Jan. 14, 1964 A. M. MIERS 3,117,679

UNCOUPLING DEVICE FOR LONG TRAVEL CUSHIONED UNDERFRAME

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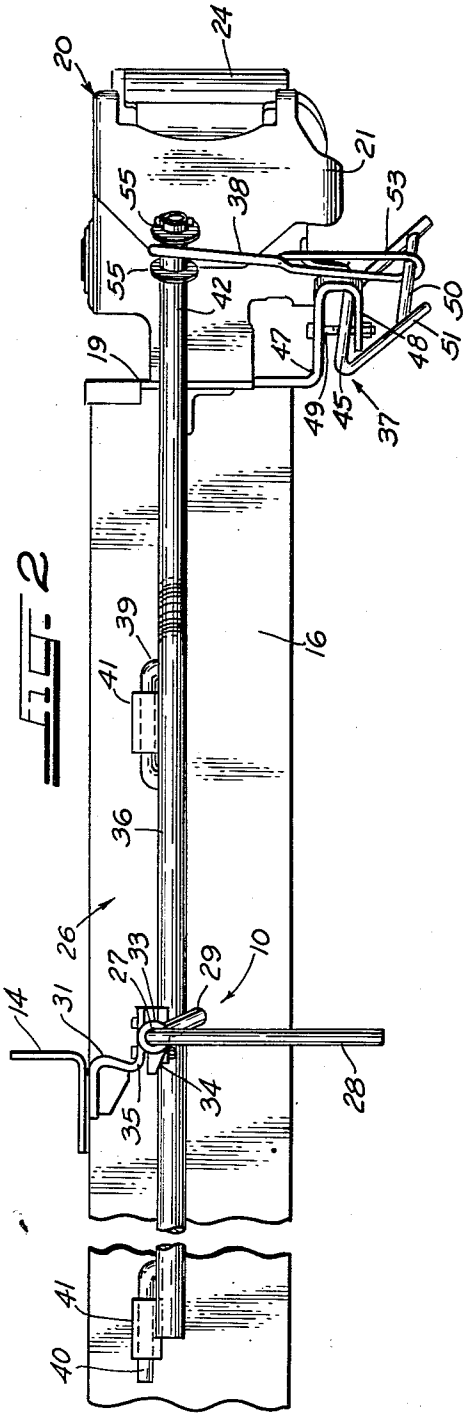


