Jan. 25, 1966 J. L. BONANNO ETAL 3,231,108

TOY FOR UNLOADING TOY ARTICLES

Filed Feb. 14, 1962 5 Sheets-Sheet 1

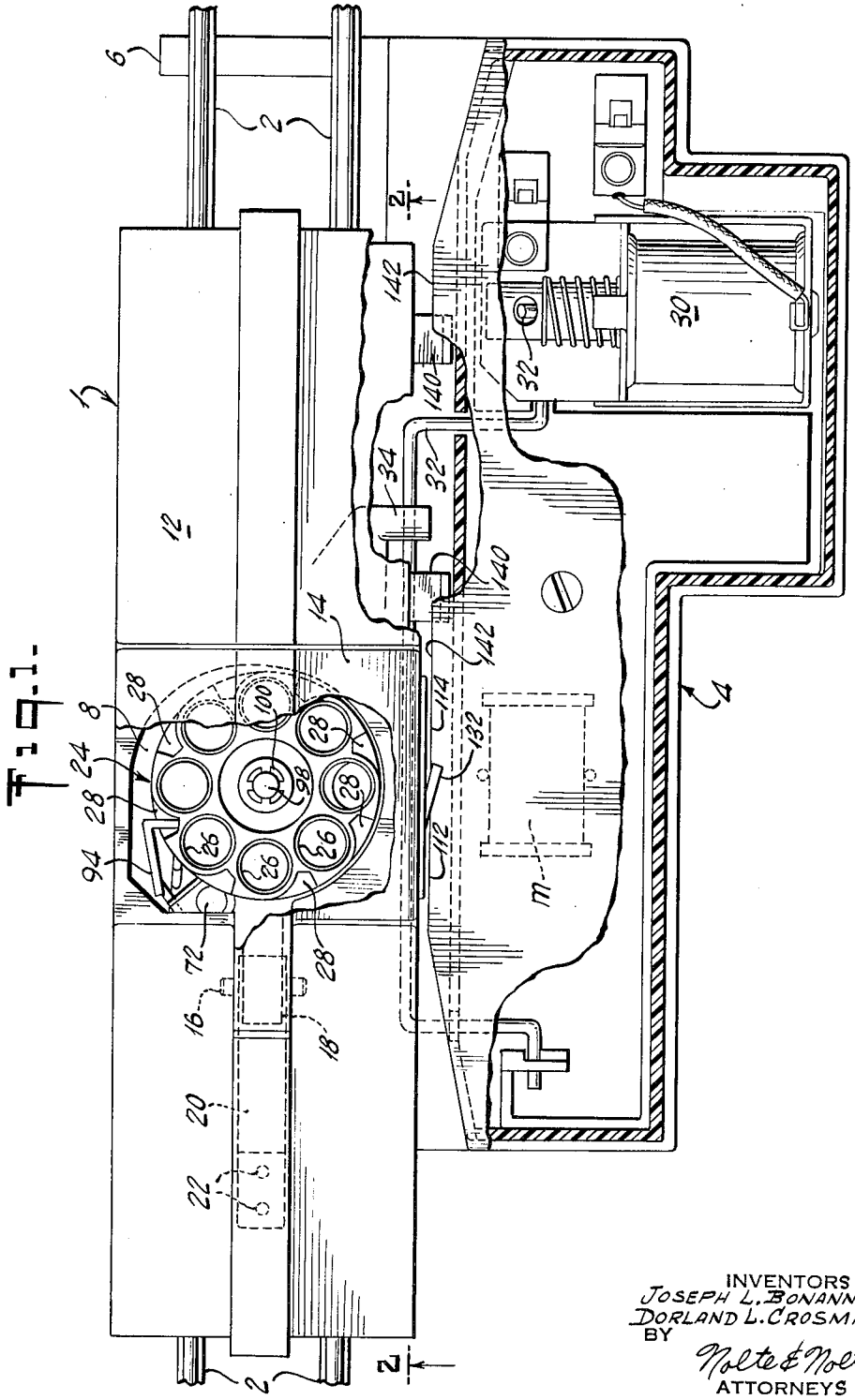


FIG. 1.

