Nov. 17, 1942. F. PETTIT 2,302,142

TOY CAR

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Fig. 1.

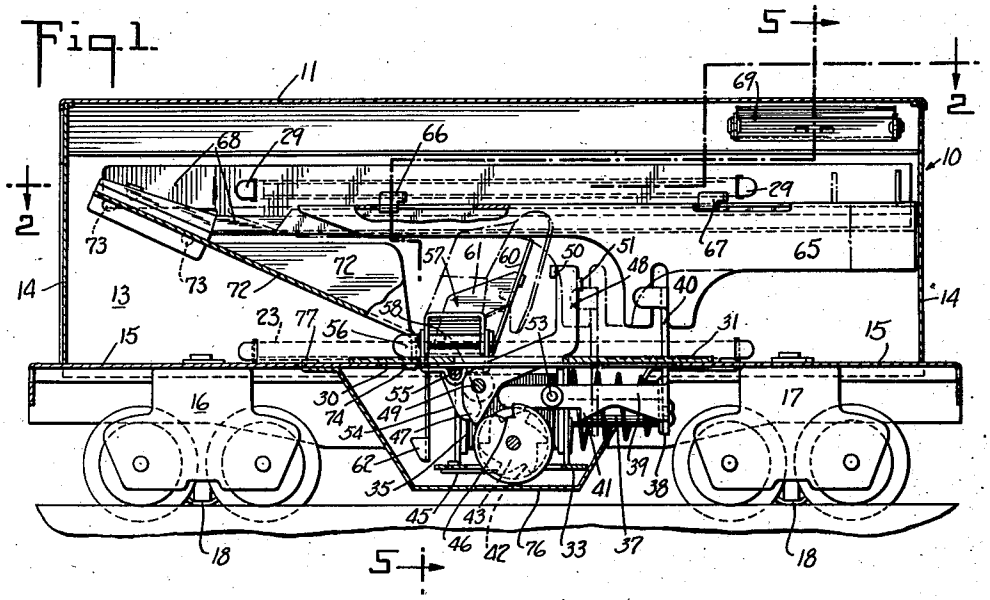


Fig. 2.

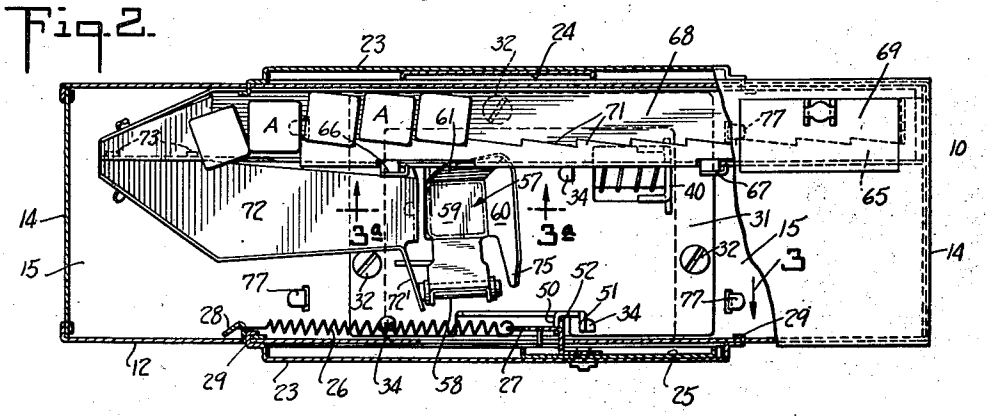


Fig. 3.

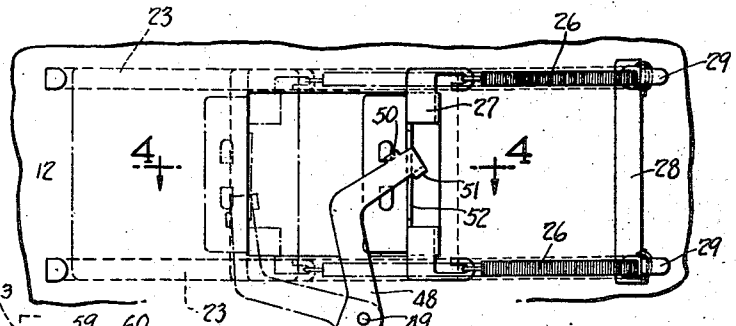
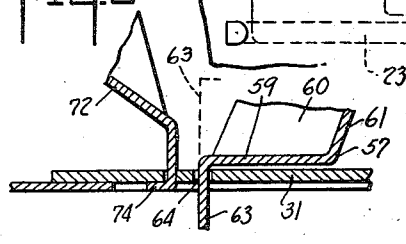