FIG. 2

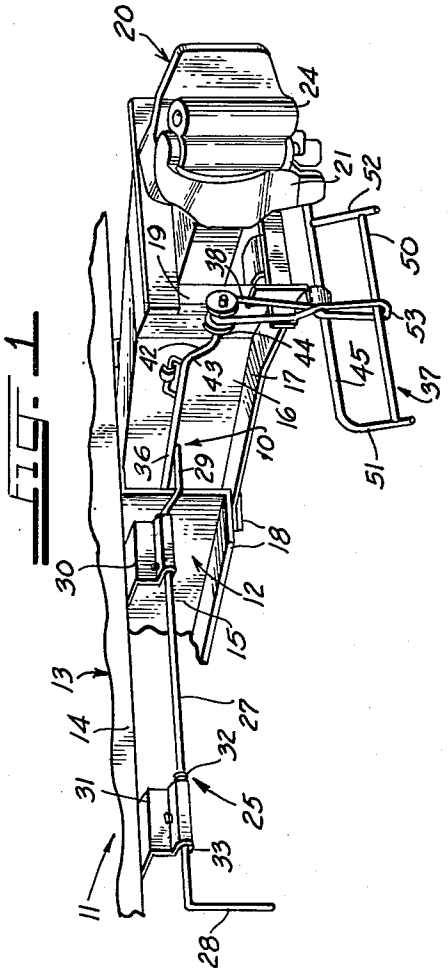


FIG. 1

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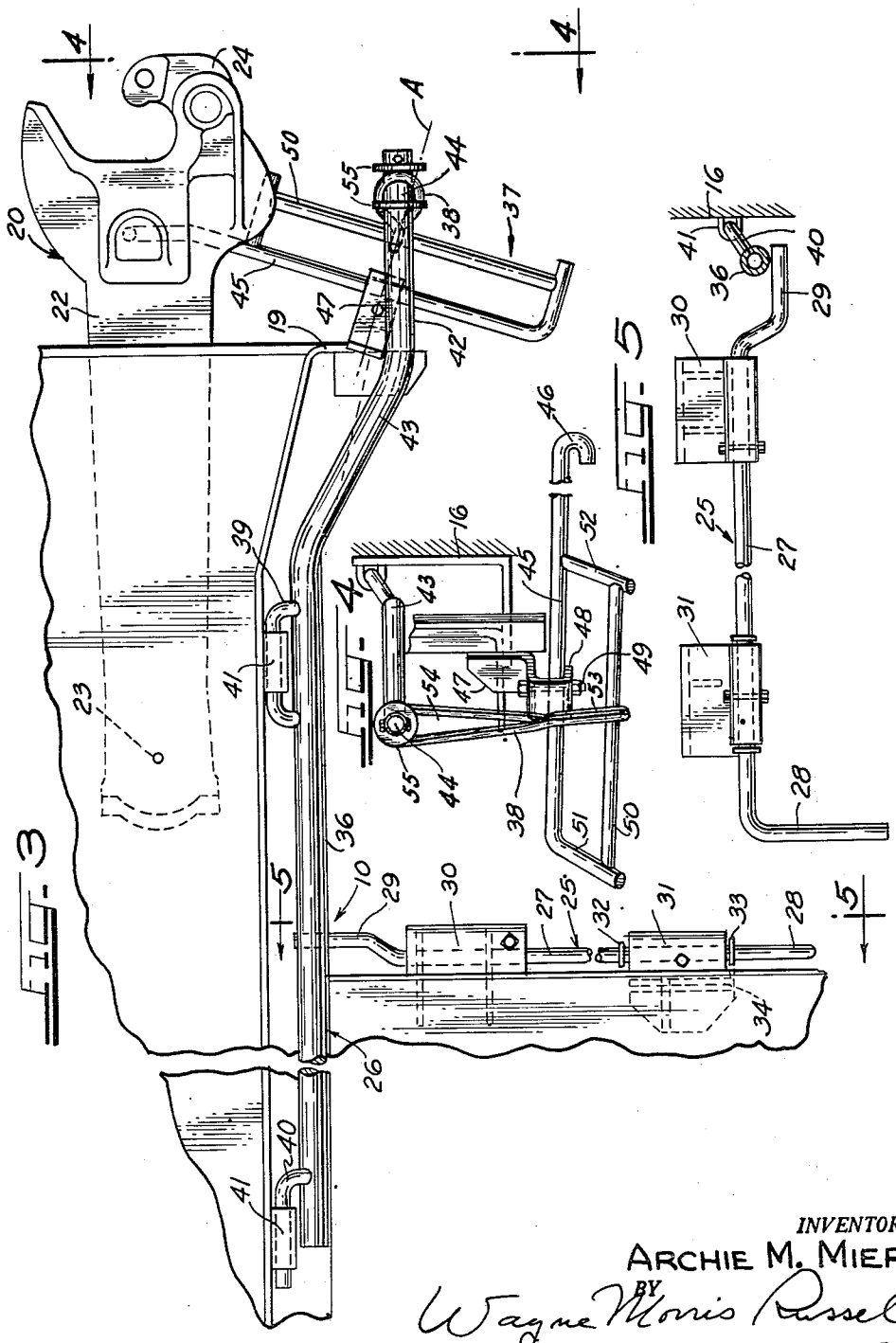


