

[54] RAILWAY CAR STEERING BOGIES

[75] Inventor: **Hermann Hinnen**, Sulz-Attikon, Switzerland

[73] Assignee: **Schweizerische Lokomotiv-Und Maschinenfabrik**, Winterthur, Switzerland

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[51] Int. Cl.**B61f 3/08, B61f 5/44, B61f 13/00**

[58] Field of Search.....105/168, 171, 176; 213/8, 20

[56] References Cited

UNITED STATES PATENTS

1,388,508 8/1921 Brillhart105/168 X

798,370	8/1905	Swonson	105/176
1,588,584	6/1926	Kasley	105/176
2,081,007	5/1937	Geissen	105/176
424,089	3/1890	Bosdevex	105/168
488,255	12/1892	Shaw	105/176
760,084	5/1904	Stelle.....	105/176

FOREIGN PATENTS OR APPLICATIONS

827,972	2/1960	Great Britain.....	105/171
479,714	2/1938	Great Britain.....	105/168

Primary Examiner—Robert G. Sheridan

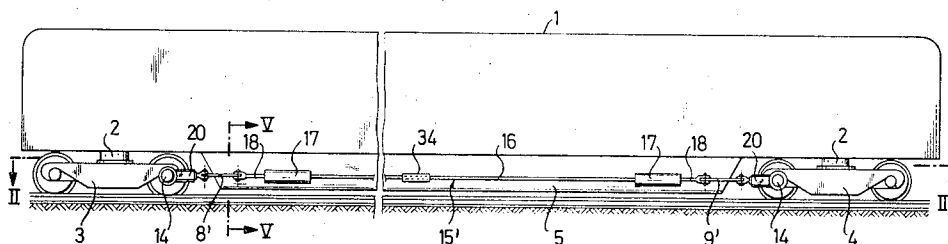
Assistant Examiner—Howard Beltran

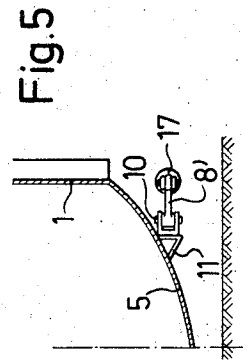
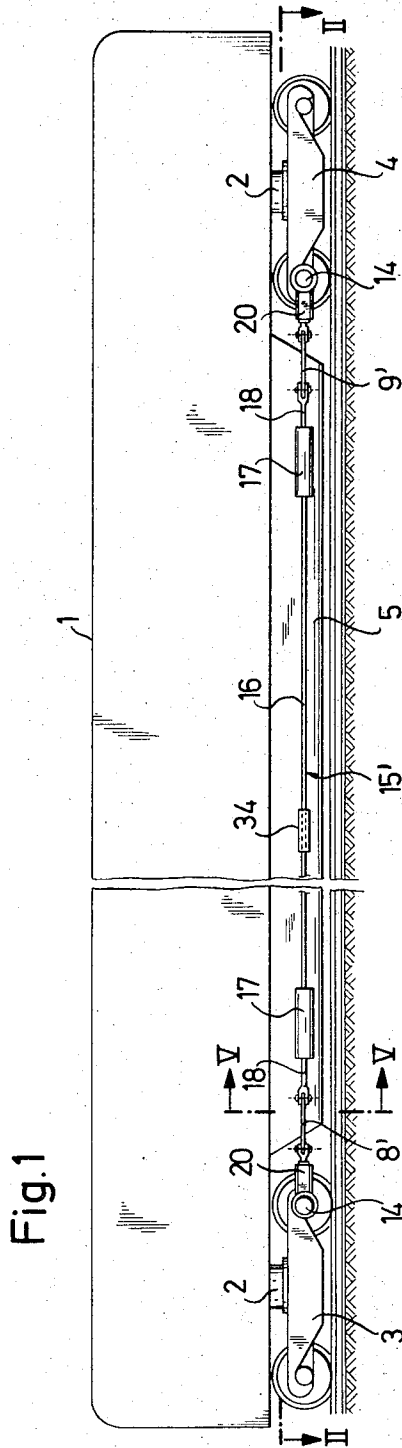
Attorney—Kenyon & Kenyon Reilly Carr & Chapin

[57] ABSTRACT

The undercarriages are coupled together by tension elements and transverse links so as to reduce the angle of approach of the leading axles of the undercarriages and the guiding forces thereon. Elastic elements can be incorporated in either the tension elements or transverse links or can be used in the connection between the transverse links and undercarriages.