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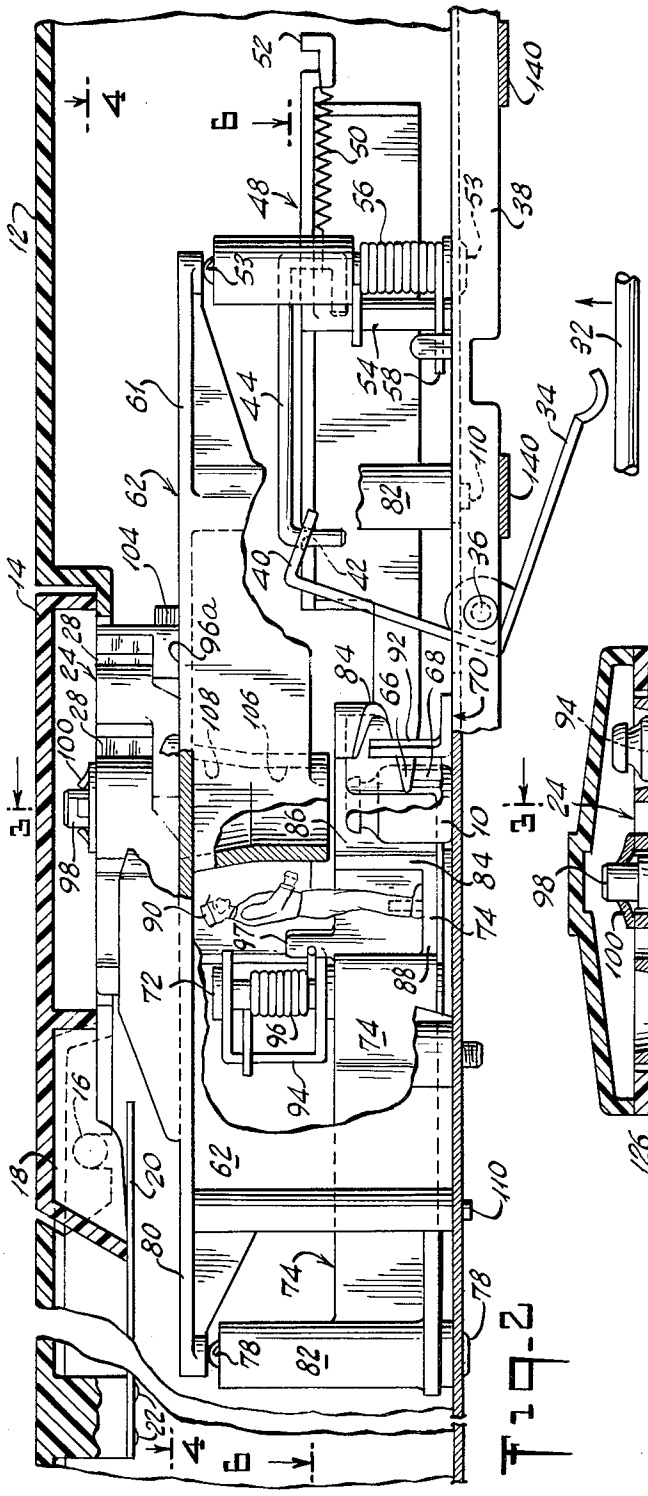


FIG-2

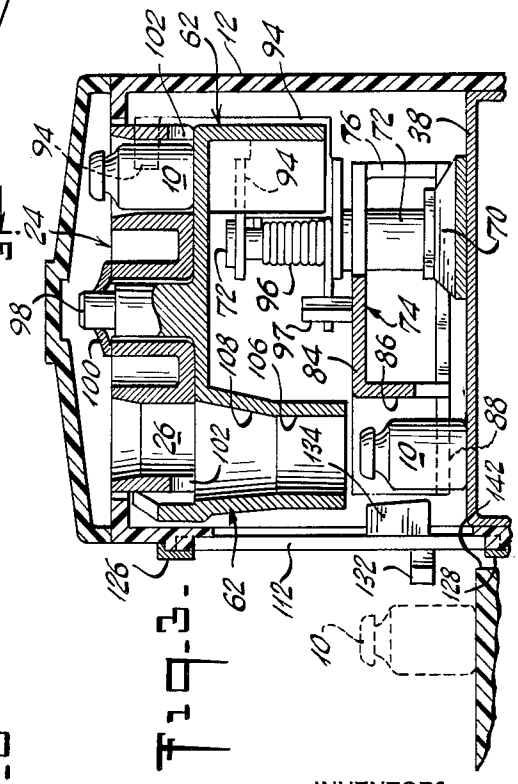


FIG-3

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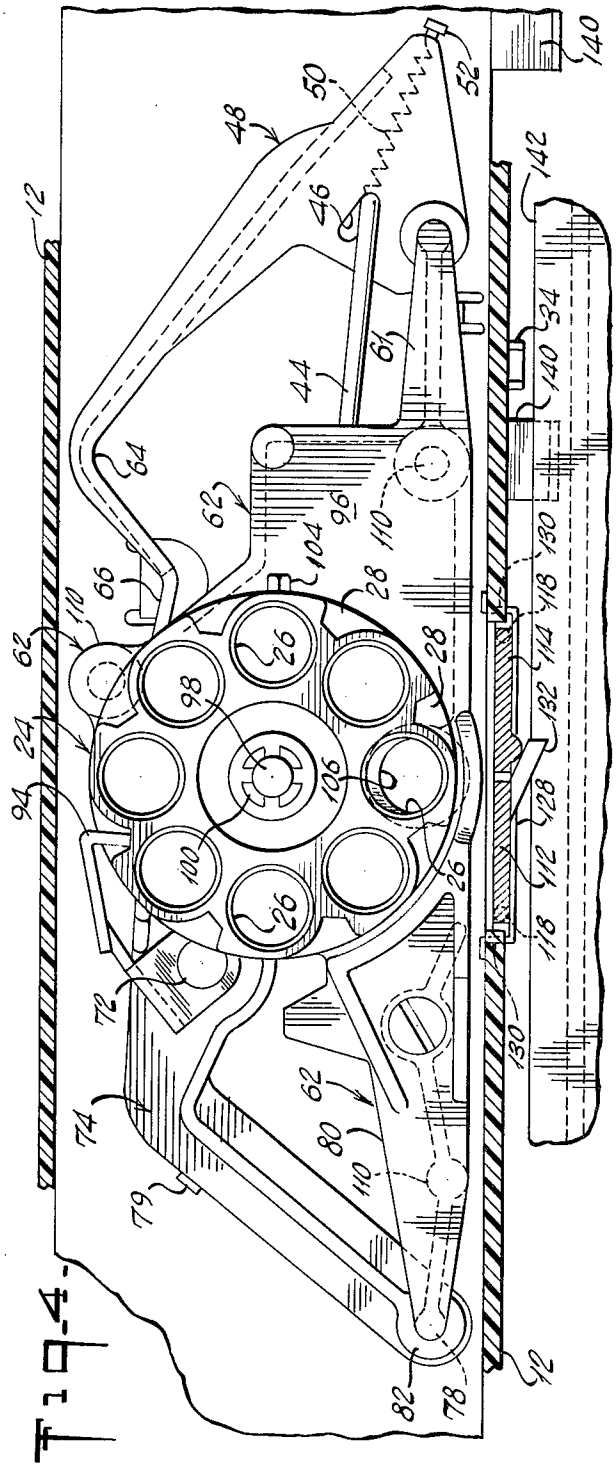