FIG. 3

FIG. 5

FIG. 4

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FIG. 6

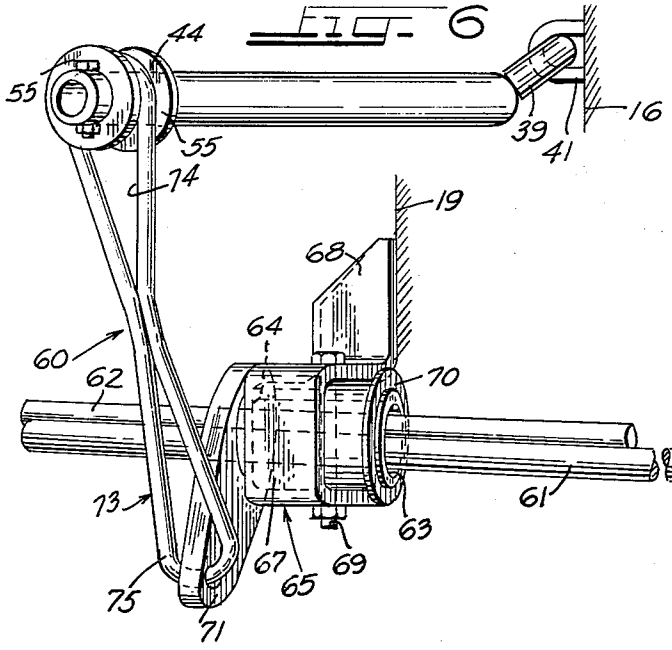


FIG. 7

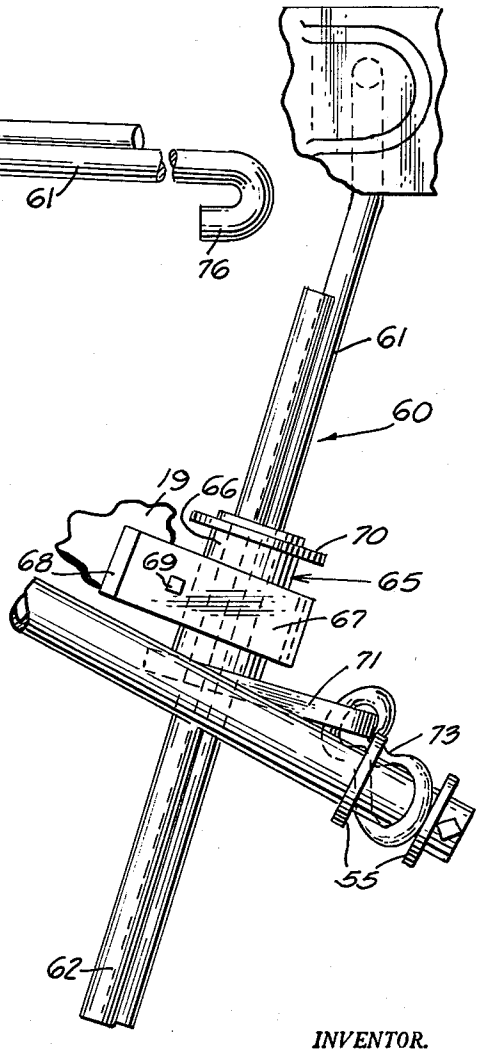
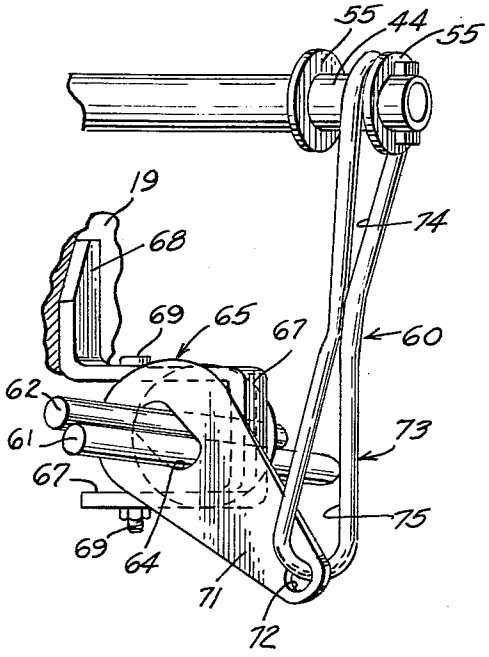


FIG. 8



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UNCOUPLING DEVICE FOR LONG TRAVEL CUSHIONED UNDERFRAME

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13 Claims. (Cl. 213—219)

The present invention is related to uncoupling devices for use in railway vehicles of the cushioned underframe type and more particularly to uncoupling devices employed in cushioned underframe railway vehicles wherein the sill of the underframe carrying the coupling mechanisms is relatively movable with respect to the superstructure such that the ends of the superstructure travel toward and away from the respective ends of the sill from which the couplers project.

In one type of cushioned underframe structure employed in other railway vehicles such as flat cars and railway vehicles a center sill cushioning arrangement is frequently employed. This cushioned center sill arrangement described in copending application Serial No. 856,963, filed December 3, 1959, now Patent No. 3,003,436 issued October 10, 1961, and assigned to the assignee of the present invention is used herein for purposes of illustrating a typical cushioned underframe railway vehicle with which the uncoupling device of the present invention may be employed, but the uncoupling device is not limited for use with the exemplary center sill cushioning arrangement.