12 Claims, 6 Drawing Figures

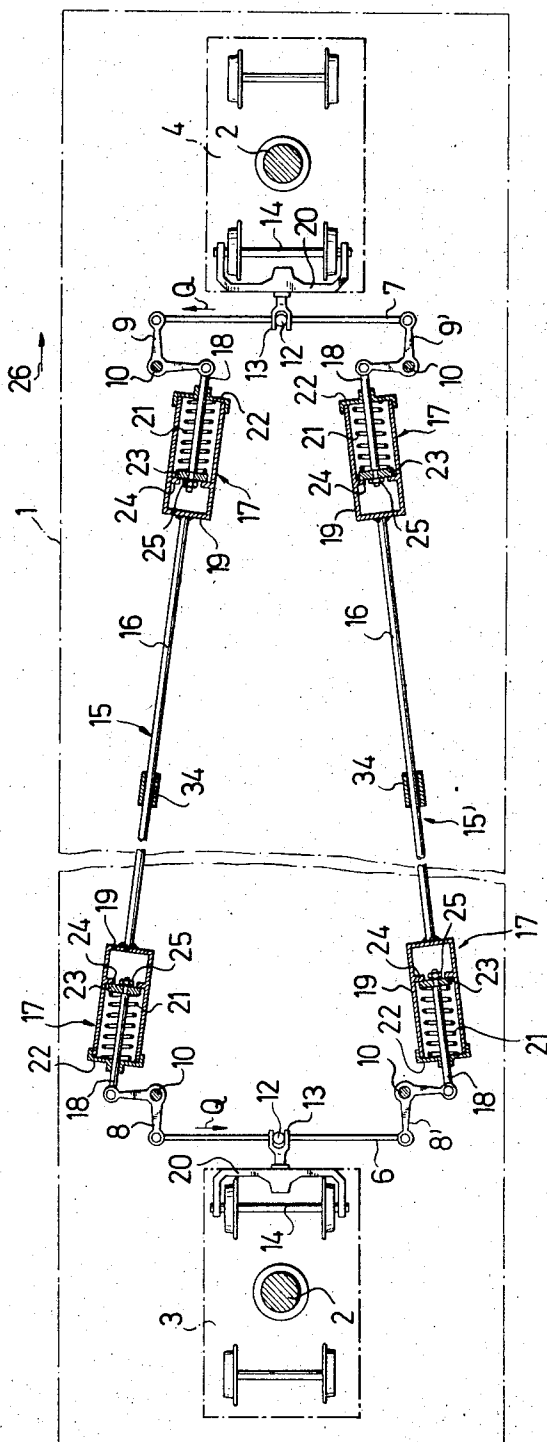




INVENTOR:
HERMANN HINNEN

BY:
Kenyon & Kenyon Reilly Carr & Chapin
ATTORNEYS

Fig. 2



