United States Patent

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[54] **REMOTE UNCOUPLING MECHANISM**
10 Claims, 7 Drawing Figs.

[52] U.S. Cl. 213/212, 213/217
[51] Int. Cl. B61g 3/14
[50] Field of Search 213/100, 162, 148, 153, 159, 166, 167, 168, 212, 217, 219

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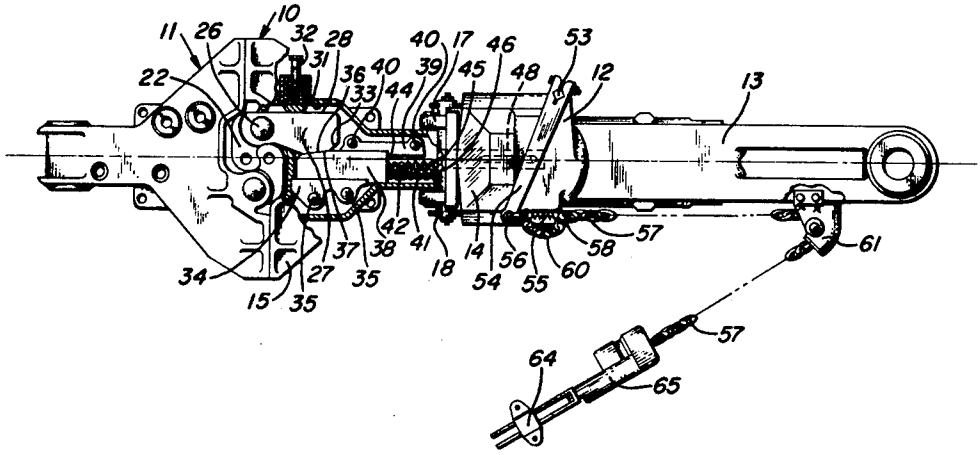
ABSTRACT: A remote uncoupling mechanism for railway cars connected by mating couplers having means for locking the couplers together. Remotely operated power means are provided to release the locking means to uncouple the cars.