Fig. 3a



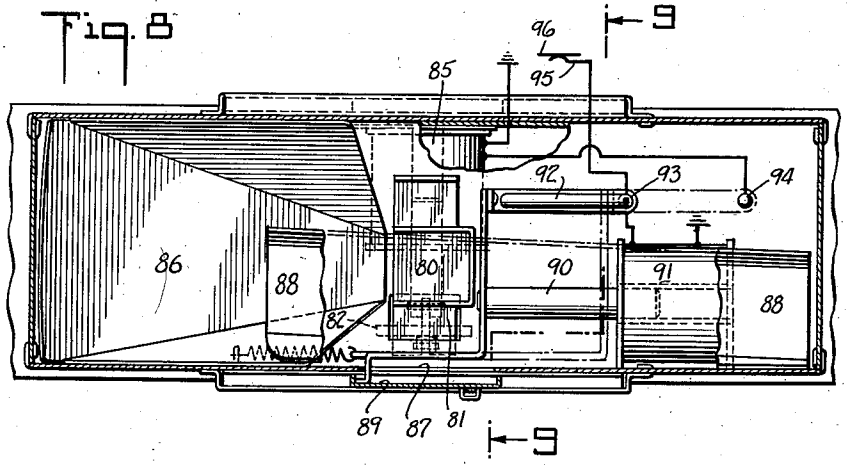
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Fig. 8



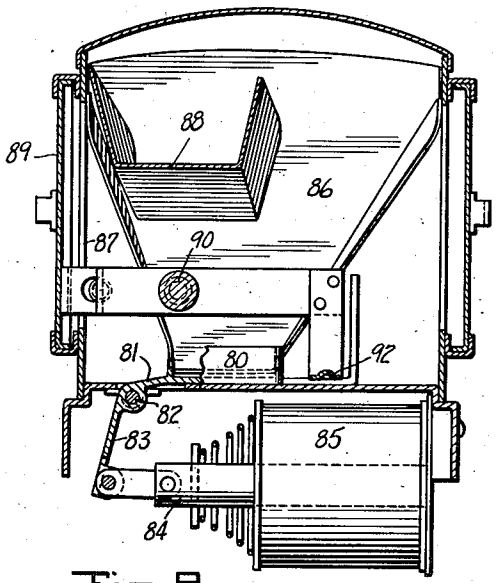


Fig. 9.

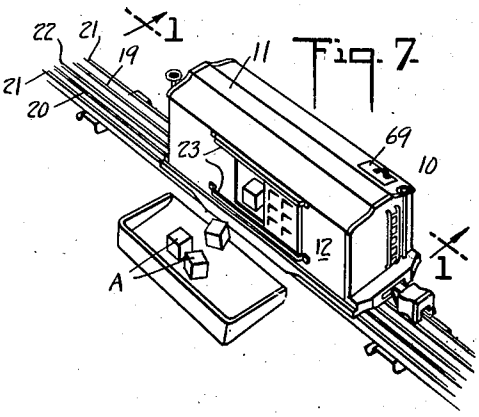
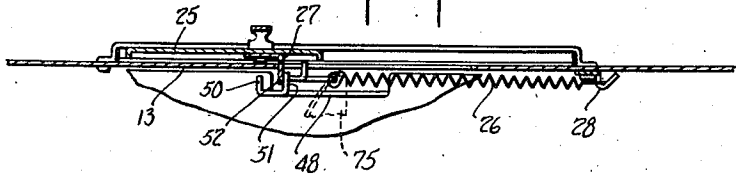


Fig. 7.

Fig. 4.



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Fig. 5.

