Dec. 15, 1942. N. L. CASE ET AL 2,305,134

COUPLING MECHANISM FOR TOY RAILROADS

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Fig. 1

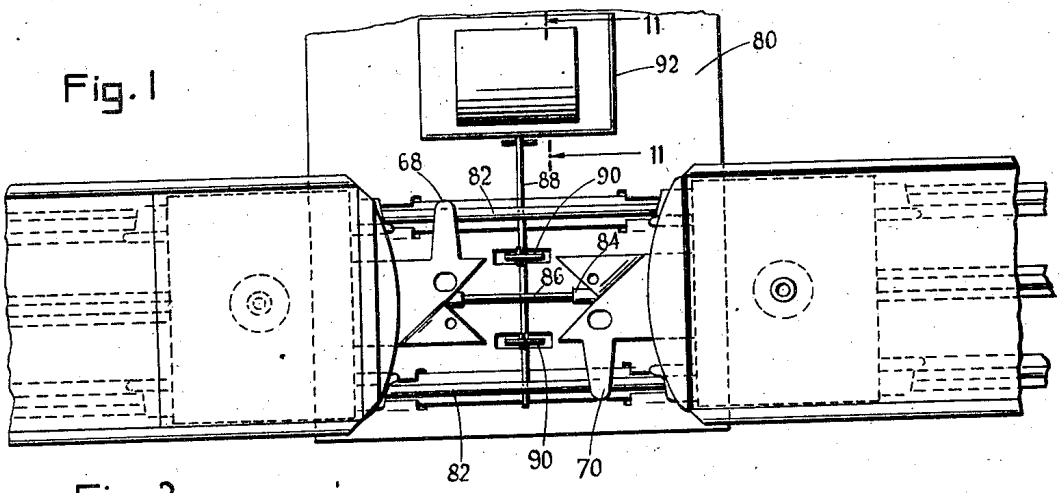


Fig. 2

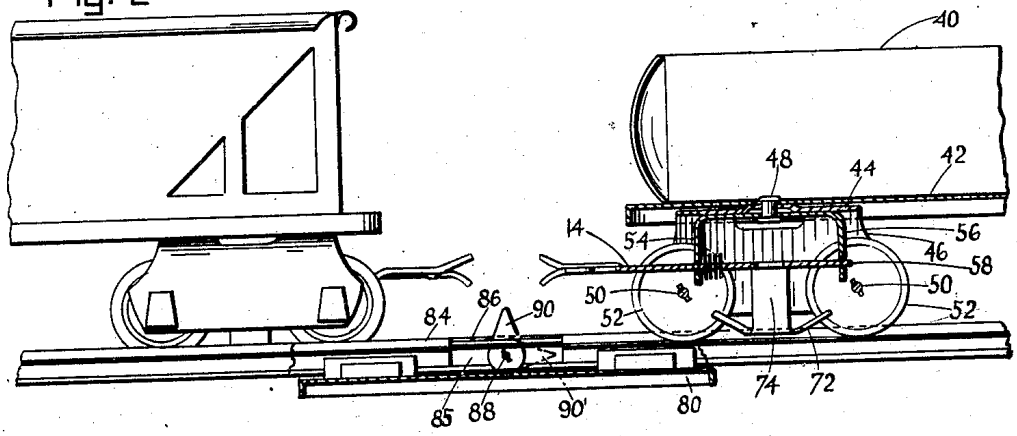


Fig. 3

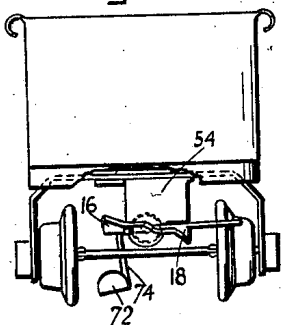


Fig. 4

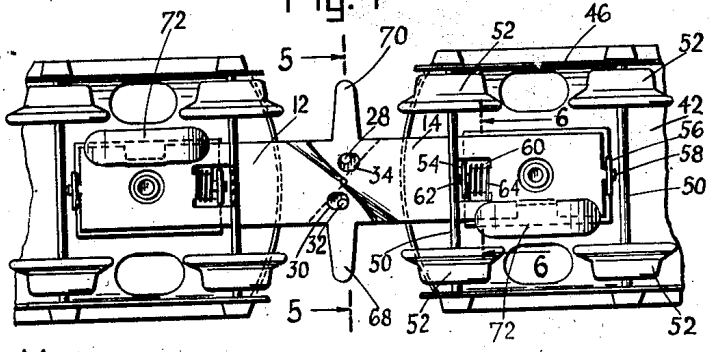


Fig. 13

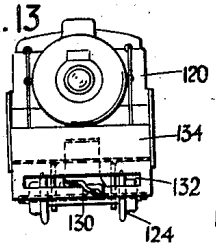
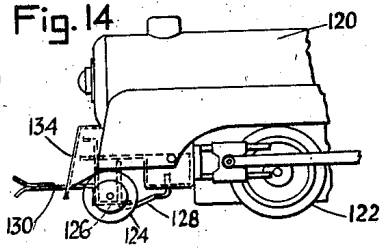


Fig. 14