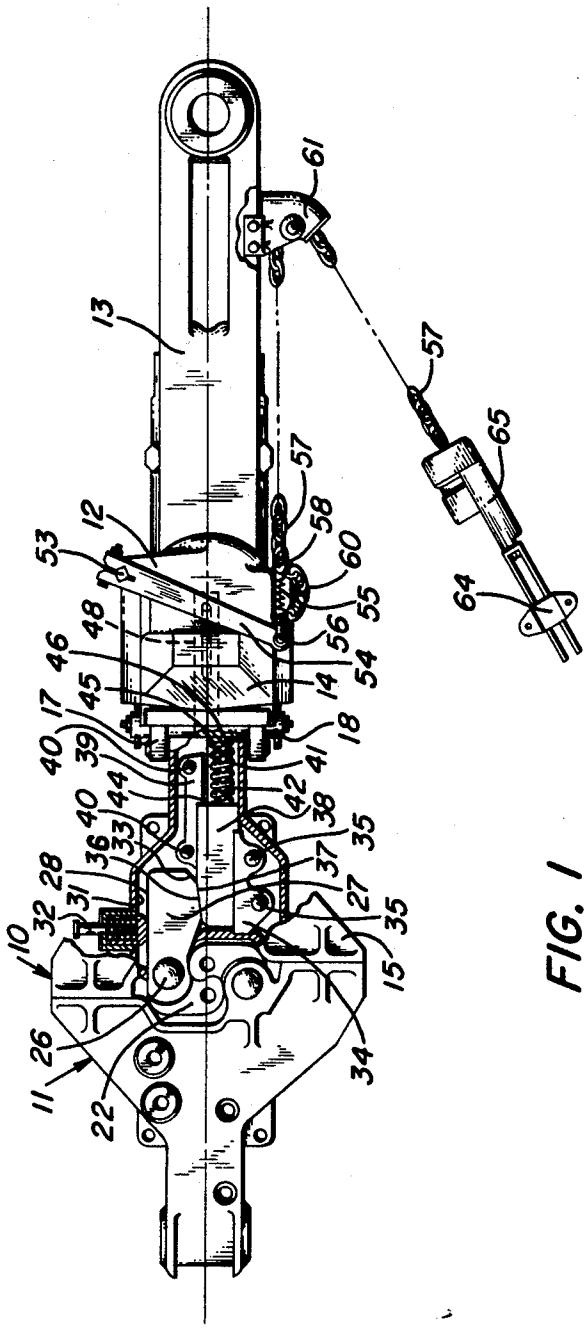


FIG. 1

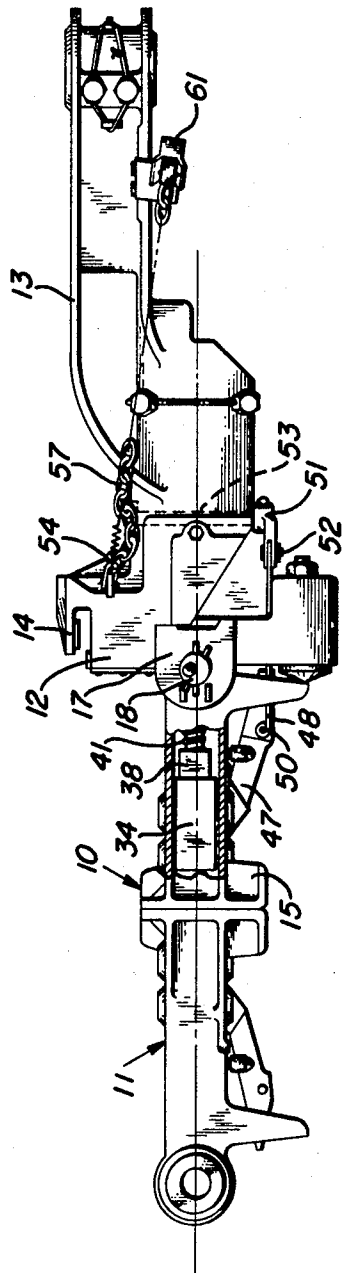


FIG. 2

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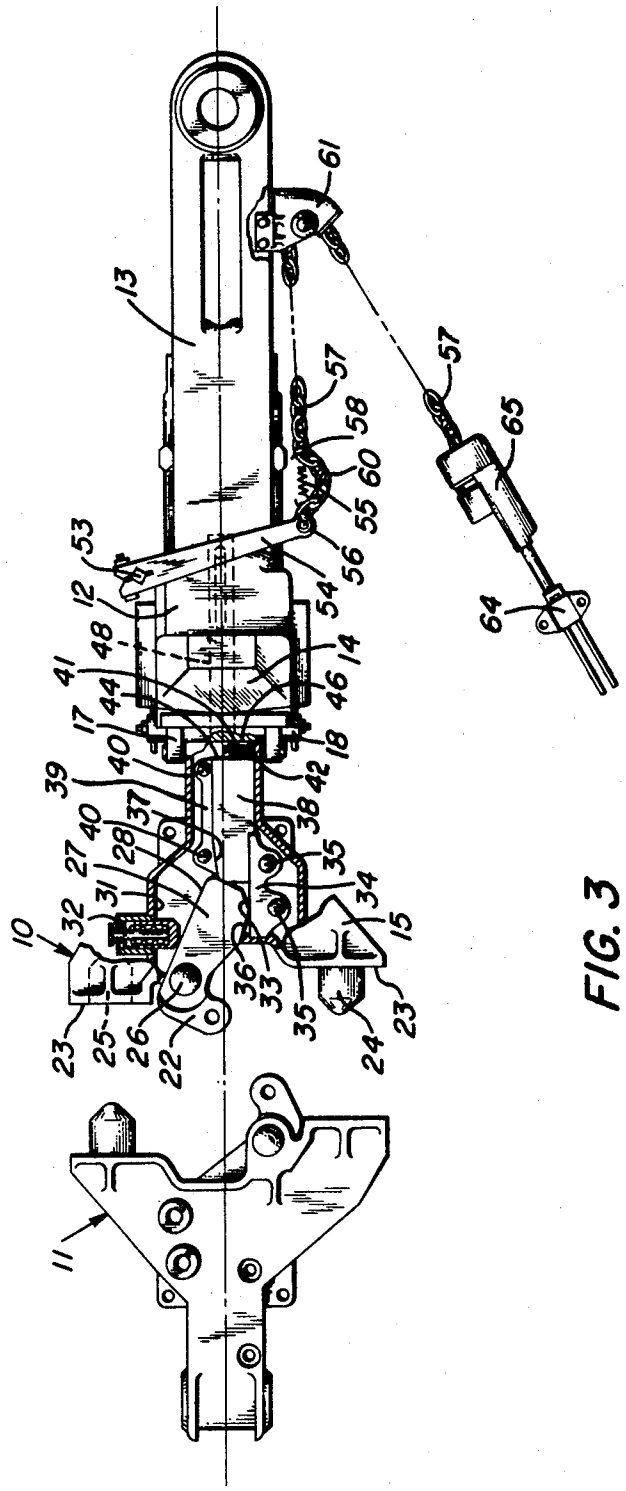

