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(54) Resilient damping friction wedge

(57) A friction damping arrangement for a railway vehicle comprises first and second relatively moveable vehicle components (14,16), a friction wedge (18) having a surface (37) arranged to co-operate with a surface of the second vehicle component (16), and resiliently urged towards the first vehicle component (14), and a resiliently deformable component (48), located between the first vehicle component (14) and the friction wedge (18), the resiliently deformable component (48) being deformable to allow relative movement between the first vehicle component (14) and the friction wedge (18).

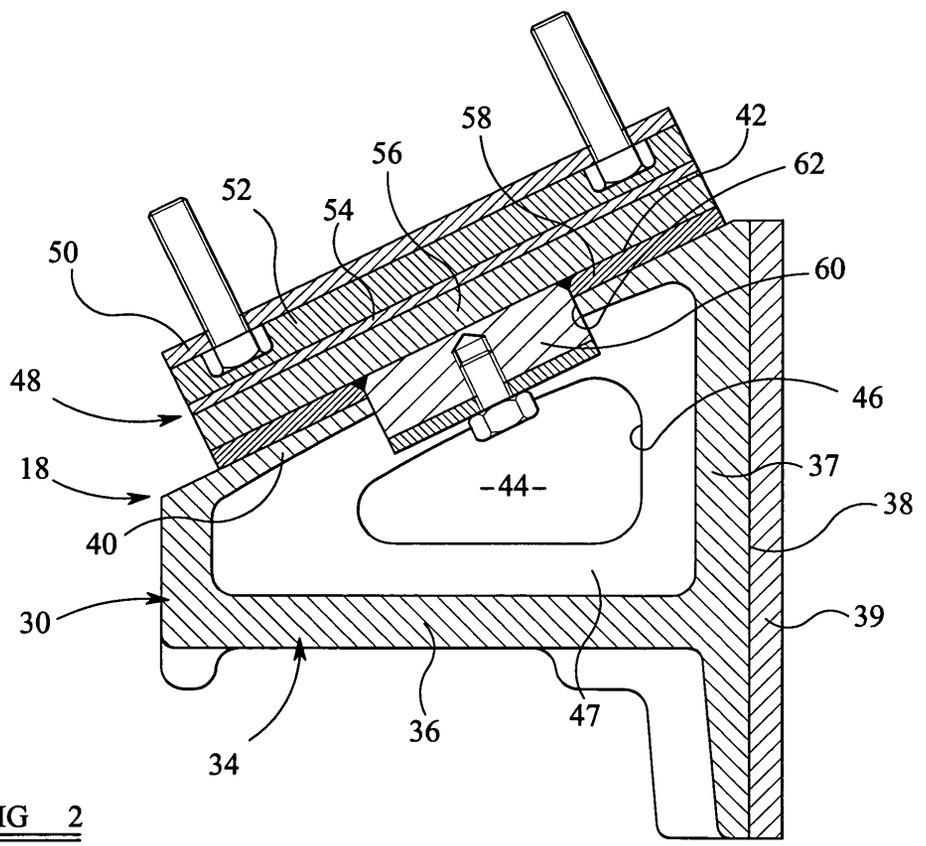

FIG 2

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Description

[0001] The invention relates to a friction wedge for use on a railway vehicle.

[0002] A number of vehicle designs include a pair of spaced apart side frames and a bolster that extends transversely between the side frames. Each side frame includes a pair of pedestals, each of which is supported, through suspension springs, upon an associated saddle. Friction wedges are used to dampen movement of each pedestal with respect to the associated saddle. Friction wedges are often generally triangular-shaped such that the friction wedge can act as a wedge between an inclined surface of the pedestal and a generally vertical wear plate on a column of the saddle. The friction wedge is wedged into engagement between the pedestal and the column of the saddle by a suspension spring. Resistance to sliding movement of the friction wedge with respect to the pedestal and the saddle, which in turn provides dampening of movement, is provided by the frictional forces generated between the friction wedge and the pedestal and saddle.

[0003] It is thought that, for example under certain weather or atmospheric conditions, variations may occur in the frictional forces between the friction wedge and the associated surface of the pedestal giving rise to variations in the operation of the friction wedge to damp movement. Such variations are undesirable and it is an object of the invention to provide a friction wedge whereby such variations can be reduced or avoided.

