March 8, 1966 A. M. BOONE ETAL 3,239,074

RAILWAY CAR UNCOUPLING DEVICES

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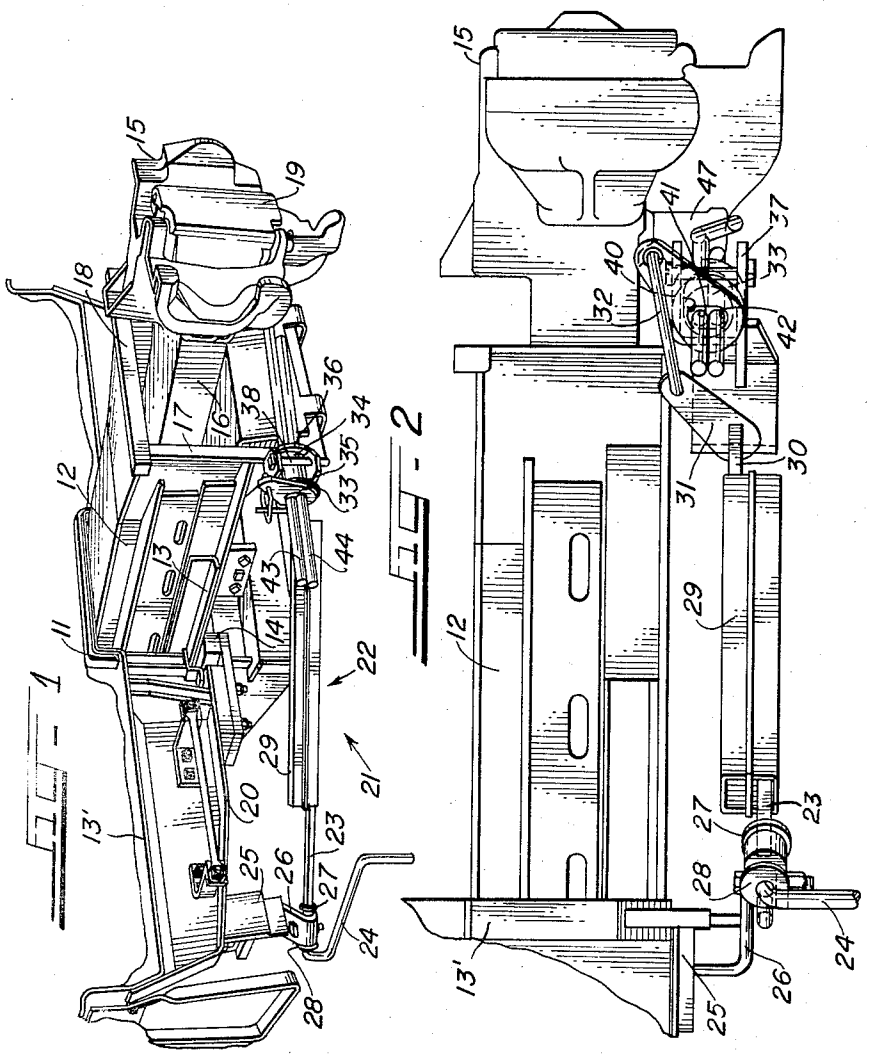


FIG - 1

FIG - 2

10

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RAILWAY CAR UNCOUPLING DEVICES

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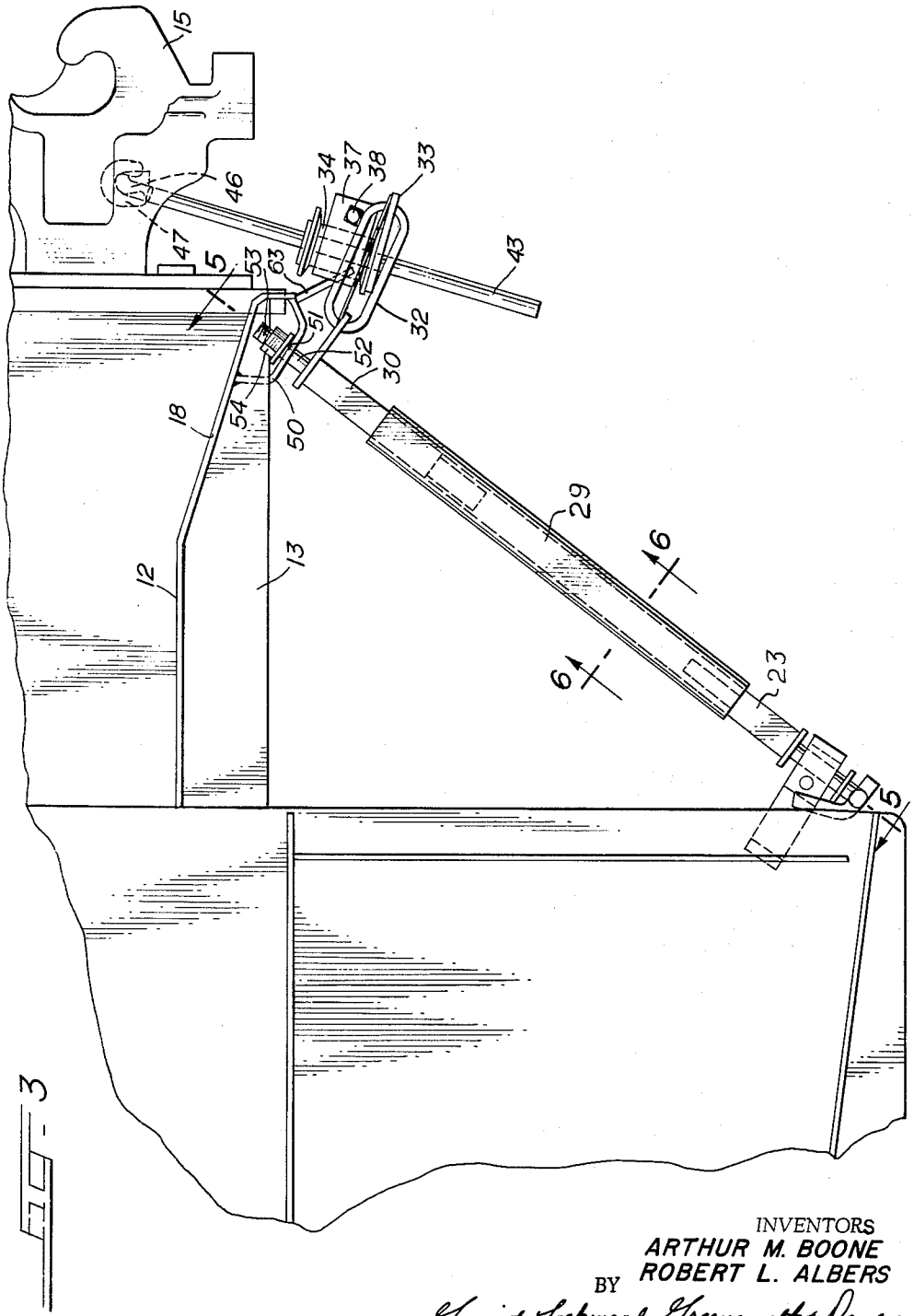


FIG. 3

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RAILWAY CAR UNCOUPLING DEVICES

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FIG. 4

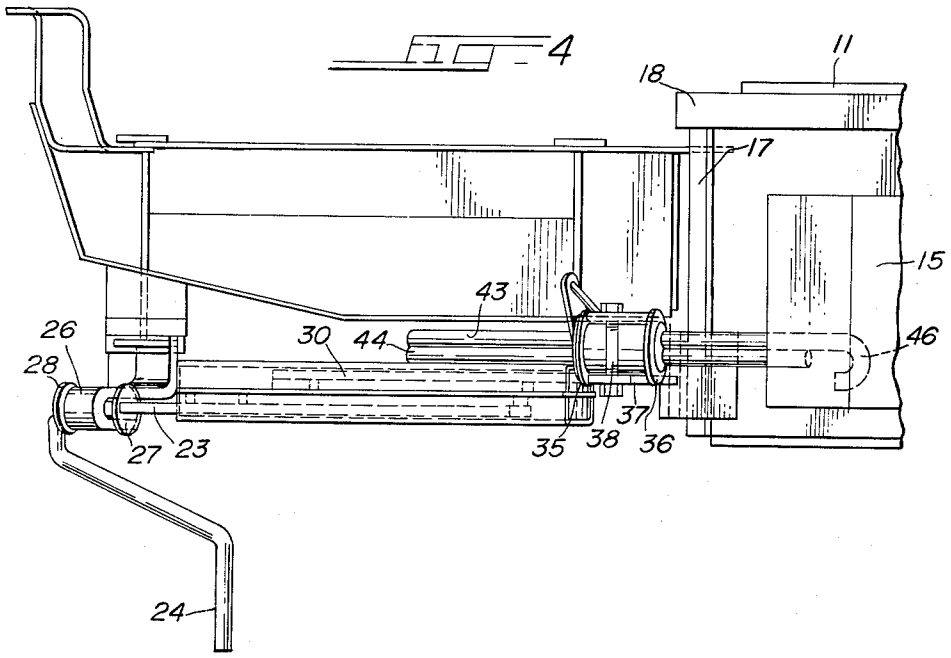


FIG. 5

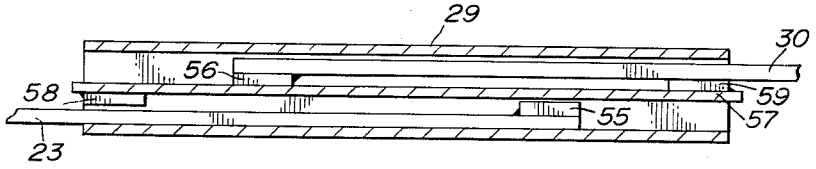
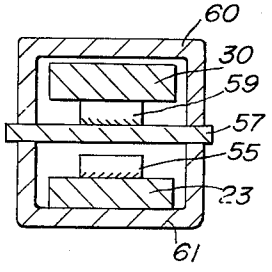