FIG. 3

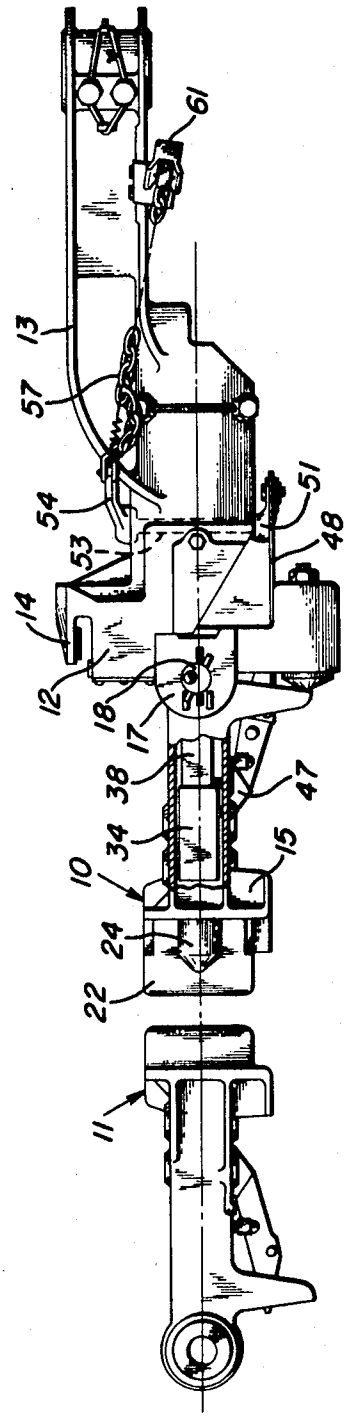

FIG. 4

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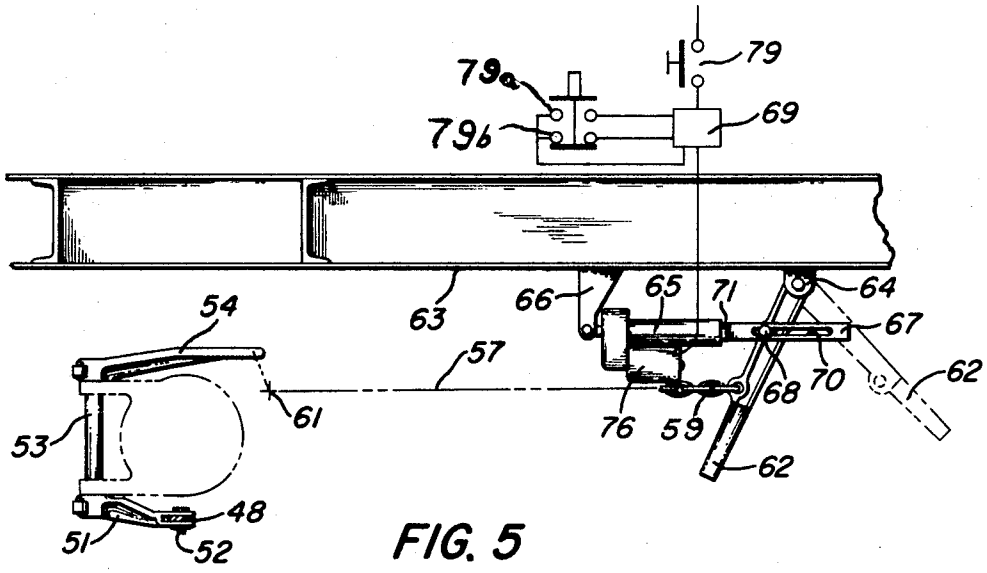

