United States Patent

Schwiebert et al.

[15] **3,667,401**

[45] **June 6, 1972**

[54] CONTAINER RETAINING LATCH MECHANISM

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

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

[58] **Field of Search**.....105/366 C, 366 D; 248/361 R, 248/119 R

[56] **References Cited**

UNITED STATES PATENTS

1,875,906	9/1932	Zarobsky	105/366 D
2,261,789	11/1941	Andersen	105/366 D
2,755,120	7/1956	Young et al.	105/366 D
3,391,654	7/1968	Grob et al.	105/366 D

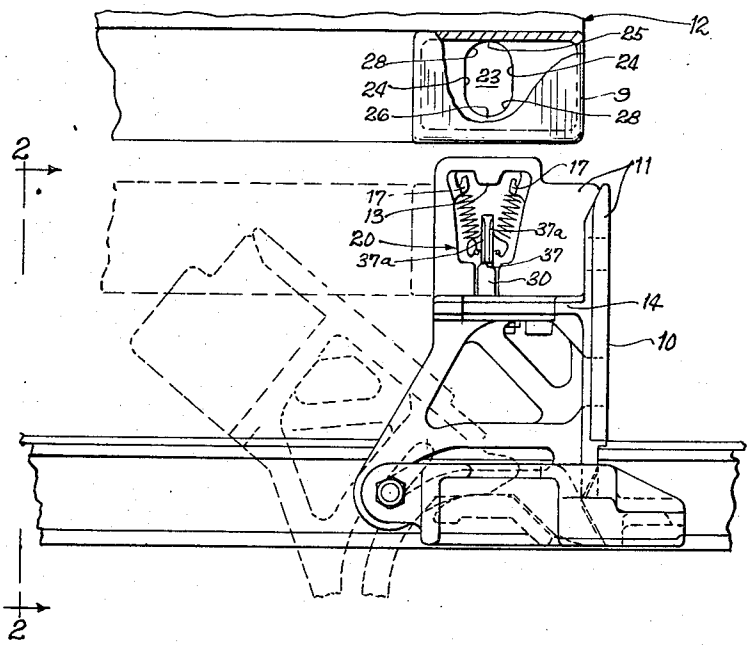
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[57] **ABSTRACT**

A latch mechanism including a pivotable clasp biased for engagement with a catch opening in a container part. The clasp has a head portion with a cam surface of steep incline and a detent surface of slight incline, with respect to the plane of a catch support having an opening through which the clasp extends, whereby bias is easily overcome through engagement of the detent surface for latching engagement, and retention force is large, as a result of the steep angle of the cam surface. Space for lateral play of the clasp element in its receiving opening of the container, together with wedge sides of the clasp and rounded surfaces of the catch opening compensate for off-center variations therebetween upon initial container seating. Bias springs acting upon the clasp form the arms of a lateral "Y" configuration, respectively, to balance, center and stabilize the clasp upon final container seating.