FIG. 6



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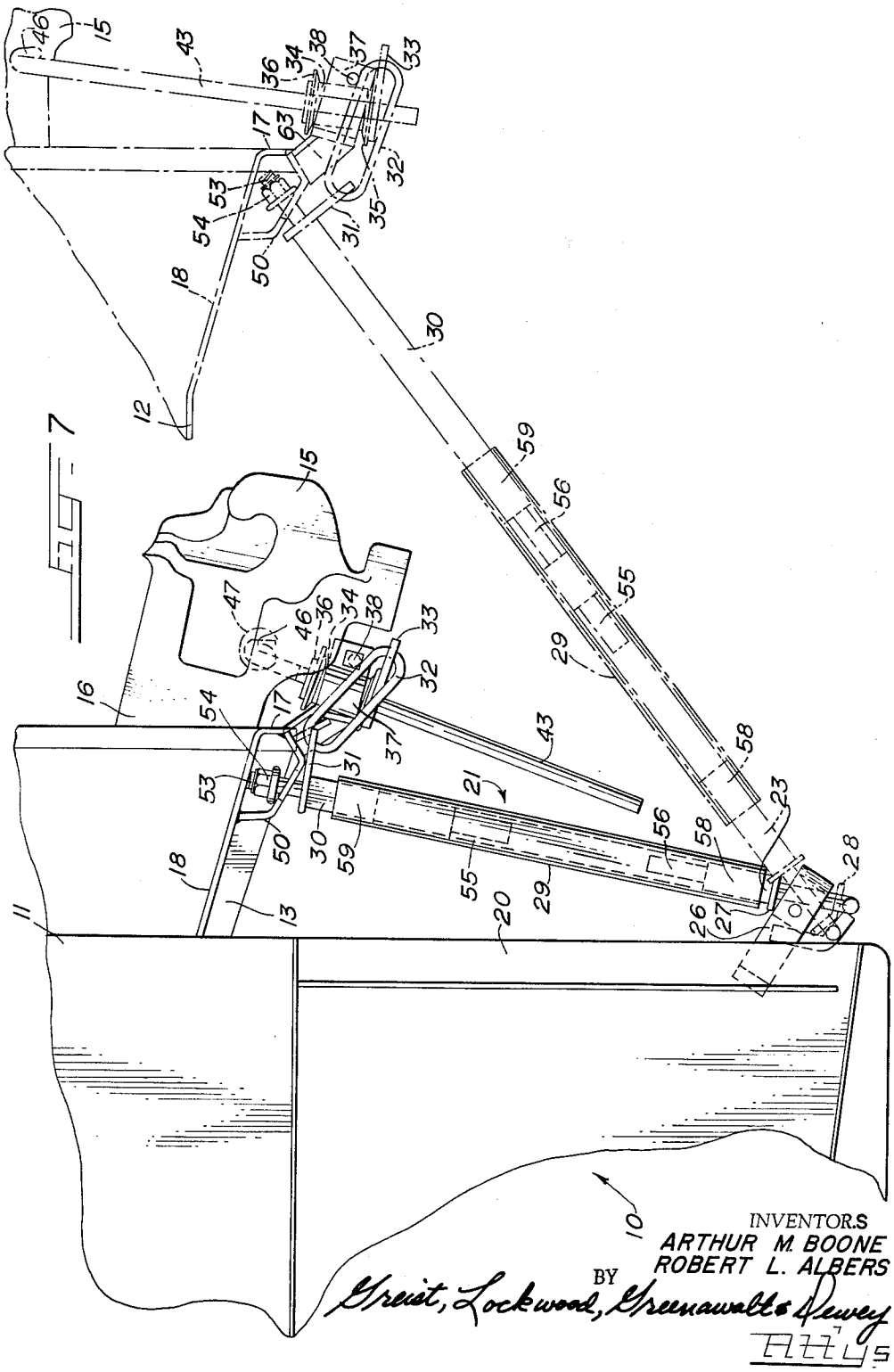


FIG. 7

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RAILWAY CAR UNCOUPLING DEVICES

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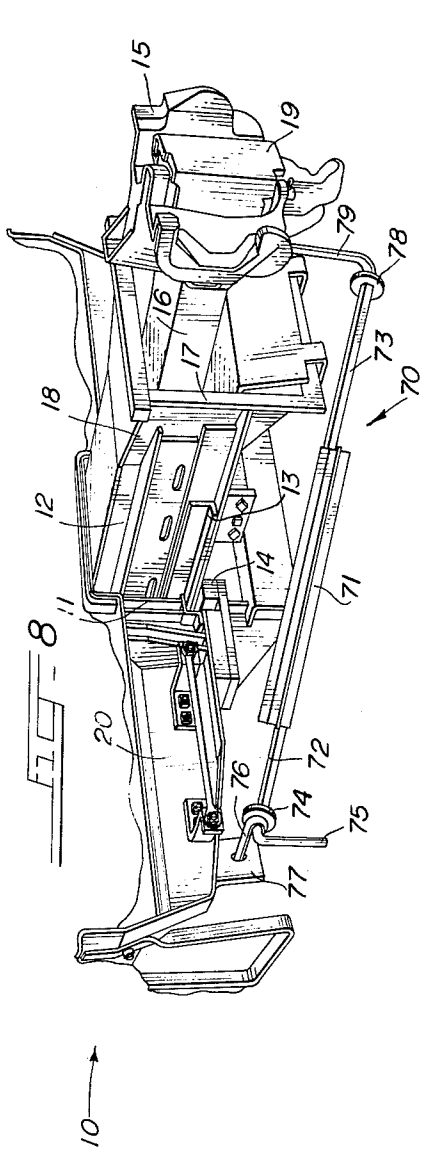


FIG. 8

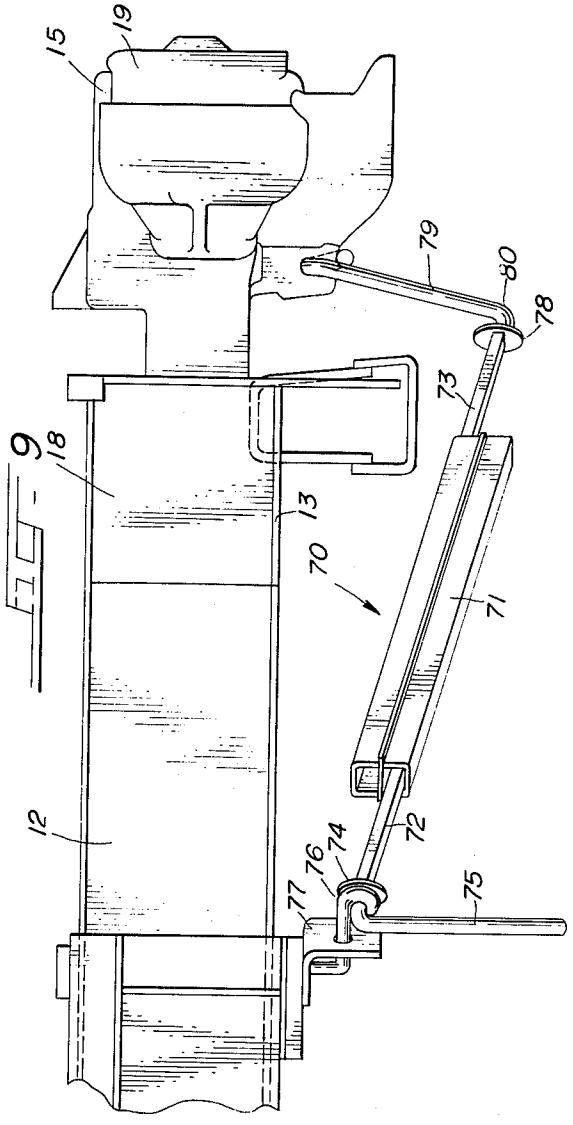


FIG. 9

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RAILWAY CAR UNCOUPLING DEVICES

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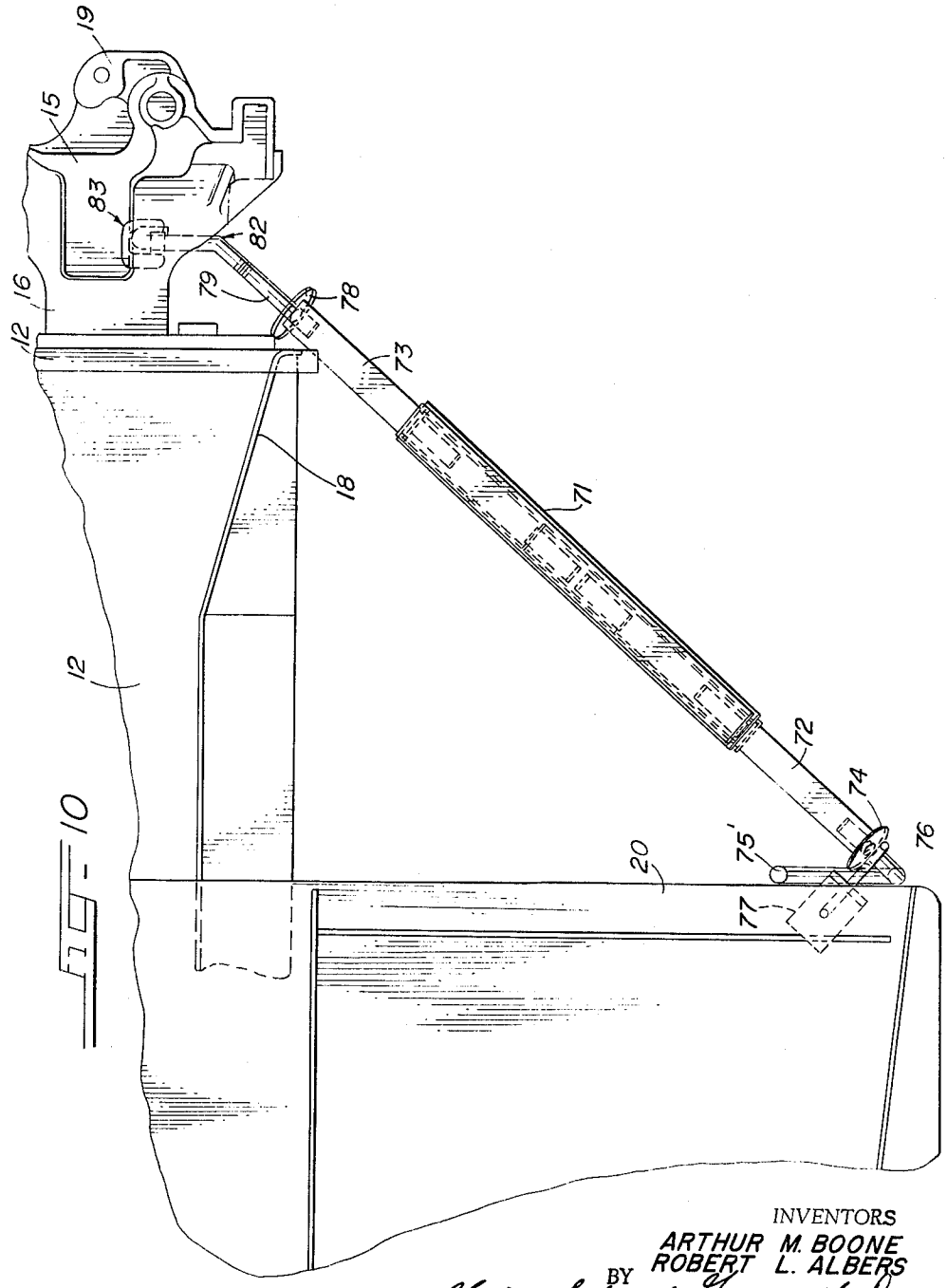


FIG - 10

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RAILWAY CAR UNCOUPLING DEVICES