As disclosed in the aforesaid copending application to which reference is made for a more detailed description of the cushioned center sill, a cushioning device is disposed between a sliding sill supporting the couplers at each end thereof and the superstructure to absorb buff and draft forces applied to the couplers. The cushioned sliding sill design basically includes a hollow longitudinally extending center sill receiving therein a sliding sill unit which in turn pivotally mounts couplers at its projecting ends. The sliding sill is in engagement generally centrally of the car with a suitable cushioning device, hydraulically or otherwise appropriately operated, which functions to absorb coupler shocks in buff or draft encountered during operation and which result in retraction of the sliding sill into the hollow center sill at one or the other end of the car. In this manner the sliding sill and the couplers mounted therein travel longitudinally relative to the car thereby to protect the lading carried by the car from the destructive forces of the coupler shock. Upon dissipation of the shock the cushioning arrangement is operative to return the sliding sill and couplers mounted therein to their original positions. The travel of the sliding sill and the couplers relative to the car body when in the long travel range may extend by way of example between 20-40 inches on either side of the normal transit position of the coupler relative to the end of the car body.

It is a principal object of the present invention to provide a new and improved uncoupling device for use with a railway car having a long travel cushioned underframe in which the uncoupling device is constructed and arranged to accommodate the relative traevl of the coupler to the car body such that the different components of the uncoupling device remain in operative association over the full length of travel of the coupler and car body when the coupler is subject to impact.

It is a further object to provide a new and improved uncoupling mechanism for use in a railway car having a long travel cushioned underframe in which the uncoupling device is constructed and arranged so as to include a portion movable with the sill structure on which the coupler is mounted and a portion mounted on the car body so that upon relative movement between the car body and said coupler the above-mentioned portions of said uncoupling device remain in operative association over the full range of travel of the coupler with respect to the car body.

It is still a further object to provide a new and improved uncoupling mechanism for use in a railway car having a long travel cushioned underframe in which the uncoupling mechanism is constructed and arranged to include lost motion means which serve to prevent inadvertent unlocking of the coupler upon an unintended partial operation of the uncoupling mechanism.

It is still a further object of the invention to provide a new and improved uncoupling device of the type described taken in conjunction with the other objects which includes therein means constructed and arranged to efficiently unlock the coupler in various different angular positions of the coupler relative to the longitudinal axis of the sill on which the coupler is mounted.

Further objects and features will hereinafter appear.

In the drawings:

FIG. 1 is a fragmentary perspective view of an end of a railway car provided with a long travel cushioning arrangement embodying the uncoupling device of the present invention.

FIG. 2 is a fragmentary side elevational view of the uncoupling device shown attached to the center sill and coupler housing.

FIG. 3 is an enlarged fragmentary plan view similar to FIG. 2.

FIG. 4 is a fragmentary view taken substantially along the line 4—4 of FIG. 3 showing the operating portion of the uncoupling device of the present invention.

FIG. 5 is a partly sectioned fragmentary view taken substantially along the lines 5—5 of FIG. 3 illustrating the association of the manually operated means mounted on the end sill of the car body with the crank lever mounted on the sliding sill.

FIG. 6 is a fragmentary front end perspective of another embodiment of the operating portion of the device.

FIG. 7 is a fragmentary plan view of the operating portion of the device shown in FIG. 6.

FIG. 8 is another front end perspective of the operating portion of the device shown in FIG. 6 as viewed from a different angle.

Referring now to FIGS. 1–5 of the drawings the uncoupling device 10 is shown for purposes of illustration employed with a cushioned underframe railway vehicle 11 of the cushioned sliding sill type. The railway vehicle 11 includes an underframe 12 having a superstructure 13 mounted thereon which may be an enclosed car body or a flat bed. The bed 13 includes an end sill 14 and a hollow center sill structure 15 of substantially rectilinear cross section extending longitudinally thereof. A sliding sill 16 is mounted in the center sill 15 for relative longitudinal sliding movement and extends through the center sill the ends of the sliding sill projecting outwardly of the center sill 15. The sliding sill 16 is of generally rectilinear section and is guided and held within said center sill 15 by way of horizontal flanges 17 extending from the lower end thereof between spaced flanges 18. As fully disclosed in the aforementioned copending application, a cushioning arrangement is operatively disposed between the sliding sill 16 and center sill 15. The cushioning device (not shown) may be in the form of a hydraulic cylinder.

