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GUIDING DEVICE FOR CARS OF DOUBLE-RAIL TRAINS

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Fig. 1

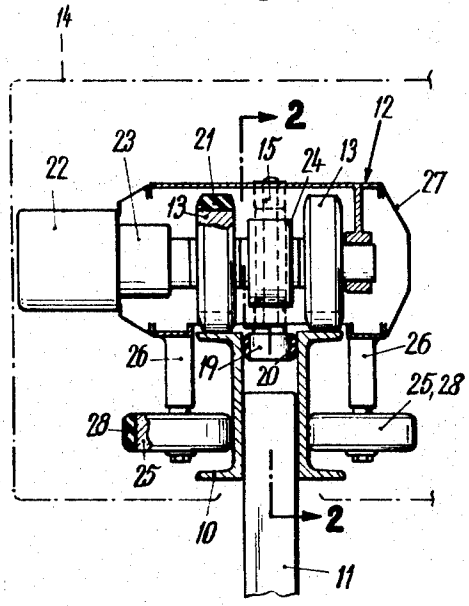


Fig. 2

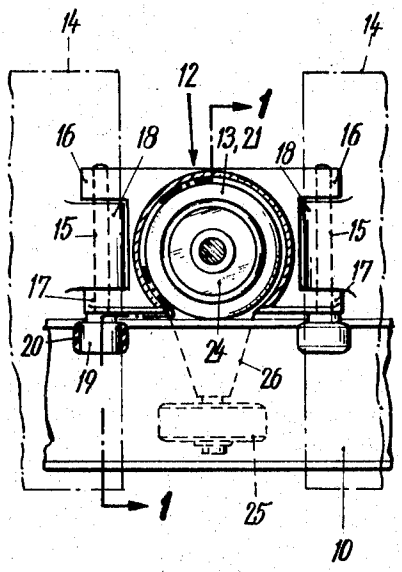
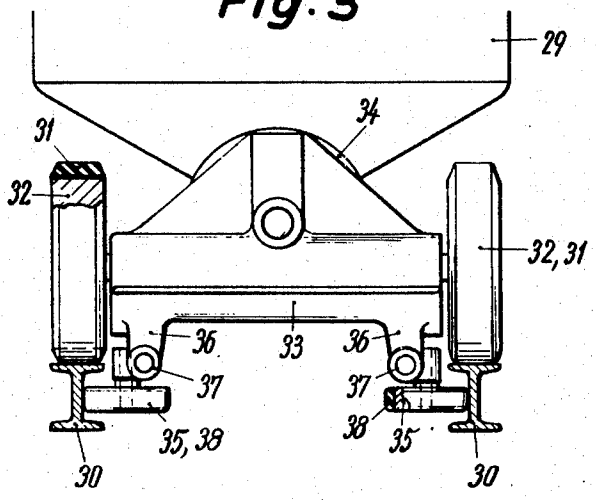


Fig. 3



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GUIDING DEVICE FOR CARS OF DOUBLE-RAIL TRAINS

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ABSTRACT OF THE DISCLOSURE

A guiding device for the cars of a double-rail train in which a plurality of guide rollers mounted on the cars rotatable about substantially vertical axes are arranged in a single line between the rails and each adapted to alternately engage with either rail.

The present invention relates to a guiding device for the cars of double-rail trains or the like.

In general, the cars of the usual double-rail trains and the like are supported on the rails in transverse directions by means of a lateral flange on each wheel. In order to prevent derailing of the cars in curves, the radius of curvature of the rails must in such curves be made of a considerable size. On the other hand, it is known in monorail trains that the rollers or wheels of the cars may be prevented from sliding laterally off the rail by providing the car with additional rollers which are rotatable about perpendicular axes and engage from opposite sides upon the central part of the rail.

It is an object of the present invention to provide guide means for the cars of double-rail trains or the like which are adapted to guide the cars very securely in lateral directions not only on a straight track, but also in curves and thus permit such a train to drive along curves which have a relatively small radius of curvature without any danger that any of its cars might derail.

