June 29, 1943. W. E. REXFORD 2,323,240

TOY RAILWAY MAIL CAR OR THE LIKE

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Fig. 1.

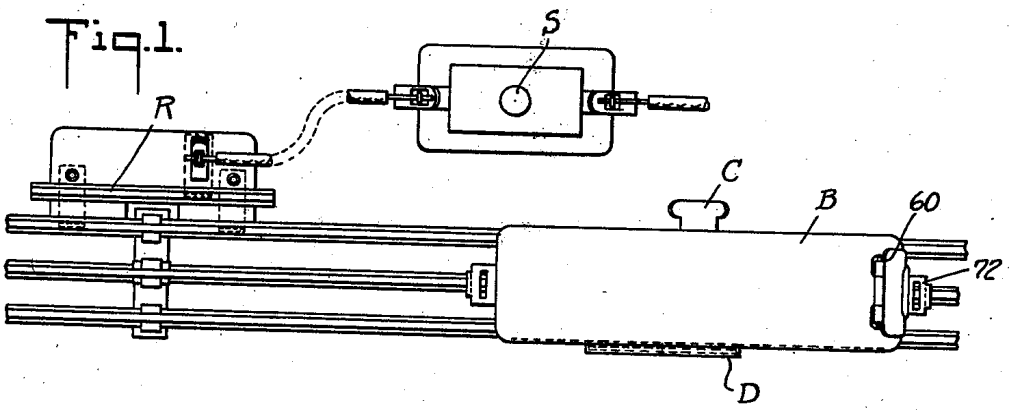

Fig. 2.

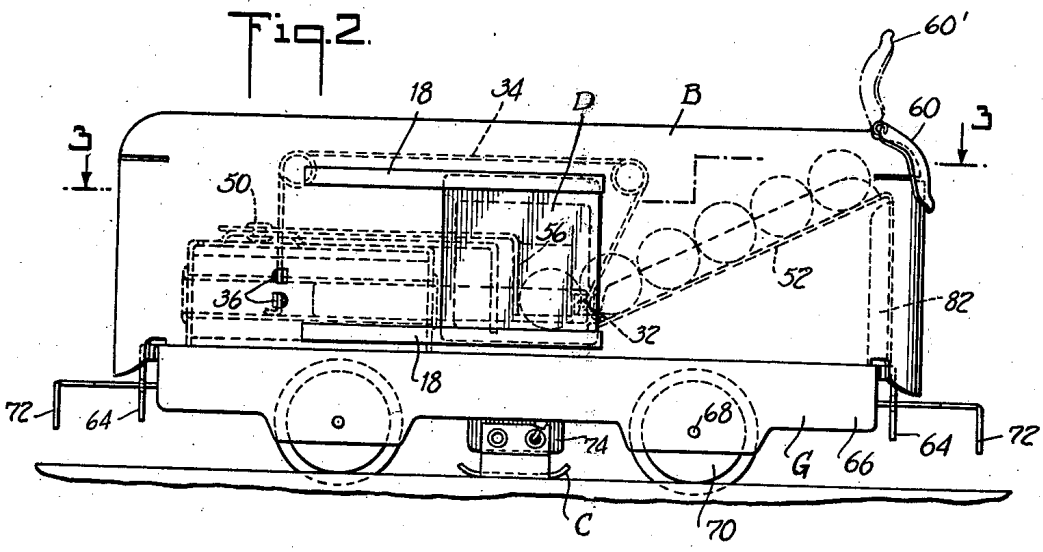

Fig. 3.

