Aug. 29, 1944. R. G. SMITH 2,356,895

DISCHARGE AND PICKUP APPARATUS FOR TRAVELING TOY RAILWAY CARS

Filed Feb. 24, 1941 2 Sheets-Sheet 1

Fig. 1

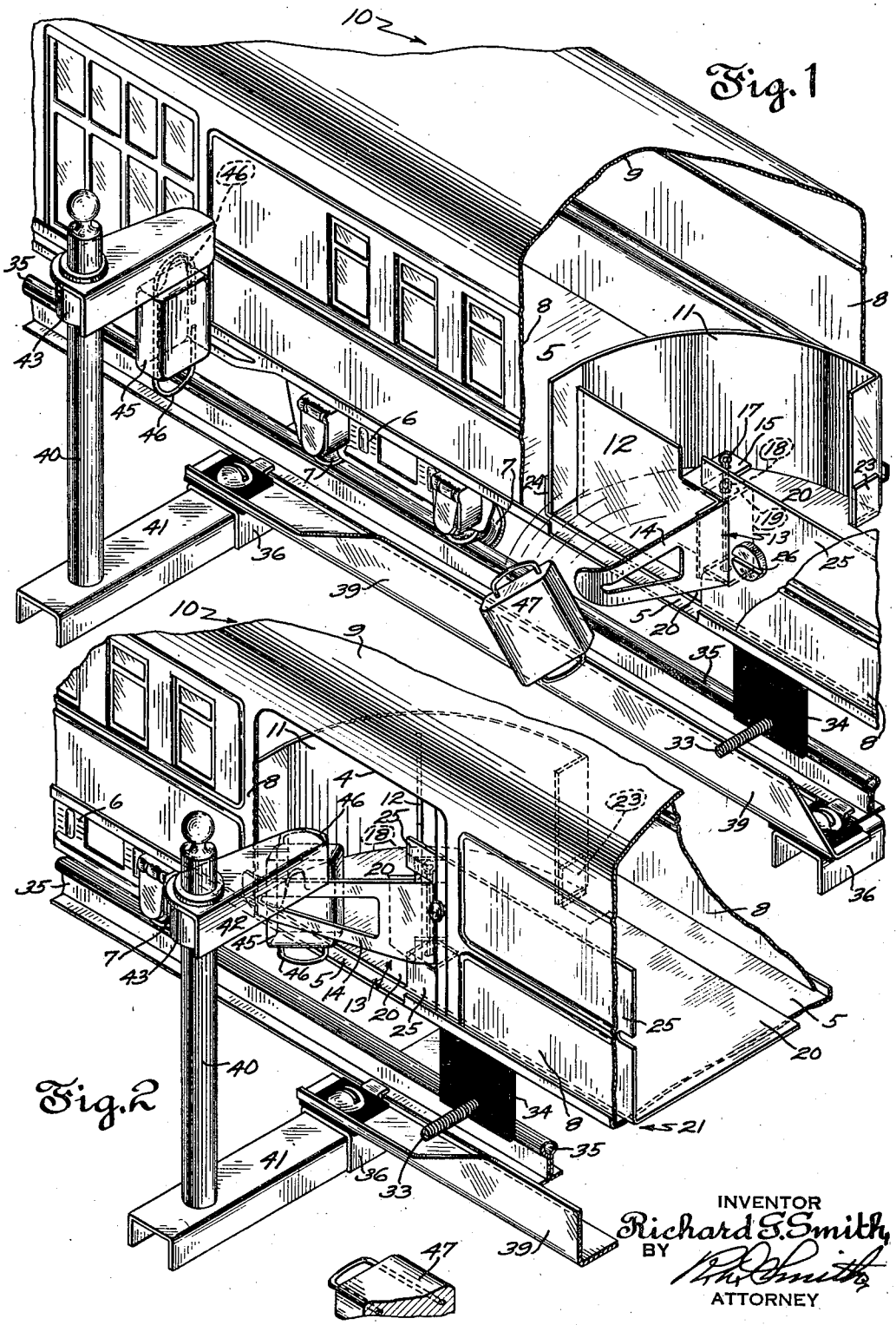


Fig. 2

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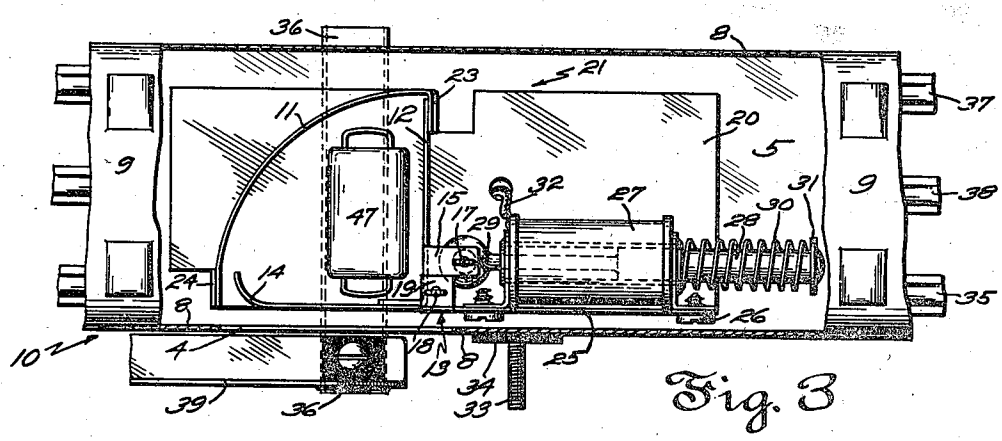


Fig. 3

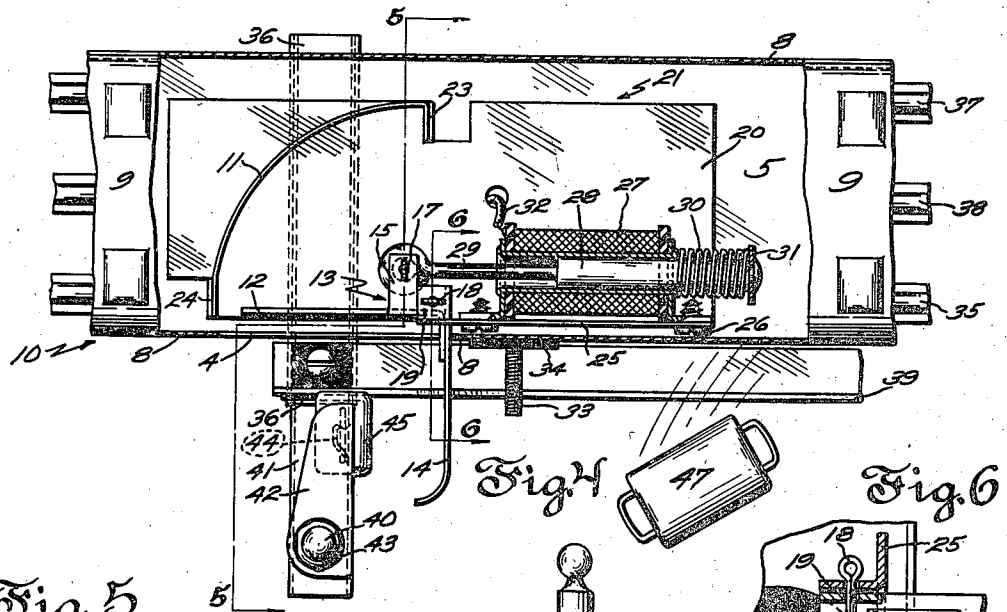