FIG-4.

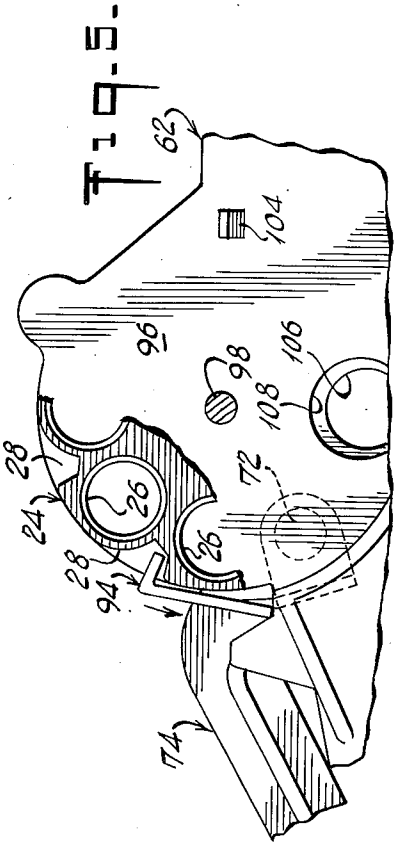


FIG-5.

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TOY FOR UNLOADING TOY ARTICLES

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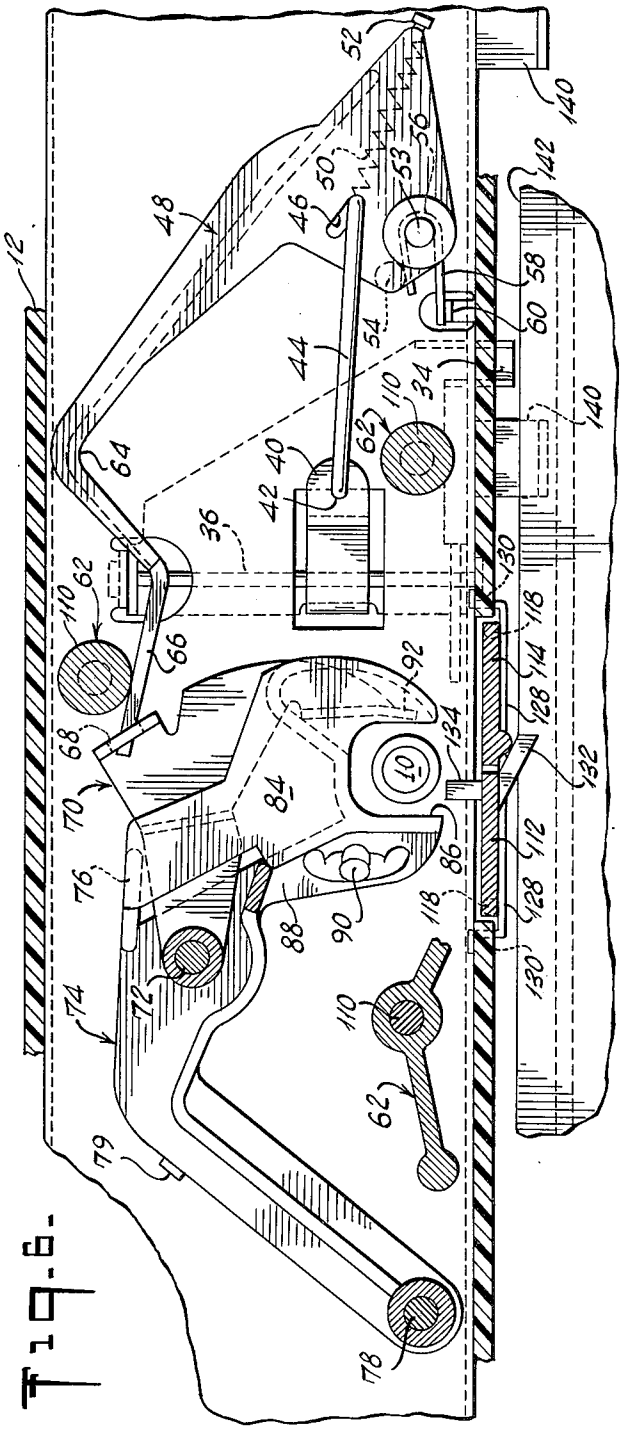


FIG. 6.