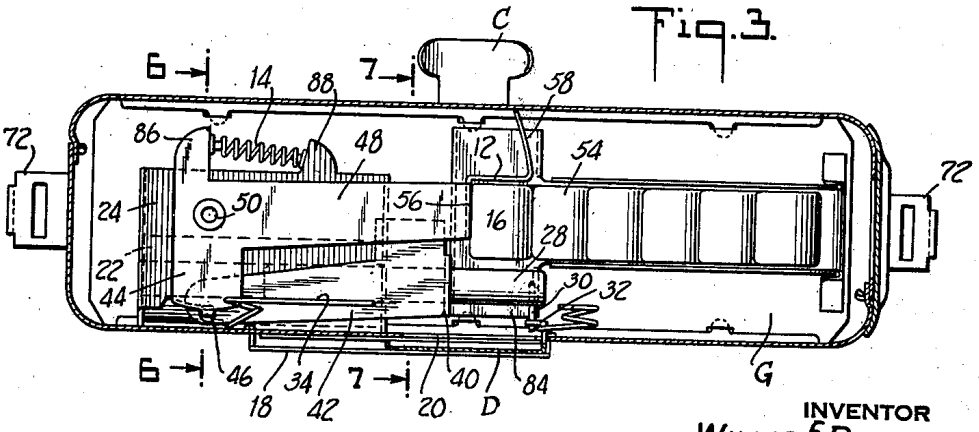

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Fig. 4.

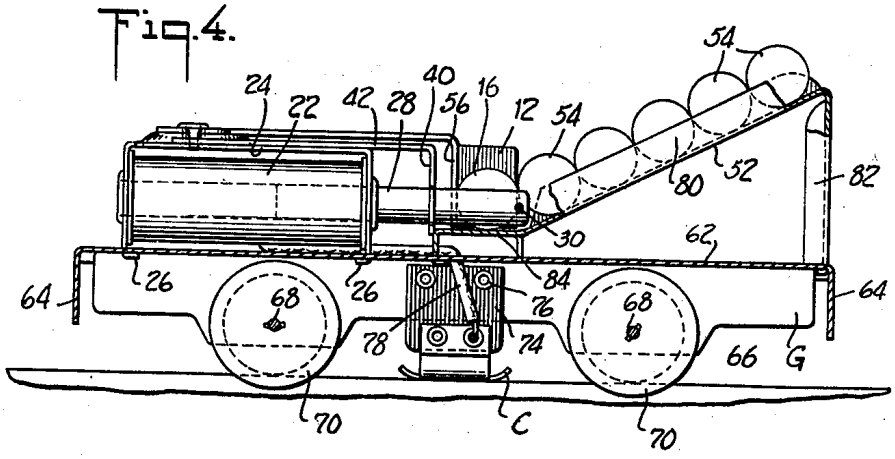


Fig. 5.

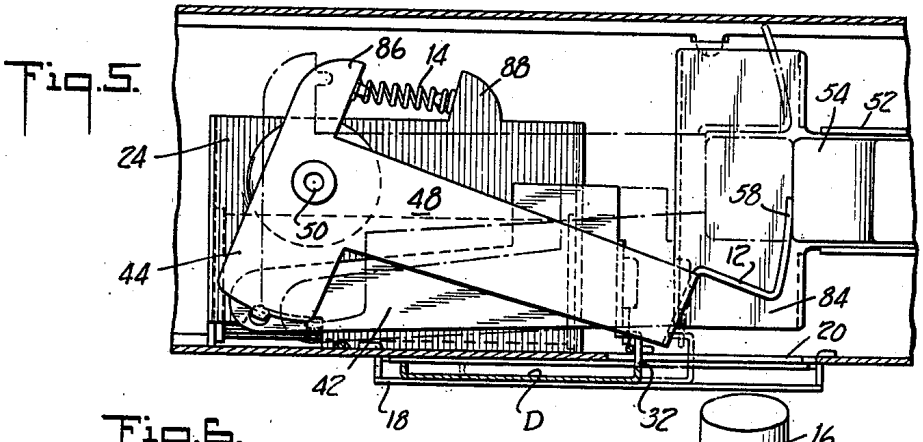


Fig. 6.

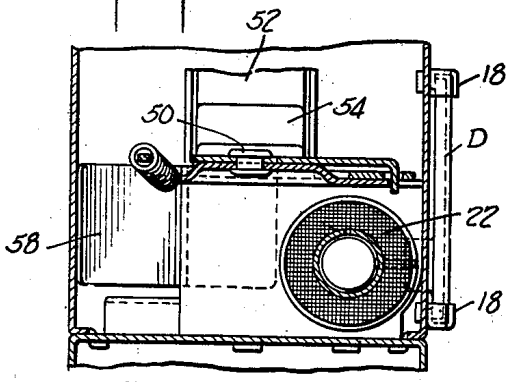


Fig. 7.