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COUPLING MECHANISM FOR TOY RAILROADS

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Fig 5

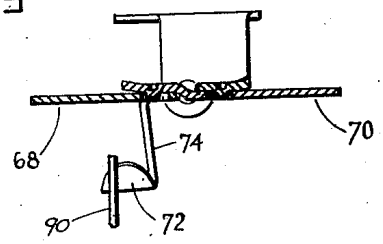


Fig. 6

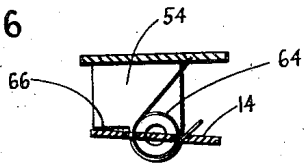


Fig. 7

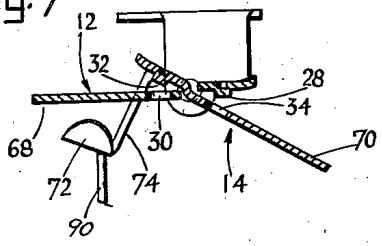


Fig. 8

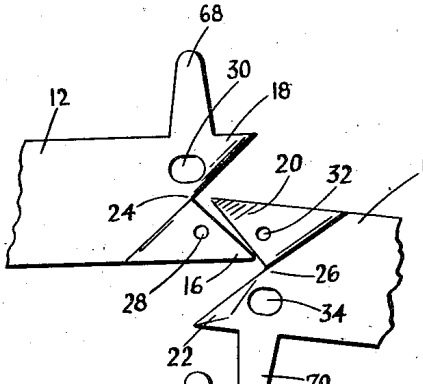


Fig. 10

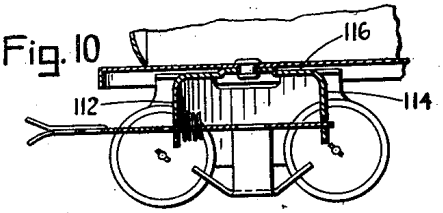
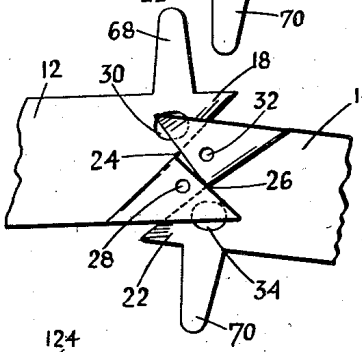


