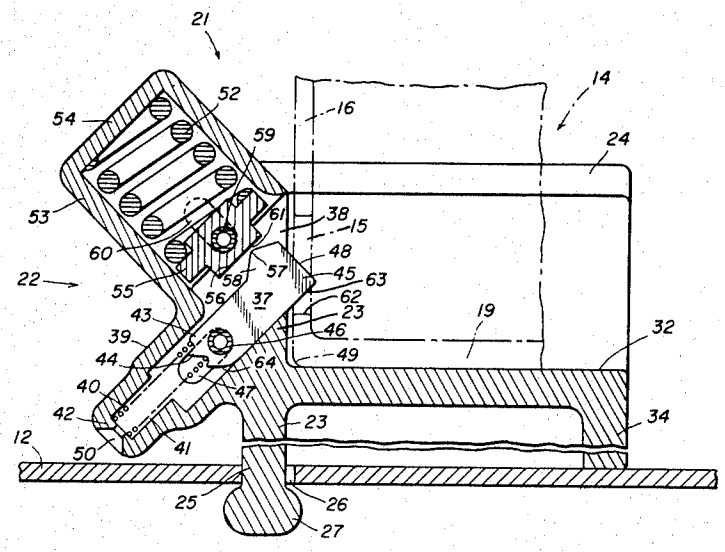


FIG. 1

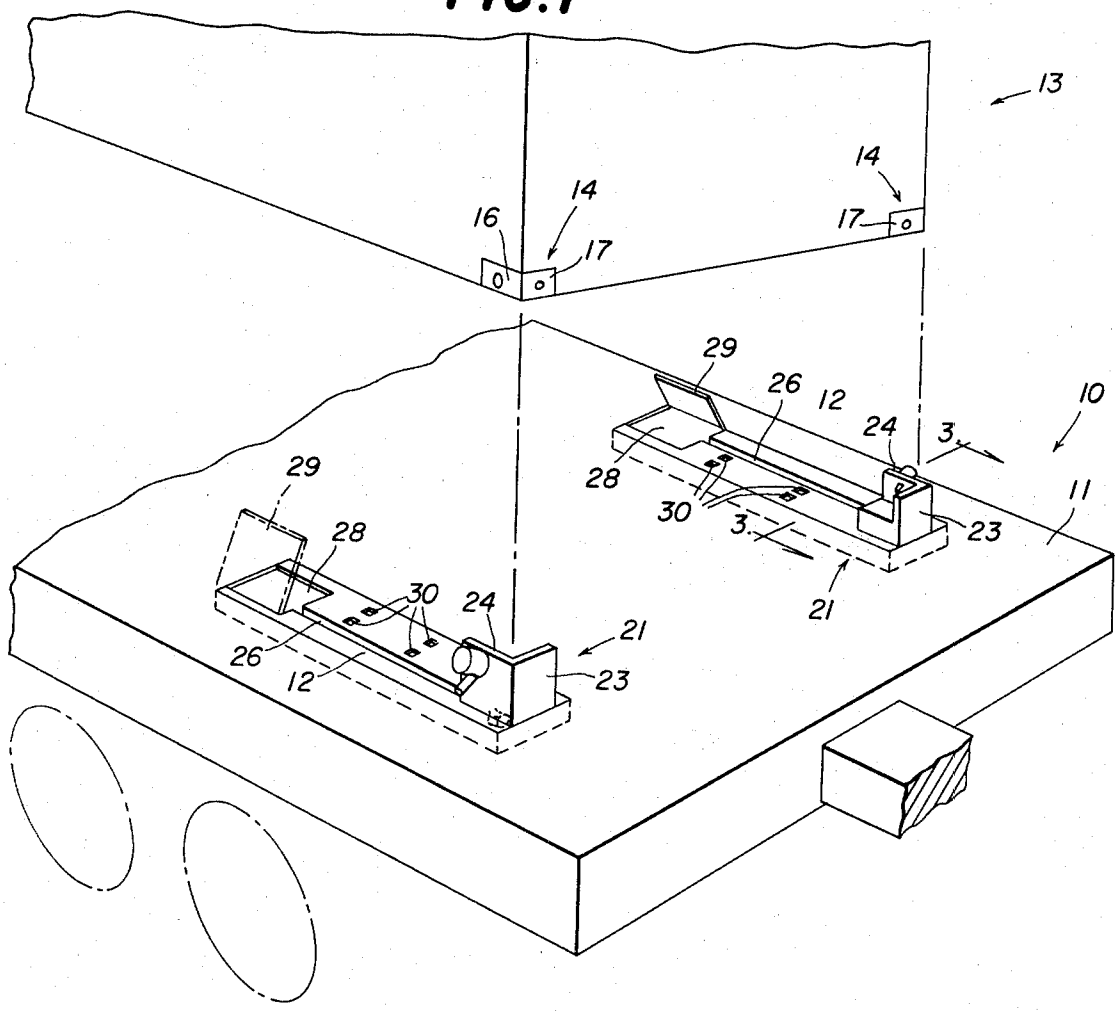

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FIG. 2

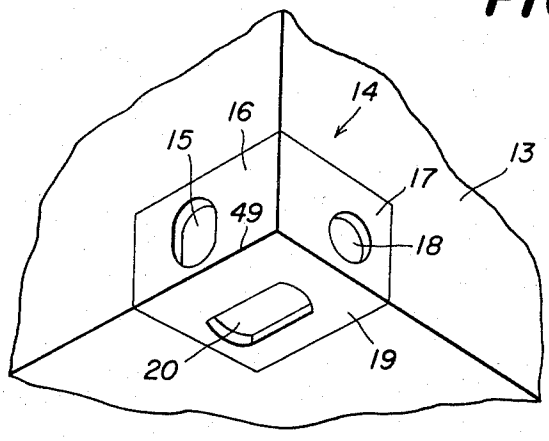

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FIG. 3

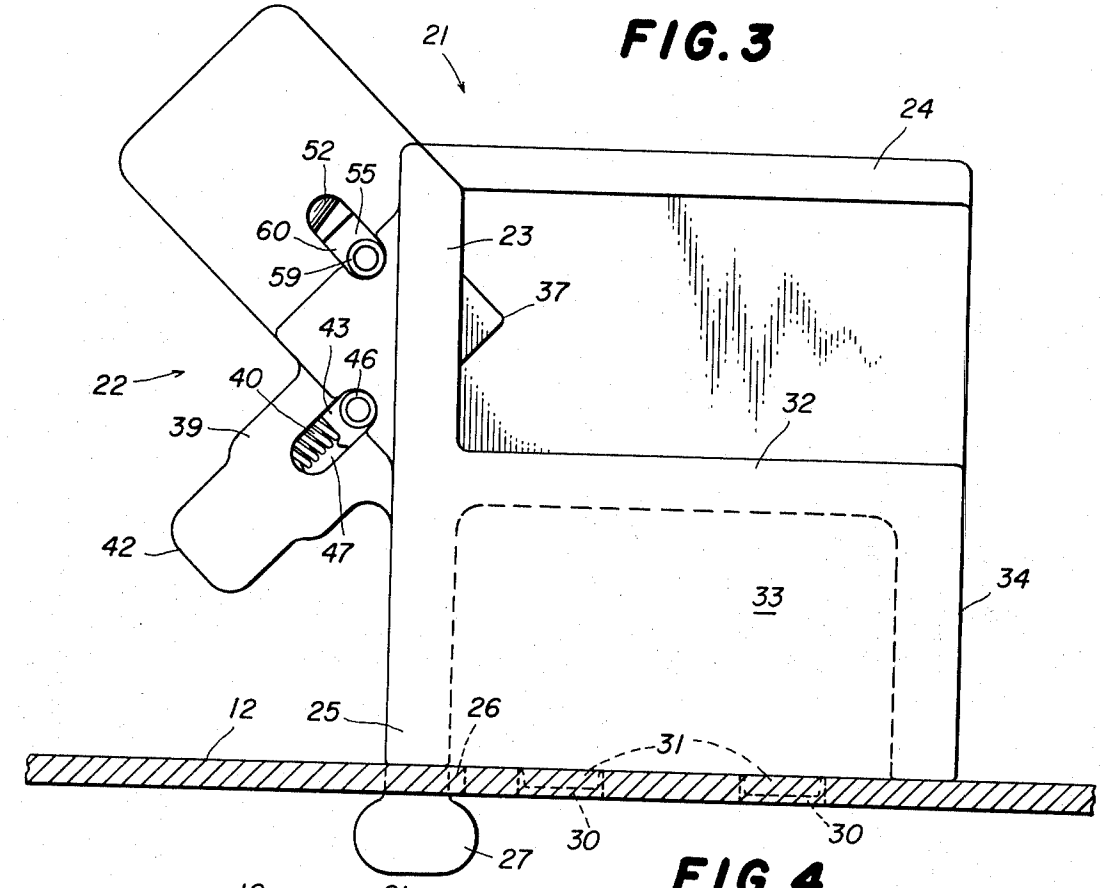