11 Claims, 7 Drawing Figures



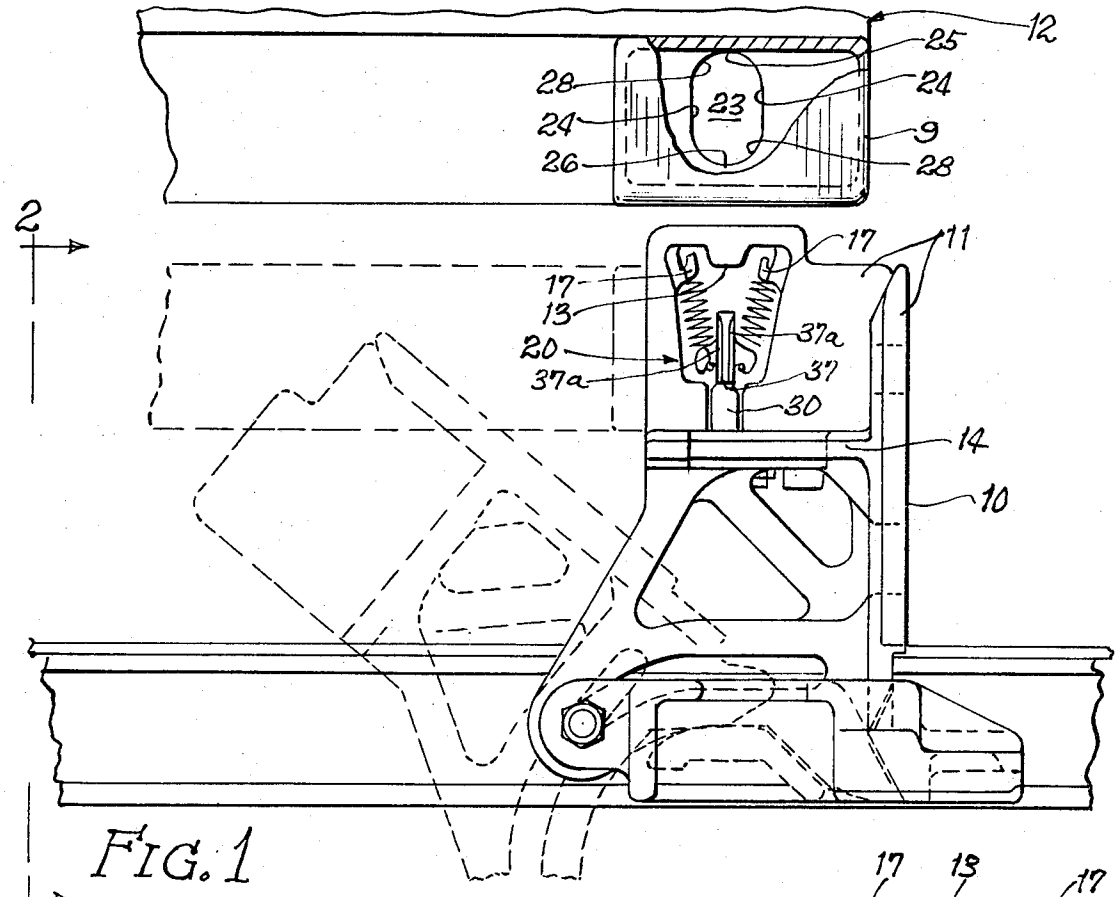


FIG. 1

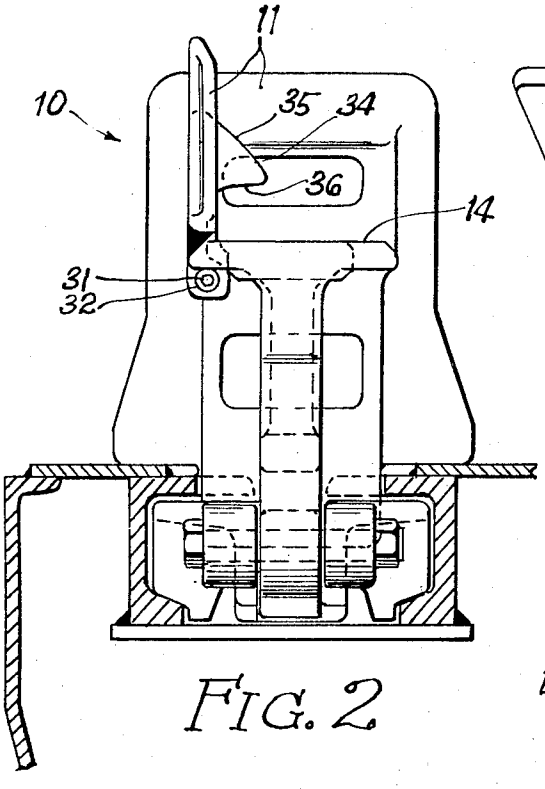


FIG. 2

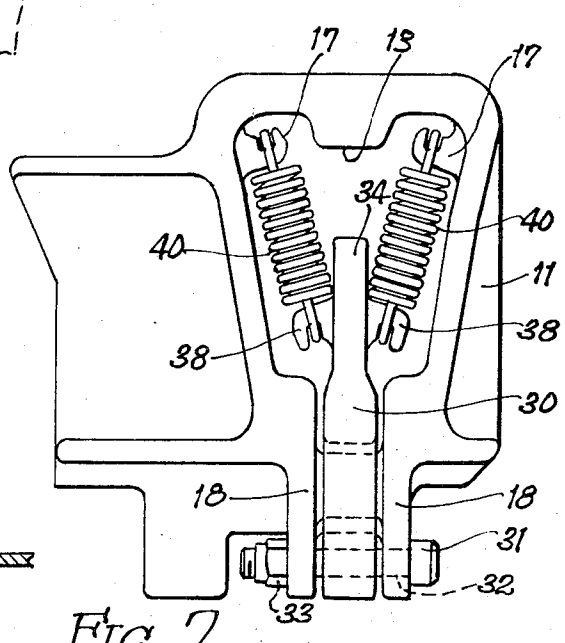


FIG. 7

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FIG. 3

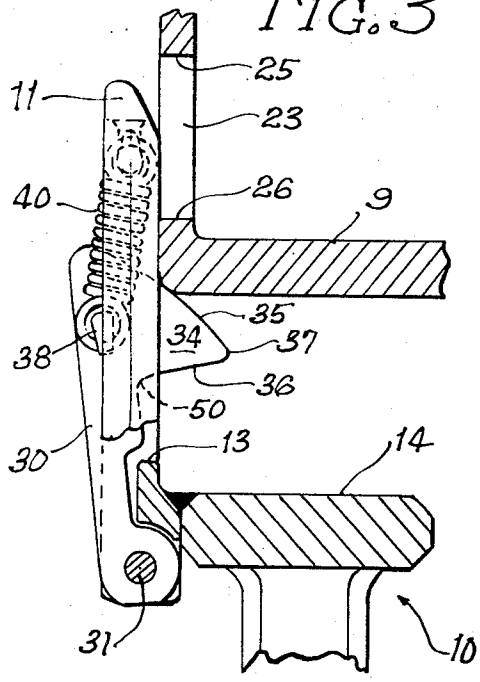


FIG. 4

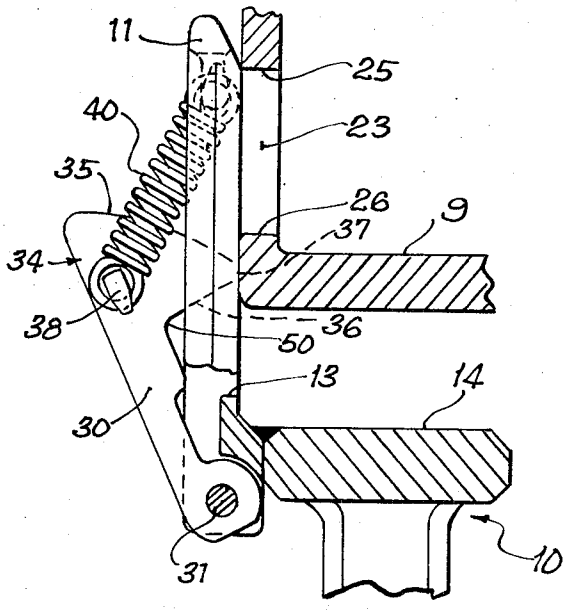


FIG. 5

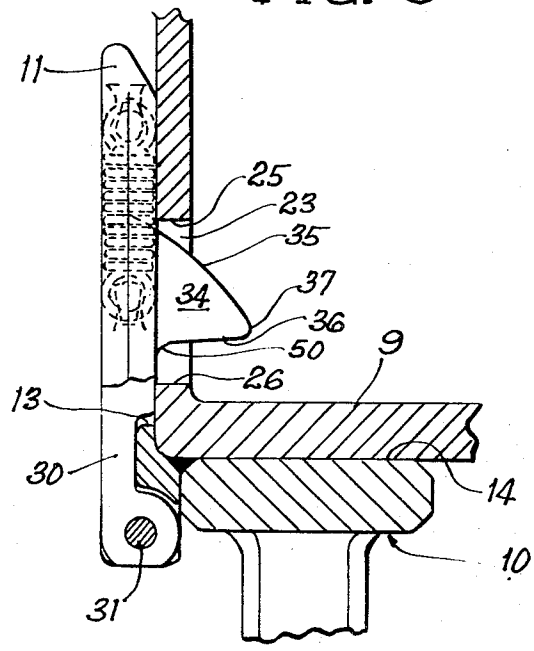
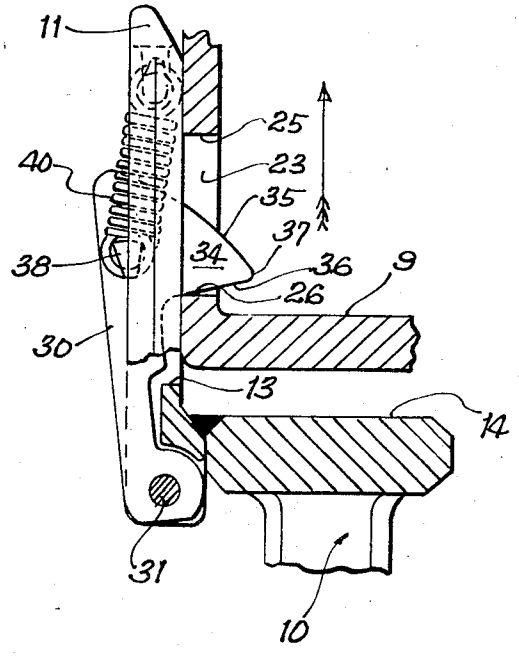


FIG. 6



CONTAINER RETAINING LATCH MECHANISM

BACKGROUND OF THE INVENTION

This invention relates generally to latches, and more particularly to a latch mechanism which has an adaptation to the releasable securement of a freight container on a support pedestal of a flat car.

Recent developments in freight handling have a trend toward the use of individual freight containers, smaller in volume than a box car, and which are readily and quickly transferable between carrier vehicles including ship, railroad cars, trucks and the like. Since the freight containers are usually handled by crane or lift mechanisms, it has been the practice to support the container upon pedestals which extend upward from the deck of a flat car, usually at the four corners of the container. For example, reference may be made to our co-pending patent application, Ser. No. 778,517, filed Nov. 25, 1968, now U.S. Pat. No. 