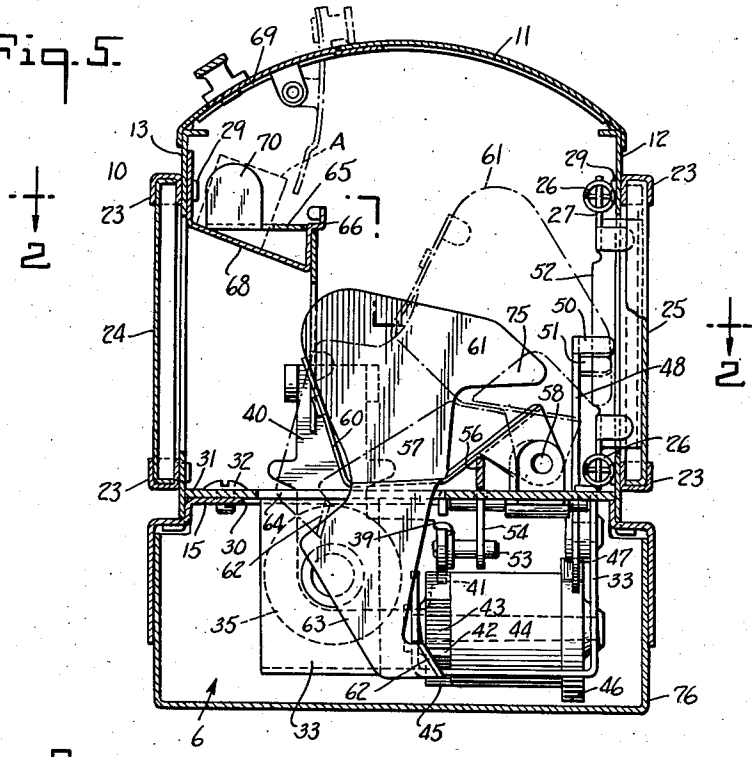
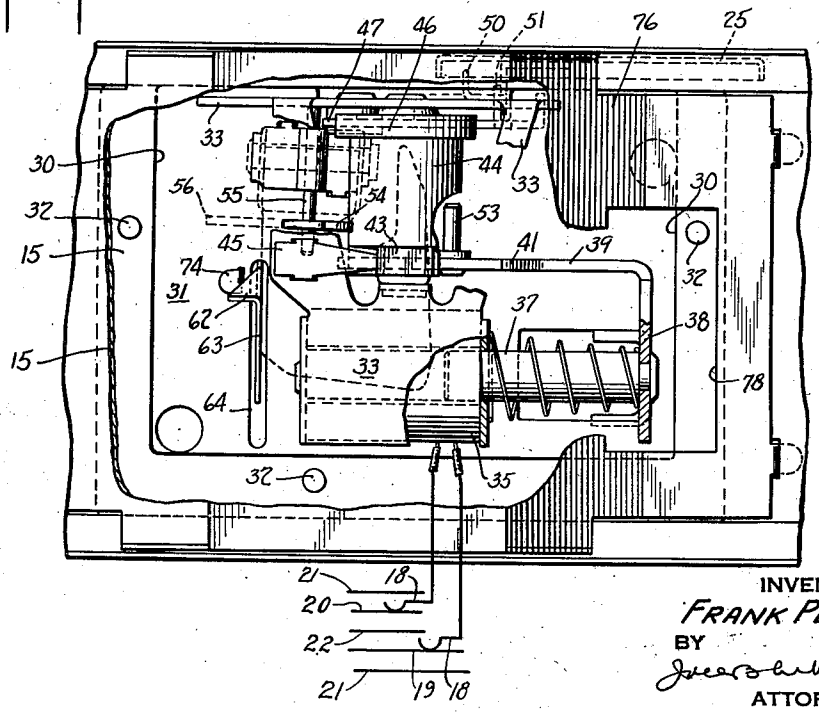


Fig. 6.



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UNITED STATES PATENT OFFICE

2,302,142

TOY CAR

Frank Pettit, Irvington, N. J., assignor to The Lionel Corporation, New York, N. Y., a corporation of New York

Application July 23, 1940, Serial No. 346,923

17 Claims. (Cl. 46—218)

The present invention relates to toy cars, and is more particularly directed toward toy freight cars provided with mechanism for discharging or ejecting articles from the interior of the freight car body after the fashion of a catapult.

According to the present invention it is possible to place a number of articles in the toy car and to discharge these articles one at a time out through an open doorway in the side of the car.

The present invention also contemplates that the mechanism will have means for opening the door whenever the discharging or ejecting action is to take place and preferably the door is held open during a predetermined number of operations of the mechanism, after which the door is closed.

The invention also contemplates the provision of electromagnetic operating means for the ejecting mechanism, parts being arranged so that they operate in the desired sequence to catapult the article suddenly and with considerable velocity so that it flies clear of the car.