As shown the sliding sill 16 projects outwardly of the end sill 14 and center sill 15 of the car body 12 and is provided at its terminal face with a striker plate portion 19. Disposed within the hollow and pivotally supported therein is a conventional coupling device 20 of which the coupler head 21 is disposed outwardly of the striker plate 19.

The coupler 20 includes a shank portion 22 pivotal about an axis 23 and the conventional pivotally mounted knuckle 24 which is operated by a knuckle thrower (not shown) which in turn is controlled by a locking mechanism (not shown). Further details of the coupler device are not believed to be necessary because the structure and operation thereof is well-known in the art.

When the couplers 20 at opposite ends of the sliding sill 16 are subject to shock either in buff or draft the sliding sill 16 is responsive to the shock and moves through the center sill 15 against the resisting force of the cushioning device thereby to absorb the forces of the shock and substantially prevent damage to the cargo or lading on the car superstructure 13. Upon dissipation of the shock the cushioning device is operative to return the sliding sill 16 and accordingly the couplers 20 to their normal position. A long travel cushion arrangement of the type for which the uncoupling device is primarily intended may have travels of from about 20 to 40 inches in either direction.

In accordance with the present invention there is provided the uncoupling device 10 comprising generally a manual operating means 25 connected to the car body 13 and coupler lock operating means 26 connected to the movable sill 16 for movement therewith for unlocking the coupler and being operatively connected to the manual operating means for the full length of travel of the car body 13 relative to the coupler 20 so that actuation of the manual operating means at any time is operative to unlock the coupling device.

The manual operating means 25 includes an operating lever 27 extending parallel to and along the bottom edge of the end sill 14 and is formed at the car side wall end thereof with a bent operating handle 28. At its other end the lever 27 is formed with a crank or lifting arm 29. The lever 27 is turnably supported on the underside of the end sill 14 by way of clip members 30 and 31 of which the clip member 31 adjacent the operating handle 28 cooperates with spaced stop discs 32 and 33 fixed to the lever 27 and arranged to maintain the crank portion disposed in operative association with the coupler lock operating means 26. To limit clockwise turning of the handle 28 the disc 33 is formed as shown in particular in FIG. 2 with a stop projection 34 which underlies a horizontal flange 35 of the clip 31.

The uncoupler lock operating means 26 includes generally a crank lever 36 secured to the sliding sill 16 for movement therewith, an uncoupling rod assembly 37 for unlocking the coupler 20 and an uncoupling rod link 38 connecting the crank lever 36 with the uncoupling rod assembly 37.

The crank lever 36 is mounted on the side of the sliding sill 16 by way of spaced straps 39 and 40 fixed thereto as by welding. The straps 39 and 40 are turnably supported by clips 41 fixed to the sliding sill 16 and which are arranged so as to permit limited lengthwise movement of the crank lever 36 relative to the sliding sill 16. The outer end of the crank lever 36 is formed with a crank portion 42 which projects beyond the striker plate portion 19 of the sill 16. As shown in particular in FIG. 3 the crank portion 36 is formed with a length 43 thereof being arranged parallel to the outwardly flaring portion of the sill 16 and a crank end portion 44 arranged substantially parallel to the longitudinal axis of the sliding sill 16.

The uncoupling rod assembly 37 includes an uncoupling rod 45 on the coupler end of which there is formed a coupler lock engaging hook-like extension 46 which is operative upon turning of the rod 45 from the position shown to release the locking mechanism of the coupler 20 in the well-known manner. As shown in the drawings the coupler 20 is supported on the axis 23 for limited angular turning toward and away from the crank arm end portion 44 supported on the sliding sill such that the uncoupling rod 45 is accordingly moved relative to the crank arm end portion 44. To accommodate for such movement the uncoupling rod 45 is loosely mounted for free sliding substantially linear movement in a bracket 47 fixed to the striker plate 19. The bracket includes a U-shaped portion 48 through the legs of which there passes a bolt 49 which serves to retain the uncoupling rod 45 freely supported in a bracket for the linear limited movement as the coupler turns about its axis and effects movement of the rod 45.