Fig. 9



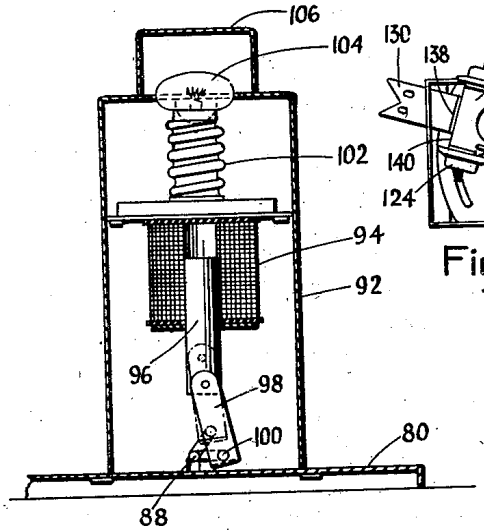


Fig. 11

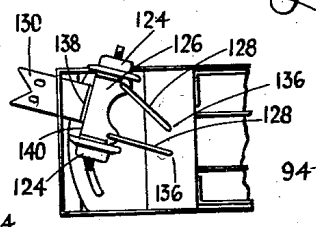


Fig. 15

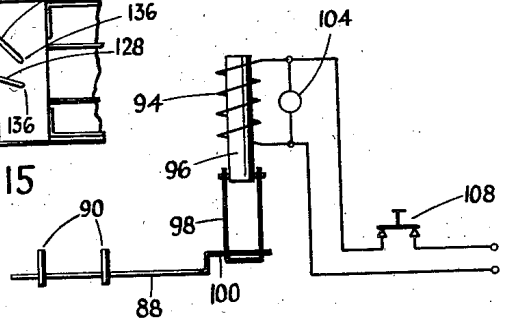


Fig. 12

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2,305,134

COUPLING MECHANISM FOR TOY RAILROADS

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Application May 16, 1940, Serial No. 335,610

10 Claims. (Cl. 213—97)

This invention relates to toys, especially toy railroads, and more particularly to a coupling mechanism for the same.

The primary object of our invention is to generally improve couplers for toy railroads. More particular objects are to provide a coupler which is symmetrical, so that the cars may be turned end for end; which will gather over a large angle, so that the couplers will be lined up when cars are moved together, even on a curve, or on an uneven track; which is inexpensive, dependable in operation, and sturdy in construction; which is easily accessible to be uncoupled by hand; which is sensitive enough to be readily uncoupled by remote control; which is short, so that the cars may be coupled closely together; and which may be applied in simplified inconspicuous form at the front end of a locomotive, as well as in regular form between cars.

To the accomplishment of the foregoing, and other objects which will hereinafter appear, our invention consists in the coupling elements 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 showing car ends at a remotely controllable uncoupling station;

Fig. 2 is a partially sectioned side elevation of the same;

Fig. 3 is an end elevation of a car provided with our improved coupling;

Fig. 4 is an inverted plan view of coupled car ends;

Fig. 5 is a section taken in the plane of the line 5—5 of Fig. 4, but showing the parts in upright position;

Fig. 6 is a section taken in the plane of the line 6—6 of Fig. 4, but with the parts in upright position;

Fig. 7 is a section similar to Fig. 5, but showing how the coupling is released;

Figs. 8 and 9 illustrate the manner in which the couplers gather when moved together;

Fig. 10 illustrates a modified drawbar mounting, made integral with the truck;

Fig. 11 is a section through the remotely controllable trip mechanism, taken in the plane of the line 11—11 of Fig. 1;

Fig. 12 is a wiring diagram explanatory of the same;

Fig. 13 is a front elevation of a locomotive having a simplified form of coupler at its forward end;

Fig. 14 is a side elevation of the same; and

Fig. 15 is a bottom view of the same.

Referring to Fig. 8 of the drawings, it will be seen that the couplers or drawbars 12 and 14 have bifurcated ends. Referring momentarily to Fig. 3, it will be observed that one of these ends is biased upwardly, as is indicated at 16, while the other is biased downwardly, as is indicated at 18. Reverting now to Fig. 8, the coupler 12 has an up branch 16, and a down branch 18. The coupler 14 is identical, it having an up branch 20, and a down branch 22, but inasmuch as coupler 14 faces in opposite direction, the up branch 20 of coupler 14 comes opposite the down branch 18 of coupler 12, and the down branch 22 of coupler 14 comes opposite the up branch 16 of coupler 12. Because of this biased crotch-like arrangement, the couplers 12 and 14 will be guided into alignment, or will "gather" when the couplers are brought together, even though the cars are on a curve, or even though the track may be somewhat irregular. This will be seen by comparison of Figs. 8 and 9, Fig. 9 showing the relation of the parts an instant later as the couplers are being moved together. When the couplers meet in alignment, as in Fig. 1, or approximately in alignment, as in Fig. 9, the up branches contact the down branches immediately. When the couplers meet out of alignment the leading edges of the up branches intersect and contact one another, as in Fig. 8, or the leading edges of the down branches intersect and engage one another, because of the biased relation of the edges. In any case, as the couplers are moved further together, they are invariably brought into a position with the crotch point 24 of coupler 12 opposite the crotch point 26 of coupler 14.