A further object of the present invention is to provide an arrangement wherein a considerable number of the articles may be stored in the car and advanced toward a chute, adapted to carry them to the ejector mechanism, as the ejector mechanism is operated to discharge the articles.

The accompanying drawings show, for purposes of illustrating the present invention, two of the many embodiments in which the invention may take form, it being understood that the drawings are illustrative of the invention rather than limiting the same.

In these drawings:

Figure 1 is a longitudinal sectional view through one form of a toy freight car taken generally on the line 1—1 of Figure 7 and in full lines showing the parts in deenergized position with the door controlling arm in the position to hold the door open, and in the dot-and-dash line position showing the parts in the position assumed at the end of the movement of the armature;

Figure 2 is a top plan view with parts in section along the line 2—2 of Figures 1 and 5;

Figure 3 is an interior side elevational view taken in the direction of the arrow 3 of Figure 2, the door being shown in full lines in the closed position and in dot-and-dash lines in the open position;

Figure 3a is a fragmentary section on the line 3a—3a of Figure 2;

Figure 4 is a horizontal sectional view on the line 4—4 of Figure 3, the door being in the open position;

Figure 5 is a cross sectional view on the line 5—5 of Figure 1, the ejector mechanism being shown in full lines in the normal position and in dot-and-dash lines in the position for discharging the article;

Figure 6 is an inverted plan view with parts broken away to show interior construction;

Figure 7 is a perspective view illustrating the car on the track;

Figure 8 is a horizontal sectional view with parts broken away showing a modified form of construction; and

Figure 9 is a vertical cross sectional view on the line 9—9 of Figure 8.

The toy car 10, as illustrated in Figures 1 to 7, has generally the conventional appearance of a box car with a roof, indicated at 11, side walls 12 and 13, end walls 14, 14, platform or floor 15, and trucks 16 and 17. The trucks have collector shoes 18, 18, each adapted to ride on one of the insulated rails 19 or 20 placed between the regular wheel bearing rails 21, 21 and a third rail 22.

The side walls 12 and 13 are provided with sheet metal guides 23 for sliding doors 24 and 25. The sliding door 24 is merely decorative. The sliding door 25 is normally biased towards closed position by springs 26 anchored to a stamping 27 carried by the door and to an anchoring plate 28 secured to the side of the car body by the adjacent bent over ends 29 of the guides 23. The door 25 is shifted to open position by mechanism to be described.

The bottom 15 of the car body has a comparatively large central opening 30 which is substantially closed on the top by a plate 31 secured in place by screws 32, this plate carrying the electromagnetically operated ejector mechanism. A sub-frame plate 33 is secured to the plate 31 by bent over lugs indicated at 34. This sub-frame plate carries a solenoid coil 35 connected by wires 36, 36 with the collector shoes 18, 18, as diagrammatically illustrated in Figure 6 so that the coil may be energized by connecting the rails 19 and 20 to a suitable source.

The solenoid coil acts on a plunger type armature 37 to move it from the full line position of Figures 1, 2 and 5 to the dot-and-dash line position of Figure 1. The plunger is secured at this outer position to an angle member 38 having a horizontally extending arm 39 moving back and forth under the plate 31 and an upwardly extending arm 40 for a purpose to be described.

The horizontally extending arm 39 has a tooth

41 adapted to engage the teeth 42 of a ratchet wheel 43. This ratchet wheel is preferably in the form of a piece of molded material 44 pivotally supported in the sub-frame 33, as will be obvious. A flat spring 45 overlies the ratchet wheel to keep it from turning backward.

The molded member 44 has a one tooth cam 46, shown more clearly in Figure 3, which cooperates with the lower end 47 of a lever 48 pivoted at 49. The upper end of this lever has two wing-like elements 50, 51 which engage a fin 52 carried by the stamping 27 secured to the door 25. When the cam 46 is in the position shown in Figure 3 the tooth is opposite the lower end of the arm 48 and the springs 26, 26 can then pull the door to closed position. On the next actuation of the plunger the ratchet and pawl mechanism operate to advance the drum in the direction shown by the arrow in Figure 3, and this will cause the door to be opened, this opening takes place during a comparatively early part of the movement of the plunger, and the door remains open until sufficient plunger operations have occurred to complete the selected number of cycles.