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FIG. 4

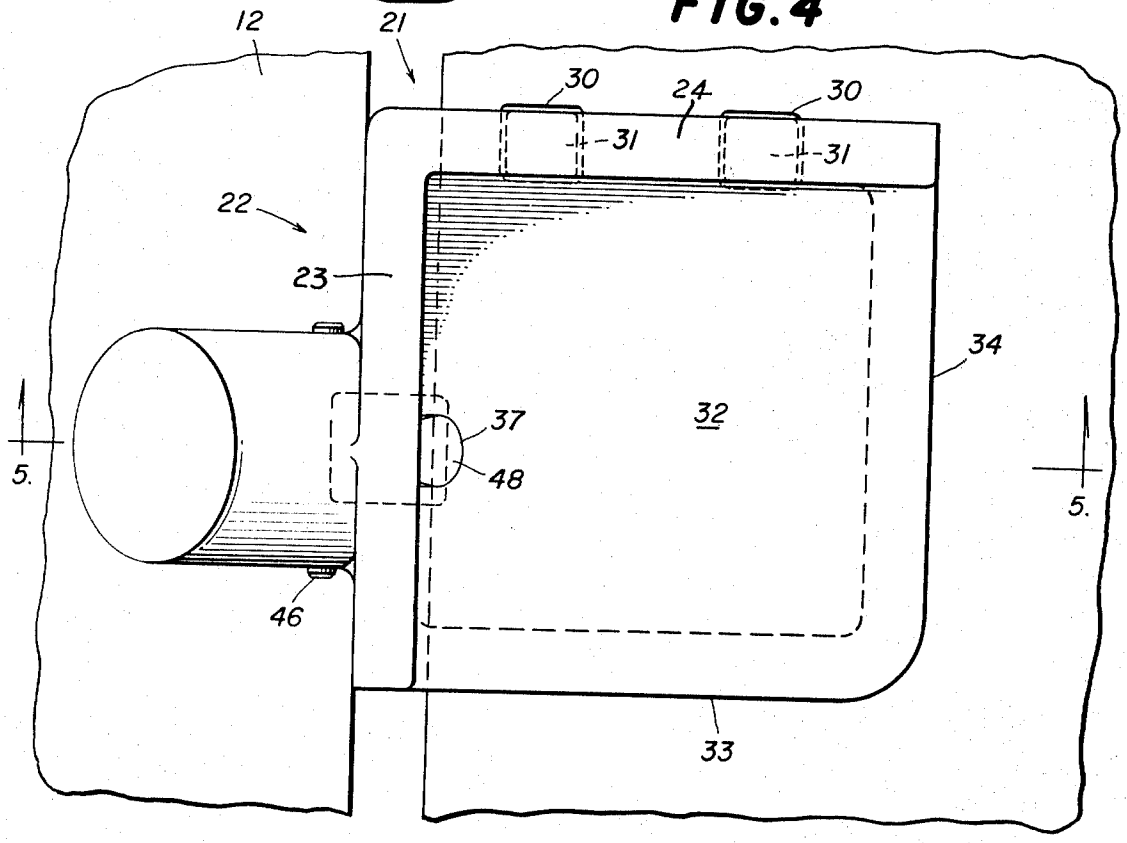

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FIG. 5

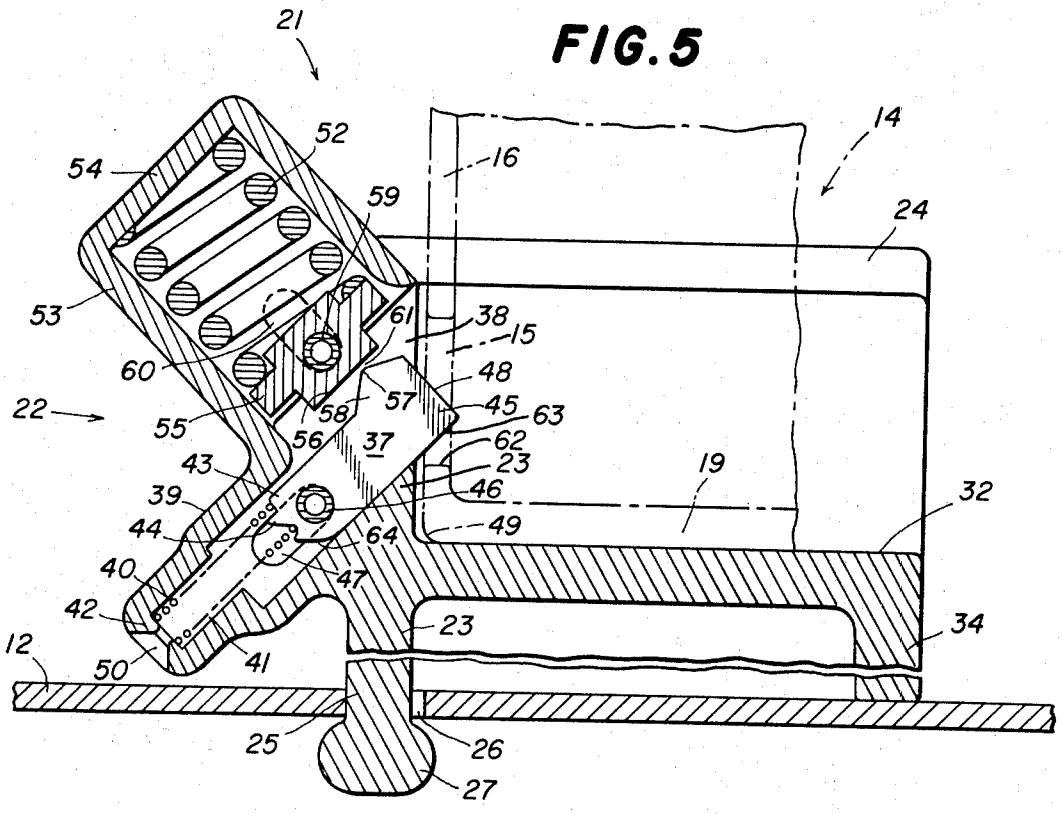


FIG. 6

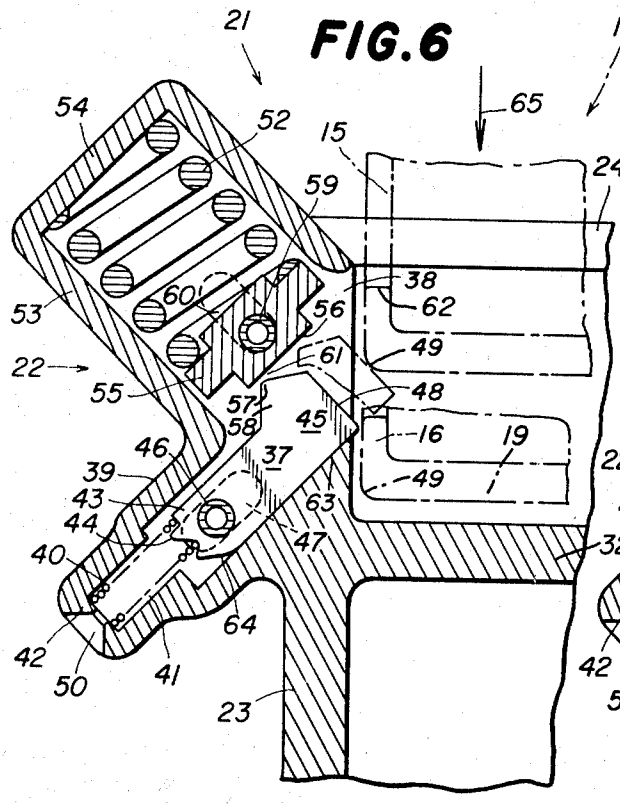
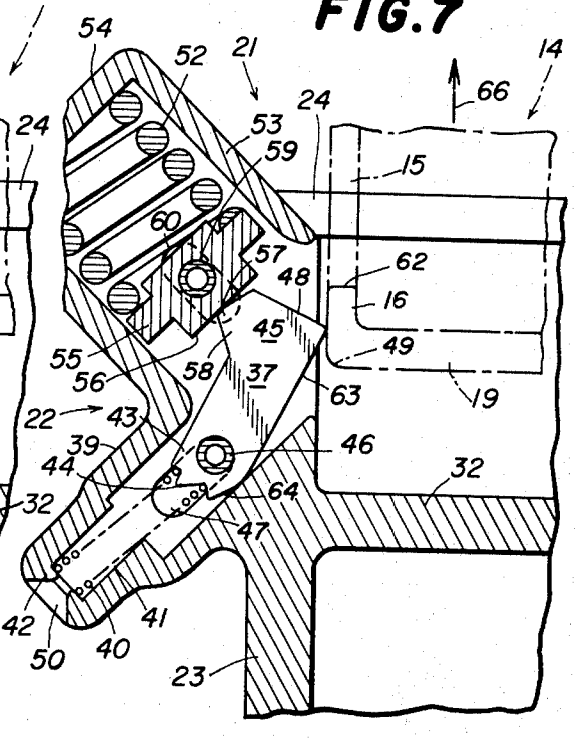