The couplers or drawbars are additionally provided with interlocking means. These preferably take the form of projections, and mating holes or recesses. In the specific case here illustrated, the up branch 16 is provided with a downwardly directed pin 28, while the down branch 18 has a hole 30. Similarly, the up branch 20 of coupler 14 has a downwardly directed pin 32, and the down branch 22 has a hole 34. When the couplers are brought together further than is shown in Fig. 9, the pin 32 rides up on the downwardly curved surface of branch 18, and the pin 28 rides up on the downwardly curved surface of branch 22, until the pins 28 and 32 are received in the holes 30 and 34.

This relation of the parts is best shown in Fig. 4, which is a bottom plan view of the cou-

plers in interlocked relation. Pin 28 is seen occupying the hole 34, and pin 32 is seen occupying the hole 30.

To facilitate engagement of the couplers, they are preferably pivotally mounted for oscillation about their longitudinal axes. Thus, in Fig. 7, which is a section across the couplers, the coupler 12 has been left in horizontal position, while coupler 14 has been tilted about its longitudinal axis, thereby lifting pin 32 out of hole 30, and lowering hole 34 from pin 28, and so releasing the coupling. Referring now to Figs. 2 and 4, the car body 40 is mounted on a floor or chassis 42, which is itself carried on two trucks, only one of which is shown in the drawings. The truck comprises a sheet metal housing bent to provide a top wall 44, and downwardly bent side walls 46. The top wall is pivoted on chassis 42 by an eyelet 48. Side walls 46 carry axles 50, which in turn carry four flanged wheels 52.

The truck is additionally provided with depending bearing lugs 54 and 56 for pivotally carrying the coupler or drawbar 14. The coupler is preferably stamped out of heavy gauge sheet metal, and is shaped to provide a tenon or pivot 58 at its inner end, this being received in lug 56. The coupler is cut away at 60 (Fig. 4) to receive the lug 54, but a tenon or pivot 62 is retained as an integral part of the coupler, and is received in the lug 54. A torsion spring 64 may be provided for normally urging the coupler in interlocking direction. Referring now to Fig. 6, it will be seen that the lug 54 is so shaped as to provide a stop surface or shoulder 66 which limits the oscillation of coupler 14 in clockwise direction as viewed in Fig. 6, this being the direction in which the coupler is urged by the torsion spring 64.

With the arrangement as so far described, it will be understood that the couplers readily oscillate relative to one another as two cars are run together, thereby permitting the mating pins and holes to interlock. To release the couplers, it is necessary to oscillate one or the other about its longitudinal axis, as is shown in Fig. 7. This may be done either manually, or under remote control. To facilitate manual release, each coupler is provided with a sidewardly extending finger, as is clearly shown at 68 and 70 in Figs. 1, and 4 through 9. Inasmuch as it is a little more convenient to depress than to lift such a finger, the finger is preferably provided on the down branch side of the coupler. It is most conveniently formed integrally with the coupler, as is clearly shown in the drawings. It will be evident from comparison of Figs. 5 and 7 of the drawings that by simply depressing either the finger 68, or the finger 70, downwardly, the interlocked couplers are readily released.

To release the couplers under remote control, a trackside tripping station may be employed. A contact device is carried by the coupler, and in the present case this takes the form of a shoe 72 supported by an arm 74 which is rigidly connected to the up branch side of the coupler, as is best shown in Figs. 3, 4, 5, and 7. It will be evident that by interposing a suitable obstruction or lifting device on the track, as is indicated at 90 in Figs. 5 and 7, the shoe 72 may be raised, thereby releasing the coupling.