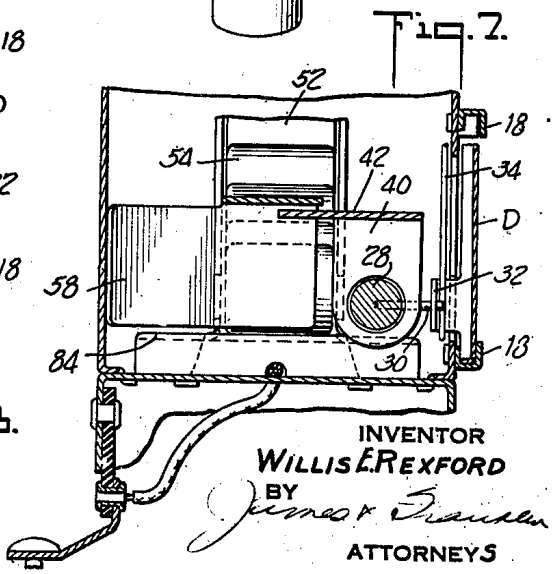
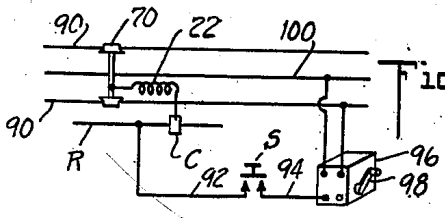


Fig. 8.



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UNITED STATES PATENT OFFICE

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TOY RAILWAY MAIL CAR OR THE LIKE

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Application September 12, 1939, Serial No. 294,416

10 Claims. (Cl. 258—6)

This invention relates to toys, especially toy railroads, and more particularly to a simulated mail car.

The primary object of my invention is to generally improve toy railroads. A more particular object is to generally improve toy cars. One specific object is to provide a toy car adapted to eject an object, especially with the car in motion, although the mechanism may also be used with the car stationary. Thus the car may simulate the ejection of a mail bag from a mail car.

Another specific object is to provide the car with a normally closed door, which door is, however, automatically opened preparatory to ejection of an object from the car. Still another object is to so design the car and the ejector mechanism that a plurality of objects or pellets may be carried, these being successively ejected at any desired intervals. A further object of the invention is to make it possible to remotely control the ejection of the pellets from the car.

Other objects are to accomplish the foregoing by means of simplified mechanism which is inexpensive to manufacture, and which is dependable and fool-proof in operation.

To the accomplishment of the foregoing, and such other objects as will hereinafter appear, my invention consists in the railroad car and ejector mechanism and their relation one to the other, as hereinafter are more particularly described in the specification and sought to be defined in the claims. The specification is accompanied by drawings in which:

Fig. 1 is a plan view of a toy car embodying features of my invention, disposed on a track section provided with a ramp and remote control switch for cooperation with the car;

Fig. 2 is a side elevation of the car;

Fig. 3 is a horizontal section taken in the plane of the line 3—3 of Fig. 2;

Fig. 4 is a side elevation of the chassis of the car with the body removed;

Fig. 5 is a horizontal section similar to Fig. 3, but showing the ejector mechanism to enlarged scale, at the end of the ejecting operation;

Fig. 6 is a transverse section taken in the plane of the line 6—6 of Fig. 3;

Fig. 7 is a transverse section taken in the plane of the line 7—7 of Fig. 3; and

Fig. 8 is a schematic wiring diagram explanatory of the invention.

Referring to the drawings, and more particularly to Figs. 1 and 2, the car comprises a wheeled chassis G having a body B mounted thereon, said body being provided with a door D. The chassis is provided with a contact shoe C adapted to engage an extra power rail or ramp R mounted at any desired point along the track. The ramp R may be energized by means of a remote switch S. The car is provided with electrically operated mechanism for opening the door D and ejecting a pellet or simulated mail bag or package from the car, this mechanism being connected to contact shoe C, and thus functioning when the car passes over or is stopped at the ramp R, provided, of course, that the switch S is closed. When switch S is open the mechanism is inoperative. A number of ramps R may be provided along the track if it is desired to simulate the ejection of a mail pouch at a number of stations.

