Dec. 8, 1953 J. L. BONANNO 2,661,852

TOY ELECTRIC RAILROAD

Filed April 23, 1949 3 Sheets-Sheet 1

Fig. 1.

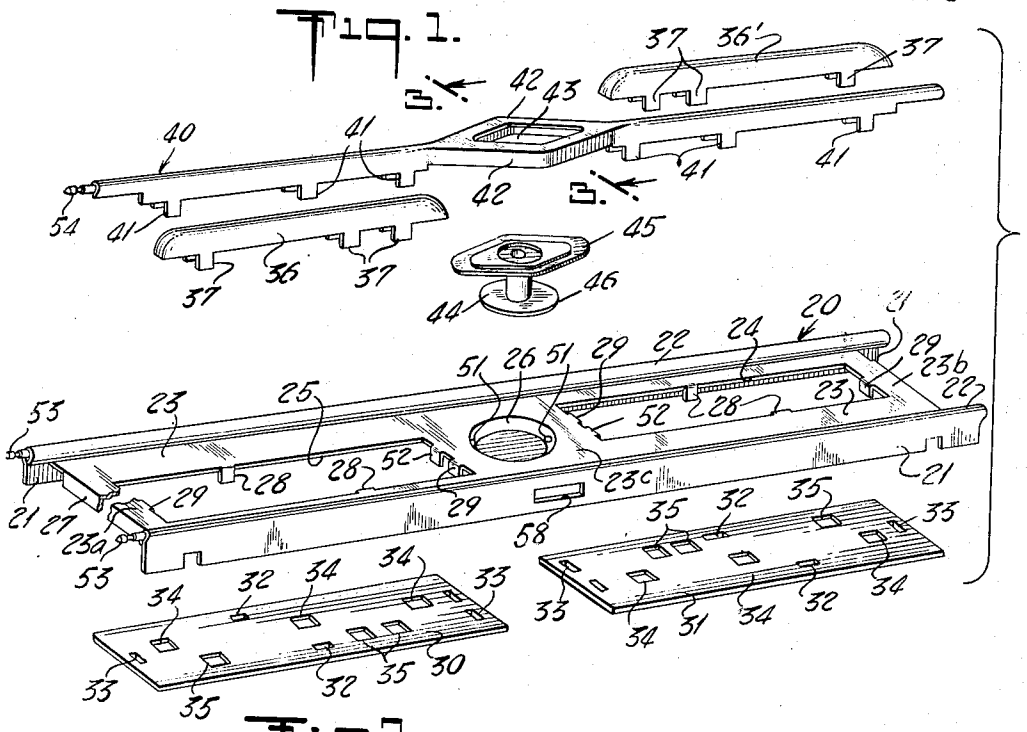


Fig. 2.

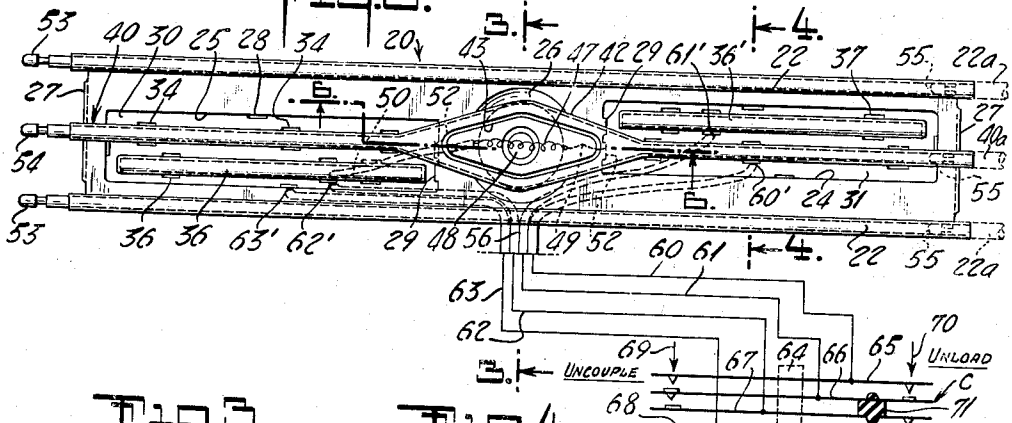


Fig. 3.