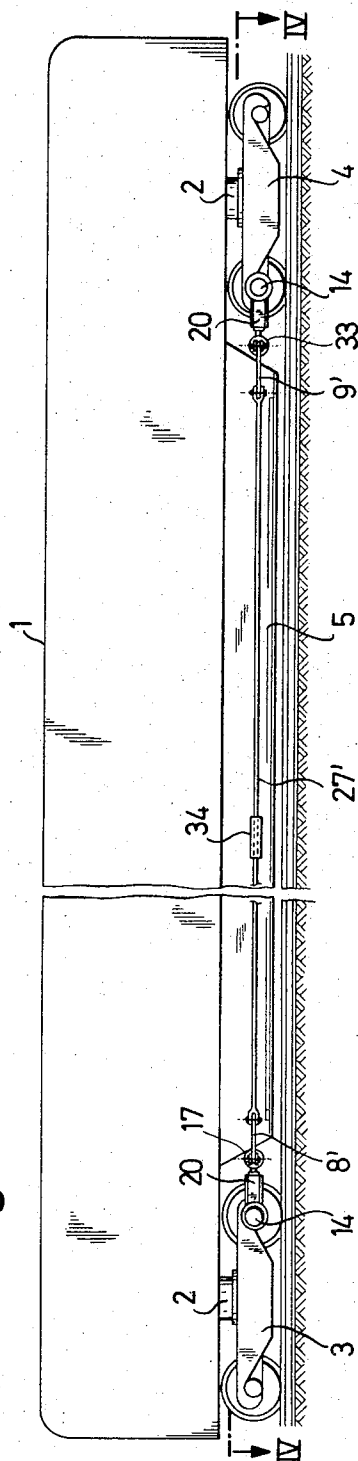
INVENTOR:

HERMANN HINNEN

BY:

Kenny & Kenny Kelly, Can & Chapin
ATTORNEYS

Fig.3



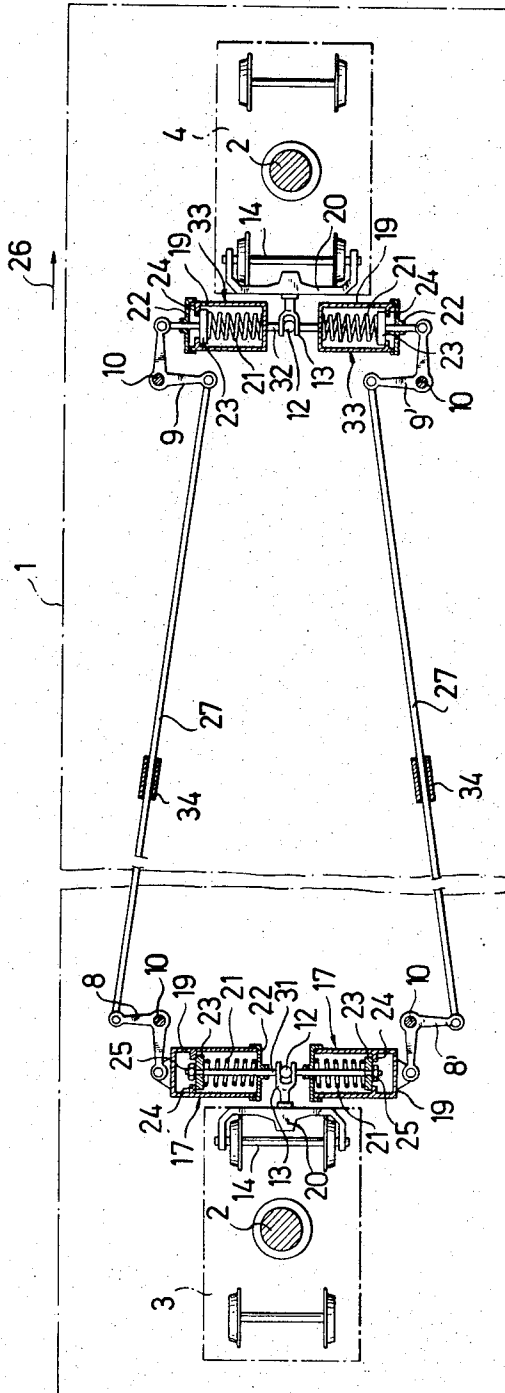
INVENTOR:

HERMANN HINNEN

BY:

Kenyon & Kenyon, Kelly, Carr & Chapin
ATTORNEYS

Fig. 4



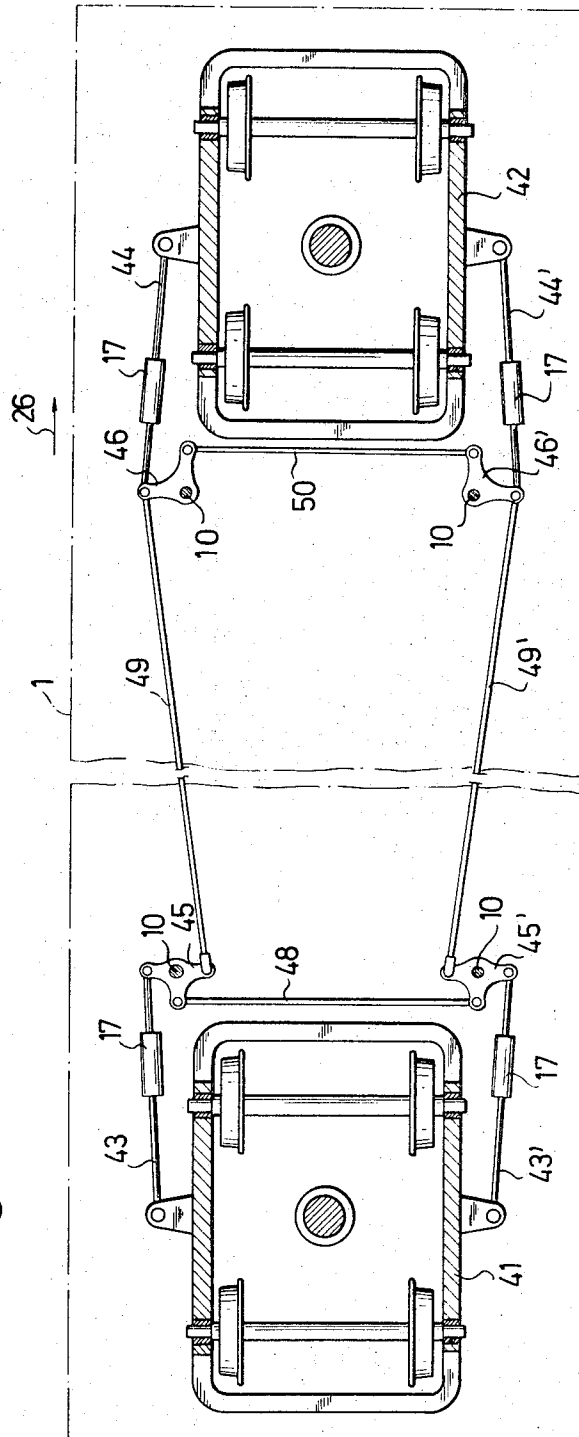
INVENTOR:

HERMANN HINNEN

BY:

Kenny & Kenny Reilly Carr & Chapin
ATTORNEYS

Fig.6



INVENTOR:
HERMANN HINNEN

BY:
Kenyon & Kenyon Reilly Carr & Chapin
ATTORNEYS

RAILWAY CAR STEERING BOGIES

This invention relates to a railway vehicle. More particularly, this invention relates to a coupling for the undercarriages of a railway vehicle.

It has been known to provide two adjacent undercarriages or trucks of a railway car with three-point links suspended in articulated fashion on the car body at the inner opposed ends of the undercarriages and to couple the ends of the links in a transverse direction. However, this arrangement has not been suitable for railway cars having trucks set at a great distance from one another, because, on the one hand, the three-point links can not be made of any desired length for reasons of stability and because, on the other hand, there is often no space available for installing a transverse coupling of the known kind. This is particularly the case with self-propelled cars and freight cars that have parts extending downwardly between their undercarriages to take various accessory units or to increase the load capacity. Consequently, transverse coupling arrangements have not been used in railways cars of relatively long length. As a result, under certain conditions, a substantial wear of the sets of wheels and of the rails, resulting from travel around curves, has been tolerated.