FIG. 7



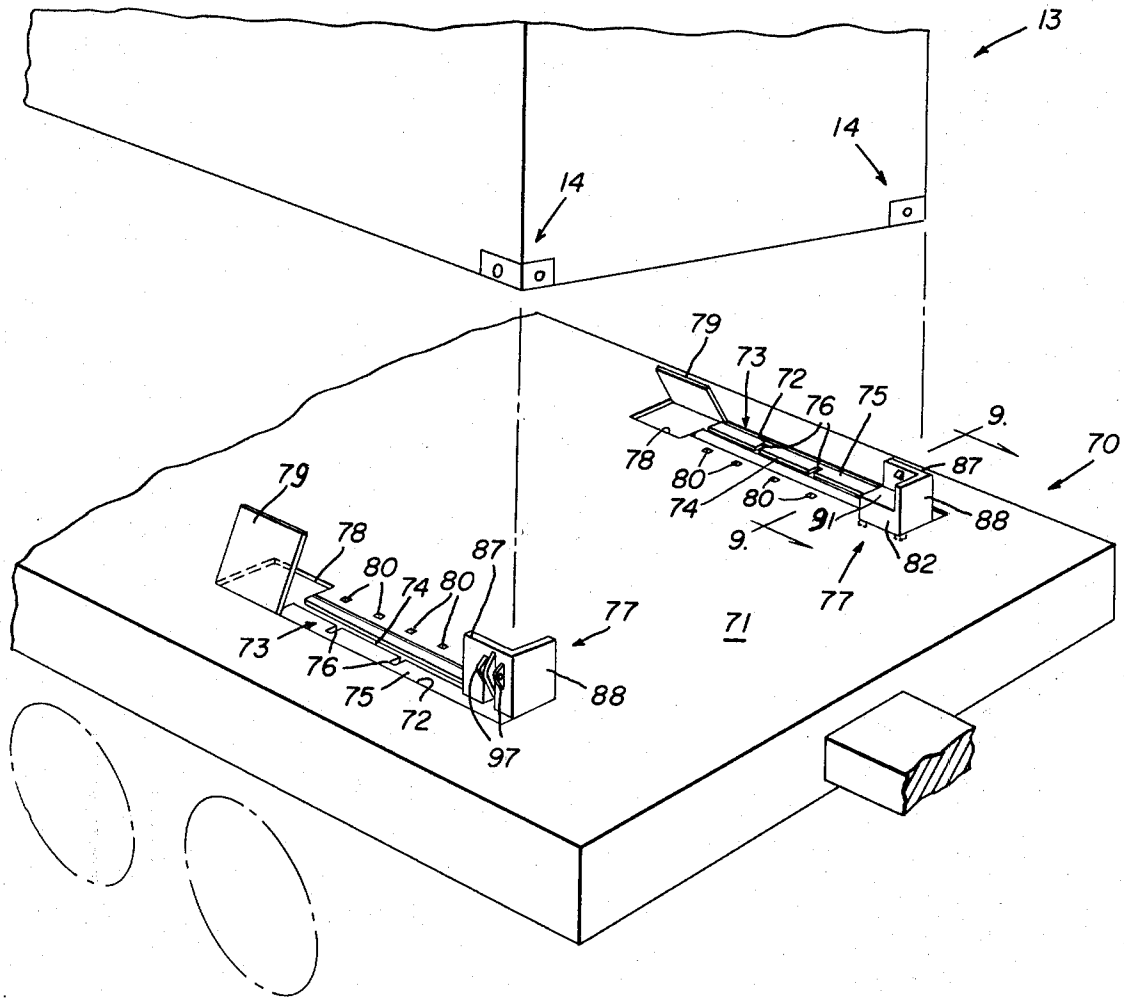

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FIG. 8

FIG. 9

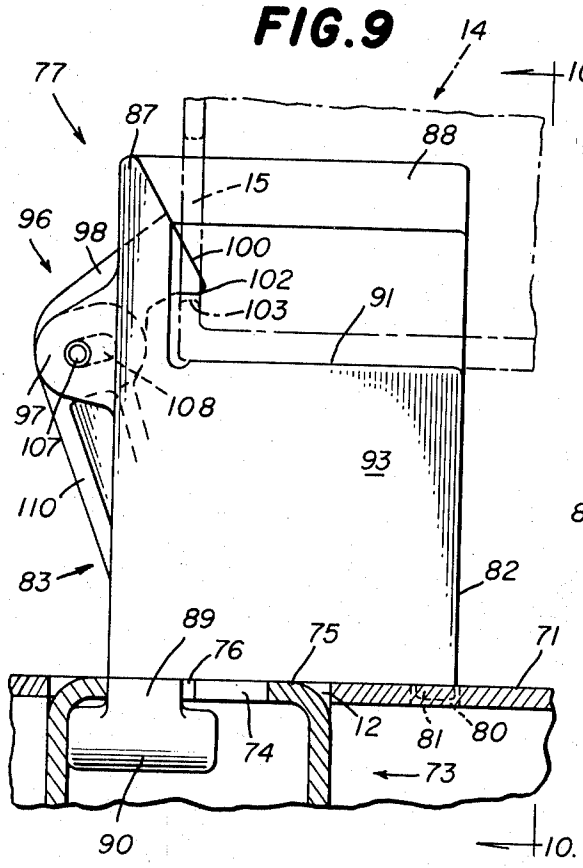


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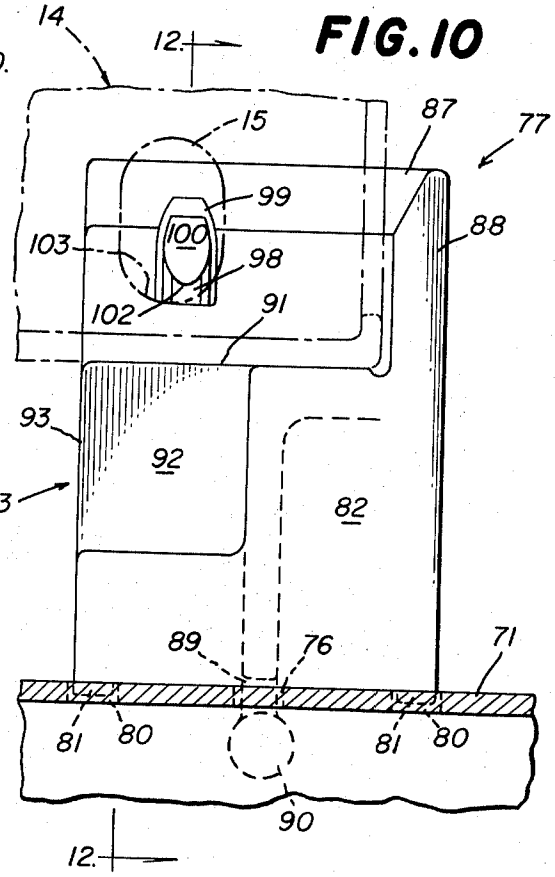


FIG. 11

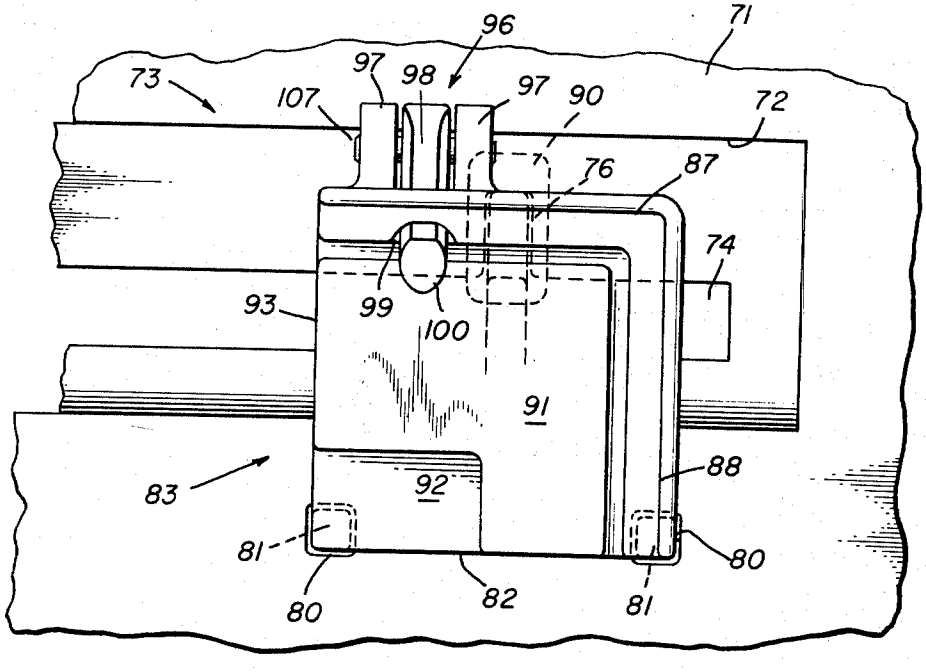


FIG. 13

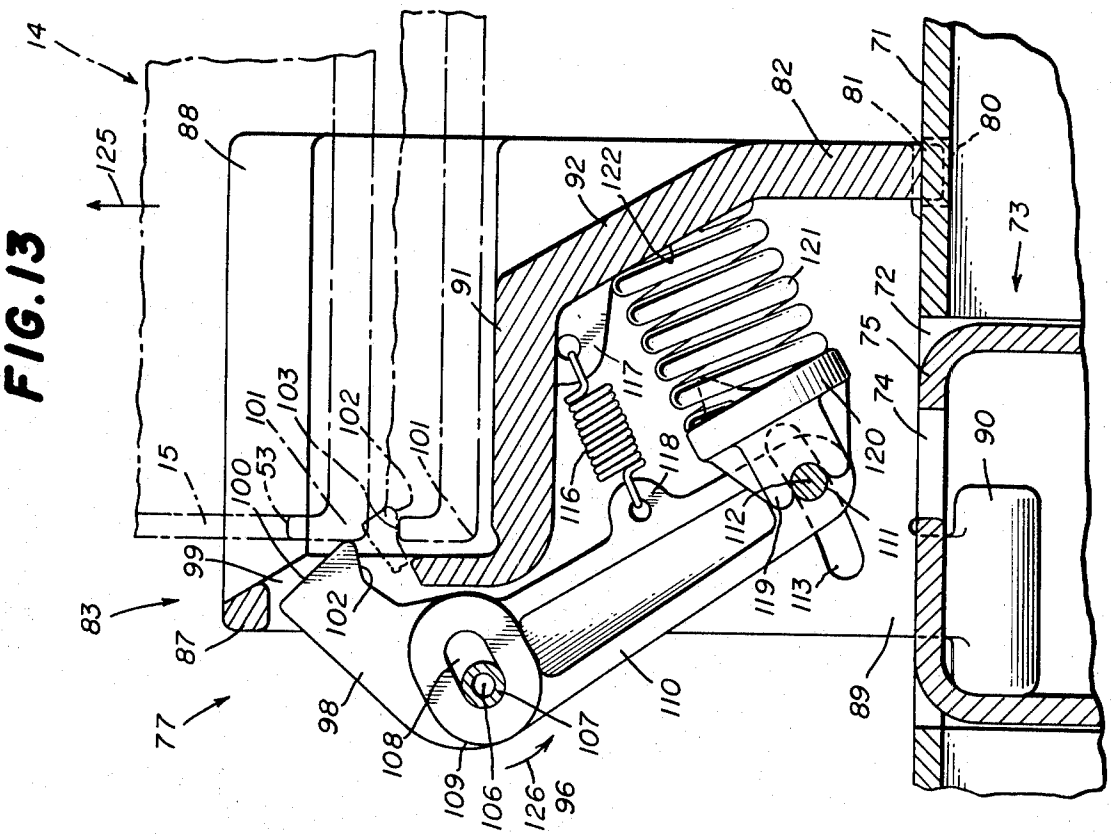
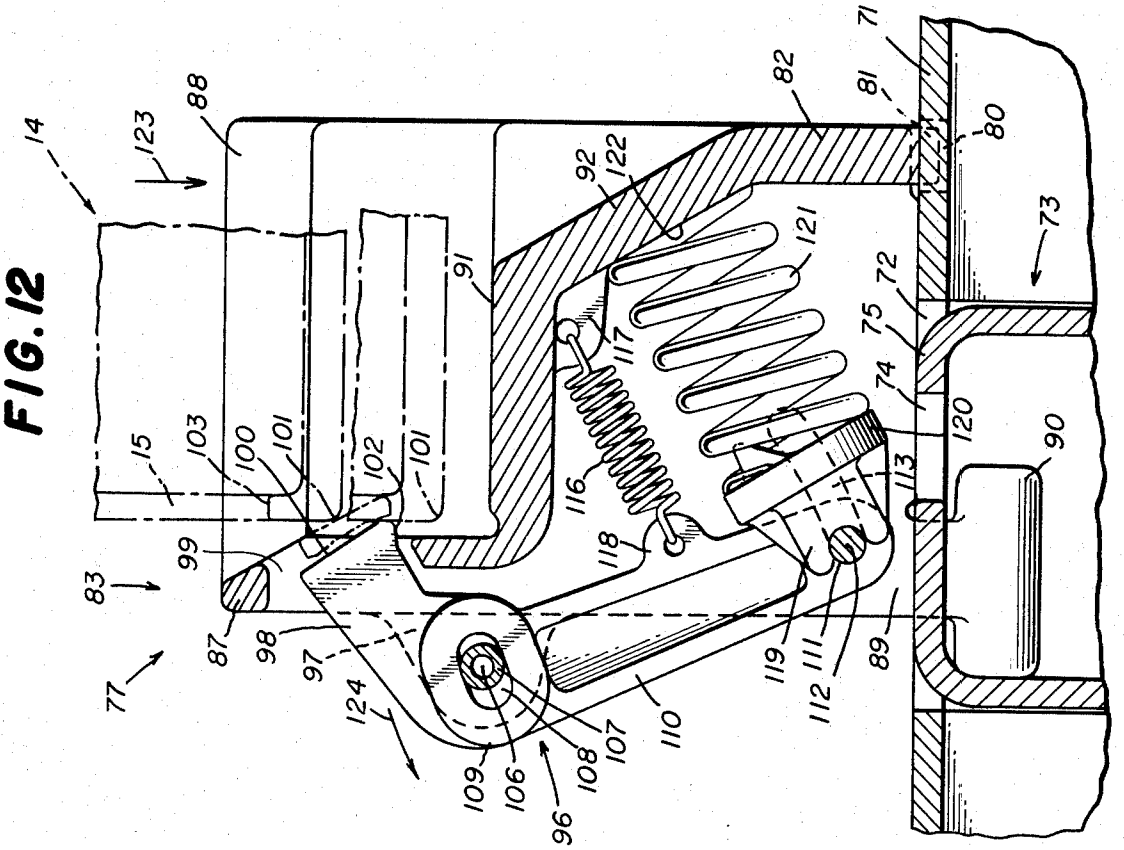