FIG. 5

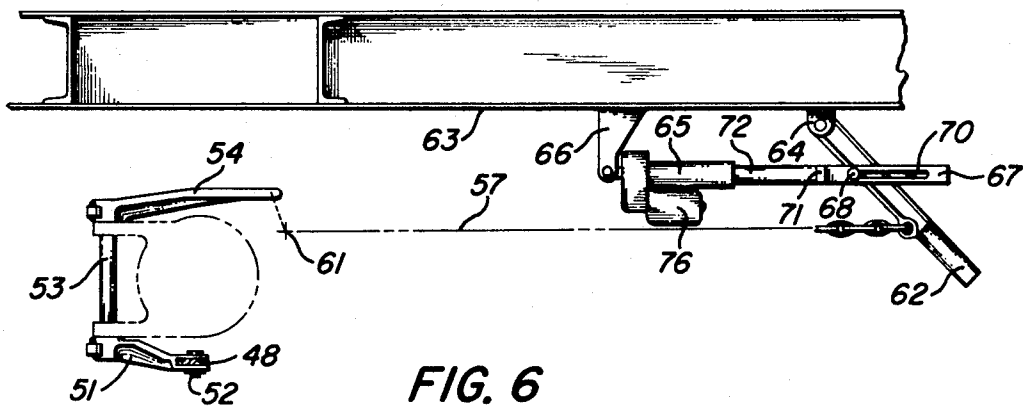

FIG. 6

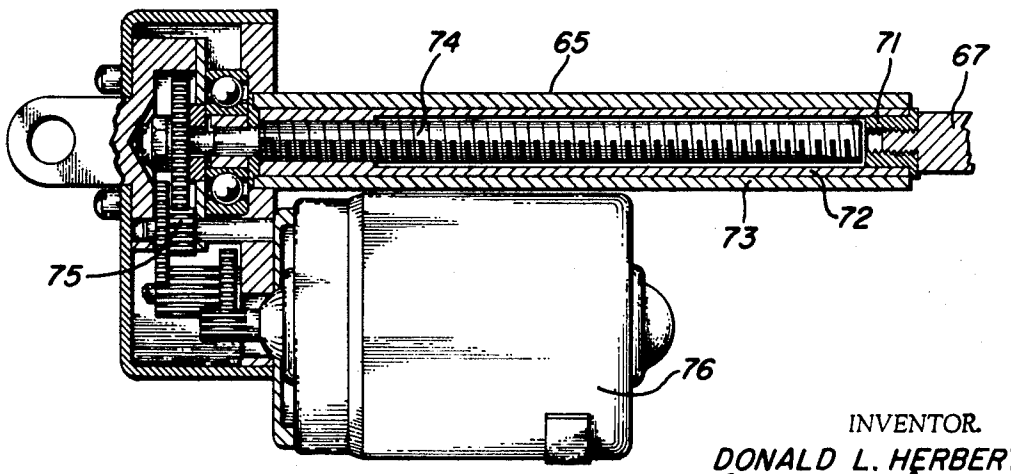

FIG. 7

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REMOTE UNCOUPLING MECHANISM

BACKGROUND OF THE INVENTION

This invention relates to uncoupling mechanisms for railway cars and more particularly to remotely controlled power mechanisms for uncoupling railway cars.

Railway and rapid transit cars are connected by a pair of mating couplers extending between adjacent cars. Each coupler is provided with a rotatable knuckle that engages the corresponding knuckle on the mating coupler. The knuckles are maintained in interlocking relationship by a spring loaded sliding lock being forced against the rear portion of the knuckle thereby preventing its rotation. The sliding lock is wedged into position between a portion of the coupler head and the rear portion of the knuckle. The sliding lock must be retracted out of contact with the knuckle before the couplers may be uncoupled. The present practice is to link the sliding lock to a chain that is affixed at one end to a lever. Movement of the lever and chain pulls the sliding lock out of contact with the coupler knuckle. The lever is customarily affixed to the underside of the car near the end thereof. Thus, in order for the cars to be uncoupled the trainman must leave the train and go between the two cars to actuate the sliding lock. This is time consuming and places the trainman in a position where he may be injured. In addition, because of the time required for the trainman to approach the end of the car, rapid uncoupling is not possible. While automatic uncoupling devices have been proposed, these have been complicated and have been operated by compressed air and thus unsuitable for modern transit cars embodying electric brakes and not having sources of compressed air.

