United States Patent [19]

Altherr

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[54] **SLACK ADJUSTER FOR RAILWAY CAR COUPLERS**

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[21] Appl. No.: **175,107**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 17,257, March 6, 1970, abandoned.

[52] **U.S. Cl.** .....**213/75 R,** 213/64, 213/67 R, 213/69

[51] **Int. Cl.**.....**B61g 1/28**

[58] **Field of Search** .....213/75 R, 64, 67 R, 69

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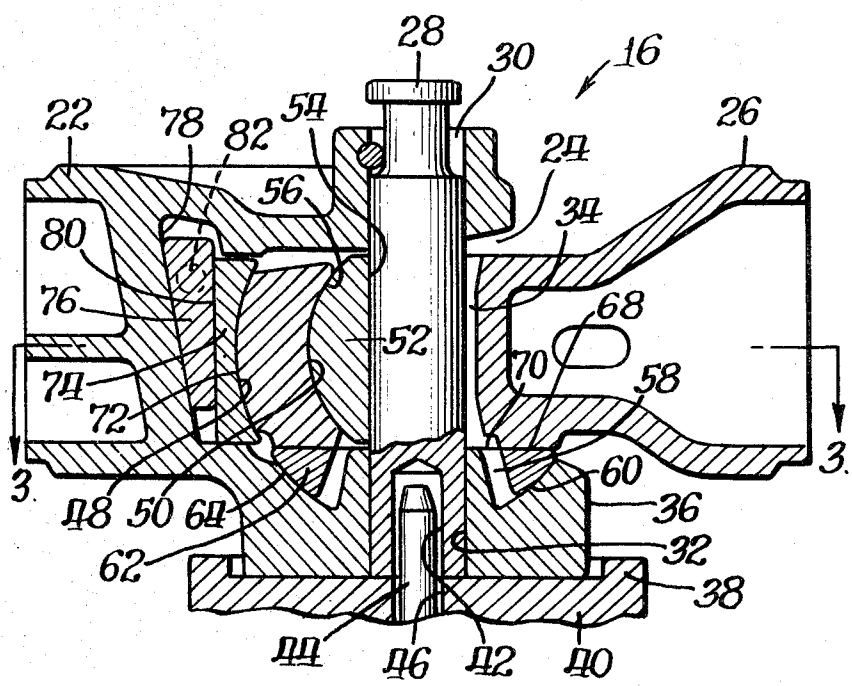
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[57] **ABSTRACT**

A gravity-feed wedge shaped shim disposed within the coupler, is utilized as a slack adjuster in conjunction with positioning means to establish the desired minimum clearance between abutting parts to substantially compensate for slack along the longitudinal axis of the coupler.

6 Claims, 6 Drawing Figures



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SHEET 1 OF 2

Fig. 1.

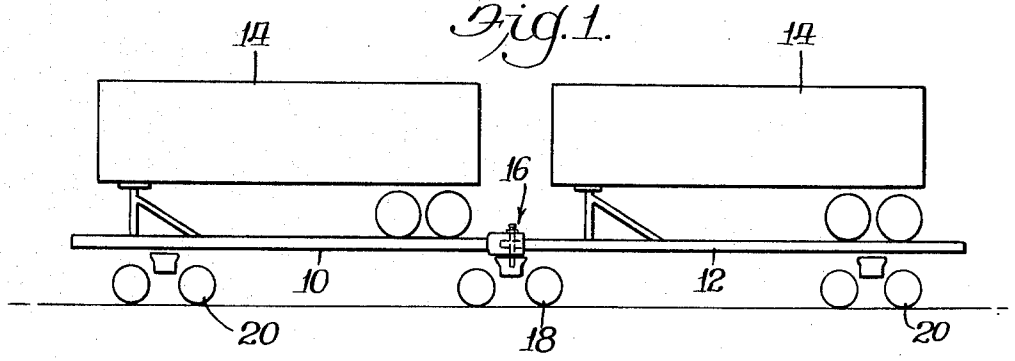


Fig. 2.