For providing a torque arm which is substantially constant for any of the different angular positions of the coupler with respect to the crank end portion 44 of the crank lever 36 a torque bar 50 is fixed between a bent outer end 51 of the uncoupling rod 45 and a rod 52 fixed intermediate the inner and outer ends of the uncoupling rod 45. The torque bar 50 is spaced from and extends parallel to the uncoupling rod 45 and is located somewhat inwardly of the end of free ends of rod 52 and the bent end 51 so that the latter are operative to retain the uncoupler connecting link 38 thereon. The torque bar 50 is of sufficient length to permit relative sliding movement of coupler connecting link 38 on the torque bar 50 for the limit of movement of uncoupling rod 45 as the latter moves with the angular turning of the coupler to either its right or left limit position.

The uncoupler connecting link 38 is constructed to provide lost motion so as to accommodate for the usual motions occurring during transit of the railway vehicle without causing damage or inadvertent operation of the uncoupling device 10. The link 38 is formed from a rod-like member twisted so as to provide a lower loop 53 and an upper loop 54 which are bent into planes substantially normal to each other. The lower loop 53 is arranged to encompass the torque bar 50 and the upper loop is supported on the end of the crank arm portion 44 between washers 55 spaced to permit limited relative movement of the loop along the crank portion 44.

The uncoupling device 10 in the position illustrated in the drawings is operative to hold uncoupling rod 45 relative to the uncoupling mechanism of the coupler 20 in its locked or coupling position. In this position the lifter or crank arm 29 bears against the underside of the crank lever 36. However, because arm 29 is not positively connected to the crank lever 36 mounted on the sliding sill 16 the arm 29 remains in sliding engagement for the full length of travel of the sill 16 relative to the car body 13. Upon impact at the couplers 20 such sliding engagement does not effect the relative position of the uncoupling rod 45 so that the coupler 20 remains locked.

Upon turning the handle 28 counterclockwise, clockwise movement of the handle being prevented by the stop lug, the lifter arm 29 raises the crank lever 36 via the straps 39 and 40 turnably mounted in clips 41 to turn the crank arm portion 44 clockwise. Clockwise turning of the crank arm portion 44 raises the connecting link 38 whereupon the lower loop 53 thereof engaging the torque bar 50 of the uncoupling rod 45 lifts the bar 50 for turning movement about the point of engagement of the uncoupling rod 45 with the bracket 47. Turning of the torque bar 50 causes a corresponding turning of the uncoupling rod 45 so that the hook end 46 unlocks the coupler 20.

Advantageously, the uncoupling rod 45 is loosely supported within the U-shaped portion 48 and the stud 49 of the bracket 47 so as to permit free linear sliding movement thereof as the coupler pivots or turns about its axis. At the same time, the torque bar 50, which is movable with the uncoupling rod 45, slides freely within the lower loop 53 of the connecting link 38 so that the latter remains substantially in the same position or attitude as shown in FIGS. 3 and 4. In this connection, it is to be noted that the crank arm portion 44 and the torque bar 50 are located relative to each other so that the lower loop 53 of the connecting link 38 contacts the torque bar 50 approximately along the line A normal to the turning axis of the uncoupling rod 45 and extending

through the bracket 47. This relationship is of significance because in the event that the lower loop 53 contacts the torque bar 50 a substantial distance on either side of the above-defined line upon lifting of the crank arm portion 44 to turn the uncoupling rod 45 to its recommended position, the link 38 would tend to tilt the uncoupling rod 45 in a vertical plane so that the latter binds in the U-portion 49 of the bracket. Such binding of the uncoupling rod 45 would cause difficulty in turning the uncoupling rod 45 and thereby in actuating the locking mechanism of the coupler device so that the latter would remain locked even though the crank arm 44 is lifted to an unlocked position. However, with the arrangement of the present invention wherein the lower loop 53 is positioned in approximate alignment with the line A, such tilting is precluded and only a turning of the uncoupling rod 45 occurs. Following the coupler unlocking operation the various elements are returned to their original position. However, the coupler remains unlocked until coupled with another railway car in the usual manner so that the knuckle 24 is engaged.