3,556,019. It is, of course, essential to retain the freight containers on the support pedestals, regardless of impact, vibration and other forces during transit. Yet, on the other hand, the freight containers are desirably releasable readily for unloading without manual release of a retaining device on each pedestal. A latch mechanism for effecting releasable securement is very desirable.

SUMMARY OF THE INVENTION

Therefore, to meet and satisfy the foregoing requirements, a general object of this invention is to provide a latch mechanism for the releasable securement of a freight container on a support pedestal utilized in association with a carrier vehicle. It is desirable that the latch shall be simple, durable, compact, and adaptable to variations in freight containers, and that it will securely retain the freight container upon a support pedestal, while being adapted to release the containers for the unloading thereof. To this end, the disclosed latch mechanism utilizes a clasp mounted for angular swinging movement on the support pedestal and which is engageable in a catch opening in a side wall of a part of a freight container. The clasp member has a cam surface of steep incline and a detent surface of lesser incline with respect to the plane of a wall of the container pedestal which has therein an opening through which the clasp is adapted to extend for retaining purposes, and into which the clasp is normally biased during use. The detent surface is initially contacted by the part of the container having the clasp receiving opening therein and is swung outward against the bias for initial container seating, whereupon the engagement of the cam surface in the container part wall opening retains the container until a sufficiently large removal force is applied thereto to effect movement of the clasp as a result of force exerted by engagement of the container part with the steep incline of the cam surface of the clasp. The clasp member has also lateral play and wedge shaped sides and the catch opening has rounded corners to allow for off-center variations upon initial seating thereof. The bias is on the clasp and is effected by a pair of coil springs at the sides of the clasp member which extend angularly from the sides of the clasp in the manner of a "Y" so as to stabilize the clasp laterally, as well as to bias it to a predetermined position relative to the pedestal.

Thus, one of the objects of this invention is to provide releasable securement of a freight container upon a support pedestal.

It is an object of this invention to provide a simple, durable, latch mechanism which will release upon a predetermined removal force.