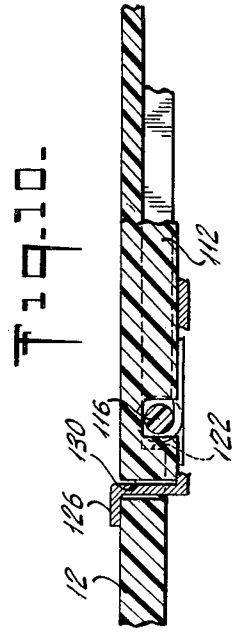


FIG. 10.

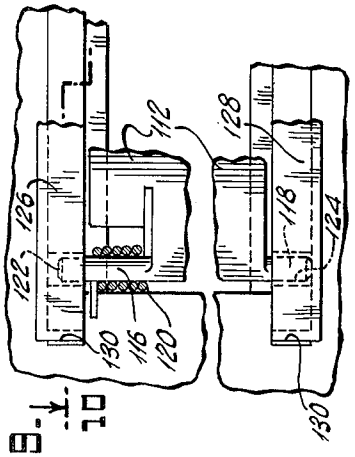


FIG. 9.

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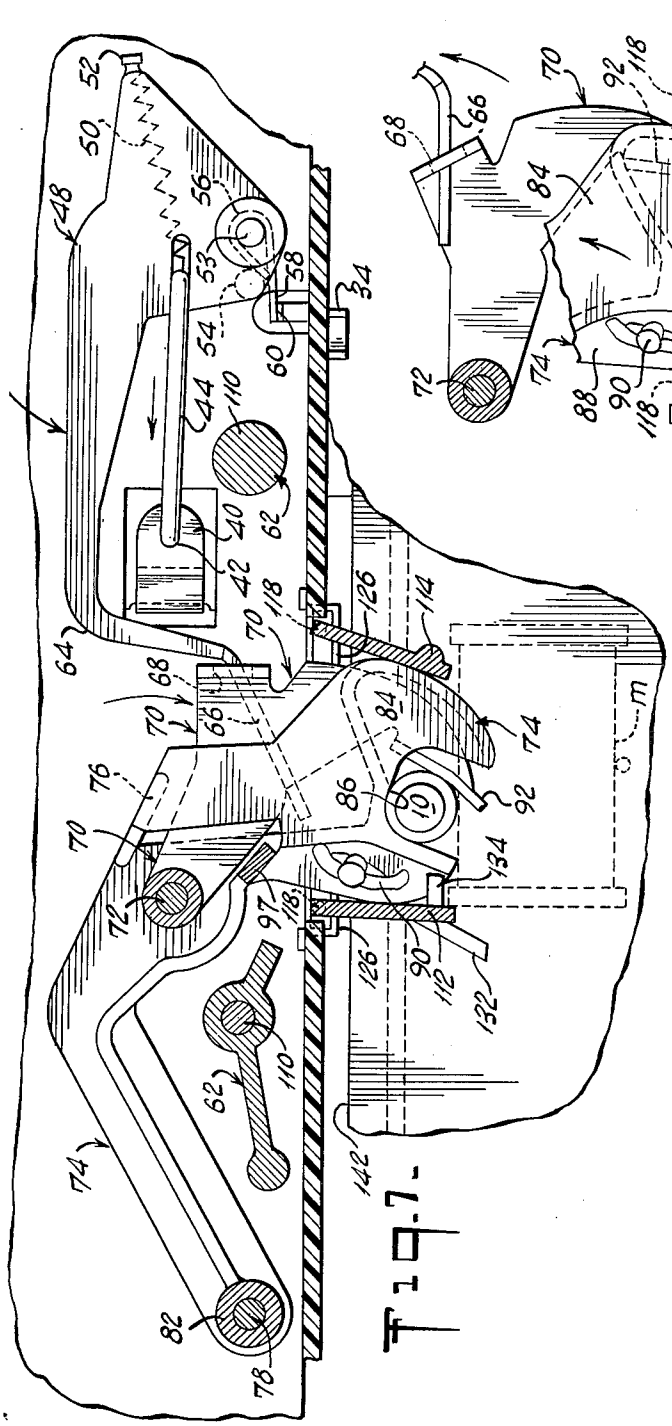


FIG. 7.

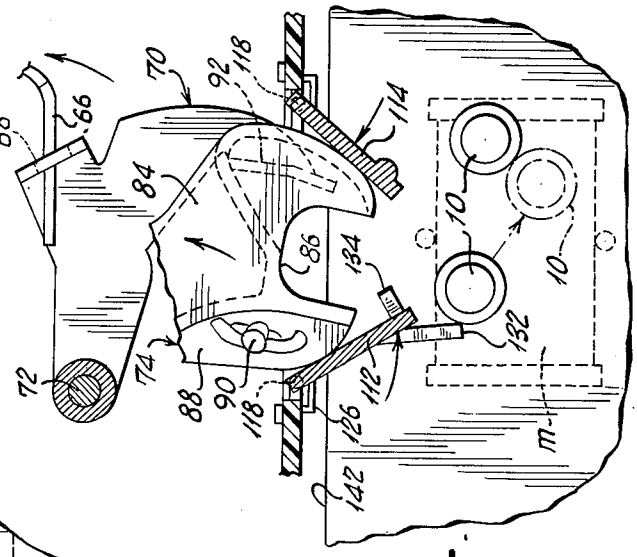


FIG. 8.