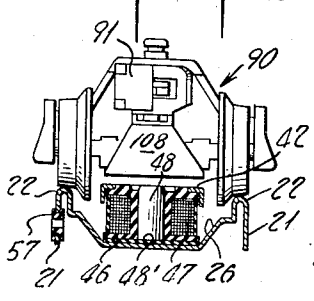


Fig. 4.

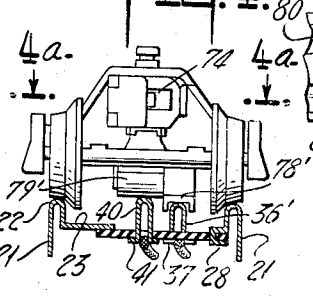
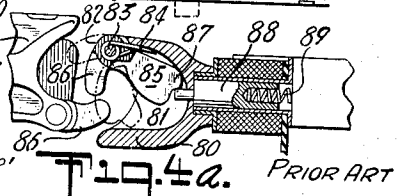


Fig. 4a.



PRIOR ART

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Filed April 23, 1949 3 Sheets-Sheet 2

Fig. 5.

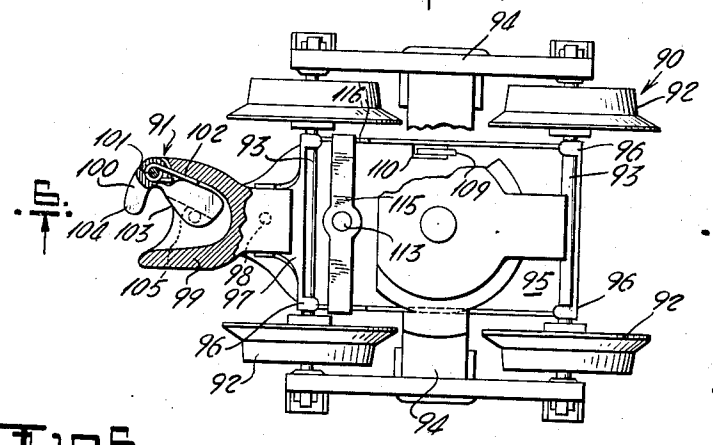


Fig. 6.

Fig. 7.

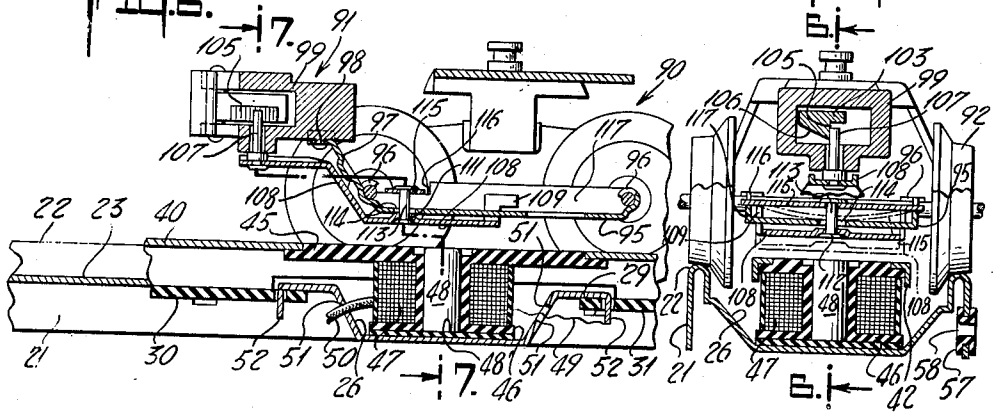
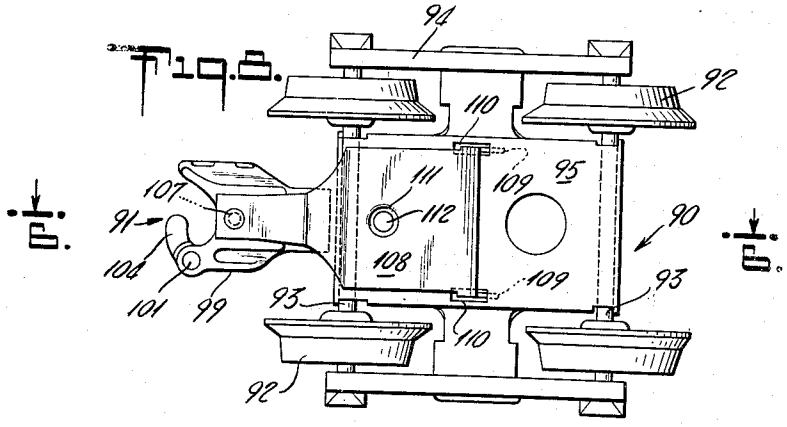


Fig. 8.