Referring now to Figs. 3 through 7, the ejector mechanism comprises an ejector or pusher 12 normally moved to the retracted position shown in Fig. 3 by means of a spring 14. At this time the pusher 12 is remote from door D, and a pellet 16 is disposed between pusher 12 and door D. The door is a sliding door, it being movable in top and bottom guide channels 18 between the closed position shown in Figs. 2 and 3 and the open position shown in Fig. 5. The side of the car body is cut away at 20, so that when the door opens there is no obstruction to ejection of pellet 16 when ejector 12 moves toward the doorway, as is shown in Fig. 5. It is not essential to use a door, but the operation of the toy is much more realistic when a door is employed. It is not essential to use a sliding door, but a sliding door is preferable to a swinging door in order not to add to the clearance needed for movement of the car.

The mechanism carried by chassis G is best shown in Fig. 4 in which the car body has been removed. This mechanism comprises a solenoid 22 fixedly mounted in position by means of an inverted U-shaped frame 24, the ends of which are secured to the chassis by bent tongue and slot connections 26. A solenoid core 28 is slidable in the solenoid. The end of core 28 is provided with a sidewardly projecting pin 30 which is received in a lug 32 projecting inwardly from the door. It will be evident, from inspection of Fig. 3, that upon energization of solenoid 22, the core 28 will be drawn into the solenoid, thus causing the pin 30 to carry the sliding door D with it. The door is normally closed by means of a bent wire spring 34, the configuration of which is best shown in Fig. 2, one end of the spring being stationarily secured to the car body at 36, and the other end being looped within the lug 32 previously referred to. This spring also functions to normally move solenoid core 28 out of the solenoid to the extended position shown in Figs. 2, 3 and 4.

Solenoid 22 not only opens the door, but also operates the ejector 12. For this purpose, pin 30 on core 28 engages the downwardly turned end 40 (Fig. 4) of a link 42, said link being pivotally connected to an arm 44 (Fig. 3) at the point 46. Arm 44 is formed integrally with an arm 48 car-

rying the ejector 12. Arms 44 and 48 constitute an angle lever which is pivotally mounted at 50 on the stationary frame 24, previously referred to. Comparison of Figs. 3 and 5 will show how movement toward the left of link 42 causes a clockwise oscillation of arm 48 with consequent ejection movement of pusher 12.

It is important that the door be open before the pellet is ejected or, in other words, that the operation of the ejector be delayed relative to the operation of the door. In the present case, this is accomplished by a lost motion connection which is established by reason of core 28 being freely slidable through the depending part 40 of link 42, until the pin 30 on core 28 reaches the part 40. When pin 30 thus reaches the part 40, the core 28 has been moved out of the path of pellet 16 and has moved the door D with it, so that the door is sufficiently open for discharge of the pellet. Continued movement of solenoid core 28 opens the door somewhat further as the pellet is being ejected, but this additional movement is comparatively small in amount. One advantage of the present arrangement is that the door constitutes a light and comparatively negligible load on the solenoid core. Hence, the core acquires momentum and then actuates the ejector mechanism with a forcible blow which insures a flying discharge of the pellet. This adds to the realism and amusement value of the toy.

As so far described, the mechanism is adapted to eject only a single pellet. However, I additionally provide an inclined chute or support 52 which constitutes a magazine for supporting a series of pellets 54. The pellets tend to move down the chute 52 until the lowermost pellet is deposited at ejector 12. It is limited against further movement by the downturned end 56 of arm 48.

Referring to Figs. 3 and 5, it will be seen that ejector 12 is provided with an outwardly extending retainer means 58, this functioning to hold the pellets 54 against downward movement during the ejection of the lowermost pellet 16, and until the ejector returns from the solid line position, shown in Fig. 5, to the broken line position, at which time the pellets move downwardly until the lowermost pellet is again deposited in position for subsequent discharge.

The pellets may be loaded into the magazine by means of a special door 60, best shown in Fig. 2. This door is located near the upper end of the chute and may be opened from the solid line position shown in Fig. 2, to the broken line position 60', at which time the pellets are readily loaded into the magazine.

While the structural details of the car may be varied widely, it may be of interest to point out some of the features which go to minimize the number of parts. The chassis G is formed out of a single piece of sheet metal 62 having its ends 64 and sides 66 turned downwardly, the sides receiving the car axles 68 and wheels 70. Suitable couplers 72 are provided, these being pivotally mounted on the chassis in convenient fashion and passing through slots in end walls 64, in order to support the same in desired position. One of the side flanges 66, preferably that opposite the door D, carries the contact shoe C. This consists of a single piece of springy metal, such as phosphor bronze, the lower part of which is curved to slide readily onto the ramp R, and the upper part of which is bent to upright position and eyeletted to a piece of insulation 74 (Fig. 4), which in turn is secured to the chassis at 76. An insulated conductor 78 leads from contact shoe C to one end of the solenoid winding. The opposite end of the solenoid winding is grounded to the chassis.