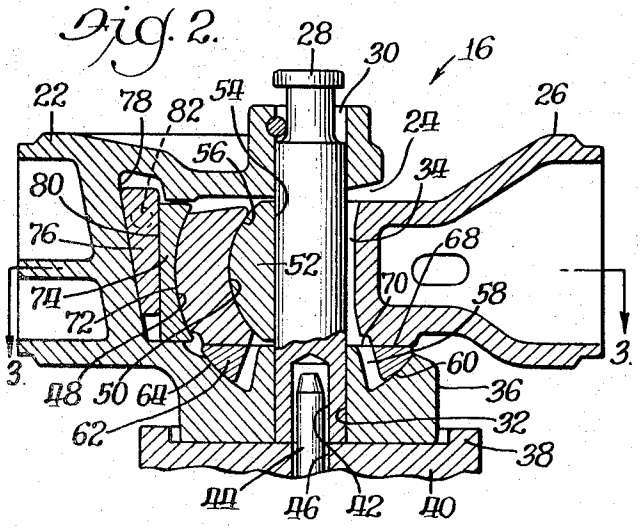
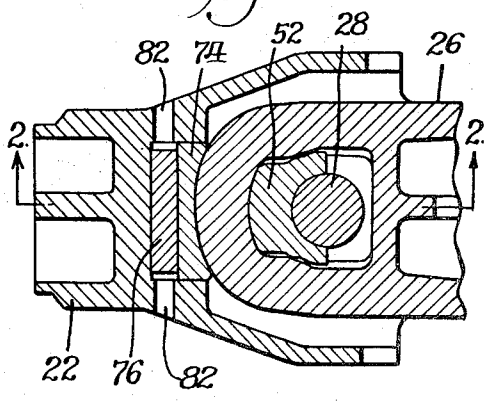


Fig. 3.



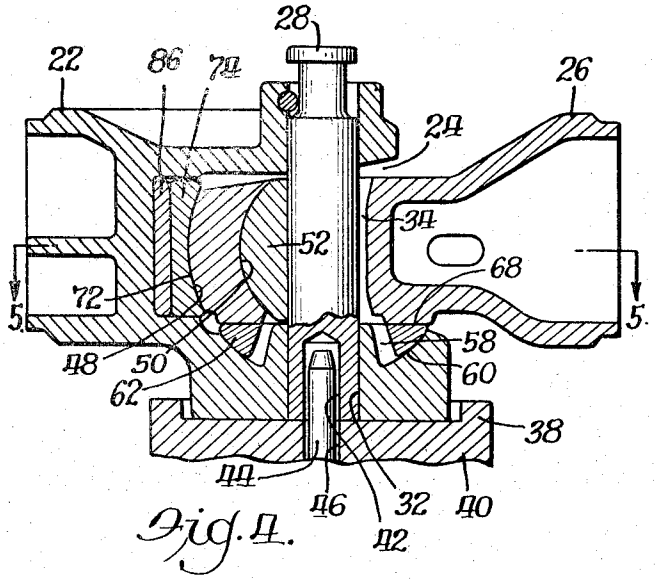
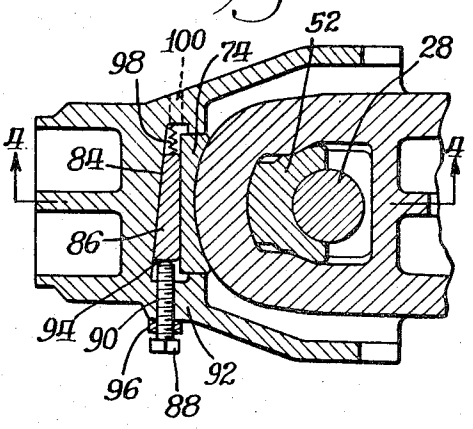


Fig. 4.

Fig. 5.