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TOY ELECTRIC RAILROAD

Filed April 23, 1949 3 Sheets-Sheet 3

Fig. 9.

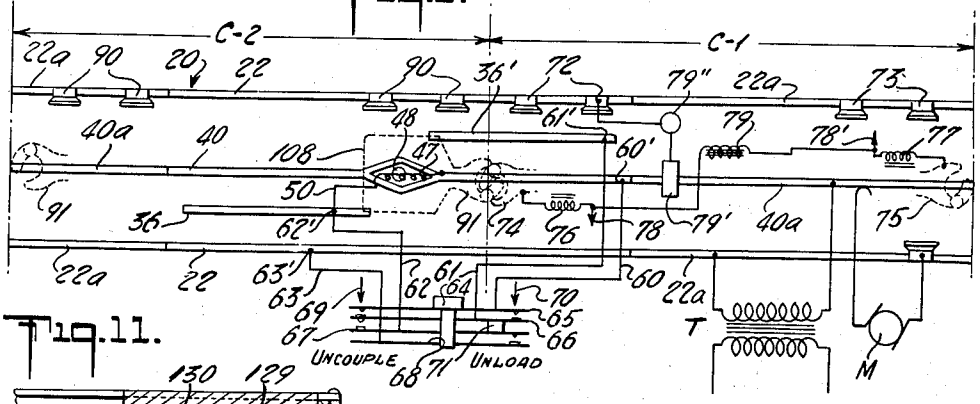


Fig. 11.

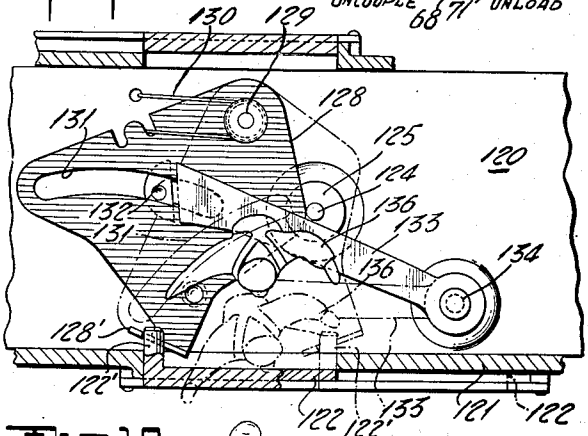


Fig. 13.

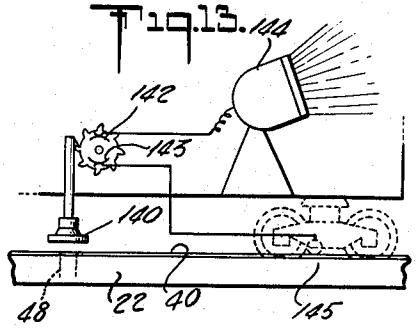


Fig. 10.