Another object of this invention is to provide a latch mechanism on a support pedestal for a freight container which compensates for off-center variations therebetween upon initial seating thereof.

It is still another object to provide a latch mechanism with lateral play and lateral bias stability which compensates for off-center variations between a freight container and support pedestal upon initial seating, and which finds a center position upon final seating.

Yet another object is to provide a dependable, durable, compact, simple latch mechanism which is economical to produce by utilizing a minimum of conventional, currently available materials and parts which may be easily produced and which lend themselves to standard mass-production manufacturing techniques.

Further and other objects, and a more complete understanding of the invention, may be had by referring to the following description and claims, taken in conjunction with the accompanying drawings:

DESCRIPTION OF THE DRAWINGS

For the purpose of illustrating the invention, there is shown in the drawings the form which is presently preferred, it being understood, however, that this invention is not necessarily limited to precise arrangements and instrumentalities there shown.

FIG. 1 is a fragmentary elevation of a portion of a freight container in position to be lowered onto a foldable support pedestal having the latch mechanism of the present invention;

FIG. 2 is a fragmentary end view taken as indicated by a line 2—2 and arrows in FIG. 1;

FIG. 3 is a sectional end detail showing the latch mechanism upon initial contact with a freight container;

FIG. 4 is a view similar to FIG. 3 showing the latch mechanism fully retracted prior to initial seating of the freight container;

FIG. 5 illustrates the engagement between the clasp member of the latch mechanism and the catch opening in the freight container upon final seating;

FIG. 6 illustrates contact between the freight container and clasp member which occurs upon upward movement of the container tending to effect the removal thereof from the pedestal;

FIG. 7 is a fragmentary back view showing components of the clasp member.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Having reference to the drawings, wherein like numerals indicate corresponding elements, there is shown in FIG. 1 an illustration of a foldable support pedestal **10** and and a retaining foot **9** on a corner of a freight container **12** which is in position to be lowered into seating position thereon. A latch mechanism, indicated generally at **20**, is provided for releasable securement of the container **12** upon pedestal **10**.

The support pedestal **10** includes adjoined and angularly disposed retaining walls **11** which parallel the corner side walls of the retaining foot. Pedestal seat **14** between retaining walls **11** forms a retention pocket for the retaining foot of container **12**. One or more of the retaining walls **11** may have an aperture **13** of generally "Y" conformation therethrough. As shown in FIG. 7, inwardly extending hook members **17** are at each outer arm reach of the "Y" conformation of the aperture **13**. Lug portions **18** extend downwardly along opposite sides of stem region of the general "Y" configuration of the aperture **13**.

Catch means are provided in an outer side wall of the retaining foot **9** of container **12** by a catch opening **23** which is defined by side edges **24**, top edge **25**, bottom edge **26**, all joined by rounded corner edges **28**, as shown at FIG. **1**.

A clasp member **30** is pivoted at one end for swinging movements relative to one of the retaining walls **11** through the aperture **13**, as may be seen with reference to FIGS. **3–7**. Pivot **31** may be provided by a bolt having an unthreaded portion **32** which passes through the lugs **18**, one end of clasp **30**, and which is secured in place by a nut **33**, as shown in FIG. **7**. The clasp member **30** fits loosely between the lug portions **18**, providing some space for lateral movement of the clasp member along the pivot **31**. Clasp member **30** includes a head portion **34** at the end thereof remote from the pivot **31**. Head portion **34** includes an uppermost detent surface **35** having an inclination with respect to the general plane of the retaining wall **11** which makes the clasp element readily movable

laterally by cam action effected by downward movement of the container foot along wall **11**. Additionally, the head portion has a lower cam surface **36** which has a steep inclination with respect to the wall **11** and which engages and latches over the edge **26** of the catch opening in foot **9**, as illustrated in the side elevations of FIGS. **3–6**. Detent surface **35** is slightly arcuate in shape, terminating at a tip **37**, which separates it from cam surface **36**. As illustrated in FIG. **1**, forward side portions of the head portion **34** taper together to form wedge sides **37***a*. Hooks **38** extend laterally from the sides of head portion **34** at the rear of wedge sides **37**, as indicated in FIGS. **1**, **4** and **7**.