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United States Patent Office 3,231,108 Patented Jan. 25, 1966

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TOY FOR UNLOADING TOY ARTICLES

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Filed Feb. 14, 1962, Ser. No. 173,298
15 Claims. (Cl. 214—44)

This invention relates to toy railway systems and to toy railway cars, particularly to lightweight toy cars, such as may be used in HO gauge and similar sizes.

The invention is to be described in the embodiment of an automatic milk car, but it is to be understood that the principle of the unloading mechanism as described in the appended claims, is suitable for the unloading of items other than milk cans. The operation of the unloading mechanism involves the use of actuator means, such as described in the co-pending application, Serial No. 107,357, filed May 3, 1961, now Patent No. 3,125,668.

In the above-named patent it has been pointed out that the basic problem in providing a workable toy railway unloading car in the smaller gauges arises due to the lightweight of such cars. Therefore, the car according to the present invention is provided with means by the aid of which it is attached to a fixed unloading platform, preventing the derailment of the car during the operation of the unloading mechanism.

Accordingly, it is an object of the present invention to provide an unloading car in which the weight problem of light cars is overcome and it can be used for automatic unloading operations and the like.

Another object of the invention is to provide a railway car which retains its realistic appearance although provided with stabilizer means to insure an underailing performance during the operation of the car.

It is another object of the present invention to provide an unloading car for the continuous unloading of a plurality of simulated freight objects onto an unloading platform.

Yet another object of the invention is to provide an unloading mechanism which is simple in construction and lends itself to ready assembly during the manufacturing operation.

Another object of the invention is to provide an automatic milk car for the unloading of a plurality of milk cans onto an unloading platform.

In accordance with the objects of the invention, the specific embodiment of the invention presently to be described, includes a car platform resting on a conventional toy railroad carriage. The car platform provides laterally extending projections or stabilizers, similar to the ones described in the above-named patent, which become positioned beneath the edge of the unloading platform when the car pulls up to the unloading platform. An actuating lever operates an unloading actuator depending from the bottom side of the car platform, resulting in substantially three operating sequences. The first sequence involves the rotation of a revolver goods replenisher, which in this instance, supplies subsequent milk cans for the unloading operation. According to the second sequence, a milk can supplied during an earlier actuation is brought onto the unloading platform. The third sequence involves the opening of the car door for providing a path for the unloading mechanism. When the actuating arm or lever is withdrawn, the unloading actuator returns to its initial position, whereby a milk can, supplied in the previous operation and placed into a ready-position falls into place for subsequent unloading, while the unloading mechanism retracts, functioning in reverse and the doors close. The holding capacity of the revolver goods replenisher and the desire of the operator will determine the number of cans to be unloaded. Each unloading operation requires a separate actuation of the actuating lever.

Other objects and advantages of the invention will be better understood from the following detailed description of the specific embodiment of the invention, together with the drawings, wherein:

FIG. 1 is a top plan view partially broken away and partially in section of a milk car and an actuator-unloading platform combination of one embodiment;

FIG. 2 is a sectional-elevational view along line 2—2 of FIG. 1;

FIG. 3 is a section taken along line 3—3 of FIG. 2;

FIG. 4 is a section taken along line 4—4 of FIG. 2;

FIG. 5 shows an enlarged view of the center portion of FIG. 4 when the unloading actuator is depressed;

FIG. 6 is a section taken along line 6—6 of FIG. 2;

FIG. 7 shows the elements of FIG. 6 in an actuated position;

FIG. 8 shows part of the unloading platform during the operation of the car;

FIG. 9 is a sectional-elevational view of the hinge arrangement; and

FIG. 10 is a section taken along line 10—10 of FIG. 9.

The unloading platform shown for the operation of the milk car is the same as in our above-mentioned patent, except for a magnet M as best shown in FIG. 1. This magnet is attached at a suitable unloading location to the underside of the unloading platform, for a purpose to be described later.

In FIG. 1, a milk car 1 is shown on tracks 2 beside an unloading platform and actuator combination 4. The tracks 2 with their ties 6 form part of the unloading platform-actuator combination 4. As also shown in FIG. 1, a reloading opening 8 for milk cans 10 (FIG. 2) is located at the roof of a car housing 12. The opening 8 is covered with a cover 14, which when closed is flush with the roof of the housing 12. The cover 14 pivots around a pin 16 by means of an extending portion 18 of the cover 14, and a flat spring 20 secured to the inside of body 12 by rivets 22 assures that the cover 14 remains either in its entirely open or entirely shut position. A revolver-goods-replenisher, or magazine 24 is located directly under the opening 8. The magazine 24 has holes 26 distributed along its periphery, and ratchet teeth 28 are formed in its side, the number of these teeth being equal to the number of holes 26.

The solenoid 30 is adapted to pull a lever 32 upward in a direction indicated by the arrow in FIG. 2, to contact an unloading actuator 34 of the milk car 1. The unloading actuator 34 is pivoted at 36 to the underside of car platform 38.