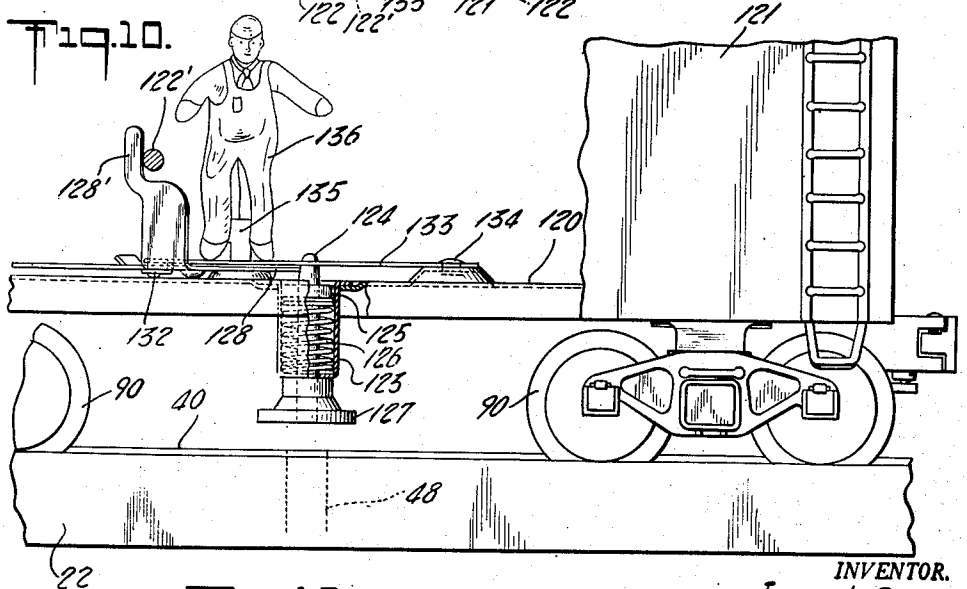


Fig. 12.



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TOY ELECTRIC RAILROAD

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Application April 23, 1949, Serial No. 89,290

14 Claims. (Cl. 213—212)

1

The present invention relates to toy electric railroads and is more particularly directed toward toy electric railroads having cars provided with remote controlled, electrically operated couplers and other accessories, trackage over which said cars may be operated and controls connected to such trackage.

Toy cars for toy electric railroads have heretofore employed couplers with truck carried electromagnetic releases and have been provided with truck carried electromagnetically operated accessory devices adapted to be selectively operated by remote control, as shown, for example, in my Patent No. 2,232,508, dated February 18, 1941; and more recently, as shown in pending application Ser. No. 710,355 filed November 16, 1946, knuckle type couplers have been developed for use on such toy electric railroad cars.

The present invention contemplates constructions in which the trackage is provided with a remote controlled electromagnet, and the cars are provided with latched couplers having armatures attractable by the track magnet for releasing the same and uncoupling the cars. Inasmuch as the cars of a toy train are interchangeable and may have either form of coupler, the armature released couplers adapted for track magnet control are made so as to be structurally cooperable with electromagnetic coupler (preferably of the knuckle type) both in coupling and uncoupling, and the trackage is made so that the same controls may be used for the various cars in the train irrespective of the type of coupler employed.

The present invention also contemplates that the cars with the track magnet operated automatic couplers may also have other accessories which may be actuated when the car carrying a suitably placed armature is brought to the proper position on the track so as to be over the track carried electromagnet.

According to the present invention a special section of track adapted to be substituted for the ordinary three track section having the usual power and wheel bearing rails is provided, this special track section having the wheel bearing rails, power rail, the supplemental rails for controlling the car carried electromagnetic couplers and accessories and the track electromagnet for actuating the train carried armatures for releasing the couplers, or other devices, and all these elements are interconnected with the remote control, whereby uncoupling may be effected irrespective of the type of car coupler employed and the car carried accessories may be actuated where cars so equipped are in use.

Other and further objects will appear hereinafter as the description proceeds.

The accompanying drawings show, for purposes of illustrating the present invention, one embodiment in which the invention may take form, together with modifications, it being understood that the drawings are illustrative of the invention rather than limiting the same.

2

In these drawings:

Figure 1 is an exploded perspective view illustrating the various parts employed in the track section;

Figure 2 is a top plan view of the completely assembled track section showing the wiring of the same to a remote control device;

Figure 3 is a cross sectional view on the line 3—3 of Figures 1 and 2 looking in the direction of the arrows, parts being in elevation and showing an end elevational view of the truck with armature operated coupler;

Figure 4 is a sectional view taken on the line 4—4 of Figure 2 and showing in elevation a knuckle type coupler adapted for electromagnetic operation by current furnished through a collector shoe cooperable with a supplemental rail.