Accordingly, it is an object of the invention to reduce the stressing and wear of wheels and rails of railway vehicles. It is another object to provide a transverse coupling that consists of simple and favorably stressed constructional parts.

It is another object of the invention to provide a transverse coupling that can be installed on existing railway cars at minimal expense.

Briefly, the invention provides a railway vehicle with a coupling for a pair of undercarriages or trucks supporting the car body of the vehicle which is secured to the undercarriages to reduce the angle of approach of the leading axles of the undercarriages and the guiding forces acting thereon. The coupling includes a transverse link which is installed at a location adjacent to the interior end of each undercarriage, i.e., the end facing the opposite undercarriage, and which is connected with the undercarriage to follow the transverse movements of the car body relative to the undercarriage. In addition, a pair of levers are suitably mounted on vertically disposed pivot pins depending from the car body and are arranged symmetrically on opposite sides of the longitudinal axis of the car body. Each lever of each lever pair is articulated to an end of a respective transverse link so as to pivot about the respective pivot pin upon transverse movement of the transverse link articulated thereto. The coupling also includes a pair of tension elements which are disposed longitudinally of the car body in symmetry to the longitudinal axis of the car body. Each tension element is connected to the free arms of the levers disposed on the same side of the car body.

The parts of the coupling which are stressed only in tension can be made small so that the space required for the installation of the coupling is available with practically all types of railway vehicles.

In one embodiment of especially compact construction which requires minimal maintenance and makes possible a transmission of displacement forces that is practically free of backlash, the levers are angle levers and the tension elements are rods.

In the case where great lateral shocks or great piloting forces occur, the tension elements and/or transverse links each contain a prestressed elastic or spring element. This allows an elastic transmission of the displacing forces to be obtained as well as a reduction of the forces to a predetermined optimum value, for example, to about one half.

These and other objects and advantages of the invention will become more apparent from the following detailed description taken in conjunction with the drawings in which:

FIG. 1 illustrates an elevational view of a railway car equipped in accordance with the invention;

FIG. 2 illustrates a view taken on line II—II of FIG. 1;

FIG. 3 illustrates a view of a railway car with a modified form of construction according to the invention;

FIG. 4 illustrates a view taken on line IV—IV of FIG. 3;

FIG. 5 illustrates a fragmentary view taken on line V—V of FIG. 1; and

FIG. 6 illustrates a view similar to that of FIG. 2 of a further form of construction.

Referring to FIG. 1, a railway car comprises a car body 1 which is connected at longitudinally spaced points by means of pivots 2 to two undercarriages or trucks 3, 4, and is supported upon the trucks 3, 4 in a known manner (not shown). The car body 1 has a floor 5 which is curved downward in an intermediate part 5 between the trucks 3, 4, (FIG. 5).

Referring to FIGS. 1 and 2, the car body 1 is provided with a coupling device including transverse links 6, 7 adjacent to the ends of the trucks 6, 7 facing each other, i.e., the interior ends. Each link 6, 7, in turn, is connected at the ends to a pair of double arm angle levers 8, 8', 9, 9' which are disposed symmetrically of the longitudinal axis of the car body 1. Each angle lever 8, 8', 9, 9' is pivotally mounted on a vertically disposed pivot pin 10 which is secured in a mount 11 attached to the underside of the floor 5 (FIG. 5).

The links 6, 7 are also guided by means of a centrally located vertical pin 12 which is guided in a guide piece 13 which, in turn, is pivotally mounted in a yoke 20 mounted on the inner wheel axle 14 of a corresponding truck 3, 4.