The upper side 40 of the unloading actuator 34 is provided with a hole 42 (see also FIG. 6), having a bent portion of a connecting rod 44 lodged in it. The other end of the connecting rod 44 is lodged in an oval cutout 46 of a connecting member 48. A tensioning spring 50 is attached at its one end to the bent portion of the connecting rod 44 lodged in the cutout 46 and at its other end to a hook 52 formed on the connecting member 48. The spring 50 pulls connecting rod 44 and unloading actuator 34 to one extremity of the cutout 46, so that when the unloading actuator is not depressed backlash and noise that would result from backlash of the uncomplicated construction is avoided; and when the unloading actuator 34 is depressed, the rod 44 travels to the other extremity of the cutout 46, thus giving some resiliency to the system. A pin 53 at its lower end is peened to car platform 38 and provides a pivot for the connecting member 48. The connecting member 48 has a depending lug 54 integral therewith, having the bias of

a retraction spring 56 exerting a pressure thereon, to keep the connecting member 48 in its clockwise retracted position. The lower end 58 of spring 56 presses against an upstanding lug 60 formed from the car platform 38. A wing 61 of a principal frame member 62 projects over the free end of pin 53, preventing connecting member 48 and spring 56 from falling off the pin.

As best shown in FIGS. 4 and 6, the connecting member 48 is bent at 64 and terminates in a nose portion 66. Also shown in FIG. 7, the nose portion 66 engages a hole 68 in a pressure member 70. The pressure member is pivoted at 72 to a pivot lever 74. The pivot lever 74 has an upstanding shoulder 76 against which pressure member 70 can press when the mechanism is retracting due to the bias of the spring 56. The pivot lever 74 is pivotally supported on the car platform 38 by means of a pin 78, at its lower end being peened to the car platform. A limiting stop is provided for the pivot lever 74 by means of an upstanding flange 79, for limiting its retractive travel, to thus prevent the nose portion 66 to slide out of hole 68. A wing 80 of the principal frame member 62 secures a pivoting sleeve portion 82 of pivot lever 74 on pin 78.

Integrally attached to the other end of the pivot lever 74 is a principal unloading member 84, having its free end formed to define a U-shaped recess 86. A platform 88 is provided at the side of member 84 with a man 90 being attached thereto for a realistic appearance.

A free end 92 of pressure member 70 is located below the end of the U-shaped recess 86 opposite platform 88. The free end 92 is shaped in the form of an upstanding vertical wall portion, and is adapted to diminish the width of the U-shaped recess 86 in the principal unloading member 84.

A pawl member 94, adapted to engage ratchet teeth 28 on magazine 24 is pivotally attached to the pivot lever 74, at 72. The ratchet engaging portion of pawl member 94 is maintained by spring 96 (FIG. 2) against a ratchet 28 of the magazine 24. An upstanding flange 97, integral with pivot lever 74, supports one end of the spring 96. The principal frame member 62 has a flat top portion 95*a* (FIG. 5), upon which the magazine 24 can rotate. An upstanding peg 98, integral with the flat top 96*a* serves as an axle for the magazine 24, which is attached to it by means of a securing spider 100. Notches 102 (FIGS. 2 and 3) are formed within the bottom edge of the magazine 24 having one wall of said notches slanted while the other wall is substantially vertical. A fixed detent protrusion 104 is formed integral with the flat top portion 96*a*, and shaped to fit the notches 102. When the magazine rotates, portions of it, intermediate the notches 102, ride over the fixed detent protrusion 104 and the revolver rotates in an indexing manner from notch to notch.

Flat top 96*a* forms the bottom of holes 26, so that the milk cans 10, which are loaded in holes 26, slide over the flat top 96*a*. A hole 106 (FIGS. 3 and 5), being of a slightly larger diameter at its upper end than the holes 26, is provided in a sleeve 108 forming part of the principal frame member 62 for removing a milk can 10 at the time from the hole 26 overriding the hole 106 (FIG. 2). This hole 106 is in line with hole 26 and serves to channel the dropping milk cans to eventually come to rest within the U-shaped recess 86 of principal unloading member 84. The principal frame 62 is firmly attached to car platform 38 at various locations 110.

In FIGS. 9 and 10 the hinge arrangement of the door is shown. The car body 12 consists of a molded plastic shell, in its details approximating the appearance of a real railroad car. A pair of doors is provided on both sides of body 12, but the doors are operable only on one side. The inoperable doors (not shown) are molded in shell 12 only for appearance. The hinge construction of door 114 is an inverted mirror-image of the hinge construction on door 112, therefore, in FIGS. 9 and 10 reference is made only to door 112. The left hand pivoting side of door 112 is formed with two protruding pins, an upper pin 116 and a lower pin 118. The pin 116 is formed to be longer than pin 118 so as to accommodate a door closing spring 120. The pins 116 and 118 are inserted in grooves 122 and 124 respectively, formed in the car body 12, and the doors are held in place by overhanging flange strips 126 and 128. These overhanging flange strips are anchored in the body 12 through holes 130. Spring 120 is biased to keep the door 112 closed.

The door 112 is molded to include a simulated latch member having a protruding portion 132 (FIGS. 1, 3, 4 and 6–8). An inward protruding member 134 is also molded onto the door 112 (FIGS. 3, 6 and 7), to keep the can 10 located within the U-shaped recess 86 when the door 112 is closed.

Laterally extending stabilizers 140 are provided integral with car platform 38. The stabilizers 140 are adapted to lodge under the overhanging edge 142 (FIG. 3) of the unloading platform 4 so that when actuating lever 32 presses against unloading actuator 34 the stabilizers 140 will lean against the overhanging edge 142 and keep the car 1 from tilting and maintaining it on the tracks 2.