SUMMARY OF THE INVENTION

It is, therefore, an object of this invention to provide an improved remote uncoupling mechanism for railway car couplers. Further objects of this invention are to provide mechanism for uncoupling railway cars from within the railway car, to provide electric power means for remotely uncoupling the couplers of railway cars; to provide a simple and convenient control for the uncoupling mechanism, and to provide a remote uncoupling mechanism for railway car couplers which will readily uncouple the cars even when the cars are not axially aligned.

This invention contemplates an uncoupling mechanism for railway car couplers in which the coupler knuckles are conventionally retained in coupled position by a spring loaded sliding lock located in the coupler head and bearing against the back of the knuckle. Suitable operative connections including a tension member and a resilient portion are provided between the sliding lock and a remotely controlled mechanism, which mechanism is adapted to pull the linkage and thus the lock out of locking engagement with the knuckle. This mechanism is actuated by suitable electrical controls from within the car.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a top plan view, with a portion broken away, of two couplers in coupled position illustrating the invention;

FIG. 2 is a side elevational view, with a portion broken away, of the couplers of FIG. 1;

FIG. 3 is a top plan view, with a portion broken away, of the couplers in uncoupled position;

FIG. 4 is a side elevational view, partially broken away, of the couplers of FIG. 3;

FIG. 5 is a schematic end view illustrating the linkage and remotely controlled mechanism for uncoupling the couplers as shown in coupled position;

FIG. 6 is a schematic view similar to FIG. 5 but with the remotely controlled mechanism shown in uncoupled position; and

FIG. 7 is a partial sectional view and to an enlarged scale of the actuator employed to operate the mechanism.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to FIG. 1, there are shown two railway car couplers 10 and 11 which are supported on adjacent ends of two railway cars (not shown). The couplers 10 and 11 are of the same design and construction thus only the components of coupler 10 will be described. The coupler 10 comprises a housing 12, an integrally formed draw bar 13, a flange 14 and a coupler head 15. The two couplers 10 and 11 have their adjoining parts constructed and arranged for interlocking engagement and separation to couple and uncouple the two cars in the conventional manner.

The coupler 10 is carried on the underside of a railway car by means of an anchor (not shown) which supports the draw bar 13 and by a sector bar (not shown) which supports the flange 14 in known manner. The coupler head 15 of the coupler 10 is carried by a yoke 17 which extends axially into the housing 12 and the yoke is resiliently held therein by a conventional draft gear mechanism (not shown). The coupler head is supported from the yoke 17 by a clevis pin 18 in a known manner.

The coupler head 15 includes a knuckle 22, buffing faces 23, a projecting piece 24 and a counterpart recess 25, all for engaging and cooperating with the associated parts of the companion coupler as shown in FIGS. 1 and 3. The knuckle 22 is pivotally mounted on the coupler head 15 by a vertical pin 26 and is provided with a locking tail piece 27. The tail piece 27 is provided with a contact face 28 arranged to contact an adjustable stop (not shown) when the knuckle 22 is in its locking position. The stop is located in the sidewall 31 of the coupler head and prevents the knuckle from further rotation in the counterclockwise direction. A spring biased plunger 32 positioned in the sidewall 31 contacts the face 28 of the knuckle and urges the knuckle away from the sidewall 31 to assist in moving the knuckle 22 toward its open or uncoupled position.

To limit the rotation of the knuckle 22 in the clockwise direction, the tail piece 27 of the knuckle is provided with another contact face 33 that is arranged to engage a lock block 34 at the side of the coupler head 15 opposite the coupler sidewall 31. The lock block 34 is maintained in a fixed position by a pair of lock block pins 35 extending vertically through the coupler head 15. Rotation of the knuckle about the pin 26 during uncoupling brings the contact face 33 into engagement with the lock block 34.

In order to lock the knuckle in coupled position, the tail piece 27 is provided with a third contact face 36 arranged for contacting the inclined face 37 of a sliding wedge lock 38. The sliding wedge lock 38 is located between a lock guide 39 and the lock block 34. The lock guide 39 is held in position in the coupler head 15 by a pair of lock guide pins 40 extending vertically through the coupler head. The lock block 34 and the lock guide 39 are arranged on opposite sides of the sliding lock 38 to define a fixed path through which the sliding lock 38 moves. The sliding lock 38 is biased into contact with the third contact face 36 of the tall piece 27 by a spring 41 surrounding a sleeve 42 secured to the sliding wedge lock 38. The spring 41 is retained between the rear end 44 of the sliding lock 38 and the base 45 of the sleeve 42 which base 45 bears against the rear wall 46 of the coupler head 15.