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FIG. 12


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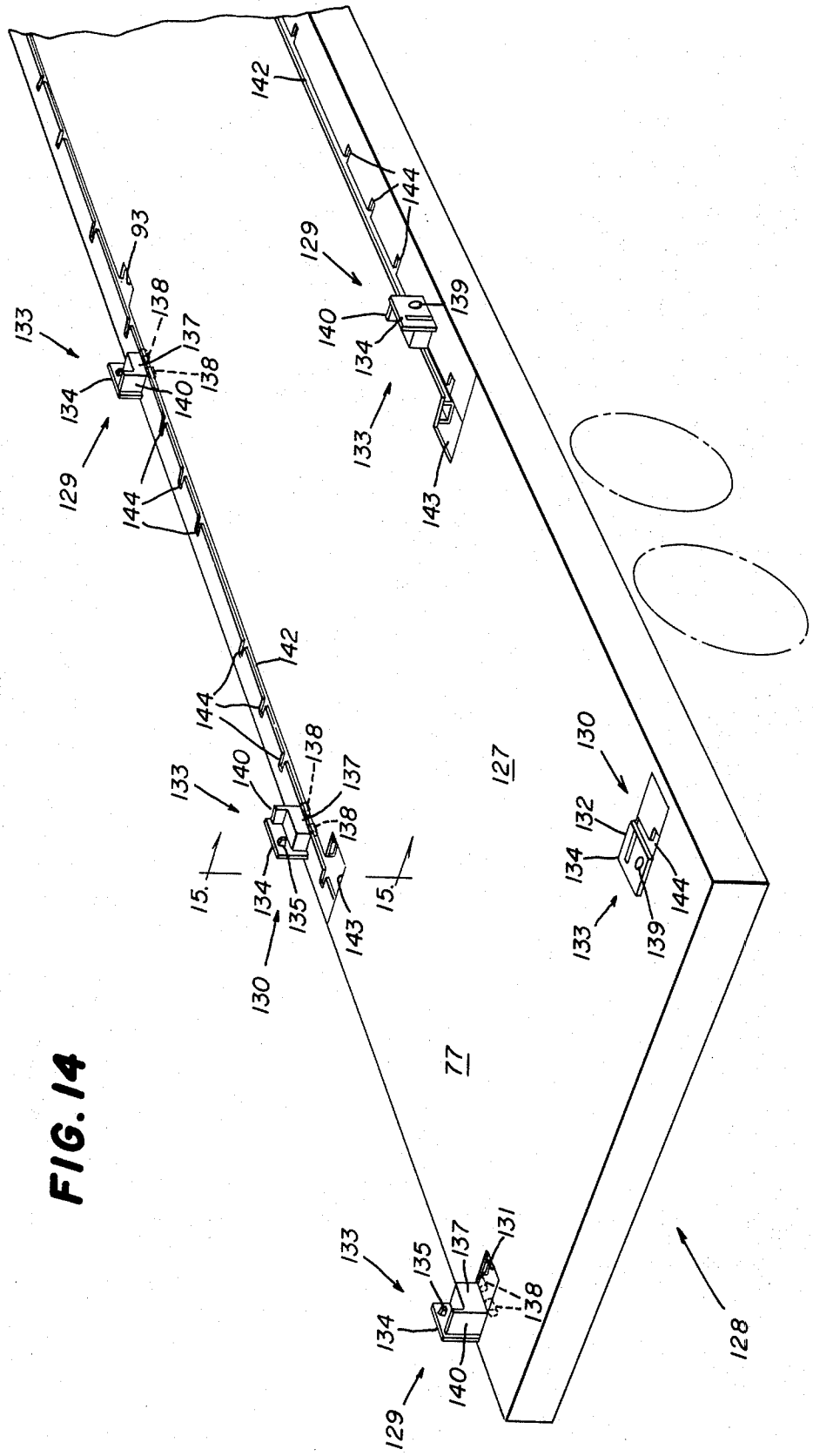

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FIG. 14

FIG. 16

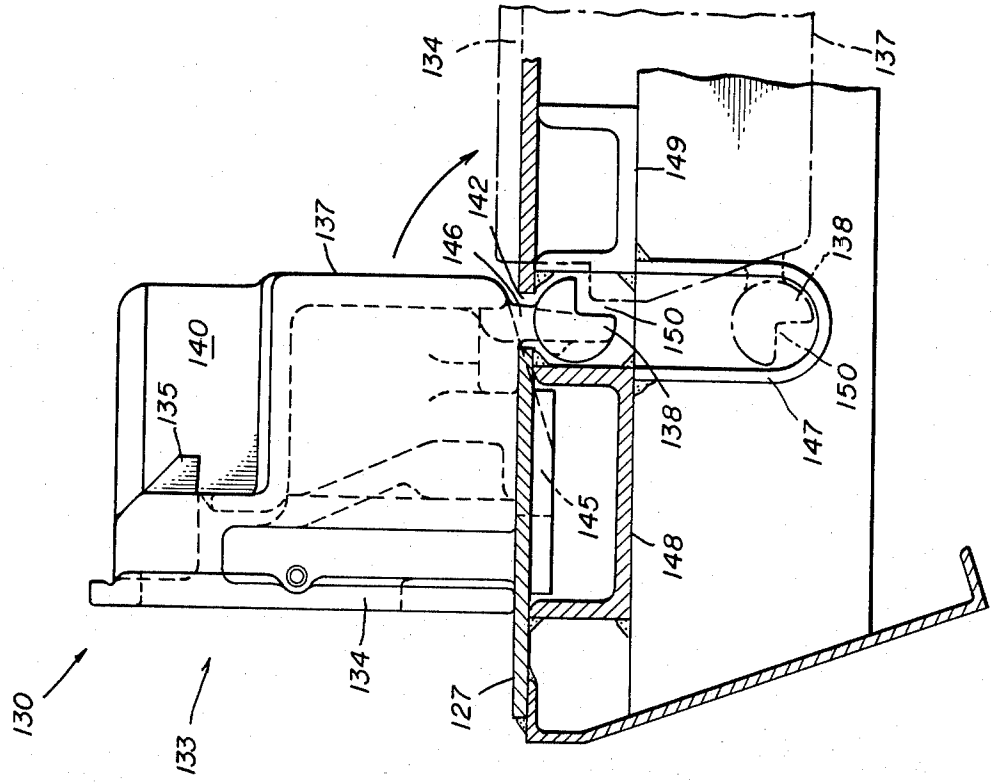
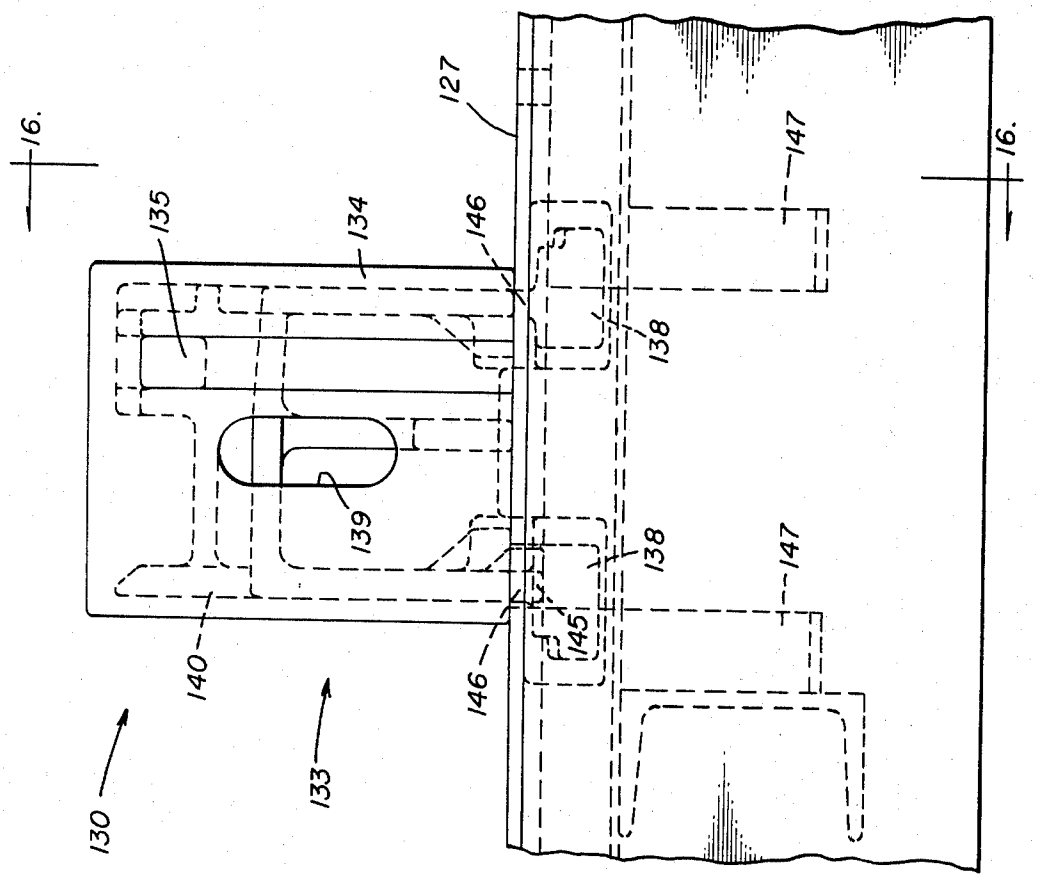

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FIG. 15


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DEVICE FOR AUTOMATICALLY LATCHING A CONTAINER TO A RAILWAY CAR OR THE LIKE AND FOR AUTOMATICALLY UNLATCHING IT THEREFROM

This invention is an improvement over the construction disclosed in Sweger U.S. application Ser. No. 703,005, filed Feb. 5, 1968 now U.S. Pat. No. 3,498,238, issued Mar. 3, 1970.