Operation of the car

When the train pulls alongside the unloading platform 4, the milk car 1 is stopped so that its doors 112 and 114 are approximately in line with the magnet M of the platform 4. At the same time, laterally extending stabilizers 140 are disposed under the overhanging edge 142 of the unloading platform 4.

The magazine 24 was previously loaded with cans 10 by opening the lid 14 in the body 12. After the loading operation was completed, lid 14 was closed.

When the unloading of one, or more cans onto the unloading platform 4 is desired, the solenoid 30 is energized resulting in a sudden upward move of actuating lever 32. This move will result in a series of sequences, taking place substantially simultaneously. As the unloading actuator 34 pivots around its hinge 36 (FIG. 2), the interior mechanism of milk car 1 will change from the position shown in FIG. 6 to the position shown in FIG. 7. The connecting rod 44 is pulled leftwards, pulling the connecting member 48 leftwards with it, causing its nose portion 66 to move forward. This movement of the connecting member 48 occurs against the bias of the retracting spring 56.

The nose portion 66, at its free end being located in hole 68, by its forward movement pushes the pressure member 70 forward. Since the pressure member pivots at 72, the diminishing of the width of the U-shaped recess 86 will result. This narrowing of the recess 86 continues until the end 92 of pressure member 70 comes into contact with the milk can 10 pressing it firmly within the recess 86. Continued pressure transmitted from the unloading actuator 34 causes the pivot lever 74 with all its associated and integral portions to move forward. The rounded-off portions of pivot lever 74 forming the fork-like shape that defines U-shaped recess 88, push against the inside of doors 112 and 114 and open them under continued forward movement.

Since the upward movement of actuating arm 32 is quite sudden, care has to be taken that the above-mentioned sequences do not cause the milk can 10 to be swung out onto or past the platform with too much force. Since the pressure member 70 applies continuous pressure against the can 10, in effect pressing it against the wall of U-shaped recess 86 adjacent to platform 88, the can 12 is held captive within recess 86.

Simultaneously with the forward movement of pivot lever 74, the pawl 94 tends to grasp the recessed portion of the ratchet 28 and cause the magazine 24 to make one indexed rotation in a counterclockwise direction. During this rotation, the fixed detent protrusion 104 releases the corresponding notch 102 and during the rotation of the magazine the fixed detent will ride over a smooth edge

portion between adjoining notches **102**. When the forward movement of pivot lever **74** and pawl **94** coupled thereto ends, a subsequent notch **102** will nest over fixed detent **104**. As a result of this one indexed revolving motion, another hole **26** with another milk can **10** will be positioned over hole **106** (FIGS. 2 and 5). Due to the effect of gravity, the milk can **10** will drop through hole **106** and guided by conical sleeve **108** and come to rest on a flat portion of the extended pivot lever **74**. This flat portion is located under the hole **106** when the pivot lever is extended and upon retraction, the can **10** will drop into the recess **86**. The conical design of hole **106** in sleeve **108** will assure that the can **10** from hole **26** will always be guided into the hole **106**.

When the pivot lever **74**, with the milk can **10** seated firmly in its U-shaped recess **86** by the pressure of pressure member **70**, reaches its extreme outward position as shown in FIG. 7, the can **10** reaches the attracting field of the magnet M which will pull the can out of the recess **86** over the magnet itself on the unloading platform **4** as soon as the pressure applied by the free end **92** of pressure member **70** is released.

As soon as the solenoid **30** is de-energized, the actuating arm **32** is lowered and the retractive sequence of the mechanism starts. The pressure applied against unloading actuator **34** is released and the bias of spring **56** pulls the connecting member **48** now in the opposite direction. The bias of spring **56** pulls the unloading actuator through connecting rod **44** into its initial, original position. The mechanism goes through the same sequence as outlined above, only in the opposite, retractive direction. The pawl member **94** is maintained by spring **96** constantly against the ratchet surface of revolver goods replenisher **24**. During the return motion, the end of the pawl **94** rides over a ratchet tooth surface **28** and in the extreme return position becomes lodged in another of the ratchet tooth recesses. The elongated nose portion **66** of the returning connecting member **48** pulls against the rear wall of hole **68** of the pressure member **70** and causes it in the first moment of retraction to release its pressure, and the force of the magnet M pulls a can **10** out of the recess **86** and disposes it on the platform **4**.

As the pivot lever **74** retracts, the spring loaded doors **112** and **114** begin to close along with its retraction. During the closing movement of the doors **112** and **114**, the protruding portion **132** on door **112** pushes the last unloaded can aside, as shown in FIG. 8, to make room for subsequent cans to be unloaded.

The milk can dropped through sleeve **108** during the can unloading sequences rides over the flat portion of the retracting pivot lever **74** until the recess **86** is located under hole **108**, at which time the can will drop into the recess **86**. At this time the mechanism is ready for subsequent unloading sequences, until the supply of milk cans **10** in the magazine **24** is exhausted, at which time it can be reloaded again.

The cooperation of the magnet M and the protruding portion **132** of door **112** with the cans **10** being unloaded assures that the cans are stacked in an orderly manner, close to each other over the magnetized portion of unloading platform **4**.

While the invention has been described and illustrated through a preferred embodiment, it is to be understood that the scope for which protection is claimed is to be interpreted from the appended claims.