The free arms of each lever 8, 8', 9, 9' are connected in opposed pairs to each other by means of tension elements 15, 15', such as tension rods, which are oriented longitudinally of the car body 1. Each tension element 15, 15' is formed of a number of parts including an intermediate or middle piece 16, a pair of elastic elements 17 attached to the respective ends of the middle piece 16 and a pair of end pieces 18 attached to the ends of the elastic elements 17. The middle pieces 16 are each guided in a respective guideway 34 secured intermediately to the floor of the car body 1. Each elastic element 17 is formed of a spring pot 19 fixed at one end to a tension element 15 and containing a cover 22 fixed at the opposite end, a spring plate 23 slidably mounted in the pot 19 between the cover 22 and a shoulder 24 fixed within the pot 19 in spaced relation to the tension element end of the pot 19, and a compression spring 21. The spring 21 is mounted within the pot 19 in prestressed condition between the cover 22 and shoulder 24. Each end piece 18 extends through a

cover 22 and a spring plate 23 of an elastic element 17 and has a threaded end onto which a nut 25 is threaded against the spring plate 23 on the opposite side of the spring 19. In this manner, the end piece 18 can only be stressed in tension.

In operation, for example, during travel of the car body 1 around a curve of a railway track curved to the left as viewed in the direction indicated by the arrow 26, the undercarriages or trucks 3, 4 run with the leading sets of wheels against the outer rail of the track. This introduces oppositely directed transverse forces Q through the links 6, 7 into the angle levers 8, 9 which forces Q are counterbalanced by the tension element 15. As a result, the angle of approach of the leading axles of the trucks 3, 4 and the guiding forces acting thereon are decreased with respect to a car body constructed with uncoupled trucks.

During travel of the car body 1 around a right-hand curve, the oppositely directed forces would act through the angle levers 8', 9' on the tension element 15'.

Alternatively, by a suitable choice of the prestress of the compression springs 21, it is possible to exactly adjust the magnitude of the force to be transmitted without action of the springs.

Referring to FIGS. 3 and 4, wherein like parts as above are designated by like reference characters, a coupling device for the trucks 3, 4 can also be used which includes a pair of one piece tension elements 27, 27 symmetrically arranged relative to the longitudinal axis of the car body 1 in angular relation to each other, and transverse links 31, 32 which have built-in spring elements. The transverse link 31 at one end of the car body 1 includes two elastic elements 17, as above constructed, for transmitting tension forces while the transverse link 32 at the other end of the car body 1 includes two elastic elements 33 for transmitting compression forces. The elastic elements 33 are constructed in similar fashion to the elastic elements 17 except that the link 32 is fixed to an end of the pot 19, the compression spring 21 is disposed between the end wall of the pot 19 and the shoulder 24, and the angle lever 9, 9' is fixed to the spring plate 23 by an end piece 18 which passes through the cover 22.

The operation of the coupling of FIGS. 3 and 4 corresponds to that of the coupling of FIGS. 1 and 2 and need not be further described.

Referring to FIG. 6, wherein like reference characters indicate like parts as above, the car body 1 rests on carriages or trucks 41, 42 and is provided with a coupling between these trucks 41, 42. The coupling includes pairs of tension rods 43, 43', 44, 44' which are each provided intermediately thereof with elastic elements 17, as above constructed. The respective rods 43, 43', 44, 44' are pivotally secured at the outer ends to the trucks 41, 42 and are pivotally secured at the inner ends to a respective arm of multi-arm levers 45, 45', 46, 46'. Each multi-arm lever 45-46' is pivotally mounted on a pivot pin 10 depending vertically from the car body 1. In addition, the levers 45, 45' are made as three arm levers and are connected together by a transverse link 48, which is articulated to the middle arms. The remaining arms of the levers 45, 45' are pivotally connected to the ends of respective tension rods 49, 49'. The opposite ends of the tension rods 49, 49' are pivotally connected to the arms of the levers 46,

46' to which the tension rods 44, 44' connect. The levers 46, 46' are made as two-arm or angle levers and are also connected together by a transverse link 50 pivotally secured to the remaining arms.

In this coupling arrangement, it is possible to do without the highly stressed connecting and guiding elements corresponding to the pin 12, fork 13 and yoke 20 above described.