Fig. 4

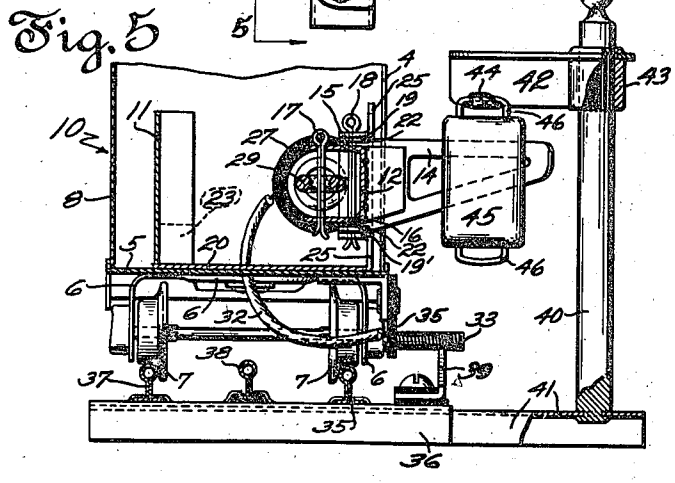


Fig. 5

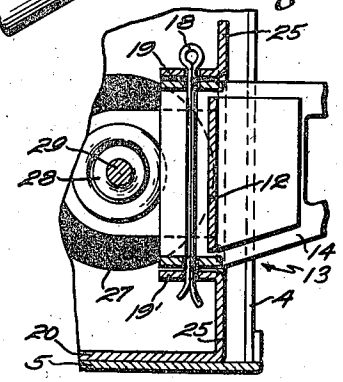


Fig. 6

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2,356,895

DISCHARGE AND PICKUP APPARATUS FOR TRAVELING TOY RAILWAY CARS

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Application February 24, 1941, Serial No. 380,340