Figure 4a is a fragmentary horizontal sectional view of such electromagnetically operated coupler taken on line 4a—4a of Figure 4;

Figure 5 is a top plan view of a toy truck having an armature releasable knuckle;

Figure 6 is a longitudinal sectional view on the lines 6—6 of Figures 2, 5, 7 and 8 looking in the direction of the arrows and showing the truck with armature releasable coupler on the track section and in position for operation;

Figure 7 is a vertical sectional view on the broken line 7—7 of Figure 6;

Figure 8 is an inverted plan view of the truck and coupler of Figure 6;

Figure 9 is a wiring diagram for toy track layout having the special track section and showing its use with cars with electromagnetic couplers and with armature released couplers;

Figure 10 is a side elevational view of a toy car with an accessory operable by the track magnet;

Figure 11 is a top plan view of the accessory;

Figure 12 is a perspective view of a detail; and

Figure 13 is a diagrammatic view of a modified form of track magnet operable accessory.

The track section and circuit

The special track section shown in the drawings as a sheet metal base generally indicated at 20 in the form of a sheet metal stamping of the proper length is to be used interchangeably with other standard toy track sections of the same gauge and track height. It has side walls 21, 21 which support it. These side walls are doubled back to form wheel bearing rails 22 extending the entire length of the section. The rails are interconnected by a platform portion 23 of the stamping at a level above the lower edges of the side elements 21. This platform portion has two elongated openings 24 and 25 displaced from the

center line of the track section, so as to leave three connecting webs 23*a*, 23*b*, 23*c*, a depressed well 26 in the center web 23*c* and downwardly bent end flanges 27. At the sides and ends of the openings 24 and 25 downwardly extending prongs 28, 29 are provided. This base stamping is adapted to support all track elements and wiring forming the completed track section.

Two insulating plates 30 and 31 slightly larger than the openings 24 and 25 are secured below the platform 23 of the base stamping by the prongs 28 and 29 which are passed through holes 32 and 33 on the sides and ends of the insulating plates. The plates 30 and 31 are each provided with three holes 34 so disposed as to be aligned with the center line of the track section when the insulating plates are in place as well as three aligned holes 35 so located as to be substantially midway between the track rails 22, 22 and the center line of the track section.

The holes 35 are employed to support supplemental rail elements indicated at 36 and 36', these rail elements being made of sheet metal and having three pairs of downwardly extending prongs 37 adapted to enter the holes 35 and be spread apart as indicated in Figure 4. The aligned openings 34 are employed to support a power rail indicated generally at 40. This power rail, made of sheet metal, has six pairs of downwardly extending prongs indicated at 41 which pass through the holes 34 in the insulating plates and are bent outwardly as shown in Figure 4. The central portion of the power rail element 40 is widened as indicated at 42, 42 so as to provide an aperture 43.

An insulating spool element 44 has an upper diamond-shaped end 45 stepped as indicated and adapted to be received in the opening 43 and a lower round end 46 adapted to be received in the well 26. This spool element carries a coil indicated at 47 and a core indicated at 48. The bottom of the core is insulated from the bottom of the well 26 by an insulating sheet indicated at 49'. Insulating the core makes it impossible for the collector roller of the locomotive to be grounded as it passes by or for the armature of the coupler or accessory to effect a short circuit should it contact the power rail. In assembling these parts the wound spool is inserted in place between the base member and the power rail member and held there when the prongs 41 are bent over as above described. The leads 49 and 50 for the coil 47 pass out through holes 51 in the side walls of the well 26 and the lead 49 is grounded to a downwardly bent prong 52 formed out of the base stamping 20. For symmetry of structure, two such prongs are provided in the stamping, but only one is used.

On the drawings the left ends of the track rails 22, 22 and the third or power rail 40 fixedly carry conducting pins 53 and 54 adapted to slidably enter sockets 55 provided at the other ends of the rails of cooperable sections of track so as to permit assembling the special track section into a toy track layout having the wheel bearing rails 22*a*, 22*a* and power rail 40*a* (see Fig. 9), thereby providing continuous trackage for train operation and connections for propulsion current. The trackage is connected to a transformer T in the usual manner so that propulsion current potential is imposed upon the third rail and track rails.