The horizontally extending element 39 reciprocated by the plunger 37 carries a laterally extending pin 53 adapted to engage a lever 54 pivoted at 55. The upper end of this lever is above the plate 31 and extends horizontally, as indicated at 56. It lies under an oscillatory ejector 57 pivoted on a shaft indicated at 58. This ejector has a substantially horizontal central portion 59 and upwardly extending sides 60, 61, and is adapted to be shifted from the full line position of Figures 1, 2 and 5 to the dot-and-dash line position of Figure 5 during the very last part of the movement of the plunger. Such movement therefore occurs when the plunger is moving at high velocity and has acquired considerable momentum so that the ejector is shifted upwardly suddenly. It is prevented from moving too far by a prong 62 carried on the lower end of arm 63, this arm extending down through a slot 64 of the plate 31.

The upwardly extending arm 40 carried by the reciprocatory plunger is used to actuate a horizontally extending slider 65. This slider is guided by lugs 66 and 67 struck out of an angular shaped piece of sheet metal 68. This piece of sheet metal is secured to the side walls of the car body by bent over prongs 29, as shown at the left of Figure 5, and is adapted to support a number of articles A which may be inserted through a door 69 in the roof. The slider 65 has an upwardly bent end 70 which pushes the articles to the left and has a number of teeth 71 which assist in pushing the articles along. The bottom of the trough 68 slopes so that the articles have a tendency to slide down against the teeth, as will be obvious from Figures 2 and 5.

As the articles are pushed along the trough 68 they are forced off the trough at the left end as shown in the drawings, and fall into a chute 72 formed of sheet metal. The chute is secured to the end of the trough member 68 by prongs, indicated at 73, and is anchored to the plate 31 by a lug 74. It has a forwardly extending wing 72' terminating near the wall of the car body When the article reaches the top of the chute 72 it slides down it rapidly and arrives on the bottom portion 59 of the ejector 57 where it will rest flat on the bottom and in definite position relative to the mechanism. When the magnet coil is energized the ejector will be suddenly shifted, as above described, to throw the article out through the door opening after the fashion of a catapult. The arm 63 which extends down through the plate and carries the stop element 62 also prevents the articles farther up the chute from sliding off the chute. The wall 61 of the ejector has a forwardly extending element 75 which, as shown in Figure 4 and in the dot-and-dash line in Figure 5, extends into the path of the fin 52 on the door. The cam release mechanism is timed to function at the extreme end of the plunger movement so that the point or extension 75 of the ejector is in the path of the fin 52 before the release of the arm 48. Hence the door will be held against closing until the ejector has dropped back to normal position.

The mechanism under the car body is covered and concealed by a stamping 76 secured to the bottom 15 of the car body by bent over lugs 77. It is apertured at 78 to give access to the armature for manual manipulation.

The car body shown in Figures 8 and 9 is generally the same as the car above described. The ejector or catapult 80 is carried on a lever 81 pivoted at 82 and rests on the floor of the car as indicated. The lower end 83 of the arm 81 is connected to the plunger 84 of an electromagnet whose coil is indicated at 85. The ejector 80 is located opposite the lower end of a chute 86 and opposite a door opening 87 in the side of the car. A storage chute or trough 88 is disposed in the upper part of the car body and slopes downwardly so that the articles placed in it will tend to slide down owing to the vibration of the car. The door opening is normally closed by a door indicated at 89. This door is moved toward open position by a plunger 90 operated by a solenoid coil 91. In addition to operating the door to open position, the plunger 90 operates a slider 92 adapted to bridge from a contact 93 connected to a collector shoe 95 cooperable with a rail 96 to contact 94 connected to the coil 85. The coils 85 and 91 are grounded. When the rail 96 is energized current flows through the coil 91 to actuate the door to open position, and then the coil 85 is energized and this operates the ejector or catapult to throw the article out of the car door. On deenergization of the rail 96 the parts return to normal position, as will be obvious.

It is obvious that the invention may be embodied in many forms and constructions within the scope of the claims and I wish it to be understood that the particular forms shown are but a few of the many forms. Various modifications and changes being possible, I do not otherwise limit myself in any way with respect thereto.

What is claimed is:

1. A toy car comprising a car body simulating a box car and having a door opening in the side, article ejecting means for ejecting articles inside the car body outwardly through the opening, and a sloping chute in the car body to guide articles toward the ejecting means, the ejecting means having a receiving platform substantially below the bottom of the chute so that the article falls onto the platform, and having upwardly extending elements which keep the article on said platform until ejected.