Referring now to FIGS. 6–8 inclusive there is shown a further embodiment of an uncoupler rod assembly 60 which is adapted to be employed wtih a manual operating means 25 and crank lever 36 identical to that described in connection with the uncoupling device of FIGS. 1–5.

As shown the second embodiment of the uncoupler rod assembly 60 includes an uncoupling rod 61 of which one portion is formed of a non-circular contour by way of a second rod 62 welded in tangentially thereto. The non-circular portion is loosely accommodated within openings 63 and 64 formed in a torque arm means 65. The torque arm means 65 includes a hub portion 66 supported for limited sliding movement and limited turning in the U-shaped portion 67 of a bracket 68 fixed to the striker 19. A bolt 69 extending through the legs of the U-shaped portion 67 retains the hub within the bracket 68. Endwise movement of the hub 66 is limited by way of a stop collar 70 on one end thereof and a torque arm 71 on the other end. The stop collar 70 and torque arm 71 are suitably fixed to the hub as by welding or the like. The opening 63 in the hub 66 may be circular and is sized so as to loosely receive the non-circular length of the uncoupling rod 61.

The torque arm is provided adjacent its hub with the opening 64 which is of an elongate shape having circular end portions so as to loosely accommodate the non-circular portion of the uncoupling rod 61 for relative sliding movement and upon turning of the torque arm 71 to turn the uncoupling rod 61. The torque arm 71 extends outwardly of the uncoupling rod 61 and is provided with an opening 72 adjacent its free end through which there passes a connecting link 73.

The connecting link 73 is formed from a rod twisted to provide an upper loop 74 and a lower loop 75 arranged relatively to each other to permit limited relative turning movement of the torque arm means 65 with the bracket 68. The loop 74 is sized so as to permit lost motion at the crank arm 44 on which it is supported between the washers 55. In operation turning of the manual operating lever 28 causes the crank arm portion 44 of the lever 36 to be lifted as described in connection with the operation of FIGS. 1–5. Lifting of the crank arm portion 44 causes the latter to engage the closed end of the upper loop 74 whereupon the torque arm 71 connected to the lower loop 75 is correspondingly lifted so that the torque arm hub 66 is turned within the bracket 68. The hub 66 as described heretofore is loosely accommodated within the U-shaped portion of the bracket such that it may rock there as the angularity of the uncoupling rod 61 changes due to turning of the coupler 20 about its axis 23. In this connection it is to be noted that as the coupler changes its angularity the uncoupling rod 61 is free to slide through the openings 63 and 64 such that the torque arm 71 remains in substantially the same position with respect to the crank arm 44.

Upon turning of the torque arm 71 and hub 66 the uncoupling rod 61 is turned by way of its engagement at the non-circular portion with the sides of the elongate opening 64 so that the hook or lock engaging end 76 is turned to unlock the coupler 20.

As described in connection wtih FIGS. 1–5 upon returning the handle 28 to the position shown the elements of the uncoupling rod assembly are returned to their initial lock position but the coupler is not locked until coupled with another railway vehicle.

What is claimed is:

1. In a railway car of the cushioned underframe type in which a coupler is turnable about a vertical axis and is attached for movement with a sill longitudinally movable relative to the end sill of the car in telescoping relation with the car in response to buff or draft forces, an uncoupling device mounted on said end sill and said longitudinally movable sill and connected to the coupler for unlocking the latter, comprising a manual operating means supported along the end sill of the car, a coupler lock operating means mounted on said longitudinally movable sill for movement therewith including a longitudinally pivotal shaft having a length slidably engageable wtih said manual operating means for the full length of said relative longitudinal movement, a crank arm on said shaft, an uncoupling rod having means connectable at one end to the coupler for unlocking the latter, torque providing means operatively connected to said uncoupling rod for providing the torque to turn said uncoupling rod to its unlocked position, tension link means connecting said torque providing means with said crank arm of said shaft, and fulcrum means in substantial alignment with said link means and on said longitudinally movable sill supporting said uncoupling rod and torque providing means so as to retain said torque providing means in substantially the same relationship with said crank arm in the different angular positions of the coupler upon actuation of said manual operating means.

2. The uncoupling device of claim 1 wherein said pivotal shaft is in the form of a lifter arm of rod-like configuration which is pivotally mounted along said longitudinally movable sill for generally vertical arcuate movement about a pair of longitudinally spaced points which are radially offset from the longitudinal axis thereof.