Among the objects of this invention are: To automatically latch the bottom container fittings to the bed of a railway car, truck or deck of a ship by lowering the container into transport position thereon and without requiring any manual operation with respect to the latch mechanism; to automatically unlatch the bottom container fittings from the transport carrier when the container is lifted therefrom without requiring any manual unlocking operation of the latch mechanism; to employ for this purpose a latch that is biased by a relatively weak spring to a latch receiving opening in a bottom container fitting which is displaced from latched position on lowering of the container to the transport carrier and is moved into the opening by this spring when the container is fully lowered into transport position and also to employ a relatively strong spring that reacts against the latch to hold it in latched position and is overcome only when sufficient force is applied to the container to lift it from the transport carrier against the force of gravity and to overcome the action of the relatively strong spring; to provide the latch with angularly related surfaces to be engaged by the container fitting one as it is being lowered onto the transport carrier and the other as it is being lifted therefrom for selectively stressing relatively weak and relatively strong springs to displace the latch from latched position; to arrange for prestressing the springs; to arrange for translatory and rotary movement of the latch; to permit translation of the latch under the biasing action of the relatively weak spring and rotation of the latch under the biasing action of the relatively strong spring; to guide the springs to exert their biasing actions in transverse directions; to multiply the forces exerted by the relatively weak and relatively strong springs in biasing a latch to and holding it in latching position with a container fitting thereby making it possible to employ less expensive springs for this purpose; to utilize the action of an L-shaped lever or bell crank for this purpose with one arm arranged to be moved into latching engagement with an opening in the container fitting; to mount the L-shaped lever or bell crank for rotation about two axes one at the junction between the arms of the lever or bell crank and the other at the distal end of the other arm; to employ pin and slot connections to the L-shaped lever or bell crank; to arrange for a relatively weak coil tension spring to bias the one arm of the lever or bell crank into latching position in the container fitting, this spring being connected to the other arm intermediate its ends and for a relatively strong compression spring to react against the distal end of this other arm to hold the bell crank in latching position; to rotate the lever or bell crank about both axes and principally against the biasing action of the relatively strong compression spring when sufficient force is applied to the container to lift it from the railway car and against this biasing action; to mount the latch assemblies for movement in slots along opposite sides of the floor of the railway car at different locations to accommodate different lengths of the containers; to arrange for swinging the latch assemblies to retracted positions below the surface of the floor; and to provide for by passing certain of the retracted latch assemblies which are not required for a given container size or to facilitate the use of properly shaped latch assemblies for a given container.

According to one embodiment of this invention a number of container securing devices is mounted on the bed or deck of a railway car, truck, ship or the like, one for each of the four corners of the container which, at each corner, has a bottom container fitting with at least one opening in one of its walls. More than one set of four devices is provided depending upon the number of containers to be received on a particular transport carrier. Each device includes a pair of right angularly related walls for overlying the similarly related walls of a bottom container fitting. On one of the walls of the device a latch is mounted for translation into the opening in the adjacent wall

of the bottom container fitting. The latch has an end surface inclined to the path of the bottom container fitting as it is lowered onto the device which is engageable by the container fitting to displace the latch against the biasing action of a relatively weak coil compression spring. When the container fitting is fully seated on the container securing device, the latch is moved into latching position in the opening in the container fitting by the relatively weak spring and is held in the latched position by a relatively strong spring which is arranged to react against the latch in a direction transverse to the direction in which the relatively weak spring acts when there is any force exerted on the latch tending to move it to the unlatched position. The latch is retained in the latched position by the relatively strong spring against any force likely to be applied to the container during its transport. A side surface on the latch is engageable by the container fitting when the container is lifted from the transport device by an overhead crane or the like to displace the latch against the force exerted by the relatively strong spring and rotate it out of latching engagement. The weight of the transport carrier is greater than the force required to lift the container and also overcome the biasing action of each of the relatively strong springs at the corners of the container biasing the respective latches toward the latched positions. No manual operation is required for the manipulation of the latch to and from the latched position.

According to another embodiment of this invention an L-shaped lever or bell crank is mounted on a housing for rotation about two axes. It has a relatively short arm for latching engagement with an opening in a side wall of a container fitting and a relatively long arm having a relatively strong coil compression spring reacting against its distal end to maintain the latching engagement. A relatively weak coil tension spring, connected to the long arm of the lever or bell crank intermediate its ends, biases the short arm into latching position when the container is lowered onto the railway car. The distal end of the short arm has an inclined face that is engaged by the container fitting as it is lowered into latching position for displacing the lever or bell crank against the biasing action of the tension spring. Another surface of the short arm is engaged by the container fitting as it is elevated to rotate the lever or bell crank against the action of the compression spring and out of latching position. The latch assemblies, each including the housing and spring biased lever or bell crank, are mounted in slots along opposite sides of the floor of the railway car and are slidable to different positions to accommodate different lengths of containers. The latch assemblies are swingable to retracted positions below the surface of the deck or floor and, where they are not needed, they can be by passed in retracted position.

In the drawings:

FIG. 1 is a perspective view of an end portion of a railway car which typifies the application of the container securing device of the present invention.

FIG. 2 is a perspective view, at an enlarged scale, showing the details of construction of one of the hollow bottom container fittings, it being understood that they are constructed for right hand and left hand mounting at the lower corners of the container.

FIG. 3 is a vertical sectional view taken generally along the line 3—3 of FIG. 1.

FIG. 4 is a top plan view of the construction shown in FIG. 3.

FIG. 5 is a vertical sectional view taken generally along the line 5—5 of FIG. 4, and shows the latch in the latched position in an opening in a side wall of the container fitting which occupies the transport position.

FIG. 6 is a view, similar to FIG. 5, and shows the container fitting being moved downwardly as the container is being lowered into transport position with the latch being displaced from latched position against the biasing action of the relatively weak spring.

FIG. 7 is a view, similar to FIG. 5, and shows the manner in which the latch is moved to the unlatched position against the

biasing action of the relatively strong spring when the container is lifted and the container fitting is moved upwardly.

FIG. 8 is a perspective view of an end portion of a railway car which typifies the application of another embodiment of the container securing device of the present invention.

FIG. 9 is a vertical sectional view, at an enlarged scale, taken generally along the line 9—9 of FIG. 8.

FIG. 10 is a vertical sectional view taken generally along the line 10—10 of FIG. 9.

FIG. 11 is a top plan view of the construction shown in FIG. 10.

FIG. 12 is a vertical sectional view, at an enlarged scale, taken generally along the line 12—12 of FIG. 10 and showing the container fitting being lowered into latching engagement with the latch assembly.

FIG. 13 is a view, similar to FIG. 12, showing the container fitting being lifted off of the latching assembly.

FIG. 14 is a perspective view of a modified form of transport carrier deck with which the container locking means of this invention can be employed.

FIG. 15 is an elevational view at an enlarged scale taken generally along the line 15—15 of FIG. 14.

FIG. 16 is a vertical sectional view taken generally along the line 16—16 of FIG. 15.

Referring now to FIG. 1, it will be observed that the reference character 10 designates, generally, a portion of a transport carrier such as a railway car. However, it will be understood that the present invention can be employed in connection with other transport carriers such as trucks, ships and the like. The transport carrier 10 is provided with a floor or deck 11 which, in the case of a railway car, may include transversely extending floor boards overlying an underframe of conventional construction. Secured to the underframe and mounted in the floor or deck 11 is a number of elongated mounting fixtures that are indicated at 12. The mounting fixtures 12 are secured to the railway car and in particular are preferably secured to the underframe. The railway car 10 is arranged to transport rectangular containers one of which is indicated, generally, at 13 and is provided at each of its lower corners with a hollow bottom container fitting 14 that may be a metallic casting and the general details of which are illustrated more clearly in FIG. 2. Here it will be observed that the bottom container fitting 14 has a vertical slot or latch receiving opening 15 in one side wall 16 which extends at right angles to another side wall 17 having a circular opening 18. A bottom wall 19 interconnects the side walls 16 and 17 and it has a slot 20 therein. It will be understood that the container fitting 14 is constructed for right hand and left hand application to the bottom of the rectangular container 13. However, the construction at each corner is identical except for being opposite hand from one side to the other.

For receiving the container fittings 14 at the lower corners of the container 13 container locking means, indicated generally at 21 in FIG, 1, are provided. They are of identical construction except that they are arranged for opposite hand mounting to cooperate with correspondingly constructed container fittings 14.

In FIGS. 3 and 4 the details of construction of the container locking means 21 are shown more clearly. It will be understood that the container locking means 21 here shown is for application to the container fitting 14 that is located at the lower right side of the container 13 as viewed in FIG. 1. Except for the opposite hand construction the container locking means 21 for the left side of the container 13 is identical in construction. The container locking means 21 includes a housing that is indicated, generally, at 22 and may be a malleable iron casting. It includes vertical walls 23 and 24 which extend at right angles to each other and are arranged to overlie respectively the walls 16 and 17 of the container fitting 14. A lower wall section 25 of the vertical wall 23 projects through a slot 26 in the elongated mounting fixture 12 and it terminates at its lower end with an enlargement or trunnion 27 which serves to hold the housing 22 from being lifted above the respective mounting fixture 12 when the container 13 is lifted from the transport carrier 10. A rectangular opening 28 is provided at the opposite end of the mounting fixture 12 for receiving the container locking means 21 which can be rotated about the trunnion 27 underneath the slot 26 in order to position the container locking means 21 below the surface of the floor or deck 11. A hinged cover 29 then is swung to closed position over the rectangular opening 28.

In order to limit the lateral bodily movement of each of the container locking means 21 recesses 30 are formed in the mounting fixture 12 for receiving shear lugs 31, FIGS. 3 and 4, that extend downwardly from the lower edge of the vertical wall 24. The recesses 30 are located at various positions along the mounting fixture 12 to accommodate different lengths of container 13.

In FIGS. 3 and 4 it will be noted that a floor 32 extends horizontally from the vertical walls 23 and 24 and is arranged to receive the bottom wall 19 of the respective container fitting 14. Also walls 33 and 34 depend from two of the sides of the floor 32 and extend into engagement with the surface of the mounting fixture 12 to provide a suitable support having substantial area for the container locking means 21 which is capable of sustaining readily the weight of the container 13.