[0004] According to the present invention there is provided a friction damping arrangement for a railway vehicle comprising first and second relatively moveable vehicle components, a friction wedge having a surface arranged to co-operate with a surface of the second vehicle component, and resiliently urged towards the first vehicle component, and a resiliently deformable component located between the first vehicle component and the friction wedge, the resiliently deformable component being deformable to allow relative movement between the first vehicle component and the friction wedge.

[0005] Where the railway vehicle is of the type comprising a pedestal supported by a saddle through suspension springs, the pedestal may form the first vehicle component and the saddle may form the second vehicle component.

[0006] The resiliently deformable component may be secured to the first vehicle component. The resiliently deformable component may be arranged such that all relative movement of the friction wedge requires deformation of the resiliently deformable component, or alternatively a limited amount of movement of the friction wedge may be permitted before such deformation occurs.

[0007] The provision of the resiliently deformable component ensures that, regardless as to weather or atmospheric conditions, the resistance to relative movement between the friction wedge and the first vehicle component falls within a predetermined acceptable range, and thus acceptable predictable damping of movement between the first and second vehicle components takes place.

[0008] The invention will further be described, by way of example, with reference to the accompanying drawings in which:

Figure 1 is a partial cross-sectional view illustrating part of a railway vehicle incorporating a constant friction damping wedge; and

Figure 2 is an enlargement of the friction damping wedge of Figure 1.

[0009] Part of a railway truck 12 incorporating a friction wedge 18 of the present invention is shown in Figure 1. The truck 12 includes two side frames 14 (only part of one of which is shown) which are spaced apart and generally parallel to one another. Each side frame 14 includes a pair of pedestals 15, each pedestal 15 including a pair of inclined surfaces 24 defining therebetween a cavity into which part of a saddle 16 extends. Suspension springs 22 are carried by the saddle 16 and support the pedestal 15. Each saddle 16 co-operates with a wheelset of the vehicle, for example through appropriate rocker assemblies.

[0010] A friction wedge 18 is associated with each inclined surface 24, the friction wedge 18 being urged towards the associated surface 24 by at least some of the suspension springs 22.

[0011] The motion wedge 18 includes a body 30. As best shown in Figure 2, the body 30 is generally triangular or wedge-shaped. The body 30 includes a base 34 having a generally horizontal bottom wall 36. The bottom wall 36 is adapted to engage the top end of one of the suspension springs 22. The body 30 also includes a generally vertical front wall 37 including a front face 38, upon which a wear pad 39 is mounted. The body 30 also includes an inclined wall 40 that extends at an inclined angle of approximately 30° between the wall 36 of the base 34 and the front wall 37. The inclined wall 40 includes a generally planar surface 42. The body 30 includes a hollow chamber 44 and an aperture 46 in each side wall 47 of the body 30 that is in communication with the chamber 44.

[0012] Secured to the inclined surface 24 of the pedestal 15 is a resiliently deformable component 48. The component 48 comprises a metallic, for example steel, mounting plate 50 to which is bonded a layer 52 of a resiliently deformable, rubber-like material. A reinforcing layer 54 is bonded to the layer 52, and a further layer 56 of resiliently deformable material is bonded to the reinforcing layer 54. The layer 56 is further bonded to a second mounting plate 58 to which is secured a block 60. The block 60 projects through an opening 62 formed in the inclined wall 40 of the friction wedge 18.

[0013] In use, the friction wedge 18 is installed in a truck 12 as shown in Figure 1 such that a suspension

spring 22 engages the wall 36 of the base 34, and such that the component 48 is located between the inclined surface 24 of the pedestal 15 and the surface 42 of the inclined wall 40 of the body 30. The spring 22 and the inclined surface 24 of the pedestal 15 thereby force the wear pad 39 into abutting engagement with a wear plate 17 mounted upon the saddle 16. The wear pad 39 of the friction wedge 18 slides generally upwardly and downwardly in engagement with the wear plate 17 conjointly with and in response to upward and/or downward movement of the pedestal 15 relative to the saddle 16. The frictional force generated between the wear pad 39 and the wear plate 17 dampens the movement of the pedestal 15 relative to the saddle 16.

[0014] In use, in order to allow the movement of the axle which occurs, for example, when the vehicle passes around a curve, the saddle 16 is permitted to move longitudinally relative to the pedestal 15. Such movement requires the friction wedges 18 associated with the saddle 16 to move laterally, such movement requiring deformation of the associated components 48 and hence is damped in a reliable, predictable manner.