2. A toy car comprising a car body simulating a box car and having a door opening in the side, a normally closed door for said opening, a solenoid, solenoid operated means for moving the door to open position, solenoid operated article ejecting means for ejecting articles inside the car body outwardly through the opening, and means

for holding the door open during a predetermined number of operations of the ejecting means and for thereafter releasing the door so that it may close.

3. A toy car such as claimed in claim 2, having means to prevent closure of the door until the article ejecting means has completed the ejecting of the last article.

4. A toy car such as claimed in claim 2, wherein the article ejecting means has an element which acts as an obstruction to the closing of the door when the ejecting means is in its extreme ejecting position.

5. In a toy car, a body having a door opening, a movable door for closing the opening, an article ejector for ejecting articles from inside the car body out through the door opening, and electromagnetically operated mechanism for opening the door prior to operating the ejector and holding it open for a predetermined number of ejector operations, and for thereafter closing the door.

6. A toy car such as claimed in claim 5, wherein the door opening and closing mechanism includes a cam operated lever, means advancing the cam step by step for each ejector operation, the cam and step by step mechanism being timed to function during the early part of the movement of the armature of the electromagnetically operated mechanism.

7. Sequence mechanism for opening and closing the door of a toy car and for operating an ejector for ejecting articles out through the door opening, the opening of the door taking place before an ejector operation, the door being released before the ejector operation has been completed, the ejector engaging the door opening mechanism and holding it against closing until after the article has been ejected.

8. In a toy car, a car body, an ejector mounted on a longitudinally extending horizontal pivot and having a substantially horizontal article receiving portion, and means for giving the ejector a quick movement to lift the article and throw it clear of the side of the car.

9. An ejector for unloading articles from toy box cars, comprising a solenoid coil, a reciprocable armature having a substantial movement, a spring restoring the armature to normal position, an ejector pivoted on a horizontal axis and having a normal position in which it is held by gravity, and means actuated by the armature near the end of its movement when the coil is energized to suddenly swing the ejector upwardly about the pivot.

10. A door controlling mechanism for toy cars, comprising a rotatable drum, a cam operated thereby, a step by step mechanism for operating the drum, a reciprocatory door, spring means urging it to closed position, and a cam operated arm for opening the door and holding it open except when the cam is in a selected position whereby the door may be held open during a predetermined number of operations by the step by step mechanism.

11. Mechanism such as claimed in claim 10, having a device moved by the step by step operating mechanism engaging the cam operated arm and holding the door open until the step by step mechanism has completed a predetermined portion of its cycle of operations.

12. An ejector operating mechanism for toy cars, comprising a solenoid having a horizontally reciprocable armature, a plunger carried by the armature outside the coil of the solenoid, a horizontally pivoted ejector normally held by gravity in a lower position, an ejector lifter in the path of movement of the plunger and engageable thereby during the latter part of the armature movement to suddenly lift the ejector.

13. A toy car comprising a car body simulating a box car and having a door opening in the side, article ejecting means for ejecting articles inside the car body outwardly through the opening, a longitudinally extending sloping chute in the car body to guide articles toward the ejecting means, and a longitudinally extending horizontal support terminating at the top of the chute and adapted to store articles above the chute and discharge them into it.

14. A toy car such as claimed in claim 13, having an article pusher for sliding the articles along the support and operated in unison with the ejecting means.

15. A toy car such as claimed in claim 13, having a horizontally reciprocable, notched article pusher for sliding the articles along the support and operated in unison with the ejecting means.

16. A toy railway car comprising a wheeled car body, a chute or support in said car body adapted to support a series of objects which tend to move to the lower end of the chute, an ejector at the lower end of the chute, a door at the side of the car body at the lower end of the chute, a solenoid and core carried by said car, and linkage operatively connected between said solenoid core and said door and ejector whereby operation of the solenoid opens the door and causes the ejector to eject the lowermost object through the opened doorway.

17. A toy railway car comprising a wheeled car body having a door opening in the side, a normally closed door for said opening, a longitudinally extending sloping chute in the car body down which a series of objects are adapted to slide, an ejector at the lower end of the chute opposite the door opening and pivoted on a longitudinal axis adjacent the door opening, and remote controlled, electromagnetically-operated, car-carried means for opening the door and immediately thereafter operating the ejector to eject the lowermost object through the opening.

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