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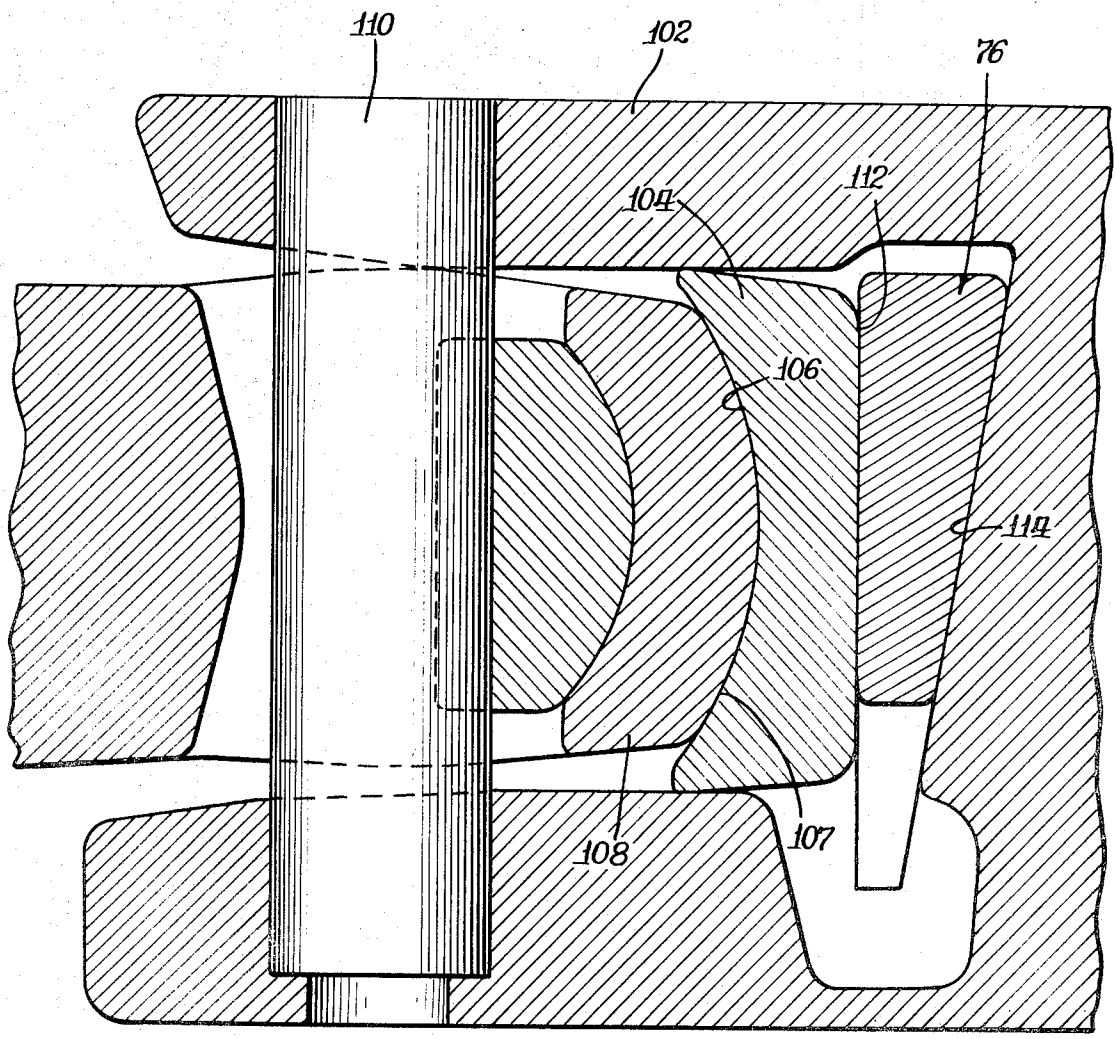


Fig. 6.

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SLACK ADJUSTER FOR RAILWAY CAR COUPLERS

This application is a continuation-in-part of my co-pending application, Ser. No. 17,257, filed Mar. 6, 1970, now abandoned.

BACKGROUND OF THE INVENTION

This invention relates generally to a railroad car articulated connection and particularly to a new and novel slack adjuster for said connection.