The chute 52 is formed of a single piece of metal having its sides turned upwardly at 80. It is supported at its elevated end by a channel shaped upright 82 which is preferably formed integrally with chute 52. The lower end of upright 82 is secured to the chassis by appropriate tongue and slot connections. The lower end of the chute is extended to form a platform or slide surface 84, and this is downwardly flanged at its side edges and is secured to the chassis by bent tongue and slot connections. The pellet which is to be discharged rests on the slide surface 84, and the latter is preferably extended sidewardly to a point near the door D, as will be clearly seen in Figs. 3, 5 and 7. The slide surface 84, the chute 52 and the support 82 are all preferably formed of a single piece of metal.

The ejector 12, retainer 58, stop surface 56, arm 48 and arm 44 are all formed of a single piece of metal. This piece of metal is also provided with a projection 86 (Figs. 3 and 5) which receives one end of the compression spring 14. The ejector is pivotally mounted on inverted U-frame 24 previously referred to, and this frame also functions to hold the solenoid 22. The frame is provided with a projection 88 (Figs. 3 and 5) which receives the other end of spring 14.

The car body is preferably made of a single piece of sheet metal which is drawn and appropriately folded to form the desired top, side and end walls. This car body is secured to the chassis by appropriately bent tongue and slot connections. The car body carries the doors D and 60 which are, of course, made of separate pieces of sheet metal. The return spring 34 for door D is mounted on and forms a part of the car body. The body is readily assembled with the chassis, the only parts which need be connected during the assembly being the pin 30 of solenoid core 28 and the lug 32 of door D.

The wiring of the system is extremely simple and probably requires no detailed description, but for the sake of completeness is shown in Fig. 8. The solenoid is indicated at 22, and one end is grounded to the chassis and consequently to the wheels 70 and service rails 90. The other end of solenoid 22 is connected to the contact shoe C which is adapted to ride on the ramp R. The latter is connected to a suitable conductor 92 and to a remote switch S which is preferably of the push button type. The opposite terminal of the switch is connected by means of a wire 94 to a suitable power source, in this case a conventional step-down transformer 96. The transformer is provided with a pair of terminals, the potential on which is varied by means of a speed control handle 98. These are the upper terminals in Fig. 8 which are connected to service rails 90 and power rail 100. The transformer is also provided with constant potential terminals which, in this case, are the lower terminals. One of these terminals receives the wire 94. The only precaution which need be taken is that both circuits should have a common ground. In other words, if at any one instant the terminal connected to power rail 100 is considered positive, then the conductor 94 should be connected to a corresponding positive terminal, so that the service rails may act as a common negative return for both circuits. These step-down transformers are commonly wired to insure proper con-

nections as, for example, by connecting two of the terminals together, or by only providing three terminals in all.

It is believed that the construction and operation, as well as the many advantages of my improved toy railway car, will be apparent from the foregoing detailed description thereof. The car is preliminarily loaded with a supply of pellets or simulated packages or pouches. As the train runs around the track nothing will happen unless the switch S is closed. If switch S is closed, then when the car passes the ramp station, the door opens and a pellet is ejected. If the switch is held closed another pellet will be ejected each time the car passes the ramp station. If desired, the car may be stopped at the ramp while the switch is open. The switch may then be depressed to eject the pellet. By depressing the switch button a number of times, a series of pellets may be ejected during the one stop. The track may be provided with a number of ramp stations, in which case a pellet may be ejected at each station as the train runs around the track.

It will be apparent that while I have shown and described my invention in a preferred form, many changes and modifications may be made in the structure disclosed without departing from the spirit of the invention defined in the following claims.