Before the couplers 10 and 11 can be uncoupled, the sliding lock 38 must be retracted against the force of the spring 41. With the sliding lock retracted the spring biased plunger 32 aids in moving the tail piece 27 of the knuckle 22 around the pivot pin 26 to the uncoupled position as shown in FIG. 3. After the lock 38 has been retracted the cars can be separated, the parts taking the position shown in FIG. 3 of the drawings. With the parts in this position and with no restraint on the movement of the lever 54, the cars may be coupled again

merely by bringing them together, which swings the knuckles 22 into coupling position. The sliding lock 38 then moves forward under the influence of the spring 41 and the parts are returned to the coupled position shown in FIGS. 1 and 2 of the drawings.

In order to provide for retracting the sliding lock 38, it is secured in conventional manner to a safety lock 47 supported on the underside of the coupler head 15. The safety lock 47 is connected to an uncoupling link 48 as by a pivot 50. The uncoupling link 48 is affixed to a lever 51 as by a link pin 52. The lever 51 is supported on the underside of the coupler housing 12 by an uncoupling level shaft 53 mounted on one side of the coupler housing 12 with one end secured to the lever 51 and the other end rigidly secured to an uncoupling lever 54 located on top of the coupler housing 12. Movement of the uncoupling lever 54 results in movement of the lever 51, uncoupling link 48 and safety lock 47, and thus retraction of the sliding lock 38. The construction and operation of the above described components of the railway car couplers are conventional and well known to those skilled in the art.

Since the uncoupling lever 54 is located on the top of the coupler housing 12, which is normally aligned with the centerline of the car, means must be provided to actuate this lever from the side of the car in order that the trainman will not be required to go between the two cars to uncouple them. As previously indicated, the conventional means for actuating the uncoupling lever consists of a chain affixed to the free end of the uncoupling lever 54 and to a lever secured to the side of the car.

According to the present invention, one end of a spring 55 is fixed to the free end 56 of the uncoupling lever 54, and the other end of the spring is fixed to one end 58 of a chain 57. A length of chain 60 is also secured to the free end 56 of the uncoupling lever 54 and to the end 58 of the chain 57 as a safety measure in the event that the spring were to break during operation and to limit extension of the spring 55.

The chain 57 extends from the spring toward the anchor substantially parallel to the draw bar 13 and thus away from the end of the railway car. The chain 57 extends through a chain guide assembly 61 mounted on the anchor and then again toward the end of the car where its other end 59 is connected to a lever 62 pivotally mounted on the underside 63 of the car by a bracket 64. The chain 57 is slightly longer than the distance between the spring 55 and the lever 62 to provide some slack in the chain to compensate for changes in alignment of the coupler with respect to the car center line.

To uncouple the cars, the lever 62 must be moved from its position shown in full lines in FIG. 5 to the position shown in dotted lines in FIG. 5 and in full lines in FIG. 6. This movement of lever 62 moves through tension in the chain 57 the uncoupling lever 54 from the coupled position shown in FIG. 2 to the uncoupled position shown in FIG. 4 and retracts the sliding lock 38. (It is to be noted that FIGS. 5 and 6 are views taken in such a manner that the movement of lever 54 and 51 does not show). The lever 62 is moved by an actuator 65 which is electrically operated from within the railway car by conventional electrical circuitry schematically illustrated at 69 and controlled by a push button 79. The actuator 65 is suspended from the underside 63 of the car by a bracket 66 and is connected to the lever 62 by a reciprocating uncoupling yoke 67. A pin 68 secured to lever 62 and extending through a slot 70 near the end of the uncoupling yoke 67 joins the uncoupling yoke 67 and the lever 62. The pin is slidable in the slot, and the pin and slot together provide a lost motion connection between the yoke 67 and lever 62.

To reciprocate the uncoupling yoke 67, it is secured to one end 71 of an internally threaded sleeve 72 extending into the housing 73 of the actuator 65. A member 74 is threaded into the sleeve 72 in such a fashion that rotation of member 74 moves the sleeve axially in and out of the housing 73. The sleeve 72 may thus be extended from the actuator to move the uncoupling yoke 67 and thus move the lever 62 in the uncoupling direction. Rotation of member 74 in the opposite direction will retract the sleeve and yoke but not the lever 62 because the pin 68 joining them slides in the elongated slot 70 in the yoke.