The special track section is provided with a four conductor cable 56 which extends out through a grommet 57 carried in an opening 58 at the center

of the track section as indicated. The conductor 60 is connected to the power rail by soldering it to one of the prongs 41 as indicated at 60', the conductor 61 is soldered to one of the prongs 37 carried by the supplemental rail 36' as indicated at 61'. The conductor 62 is soldered as indicated at 62' to one of the prongs 37 of the supplemental rail 36 and this prong is also soldered to the lead 50 for the coil 47. The fourth conductor 63 of the four conductor cable is soldered to one of the base carried prongs 28 as indicated at 63'. The four conductor cable 56 is connected to a controller indicated at C; this controller being the same as the one shown in my prior Patent No. 2,232,508 of February 18, 1941. It has a central insulating post 64 adapted to receive four contact strips or straps 65, 66, 67 and 68 connected to the wires 60, 61, 62 and 63 respectively. An uncoupling push button indicated at arrow 69 on the left of Figures 2 and 9 is adapted to bend the left-hand ends of the straps 65, 66 and 67 downwardly, bringing them all into contact. This connects the power rail 40 through the wire 60 and strip 65 to both the strips 66 and 67 and applies potential through lead 61 to the supplemental rail 36' and through the lead 62 to the supplemental rail 36 and the solenoid coil 47, and, as the latter is always grounded, energizes it.

Pushing the right or unloading button 70 on the controller down brings the strip 65 into contact with the strip 66, thereby applying power to the supplemental rail 36' and through an insulating spacer 71 forces the contact 67 into engagement with the grounded contact 68 so that the supplemental rail 36' is energized and rail 36 grounded.

The track section and controller illustrated in Figures 1 and 2 and shown with other parts in the other figures of the drawing form a complete article of manufacture ready for installation in a toy track layout. As above stated, the special track section herein is suitable for controlling not only toy cars of the type diagrammatically shown in my Patent No. 2,232,508, but also for controlling toy vehicles having armature operated accessories.

A toy car C–1 with a circuit of the prior art type is indicated at the right of Figure 9. It has trucks indicated at 72, 73 each carrying couplers 74, 75 actuated by coils 76 and 77 connected to the current collectors 78, 78' disposed so as to contact the supplemental rails 36 and 36' respectively when in proper position on the special section of track. The car C–1 also carries another electrically operated accessory 79 connected to the current collectors 78, 78' so that when the car C–1 is over the special track section 20, one can release its couplers or operate the accessory by manipulating the controller C as heretofore. The truck 72 may carry a roller 79' riding on the power rail for energizing a lamp 79''.

One of these couplers is illustrated in Figure 4*a*. Here the coupler head 80, suitably carried by the truck and grounded, is provided with a recess 81 adapted to accommodate a knuckle 82 carried on a pin 83 and biased in a clockwise or outward direction by a spring 84. The knuckle has a latching arm 85 extending into the recess 81 and coupling arm 86 which extends from the side of the coupler head carrying the pivot 42 toward the other side. The knuckle 82 is biased to an unlatched or uncoupled position shown in dotted lines by the spring 84 and when the knuckle is pushed in to tension the spring, as by pressure applied to the latching arm 85, the end

87 of the knuckle passes by the end of a magnetizable armature 89 urged outwardly by a spring 89, the parts being latched as indicated in full lines in Figure 4a. The operation of these couplers is more fully described in application Ser. No. 710,355 above referred to.

The vehicle carried armature operated accessories

The car C–2 shown at the left of Figure 9 is provided with trucks indicated generally at 90. Such a truck is shown in detail in Figures 3 and 5 to 8, inclusive. It is characterized by the absence of a coil and is provided with a coupler 91 releasable by an armature energizable from the track carried coil. This coupler is fully cooperative with the electromagnetically operated coupler discussed above.

The truck 90 has the usual wheels 92, axles 93 and truck body 94. The axles 93 support a horizontal plate 95 by means of hooks 96. The plate 95 has an upwardly bent portion 97 riveted at 98 to a cast coupler head 99 so as to carry it at the same height as the similar coupler head 80 on the other type of cars. The coupler head 99 carries a knuckle 100 similar to knuckle 82 pivoted at 101 and urged to the outer or uncoupling position by a spring 102.