3. The invention as defined in claim 6 in which said torque providing means comprises a torque bar connected to said uncoupling rod in spaced and parallel relationship thereto, and said link means connecting said crank arm to said torque providing means includes means permitting slidable movement of said torque bar relative thereto.

4. The invention as defined in claim 6 in which said torque providing means comprises a torque arm turnably supported by said fulcrum means on said longitudinally movable sill, and said uncoupling rod is supported by said fulcrum means for turning movement with said torque arm and is slidable along an axis substantially normal to the turning axis of said torque arm.

5. The invention as defined in claim 4 in which said torque arm includes a hub portion turnably supported on a bracket mounted on said longitudinally movable sill.

6. In a railway car of the cushioned underframe type in which a coupler is turnable about a vertical axis and is attached for movement with a sill longitudinally movable relative to the end sill of the car in telescoping relation with the car in response to buff or draft forces, an uncoupling device mounted on said end sill and said longitudinally movable sill and connected to the coupler for unlocking the latter, comprising a manual operating means supported along the end sill of the car, a coupler lock operating means mounted on said longitudinally movable sill for movement therewith, including a longitudinally pivotal shaft having a length

freely slidably engageable with but detached from said manual operating means for the full length of said relative longitudinal movement, a crank arm formed on said shaft, an uncoupling rod turnably and slidably supported on said longitudinal movable sill and having means connectable at one end to the coupler for unlocking the latter, torque providing means operatively connected to said uncoupling rod for providing the torque to turn said uncoupling rod to its unlocked position, tension link means connecting said torque providing means with said crank arm, and fulcrum means in substantial alignment with said link means and on said longitudinally movable sill supporting said uncoupling rod and torque providing means for turning thereof about the longitudinal axis of said uncoupling rod and for sliding of said uncoupling rod relative to said crank arm, said fulcrum means being located relative to said crank arm so that said link means acts with said torque providing means along a line normal to the turning axis provided by said fulcrum means in all positions of said coupler.

7. The uncoupling device of claim 6 wherein said pivotal shaft is in the form of a lifter arm of rod-like configuration which is pivotally mounted along said longitudinally movable sill for generally vertical arcuate movement about a pair of longitudinally spaced points which are radially offset from the longitudinal axis thereof.

8. The invention as defined in claim 6 in which said torque providing means includes a torque arm and a hub portion turnably supported on a bracket mounted on said longitudinally movable sill, said hub portion including an opening for slidably receiving said uncoupling rod, and said uncoupling rod and said opening are contoured so that said uncoupling rod is turnable with said torque arm.

9. The invention as defined in claim 8 in which at least a portion of said opening is non-circular and said uncoupling rod is similarly contoured so as to be turnable with said torque arm.

10. In a sliding sill type railway car wherein a longitudinal sill is mounted for movement relative to the remainder of the car in response to buff and draft forces and said sill mounts a coupler at an end thereof for at least lateral movement relative to said sill, the provision of an uncoupling device comprising an uncoupling rod means connected to said coupler to unlock the same, a longitudinally pivotal operating means mounted relative to said sill for movement therewith and connected through tension means to said uncoupling rod means to operate the same, and lost motion means aligned with said tension means and slidably engaging said uncoupling rod means along an axis which is at least parallel to the coupler unlocking operational axis of said uncoupling rod means, said lost motion means being carried by said sill and defining a fulcrum for said uncoupling rod means, the operational axis of said tension means being maintained at least substantially normal to the coupler unlocking operational axis of said uncoupling rod means independent of the position of said coupler relative to said sill.

11. The invention as defined in claim 10 in which said uncoupling rod means includes a torque bar fixed in spaced parallel relation to the operational axis of said uncoupling rod means and to which said tension means is slidably connected.

12. The invention as defined in claim 10 in which said lost motion means includes a rotatable hub slidably receiving said uncoupling rod means therethrough and provided with a torque arm projecting therefrom and to which said tension means is connected.

13. The uncoupling device of claim 10 wherein said pivotal operating means is in the form of a lifter arm of rod-like configuration which is pivotally mounted along said longitudinal sill for generally vertical arcuate movement about a pair of longitudinally spaced points which are radially offset from the longitudinal axis thereof.

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