The specific form of track trip here disclosed, is best shown in Figs. 1 and 2. It comprises a base 80 carrying wheel bearing rails 82, and a third rail 84, the lower portion or web of which is cut away at 85. Actually, a wire or rod 86 is inserted between spaced ends of the third rail 84. A shaft 88 extends across the rails and carries a pair of cams or trip elements 90. By rotating the shaft 88 through a quarter revolution, the cams 90 may be moved between the broken line position 90' shown in Fig. 2, and the solid line position 90. When the cams are in the broken line position 90', they are out of the way, or ineffective, and the contact shoes of the couplers pass freely over the same. When, however, the cams are raised to the solid line position 90, they obstruct and are engaged by one or the other of the coupler shoes, as is indicated in Figs. 5 and 7. It will be understood that the cams may be shaped abruptly, in the nature of trip elements, as shown, because of the gradual curvature of the shoes 72, but that, if desired, the contact member carried by the coupler may be a small abrupt feeler or finger, in which case the cams would preferably be shaped with a gradual rise or may be used indirectly to raise or lower a somewhat elongated tripping device or ramp.

The shaft 88 is turned by a solenoid housed in a casing 92. The construction will be clear from inspection of Fig. 11 in which housing 92 carries a solenoid 94, the core 96 of which is connected through a link 98 to a crank portion 100 on shaft 88. The crank is most simply formed by bending the shaft, as is schematically illustrated in Fig. 12. This figure also shows how link 98 may be formed by bending a piece of sheet metal to U-shape. The housing 92 also carries a socket 102 for a pilot lamp 104, this being housed in a small tunnel-shaped or open-ended cover 106.

Referring now to Fig. 12, it will be seen that lamp 104 is connected in parallel with solenoid 94, and that the supply circuit for these elements is controlled by a preferably remotely located, normally open, push button type switch 108. The core 96 is normally in down position, with the trip cams 90 also in down position. Upon depression of button 108, however, the trip cams are raised, and the pilot lamp is lighted, thereby indicating that the device is in tripping position.

Reference has already been made to the bearing lugs 54 and 56 (Figs. 2 and 4) which oscillatably support the drawbar. The lugs 54 and 56 may be formed at the ends of a strip of metal which is secured to the top of an otherwise conventional toy truck. This strip is preferably not oscillatable relative to the truck, because the truck will itself properly turn the coupler when the car is located on a curve.

If the truck is being made specially for use with the present couplers, then the bearing lugs may conveniently be formed integrally with the truck. Such a modification of the invention is shown in Fig. 10, in which the lugs 112 and 114 are formed integrally with and are bent downwardly from the top wall 116 of the truck. The side walls of the truck are formed integrally with the top wall 116, as before, so that the entire truck housing, including the mounting for the drawbar, is made out of a single piece of sheet metal. The drawbar including its release means is also preferably formed out of a single piece of metal. This completes the truck, except for the wheels and axles, and a spring for the drawbar.

As so far described, both of the mating drawbars are oscillatable about their longitudinal axes. It is possible, however, to mount one of the drawbars fixedly, the other being tilted during engagement or disengagement of the coupling. Such an arrangement is convenient in

some cases, as for example, at the forward end of a locomotive where only limited space is available. Referring to Figs. 13 and 14, the locomotive 120 is provided with two or more pairs of driving wheels 122, only the forward pair of which is shown. The locomotive is additionally provided with a pilot truck or pair of wheels 124 (see also Fig. 15). These are small diameter idle wheels mounted on a laterally movable support plate 126 which is oscillated during lateral movement by an appropriately disposed pair of links 128 arranged to produce a non-parallel motion. The forked end of drawbar 130 is like those previously described. The drawbar is mounted fixedly on the pilot truck. Inasmuch as it is not oscillatable about its longitudinal axis, the sidewardly projecting arm and the depending contact shoe for oscillating the same are, of course, superfluous and are omitted. The drawbar projects through a suitable slot 132 in the apron 134 of the locomotive. The drawbar is aimed laterally by movement of the pilot truck, as will be clear from the bottom view shown in Fig. 15, in which it will be seen that the plate 126 carrying the pilot wheels 124 is guided by links 128 pivoted on the locomotive at 136. The center to center distance of the links at 136 is very much less than the center to center distance at their forward ends where they are pivoted on the pilot truck 126. This causes the pilot truck to swing in one direction or the other when rounding a curve, even though the pilot truck has only two wheels instead of four. The coupler 130 is, in this case, mounted on truck 126 by spot welding a right angle bend 138 to a vertical wall 140 of the truck. The drawbar 130 is, therefore, appropriately turned by the pilot truck when the locomotive is on a curved track. The drawbar may be shortened so as to project only a short distance and relatively inconspicuously in front of the apron 134 of the locomotive.