The knuckle has a latching arm 103 and a coupling arm 104 similar to the corresponding parts shown in Figure 4a. Here the latching arm 103 has a vertical face at 105 and a camming face at 106. These latter mentioned faces are cooperable with an upwardly extending pin 107 carried on a magnetic armature 108. This armature has hooked extensions 109 entering through openings 110 in the axle carried plate 95 and is recessed as indicated at 111 to receive the head 112 of a pin 113 which extends through an opening 114 in the plate 95 and carries a flat spring 115 received in notches 116 in the side walls 117 of the plate 95. The spring 115 normally holds the armature 108 in the extreme upper full line position in Figures 6 and 7 and keeps the pin 107 in latching position with respect to the knuckle 100. Where all the cars of a train are the C–1 type and have couplers such as 74 and 75 (Fig. 4a), they may be uncoupled from one another or from any cooperable coupler by placing the car so that the current collectors 78, 78' are on the rails 36, 36' and energizing such rails by the uncoupling button 69. Where some or all of the cars of a train are of the C–2 type with track magnet operated couplers, uncoupling is effected by placing the car so that the armature 108 for the uncoupler is above the track magnet and energizing the same by the uncoupling button 69. The parts are so proportioned that when the armature 108 is in its lowermost position, it comes very close to but does not contact with the exposed face of the core 48. This assures good magnetic operation and avoids the possibility of mechanical obstruction arising.

The train will be operated over the track by usual locomotive whose motor is indicated at M at the right of Figure 9. The coupler or other accessory actuated by the track magnet operates better when the train is stopped in the proper position to place it over the track magnet, but in some instances these devices may be actuated while the train is in motion.

The toy car of Figures 10 to 12 has the previously described trucks 90, one of which is shown, a car platform 120 and a car body 121 with sliding door 122 with lug 122'. The car platform 120

carries a trigger housing 123 which receives a steel trigger pin 124 having a collar 125 bearing on an expansion spring 126. The lower end of the pin 124 is secured to a magnetizable button 127 adapted to be placed over the core 48 of the track magnet so that the trigger pin may be pulled down when the track coil is energized.

The platform 120 carries a plate 128 pivoted at 129 and biased in a counter-clockwise direction by a spring 130. The plate has a finger 128' engageable with lug 122' to open the door and has a slot 131 to receive the keylike end 132 of an arm 133 pivoted at 134. The arm 133 has an upwardly bent prong 135 carrying a figure 136.

When the trigger pin is up, the parts are latched in the full line position of Figure 10, and when it is down, the spring 130 swings the plate and opens the door and this movement also moves the figure out to the doorway as shown in dotted lines.

Pushing the door back to closed position shifts the plate back to full line position, whereupon the trigger pin is urged upwardly to lock plate 128 in place.

Figure 13 diagrammatically shows an arrangement wherein the armature 140 acts on a ratchet drum to advance it part of a revolution. The ratchet drum carries a commutator with contacts 142 and 143, one of which is connected to a load such as a searchlight 144, while the other is connected to a roller 145 carried by the truck and bearing on the power rail so that the lamp may be turned on and off by energizing the track magnet when the car is located so as to place the armature 140 over the track magnet.

Since it is obvious that the invention may be embodied in other forms and constructions within the scope of the claims, I wish it to be understood that the particular form shown is but one of these forms, and 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 electric railroad comprising a track having continuous track rails connected to one side of a power source, a central third rail connected to the other side of the power source, an electromagnet midway between the wheel bearing rails and having a core piece terminating at substantially the level of the third rail, a supplemental insulated rail disposed between the third rail and each track rail, wiring connecting the coil of the electromagnet to the third rail and one of the supplemental rails, a train including toy cars having wheels bearing on the track rails, at least one of the cars having two current collectors each disposed to bear on a different supplemental rail when placed thereover, and an electromagnetic coupler connected between each of the supplemental collectors and the wheels, at least one of the other toy cars having a truck provided with an upwardly biased magnetizable armature between the track rails and above the level of the third rail and core piece and a latched, armature releasable coupler cooperable with the coupler on the first car or with another latched, armature releasable coupler on another car, and switching means for simultaneously energizing both supplemental rails so that the coil of the electromagnet may be energized as well as a coupler on the first mentioned car if in position whereby two like cars of either type or two cars, one of each type, may be automatically uncoupled.

2. In a toy electric railroad, a track layout

having parallel wheel bearing rails and a continuous power rail intermediate the wheel bearing rails and insulated therefrom, the power rail having a widened portion provided with an aperture, a toy train having current collecting means contacting the power rail and wheeled trucks on the wheel bearing rails, the train including a toy railroad vehicle having a magnetizable armature disposed over the power rail and biased upwardly to provide a narrow air gap and mechanical clearance, and a vehicle carried, armature actuated device, the track carrying an electromagnet below the level of the power rail and having an insulated core piece entering the aperture in the power rail and terminating at substantially the level of the power rail, the electromagnet acting on the magnetizable armature when thereover to attract the same and actuate the device on the vehicle.