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FIG. 11

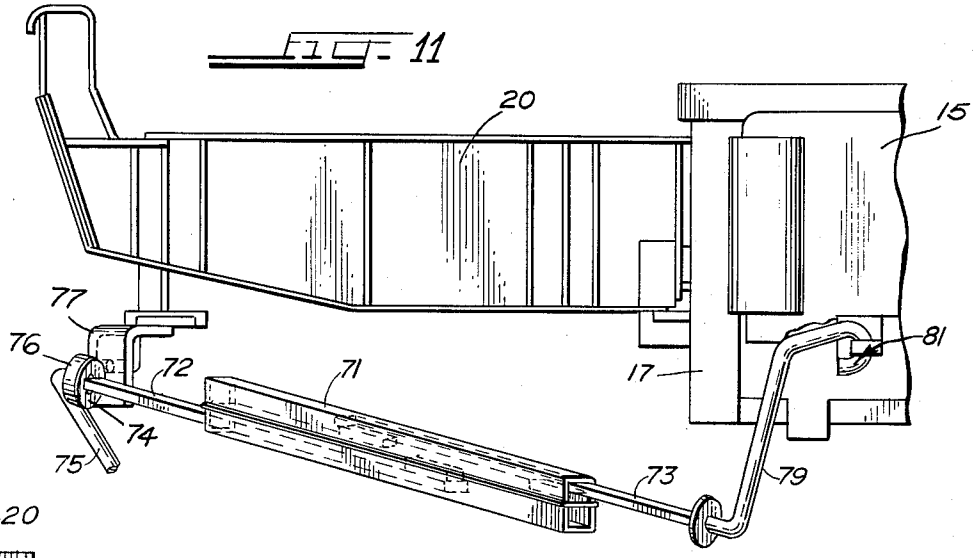


FIG. 13

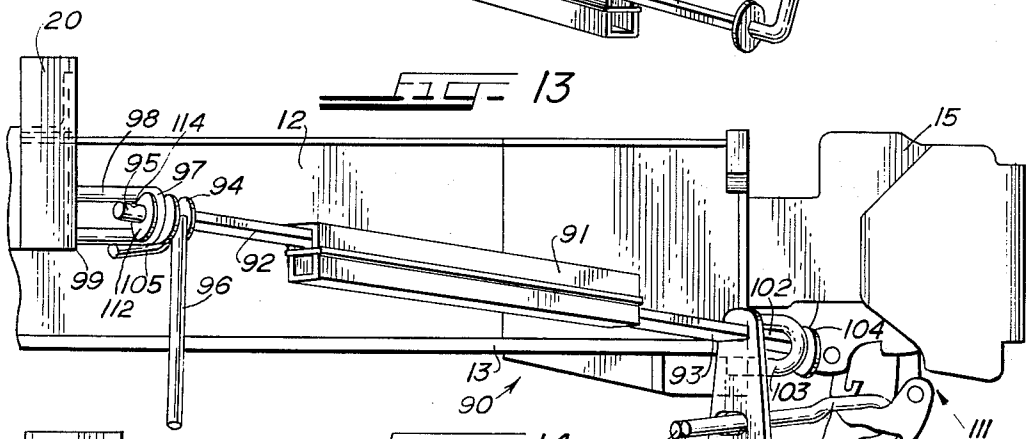
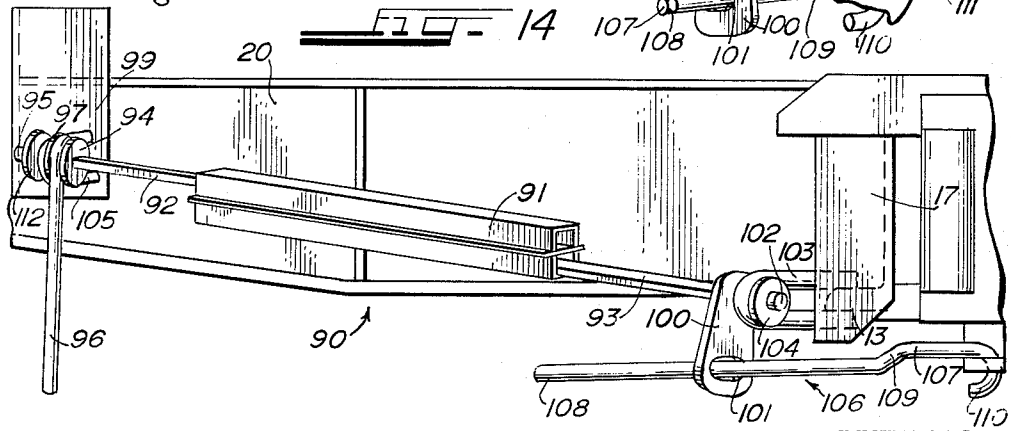


FIG. 14



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RAILWAY CAR UNCOUPLING DEVICES

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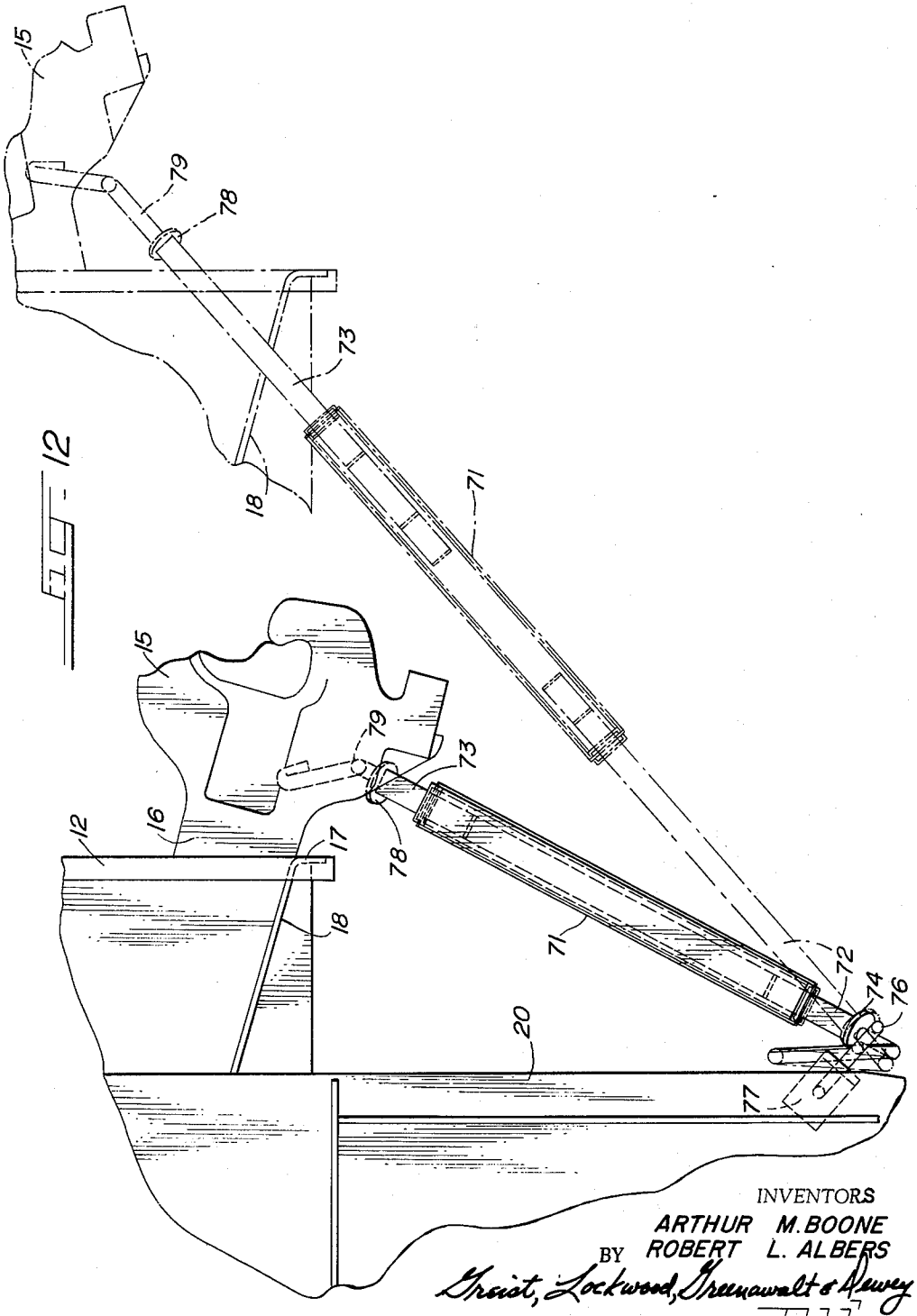


FIG. 12

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RAILWAY CAR UNCOUPLING DEVICES

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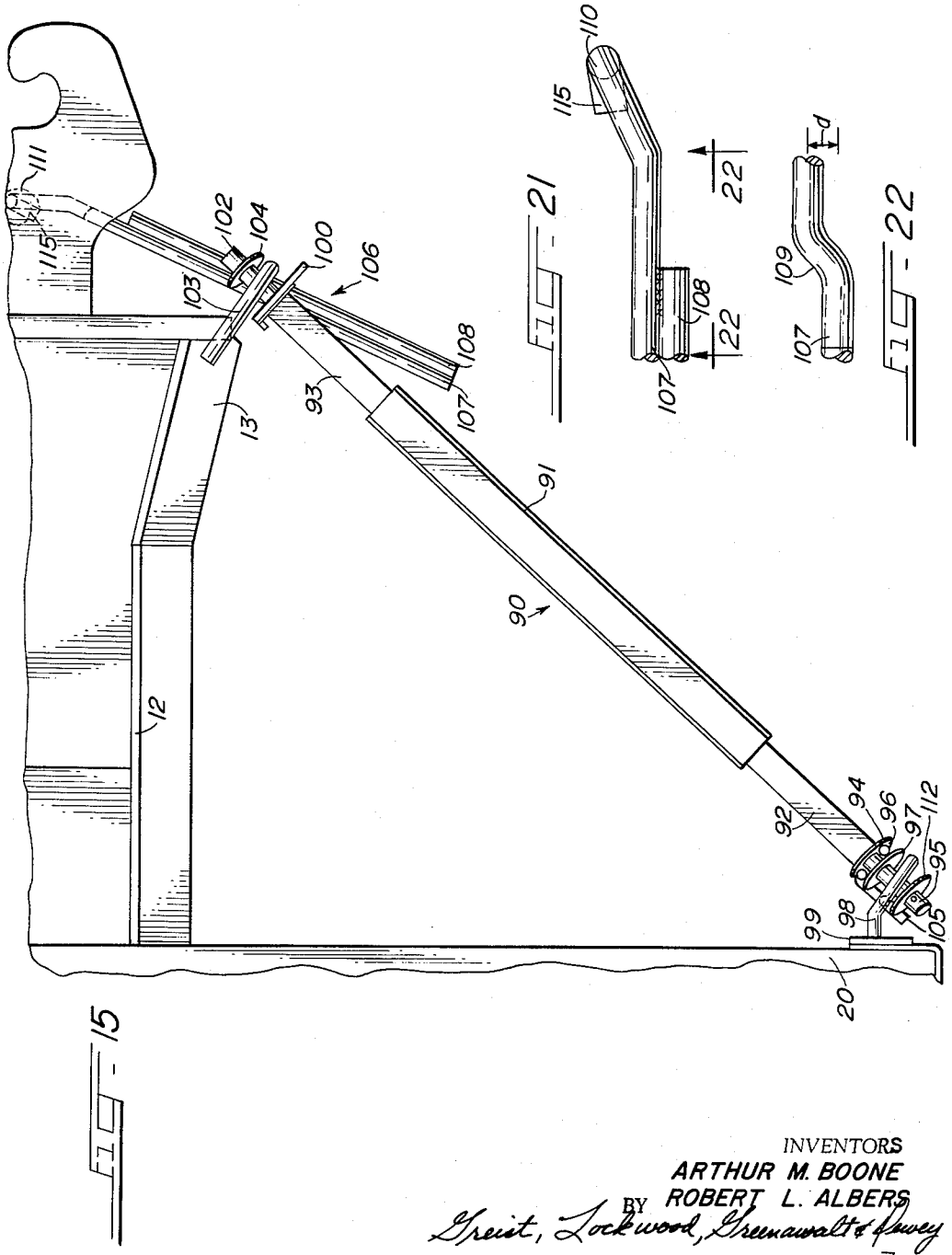