19 Claims. (Cl. 258—6)

This invention relates to toy mail or baggage cars that are self-loading and self-unloading while traveling along a toy track as part of a toy train.

Toy mail cars equipped with a projecting arm adapted to scoop off from a track-side supporting structure some loadable toy article, simulating for instance a full mail bag, have heretofore been known in the art. Also, mail ejecting as well as mail pick-up apparatus adapted to operate without stopping the train is commonly used in real railroad operation but only in forms of apparatus and mechanism which are far too complicated to be duplicated in miniature size for use in toy trains.

An object of this invention is to equip a toy mail car or baggage car with an extremely simple and reliably operating device capable of automatically discharging from such car while the car travels along its track an unloadable article representing say a mail bag, and instantly thereafter automatically picking off from some track-side stationary means of support a different or loadable toy article or mail bag and whisking the latter into the interior of the car in place of the mail bag which just previously has been ejected, all while the car continues its full speed of travel.

A further object is so to simplify a toy working mechanism for this purpose that it may make use of the same movable structure, carried by the toy car, both for discharging the first mail bag and for taking on the second or different mail bag as described.

A further object is to produce the above described functions of automatic mail bag discharge and pick-up preferably under the optional control of the operator of the electric toy railway system and preferably by means of an electrical controller which may be stationed remotely from the point in the track system at which the automatic exchange of toy mail bags is to take place.

A further object is to orient the toy mail bag when taken into the toy mail car in such manner that this same mail bag subsequently may automatically be ejected at the same or at some other mail exchange station when the toy train next passes such station.

A still further object is to produce automatic movement of a toy mail bag actuator relative to the car by which it is carried, and then to combine such relative movement coordinately with the travel of the car as a means of scooping off and transferring to the interior of the mail car that toy mail bag or other article which is presented to the toy train by the track-side article support.

These and other objects of the invention will be more clearly understood from the following description of a preferred embodiment of the invention in which description reference is made to the accompanying drawings, wherein:

Fig. 1 is an isometric view of a portion of a toy mail car carrying mail bag exchange apparatus incorporating the present improvements, together with sections of a toy railroad track and a track-side standpost.

Fig. 2 shows the take-on arm of the apparatus in Fig. 1 arrived at and acting on the post supported mail bag.

Fig. 3 is a plan view of the parts appearing in Fig. 1 with roof of the mail car broken away showing the toy mail bag in its compartment in the traveling car about to be automatically discharged therefrom at the track-side.

Fig. 4 is similar to Fig. 3 showing the mail bag of Fig. 3 ejected from the car and showing the exchange mechanism as it is positioned just before engaging with the post supported mail bag which is next to be taken into the mail car.

Fig. 5 is a fragmentary view taken in section on the planes 5—5—5 in Fig. 4 looking in the direction of the arrows.

Fig. 6 is a fragmentary view showing the hinge construction of Fig. 5 enlarged and in section on plane 6—6 in Fig. 4.

The chassis including floor 5 of toy car 10 rides on trucks, as 6, and supports a hollow car body having a roof 9 and fashioned to resemble a mail car or baggage car of a real railroad train. Car side 8 contains an aperture 4 likened to the doorway of a mail car just inside of which a segmental article storing or article repository compartment is walled partly about or bordered by structure including the fixed upright arcuately curved partition 11 which assists in orienting the car carried toy article or insuring its retention in position to be discharged automatically from the car. Remaining sides of this compartment are walled off in Fig. 3 by the angularly related panel forming vanes or arms of a swingable bell crank structure 13, comprising an oscillatory device of unitary nature one of whose arms 14, hereinafter sometimes referred to as the take-on arm, is given a hook-like formation and is rigid with the swingable gate-like vane 12 which sweeps back and forth crosswise of the car over floor 5 between its positions in Figs. 3 and 4. Both arm 14 and vane 12 may be made from thin, light weight, sheet material. Vane 12 further is