3. In a toy electric railroad as claimed in claim 2, wherein one of the trucks carries the armature releasable device in the form of a latched coupler hook.

4. In a toy electric railroad as claimed in claim 2, wherein the armature actuated device is carried by the vehicle intermediate the trucks.

5. A toy railroad track section comprising a sheet metal base, wheel bearing rails, a power rail intermediate the wheel bearing rails, the rails having bearing surfaces above the level of the base, means for insulatedly supporting the power rail from the base, the power rail having a widened portion between its ends and an electromagnet carried between the base and the widened portion of the power rail and having a fixed core piece terminating at substantially the level of the power rail.

6. A toy railroad track section as claimed in claim 5, wherein the electromagnet includes an insulating spool confined between the base and power rail and carrying a coil connected at one end to a wheel bearing rail.

7. A toy railroad track section comprising a sheet metal base having its side edges bent to form two parallel wheel bearing rails of inverted U-shaped cross-section, the base having two longitudinally extending openings and central and end connecting elements, insulating plates secured opposite the openings, a power rail secured at its ends to each of the insulating plates and having a widened apertured central portion above the central connecting element, and an electromagnet carried between the central connecting element and the central portion of the power rail and having a core piece terminating at substantially the level of the power rail.

8. A toy railroad track section as claimed in claim 7, wherein each of the insulating plates carries a supplemental conducting rail parallel with the other rails and between a wheel bearing rail and an end portion of the power rail.

9. A toy railroad track section having parallel wheel bearing rails and an intermediate insulated power rail, the power rail having a widened apertured portion, and an electromagnet having a vertical core piece within the apertured portion of the power rail to induce a magnetic field above the level of the power rail and completely insulated, except for its upper exposed face which is at substantially the level of the power rail.

10. A toy railroad track section comprising a base, a power rail spaced above and insulated from the base, and having a vertical aperture, an insulating spool having its lower end fitted to the top of the base and its upper end fitted into the aperture in the power rail, a coil wound about the spool and a core piece fixedly secured in the spool with its upper face substantially at the level of the power rail.

11. A combined truck and coupler for toy cars comprising a truck body carrying axles and wheels adapted to support it from a toy track, and a coupler head, the coupler head carrying a knuckle, spring biased toward open or uncoupling position and movable toward closed or coupling position, a magnetizable armature movably carried by the truck body and disposed between the wheels slightly above the level of the treads of the wheels, and a spring biasing the armature upwardly, the armature carrying a latch cooperable with the knuckle for normally latching it in closed position and releasing it upon actuation of the armature downwardly.

12. A combined truck and coupler for toy cars as claimed in claim 11, wherein the armature is pivotally secured to an axle carried plate and the plate carries the coupler head.

13. A combined truck and coupler for toy cars comprising a truck body carrying axles and wheels adapted to support it from a toy track, a plate secured to the axles and having an upwardly bent portion which carries a coupler head, the coupler head carrying a knuckle spring biased toward open or uncoupling position and movable toward closed or coupling position, a magnetizable armature having one end pivotally secured to the plate intermediate the axles, and its other end adjacent the coupler head and carrying a latch cooperable with the knuckle for latching it in closed or coupling position when the armature is in its upper position and for releasing the knuckle when the armature is in its lower position, and a spring interconnecting the armature and plate to hold the armature up.

14. In a combined truck and coupler for toy cars, two spaced wheel bearing axles, a plate fixedly secured to the axles and below the axles, the plate having an extension above the level of the axles, a coupler head carried by the extension, a knuckle pivotally carried by the coupler head and spring biased toward open position, a magnetizable armature under the plate and having one end pivoted to the plate midway between the axles and carrying a latch cooperable with the knuckle for latching it in closed position and for releasing the knuckle when the armature is in its lower position, a pin carried by the armature and extending upwardly through a hole in the plate, and an armature biasing spring between the plate and pins for urging the armature to latching position.

JOSEPH L. BONANNO.

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