The threaded member 74 is affixed to a gear assembly 75 driven by a reversible motor 76 operated from within the railway car through the conventional electrical circuitry 69. The actuator motor 76 can be operated to extend the threaded member 74 to move the uncoupling yoke 67 to uncouple the cars by the pushbutton 79 which energizes an electrical circuit to operate the reversible motor 76. When the sleeve 72 reaches the end of its travel, the uncoupling yoke 67 assumes the position shown in FIG. 6.

When the coupler 10 is aligned with the center of the car and in the coupled position, there is a small amount of slack in the chain 57. As the coupler moves to the side of the car away from the side on which lever 62 is mounted as when the train rounds or stops on a curve, the slack will be taken up at least in part. The slack in the chain is such that normal movements of the coupler away from the center of the car will not create tension in the chain sufficient to move the uncoupling lever 54. The distance through which the yoke travels when the actuator is operated is constant. If there is any slack in the chain 57, this is taken up by the uncoupling yoke 67 moving the lever 62 a short distance before the chain pulls the spring 55 and the uncoupling level 54. The spring 55 is designed so that in ordinary operation it pulls the uncoupling lever 54 without elongation. If the coupler is on a curve, there will be little, if any, slack in the chain and the spring 55 then elongates to permit continued movement of the chain 57 after the uncoupling lever 54 has reached the limit of its travel in the uncoupling direction. Elongation of the spring thus allows the actuator 65 to complete its normal stroke even though the entire stroke may not be required to complete the withdrawal of the sliding wedge lock 38 to uncoupling position.

The actuator 65 is preferably controlled electrically so that when the pushbutton 79 is depressed the uncoupling yoke 67 will be extended and will remain in its extended position until the trainman releases the pushbutton after the car has been uncoupled, whereupon the yoke 67 will be retracted by the actuator 65 and the car placed in readiness for a conventional automatic coupling operation. This is accomplished by conventional circuits and limit switches arranged so that when the button 79 is depressed, closing the contacts 79*a* and opening the contacts 79*b* of FIG. 5, the motor 76 will be energized to operate it in the proper direction to extend the yoke 67 and move the lever 62 in the uncoupling direction. A holding circuit is provided so that if the trainman releases the button 79 the motor continues to operate until the yoke 67 is fully extended, whereupon the circuit that supplies power to operate the motor 76 in the extending direction is opened by an appropriate limit switch. The spring 55 or other resilient connection is important to this operation since it insures that the actuator 65 will be able to complete its extending stroke and move the lever to its normal uncoupling position even though the movement of the lock 38 to its uncoupling position may have been completed before the actuator has reached the end of its stroke.

If the operator has simply momentarily depressed the button 79 and released it, the circuits through contacts 79*b* will be closed and the motor 76 will start operating in the reverse direction to retract the yoke 67 immediately after the yoke has been fully extended. The retracting movement will continue, through the provision of a holding circuit, until the yoke reaches the fully retracted position as shown in FIGS. 5 and 7, whereupon another limit switch will shut off all power supply to the motor. It will be noted that, because of the lost motion connection, retraction of the yoke does not move the lever to its coupling position, but this movement will take place after the car has been coupled to another car, the coupling operation swinging the knuckle 22 from the position shown in FIG. 3 to the coupled position shown in FIG. 1, permitting the lock 38 to be moved by spring 41 to the locking or coupling position shown in FIG. 1. This same movement of the lock 38

causes the uncoupling lever **54** and the lever **62** (through the tension member **57**) to be moved from their uncoupling positions to their coupling positions. This movement cannot take place so long as the yoke **67** is extended by actuator **65**.

If, instead of momentarily depressing the button **79**, the operator holds the button **79** in the depressed position, then when the actuator **65** reaches the end of its extending stroke and the yoke **65** has been extended to the position shown in FIG. **6**, the limit switch will cut off the power to the motor **76** and the actuator will remain in fully extended position so long as the operator continues to depress the button. However, as soon as the operator releases the pushbutton the motor will operate to retract the yoke **67**, power being supplied through contacts **79*a***, and the retracting movement will continue until the actuator reaches the fully retracted position where, as before, the power will be cut off. Thus, the trainman can unlock the coupler and maintain it in unlocked condition by pushing the pushbutton and holding it in the depressed position. When the trainman releases the pushbutton, the actuator retracts and places the coupler in condition for a subsequent coupling operation. It will be evident that different types of electrical controls may be provided; for example, a two position switch, that in one position would extend the actuator **65** and in the other position retract it, could be employed, again with appropriate limit switches so that the actuator would go to the limits of its stroke and stop.