provided with spaced upper and lower back-turned ears 15, 16, carrying a vertical crank pin 17. The bell crank structure or double armed gate 13 swings freely on a vertical hinge pin 18 by means of hinge lugs 22, 22 turned over from the metal of arm 14 and this pin is held jointly in an upper flange 19 and in a flange 19' spaced therebelow on a mechanism frame 21 which has its base 20 fixed to the chassis or floor 5 of the mail car. This establishes a vertical pivotal bearing axis about which the oscillatory device or bell crank structure is swingable as a unit. Frame 21 further includes two holding tabs 23 and 24 bent up from base plate 20 to which tabs the curved partition 11 is spot welded or otherwise fixed. Mechanism frame 21 further has the upright side wall 25 which carries the above mentioned flanges 19, 19'. On this side wall is mounted by screws 26 an electromagnet which may take the form of a solenoid 27 having the usual hollow core in which freely slides horizontally a magnet plunger 28. A connecting rod 29 whose looped end loosely and pivotally engages with crank pin 17 may be fixed in plunger 28 to slide longitudinally therewith. A spring 30 loosely coiled about plunger 28 is compressed between the end of the solenoid and a thrust washer 31 retained on the end of plunger 28 by peaning over the reduced terminal portion of the plunger. Spring 30 constantly urges plunger 28 toward the right into its normal position shown in Fig. 3 whenever solenoid 27 is electrically deenergized. The insulated winding of conductive wire of the solenoid terminates at one end in a lead 32 which connects electrically with a "cat's whisker" 33, or flexible current collector "shoe," projecting sidewise from the car at a low point and insulated from all metallic structure of the car by a mounting plate 34 of insulating material. The other end of the solenoid winding is grounded to the car chassis 5 and therefore is constantly in electrical connection through wheels 7 with the traction rail 35 which in usual manner may be supported upon sleepers 36.

In Figs. 3, 4 and 5, 37 represents the opposite traction rail or power rail of a two track electric track, while 38 represents the "third" rail or power rail, of a three-rail toy track system. It will be understood that traction rail 35 connects to the negative or return circuit binding post of a battery or toy transformer (not shown) so that a fourth rail or auxiliary rail 39 may be provided at the track side in insulated relation to rail 35 in position to be momentarily contacted by the cat's whisker or current collector shoe 33 just as the toy mail car approaches stand post 40 which is stationed beside the track.

This stand post may be held upright by riveting its lower end to a channel iron 41 which is nested in and projects beyond one of the sleepers 36. A bracket 42 is carried in an elevated position on post 40 in the form of an angle bar provided with the mounting hub 43 which is assembled rigidly with post 40 by being pressed tightly onto a section of the latter roughened by knurling. Bracket 42 carries a tongue 44 which will preferably be given an upward tilt and from which is suspended a toy mail bag 45 having loops 46 fixed in its ends for this purpose. Thus constructed the stand post and bracket may be referred to as a track-side article let-off support or rest.

In operation a toy train will be impelled along the track incorporating a mail car such as 10 containing a "mail bag" as shown in Fig. 3. Shortly before reaching the stand post 40, "cat's whisker" 33 rides into contact with the top edge of fourth rail 39 and thereby energizes solenoid 27 drawing plunger 28 and thrust rod 29 smartly to the left. This swings the bell crank or double armed gate 13 counterclockwise in Figs. 1 and 4. In this movement of the gate, ejector vane or article unloader 12 discharges mail bag 47 through the doorway 4 in the side of the mail car and onto the "ground" or table top alongside the fourth or auxiliary power rail 39 as indicated in Fig. 4. Immediately thereafter take-on or article loader arm 14 of gate 13, riding with the mail car, advances into engagement with the toy mail bag 45 which is suspended from bracket 42 and sweeps the latter forward and abruptly inward toward the car whereby the mail bag is whisked into the interior of the mail car through doorway 4 and is penned in its position shown in Fig. 3 by the partition 11 and arms 12, 14 of gate 13. Arm 14 then forms a barrier across the doorway preventing the loaded mail bag from falling out of the car and the two crank arms 12, 13 then straddle the loaded article at the same time cooperating with partition 11 to more fully enclose the article containing compartment. This loading action results at least in part from the sudden deenergization of solenoid 27 when cat's whisker 33 runs off from the end of the short length of auxiliary rail 39 thus causing deenergization of the solenoid and permitting spring 30 instantaneously to snap the bell crank structure 13 clockwise from its position in Fig. 4 to its position in Fig. 3 just as hook 14 contacts with the mail bag 45 which is to be taken off from post 40. It will help to make clear that different mail bags have actually been exchanged if the imitative toy bag bodies 45 and 47 are colored to contrast or made of radically different shape or size so that the unloaded bag or article may readily be distinguished from the bag or article to be loaded. Otherwise the discharge and pick up actions may be so rapid as to defeat ability of the eye to follow the actual bag exchanging movements when the train is traveling relatively fast.