[0015] It will be appreciated that the resilient layers 52, 56 will apply a predictable biassing force to the friction wedge 18 against which such movement occurs. In the prior art arrangements in which the component 48 is not provided and the friction wedge bears directly against the pedestal, there is a risk of ice crystals forming on the pedestal which may reduce the friction between the components, or in other contaminants achieving a similar effect, which may impair the damping operation of the friction wedge.

[0016] Although in the arrangement described hereinbefore all movement of the friction wedge requires deformation of the component 48, this need not be the case and arrangements are possible in which a degree of movement of the friction wedge is permitted before deformation of the component 48 occurs. This may be achieved by making the opening 62 in the friction wedge larger than the block 60 so that the component 48 is deformed only after sufficient longitudinal movement of the friction wedge has occurred to bring the edge of the opening 62 into contact with the block 60.

[0017] In either case, the component 48 is preferably designed to be of high stiffness in the vertical direction.

[0018] Although the description hereinbefore is of the use of the invention in connection with a specific design of railway vehicle, it will be appreciated that the invention may be used in other applications and this application covers the use of the invention in such applications.

Claims

1. A friction damping arrangement for a railway vehicle comprising first and second relatively moveable vehicle components, a friction wedge having a surface arranged to co-operate with a surface of the second vehicle component, and resiliently urged towards the first vehicle component, and a resiliently deformable component located between the first vehicle component and the friction wedge, the resiliently deformable component being deformable to allow relative movement between the first vehicle component and the friction wedge.

2. An arrangement according to Claim 1, wherein the railway vehicle comprises a pedestal supported by a saddle through suspension springs, the pedestal forming the first vehicle component and the saddle forming the second vehicle component.

3. An arrangement according to Claim 1 or Claim 2, wherein the resiliently deformable component is secured to the first vehicle component.

4. An arrangement according to any of the preceding claims, wherein the resiliently deformable component is arranged such that all relative movement of the friction wedge requires deformation of the resiliently deformable component.

5. An arrangement according to any of Claims 1 to 3, wherein a limited amount of movement of the friction wedge is permitted before deformation of the resiliently deformable component occurs.

6. An arrangement according to any of the preceding claims, wherein the resiliently deformable component comprises a pair of layers of a rubber or rubber-like material with a reinforcing layer located therebetween.

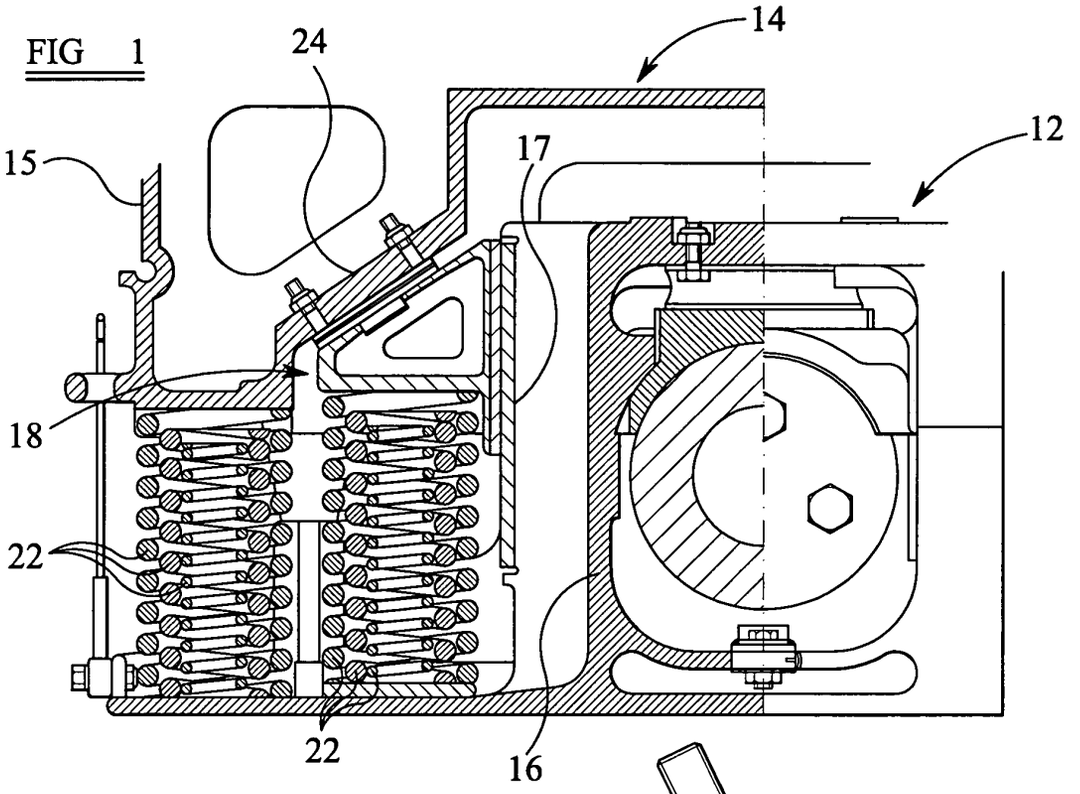
7. An arrangement according to any one of the preceding claims, wherein the resiliently deformable component includes a projection arranged to extend into an opening formed in one of the friction wedge and the first vehicle component.