Articulated connections of the type disclosed herein are provided between adjacent ends of railway cars which are supported upon the bolster of a single four wheel truck. A male member is secured to one end of one car and a mating female member is secured to one end of the other car to receive the male member. The respective members are held together around an axis of relative pivotal movement by a vertical pin extending through the articulated connection and to the underlying bolster center plate of the truck.

The connections of the type described also comprise internal parts having spherical surfaces to provide for flexibility and include separate wear-absorbing parts that may be replaced after prolonged use of the connection. The use of such parts in an abutting relationship under high loads requires the maintenance of close tolerances to prevent high impact forces which cause excessive wear and possible fracture and also to prevent the misalignment of mating contours which may cause internal binding and galling within the connection. For example, excessive slack between the mating male and female members may allow displacement of certain parts against other parts. Since many of the parts used are cast steel structures, the maintenance of close tolerances to insure a proper non-yielding fit is often difficult.

Prior art slack adjustment was accomplished by the use of a planar shim which was placed at the flat end surface within the female cavity to abut the follower block which in turn abutted the spherical end surface of the mating male member. The purpose of the shim was to act as a slack adjuster to minimize the longitudinal slack in the connection and was conveniently sized to accommodate the slack found in a particular assembly, with the shim being changed when necessary as the internal parts wore down under service conditions.

In order to obtain the proper size shim, the connection was first assembled without the shim and the slack in that particular connection was measured as the possible relative distance of longitudinal movement between the male and female members when in a fully compressed and fully extended position. The connection was then disassembled and the proper shim was inserted to control the slack. This procedure had to be repeated whenever wear occurred or whenever one of the members was connected to a different mating member that had a different longitudinal slack and was a time consuming and costly operation to carry out.

SUMMARY OF THE INVENTION

In order to overcome the problems inherent in such prior art slack adjusters there is provided by the present invention a new and improved novel slack adjuster for the articulated connection of a railway car which comprises the use of a wedge shaped shim disposed within the connection along with means to establish the desired minimum clearance between abutting parts to compensate for slack along the longitudinal axis of the connection.

Accordingly an object of the invention is to provide a new and novel slack adjuster that may be used to quickly and easily remove longitudinal slack without requiring a connection and disconnection of the members for purposes of measuring the slack and sizing the shim.

Another object of the invention is to provide a new and novel railway slack adjuster for an articulated connector that automatically adjusts the slack while the connector is in operation on the railroad.

Still another object of the invention is to provide a new and novel slack adjuster for an articulated connection that allows the amount of slack to be positively controlled and changed from outside of the connector without requiring the removal and replacement of shims or the disconnection of the members.

These and other objects and advantages will become apparent from a reading of the following description of the preferred embodiment and from a study of the attached drawing illustrating the invention.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a simplified side view of a railway car made up of two sections, incorporating an articulated connection between the adjacent ends of said sections;

FIG. 2 is a vertical cross sectional view, taken along line 2—2 of FIG. 3, of an articulated connection showing the wedge shaped shim used as a slack adjuster;

FIG. 3 is a plan view, partly in cross section, taken along line 3—3 of FIG. 2;

FIG. 4 is a vertical cross sectional view, taken along line 4—4 of FIG. 5, showing a modification of the invention;

FIG. 5 is a plan view, partly in cross section, taken along line 5—5 of FIG. 4; and

FIG. 6 is a vertical cross sectional view through a portion of another type of railway car coupler utilizing the wedge shaped shim.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing, FIG. 1 illustrates schematically the two sections of an articulated railway car **10** and **12** having positioned thereon a pair of trailers **14**. the adjacent ends of the cars **10** and **12** are connected by an articulated connection, shown generally at **16**, which is supported on a common four wheel truck **18**, while the other ends of the cars **10** and **12** are supported by a pair of four wheel trucks **20**.