Inward swing of gate 13 may be limited by the engagement of vane 12 with 23. Outward swing of said gate may be limited by the engagement of take-on arm 14 with the vertical edge of doorway 4. Or suitable stops may otherwise be provided as desired.

For an example of a suitable electrical wiring diagram and of a suitable remote electric control system which may be employed with the structures of these improvements, reference may be had to my copending application Serial No. 337,625, filed May 28, 1940, wherein counterparts of the herein disclosed auxiliary rail 39 and cat's whisker 33 will be observed. It will suffice here to mention that auxiliary rail 39 is designed to be manually switched into or out of circuit with the positive binding post of the before mentioned battery or toy transformer shown in the said copending application to whose negative terminal is connected the traction rail 35. Thus at some remote point it may be determined upon what occasions the contacting of current collector 33 with auxiliary rail 39 will or will not cause the described automatic mail bag exchanging performance.

There is thus provided horizontally swinging article motivating instrumentalities in a system of apparatus which automatically determines the

sequence and timing of unloading and loading operations in accordance with the distance of the car from the track-side rest 42.

The appended claims are intended to cover all substitutes and equivalents for the exact constructions and arrangements herein shown which fairly come within the language of the claims:

I claim:

1. Load article exchanging mechanism for a toy railway car embodying the combination of, compartment forming structure within said car, a car doorway above the floor of said compartment giving access to the latter, and a two-armed gate pivotally anchored on said car near one side of said doorway and swingable between positions in which first one arm and then the other arm of said gate extends crosswise said doorway.

2. Load article exchanging mechanism as defined in claim 1, in which one of the said gate arms swings from a position occupying said doorway to a position within the said car forming an angle with said doorway.

3. Load article exchanging mechanism as defined in claim 1, in which one of the said gate arms cooperates with the said structure to more fully enclose the said compartment.

4. Load article exchanging mechanism as defined in claim 1, in which both of the said gate arms cooperate with the said structure to more fully enclose the said compartment.

5. Load article exchanging mechanism as defined in claim 1, in which one of the said gate arms sweeps transversely of the said car along the floor of the said compartment toward the said doorway thereby to eject from said compartment through the said doorway any unloadable contents of said compartment.

6. Load article exchanging mechanism as defined in claim 1, in which one of the said gate arms possesses a hook-like formation and swings from a position projecting outward from said car to a position occupying the said doorway.

7. Load article exchanging mechanism as defined in claim 1, in which one of the said gate arms sweeps transversely of the said car along the floor of said compartment toward the said doorway thereby to eject a toy article to be unloaded from said compartment through said doorway, and in which the other of said gate arms swings from a position projecting outward from said car toward a position occupying said doorway thereby to scoop into said compartment through said doorway a different toy article to be loaded into said compartment.

8. In automatic load article handling mechanism for a toy mail car, the combination of an upright arcuately curved partition stationed inside of said car, perpendicularly related upright movable panels joined together to comprise an integral structure co-acting with said partition to define and enclose a segmental pen-like space, and hinge structure pivotally supporting said structure in swingable relation to said car.

9. In automatic article handling mechanism for a toy mail car, the combination defined in claim 8, together with a crank pin carried by the said integral structure, and automatically actuated means connected to push and pull on said crank pin for swinging said structure in relation to the said stationary curved partition.

10. In automatic article handling mechanism for a toy mail car, the combination defined in claim 8, together with a crank pin carried by the said integral structure, and an electromagnet having an armature connected to push and pull on said crank pin for swinging said structure in relation to the said stationary curved partition.