In FIGS. 5, 6 and 7 further details of construction of each of the container locking means 21 are shown. It will be observed that a cylindrical latch 37 is translatorily and rotatably mounted in a clearance opening 38 in the wall 23 of the housing 22. The latch 37 is mounted for sliding movement in an opening through a cylindrical extension 39 that is an integral part of the housing 22. Within the cylindrical extension 39 there is a coil compression spring 40 that is relatively weak, i.e., it may be a 50 pound spring and one end is located in a reduced diameter opening 41 at the outer end of the extension 39. One end of the relatively weak spring 40 reacts against a lower end 42 of the extension 39 and at its other end against the inner end 43 of the cylindrical latch 37. A centering boss 44 extending from the inner end 43 of the latch 37 serves to maintain the upper end of the spring 40 in proper position. The outer end 45 of the latch 37 is arranged to extend into the vertical slot or latch receiving opening 15 in the side wall 16 of the container fitting 14 as shown in FIG. 5. The outward movement of the latch 37 is limited and the spring 40 is held in prestressed condition by a transverse pin 46 which extends through a suitable opening in the latch 37 with the ends projecting through slots 47 in the cylindrical extension 39.

As the container 13 is lowered onto the floor or deck 11 an end surface 48 of the latch 37 is engaged by a lower corner 49 of the bottom container fitting 14. This is shown by broken lines in FIG. 6. The continued downward movement of the container fitting 14 moves the latch 37 downwardly into the cylindrical extension 39 and compresses the spring 40 somewhat further. As soon as the container fitting 14 is seated, as shown in FIG. 5, the spring 40 expands and moves the latch 37 into the latched position in the latch receiving opening 15.

At its lower end the cylindrical extension 39 has a drainage opening 50 to prevent the accumulation of moisture within the housing 22.

A substantial force is required to hold the latch 37 in the latched position. For this purpose the spring 52 is relatively strong. For example, the spring 52 can be a 1,500 pound spring. It is mounted in a hollow cylindrical extension 53 of the housing 22. It will be noted that the cylindrical extension 53 is located at right angles to the location of the cylindrical extension 39 containing the relatively weak spring 40. Thus the springs 40 and 52 react in directions that are transverse to each other. The spring 52 reacts against a bottom wall 54 of the extension 53 and against a follower 55 which is movably mounted within the extension 53. The follower 55 has a flat surface 56 that is arranged to be engaged by a knife edge 57 that is formed on an extension 58 from the latch 37. In order to hold the spring 52 in prestressed condition a transverse pin 59 extends through the follower 55 and into slots 60 that are

provided in opposite sides of the cylindrical extension 53. The construction is such that, when the latch 37 is in the position shown in FIG. 5, there is a slight space 61 between the knife edge 57 and the juxtaposed flat surface 56. When the container 13 is lifted from the floor or deck 11, the container fitting 14 moves upwardly as indicated in FIG. 7. When this takes place, the lower edge 62 of the opening 15 in the container fitting 14 engages a side surface 63 of the latch 37 which extends at right angles to the end surface 48. As a result the latch 37 is rotated about the transverse pin 46 as here illustrated and the knife edge 57 engages the flat surface 56 and moves the follower 55 inwardly compressing the spring 52. It will be understood that this requires the exertion of substantial force which is greater than the force that is exerted against the latch 37 during the normal transit of the transport carrier 10. A rounded lower side 64 of the latch 37 facilitates its being rotated to the position shown in FIG. 7 or to the position in which it clears the side wall 16 and has been moved out of juxtaposition with the lower edge 62 of the slot 15.

It now will be apparent that, as the container fitting 14 is moved downwardly, as indicated by the arrow 65 in FIG. 6, the lower corner 49 first engages the end surface 48 of the latch 37 and moves the latch 37 downwardly against the biasing action of the relatively weak spring 40. As soon as the lower edge of the end surface 48 clears the lower edge 62 of the slot 15, the spring 40 biases the latch 37 with a translatory movement into the slot 15 or into the latched position. The latch 37 then remains in the latched position since the spring 52 is strong enough to hold it against any force normally exerted on the latch 37 during the transit of the transport carrier 10.

When the container fitting 14 is moved upwardly as indicated by the arrow 66 in FIG. 7, the lower edge 62 of the opening 15 engages the side surface 63 of the latch 37 and rotates it out of the slot 15 or out of the latched position. This requires the application of sufficient force to the container 13 not only to lift it against the force of gravity but also to compress each of the four relatively strong coil compression springs 52 at the corners of the container 13. Since the weight of the transport carrier 10 is substantially greater than the force required to lift the container 13 under these conditions, the latches 37 are rotated to the unlatched position as the respective container fittings 14 are moved upwardly. As soon as the lower corner 49 of each of the container fittings 14 clears the latch 37 it is rotated to the latched position shown in FIG. 5, the container fitting 14 being absent.

In FIG. 8 a portion of a transport carrier, such as a railway car, truck, ship or the like, is indicated, generally, at 70. The transport carrier 70 is provided with a floor or deck 71 which may be formed of steel plate and secured in a suitable manner to the underframe of the railway car, if used. Longitudinal openings 72 are formed in the floor or deck 77 along opposite sides and at different locations for the purpose of securing a number of containers 13 in place and also for securing containers 13 of varying lengths. In each of the longitudinal openings there is positioned an inverted U-shaped mounting fixture 73 which is secured to the underframe and it has a longitudinal slot 74 in the top portion 75 from which notches 76 extend to one side to permit positioning of container locking means, indicated generally at 77, at various locations along the mounting fixture 73. Each of the longitudinal slots 74 opens into a rectangular opening 78 in the top portion 75 of the fixture 73 to permit retraction of the container locking means 77 below the surface of the floor or deck 71. A cover 79, hinged to the fixture 73, is arranged to cover the opening 78 in order to present a flat upper surface for the transport carrier 70 flush with the surface of the floor or deck 71.

Recesses 80 are provided at spaced locations in the floor or deck 71 for receiving shear lugs 81 that depend from the side wall 82 of a housing, indicated generally at 83, and formed of malleable iron, for preventing shifting of the container locking means 77. It will be understood that the housing 83 is suitably constructed and arranged for left hand and right hand mounting on the transport carrier 70. Except for this relationship the container locking means 77 are identical in construction.

The transport carrier 70 is intended for having mounted thereon one or more of the rectangular containers a portion of one of which is indicated, generally, at 13 having right and left hand hollow bottom container fittings 14 at their lower corners as previously described.

The housing 83 includes vertical walls 87 and 88 which are located at right angles to each other and are arranged to overlie the side walls 16 and 17 of the container fitting 14.

In order to prevent upward movement of the container locking means 77 the vertical wall 87 is provided with a lower wall extension 89, FIG. 9, which projects through one of the notches 76 depending upon the position of the housing 83 along the mounting fixture 73. The lower wall extension 89 is of such dimension that it is readily slidable along longitudinal slot 74 to position it in registry with the desired notch 76 for locating the position of the container locking means 77 in accordance with the length of the container 13. At its lower end the lower wall extension 89 has a trunnion 90 that is formed integrally therewith and is of such dimension that it extends across the notch 76 underneath which it is located. It will be understood that, for each location of the container locking means 77 with respect to one of the notches 76, the shear lugs 81 are arranged to enter the recesses 80. Thus the housing 83 is secured to the mounting fixture 73 and against sliding movement with respect to the floor or deck 71.

The housing 83 is provided with a floor 91 that extends laterally from the vertical walls 87 and 88 and is arranged to receive the bottom wall 19 of the respective hollow bottom container fitting 14. The floor 91 terminates, in part, in a downwardly inclined portion 92 which connects with the side wall 22 as shown more clearly in FIGS. 12 and 13. A front wall 93 extends downwardly from the floor 91 and interconnects the side wall 82 and the vertical wall 87 of the housing 83.

For automatically latching the individual hollow bottom container fittings 14 and thereby the container 13 to the respective container locking means 77 an L-shaped latch lever or bell crank 96 is employed as shown more clearly in FIGS. 12 and 13. The lever or bell crank 96 is movably mounted between lateral extensions 97 from the vertical wall 87 and includes a relatively short arm 98 that is arranged to move through an opening 99 in the vertical wall 87 and into the adjacent latch receiving opening 15 in the side wall 16 of the hollow bottom container fitting 14. At its distal end the relatively short arm 98 has an inclined oval face 100 that is located in the path of the downward movement of the lower corner 101 of the container fitting 14. The arrangement is such that, as the container fitting 14 moves downwardly and the lower corner 101 engages the inclined oval face 100, the lever or bell crank 96 is moved outwardly and is displaced until the latch receiving opening 15 registers with the end of the short arm 98 whereupon a side surface 102 of the relatively short arm 98, which extends transversely to the path of the container fitting 14, overlies a lower end 103 of the latch receiving opening 15. Thereupon the relatively short arm 98 is biased into latching position in the latch receiving opening 15 in which the side surface 102 is parallel to the surface of the lower end 103 of the latch receiving opening 15.

The latch lever or bell crank 96 is movable about a transverse axis 106 which extends through a transverse hollow pin 107 that is carried at its ends by the lateral extensions 97 of the vertical end wall 87. An arcuate slot 108 at the junction 109 between the relatively short arm 98 of the latch lever or bell crank 106 and the relatively long arm 110 thereof has the pin 107 extending therethrough. A transverse pin 111 is located near the distal end of the relatively long arm 110 and its central axis 112 is the center of curvature of the arcuate slot 108 at the junction 109 between the arms 98 and 110 of the latch lever or bell crank 96. The transverse pin 111 extends at its ends into arcuate slots 113 that are located in the inner sides of the lower wall extension 89 of the vertical wall 88 and in the front wall 93. The center of curvature of the ar-

cuate slots **113** is located on the axis **106** through the hollow pin **107**. In this manner the latch lever or bell crank **96** is rotatable about two axes **106** and **112**.

For biasing the relatively short arm **98** into latching engagement with the latch receiving opening **15** in the container fitting **14** a relatively weak coil tension spring **116** is employed. It may be a **50** pound spring with one end secured to an apertured lug **117** that depends from the inclined portion **92** of the side wall **82** and an apertured lug **118** that extends laterally from the relatively long arm **110** intermediate its ends. The coil tension spring **116** is arranged to rotate the latch lever or bell crank **96** about the axis **112** which, during the application of the container fitting **14** to the housing **83**, remains stationary. In the latched position, as shown in FIG. **9**, the left end of the arcuate slot **108** is held against the pin **107** which acts as a stop for the latch lever or bell crank **96** in its movement toward latched position under the influence of spring **116**. In this position the latch lever or bell crank **96** is spaced from the adjacent outer surface of the wall **87**.