I claim:

1. A toy railway car comprising a generally enclosed toy car body mounted on axles and flanged wheels for operation over a toy railroad track, a sloping support for a series of objects in said car body, an ejector at the lower end of the support at the bottom of the car body, said ejector being movable transversely of said car body in a direction parallel to the bottom of the car, and said support extending transversely of the path of the ejector, the upper end of said support terminating at the top of the car body, a loading door at the top of the car body and support, said objects when disposed on said support tending to move gravitationally toward the ejector, the movement of said objects being arrested by the lowermost object, and driving means connected to the ejector for operating the ejector to forcibly eject the lowermost object sidewardly from the car, the aforesaid support arrangement being such that the ejector may be operated repeatedly in order to eject the series of objects in succession.

2. A toy railway car comprising a wheeled car body, an inclined chute or support in said car body for a series of objects, said objects when disposed on said chute tending to move gravitationally to the lower end of the chute, an ejector movable transversely of the car at the lower end of the chute in a direction parallel to the bottom of the car, a door at the side of the car body at the lower end of the chute, the lowermost object being disposed between the ejector and the door, linkage, and a repeatedly operable power means to actuate said linkage carried by said car, said linkage operatively interconnecting the power means and the ejector and the door, whereby said power means functions to open said door and to operate the ejector to forcibly eject the lowermost object sidewardly from the car.

3. A toy railway car comprising a wheeled car body, an inclined chute or support in said car body for a series of objects, said objects when disposed on said chute tending to move gravitationally to the lower end of the chute, an ejector movable transversely of the car at the lower end of the chute in a direction parallel to the bottom of the car, a sliding door at the side of the car body at the lower end of the chute, the lowermost object being disposed between the ejector and the door, a repeatedly operable drive means connected to said door and ejector for opening said door and operating the ejector to eject the lowermost object through the opened doorway, and an additional means operatively connected with and movable in timed relation to the ejector for retaining the remaining objects in position on the chute until after the ejector has returned to initial position, whereby the ejector may be operated repeatedly to eject the series of objects in succession.

4. A toy railway car comprising a generally enclosed toy car body mounted on axles and flanged wheels for operation over a toy railroad track, a sloping chute or support for a series of objects in said car body, said objects when disposed on said chute tending to move gravitationally to the lower end of the chute, an ejector at the lower end of the chute, said ejector being movable transversely of said car body in a direction parallel to the bottom of the car, and said chute extending transversely of the path of the ejector, the upper end of said support terminating at the top of the car body, a loading door at the top of the car body and support, a solenoid and core in said car, and linkage operatively connected between said core and ejector and so arranged that operation of the solenoid causes the ejector to move transversely of the car and so to forcibly eject the lowermost object sidewardly out of the car.

5. A toy railway system comprising a generally enclosed toy car body mounted on axles and flanged wheels for operation over a toy railroad track, a sloping chute or support for a series of objects in said car body, said objects when disposed on said chute tending to move gravitationally to the lower end of the chute, an ejector at the lower end of the chute, said ejector being movable transversely of said car body in a direction parallel to the bottom of the car, and said chute extending transversely of the path of the ejector, the upper end of said support terminating at the top of the car body, a loading door at the top of the car body and support, a door at the side of the car body near the lower end of the chute, a solenoid and core in said car, and linkage operatively connecting said solenoid core to said ejector and said door that each operation of the solenoid opens the door and causes the ejector to eject the lowermost object, a ramp or extra power rail associated with the track of the toy railroad, a power supply source, an electric circuit switch whereby said ramp may be energized from the source when desired, and a contact shoe on said car adapted to engage said power rail in order to energize the solenoid when the power rail is energized.

6. A toy railway car comprising a wheeled car body, a chute or support in said car body for a series of objects, said objects when disposed on said chute tending to move to the lower end of the chute, an ejector at the lower end of the chute, a sliding door at the side of the car body at the lower end of the chute, a solenoid extending longitudinally of the car body, a solenoid plunger normally projecting out of said solenoid along the inner side of said door, a pin connect-

ing said plunger with said door, a link operatively connected to said ejector and having a part disposed in the path of said pin on the plunger part way between the terminal positions of the pin, said link being moved by the pin after the plunger has been drawn into the solenoid far enough to at least partially open the sliding door, thereby clearing the plunger and the door from the path of the ejector, the continued movement of the plunger causing movement of the link and the ejector to eject the lowermost object through the then opened side of the car, retainer means to hold the other objects in position until the ejector returns, and an auxiliary door near the upper end of the chute for loading the chute with objects.