What I claim is:

1. A toy railway car comprising a cylindrical member having holes therein, the edge of said cylindrical member being ratchet shaped, pawl means adapted to engage said ratchet-shaped edge of said cylindrical member, pivoting means adapted to receive an article to be unloaded from said cylindrical member at a freely swinging end of said pivoting means, said pawl means being pivotally attached to said pivoting means, gripping means attached to said pivoting means for selective retention of said article to be unloaded within said freely swinging end of said pivoting means, an actuating lever being connected to said gripping means for causing all of the above means to move in a first direction, and spring means for causing all of the above-mentioned means to move in a second direction, opposite to said first direction.

2. A car according to claim **1**, wherein said pawl means includes a spring for biasing said pawl means into constant contact with said ratchet means.

3. A car according to claim **2** further comprising stabilizing means, and stationary means positioned externally of the car.

4. A car according to claim **3**, wherein said stabilizing means comprises at least one laterally projecting protrusion for contacting said stationary means.

5. A car according to claim **3**, wherein said stationary means includes a magnet attached thereto for promoting an orderly unloading from said car.

6. A car according to claim **1**, including at least one door, said door being spring loaded and adapted for opening by said free swinging end of said pivoting means.

7. A car according to claim **6**, wherein said door includes a protruding member for arranging the unloaded articles.

8. A toy railway car, comprising a toy railway car supporting structure, an article delivery magazine rotatably mounted upon said structure, said magazine including a plurality of guides for articles placed therein, said structure including a passageway over which said guides pass as the magazine is rotated, means, positioned beneath said passageway, for receiving the articles, means for rotating said magazine and sequentially delivering the articles to said receiving means through said passageway, a first pivot member connected to said structure, a lever mounted to said pivot member, means pivoted on said lever for gripping an article resting in said receiving means and subsequently depositing the article externally of the railway car structure, and means for actuating said pivot means.

9. A toy railway car as in claim **8**, wherein said pivot means include a second pivot member pivotally mounted on said lever, a pressure member mounted upon said second pivot member, and said magazine rotating means includes a ratchet connected to said magazine and a pawl mounted upon said second pivot member and adapted to engage said ratchet to thereby rotate said magazine when said lever is rotated.

10. A toy railway car as in claim **8**, wherein said pivot actuating means includes an unloading actuator protruding externally of said structure, and a pivotal elongated member connected to said unloading actuator, and said pivot means includes a catch engaged by said elongated member whereby the triggering of said unloading actuator pivots said elongated member thereby rotating said pivot means.

11. A toy railway car adapted to sequentially unload a plurality of articles carried thereby, the car comprising a car body rotary storage means for said articles, unloading means adjacent said rotary storage means, said articles being adapted to be transferred by gravity from said rotary storage means to said unloading means, actuating means for effecting said transfer and for operating said unloading means, said unloading means including pivoting means adapted for pivoting at one end thereof and adapted to receive articles to be unloaded at another end thereof, said other end of said pivoting means defining a recess being larger in size than the item to be unloaded, said unloading means further including gripping means for selected retention of said article in said recess.

12. A transfer mechanism for unloading articles from a toy comprising arm means pivotally mounted at one end upon said toy for movement in a horizontal plane, wall means defining an article receiving recess in an opposite end portion of said arm means, an article gripping jaw pivotally mounted upon said arm means, said gripping jaw

forming a portion of the wall means defining said article receiving recess, actuator means connected to said gripping jaw for pivoting said arm means to an extended portion after closure of said gripping jaw into tight engagement with an article placed within said recess, whereby upon retraction of said actuator to return said arm means from its extended position, the gripping jaw is first pivoted relative to said arm means to release said article from said recess, and means responsive to movement of said arm means for sequentially delivering articles to said recess.

13. A transfer mechanism for unloading articles from a toy in which the mechanism and articles are positioned, comprising a toy supporting structure, an article receiving chamber, rotatable indexing means for sequentially delivering articles placed therein to said receiving chamber, said indexing means being positioned within said supporting structure, pivotal means for gripping the article delivered to said chamber and subsequently repositioning the article externally of said structure, and means for actuating said pivotal gripping means and said rotatable indexing means including an unloading actuator, a solenoid adapted to engage said unloading actuator, a pivotal elongated member connected to said unloading actuator, said pivotal elongated member including an end means for engagement with said pivotal gripping means, whereby the actuation of said solenoid causes said elongated member to pivot thereby simultaneously moving said gripping means and said indexing means.

14. A system for unloading articles from a toy railway car, comprising a toy railway car supporting structure, an article delivery magazine rotatably mounted upon said structure, said magazine including a plurality of guides for articles placed therein, said structure including a passageway over which said guides pass as the magazine is rotated, means positioned beneath said passageway, for receiving the articles one at a time, means for rotating said magazine and subsequently delivering articles to said receiving means through said passageway, means for gripping an article resting in the receiving means and carrying the article out beyond the structure and releasing the article, means for moving said rotating means and said gripping means simultaneously, and means positioned externally of the structure for triggering said moving means including a platformed structure, a solenoid positioned in said platform structure, a lever connected to said solenoid and adapted to engage said moving means, and a magnet connected to said platformed structure adapted to pull the article onto the platform when the article is released by the gripping means.

15. A system as in claim 14, wherein said supporting structure includes pivotable doors through which the article is passed and said doors include means for repositioning the articles deposited on the platform.

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