FIG - 15

FIG - 21

FIG - 22

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RAILWAY CAR UNCOUPLING DEVICES

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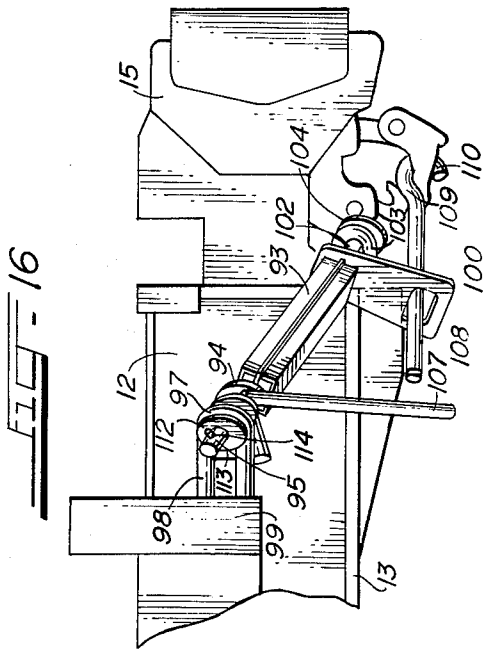


FIG - 16

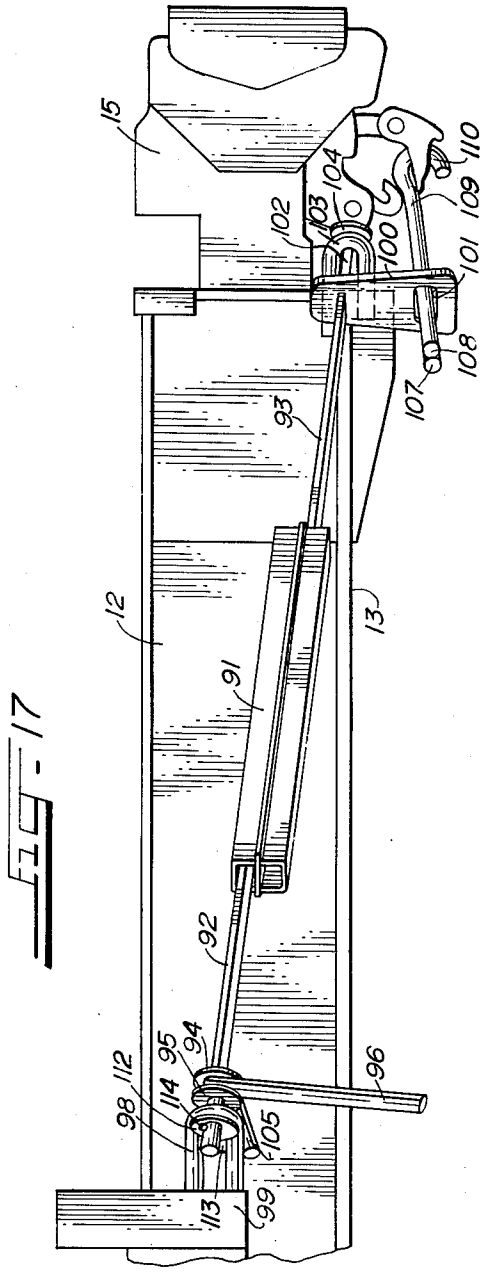


FIG - 17

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FIG. 18

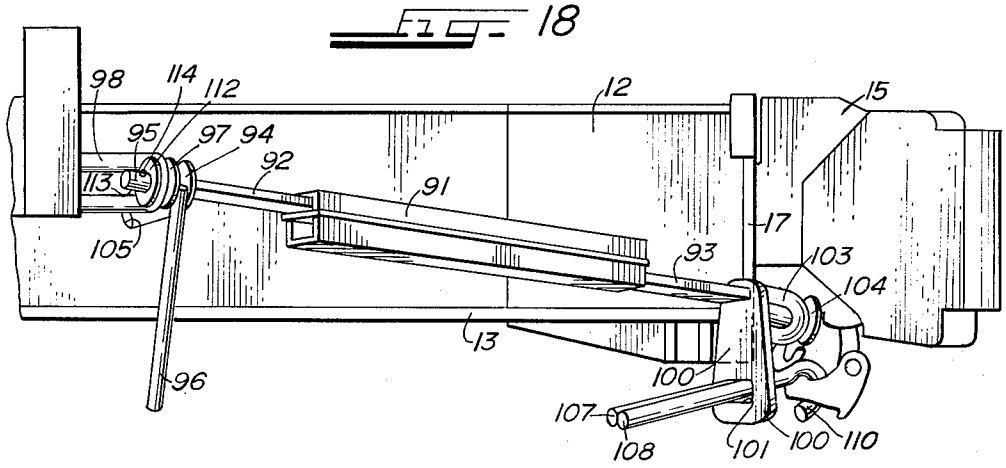


FIG. 19

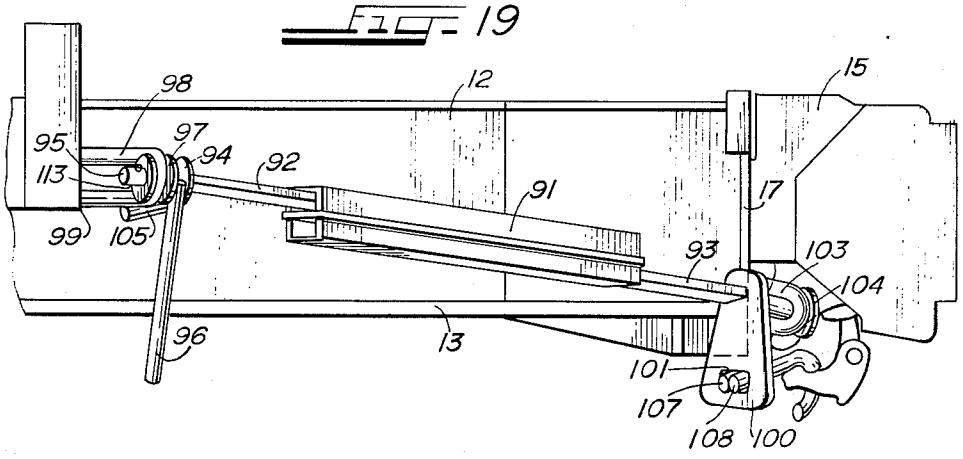
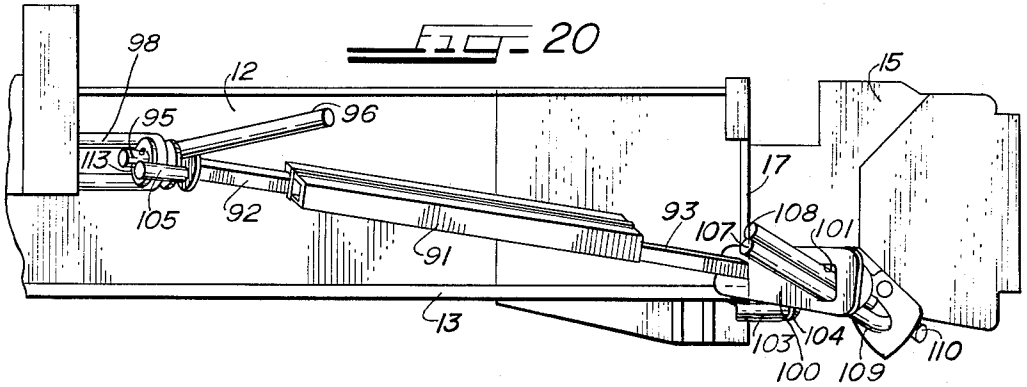


FIG. 20



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United States Patent Office 3,239,074 Patented Mar. 8, 1966

3,239,074

RAILWAY CAR UNCOUPLING DEVICES

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Filed Mar. 3, 1964, Ser. No. 348,949
17 Claims. (Cl. 213—211)

This invention relates to an uncoupling device for use in a railway car having a long travel cushioning arrangement, for example, of the type disclosed in U.S. Patent No. 3,003,436. More specifically, the present invention deals with a special uncoupling device having parts designed for maintaining operational engagement with a coupler locking means forming a part of the coupler, and controlling actuation of the standard coupling knuckle, the device being designed to accommodate long travel of a cushioned sliding sill relative to the car body with the projecting end portion of the sill carrying the pivotally mounted coupler therein.

As fully disclosed in the aforementioned patent, sliding center sill cushioning is now being used in various types of railway cars to absorb buff and draft forces exerted through car coupler mounted on the sliding center sill at the opposite ends of the car. The cushioned design basically includes a hollow longitudinally extending stationary center sill receiving therein a telescopically sliding sill unit which in turn pivotally mounts couplers at its projecting ends. The stationary and sliding sill is interconnected through a suitable cushioning device, which functions to absorb operational coupler shocks in buff or draft resulting in the retraction of the sliding sill into the car at one end thereof and extension of the sliding sill at the other end of the car. Thus, the couplers and sliding sill actually move relative to the car longitudinally thereof to protect the freight from destructive operational shocks brought about by impacting of cars. The cushioning arrangement provides for automatic return of the coupler mounting sliding sill to a neutral position while the car body itself remains generally unaffected throughout the operational shock absorption by the cushion.