The articulated connection **16** shown in detail in FIGS. 2 and 3 allows relative vertical rotational and lateral angular movement between the car sections **10** and **12** and comprises a female member **22** having an open ended cavity **24** formed therein for receiving the male member **26** which is secured to the adjacent end of the car section **12**. The male and female members are pivotably connected by a pin **28** which is positioned in a pair of openings **30** and **32** formed in the female member **22** and also is positioned in an opening **34** formed in the male member **26**.

The open ended cavity 24 is substantially larger than the male member 26 to allow the connection to articulate when negotiating vertical curves as well as horizontal curves during service operation. Formed on the bottom portion of the female member 22 is an annular boss 36 which is designed to be received within the cup shaped depression of the center plate 38 of the truck bolster 40, shown partly in FIG. 2. An aperture 42 is formed in the bottom of the pin 28 to loosely receive a second pin 44 of a smaller diameter, which is in turn received in an opening 46 in the truck bolster center plate 38.

The male member 26 has an outer end spherical surface 48 along with an inner end spherical surface 50 which is formed in the vertical opening 34. Positioned within the vertical opening 34 is a pin bearing block 52 having a semi-circular surface 54, partly surrounding the pin 28, and an end spherical surface 56 abutting and complementary with the spherical inner surface 50 of the male member 26.

Provision is made in the articulated connection to accommodate vertical angular movements of the male member 26 and the female member 22 with respect to one another. For the purpose of lower angular clearance, an annular recess 58 is formed in the bottom portion of the female member 22, coaxial with the pin 28, said recess defining a spherical concave annular surface 60 disposed outward and upward with respect to the pin. A ring 62 having an outer spherical convey annular surface 60 is carried in the recess 58 and is suitably designed for universal tilting movement therein. A planar top surface 68 of the ring 62 supports the male member 26 on a similar continuous surface 70 thereof.

The end spherical surface 48 of the male member 26 abuts a complementary spherical surface 72 of a follower block 74 positioned within the cavity 24 of the female member 22 and is backed by a wedge shaped shim 76 of the invention said shim serving as an automatic slack adjuster as will now be described in more detail.

The wedge shaped shim 76 is positioned between the open ended cavity's interior end surface 78 and the back surface 80 of the follower block 74. The interior end surface 78 is formed at an acute angle similar to the angle on the shim, relative to the longitudinal axis of the connection, said angle preferably being in the range of approximately 76° to 80° when the shim is formed of steel in order to prevent the shim from becoming dislodged and rising upwardly on impact.

When the shim 76 is positioned as shown in FIG. 1 it automatically establishes the desired minimum clearance between abutting parts by the force of gravity between the interior end surface 78 and the follow block 74 to substantially compensate for slack along the longitudinal axis of the articulated connection. A hole 82 may be provided in the sides of the female member 22 to provide access to the shim 76 for raising it with a pinch bar or some other shim adjusting tool during assembly and connection with the male member.

Referring now to FIGS. 4 and 5 there is shown a modification of the invention wherein the rear portion of the open ended cavity 24 of the female member is formed with a horizontally tapered end surface 84 to receive a similarly tapered horizontal wedge shaped shim 86 which is positioned as before between the follower block 74 and the end surface 84 to adjust the slack along the longitudinal axis of the articulated connection. In this form of the invention, the shim is positioned horizontally, not by gravity as before, but by means of an adjusting screw 88 contained within a drilled and tapped hole 90 in the side wall 92 of the female member 22. The end 94 of the adjusting screw is positioned against the surface of the shim 86 so that a rotation of the screw will position the shim between the follower block 74 and the interior end surface of the cavity 24 to establish the desired minimum clearance between abutting parts.

Locking means may be provided in the form of a lock nut 96 to lock the adjusting screw in the female member 22 after positioning the wedge thereby preventing the screw from accidentally vibrating out of the hole 90 and allowing the shim to become loose. Since gravity is not necessary in this form of the invention, the angle on the wedge shaped shim 86 and the end surface 84 is not critical since the shim is prevented from moving on impact by the restraint provided by the adjusting screw.