The ends of the transverse pin **111** projecting from opposite sides of the distal end of the relatively long arm **110** are located in bifurcated extensions **119** from a spring follower **120** against which a relatively strong coil compression spring **121** reacts. The spring **121** may be a 350 pound spring. One end bears against the spring follower **120** while the other end bears against the under side **122** of the inclined portion **92** of the side wall **82**.

In operation the latched position of the latch lever or bell crank **96** with respect to the housing **83** of the container locking means **77** is as shown by full lines in FIG. **9** and by broken lines in FIG. **12**. As the container fitting **14** moves downwardly in the direction indicated by arrow **123** in FIG. **12** the lower corner **101** of the container fitting **14** engages the inclined oval face **100** and causes the latch lever or bell crank **96** to rotate about the axis **112** in a counterclockwise direction indicated by arrow **124**, FIG. **12**. Continued downward movement of the container fitting **14** results in the side surface **102** coming into registry with the lower end **103** of the latch receiving opening **15**. Thereupon the relatively weak coil tension spring **116** rotates the latch lever or bell crank **96** about the axis **112** in a clockwise direction opposite to arrow **124** and moves the relatively short arm **98** into latching engagement with the latch receiving opening **15**. This position is shown in FIG. **9** where the side surface **102** is parallel to the surface of the lower end **103** of the latch receiving opening **15**.

In the latched position of the latch lever or bell crank **96**, any tendency of it to be rotated to an unlatching position as the result of normal upward movement of the container fitting **14** is resisted by the relatively strong coil compression spring **121**. It is only when sufficient force is applied to the rectangular container **13** to lift it from the transport carrier **70** and to overcome the biasing action of the relatively strong coil compression springs **121**, that the latch lever or bell crank **96** is moved to unlatching position.

As indicated in FIG. **13**, when the container fitting **14** is moved upwardly, as indicated by arrow **125**, the lower end **103** of the latch receiving opening **15** engages the side surface **102** of the relatively short arm **98**. Sufficient force is applied in lifting the container **13** to rotate the latch lever or bell crank **96** about axis **106** in the direction indicated by arrow **126**, FIG. **13**, and to compress the relatively strong coil compression spring **121**. As sufficient over-ride force is applied to the container **13** by the unloading hoist, the latch lever or bell crank **96** pivots about axis **106** until the angle of the side surface **102** approaches the angle of the coefficient of friction between the materials of which the housing **83** and latch lever or bell crank **96** are formed, for example malleable iron and steel. When this occurs the latch lever or bell crank **96** rotates about axis **112** outwardly as indicated by arrow **124** in FIG. **12** as permitted by arcuate slot **108**. Thus the relatively short arm **98** is moved out of latching engagement with the latch receiving opening **15** on continued upward movement of the container fitting **14**. As soon as the lower corner **101** clears the juncture between the inclined oval face **100** and the side surface **102**, the relatively strong coil compression spring **121** expands and the latch lever or bell crank **96** is rotated to the latching position, the container fitting **14**, however, being absent. This unlatching action will only occur when sufficient force is applied in lifting the container **13** to overcome the forces exerted by the relatively strong compression springs **121**. It will not take place due to rocking action of the transport carrier **70**, wind loads and the like incident to normal transport operations.

When it is desirable to store the container locking means **77** to permit use of the transport carrier **70** for other purposes, the lower wall extension **89** is shifted out of the notch **76** and into the longitudinal slot **74**. It is moved along the slot **74** and near the end it is swung about the trunnion **90** into the opening **78** which subsequently is closed by the cover **79**.

In FIG. **14** there is illustrated at **127** a deck formed of steel plate of a transport carrier as indicated, generally, at **128**. It will be understood that the transport carrier **128**, like the transport carriers **10** and **70**, can be a part of a railway car, truck, ship, etc. Only one end and a portion of the deck **127** are illustrated. Here left and right hand container locking means **129** and **130** are illustrated which are duplicates in construction except for right and left hand configurations. At the extreme end of the deck **127** the container locking means **129** and **130** are in fixed locations, i.e., they are not movable along the deck **127**. However, they are arranged to be retracted into rectangular openings **131** and **132** in the deck **127**. Each of the container locking means **129** and **130** includes a housing **133** which, like the housing **83**, is formed of malleable iron or other suitable material. Each housing **133** includes a cover wall **134** which as shown for the container locking means **130** is arranged to overlie the respective rectangular opening **131** or **132** when the container locking means **129** or **130** is in the retracted position. A latch lever or bell crank **135**, similar in construction to the latch lever or bell crank **96** previously described, is mounted in the cover wall **134** for engagement with the latch receiving opening **15** in the hollow bottom container fitting **14** at the lower corner of a container **13**. Each housing **133** includes an inner wall **137** from which a pair of trunnions **138** extend underneath the deck **127**. The trunnions **138** permit rotation of the housing **133** into the respective rectangular opening **131** or **132** for retracting the same. A slot **139** in the cover wall **134** facilitates removing the container locking means **129** and **130** from the respective opening **131** and **132** to swing the same to the erect position.

A side wall **140** extends at right angles from each of the cover walls **134**. It will be understood that the cover wall **134** is arranged to overlie the side wall **16** of the container fitting **14** while the side wall **140** of the housing **133** is arranged to overlie the side wall **17** of the container fitting **14**. The cover wall **134** and side wall **140** for the right and left hand container locking means **129** and **130** are arranged as illustrated in FIG. **14** so that the four container locking means at the end of the deck **127** can receive the lower four corners of the container **13**. While the container locking means **129** and **130** at the extreme end of the deck **127** occupy fixed locations, the next set of container locking means **129** and **130** are movable along longitudinal slots **142** which extend near the sides of the deck **127** as shown. Rectangular openings **143** communicate with the longitudinal slots **142** for the purpose of permitting retraction of the left and right hand container locking means **129** and **130** either to permit the use of the transport carrier **128** for other transportation service or for retracting the container locking means **129** and **130** to permit their being by passed by other container locking means. For each location of the container locking means **129** and **130** movable along the longitudinal slots **142** a notch **144** is provided for receiving a shear lug **145**, FIGS. **15** and **16**, that depends from each of the housings **133**. The shear lugs **145** extend generally transversely of extensions **146** of the cover wall **134** which project downwardly through the slots **142** as indicated more clearly in FIG. **16**.

For holding the trunnions **138** in place when the housing **133** occupies the retracted position shown by broken lines in FIG. **16**, stirrups **147** are secured to the under sides of longitudinal channels **148** and **149**. Each of the trunnions **138** is relieved as indicated at **150** in order to by pass the juxtaposed end of the shear lug **145** in retracted position by the housing **133** in erect position.

The reason for providing for by passing a retracted housing **133** is to provide a wide range in adjustment for the container locking means **129** and **130** along the slots **142**. For example, it may be necessary to interchange the movable left hand and right hand container locking means **129** and **130** for a given container. This can be accomplished by retracting one of the sets, for example the sets of container locking means **130** and **129** at the left ends of the longitudinal slots **142** in FIG. **14**, and then replacing them with the left and right hand container locking means **129** and **130** which in this instance would face in the opposite direction.

What is claimed is:

1. Container securing means for a transport carrier arranged to secure thereto one or more containers each having at least one bottom container fitting with a latch receiving opening in a wall thereof, said container securing means comprising: housing means for attachment to said transport carrier for underlying each bottom container fitting, latch means on said housing means for entering said opening in said wall for latching engagement therewith, and spring means reacting against said latch means and being characterized by permitting displacement thereof out of the path of said container fitting in moving toward said housing means and biasing said latch means into latching position in said opening in said fitting, said spring means being further characterized by being capable of holding said latch means in said latching position until sufficient force is applied to lift said container from and transport carrier whereupon said latch means is moved out of said latching position, said spring means including: relatively weak first spring means arranged to be stressed on application of said container to said housing means to bias said latch means to latching position, and relatively strong second spring means providing the principal force for holding said latch means in latching position and arranged to be stressed when said container is lifted from said transport carrier.

2. Container securing means according to claim **1** wherein

guide means mount said first spring means to react against said latch means in one direction, and

guide means mount said second spring means to react against said latch means in a direction transverse to said one direction.

3. Container securing means according to claim **2** wherein

pin and slot means in the first mentioned guide means hold said first spring means in prestressed condition, and

pin and slot means in the second mentioned guide means hold said second spring means in prestressed condition.

4. Container securing means for a transport carrier arranged to secure thereto one or more containers each having at least one bottom container fitting with a latch receiving opening in a wall thereof, said container securing means comprising: housing means for attachment to said transport carrier for underlying each bottom container fitting, latch means on said housing means for entering said opening in said wall for latching engagement therewith, spring means reacting against said latch means and being characterized by permitting displacement thereof out of the path of said container fitting in moving toward said housing means and biasing said latch means into latching position in said opening in said fitting, said spring means being further characterized by being capable of holding said latch means in said latching position until sufficient force is applied to lift said container from said transport carrier whereupon said latch means is moved out of said latching position, said spring means including: first spring means arranged to be stressed on application of said container to said housing means to bias said latch means to latching position, and second spring means providing the principal force for holding said latch means in latching position and arranged to be stressed when said container is lifted from said transport carrier, means guiding said latch means for translatory movement into said latching position under the influence of said first spring means, and means mounting said latch means for rotary movement away from said latching position and against the influence of said second spring means.

5. Container securing means according to claim **4** wherein

a spring follower is biased by said second spring means to react against said latch means,

said spring follower has a surface for sliding engagement with said latch means, and

stop means hold said spring follower in spaced relation to said latch means and said second spring means in prestressed condition.

6. Container securing means for a transport carrier arranged to secure thereto one or more containers each having at least one bottom container fitting with a latch receiving opening in a wall thereof, said container securing means comprising:

housing means for attachment to said transport carrier for underlying each bottom container fitting,

latch means translatorily and rotatably mounted on said housing means for entering said opening in said wall of said container fitting,

means for automatically translatorily moving said latch means to latching position with respect to said opening in said wall in response to application of said container thereto,

means for automatically rotating said latch means from said latching position with respect to said opening in said wall in response to removal of said container therefrom,

first spring means for biasing said latch means for translatory movement to said latching position, and

second spring means reacting against said latch means to hold it in said latching position.

7. Container securing means according to claim **6** wherein said second spring means is stronger than said first spring means and acts to hold said latch means against rotation from said latching position.