7. A toy railway car comprising a wheeled car body, a chute or support in said car body for a series of objects, said objects when disposed on said chute tending to move to the lower end of the chute, an ejector at the lower end of the chute, a sliding door at the side of the car body at the lower end of the chute, a solenoid extending longitudinally of the car body, a solenoid plunger normally projecting out of said solenoid along the inner side of said door, a pin connecting said plunger with said door, a link operatively connected to said ejector and having a part disposed in the path of said pin on the plunger part way between the terminal positions of the pin, said link being moved by the pin after the plunger has been drawn into the solenoid far enough to at least partially open the sliding door, thereby clearing the plunger and the door from the path of the ejector, the continued movement of the plunger causing movement of the link and the ejector to eject the lowermost object through the then opened side of the car.

8. A toy railway car comprising a wheeled car body having a flat bottom disposed over the wheels, a sliding door at the middle of the side wall of the car body, a sloping chute or support in one end of said car body, the lower end of said chute being disposed adjacent the door, and the upper end of said chute being disposed near the top of the car body at one end, an auxiliary door at the upper end of the chute for loading said chute with a series of objects, said objects tending to move gravitationally to the lower end of the chute, an ejector at the lower end of the chute, said ejector being movable transversely of the car, the other end of the car body being left open to receive ejector operating mechanism, and an ejector operating mechanism including a solenoid disposed in the latter end of the car body above the bottom of the car body, a solenoid plunger normally projecting out of said solenoid, linkage connecting said plunger and side door, said linkage being connected to said ejector with a lost-motion connection, thereby clearing the door from the path of the ejector before the continued movement of the plunger causes movement of the ejector to eject the lower-most object through the then-opened side of the car.

9. A toy railway car comprising a wheeled car body having a bottom disposed over the wheels, a sliding door at the middle of the side wall of the car body, a sloping chute or support in said car body at one side of the door, the lower end of said chute being disposed adjacent the door, and the upper end of said chute being disposed near the top of the car body at one end, an auxiliary door at the upper end of the chute for loading said chute with a series of objects which rest simultaneously on the chute, said objects tending to move gravitationally to the lower end of the chute, an ejector at the lower end of the chute, said ejector being movable transversely of the car, a retainer on said ejector movable in front of the next lowermost object as the lowermost object is moved by the ejector, a solenoid disposed in the other end of the car body from the chute above the bottom of the car body, a solenoid plunger normally projecting out of said solenoid, and linkage connecting said plunger and side door, said linkage being connected to said ejector with a lost-motion connection, thereby clearing the door from the path of the ejector, the continued movement of the plunger causing movement of the ejector to eject the lowermost object through the then-opened side of the car, the remaining objects on the chute being held against downward movement by the aforesaid retainer until the ejector has moved back to initial position, whereupon the objects move downwardly to bring the lowermost object in front of the ejector preparatory to the next operation of the ejector.

10. A toy railway car comprising a wheeled car body having a bottom disposed over the wheels, a sliding door at the middle of the side wall of the car body, a sloping chute or support in said car body at one side of the door, the lower end of said chute being disposed adjacent the door, and the upper end of said chute being disposed near the top of the car body at one end, an auxiliary door at the upper end of the chute for loading said chute with a series of objects which rest simultaneously on the chute, said objects tending to move gravitationally to the lower end of the chute, an ejector at the lower end of the chute and sliding door, said ejector being movable transversely of the car, a retainer on said ejector movable in front of the next lowermost object as the lowermost object is moved by the ejector, a solenoid disposed longitudinally of said car body in the other end of the car body from the chute above the bottom of the car body, a solenoid plunger normally projecting out of said solenoid along the inner side of the door, a pin connecting said plunger with said door, linkage connected to the ejector disposed in the solenoid end of the car body and having a part disposed in the path of said pin on the plunger partway between the terminal positions of the pin, said linkage being moved by the pin after the plunger has been drawn into the solenoid far enough to at least partially open the sliding door, thereby clearing the plunger and the door from the path of the ejector, the continued movement of the plunger causing movement of the linkage and the ejector to eject the lowermost object through the then-opened side of the car, the remaining objects on the chute being held against downward movement by the aforesaid retainer until the ejector has moved back to initial position, whereupon the objects move downwardly to bring the lowermost object in front of the ejector preparatory to the next operation of the ejector.

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