There is also provided in this modification, means for returning the wedge shaped shim 86 to its unwedged position within the connection whenever it is desired to change male members in the connection. The returning means may comprise a spring 98 or an access hole 100 provided in the side of the female member 22, through which a pinch bar or some other implement may be inserted to force the shim 86 to its unwedged position. Prior to the shim being returned to the unwedged position, the locknut 96 must be unlocked and the adjusting screw must also be backed off.

The gravity-feed, self adjusting shim arrangement may also be used in a coupler arrangement wherein the male member comprises a coupler shank and the female member comprises a cushioned yoke or adapter of the type having a fixed relationship, in a longitudinal direction, between the connecting pin hole and the interior buffing surface of the yoke cavity.

Such an arrangement is shown in FIG. 6 wherein an F type yoke 102 is restrained from longitudinal motion by a conventional draft gear mechanism (not shown) and contains an internally uncushioned follower 104 having a spherical front face 106 in contact with the butt end 107 of coupler shank 108, the shank being retained in the yoke by pivot pin 110. The rear face 112 of follower 104 is spaced from a yoke buffing surface 114 and angularly disposed relative thereto such that surfaces 112 and 114 diverge upwardly at an angle in the range of approximately 10° to 14°. Similarly to the earlier described embodiments, a wedge shaped shim 76 is interposed between surfaces 112 and 114 to establish the desired minimum clearance between abutting parts and compensate for slack by dropping downwardly by force of gravity as wear occurs in the coupler parts.

From the foregoing it can be seen that there has been provided a new and novel slack adjuster using a wedge shaped shim for an articulated connection, as well as for a standard coupler-yoke combination, which accomplishes all of the objects of the invention and alleviates all of the problems encountered in adjusting slack with the use of individual planar shims sized and

installed in the connection after a time consuming connection, disconnection and reconnection of the articulated connection. With the use of the gravity positioned wedge shaped shim the slack in the articulated connection is continuously automatically adjusted during service operation. By using the manual positioned wedge shaped shim, the slack may be quickly adjusted whenever it changes without having to resort to the lengthy prior art practices. While many changes may be made in the construction details and arrangement of the parts without departing from the spirit and scope of the invention as expressed in the accompanying claims, the invention is not to be limited to the exact matters shown and described since only the preferred embodiments has been given by way of illustration.

I claim:

1. In an articulated connection for adjacent ends of articulated railway cars of the type having a female member, with an open ended cavity formed therein, secured to the end of one of the cars, a male member secured to the end of the other car and received within the cavity, said members being located on a common longitudinal axis, a pin extending vertically through and pivotally connecting the members, and a vertical follower block having a front spherical surface and a flat back surface disposed between the end of the male member and the interior surface of the cavity, the improvement comprising:

a. the interior end of the cavity and the flat back surface of the follower block diverging upwardly at an acute angle;

b. a wedge shaped shim disposed between the follower block and the interior surface of the cavity, said shim being automatically adjustable by gravity to compensate for wear in the connection.

2. The improvement of claim 1 wherein said interior end surface is inclined downwardly and inwardly toward the center line of the pin, and the back surface of the follower block is vertical.

3. The improvement of claim 1 wherein said acute angle is less than 14°.

4. the improvement as defined in claim 3 further comprising means formed in the female member for providing access to said shim to raise said shim during connection of the male member to the female member.

5. The improvement as defined in claim 4 wherein said access means comprises an aperture formed in the side of the female member for inserting a shim adjusting tool within said aperture.

6. In a coupler arrangement for adjacent ends of railway cars of the type having a female member, with an open ended cavity formed therein, secured to the end of one of the cars, a male member received within the cavity, a pin extending through and pivotally connecting the members, and a vertical follower block having a front arcuate surface and a back surface, flat in vertical longitudinal cross section, disposed between the end of the male member and the interior surface of the cavity, the improvement comprising:

a. the interior end of the cavity and the back surface of the follower block diverging upwardly at an acute angle; and

b. a wedge shaped shim disposed between the follower block and the interior surface of the cavity, said shim being automatically adjustable by gravity to compensate for wear in the arrangement.

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