Obviously, any uncoupling device must be mounted in such a fashion that it can accommodate the longitudinal travel of the sill in both directions, that is, from a fully retracted position to a fully extended position. The present invention relates to an uncoupling device having one end mounted for slight pivoting movement about a generally vertical axis as well as being rotatable about a longitudinal axis through the coupling device. The opposite end portion of the uncoupling device is mounted in the region of the end of the sliding sill and coupler, and is provided with means for attachment to a coupler lock operating means. Suitable means is provided to accommodate the lateral swinging movement of the coupler relative to the sliding sill, as well as the longitudinal movement of the sill itself. In addition, rotational forces of the uncoupling device are transmitted in a generally straight line directly to the coupler locking means, through the unique disposition of the uncoupling device.

The present construction, which will be described hereinafter in detail, has improved efficiency over known prior art prototypes, as well as being less susceptible to damage by passing couplers for reasons to become apparent. Excellent mechanical advantage is obtained because of a generally straight line force application, with a telescoping means in the central portion of the uncoupling device being of substantial mass to enhance the efficiency of operation and accommodate relative movement of the sliding sill with respect to the car structure.

Further and fuller advantages will become apparent upon a perusal of the objects and description to follow.

It is therefore an object of the present invention to provide a new and improved uncoupling device for use with a railway car having cushioned long travel coupling arrangement of the type described, the uncoupling device being particularly adapted to accommodate telescopic movement of a sliding sill relative to the car body as well as lateral movement of the coupler relative to the sill with the various elements of the uncoupling device retaining porper operative association throughout such movement.

It is a further object of this invention to provide a new and improved uncoupling device particularly adapted for use in a railway car having a cushioned long travel coupling arrangement, the device being adapted for mounting along the outer marginal end portion of the car at one end and in the vicinity of the end portion of the sliding sill and coupler at the other end, with the uncoupling device including means to permit lateral and longitudinal movement of the coupler and sill respectively while maintaining operative association therewith for efficient actuation of the coupler.

It is a further object of this invention, taken in conjunction with the foregoing objects, to provide an uncoupling device of the type described which will be so disposed so as to be less susceptible to damage by passing couplers, as well as providing better mechanical advantage due to the straight line of force application.

Further and fuller objects will become readily apparent when reference is made to the accompanying drawings wherein like reference characters refer to like parts.

FIG. 1 is a fragmentary perspective view of an end portion of a railway car equipped with a sliding sill having one form of uncoupling device of the present invention mounted thereon;

FIG. 2 is an enlarged side elevational view of the uncoupling device shown in FIG. 1 with the detailed features of the sliding sill omitted for clarity;

FIG. 3 is an enlarged top plan view of the uncoupling device of FIGS. 1 and 2 with portions of the sliding sill and coupler shown fragmentarily;

FIG. 4 is an enlarged front end elevational view of the uncoupling device of FIGS. 1 and 2 with the sliding sill and coupler shown fragmentarily;

FIG. 5 is a longitudinal cross sectional view taken along the lines 5—5 of FIG. 3;

FIG. 6 is a transverse cross section in elevation taken along the lines 6—6 of FIG. 3;

FIG. 7 is a top plan view similar to FIG. 3 with the longitudinal sliding sill, coupler and uncoupling device shown at the retracted limit in solid lines, and at the fully extended limit in phantom lines;

FIG. 8 is a perspective view of a fragmentary end portion of the car equipped with a sliding sill and a modified form of uncoupling device;

FIG. 9 is an enlarged side elevational view of the construction of FIG. 8 further illustrating a modified form of uncoupling device with the details of the sliding sill omitted for clarity;

FIG. 10 is an enlarged top plan view of the uncoupling device illustrated in FIGS. 8 and 9 with the car, sill and coupler shown fragmentarily;

FIG. 11 is a fragmentary end view of the car further illustrating the disposition of the modified form of uncoupling device in FIGS. 8–10;

FIG. 12 is a top plan view of the uncoupling device of FIG. 8 at the limits of coupler and sliding sill, showing the retracted position of the sliding sill with the coupler to one side in solid lines, and the extended position of the sliding sill with the coupler moved to an opposite side in phantom lines;

FIG. 13 is a fragmentary side elevational view of an end portion and sill of a railway car with a modified form of uncoupling device;

FIG. 14 is a fragmentary front elevational view of the embodiment of FIG. 13;

FIG. 15 is a fragmentary top plan view of the embodiment of FIGS. 13 and 14;

FIG. 16 is an enlarged side elevational view with the sliding sill in the fully retracted position illustrating the relationship of the components of the uncoupling device under these conditions;

FIG. 17 is a fragmentary side elevational view of the sliding sill in the extended position with the components of the uncoupling device in the position assumed under these conditions;

FIG. 18 is a side elevational view of the uncoupling device of FIGS. 13–15 with the sill in the neutral position and the coupler swung to one side;

FIG. 19 is a view similar to FIG. 18 with the coupler swung to the opposite side;

FIG. 20 is a view similar to FIGS. 18 and 19 with the uncoupling device moved to the unlocked position;

FIG. 21 is an enlarged fragmentary plan view of the end of the coupler lock operating rods; and

FIG. 22 is a fragmentary side elevational view of one of the coupler lock operating rods taken along lines **22—22** of FIG. 21.

Reference character **10** generally indicates the end portion of a railway car having an end sill portion **13** of the usual construction. A longitudinally extending center sill structure **11** is carried below the car body and is of box-like shape receiving therein a sliding sill structure **12**. The sliding sill is also of box-like shape and is provided with bottom laterally directed guide flanges **13** which are slidingly received above a bottom cover plate **14** attached to the outer marginal edges of the stationary center sill **11**.

The sliding sill **12** is telescopically received in the stationary center sill **11**, and as fully disclosed in the patent alluded to hereinbefore, the sliding sill is suitably engaged with a cushioning device to permit relative cushioned movement between the sliding sill **12** and the stationary center sill **11**. As illustrated, the sliding sill **12** projects substantially outwardly beyond each end of the car, and in response to operational shock in the form of buff or draft forces or the like, will move telescopically within the center sill **11** to compress the cushioning unit for absorption of such forces without transferal to the lading carried by the car, thereby avoiding the damaging effects of operational shocks on the lading. After compression, the cushioning unit will provide for the return of the sliding sill to a neutral position such as the one illustrated in FIGS. 1 and 3 with the total travel of the sliding sill being somewhere, for example, in the range of 20 to 40 inches in either direction.

Each open projecting end portion of the sliding sill **12** is provided with a coupler, indicated generally at **15**, having an integral relatively long shank portion **16** which is mounted in the interior of the sliding sill **12** in a fashion so as to be laterally pivotable about a substantial vertically axis. The freedom of lateral pivoting movement of the coupler **15** is limited by striker plate portions **17** carried on the flared end portion **18** of the sliding sill **12**. The coupler **15** includes the conventional pivotably mounted knuckle **19** which is actuated by a knuckle thrower (not shown). The coupler **15** is of a conventional variety which operates in the usual manner so further description thereof will be limited only to those elements which are necessary to describe the co-operative relationship with the present invention.

The uncoupling device of the present invention generally includes basic elements mounted on the end sill at outward marginal edge portions of the railway car and extends generally diagonally to the vicinity of the end of the sliding sill and coupler at the other end. Suitable means is provided to allow retraction and extension of the uncoupling device in response to retraction and extension of the sliding sill **12**. An operating handle is provided along the bottom edge of the end sill of the car for manual operation by a trainman, switchman or the like.

The uncoupling device of the present invention is indicated generally at **21** in FIG. 1 and includes an extensible uncoupler rod assembly **22** having a first rod-like portion **23** connected to an operating handle **24** which extends downwardly below the end sill **20**. A bracket assembly **25** is attached to the underside of the end sill **20** and projects downwardly terminating in a lateral flange portion **26** having a curled end portion which rotatably and loosely receives one end portion of the rod-like member **23** for slight pivoting movement therein. Suitable washer means **28** and **27** are provided on opposite sides of the curled portion of the lateral flange **26** to prevent transverse movement of the rod-like member therethrough. The opposite end of the rod-like member **23** is received in a sleeve-like housing **29**, the particular construction of which will be more specifically described in connection with FIGS. 5 and 6.

As seen in FIG. 2 a second rod-like member **30** projects from the opposite end of the sleeve-like housing **29** and is joined by welding or the like to a first torque lever **31**. The outer end of the lever **31** is provided with a suitable aperture to receive an endless link member **32** which extends longitudinally for connection to a second torque lever **33** in the manner shown in FIGS. 1 and 2. The torque lever **33** is welded or otherwise suitably attached to a rotating hub portion **34**, having a pair of collars **35** and **36** attached at the ends thereof. The central section of the hub portion **34** between the collars **35** and **36** is of reduced diameter and is rotatably received in a generally U-shaped bracket **37** being held laterally therein by means of a bolt member **38**.

The sleeve **34** and associated collars **35** and **36** are provided with a central bore indicated by dotted lines at **40** in FIG. 2 which is in alignment with a pair of juxtaposed apertures **41** and **42** in the torque lever **33**. A pair of juxtaposed rod members **43** and **44** are slidably received in the torque lever **33** for movement longitudinally thereof while being rotatable therewith. As more clearly seen in FIGS. 3 and 4, the juxtaposed rod member **43** and **44** extend through the sleeve-like member with the rod **43** being curled at its end portion as at **46** for connection to a coupler lock operating means (indicated generally at **47**). On the opposite side of the first torque lever **31** is provided a bracket member **50** which is attached to the flared portion **18** of the sliding sill **12** below the lateral flange portion **13**. The bracket member **50** is provided with a central aperture **51** which receives a short cylindrical section **52** of the rod-like member **30**. A threaded end portion **53** receives a nut member **54** for rotatable mounting of the cylindrical end section **52** of rod-like member **30** in a longitudinally confined manner. A rigidifying brace **63** is attached to and extends from the bracket member **50** to the U-shaped bracket **37**, being attached thereto by suitable means.

The longitudinal and vertical disposition of the uncoupling mechanism is best seen in FIGS. 3 anrd 4, illustrating the uncoupling mechanism being disposed below and rearwardly of the coupler **15**. Oftentimes in humping operations or coupling and uncoupling of the cars, the situation arises where the couplers are improperly oriented, and a "passed" coupler situation occurs. Some forms of uncoupling mechanisms by their construction require them to be disposed adjacent the couplers and under these circumstances they are easily damaged, putting the car out of service until it can be repaired. In the present embodiments, the unique disposition of the uncoupling mechanism permitted by the novel construction precludes any likelihood of damage during coupler passing.

The cross sectional views of the sleeve-like housing **29** in FIGS. 5 and 6, illustrate the rod-like members **23** and

30 being disposed in offset and overlapping relationship to each other. On the end portion of each of the rod-like members 23 and 30 is provided a stop block 55 and 56 respectively, which is joined to the associated rod-like member by welding or the equivalent. The sleeve-like housing 29 is provided with a central longitudinal divider 57 forming with the appropriate half of the housing, a chamber of ample size to slidably receive the rod-like member and its associated stop block. At one end of the housing, the underside of the divider 57 is provided with a co-operating stop means 58 for engagement by the stop block 55. On the upper side of the divider 57 at the opposite end, a second stop means 59 is provided for co-operation with the stop block 56 on the rod-like member 24. This construction prevents complete withdrawal of the rod-like members 23 and 30 from the sleeve-like housing, and is so dimensioned that at the maximum extended position of the rod-like members 23 and 30 one or the other of the stop blocks 55 and 56 may be in contact with or slightly spaced from the associated stop means 58 and 59. This will become apparent in the following description of FIG. 7.

As seen in FIG. 6, the sleeve-like housing 29 may be formed of a pair of channel shaped members 60 and 61 attached to the central dividing plate 57. The upper rod-like member 30 will be supported for sliding movement on the stop means 59 at one end and the stop block 56 on the other end while the lower rod-like member 23 will be in juxtaposition with the inside portion of the channel shaped lower half 61.

The rod-like members are positioned with the axis of greatest dimension generally in a direction to resist lateral bending as force is applied thereto in response to retraction and extension of the sliding sill 12. It is more clearly evident in the plan view of FIG. 3, that forces applied to the opposite ends of the uncoupling device will have a rather substantial transverse component acting generally along the axis of the rod-like members.

The uncoupling device must have sufficient strength in its central section to carry the weight of a person, since it is disposed where it can be readily used as a step by trainmen moving or passing between cars. If desired, the long axis of the rod-like members may be slightly angularly upwardly from a horizontal position to add resistance to vertical loads as well as continuing to resist the transverse loads noted above. The use of a rod-like member having a polygonal cross section is desirable from the standpoint of minimizing weight while maximizing strength in a transverse direction. In addition, no keys or the like are required in the sleeve to transfer rotational motion from one rod-like member to the other. Obviously, additional benefits are gained by this construction in the form of minimizing the total cost of the uncoupling device.

As seen in the top plan view of FIG. 7, the extreme positions of the sliding sill and coupler are illustrated along with the corresponding position assumed by the uncoupling device under these conditions. The solid line views indicate the sliding sill as being fully retracted and the coupler at one lateral limit from the neutral position shown in FIG. 3, while the phantom view represents the fully extended position of the sliding sill and the other lateral limit of the associated coupler. As previously noted, the total travel from the neutral position will be of the order of about 20 to 40 inches and accordingly the uncoupling mechanism must accommodate such movement without serving to affect the coupler locking means in the process.

The importance of this is best understood when the nature of the coupler locking means is considered. In the popular type of couplers, a rotating coupler locking means is provided which is operated with a great deal more ease than the old-fashioned pin types. One objection to the rotating type of coupler locking means is the tendency for the same to creep slight amounts with certain uncoupling devices, such occurring generally during car impacts in buff or draft which can eventually lead to the knuckle being accidentally unlocked. In the present case, the uncoupling mechanism accommodates to not only lateral shifting of the knuckle 15 but the longitudinal movement of the sliding sill 12 also, without unintentional rotational action being transferred to the coupler lock operating means 47.

In the retracted position, shown in the solid lines of FIG. 7, the coupler 15 has been moved laterally against the striker plate portion 17, thus indicating one extreme of coupler and sill movement. As the sill and coupler move to the position shown, the end portion of the rod-like member 23 has pivoted within the lateral flange portion 26 about a central axis which is substantially vertically disposed or, expressed another way, at right angles to the longitudinal axis of the rod-like member 23.

The bracket member 50, mounting the opposite end of the uncoupling device 21, is attached to the flared end portion 18 of the sill 12 by means of welding or the like and precludes longitudinal movement of the associated end of the uncoupling device, thereby causing the rod-like members 23 and 30 to telescope within the sleeve-like housing 29. Should one of the rod-like members 23 or 30 reach the associated stop means 58 or 59 before completion of the telescoping movement, the dimensioning of the uncoupling device is such, that the other rod-like member will be in a position so that it may continue to telescope within the sleeve-like housing 29 with a slight margin of safety at each of the limit positions. For example, the relative positions of the stop blocks 55 and 56 on the associated rod members are indicated in dotted lines in the approximate position assumed when the sill member is fully retracted to the position shown.

As previously pointed out, the hub portion 34 is carried in a longitudinally confined manner by the bracket 37, which is fixedly attached by means of a brace 63 to the bracket 50. Accordingly, the relationship of the lever 31 mounted on the rod 30 and the lever 33 mounted on the hub 34 will remain in the same rotational angularity with respect to their mounting axis throughout the longitudinal travel of the sliding sill 12 and lateral movement of the coupler 15.

In the phantom view in FIG. 7, the sill 12 (shown fragmentarily) is fully extended, with the coupler 15 (also shown fragmentarily) against the striker plate (not shown) furthest away from the uncoupling device 21. In this position, the rod 43 is fully extended causing slight rotation of the hub 34 about a generally vertical axis with such rotation occuring within the generally U-shaped bracket 37. The lost motion provided by the link member 32 is sufficient to enable the lever 31 and torque lever 33 to remain in a neutral position so as to not disturb the coupler lock operating means 47. In the phantom view, the rod-like members 23 and 30 are extended from the sleeve-like housing 29 with the dimensioning being such that the sill may be fully extended without both of the stop blocks 55 and 56 engaging the associated stop means 58 and 59 carried by the sleeve-like housing 29. As illustrated, the stop block 56 is engaged with the stop means 59 in the sleeve-like housing 29 and further movement of the sliding sill 12, if possible, would cause the rod-like member 23 to extend to accommodate such movement.

It is axiomatic in evaluation of the strength of slender columns that the tensile loads applied, for example during extension of the sill to the phantom position shown, are much more easily accommodated than the compression forces such as those applied to the uncoupling device 21 as the sliding sill moves to the retracted position (shown in solid lines). This is largely due to the tendency of the column to buckle under compressive loads, and the uncoupling device of the present invention exhibits columnar characteristics in this respect. In the present case, load

forces are not purely compressive since forces are applied at an angle to the longitudinal or column axis, with the angularity being greatest when the sliding sill **12** is at the fully retracted position. These forces are readily accommodated by the present construction with an adequate margin of safety to guard against deformation beyond the elastic limit which would adversely affect the good telescoping action.

FIG. 8–12 illustrate a related but slightly modified form of uncoupling device indicated generally at **70**, with like reference characters used to indicate like parts of the railway car **10**. As was explained in connection with FIG. 1, the railway car **10** is provided with a longitudinally extending center sill structure **11** which is of box-like shape and receives therein a sliding sill structure **12**. The usual coupler **15** is provided, having a long shank portion **16** mounted within the flared end portion **18** of the sliding sill **12** to permit lateral shifting movement of the coupler **15** between the striker portions **17**. The sliding sill **12** is telescopically received in the stationary center sill **11** with the cushioning means hereinbefore mentioned interconnecting the two to absorb operational shocks in order to protect the lading carried by the car **10**.

The uncoupling device indicated generally at **70** is of a unique designe employing a greatly simplified construction when contrasted with the complex construction of comparable prior art types. A central sleeve-like housing **71** telescopically receives a pair of rod-like members **72** and **73** of polygonal cross section and is positioned between the end sill **20** and the coupler **15**. The end portions of th rod-like members **72** and **73** are disposed within opposite ends of the sleeve-like housing **71** and are of the same construction shown in the embodiment of FIGS. 1–7 and more specifically described in connection with associated cross sectional views of FIGS. 5 and 6. Accordingly, the sleeve-like housing **71** is also of like construction and is provided with suitable stop means (not shown) for co-operation with the modified end portions of the rod-like members **72** and **73**.

The rod-like member **72** is provided at its outer end portion with an integral collar **74** which is attached to a circular rod section which is curled or bent into a downwardly extending operating handle **75**. An eye bolt member **76** receives the curled end portion of the operating handle **75** for rotation therein, and is of sufficient dimension to allow slight pivoting movement about a generally vertical or transverse axis through the central section of the eye bolt in a manner to be more clearly described in connection with FIG. 12.

The eye bolt member **76** is attached to the end sill **20** by suitable means such as an angle bracket **77** or the equivalent depending upon the particular design of the end sill **20**. Obviously, under certain circumstances the eye bolt member can be welded, bolted, or otherwise affixed by suitable means directly to the face or bottom of the sill **20**, or alternatively, other modified forms of bracket members may be utilized to operatively support the eye bolt **76**. The outer end of the rod-like member **73** is provided with a collar **78** which is integrally attached on one side thereto, while the other side is attached to a generally angularly upwardly extending operating rod member **79**.

The collar **74** serves to prevent extension of the rod **72** through the end bolt which obviously would cause the same to project outwardly of the car with the attendant danger to objects or persons standing in the right-of-way alongside the tracks. Accordingly, the operating handle **75** will be disposed at all times within the clearance limits prescribed by A.A.R. standards.

In the side elevational view of FIG. 9, it is evident that the uncoupling device **70** is disposed below the center sill **12** and coupler **15**. This is advantageous for the reasons noted previously in that under conditions of passed couplers, the uncoupling device **70** will not be damaged. As more clearly seen in the schematic side elevational view of FIG. 9, the upwardly extending rod member **79** is bent at its lower end **80** and joined to the collar **78** which in turn is joined to the polygonal rod-like member **73**. Any suitable form of joint may be utilized such as a welded butt joint, mortise and tenon or the like, so long as it is of sufficient strength to resist the torsional forces applied when the handle **75** is rotated or the tensile and compressive forces developed during telescoping movement of the uncoupling device.

The upper end of the rod member **79** is curled into a hook portion as at **81**, the extent of the curl being more readily apparent in solid and dotted lines in the front elevational view of FIG. 11, and top plan view of FIG. 12. The hook portion **81** is connected to the conventional type of rotating coupler lock operating means well known in the art.

The upper end of the rod member **79** extends angularly as at **82** with respect to a horizontal plane terminating in the curled end portion **81** for connection to the coupler locking means **83**. As is seen in the plan view of FIG. 10 the rod member **79** is also bent in the region of the angular portion **82** so as to be substantially perpendicular to the line of draft force, and forming an obtuse angle with the downwardly extending portion of the rod member **79**. This particular construction provides an excellent manner of accommodating the lateral forces and changes in length of the uncoupling device **79** arising as the coupler shifts about a substantially vertical axis and the sliding sill **12** extends and retracts.