For attaining this object, the invention provides that each car of a train or its undercarriage or bogie which is movable along the two rails is guided transversely by rollers which are located between the two rails and are rotatable about substantially perpendicular axes and adapted to engage upon the inner sides of the rails. Since the cars are movable along two rails, these guide means will take up at least to a considerable extent the transverse tilting and pitching forces which act upon the cars. Under certain circumstances, a single roller or a single row of rollers may suffice which are located between the two rails and alternately engage upon the inner side of one rail or the other. If the rails are spaced at a greater distance from each other, it is, however, advisable to provide two rollers or rows of rollers, one of which engages upon the inner side of one rail and the other against the inner side of the other rail.

This arrangement of the rollers between the two rails has the further advantage that these rollers will be protected between the rails and do not take up any space outside of the rails.

For attaining the highest possible safety factor, it is, however, advisable to provide the cars or bogies with additional bracing rollers which engage upon the outside of both rails. Since each rail will then be acted upon by guide and bracing rollers at the inner and outer sides, a maximum in safety will be attained since all transversely acting forces will then be taken up as much as possible and these rollers will fully counteract any tendency of the cars to tilt over, especially when driving at high speeds along relatively sharp curves. However, if the two rails

are spaced at a considerable distance from each other, it will in most cases be sufficient to provide only the guide rollers on the inner sides of the rails, while the additional bracing rollers on the outer sides of the rails may then be omitted.

The present invention is especially of advantage when applied to articulated chainlike trains in which the car bodies are supported on wheeled under carriages or bogies which are movable along the rails and each of which supports a pair of adjacent car bodies which are pivotably connected thereto. Each bogie preferably has a single wheel axle and it is preferably laterally supported by a guide roller and/or a bracing roller or a pair of guide rollers and/or bracing rollers in front of as well as behind the wheel axle.

The tread surface of each guide and/or bracing roller as well as each drive roller or wheel may be provided with a rubber tread or a pneumatic tire or other elastic element so as to render the operation of the train almost noiseless.

The features and advantages of the present invention will become more clearly apparent from the following detailed description thereof which is to be read with reference to the accompanying diagrammatic drawings, in which—

FIGURE 1 shows a cross section of a first embodiment of the invention which is taken along the line 1—1 of FIGURE 2;

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

FIGURE 3 shows, partly in cross section, a front view of a modification of the invention.

Referring first to FIGURES 1 and 2 of the drawings, the two rails **10** on which the train according to the invention is guided and supported may consist, for example, of U irons with outwardly directed flanges which are mounted, for example, on posts **11** at a suitable distance from the ground and from each other. The train according to the invention consists of undercarriages, for example, in the form of bogies **12**, each of which is provided with a pair of wheels or rollers **13** which are rotatable on a common axle and are movable along the two rails **10**. Each bogie **12** supports the adjacent ends of two car bodies **14** and is for this purpose provided with a bracket which projects toward the front and toward the rear of the wheels **13** and has on each end a pair of upper and lower lugs **16** and **17** between which a lug **18** is inserted which is secured to one of the two car bodies **14** and is pivotably connected to the lugs **16** and **17** by a pivot pin **15**. For taking up the perpendicular forces, the lugs **18** on the car bodies **14** may be directly or indirectly supported on the lower lugs **17** on the bogie **12**. If desired, it is also possible to provide a universal joint between each car body **14** and the bogie **12**, for example, a ball-and-socket joint, a rubber joint or the like.

The pivot pins **15** which are disposed within the central vertical longitudinal plane of each car and bogie and also centrally between the rails **10** are extended through the lower lugs **17** on each bogie **12**, and these extensions serve as means for rotatably mounting a pair of guide rollers **19** which engage between the two rails **10** and have each a diameter slightly smaller than the distance between the rails **10**. Each of these guide rollers **19** therefore has a small amount of play between the rails so as to be able to engage with and run along one or the other rail **10**. Rollers **19** may each be provided with a rubber tread **20** or with a pneumatic tire or the like so as to roll along the rails **10** without noise. The same preferably also applies to the wheels **13**, each of which may be likewise provided with a rubber tread **21** or a pneumatic tire or the like.