11. An electrically operated article loading and unloading system for toy railroads, including the combination of, an electrified toy track, a toy car impellable along said track, an article unloader movably mounted on said car to swing about a vertical axis, an article loader movably mounted on said car to swing about said vertical axis, a track side article let-off support, an auxiliary electrical power rail of limited length paralleling the track in the vicinity of said support and insulated from said track, a solenoid carried by said car having a horizontally movable plunger mechanically connected to swing said unloader when electrically energized for discharging an article from said car, a spring mechanically associated with said plunger in a manner to be permitted to swing said loader when said solenoid is deenergized for transferring a load article from said support to said car, a circuit including said solenoid and track and power rail, and a current collector included in said circuit carried by said car in position to wipe into and out of engagement with said power rail thereby to cause said unloader and loader to be operated sequentially by said solenoid plunger and spring.

12. Devices for automatically unloading and loading toy articles with respect to a traveling toy railroad car, including in combination with said car, a plurality of load simulating toy articles, an article storing compartment in said car, a toy track along which said car is impelled, a rest stationed to support a load article in releasable manner in a position near said track, and article motivating instrumentalities carried at least in part by said car constructed and arranged to swing horizontally about a common vertically extending pivot in a manner to eject from said car an article contained in said compartment and also to scoop said loadable article away from said rest into said car as the latter approaches and passes said rest.

13. Devices for automatically unloading and loading toy articles with respect to a traveling toy railroad car as defined in claim 12, together with an electric solenoid having a horizontally movable plunger connected to cause the said horizontal swinging of the said motivating instrumentalities relative to the said toy car in one direction, a spring urging said instrumentalities to swing in the opposite direction, and an electrical circuit including said solenoid connected to be energized and deenergized by the travel of said car past predetermined points spaced along said track in the vicinity of the said stationary rest thereby automatically to determine the sequence and timing of the unloading and loading operations of said instrumentalities in accordance with the distance of said traveling car from said rest.

14. Devices for automatically unloading and loading toy articles with respect to a traveling toy railroad car, including in combination with said car, a plurality of load simulating toy articles, an article storing compartment fixedly stationed in said car, a toy track along which said car is impelled, a rest stationed to support a load article in releasable manner in a position near said track, and article motivating instrumentalities carried at least in part by said car constructed and arranged to swing horizontally

about a common vertically extending pivot relative to said compartment in a manner to eject from said car an article contained in said compartment and also to scoop said loadable article away from said rest into said car as the latter approaches and passes said rest.

15. Devices for automatically unloading and loading toy articles with respect to a traveling toy railroad car, including in combination with said car, a plurality of load simulating toy articles, an article storing compartment fixedly located in said car, a toy track along which said car is impelled, a rest stationed to support a loadable article in releasable manner in a position near said track, and article motivating instrumentalities carried at least in part by said car including a unitary bell-crank structure swingable horizontally about a single vertically extending pivot and having angularly related article engaging arms respectively operative upon a different one of said articles at respectively different times.

16. In a toy railway car having a repository receptive to loadable and unloadable toy articles, auxiliary equipment for automatically exchanging an unloadable toy article carried by the car for a loadable toy article taken from a trackside location while the car is traveling past said location, including in combination with article orienting means constructed and arranged to border on said repository and adapted to confine said toy articles to a fixed range of positions on said car, a pivotal bearing defining an axis of oscillation stationed on said car near said repository, and a toy article motivating oscillatory device supported to swing as a unit about said axis including both an ejecting instrumentality constructed and arranged to traverse said repository thereby to engage and discharge the unloadable article from said car when said device swings in one direction and a take-on instrumentality constructed and arranged to engage the loadable article at a trackside location and deliver the same into said repository on said car when said device swings in the other direction.

17. In a toy railway car, auxiliary equipment as defined in claim 16, in which the said car has a side wall containing a doorway close to the said pivotal bearing and article repository, and the said take-on instrumentality includes an arm swingable outward from and back to a position reaching substantially from side to side of said doorway shaped to scoop said loadable article from its trackside location through said doorway into the said repository and thereafter retain said article therein, together with a stop operative to arrest the swinging movement of said arm inward of said car when said arm reaches its said position.

18. In a toy railway car, auxiliary equipment as defined in claim 16, in which the said ejecting instrumentality and the said take-on instrumentality form branch arms respectively of the said unitary oscillatory structure united in fixed relation to each other at an angle nearer to ninety degrees than one hundred eighty degrees and arranged to straddle either of the said toy articles.

19. In a toy railway car, auxiliary equipment as defined in claim 16, in which the said article repository includes a compartment defined in part by the said article orienting means, and the said ejecting instrumentality and take-on instrumentality comprise respectively arms diverging in fixed angular relationship bordering on and defining dimensional limits for said compartment in at least one position of the said article motivating device.

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