8. An arrangement according to Claim 7, wherein the opening and projection are of substantially the same dimensions.

9. An arrangement according to Claim 7, wherein the opening is larger than the projection.

10. An arrangement according to any one of the preceding claims, wherein the resiliently deformable component has a high stiffness in a direction perpendicular to a surface of the friction wedge facing the first component.

FIG 1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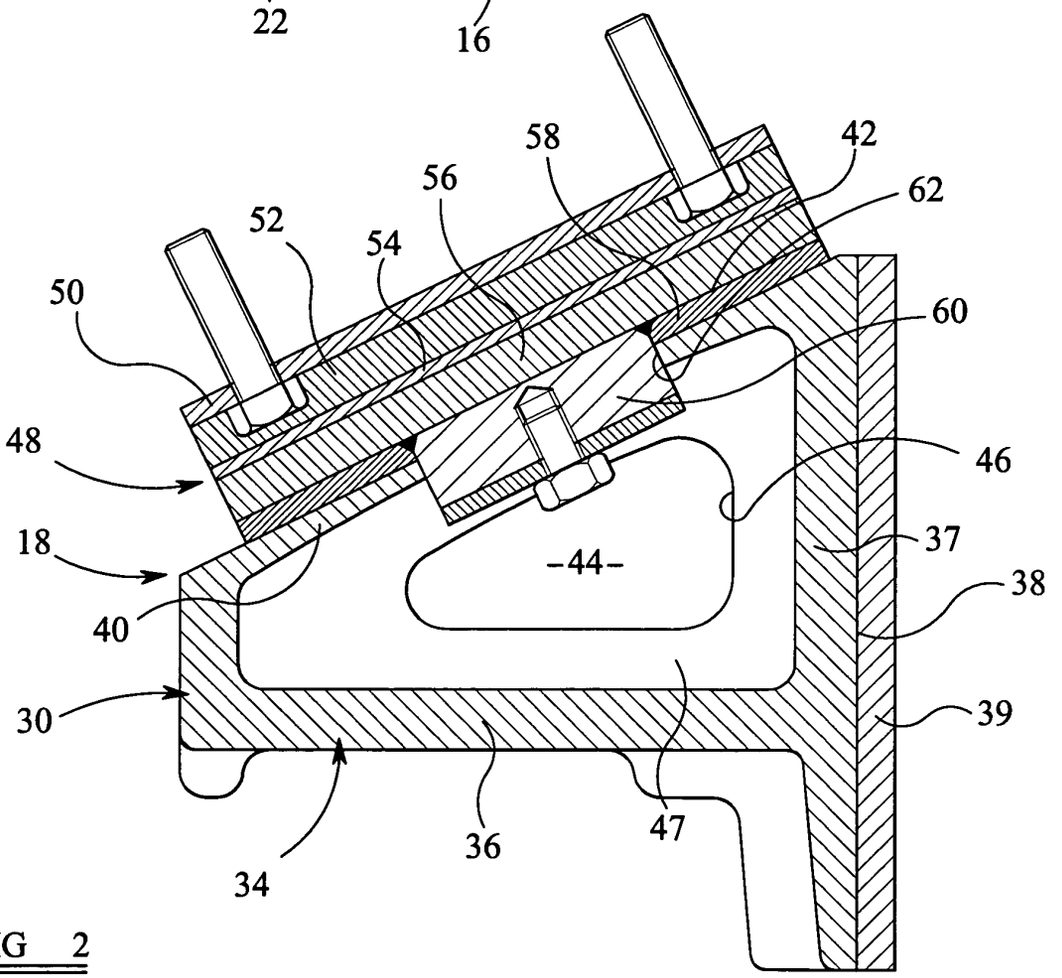
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FIG 2

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EUROPEAN SEARCH REPORT

Application Number
EP 04 25 3105

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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B61F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	29 September 2004	Ferranti, M

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