The wheels **13**, preferably of each bogie **12**, are driven by an electric motor **22** through a reduction gear **23**, and they may be connected to each other by a differential gearing **24**.

Each bogie **12** is further braced laterally on the rails **10** by means of bracing rollers **25** which are rotatable about vertical axes and are mounted on bearing elements **26** which project downwardly from the gear case or wheel housing **27**. These bracing rollers **25** are likewise provided with rubber treads **28** or with pneumatic tires and they engage upon the vertical outer surfaces of rails **10**.

FIGURE 3 illustrates a modification of the invention, in which the car **29** runs directly on the rails **30** which have a double-T-shaped cross section and are spaced from each other at a relatively large distance which may, for example, correspond substantially to the standard rail gauge. The wheels **32** which are spaced accordingly and are also provided with a rubber tread **31** or the like are mounted on and separated by the gear case **33** and may be driven, for example, by a motor **34** which extends in the longitudinal direction of the car and may be flanged to the gear case **33**.

On its lower side the gear case **33** is further provided with bearing brackets **36** which may be provided, for example, with tubular longitudinal extensions **37** in which guide or bracing rollers **35** are mounted underneath the wheels **32** and preferably in a position in front and/or at the rear of these wheels. These bracing rollers which may again be provided with a rubber tread **38** or the like engage upon the inner vertical surfaces of both rails **30**.

Of course, each drive unit including the wheels and the guide or bracing rollers may also in this case form a separate bogie on which the ends of two car bodies are pivotably mounted and supported in a suitable manner. In both embodiments of the invention as shown in FIGURES 1 to 3 it is also possible to connect each bogie to one car body either rigidly or by means of a joint which only permits the car body to pivot relative to the bogie about a vertical axis so that there is no danger of any lateral tilting of the car body relative to the bogie, while the other car body which is also supported on the same bogie may then be connected thereto by another suitable type of articulated joint, preferably a universal joint, which may consist, for example, of rubber elements or the like.

Although my invention has been illustrated and described with reference to the preferred embodiments thereof, I wish to have it understood that it is in no way limited to the details of such embodiments but is capable of numerous modifications within the scope of the appended claims.

Having thus fully disclosed my invention, what I claim is:

1. A guide device for cars of a double-railed train in which two adjacent cars of said train comprise a bogie having a single axle with a pair of wheels thereon and two car bodies each supported at one end on said bogie, and a pair of pivot means having each substantially vertical axis located in the vertical longitudinal plane of symmetry of said pair of rails, and respectively pivotally connecting each car body to a respective one of the opposite ends of said bogie, each of said pivot means having a lower end; and a pair of guide rollers respectively mounted on said lower ends of said pivot means rotatable about the respective vertical axis, each of said guide rollers having a diameter slightly smaller than the distance between the inner sides of said rails so as to be adapted to engage at diametrically opposite points with one or the other of said rails, whereby said guide rollers may freely turn during movement of the train.

2. A guiding device as defined in claim **1**, and including a pair of bracing rollers mounted on said bogie rotatable about substantially vertical axes located in one plane with said single axle.

3. A guiding device as defined in claim **2**, wherein said bracing rollers are arranged displaced in axial direction with respect to said guide rollers.

4. A guiding device for the cars of a double-rail train comprising, in combination, a plurality of guide rollers mounted on said cars rotatable about substantially vertical axes and disposed between the two rails so as to be adapted to engage the latter on the inner sides thereof; and a plurality of bracing rollers mounted on said cars rotatable about substantially vertical axes and disposed on the outside of said two rails so as to be adapted to engage upon the outer sides of said two rails, said bracing rollers are arranged axially displaced with respect to said guide rollers.

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