Further, the transverse links 48, 50 can be provided with suitable elastic elements 17, 31 as above described. Also, it is possible to use other forms of tension elements than tension rods. For example, wire cables and the like can be used for the tension elements.

What is claimed is:

1. A railway vehicle comprising
 - a longitudinally extending body;
 - a pair of longitudinally spaced apart undercarriages pivotally mounted to the underside of said body at longitudinally spaced points for supporting said body, each undercarriage having at least two axles mounted thereon and a pair of wheels on each said axle;
 - a pair of transverse links, each link being connected to a respective one of said undercarriages;
 - a pair of levers disposed symmetrically relative to the longitudinal axis of said body adjacent each undercarriage and articulated to opposite ends of each said link, each said lever being pivotally mounted from said body; and
 - a pair of tension rods disposed longitudinally of said body symmetrically of said longitudinal axis thereof, each tension rod being connected at the ends thereof to a pair of said levers disposed on the same side of said longitudinal axis as said tension rod.

2. A railway vehicle as set forth in claim 1 wherein each said lever is an angle lever and each said tension rod is a rod.

3. A railway vehicle as set forth in claim 1 which further comprises guiding means secured to said body for guiding said tension rod therein.

4. A railway vehicle as set forth in claim 1 which further comprises a prestressed elastic element positioned intermediately of each respective tension rod for resisting tension in said tension rod.

5. A railway vehicle as set forth in claim 1 which further comprises a pair of prestressed elastic elements positioned intermediately within each transverse link.

6. A railway vehicle comprising

- a longitudinally extending car body;
- a pair of longitudinally spaced apart undercarriages pivotally mounted on said body at longitudinally spaced points for supporting said body thereon, each undercarriage having at least one axle fixedly mounted thereon and a pair of wheels on said axle;
- a pair of transverse links, each link being mounted adjacent a respective one of said undercarriages for transverse movement thereto;
- means mounted on each undercarriage for guiding said adjacent link transversely therewith;
- a pair of tension rods extending symmetrically longitudinally of said car body, each tension rod being articulated at each end to a respective end of said links; and

elastic elements connected between each tension rod and each link to elastically transmit forces therebetween.

7. A railway vehicle as set forth in claim 6 wherein said elastic elements are mounted within said tension rods.

8. A railway vehicle as set forth in claim 6 wherein said elastic elements are mounted within said transverse links, said elastic elements in one link having means for resisting tension and said elastic elements in the other link having means for resisting compression.

9. A railway vehicle as set forth in claim 6 which further comprises a plurality of angle levers, each angle lever being pivotally mounted on said car body and connected at one end to one end of one tension rod and at another end to one end of one link, each pair of said angle levers connected to a respective tension rod being pivotally mounted for simultaneous rotation in

opposite directions relative to said car body.

10. A railway vehicle as set forth in claim 6 wherein said means includes a vertical pin centrally of each transverse link, a yoke mounted on each truck and a guide piece pivotally mounted on said yoke and guiding said vertical pin therein.

11. A railway vehicle as set forth in claim 6 wherein said means includes a pair of levers pivotally mounted in depending relation on said car body and pivotally connected to opposite ends of each transverse link, and a pair of second tension rods connected to each truck, each said second tension rod being pivotally connected to a respective one of said pair of levers.

12. A railway vehicle as set forth in claim 11 which further comprises an elastic element in each said second tension rod for elastically transmitting forces therethrough.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,728,973 Dated April 24, 1973

Inventor(s) Hermann Hinnen

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Correct the assignee's name to read:

--Schweizerische Lokomotiv- und Maschinenfabrik--.

Column 2, line 29, after "(not shown)." insert
--Each truck 3, 4, as shown, has a pair of axles
fixedly mounted thereon on which wheels are mounted
as is known.--

Column 3, line 30, change "27, 27" to
--27, 27'--.

Signed and sealed this 19th day of February 1974.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents