May 10, 1966 C. E. TACK ETAL 3,250,403

ROTARY RAILWAY CAR COUPLER STRUCTURE

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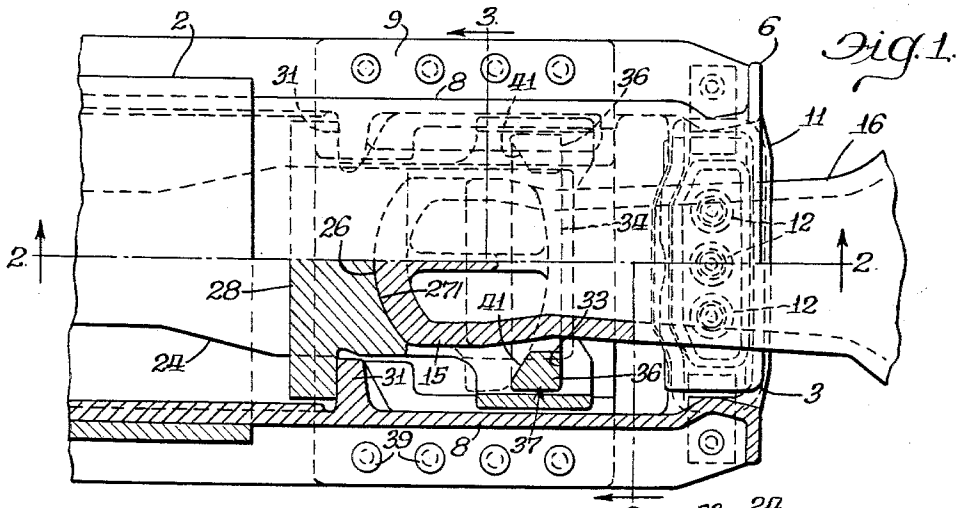

Fig. 1.

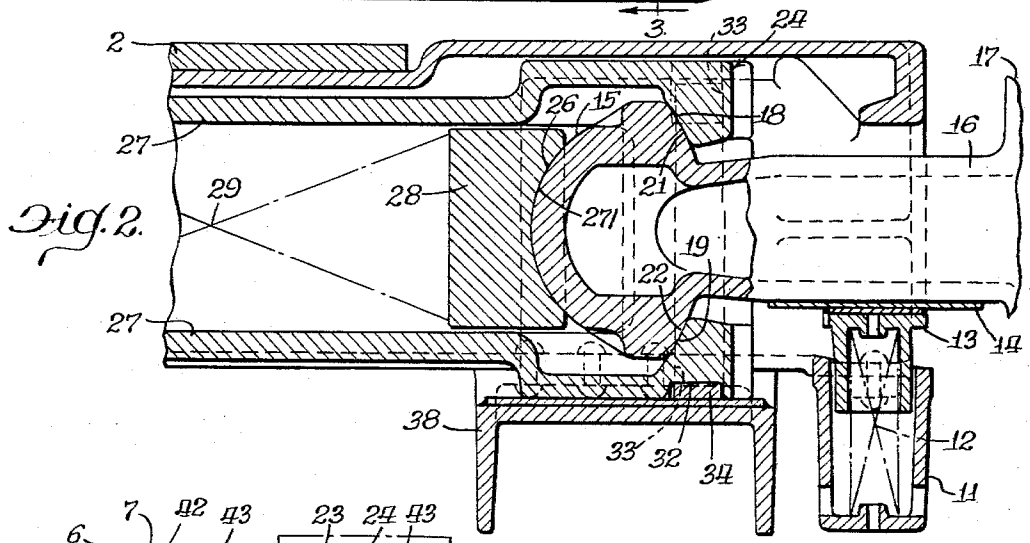

Fig. 2.

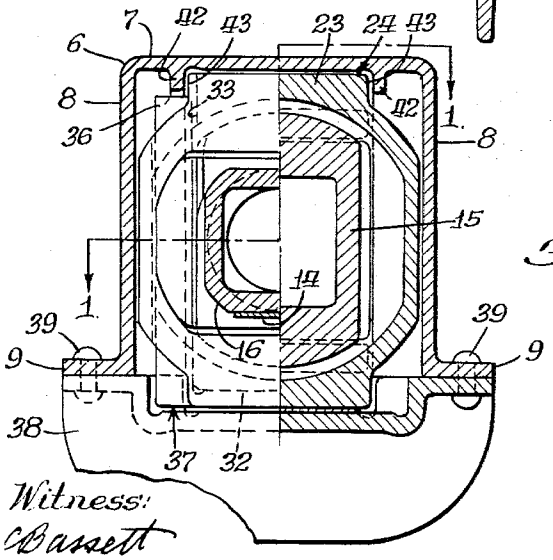

Fig. 3.

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ROTARY RAILWAY CAR COUPLER STRUCTURE

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Fig. 4.

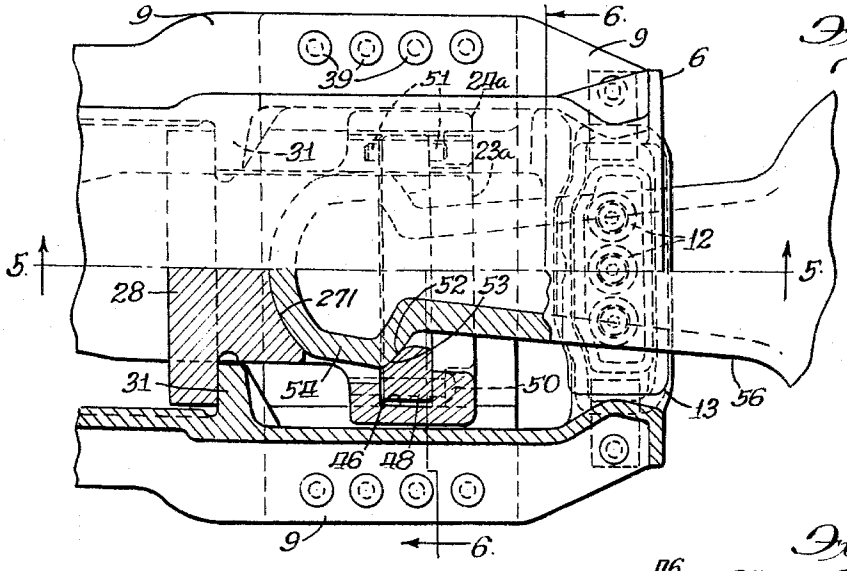
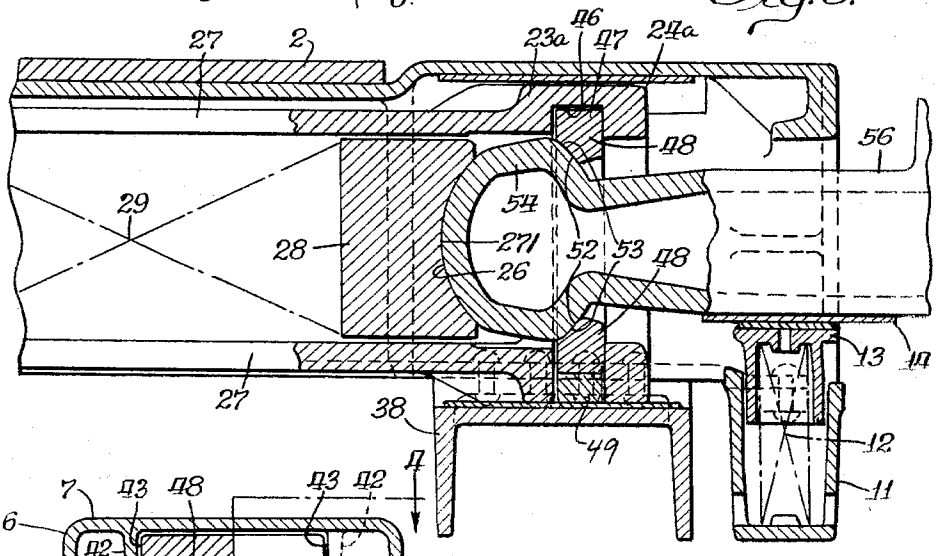



Fig. 5.



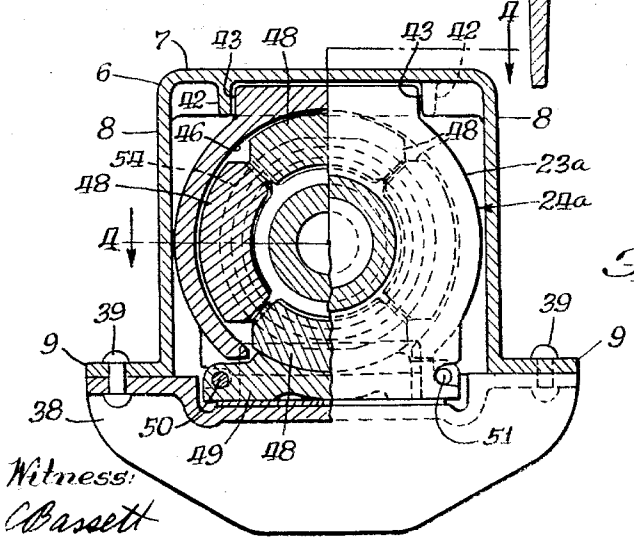




Fig. 6.

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ROTARY RAILWAY CAR COUPLER STRUCTURE

Filed April 9, 1965 3 Sheets-Sheet 3

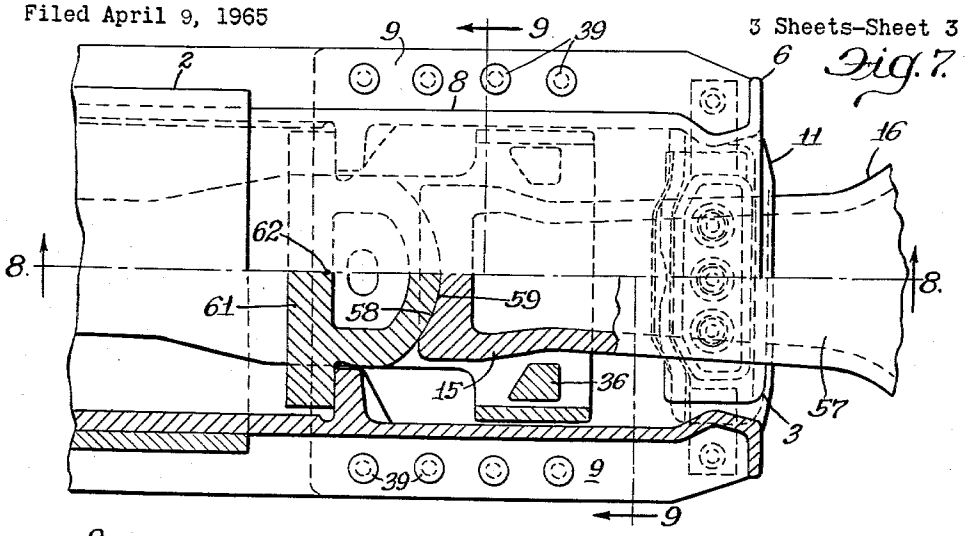


Fig. 7.

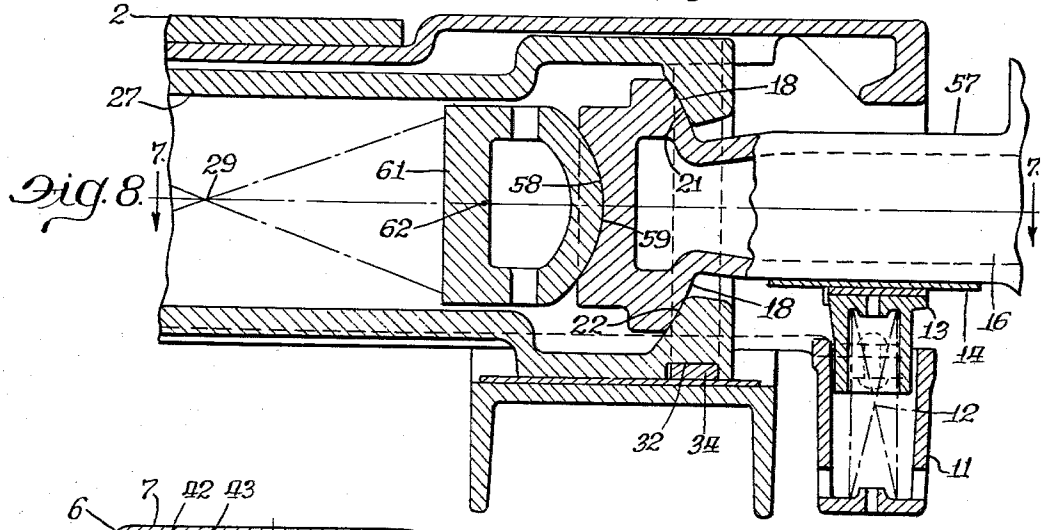


Fig. 8.

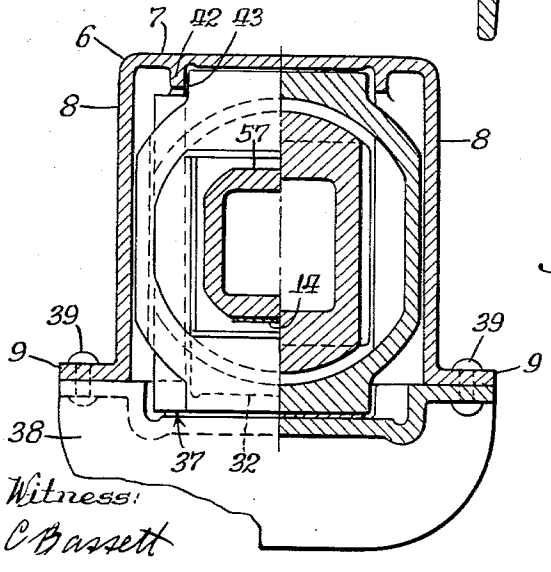


Fig. 9.

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United States Patent Office 3,250,403 Patented May 10, 1966



3,250,403

# ROTARY RAILWAY CAR COUPLER STRUCTURE

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Filed Apr. 9, 1965, Ser. No. 449,921
15 Claims. (Cl. 213—62)

This invention relates to automatic railway car couplers and more particularly to rotary couplers adapted for use on rotary dump cars of the type commonly employed in the transportation of coal. This application is a continuation-in-part of our copending application Serial No. 388,809, filed August 11, 1964, abandoned.

Prior to the use of rotary car couplers, it was necessary to uncouple each car from a train of cars to permit rotary movement of the car to an inverted position. When each car of a train of dump cars is provided with a rotary coupler engaging a fixed coupler on an adjacent car, it is possible to rotate each car in a train of cars without uncoupling the cars.

An object of the invention resides in the provision of a rotary railway car coupler structure which is relatively inexpensive to manufacture and reliable in use.

Another object of the invention resides in the provision of a rotary railway car coupler structure embodying means for detachably connecting the coupler shank to a head portion of a yoke to provide angular and/or rotational movements of the coupler relative to the yoke.

A further object of the invention resides in the provision of a rotary coupler structure in which the coupler shank is detachably connected to the yoke head by means of a retainer key.

Another object of the invention resides in the provision of a rotary coupler structure which is relatively easy to assemble for use, or to disassemble for repair or replacement of parts.

The invention embodies other novel features, details of construction and arrangement of parts which are hereinafter set forth in the specification and claims and illustrated in accompanying drawings, forming part thereof, wherein:

FIGURE 1 is a top plan view, partly in section, showing a rotary coupler structure embodying features of the invention, the part in section being taken along the line 1—1 of FIGURE 3;

FIGURE 2 is a longitudinal section taken along the line 2—2 of FIGURE 1;

FIGURE 3 is a transverse section taken along the line 3—3 of FIGURE 1;

FIGURE 4 is a top plan view, partly in section, illustrating a modified form of the invention, the part in section being taken along the line 4—4 of FIGURE 6;

FIGURE 5 is a longitudinal section taken along the line 5—5 of FIGURE 4;

FIGURE 6 is a transverse section taken along the line 6—6 of FIGURE 4;

FIGURE 7 is a top plan view, partly in section, illustrating another modified form of the invention, the part in section being taken along the line 7—7 of FIGURE 8;

FIGURE 8 is a longitudinal section taken along the line 8—8 of FIGURE 7; and

FIGURE 9 is a transverse section taken along the line 9—9 of FIGURE 7.

Referring now to the drawings for a better understanding of the invention and more particularly to FIGURES 1 to 3 therein, the rotary coupler structure is shown as



comprising a conventional center sill 2 adapted to be secured to the underside of a railway car body. A striker 6 is rigidly secured at its inner end to the end of the sill and provided with a top wall 7 and depending side walls 8 having lateral flanges 9. A carrier housing 11, secured to the forward end of the striker 6, contains a plurality of compression springs 12 to resiliently support a coupler carrier 13 for sliding engagement against a wear pad 14 provided on the lower side of a coupler shank 16.

A conventional automatic coupler head 17 is provided on the forward end of the shank 16 for coupling engagement with a non-rotatable coupler on an adjacent car.

The inner end portion 15 of the coupler shank 16 is formed with spherical convex surfaces 18 for abutting engagement against complementary upper and lower spherical concave surfaces 21 and 22, respectively, formed on the head 23 of a yoke 24. The end portion 15 is also formed with a spherical convex surface 26 for engagement against a spherical concave surface 271 formed on the front follower 28 of a conventional resilient draft gear 29 mounted within the yoke 24.

The front follower 28 is normally in abutting engagement against front stop lugs 31 provided on the side walls 8 of the striker 6. The draft gear comprises the usual rear follower normally engaged against rear stop lugs provided on the center sill and extending between the yoke arms 27 for engagement by a back wall of the yoke, as shown and described in U.S. Patent No. 2,990,963 issued July 4, 1961 to F. C. Kulieke, which patent is incorporated herein by reference.

To prevent axial displacement of the shank 16 from the yoke head 23 during rotational movement of the coupler relative to the yoke, a horizontal recess 32 and vertical apertures 33 are formed on the head to receive a horizontal base 34 and vertical legs 36, respectively, of a U-shaped retainer key 37.

The head 23 of the yoke 24 is slidably supported upon a yoke head carrier 38 secured to the lateral flanges 9 on the striker 6 by means of rivets 39, the other end of the yoke being slidably supported upon a strap secured to the center sill, as disclosed in Patent 2,990,963.

During rotational movement of the coupler relative to the yoke, the spherical convex surfaces 18 on the shank 16 slidably engage complementary spherical concave surfaces 41 on the retainer key legs 36 to prevent disengagement of the coupler from the yoke.

The yoke 24 is guided for longitudinal movement and engaged against rotational movement relative to the striker 6 by means of spaced guide lugs 42 on the striker straddling guide surfaces 43 on the yoke.

FIGURES 4, 5 and 6 illustrate a modified form of the invention in which the head 23*a* of the yoke 24*a* is formed with a circular groove 46 to receive a retainer key 47 comprising a plurality of segments 48 which are maintained within the groove by a cover 49 secured to the yoke head by a bolt 50 and bosses 51 engaged in recesses in the head.

The segments 48 are formed with concave surfaces 52 for engagement against an annular convex surface 53 formed on the inner end portion 54 of the coupler shank 56. This embodiment of the invention is otherwise the same as the form shown in FIGURES 1–3, and corresponding numbers have been applied to corresponding parts.

FIGURES 7, 8 and 9 illustrate a further embodiment of the invention in which the inner end of the coupler shank 57 is formed with a spherical concave surface 58

for complementary abutting engagement against a spherical convex surface **59** formed on the front follower **61**, the radii of curvature of the surfaces **18**, **21**, **58** and **59** having a common center **62** to permit free vertical and horizontal angling of the coupler without causing axial movement of the front follower. This embodiment of the invention is otherwise the same as the form shown in FIGURES 1 to 3 and corresponding numbers have been applied to corresponding parts.

We claim:

**1.** In a rotary railway car coupler structure, a center sill having top and side walls, a striker having a top wall and side walls secured to the center sill, a yoke having a head portion guided for axial and non-rotational movement within the center sill and striker, a draft gear mounted within the yoke to yieldably resist axial movement of the latter and comprising a front follower having a spherical front surface, a coupler shank comprising an enlarged end portion having a spherical end surface complementary to and engaging said spherical front surface, and retaining key means detachably mounted on said head portion to engage said end portion against axial movement from said head portion, said key means having spherical concave surfaces engaging a spherical convex front surface on said end portion.

**2.** A rotary railway car coupler structure according to claim **1** in which said head portion is slidably mounted on a yoke head carrier secured to said striker.

**3.** A rotary railway car coupler structure according to claim **2** in which a coupler carrier provided on the striker coacts with said front follower to yieldably resist vertical angling movement of the coupler shank.

**4.** A rotary railway car coupler structure according to claim **3** in which said key means comprises a U-shaped member having a base, and legs projecting upwardly from the base.

**5.** A rotary railway car coupler structure according to claim **4** in which said head portion has a recess to receive said base, and openings to receive said legs.

**6.** A rotary railway car coupler structure according to claim **5** in which said head portion has upper and lower spherical concave abutment surfaces engaging the spherical convex surface on said end portion.

**7.** A rotary railway car coupler structure according to claim **3** in which said key means comprises a plurality of segments encircling said end portion and mounted in an annular recess in said head portion.

**8.** A rotary railway car coupler structure according to claim **3** in which said head portion has a bottom opening, and a cover detachably secured to said head portion to close said opening.

**9.** In a rotary railway car coupler structure, a center sill having top and side walls, a striker having a top wall and side walls secured to the center sill, a yoke having a head portion guided for axial and non-rotational movement within the center sill and striker, a draft gear mounted within the yoke to yieldably resist axial movement of the latter and comprising a front follower having a spherical concave front surface, a coupler shank comprising an enlarged end portion having a spherical convex end surface complementary to and engaging said spherical concave front surface, and retaining key means detachably mounted on said head portion to engage said end portion against axial movement from said head portion, said key means having spherical concave surfaces engaging a spherical convex front surface on said end portion.

**10.** In a rotary railway car coupler structure, a center sill having top and side walls, a striker having a top wall and side walls secured to the center sill, a yoke having a head portion guided for axial and non-rotational movement within the center sill and striker, a draft gear mounted within the yoke to yieldably resist axial movement of the latter and comprising a front follower having spherical convex front surface, a coupler shank comprising an enlarged end portion having a spherical concave end surface complementary to and engaging said spherical convex front surface, and retaining key means detachably mounted on said head portion to engage said end portion against axial movement from said head portion, said key means having spherical concave surfaces engaging a spherical convex front surface on said end portion.

**11.** In a rotary railway car coupler structure, a center sill having top and side walls, a striker having a top wall and side walls secured to the center sill, a yoke having a head portion guided for axial and non-rotational movement within the center sill and striker, a draft gear mounted within the yoke to yieldably resist axial movement of the latter and comprising a front follower having a spherical front surface, a coupler shank comprising an enlarged end portion having a spherical end surface complementary to and engaging said spherical front surface, and retaining key means detachably mounted on said head portion to engage said end portion against axial movement from said head portion, said key means having spherical concave surfaces to engage a spherical convex front surface on said end portion, said head portion having upper and lower spherical concave abutment surfaces complementary to and in abutting engagement against the convex front surface on said end portion.

**12.** In a rotary railway car coupler structure, a center sill having top and side walls, a striker having a top wall and side walls secured to the center sill, a yoke having a head portion guided for axial and non-rotational movement within the center sill and striker, a draft gear mounted within the yoke to yieldably resist axial movement of the latter and comprising a front follower having a spherical convex front surface, a coupler shank comprising an enlarged end portion having a spherical concave end surface complementary to and engaging said spherical convex front surface, and retaining key means detachably mounted on said head portion to engage said end portion against axial movement from said head portion, said key means having spherical concave surfaces to engage a spherical convex front surface on said end portion, said head portion having upper and lower spherical concave abutment surfaces complementary to and in abutting engagement against the spherical convex front surface on said end portion.

**13.** In a rotary railway car coupler structure, a center sill having top and side walls, a striker having a top wall and side walls secured to the center sill, a yoke having a head portion guided for axial and non-rotational movement within the center sill and striker, a draft gear mounted within the yoke to yieldably resist axial movement of the latter and comprising a front follower having a spherical convex front surface, a coupler shank comprising an enlarged end portion having a spherical concave end surface complementary to and engaging said spherical convex front surface, and retaining key means detachably mounted on said head portion to engage said end portion against axial movement from said head portion, said key means having spherical concave surfaces to engage a spherical convex front surface on said end portion, said head portion having upper and lower spherical concave abutment surfaces complementary to and in abutting engagement against the spherical convex front surface on said end portion, said spherical concave end surface being concentric with said spherical convex front surface.

**14.** In a rotary railway car coupler structure, a center sill having top and side walls, a striker having a top wall and side walls secured to the center sill, a yoke having a head portion guided for axial and non-rotational movement within the center sill and striker, a draft gear mounted within the yoke to yieldably resist axial movement of the latter and comprising a front follower having a spherical convex front surface, a coupler shank comprising an enlarged end portion having a spherical

concave end surface complementary to and engaging said spherical convex front surface, and retaining key means detachably mounted on said head portion to engage said end portion against axial movement from said head portion, said key means having spherical concave surfaces to engage a spherical convex front surface on said end portion, said head portion having upper and lower spherical concave abutment surfaces complementary to and in abutting engagement against the spherical convex front surface on said end portion, said spherical concave end surface being concentric with said spherical convex front surface, said key means comprising a U-shaped member having a base and spaced legs extending upwardly from said base.



15. A rotary railway car coupler structure according to claim **14** in which said head portion has a recess to receive said base base and has apertures to receive said legs.


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