The telescoping action of the uncoupling device **70** is more clearly apparent when the top plan view of FIG. 12 is examined, illustrating two of the extreme positions the sliding sill **12** and coupler **15** may assume. The shank **16** of the coupler **15** is in abutment with each of the strikers **17**, and the sill **12** is in the fully retracted and extended position in the solid and phantom line views respectively. During coupler shifting movements, forces are transmitted through the connecting rod portion **79** to the rod-like members **72** and **73** causing the same to telescope within the sleeve-like housing **71** to the position shown in solid and phantom lines. During the retraction of the sill member **12** to the position shown in solid lines, considerable lateral force is applied to the rod-like members **72** and **73** as well as the connecting sleeve-like housing **71** since the retracting movement is almost instantaneous. Sufficient resistance to the applied force is provided by constructing the rod-like members **72** and **73** with a polygonal cross section having the greater longitudinal dimension in the plane of the expected lateral forces. Obviously, the rod-like members **72** and **73** could be made of uniform cross section in a circular or square shape, however the increased strength in a vertical direction is generally not needed.

The phantom line view of FIG. 12 illustrates the sliding sill **12** (shown fragmentarily) at the fully extended position, which as previously pointed out may be of the order of 20 to 40 inches from the neutral position illustrated in FIG. 10. The coupler **15** is illustrated at an opposite extreme from that shown in the solid line view however it is to be understood that the coupler may assume any lateral position irrespective of the position of the sliding sill **12**. When consideration is given to the speed with which the sill travels, the magnitude of the applied forces to the uncoupling device **70** may be readily appreciated. Obviously, under coupler impact conditions, the uncoupling device **70** must be capable of extending and retracting with the movement of the sliding sill **12** with the total flexure of the uncoupling mechanism remaining well within the elastic limits of the materials forming the same. The reasons for this are obvious in that any bending of the rod-like members **72** and **73** will impair the freedom of the telescoping movement within the sleeve-like housing **71** and accordingly, during subse-

quent impacts, the uncoupling device **70** will be incapable of smooth extension and/or retraction.

During normal operation of the uncoupling mechanism **70** by trainmen, the sliding sill **12** is in the neutral position shown in FIG. 10. Operation of the uncoupling device **70** serves to act on the coupler locking means **83** moving the knuckle **19** to the open position. Such operation is easily accomplished with the uncoupling device **70** of the present invention by merely pulling the operating handle **75** upwardly rotating the polygonal rod-like member **72** and which in turn imparts rotation to the sleeve-like housing **71**. The rod-like member **73** also rotates with the housing **71** causing the lower end of the rod member **79** to begin movement in an arcuate path. Only slight movement occurs before resistance is encountered by the curled end portion **81** being interlocked with the coupler locking means **83**. Further rotation of the handle **75** rotates the coupler locking means **83** permitting the knuckle **19** to move the the open position in a well known manner.

FIGS. 13–15 illustrate a related but slightly modified form of the invention. The modified form of uncoupling device is indicated generally by the reference character **90**, and includes a sleeve-like housing **91** telescopically receiving a pair of rod-like members **92** and **93** in opposite end portions thereof.

As was explained in connection with the embodiments of FIGS. 1–12, the railway car **10** is provided with a longitudinally extending center sill construction **11** of box-like shape and adapted to receive a sliding sill **12** therein. The usual coupler **15** is provided having a long shank portion **16** mounted within the flared end portion **18** of the sliding sill **12** to permit lateral shifting movement of the coupler **15** between the limits defined by the laterally spaced striker portions **17**. Suitable cushioning means interconnects the sliding sill to the stationary sill and/or the car underframe to permit relative movement therebetween in order to absorb operational shocks arising out of buff and draft impacts.

The uncoupling device **90** is of a similar design to that describel in connection with FIGS. 1–12 employing a telescoping mechanism the details of which were specifically described in connection with FIGS. 5 and 6. The free end portion of the rod-like member **92** is provided with a collar **94** integrally attached thereto and received around an outwardly projecting cylindrical section indicated at **95** also attached to the rod-like member **92**. A depending actuating handle **96** is attached to the cylindrical section **95** between a first collar **94** and a second collar **97**. A handle stop **105** is formed into a generally L shape with one leg welded between the collars **94** and **97** and the other leg extending outward generally parallel to the rod **92**.

The free end of the outer cylindrical section **95** is received through a generally U-shaped mounting bracket **98** which is atached to the end sill **20** by means of a plate-like bracket **99**. A vertical brace **113** maintains the cylindrical end portion **95** at the outer end of the U-shaped bracket. An outer retaining collar **112** is received over the cylindrical portion and maintained thereon by a cross pin **114** or the equivalent. Obviously, the manner of connecting the mounting bracket **98** can be varied to accommodate various end sill shapes, such being within the province of those skilled in the art. The basic requirement of the present uncoupling device however, requires the mounting bracket **98** to have a sufficiently large opening to allow the cylindrical section **95** to pivot slightly about a vertical axis lying the plane of the bracket in order to accommodate retraction and extension of the uncoupling device **90**. The outwardly projecting leg of the handle stop **105** abuts the lower portion of the mounting bracket **98** when the handle is in the "at rest" position.

The free end portion of the rod-like member **93** extends towards the end of the sliding sill **12** and is attached to one end of a torque lever **100** having an elongated slot **101** adjacent the opposite end. A cylindrical section **102** is attached to the torque lever **100** on the side opposite the attachment of the rod-like member **93**. The cylindrical section is loosely received in a generally U-shaped mounting bracket **103** attached to the sliding sill **12** and retained therein by means of a washer **104** welded to the free end of the cylindrical section **102**. As is more clearly seen in the front elevational view of FIG. 14, the U-shaped mounting bracket **103** has the leg portions thereof overlying the upper and lower faces of the flange **13** on the sliding sill **12** and joined thereto by means of welding or any other acceptable form of attachment.

A coupler lock operating rod assembly is indicated generally the reference character **106** and includes first and second rod portions **107** and **108** in juxtaposed relationship and being joined together by means of welding or the like. The outboard rod **108** terminates adjacent at offset or upwardly bent portion **109** in the rod **107**. The inner end of the rod **107** is formed into a hooked portion **110** which extends through the coupler lock operating means **111**. The juxtaposed rods **107** and **108** are received in the elongated slot **101** and when the coupler **15** is in the central position, the rods **107** and **108** project a substantial distance beyond the elongated slot **101** as is more clearly apparent in FIGS. 14 and 15. Lateral movement of the coupler **15** is accommodated by the rods **107** and **108** sliding through the elongated slot **101** in either direction from the neutral position shown.

As is more clearly seen in FIG. 15, the hook portion **110** is bent with respect to the axis of the rod **107** so as to be at approximately right angles to the aperture in the coupler lock operating means **111**. The lower end of the hook **110** is bent slightly towards the sill as indicated at **115** in the enlarged fragmentary plan view of FIG. 21, to join the rod **107** to the coupler lock operating means. This insures that the coupler lock operating rod assembly **106** will be maintained properly oriented with respect to the coupler **15** throughout lateral movements of the coupler **15**.

Generally speaking, the coupler lock operating rod assembly **106** accommodates the lateral movements of the coupler **15** while movements of the sliding sill **12** are accommodated by the telescoping movement of the rod-like members **92** and **93** within the sleeve-like housing **91**.

This will become more clearly seen upon a consideration of FIGS. 16 and 17 which show the sill **12** fully retracted and fully extended respectively. The coupler **15** is maintained in a central position in each of the views of FIGS. 16 and 17 however, it is obvious that notwithstanding the sill movement, the coupler can be moved to either side of the sill **12** without impairing the telescoping action of the uncoupling device.

The dimensional relationship between the uncoupling rods **107** and **108** and the torque lever **100** are very important in order to accommodate the change in angularity of the torque lever **100** as the sliding sill **12** retracts and extends, and also to accommodate angularity changes in the rods with respect to the torque lever **100** due to lateral shifting movement of the coupler **15**. Cylindrical section **102** may be joined to the torque lever by passing through a suitable aperture in the top portion of the torque lever **100** and then both welded directly to the end of the rod-like member **93**.

The elongated slot **101** is of a generally race track shape being slightly greater in over-all length than the combined thickness or diameters of the rods **107** and **108**, while the width of the slot **101** is slightly greater than the thickness or diameter of one of the rods **107** or **108**. The center on which the right hand or outboard end of the slot is formed is vertically in line with the rotational axis of the cylindrical section **102** to promote good uncoupling action while accommodating angularity changes between the rods **107** and **108** and the torque lever **100**.

The uncoupling rods are made from round stock and

as noted above have an over-all or combined transverse dimension slightly less than the length of the slot 101 however being somewhat greater than the thickness to promote good swivel action, while providing a good grip when the uncoupling device is actuated to impart rotation to the coupler lock operating means.

As seen in the fragmentary elevational view of FIG. 22, the upwardly bent portion 109 places a distance D between the center lines of each of the offset portions in parallelism. The longer of the two uncoupling rods is formed with a hook portion 110 being bent angularly to the configuration shown in FIG. 21. The hook is formed on a suitable inside radius to co-operate with the coupler lock opertaing means on the coupler 15. The dimensional relationship between parts is very important to accommodate the relative movement between parts which will be described more completely in conjunction with FIGS. 16–20.

The side elevational view of FIG. 16 shows the sliding sill 12 in the fully retracted position illustrating the respective positions assumed by the compenents of the uncoupling device under these corcumstanes. The end of the uncoupling device connected to the striker is somewhat similar to the connection of the embodiment in FIG. 7 except it is connected ahead of the striker 17 rather than on the back of the striker 17 as illustarted in in the top plan view of FIG. 7. Reference to FIG. 7, however, would give a representative picture of the telescoping action of the rod-like members 92 and 93 within the sleeve 91 when the sill is in the fully retracted and extended position with a slight compensation for the modified design and position of the coupler. Although the uncoupling device is not normally operated with the sill fully retracted, tests have proven that the present device is fully operative in this position since the respective components maintain their proper operational relationships through sill movement.

As seen in FIG. 17, the sill 12 is fully extended causing the rod-like members 92 and 93 to telescope outwardly of the sleeve 91. The torque lever 100 in this position is at its greatest angularity with respect to a transverse plane at right angles to the longitudinal axis of the sliding sill 12. Notwithstanding the marked change in angularity of the torque lever 100, the slot 101 readily accommodates the change without binding or buckling on the uncoupler lock operating rods 107 and 108. As was true in the retracted position of FIG. 16, the respective components of the uncoupling device remain in operating relationship when the sill is extended although under normal circumstances the uncoupler would not be operated when in this position since the cycle of cushioned movement of the sliding sill 12 occurs in a matter of a few seconds, returning to the neutral position shown in FIGS. 13–15. Should the cushioning means become inoperative or the sill stuck in the extended or retracted position, the present uncoupling device will remain completely operational allowing it to be coupled to other cars in a train for transportation to a suitable repair site. Tests have shown that the uncoupling device will operate perfectly at both ends of the car notwithstanding this rather drastic change in the relative positions of the components.

FIG. 18 illustrates the coupler 15 swung to the side of the sill at which the uncoupling device is attached. In this position, the rods 107 and 108 project through the elongated slot 101 a substantial amount. The operating characteristics of the uncoupling device are not impaired by the lateral movement of the coupler 15, and it may be freely operated in this position.

FIG. 19 illustrates a side elevational view wherein the coupler 15 is swung to the opposite extreme, that is, against the srtiker portion furthest removed from the mounting 103 of the uncoupling device. In this position, the rods 107 and 108 project through the elongated slot 101 a sufficient amount to remain position within the slot should the sill extend or retract when in this position. As was he case in FIG. 18, the operating device is maintained operational in this position and is freely operated by merely pulling on the handle 96.

Referring now to FIG. 20, the relationship of the various components in the coupling device can be seen when operated. In the uncoupling operations, the handle 96 is rotated upwardly approximately 90°, transmitting rotational force through the polygonal rod-like member 92 to the sleeve 91 which in turn transfers the rotational forces to the polygonal rod-like member 93. This causes the torque lever 100 to swing to a generally horizontal position, causing the juxtaposed rods 107 and 108 to twist which in turn twists the curve or hook end 110. This causes the coupler lock operating means to rotate about 90° throwing the knuckle open to disconnected the adjacent car, or open the knuckle to prepare the car for coupling operation. The rotational axes of the uncoupling device extends in a straight line between the supporting brackets 103 and 105. Since the geometric longitudinal axes of the rod-like members 92 and 93 are offset from each other, the inertia of the mass consisting of the rod-like members 92 and 93 together with the housing 91 assists in opening the knuckle. Accordingly, a minimum amount of manual effort is required to operate the uncoupling device.

Throughout this rotation, the angularity of the uncoupling rods 107 and 108 changes with respect to the plane surface of the torque lever 100, however, is readily accommodated since the slot 101 in the torque lever 100 is a larger dimension than the combined cross sectional dimension of the rods 107 and 108. Further angularity changes will occur depending on the lateral position of the coupler 15, however the connection between the rods 107 and 108 and the torque lever 100 permits the same without impairing the excellent uncoupling action of the device.

It is contemplated that suitable antifriction means could be provided on those surfaces wherein relative movement occurs. For example, plastic or nylon rollers could be provided on the ends of the rod-like members positioned within the sleeve-like housing or within the housing itself. The rods may be coated with an antifriction plastic to co-operate with a plastic lining in the sleeve-like housing. These modifications are but exemplary of those which could reasonably be expected once the present invention is known. Obviously, other changes could be made without departing from the inventive concepts contained herein, and therefore any limitations imposed should be within the spirit and scope of the appended claims.

We claim:

1. In a sliding still 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 opposite ends thereof for at least lateral movement relative to said sill, the provision of an uncoupling device for each of said couplers comprising, an extensible uncoupling rod assembly having first and second rod-like members in substantial longitudinal alignment, means mounting one end of said first rod-like member on said car for rotation about its longitudinal axis and pivoting movement about a generally vertical axis substantially perpendicular to the longtiudinal axis of said rod-like member, means operatively connecting one end of said second rod-like member to a coupler lock operating means, and sleeve means slidably supporting the other ends of said first and second rod-like members in substantially longitudinal alignment to permit lengthwise extension and retraction of said rod-like members relative to each other in response to lateral shifting of said coupler; said sleeve means and said other ends of said first and second rod-like members being formed so as to be conjointly rotatable upon rotation of said first rod-like member.

2. The invention as defined in claim 1 wherein said means operatively connecting said one end of said second rod-like member to said coupler lock operating means includes a third rod member having one end extending upwardly and terminating in a hook for attachment to said coupler lock operating means, and means connecting said third rod member for rotation with said first and second rod-like member, said last mentioned connecting means slidably and nonrotatably supporting said other end of said third rod member.

3. The invention as defined in claim 1 wherein said means operatively connecting said one end of said second rod-like member to said coupler lock operating means includes a lever arm nonrotatably and slidably receiving a coupler lock operating rod means therein, said coupler rod operating means having one end extending upwardly and terminating in a hook and connected to said coupler lock operating means, said lever arm being connected to said second rod-like member for rotation therewith at a location remote from said coupler lock operating means so that said coupler lock rod operating means is rotatable with said rod-like member.

4. The invention as defined in claim 1 wherein said means joining the other end of said first and second rod-like members includes a sleeve-like housing receiving the other end of each of said first and seocnd rod-like members therein for movement therebetween said first and second rod-like members received in said sleeve-like housing in overlapping relationship to allow extension and retraction thereof within said housing, and stop means to limit the extension of each of said rod-like members with respect to said sleeve-like housing.

5. The invention as defined in claim 1 wherein said means operatively connecting said one end of said second rod-like member to said coupler lock operating means includes, a torque lever connected to said one end of said second rod-like members, means mounting said one end of said second rod-like member and said torque lever on said sliding sill for rotation about the axis of said second rod-like member, and coupler lock operating rod means having one end mounted in said torque lever arm at a location spaced from said axis of rotation of said second rod-like member for rotation with said torque lever while being slidable with respect thereto.

6. In a sliding sill type railway car wherein a longitudinal sill is mounted for relative movement with respect 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 extensible rod assembly, first means mounting one end of said extensible rod assembly on said car, second means mounting the opposite end of said extensible rod assembly on an end portion of said sliding sill, said first and second mounting means rotatably supporting said extensible rod assembly, a coupler rod connected to a coupler lock operating means on said car coupler, and means connecting said coupler rod to said extensible rod assembly including a torque lever having one end thereof attached to said extensible rod assembly for turninig movement therewith, and an opening formed in the other end of said torque lever to nonrotatably and slidably receive said coupler rod.

7. In a sliding sill type railway car wherein a longitudinal sill is mounted for relative movement with respect 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, a first rod-like member, a cylindrical portion on a first end of said first rod-like member means mounting said cylindrical portion on said car for rotation about the longitudinal axis thereof while permitting pivoting movement about an axis substantially perpendicular to said longitudinal axis, a second end portion on said first rod-like member, a sleeve-like housing slidably receiving said second end portion of said first rod-like member, a second rod-like member having a first and second end portion, said second end portion of said second rod-like member being slidably received in said sleeve-like housing, means forming a part of said sleeve-like housing spacing the second end portions of each of said first and second rod-like members for sliding movement in overlapping relationship and co-rotation, stop means on said second end portions of said rod-like members co-operating with stop means on said housing to limit the longitudinal movement of said second end portions on said rod-like members relative to said housing and means on said first end portion of said second rod-like member connected to a coupler lock operating means for operating the same in response to rotation of said rod-like members.

8. The invention defined in claim 7 wherein each of said rod-like members is of polygonal cross section and said sleeve-like housing is of complementary configuration to transfer rotational forces from one rod-like member to the other.

9. The invention defined in claim 7 wherein said means on said first end portion of said second rod-like member connected to a coupler lock operating means includes a torque lever joined to said first end portion of said second rod-like member and means mounting a cylindrical end portion of said first end portion of said second rod-like member on said sliding sill for rotation about the longitudinal axis thereof and pivoting movement about an axis substantially at right angles thereto.

10. The invention defined in claim 9 wherein said torque lever is provided with an elongated slot, a pair of juxtaposed coupler lock operating rods loosely received in said slot and hook means on one of said coupler lock operating rods for connection to said coupler lock operating means.

11. In a sliding sill type railway car wherein a longitudinal sill is mounted for relative movement with respect 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 swinging movement relative to said sill, the provision of an uncoupling device comprising, an extensible uncoupler rod assembly extending diagonally from an end sill portion of said car to said sliding sill, a first torque lever joined to said extensible rod assembly for rotation therewith, a second torque lever means rotatably supported on said sliding sill, lost motion link means joining said first and second torque levers, a rod slidably received in said seocnd torque lever means and being rotatable therewith, and hook means on one of said rods joined to a coupler lock operating means on said coupler whereby rotation of said first torque lever causes rotation of said coupler lock operating means.

12. The invention defined in claim 11 wherein said extensible rod assembly includes first and second rod-like members rotatably joined and relatively movable longitudinally of each other in response to movements of said sliding sill.

13. In a sliding sill type railway car wherein a longitudinal sill is mounted for relative movement with respect 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 swinging movement relative to said sill, the provision of an uncoupling device comprising, an extensible uncoupler rod assembly extending diagonally from an end sill portion of said car to said sliding sill, a torque lever joined to said extensible rod assembly for rotation therewith, slot means in said torque lever, a coupler lock operating rod formed so as to be slidably received in said slot means and rotatable with said

torque lever, and hook means on said rod connected to a coupler lock operating means on said coupler.

14. 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 opposite ends thereof for at least lateral movement relative to said sill, the provision of an uncoupling device for each of said couplers comprising, an extensible uncoupling rod assembly having first and second rod-like members disposed with the longitudinal axes thereof slightly offset, means mounting one end of said first rod-like member on said car for rotation about its longitudinal axis and pivoting movement about a generally vertical axis substantially perpendicular to the longitudinal axis of said rod-like member, means operatively connecting one end of said seocnd rod-like member to said sliding sill for rotation about its longitudinal axis and pivoting movement about a generally vertical axis substantially perpendicular to the longitudinal axis of said second rod-like member, means joining the other ends of said first and second rod-like members to transmit rotation from one rod-like member to the other while permitting longitudinal movement of one rod-like member relative to the other rod-like member, a torque lever having an end portion joined to one end of said second rod-like member adjacent said sliding sill, an elongated slot in said torque lever spaced from said portion of said torque lever joined to said second rod-like member, a pair of juxtaposed coupler lock operating rods slidably received in said elongated slot, said slot being of such configuration with respect to said coupler lock operating rods so as to rotate said rods in response to movement of said torque lever and hook means on one of said rods connected to a coupler lock operating means on said coupler.

15. The invention defined in claim 13 further including stop means mounted on said first rod-like member and co-operating with said means mounting said one end of said first rod-like member on said car to prevent unintentional rotation of said uncoupling device.

16. The invention as defined in claim 14 wherein said means joining said other ends of said first and second rod-like members includes a sleeve-like housing formed of a pair of channel shaped members attached to a central dividing plate to form a pair of chambers for reception of said other ends of said first and second rod-like members and means on said sleeve-like housing and said first and second rod-like members to limit relative longitudinal movement therebetween while permitting extension and retraction of said rod-like members into and out of said sleeve-like housing in response to movements of said sliding sill.

17. In a sliding sill type railway car wherein a longitudinal sill is mounted for relative movement with respect 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 axially extensible rod assembly, first means turnably mounting one end of said extensible rod assembly on said car, second means mounting the opposite end of said etxensible rod assembly on an end portion of said sliding sill, a coupler rod connected to a coupler lock operating means on said coupler, and means connecting said coupler rod to said extensible rod assembly including a torque lever having one end thereof attached to said extensible rod assembly for turning movement therewith and an opening formed in the other end of said torque lever to nonrotatably and slidably receive said coupler rod, a second lever mounted on said sill for rotation relative thereto, means interconnecting said coupler rod and said second lever and a lost motion link means joining said torque lever to said second lever.

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