May 9, 1939. W. E. REXFORD 2,157,187

REMOTELY CONTROLLABLE AUTOMATIC TRAIN COUPLING SYSTEM

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Fig. 1.

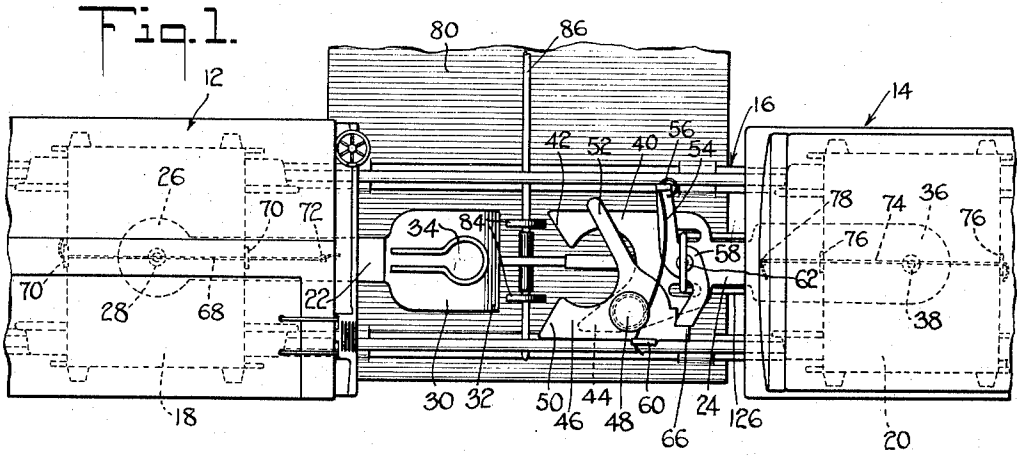

Fig. 2.

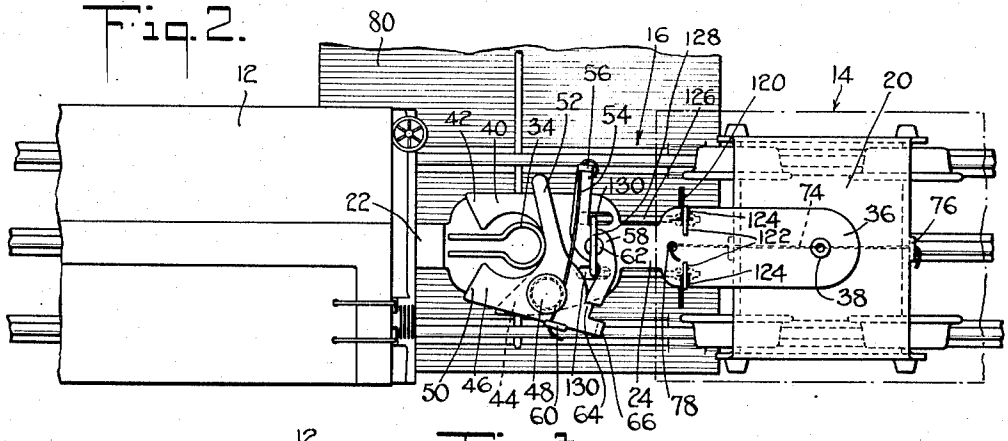

Fig. 3.

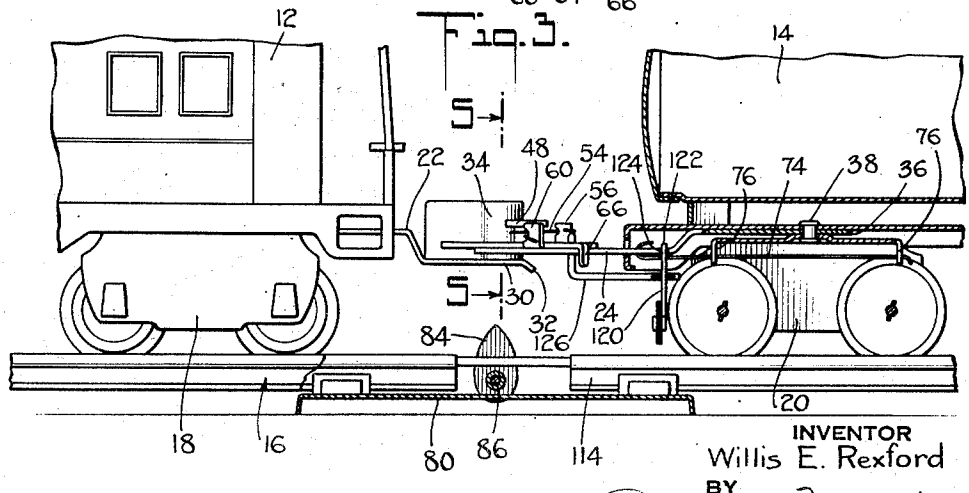

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Fig. 4.

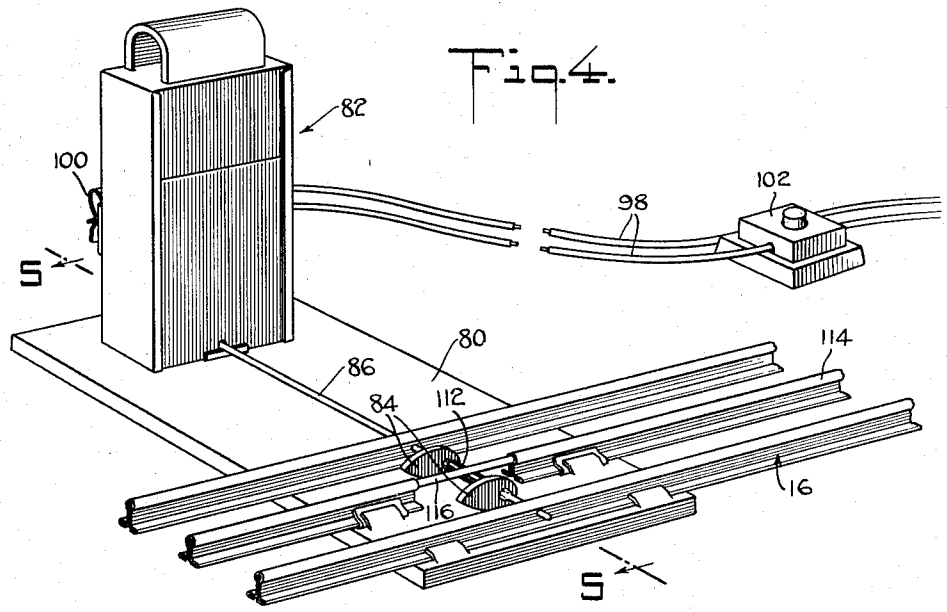


Fig. 5.

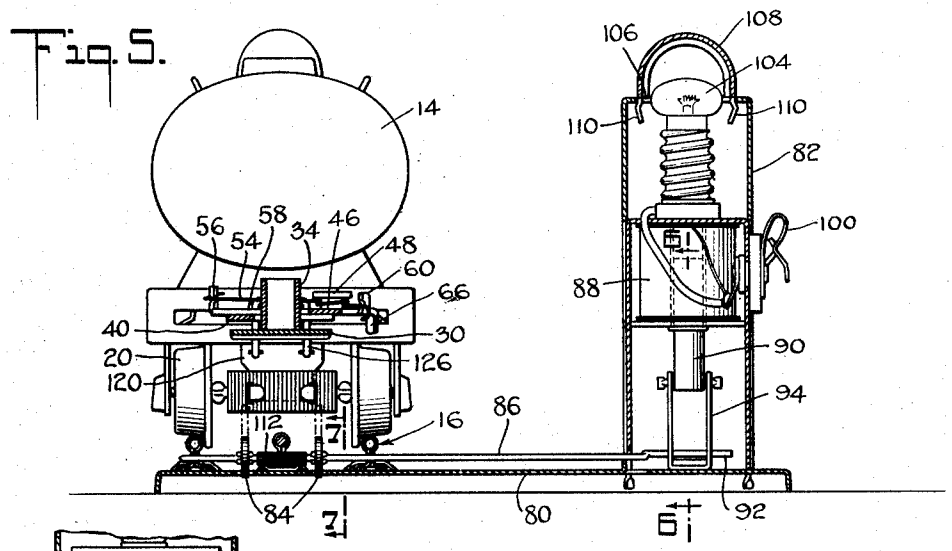


Fig. 6.

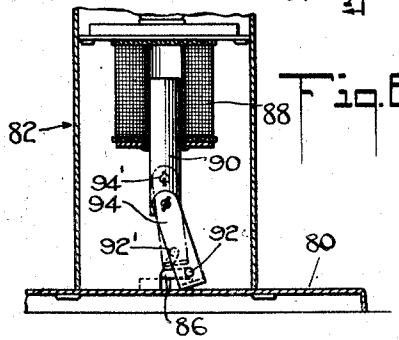
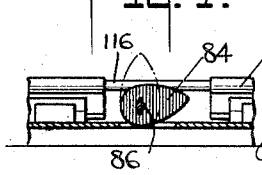


Fig. 7.



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REMOTELY CONTROLLABLE AUTOMATIC TRAIN COUPLING SYSTEM

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9 Claims. (Cl. 213—212)

This invention relates to toy trains, and more particularly to a remotely controllable automatic coupling system therefor.

The primary object of the invention is to generally improve automatic coupling systems for toy trains. A more particular object is to insure end to end alignment of the male and female coupling elements when two cars are moved toward one another for automatic coupling, this alignment being made sufficiently accurate to insure proper coupling together of the cars regardless of whether they approach one another on a curve or on a straight section of track.

In accordance with further objects and features of the present invention, the coupling may be opened under control from a remote point, through the use of a suitable elevatable track trip which cooperates with a feeler on the coupling, and the feeler functions to open the coupling regardless of the direction in which the train is moved over the the track trip. Still another object is to facilitate remote control of the track trip, and this is done by making the same electrically operated by trackside solenoid mechanism, the latter then being controllable from any desired remote point, through simple electric wiring. To the accomplishment of the foregoing and other objects which will hereinafter appear, the invention consists in the toy train coupling elements and remote control mechanism therefor, as well as their relation one to another, 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 the coupling mechanism as two cars to be coupled are moved toward one another;

Fig. 2 is a plan view showing the cars in coupled relation;

Fig. 3 is a side elevation showing the cars in coupled relation;

Fig. 4 is a perspective view of the solenoid-controlled track trip;

Fig. 5 is a vertical section taken in the plane of the line 5—5 of Figs. 3 and 4, and looking in the direction of the arrows of Fig. 3 with respect to the car and coupling mechanism, but looking in the direction of the arrows of Fig. 4 with respect to the track trip mechanism;

Fig. 6 is a transverse section taken in elevation through the solenoid mechanism, in the plane of the line 6—6 of Fig. 5; and

Fig. 7 is a section showing a detail of the track trip, taken in the plane of the line 7—7 of Fig. 5.

Referring to the drawings and more particularly to Figs. 1, 2, and 3, the toy railroad cars 12 and 14 are supported on a suitable track section 16. Only the adjacent ends of the cars 12 and 14 are shown, in order to make possible the use of an enlarged scale more clearly illustrating the coupling mechanism. In the present case, the cars form part of a freight train, and car 12 is a caboose, while car 14 is a tank car. It will be understood that each of these cars is provided not only with the wheeled trucks 18 and 20, indicated in the drawings, but also with similar wheeled trucks at the opposite or outer ends of the cars, which are not shown. A male coupler 22 is associated with truck 18, and a female coupler 24 is associated with truck 20; and it will be understood that similar couplers are provided at the opposite or outside ends of the cars, there being a female coupler like the coupler 24 at the opposite end of car 12, and a male coupler like the coupler 22 at the opposite end of car 14. Each car is provided with a male and a female coupler.

The coupling arrangement here shown is automatic in two respects. The first concerns the fact that two cars moved toward one another are thereby automatically coupled, as will next be described. In Fig. 1, the cars are shown separated and about to be moved toward one another. The male coupler 22 comprises a strap of sheet metal one end 26 of which is pivotally connected to car 12, preferably by means of the same pivot 28 as is used to oscillatably connect the wheeled truck 18 to the car body. The opposite end of strap 22 is preferably stepped downwardly to form a guide plate or table 30 having a preferably downwardly sloped leading edge 32. A generally cylindrical upright pin 34 is mounted on plate 30. As here illustrated, the pin 34 is formed by reversely bending a strip of sheet metal, the center or bent portion being nearly cylindrical in shape, as is clearly shown in the drawings.

The female coupler 24 also comprises a main strip of relatively stiff sheet metal the inner end 36 of which is pivotally secured to car 14 preferably by the same pivot 38 as is used to oscillatably secure wheeled truck 20 to car 14. The outer end of coupler 24 is bifurcated and shaped to form a coupling jaw 40 having a biased approach edge 42. The other branch 44 of the bifurcated coupler end has a movable jaw 46 pivotally mounted thereon by means of a pivot 48. Jaw 46 has a sloping approach edge 50 and a transversely extending arm 52. It will be noted from inspection of Fig. 1 that the arm 52 is dis-

posed across the space between jaws 40 and 46 when the jaws are in open condition. Jaw 46 is normally moved to the open position shown in Fig. 1 by resilient means, here exemplified by a hair-spring 54 one end of which bears against an upstanding lug 56 on a latch or detent 58, and the other end of which bears against a lug 60 bent upwardly from the side edge of jaw 46, and the intermediate part of which bears against pivot 48, being turned thereabout.

When the cars are moved together, the pin 34 of male coupler 22 is guided between the convergent edges 42 and 50 of the open jaws, and after coming between the jaws, it strikes arm 52, thus moving the arm and with it the movable jaw 46 from the position shown in Fig. 1 to the position shown in Fig. 2. Detent 58 is pivoted at 62 and cooperates with a detent tooth 64 formed on the edge of movable jaw 46, thus holding the jaws in the locked condition shown in Fig. 2. The detent is moved toward detent tooth 64 by suitable resilient means which, in the present case, is the same spring wire 54 that is used to normally keep the jaws in open condition. It may be mentioned that the opening of jaw 46 under the influence of spring 54 is limited by a downwardly bent stop lug 66 also cooperating with detent 58, as is clearly shown in the drawings.

In order to insure dependable functioning of the automatic coupling arrangement, it is important that the couplers 22 and 24 be brought in end to end relation as the cars approach one another, for otherwise they may pass alongside of instead of into one another. Moreover, this condition should be met regardless of whether the cars approach one another on curved or straight sections of track. To this end, the coupler 22 is normally held in alignment with truck 18 by means of a light hair-spring 68 which passes through lugs or ears 70 bent at the forward and rear edges of truck 18, and which is connected to the coupler, as by passing through a hole 72 therein. Similarly, coupler 24 is normally held in alignment with truck 20 by means of a slender hair-spring 74 passing through lugs 76 on truck 20 and through a hole 78 in coupler 24. It will be understood that the springs 68 and 74 are exceedingly light, and offer but negligible resistance to movement of the couplers independently of the trucks. Because of this, there is no interference with proper alignment of the couplers during normal operation of a train. However, when the couplers are entirely free, as when two cars are moved toward one another in order to couple the same together, the couplers assume the alignment of the trucks and are thereby brought into desired end to end relation.

The coupler as so far described may be automatically coupled and manually released. To open the coupling, it is simply necessary to lightly touch the detent 58, thereby moving the same about pivot 62 and releasing the jaws of the female coupler, which then assume the position shown in Fig. 1. In accordance with a further feature of the invention, the coupling may be opened under remote control by means of a suitable track trip. Thus, referring to Figs. 4 and 5, the track section 16 is secured to a base 80 on which is mounted a solenoid housing 82. Trip elements 84 are disposed between the rails of the track and are fixedly mounted on a shaft 86 extending transversely of the track and leading into housing 82. The housing carries a solenoid 88 with a vertically movable core 90 disposed above shaft 86. The outer end of the shaft is bent to form a crank 92, and the crank is connected to core 90 by a suitable connection or link 94, in this case formed by reversely bending a strip of sheet metal to U shape.

When solenoid 88 is deenergized, core 90 falls of its own weight, at which time crank 92 is moved to horizontal position, as shown in Fig. 6, the downward motion being limited by the lower end of link 94 bearing against the base 80. The parts are so relatively arranged that at this time the trip elements 84 are in horizontal or lowered position, as is shown in solid lines in Figs. 4, 5, and 7. However, when solenoid 88 is energized, core 90 is drawn upwardly and the crank 92 is moved from horizontal to upright position, shown in broken lines at 92' in Fig. 6, thereby bringing the trip elements 84 to the elevated position shown in broken lines in Figs. 5 and 7. The solenoid may, of course, be controlled from a remote point by any suitable electric circuit, indicated in Fig. 4 by the wires 98 leading from suitable connection clips 100 on housing 82 to a push-button switch 102 and any desired source of energy, such as the track itself or the transformer supplying the same with energy.

The housing 82 is preferably provided with a pilot light 104 the bulb of which is disposed near and projects through an opening 106 in the top of the housing. A tunnel-like cover 108 is snapped in place over the bulb and is held by spring tongues 110. The ends of tunnel 108 are open, thus making the light from bulb 104 visible. The lamp is connected in circuit with the solenoid and is lighted whenever the solenoid is energized, thus indicating the fact that the track trips 84 are elevated and in position to open the coupling mechanism. It will be noted that the shaft 86 of the track trip is provided with a sleeve of insulation 112 between trips 84, thereby insulating shaft 86 from the third rail 114. The web of the third rail is discontinued at the trip mechanism, the ends of the third rail then being connected by a rod or rail head 116 beneath which the sleeve of insulation 112 is disposed. This precaution becomes desirable when, as is here the case, the shaft 86 is journaled in the outer rails of the track and is thereby grounded.

Reverting now to Figs. 1, 2, 3, and 5, the female coupler 24 has depending therefrom a feeler 120. This feeler is carried by coupler 24 and is somewhat oscillatable thereon, the parts being connected by means of tongues 122 formed at the top of feeler 120 and fitting over slots 124 cut transversely at the side edges of the coupler. The feeler 120 is connected to the detent 58. This connection is made such that the detent is opened regardless of whether the feeler 120 is moved forwardly or rearwardly of the car. Specifically, I employ a U-shaped piece of wire 126 the center portion 128 of which overlies the detent and its pivot 62. The legs of the U are first bent downwardly or vertically through slots 130 in the coupler, and are then bent horizontally to the feeler 120 to which the ends of the wire are secured by pinching the wire at each side of the feeler. It is important to notice in Figs. 1 and 2 that the connecting wire 126 is disposed on one side of the detent at one side of pivot 62, and on the other side of the detent at the other side of pivot 62. Because of this arrangement, if the connecting wire 126 is moved toward the detent, the wire bears against the arm of the detent and thus opens the detent tooth. If, on the other

hand, the wire 126 is moved away from the detent, it bears against the detent tooth and pulls the same open. For this reason, the coupling may be opened by causing the feeler of the coupling to pass over the track trips 84 in either direction.

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 the train is moving rearwardly at high speed, the uncoupled cars will continue moving, and this will keep the cars uncoupled if the locomotive is stopped or reversed. Of course, where continued rearward movement of the cars past the track trip is not necessary or desired, the train may be moved rearwardly until just past the track trip, and may then be moved forwardly over the track trip, 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 track-side relay.

It is believed that the construction and operation, as well as the many advantages of the improved toy train coupling system, will be apparent from the foregoing detailed description thereof. It will also be apparent that while I have shown and described the 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 automatic uncoupling system for toy trains, comprising cars having couplers, one of said couplers having separable jaws adapted to close about and to interlock with the other coupler, resilient means normally tending to open the jaws, a pivoted latch to hold the jaws in closed position, an elevatable track trip, a feeler on said coupler adapted to engage said track trip when elevated, said feeler being movable forwardly or rearwardly by said track trip, and means interconnecting said feeler and said pivoted latch, said means bearing against one side of said latch at one side of the latch pivot and bearing against the opposite side of said latch at the opposite side of the latch pivot, whereby the latch is moved from locked to unlocked position when the feeler is moved either forwardly or reversely by the track trip.

2. Automatically engaging coupler means for toy trains, comprising a male coupler and a mating female coupler, said female coupler being so shaped as to form a jaw with a sloping approach surface at one side, an opposite jaw pivotally mounted at the opposite side, said pivoted jaw having an arm extending transversely therefrom and disposed in the space between the jaws when the pivoted jaw is open, and a latch cooperating with the pivoted jaw to lock it in closed position when the aforesaid transversely extending arm is pushed by the male coupler.

3. Automatically engaging coupler means for toy trains, comprising a male coupler having a vertically disposed generally cylindrical coupling element, and a mating female coupler, said female coupler being so shaped as to form a jaw with a sloping approach surface at one side, an opposite jaw pivotally mounted at the opposite side, said pivoted jaw having an arm extending transversely therefrom and disposed in the space between the jaws when the pivoted jaw is open, a spring normally moving the pivoted jaw to open position, and a detent cooperating with the pivoted jaw to lock the jaw in closed position when the aforesaid transversely extending arm is pushed by the male coupling element as two cars to be coupled are pushed together.

4. Automatically engaging coupler means for toy trains, comprising a male coupler and a mating female coupler, said female coupler being so shaped as to form a jaw with a sloping approach surface at one side, an opposite jaw pivotally mounted at the opposite side, said pivoted jaw having an arm extending transversely therefrom and disposed in the space between the jaws when the pivoted jaw is open, means tending to open the jaws, and a latch cooperating with the pivoted jaw to lock it in closed position when the aforesaid transversely extending arm is pushed by the male coupler, and means to release the coupling comprising an elevatable track trip, feeler means on the female coupler, said feeler means being movable forwardly or rearwardly by said track trip, and means interconnecting the feeler means and the pivoted latch, said means bearing against one side of the latch at one side of the pivot and against the opposite side of said latch at the opposite side of said pivot.

5. Automatically engaging coupler means for toy trains, comprising a male coupler having a vertically disposed generally cylindrical coupling element, and a mating female coupler, said female coupler being so shaped as to form a jaw with a sloping approach surface at one side, an opposite jaw pivotally mounted at the opposite side, said pivoted jaw having an arm extending transversely therefrom and disposed in the space between the jaws when the pivoted jaw is open, a spring normally moving the pivoted jaw to open position, and a latch cooperating with the pivoted jaw to lock the jaw in closed position when the aforesaid transversely extending arm is pushed by the male coupling element as two cars to be coupled are pushed together, and means to release the coupling comprising an elevatable track trip, feeler means on the female coupler, said feeler means being movable forwardly or rearwardly by said track trip, and means interconnecting the feeler means and the pivoted latch, said means bearing against one side of the latch at one side of the pivot and against the opposite side of said latch at the opposite side of said pivot.

6. A toy automatic uncoupling system for toy trains, comprising cars having couplers, one of said couplers having jaws, means tending to cause relative separation of the jaws, a pivoted latch to prevent relative separation thereof, an elevatable track trip, feeler means on said coupler adapted to engage said track trip when elevated, said feeler means being movable forwardly or rearwardly by said track trip, and means interconnecting said feeler means and said pivoted latch, said last-named means bearing against

one side of said latch at one side of the pivot and against the opposite side of said latch at the opposite side of said pivot, whereby the latch is moved from locked to unlocked position when the feeler is moved either forwardly or reversely by the track trip.

7. In a toy automatic uncoupling system for toy trains, a coupler having separable jaws adapted to close about and to interlock with another coupler, resilient means normally tending to cause separation of the jaws, a pivoted latch to prevent relative separation thereof, and means to trip said pivoted latch, said means bearing against one side of said latch at one side of the pivot and against the opposite side of said latch at the opposite side of said pivot, whereby the latch is moved from locked to unlocked position when the means is moved either forwardly or reversely.

8. In a toy automatic uncoupling system for toy trains, a female coupler comprising relatively movable jaws, a jaw-closing arm extending transversely thereof and disposed in the space between the jaws when the jaws are relatively open, said arm functioning to relatively move the jaws together when the arm is pushed by the male coupler, means tending to cause relative opening of the jaws, a pivoted latch to prevent relative opening of the jaws, depending feeler means, said feeler means being movable forwardly or rearwardly by an appropriate track trip, latch release means bearing against one side of the latch at one side of the pivot, latch release means bearing against the opposite side of the latch at the opposite side of the pivot, and means so connecting said latch release means and said feeler means that the latch is released upon movement of the feeler means in either direction.

9. In an automatic uncoupling system for toy trains, a female coupler comprising relatively movable jaws, means tending to cause relative separation of the jaws, a pivoted latch to prevent relative separation thereof, depending feeler means, said feeler means being movable forwardly or rearwardly by an appropriate track trip, latch release means bearing against one side of the latch at one side of the pivot, latch release means bearing against the opposite side of the latch at the opposite side of the pivot, and means so connecting said latch release means and said feeler means that the latch is released upon movement of the feeler means in either direction.

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