The other cars may also be provided with one fixed and one oscillatable drawbar, but we prefer to make both drawbars oscillatable in order that the cars may be absolutely interchangeable end for end.

It is believed that the construction, operation, and advantages of our invention will be apparent from the foregoing detailed description thereof. The switch 108 is closed when a coupling to be released is near the cams 90.

With the train moving forwardly, the uncoupled cars are simply left behind the preceding cars. With the train moving rearwardly, there is danger of the cars becoming coupled after being uncoupled if the locomotive continues its rearward movement under power. To avoid this, the power supply to the locomotive should be cut off at about the instant the uncoupling action takes place, or with a reversing locomotive, the direction of movement of the locomotive may be changed from reverse to forward as soon as the coupling passes the track trip. If desired, the train may be moved rearwardly until just past the track trip with cams down, and may then be moved forwardly over the track trip with the cams up, thus uncoupling the last cars and permitting them to remain stationary at the track trip.

The coupling is entirely remotely controlled. Two cars may be coupled together under remote control by controlling the power supply to the locomotive in such a manner as to bring the cars together, thus automatically coupling the same. The coupling may be opened under remote control, through the use of the track trip and trackside relay. The cars may be uncoupled manually at any point on the track system.

The couplers are symmetrical so that the cars may be turned end for end. The couplers are so designed that they will be brought into alignment or gather over a large angle. The construction is inexpensive and dependable in operation. The sidewardly extending fingers for manual release are readily accessible. The release action of the couplers is sensitive and is, therefore, readily accomplished under remote control. The couplers are short enough so that the cars are brought into closely spaced relation when coupled.

It will be apparent that while we have shown and described our invention in preferred forms, many changes and modifications may be made in the structures disclosed without departing from the spirit of the invention as sought to be defined in the following claims.

We claim:

1. Coupling mechanism for a toy railway car, for use with a track having a movable ramp or equivalent trip mechanism, said mechanism including a draw-bar having a bifurcated end and mounted for oscillation about its longitudinal axis, one branch of the bifurcated end being biased upwardly and the other being biased downwardly, means on said draw-bar for interlocking with mating means on another draw-bar, means to normally turn the draw-bar about its longitudinal axis to interlocking position, and release means to turn the draw-bar in opposite direction in order to disengage the interlocking parts when desired, said release means comprising a feeler connected to the up-branch side of the draw-bar, and depending to a point suitable for such cooperation with the ramp or like trip mechanism as to cause the latter to turn the draw-bar to disengaged position.

2. Coupling mechanism for a toy railway car, for use with a track having a movable ramp or equivalent trip mechanism, said mechanism including a draw-bar having a generally horizontally disposed bifurcated end and mounted for oscillation about its longitudinal axis, one branch of the bifurcated end being biased upwardly and the other being biased downwardly, means on said draw-bar for interlocking with mating means on another draw-bar, said means comprising a projection and a hole, the projection being located on one branch and the hole on the other, means to normally turn the draw-bar about its longitudinal axis to interlocking position, and release means to turn the draw-bar in opposite direction in order to disengage the interlocking parts when desired, said release means comprising a feeler connected to the up-branch side of the draw-bar, and depending to a point suitable for such cooperation with the ramp or like trip mechanism as to cause the latter to turn the draw-bar to disengaged position.

3. Coupling mechanism for a toy railway car, for use with a track having a movable ramp or equivalent trip mechanism, said mechanism including a draw-bar having a generally horizontally disposed bifurcated end and mounted for oscillation about its longitudinal axis, one branch of the bifurcated end being biased upwardly and the other being biased downwardly, whereby the divergent up and down branches of one such coupler will gather with another similar coupler for lining up the couplers when cars are moved

together while out of alignment as viewed in plan, means on said draw-bar for interlocking with mating means on another draw-bar, said means comprising a projection and a hole, the projection being located on one branch and the hole on the other, resilient means to turn the draw-bar about its longitudinal axis to interlocking position, motion-limiting means to limit the turning of the draw-bar by the resilient means, and release means to turn the draw-bar in opposite direction when desired in order to disengage the interlocking parts, said release means comprising a feeler connected to the up-branch side of the draw-bar, and depending to a point suitable for such cooperation with the ramp or like trip mechanism as to cause the latter to turn the draw-bar to disengaged position.

4. A toy railway car having a pivoted truck at each end, each truck comprising wheels and axles, a drawbar, a piece of sheet metal acting as a frame for the truck and having downwardly bent sides used as bearings for the wheels and axles, additional transverse bearings bent downwardly for pivotally mounting said drawbar for oscillation about its longitudinal axis, the top of said frame being pivoted to the car to afford turning of the truck and with it the drawbar, said drawbar being a generally horizontal strip of sheet metal, the inner portion of which is cut away to form integral pivots received in the aforesaid transverse bearings of the truck, and the outer portion of which is bifurcated, the bifurcated end being so shaped in plan that the branches of said end define a wide-angle triangular space, one branch of the bifurcated end being biased upwardly and the other being biased downwardly, whereby the divergent up and down branches of one such coupler will gather with another similar coupler for lining up the couplers when cars are moved together while out of alignment as viewed in plan, means on said drawbar for interlocking with mating means on another drawbar to couple two cars together, and means tending normally to turn the drawbar about its longitudinal axis to interlocking position.

5. A toy railway car having a pivoted truck at each end, each truck comprising wheels and axles, a drawbar, a single piece of sheet metal acting as a frame for the truck and having downwardly bent sides used as bearings for the wheels and axles, additional transverse bearings bent downwardly for pivotally mounting said drawbar for oscillation about its longitudinal axis, the top of said frame being pivoted to the car to afford turning of the truck and with it the drawbar, said drawbar being a generally horizontal strip of sheet metal, the inner portion of which is cut away to form integral pivots received in the aforesaid transverse bearings of the truck, and the outer portion of which is bifurcated, the bifurcated end being so shaped in plan that the branches of said end define a wide-angle triangular space, one branch of the bifurcated end being biased upwardly and the other being biased downwardly, means on said drawbar for interlocking with mating means on another drawbar to couple two cars together, said means comprising a projection and a hole, the projection being located on one branch and the hole on the other, and means tending normally to turn the drawbar about its longitudinal axis in order to cause engagement of the interlocking parts.

6. A toy railway car having a pivoted truck at each end, each truck comprising wheels and axles, a drawbar, a single piece of sheet metal acting as a frame for the truck and having downwardly bent sides used as bearings for the wheels and axles, additional transverse bearings bent downwardly for pivotally mounting said drawbar for oscillation about its longitudinal axis, the top of said frame being pivoted to the car to afford turning of the truck and with it the drawbar, said drawbar being a generally horizontal strip of sheet metal, the inner portion of which is cut away to form integral pivots received in the aforesaid transverse bearings of the truck, and the outer portion of which is bifurcated, the bifurcated end being so shaped in plan that the branches of said end define a wide-angle triangular space, one branch of the bifurcated end being biased upwardly and the other being biased downwardly, means on said drawbar for interlocking with mating means on another drawbar, said means comprising a projection and a hole, the projection being located on one branch and the hole on the other, means to normally turn the drawbar about its longitudinal axis to interlocking position, and release means projecting transversely from the drawbar in order to turn the drawbar in an opposite direction when desired in order to disengage the interlocking parts.

7. A toy railway car having a pivoted truck at each end, each truck comprising wheels and axles, a drawbar, a single piece of sheet metal acting as a frame for the truck and having downwardly bent sides used as bearings for the wheels and axles, additional transverse bearings bent downwardly for pivotally mounting said drawbar for oscillation about its longitudinal axis, the top of said frame being pivoted to the car to afford turning of the truck and with it the drawbar, said drawbar being a generally horizontal strip of sheet metal, the inner portion of which is cut away to form integral pivots received in the aforesaid transverse bearings of the truck, and the outer portion of which is bifurcated, the bifurcated end being so shaped in plan that the branches of said end define a wide-angle triangular space, one branch of the bifurcated end being biased upwardly and the other end being biased downwardly, whereby the divergent up and down branches of one such coupler will gather with another similar coupler for lining up the couplers when they are moved together, and means on said drawbar for interlocking with mating means on another drawbar, said means comprising a projection and a hole, the projection being located on one branch and the hole on the other, resilient means to turn the drawbar about its longitudinal axis to interlocking position, motion-limiting means to limit the turning of the drawbar by said resilient means, and release means projecting transversely from the drawbar in order to turn the drawbar in opposite direction when desired in order to disengage the interlocking parts so as to open the coupling.