In the event of an electrical failure, the car may be uncoupled manually by a trainman pulling the lever **62** to the dotted line position shown in FIG. **5**. The lever **62** may be moved to this position without disturbing the uncoupling yoke **67** because of the lost motion provided by slot **70** in the uncoupling yoke **67**. Thus the uncoupling mechanism may be operated from within the car remotely through electrical circuits to drive the motor **76** or it may be operated manually from outside of the car in the event of electrical failure or in the event that the trainman so desires.

I claim:

1. A remote uncoupling mechanism for a railway car coupler mounted on a railway car, the coupler having a lock and means resiliently biasing the lock toward a locking position, the lock being movable against the force of the biasing means to an unlocking position to permit the coupler to be uncoupled, said remote uncoupling mechanism comprising a lever mounted on the car, said lever being movable between a coupling position and an uncoupling position, an operative connection between said lever and said lock comprising a flexible tension member, whereby movement of said lever to uncoupling position moves said lock to its unlocking position and movement of said lock by said biasing means to its locking position moves said lever to its coupling position, a power operated actuator for moving said lever from its coupling position to its uncoupling position, and a spring interposed in said operative connection between said lever and said lock, said spring being constructed so that it is not substantially extended by the force normally required to move said lock from its locking position to its unlocking position and being extensible to permit the actuator to complete its movement and move the lever to its uncoupling position even though the lock has been moved to its unlocking position before the lever has reached its uncoupling position.

2. Apparatus according to claim **1** having a lost motion connection between the actuator and the lever whereby the lever can be moved manually from its coupling position to its uncoupling position without operation of the actuator.

3. Apparatus according to claim **2** wherein a linear actuator is provided, the actuator moving an uncoupliing yoke and the lost motion connection comprising an elongated slot in the actuator and a pin on the lever and disposed in the slot.

4. Apparatus according to claim **3** wherein the lever is pivotally mounted on the car.

5. Apparatus according to claim **1** wherein the actuator is operated by a reversible electric motor and the motor is controlled through circuits connected to a control within the car.

6. Apparatus according to claim **1** having means for limiting the extension of said spring.

7. Apparatus according to claim **6** wherein the flexible tension member is a chain and means for limiting the extension of said spring is a length of chain.

8. A remote uncoupling mechanism for a railway car coupler mounted on a railway car, the coupler having a lock and means resiliently biasing the lock toward a locking position, the lock being movable against the force of the biasing means to an unlocking position to permit the coupler to be uncoupled, said remote uncoupling mechanism comprising a lever mounted on the exterior of the car, said lever being movable between a coupling position and an uncoupling position, an operative connection between said lever and said lock whereby movement of said lever to uncoupling position moves said lock to its unlocking position and movement of said lock by said biasing means to its locking position moves said lever to its coupling position, a power operated actuator for moving said lever from its coupling position to its uncoupling position, means in said railway car for controlling said actuator and lost motion connecting means between the actuator and the lever whereby the lever can be moved manually from its coupling position to its uncoupling position without operation of the actuator.

9. In a remote uncoupling mechanism for a railway car coupler having a lock movable between a locking position, and an unlocking position and said remote uncoupling mechanism comprising a lever mounted on the exterior of the car and movable between a coupling position and an uncoupling position, and means for connecting said lever and said lock whereby movement of said lever to uncoupling position moves said lock to its unlocking position and movement of said lock to its locking position moves said lever to its coupling position, the improvement which comprises a power operated linearly movable actuator for moving said lever from its coupling position to its uncoupling position and means in said railway car for controlling said actuator, said actuator having a slot parallel to its line of travel and said lever having a pin slidable received in said slot to provide a lost motion connection between said actuator and said lever whereby said lever can be moved manually from its coupling position to its uncoupling position without operation of said actuator.

10. Apparatus as defined in claim **9** wherein said actuator is powered by a reversible electric motor.