A pair of coil tension springs **40** serves as bias means urging clasp member **30** to a normal position in which the cam and detent surfaces project through and from aperture **13** in the pedestal wall in position for engagement in opening **23** in the container foot **9**; said springs each being suspended between a hook member **17** and a hook **38**, on each side of the clasp **30** as indicated in FIG. **7**. It may be observed that the clasp **30** and springs **40** form the arms and stem, respectively, of a "Y" configuration, with the springs extending laterally with respect to the direction of latching movement of the latch mechanism in or out of engagement. The springs **40** counterbalance one another laterally of the clasp and provide a lateral bias tending to balance and return the clasp member to a center position along the lateral play at pivot **31**.

With reference to FIG. **3**, initial contact of the container foot **9** with the detent surface **35** of the head portion **34** urges the clasp member **30** outwardly of the pedestal wall against the bias of springs **40**. The tip **37** will ride along the lower portion of the outer surface of the foot **9** until it passes the bottom edge **26** of catch opening **23**, as shown in FIG. **4**. In FIG. **5**, the bias of springs **40** returns the clasp member to an upright normal position in which the head portion **34** extends into catch opening **23**. The retention of container **12** is accomplished by engagement between bottom edge **26** of the catch opening of the container foot and cam surface **36** of the clasp head.

During initial seating of the container **12**, there may be slight off-center variations; that is, when a container **12** is being initially placed on the pedestals **10**, it may be expected that the catch opening **23** may not always be perfectly in register and centrally aligned with clasp member **30**. Compensation for slight off-center variations is provided for by the provision of the lateral play of the clasp member **30** along pivot **31** and the wedge sides **37***a* of the clasp member **30** which engage and effectively co-act against side edges **24** or rounded corner edges **28** of the catch opening **23** and urge the clasp into a lateral position for full engagement in the catch opening **23** in the container foot. After initial seating, vibrations during transit will also move the container **12** into a final seating position with the catch opening **23** and clasp member **30** in register. Thereupon, the lateral bias stability provided by the coil springs **40** on each side of the head portion **34** will return the clasp member to a balanced center position.

The cam surface **36** contacts the bottom edge of catch opening **23** for retention of the container **12** upon the pedestal **10**. However, a sufficient removal force, provided by a lifting crane, or the like, will cause the bottom edge **26** of the catch opening in the foot **9** to apply both cam force and leverage to the steep incline of cam surface **36**, thereby to move the clasp member **30** outwardly against the bias of springs **40**, as indicated in FIG. **6**. Naturally, the strength of coil springs **40** and degree of incline of the cam surface **36** with respect to catch opening **23** are chosen for a desired removal force. In this respect, it has been found desirable to provide a rounded corner **50**, at the inner end of the cam surface **36**, such as that shown in FIGS. **3–6**, adjacent the bottom edge **26**, to aid in initiating outward movement of head portion **34**.

From the foregoing description, and by reference to the accompanying drawings, it may be readily understood that the disclosed structure provides a serviceable, durable and dependable latch mechanism which does not require manual manipulation to accomplish its retaining engagement with a container for holding the container firmly in place on supporting pedestals in a manner to provide a safety factor for all forces encountered during transportation of the container. Then when the container is unloaded with the aid of suitable equipment which is commonly used for the purpose, the latch mechanism again functions to effect release of the container without manual manipulation and upon the exertion of a sufficient lifting force on the container. In addition, the latch mechanism has lateral play and provisions for centering bias during use to insure good gripping action, as well as strong and consistent biasing force for effecting its intended operation over a long period of use.

The present invention may be embodied in other specific forms without departing from the spirit of potential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification as indicating the scope of the invention.