8. Container securing means according to claim **6** wherein

said latch means has a first surface inclined with respect to the path of said container fitting in moving toward said latching position and engageable by said fitting to translate said latch means away from said pati and

said latch means has a second surface angularly related to said first surface and engageable by said fitting in its movement away from said housing to rotate said latch means away from said latching position to release said fitting.

9. Container securing means for a transport carrier having a slot in the floor thereof communicating with an opening to secure to said transport carrier a container having at least one bottom container fitting with a latch receiving opening in a wall thereof said container securing means comprising: housing means for underlying said bottom container fitting and having a depending wall section for projecting through said slot and movement therealong to different positions to accommodate different lengths of containers, said wall section terminating in trunnion means extending across said slot to attach said housing means to said transport carrier, said housing means being rotatable by said trunnion means into said opening to position said housing means in retracted position therein, and latch means on said housing means for automatically entering said opening in said wall of said bottom container fitting for latching engagement therewith when said bottom container fitting is lowered onto said housing, relatively weak first spring means arranged to be stressed on application of said container to said housing means to bias said latch means to latching position, and relatively strong second spring means providing the principal force for holding said latch means in latching position and arranged to be stressed when said container is lifted from said transport carrier.

10. Container securing means for a transport carrier arranged to secure thereto one or more containers each having at least one bottom container fitting with a latch receiving opening in a wall thereof, said container securing means comprising

housing means for attachment to said transport carrier for underlying each bottom container fitting,

latch means for entering said opening in said wall of said container fitting,

pin and slot means on said housing means and on said latch means movably mounting said latch means on said housing means,

pivot means on said latch means,

first spring means reacting between said housing means and said latch means for rotating said latch means about said pivot means into latching position in said opening in said wall of said container fitting on application of said container to said transport carrier, and

second spring means reacting between said housing and said pivot means for holding said latch means in said latching position until sufficient force is applied to lift said container from said transport carrier and overcome the force exerted by said second spring means.

11. Container securing means according to claim 10 wherein stop means on said housing means limit movement of said latch means toward latching position.

12. Container securing means according to claim 10 wherein said latch means is generally L-shaped, said pin and slot means is located at the junction between the long and short arms, the distal end of said short arm is arranged to enter said opening in said container fitting, and said pivot means is located at the distal end of said long arm.

13. Container securing means according to claim 12 wherein

the end surface of said distal end of said short arm is inclined to the path of said container fitting and is engageable thereby to be displaced as said container is applied to said transport carrier against the force of said first spring means, and

a side surface of said distal end of said short arm extends transversely to said path of said container fitting and is engageable thereby to be displaced from said latching position as said container is lifted from said transport carrier to rotate said latch means and further stress said second spring means.

14. Container securing means according to claim 13 wherein

said first spring means is a relatively weak tension spring and is connected to said long arm intermediate its ends,

said second spring means is a relatively strong compression spring, and

said latch means is rotated when said short arm is displaced by upward movement of said container fitting and said second spring means is further compressed.

15. Container securing means according to claim 14 wherein

said pivot means includes a pin that extends into a slot in said housing means and limits the expansion of said second spring means.

16. Container securing means according to claim 15 wherein

said pin and slot means includes a pin mounted on said housing means and an arcuate slot in said latch means the center of curvature of which is located at said pin at said distal end of said long arm, and

said slot in said housing means is an arcuate slot the center of curvature of which is located at said pin on said housing means.

17. Container securing means according to claim 10 wherein

angularly related side walls of said housing means are arranged to overlie corresponding side walls of said bottom container fitting, and

said latch means is arranged to move through one of said side walls of said housing means.

18. Container securing means according to claim 17 wherein

a pair of walls extend from said one side wall of said housing means and carry said pin of said pin and slot means to mount said latch means therebetween, and

another pair of walls on said housing means have said first and second spring means therebetween.

19. Container securing means for a transport carrier arranged to secure thereto one or more containers each having at least one bottom container fitting with a latch receiving opening in a wall thereof, said container securing means comprising

housing means for attachment to said transport carrier for underlying each bottom container fitting,

a bell crank having one arm for entering said opening in said wall of said container fitting in latching position therewith,

pin and slot means on said housing means and on said bell crank for movably mounting said bell crank on said housing means,

first spring means reacting between said housing means and the other arm of said bell crank for moving said one arm into latching position in said opening in said wall of said container fitting on lowering of said container onto said transport carrier, and

second spring means reacting between said housing means and the distal end of said other arm of said bell crank for holding said one arm in said latching position until sufficient force is applied to raise said container from said transport carrier and overcome the force exerted by said second spring means.

20. Container securing means according to claim 19 wherein

said pin and slot means is located at the junction between said arms of said bell crank,

pin and slot means at the distal end of said other arm of said bell crank and on said housing means movably mount said bell crank on said housing means,

said first spring means reacts against said other arm of said bell crank between said junction and said distal end, and

said second spring means reacts against said pin of said pin and slot means at said distal end.

21. Container securing means according to claim 20 wherein

said pin of said pin and slot means at said junction is mounted on said housing means and said slot thereof is located in said bell crank,

said pin of said pin and slot means at said distal end is mounted on said other arm and said slot thereof is located in said housing means.

22. Container securing means according to claim 21 wherein

said slot of said pin and slot means at said junction is an arcuate slot having its center of curvature at said pin at said distal end, and

said slot at said distal end is an arcuate slot having its center of curvature at said pin at said junction.

23. Container securing means according to claim 22 wherein

angularly related side walls of said housing means are arranged to overlie corresponding side walls of said bottom container fitting, and

said one arm of said bell crank is arranged to move through one of said side walls of said housing means.

24. Container securing means according to claim 23 wherein

a pair of walls extend from one side wall of said housing means and carry said pin of said pin and slot means at said junction to mount said bell crank therebetween, and

another pair of walls on said housing means are located on opposite sides of said first and second spring means.

25. Container securing means according to claim 19 wherein

said one arm of said bell crank has an end surface inclined to the path of said container fitting and is engageable thereby to be displaced as said container is lowered onto said transport carrier against the force of said first spring means, and

a side surface of said one arm of said bell crank extends transversely to said path of said container fitting and is engageable thereby to be displaced from latching position as said container is lifted from said transport carrier to rotate said bell crank and further stress said second spring means.

26. Container securing means according to claim 25 wherein

said first spring means is a relatively weak tension spring and is connected to said other arm of said bell crank intermediate its ends, and

said second spring means is a relatively strong compression spring.

27. Container securing means for a transport carrier arranged to secure thereto one or more containers each having at least one bottom container fitting with a latch receiving opening in a wall thereof, said container securing means comprising:

housing means for attachment to said transport carrier for underlying each bottom container fitting,

latch means in the form of a bell crank having one arm for entering said opening in said wall of said container fitting,

pin and slot means on said housing means and at the junction between the arms of said latch means movably mounting said latch means on said housing means, and

spring means reacting against the other arm of said latch means, biasing said latch means to hold said pin and slot means at one end position and being characterized by permitting displacement of said one arm of said latch means out of the path of said container fitting in moving toward said housing means and movement of said pin and slot means away from said one position and biasing said latch means into latching position in said opening in said fitting, said spring means being further characterized by being capable of holding said latch means in said latching position until sufficient force is applied to lift said container from said transport carrier whereupon said latch means is moved out of said latching position.

28. Container securing means according to claim 27 wherein said spring means is characterized by exerting a greater force to hold said latch means in said latching position than is required to permit displacement thereof out of said path of said container fitting in moving toward said housing means.

29. Container securing means for a transport carrier having a deck, said container securing means being arranged to secure to said deck one or more containers each having at least one bottom container fitting with a latch receiving opening in a wall thereof, said container securing means comprising:

housing means having angularly related side walls for overlying corresponding side walls of said bottom container fitting,

latch means on one of said side walls for entering said latch receiving opening in said bottom container fitting for latching engagement therewith, and

trunnion means depending from said housing means on the side opposite said side wall on which said latch means is mounted and underlying said deck to permit said housing means to pivot in a direction to cause further latching engagement of said latch means with said bottom container fitting when said bottom container fitting is moved upwardly during transport.

30. Container securing means according to claim 29 wherein spring means react against said latch means to permit displacement thereof out of the path of said container fitting in moving toward said housing means and to bias said latch means into latching position in said opening in said fitting, said spring means being capable of holding said latch means in said latching position until sufficient force is applied to lift said bottom container fitting from said transport carrier whereupon said latch means is moved out of said latching position.

31. Container securing means according to claim 30 wherein said spring means is characterized by exerting a greater force to hold said latch means in said latching position than is required to permit displacement thereof out of said path of said container fitting in moving toward said housing means.

32. Container securing means for a transport carrier arranged to secure thereto one or more containers each having at least one bottom container fitting with a latch receiving opening in a wall thereof comprising:

a deck for said transport carrier having a lengthwise extending slot communicating with one or more openings extending transversely thereof,

a plurality of housing means each arranged to underlie said bottom container fitting and each having extension means extending through said slot and slidable therealong,

trunnion means at the distal end of said extension means having a transverse dimension greater than the width of said slot to hold said housing means inseparable from said deck and enabling each housing means to be swung into one of said openings, said trunnion means having a relieved section in the upright operative position of the respective housing means to by pass a housing means in retracted position, and

latch means on each housing means for entering said opening in said wall of said bottom container fitting for latching engagement therewith when said housing means is in erect position and, said bottom container fitting is lowered onto said housing.

33. Container securing means according to claim 32 wherein:

said lengthwise extending slot has notches therealong, and

each of said housing means has shear lug means depending therefrom for insertion in one of said notches to locate the respective housing means at a predetermined position therealong.

34. Container securing means for a transport carrier arranged to secure thereto one or more containers each having at least one bottom container fitting with a latch receiving opening in a wall thereof comprising:

a deck for said transport carrier having a lengthwise extending slot communicating with one or more openings extending transversely thereof,

a plurality of housing means each arranged to underlie said bottom container fitting and each having extension means extending through said slot and slidable therealong,

trunnion means at the distal end of said extension means having a transverse dimension greater than the width of said slot to hold said housing means inseparable from said deck and enabling each housing means to be swung into one of said openings, said trunnion means being arranged and constructed in the upright operative position of the respective housing means to by pass a housing means in retracted position,

latch means on each housing means for entering said opening in said wall of said bottom container fitting for latching engagement therewith when said housing means is in erect position and, said bottom container fitting is lowered onto said housing,

said lengthwise extending slot having notches therealong,

shear lug means depending from each of said housing means for insertion in one of said notches to locate the respective housing means at a predetermined position therealong,

said shear lug means in the retracted position of the respective housing means extending into the path of the trunnion means of the housing means slidable along said slot, and

each trunnion means having a relieved section to by pass said shear lug means of said housing means in retracted position.

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