8. A toy railway car having a pivoted truck at each end, each truck comprising wheels and axles, a drawbar, a single piece of sheet metal acting as a frame for the truck and having downwardly bent sides used as bearings for the wheels and axles, additional transverse bearings bent downwardly for pivotally mounting said drawbar for oscillation about its longitudinal axis, the top of said frame being pivoted to the car to afford turning of the truck and with it the drawbar, said drawbar being a generally horizontal strip

of sheet metal, the inner portion of which is cut away to form integral pivots received in the aforesaid transverse bearings of the truck, and the outer portion of which is bifurcated, the bifurcated end being so shaped in plan that the branches of said end define a wide-angle triangular space, one branch of the bifurcated end being biased upwardly and the other being biased downwardly, whereby the divergent up and down branches of one such coupler will gather with another similar coupler for lining up the cars when the cars are moved together while out of alignment as viewed in plan, means on said drawbar for interlocking with mating means on another drawbar, means to normally urge the drawbar in one direction about its longitudinal axis to interlocking position, and a manually operable release finger projecting sidewardly directly from the drawbar far enough to be accessible at the side of the car, said release finger being operable to tilt the drawbar about its longitudinal axis in unlocking direction against the action of the aforesaid means in order to uncouple the drawbar from another drawbar.

9. A toy railway car having a pivoted truck at each end, each truck comprising wheels and axles, a drawbar, a single piece of sheet metal acting as a frame for the truck and having downwardly bent sides used as bearings for the wheels and axles, additional transverse bearings bent downwardly for pivotally mounting said drawbar for oscillation about its longitudinal axis, the top of said frame being pivoted to the car to afford turning of the truck and with it the drawbar, said drawbar being a generally horizontal strip of sheet metal, the inner portion of which is cut away to form integral pivots received in the aforesaid transverse bearings of the truck, and the outer portion of which is bifurcated, the bifurcated end being so shaped in plan that the branches of said end define a wide-angle triangular space, one branch of the bifurcated end being biased upwardly and the other being biased downwardly, whereby the divergent up and down branches of one such coupler will gather with another similar coupler for lining up the cars when the cars are moved together while out of alignment as viewed in plan, means on said drawbar for interlocking with mating means on another drawbar, said means comprising a projection and a hole, resilient means to turn the drawbar about its longitudinal axis to interlocking position, motion-limiting means to limit the turning of the drawbar by the resilient means, and a manually depressible release finger formed integrally with and projecting sidewardly directly from the down branch side of the drawbar far enough to be accessible at the side of the car, said release finger being operable to tilt the drawbar about its longitudinal axis in unlocking direction against the action of the aforesaid resilient means in order to uncouple the drawbar from another drawbar.

10. A toy railway car having a pivoted truck at each end, each truck comprising wheels and axles, a drawbar, a single piece of sheet metal acting as a frame for the truck and having downwardly bent sides used as bearings for the wheels and axles, additional transverse bearings bent downwardly for pivotally mounting said drawbar for oscillation about its longitudinal axis, the top of said frame being pivoted to the car to afford turning of the truck and with it the drawbar, said drawbar being a generally horizontal strip of sheet metal, the inner portion of which is cut away to form integral pivots received in the aforesaid transverse bearings of the truck, and the outer portion of which is bifurcated, the bifurcated end being so shaped in plan that the branches of said end define a wide-angle triangular space, one branch of the bifurcated end being biased upwardly and the other being biased downwardly, means on said drawbar for interlocking with mating means on another drawbar to couple two cars together, means tending normally to turn the drawbar about its longitudinal axis to interlocking position, said means comprising a projection and a hole, the projection being located on one branch and the hole on the other, the projection being formed integrally with and being struck from the sheet metal drawbar, and means tending normally to turn the drawbar about its longitudinal axis in order to cause engagement of the interlocking parts.

NOEL L. CASE.
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