What is claimed is: container use, swinging angular

1. A latch mechanism for releasable securement of a freight container on a support pedestal in position for transportation by a carrier vehicle and comprising, in combination: catch means on said container and having side, bottom and catch surfaces at the lower region of the container, said pedestal having container supporting and retaining surfaces relative to which the contaier is carried in sue, a clasp member hingedly mounted on one of the retaining surfaces of said pedestal for switnging movements to and from positions of retaining engagement with said catch surface of the catch means when the container is supported on said supporting surface of the pedestal, said clasp member having a cam surface which has a steep incline relative to said one of the retaining surfaces and which overlies said catch surface when the container is supported on the pedestal, said clasp member also having a detent surface normally disposed in agnular relationship to said one of the retaining surfaces and disposed in opposed relationship to said cam surface for engagement with said catch means when the container is moved into supported position on said pedestal to deflect the clasp member away from the catch means until the cam surface is in position for engagement with said catch surface, and resilient means for biasing said clasp member toward said position of retaining engagement with said catch surface, the biasing force of said resilient means and the angularity of said cam surface relative to said catch surface being effective to require a large force for effecting release of said clasp member from said catch surface as a result of force applied by the catch surface to the cam surface in a direction parallel to said one of the retaining surfaces.

2. A latch mechanism in accordance with claim **1**, wherein said steep incline and resilient means are correlated, with the degree and strength thereof, respectively, chosen for a predetermination of said removal force.

3. A latch mechanism in accordance with claim **2**, wherein said resilient means is a pair of coil tension springs, one on each side of said clasp member.

4. A latch mechanism in accordance with claim **3**, wherein said springs and clasp member form arms and a stem, respectively, of a "Y" configuration, laterally with respect to the direction of movement of the clasp member, said springs counter-balancing one another for bias stability laterally of the clasp member.

5. A latch mechanism in accordance with claim **4**, wherein said catch surface is an edge of an opening in one side of said catch means and said clasp member is supported to provide play laterally with respect to the direction of swinging movement of the clasp member for compensation of off-center variations in position of said opening with respect to said clasp member upon initial seating of said container.

6. A latch mechanism in accordance with claim **5**, wherein said opening has rounded corners and said clasp member has diverging sides forming a wedge extending along said cam surface, said rounded corners and wedge sides cooperating to urge said clasp member laterally against the lateral bias stability of said springs upon entry of the clasp member into said opening.

7. A latch mechanism in accordance with claim 6, wherein said clasp member is mounted on and extends through said one of the retaining surfaces of said pedestal in a direction lateral to said catch surface.

8. A latch mechanism in accordance with claim 7, wherein said one of the retaining surfaces has an aperture in position for registery with said opening in the catch surface when the container is supported on the pedestal, said arms and stem of said "Y" configuration being suspended within said aperture.

9. A latch mechanism in accordance with claim 8, wherein said clasp member has a head portion including said cam surface, detent surface, and wedge sides, and is mounted on said pedestal for swinging movement relative to an axis remote from said head portion.

10. A latch mechanism in accordance with claim 9, wherein said head portion of the clasp member includes hooks extending laterally at each side thereof, said aperture being of "Y" conformation and having hook members extending inwardly thereof from opposite sides, one at each outer arm reach of said aperture conformation, and said coil springs being joined at each end to said hooks and hook members.

11. A railway flat car comprising a deck, a plurality of container supports on the deck, a container having lower corners supported on the container supports, each of said lower corners having an opening therein, each container support having a generally horizontal seat to support the associated lower corner of the container, and a pair of connected walls arranged in a right angular relation and extending upwardly from the seat to restrain the container against horizontal movement, a releasable locking member on each container support adjacent one of the walls, means mounting the locking member for generally pivotal movement about a generally horizontal axis, the upper portion of said locking member having a protuberance extending inwardly from one of the walls and adapted to extend into the adjacent container opening for restraining the container against removal from the associated support at a lifting force below a predetermined minimum lifting force, and means urging the upper portion of the locking member and protuberance inwardly toward the container opening, said protuberance having a lower cam surface for contacting an edge of the container corner defining the lower portion of the associated container opening and a downwardly inclined upper surface adapted to contact the lower corner of the container upon lowering of the container onto the container support, the contact of said container with said upper surface upon lowering of the container urging the locking member outwardly for seating of the container on the support, and upward movement of the container being restrained by said protuberance until a predetermined minimum upward force is reached whereupon said protuberance is urged outwardly by contact of said lower cam surface with the edge of the container corner defining the opening.

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