Subject Matter of the Invention

The goal of the invention is to provide a friction couple with which to more effectively capture the particles released by the brake pad and the friction shoe during the braking cycle and which is easily incorporated in the architecture of the railway rolling stock.

Summary

To do this, according to a first aspect of the present disclosure, a friction set for a railway disk brake system for railway rolling stock with one or two directions of movement is provided where said friction set is characterized in that it comprises:

- a shoe holder comprising a receiving slideway;
- a friction shoe comprising a brake pad and a profiled shape configured for being slid into the receiving slideway, where the friction shoe comprises a pneumatic conduit connecting a first space delimited by a first surface of the friction shoe to a second space delimited by a second opposite surface the friction shoe;
- at least one through hole arranged in the shoe holder and laid out so as to be facing the pneumatic conduit; and

a pneumatic connector mounted on the shoe holder, pneumatically connected with the through hole and extending away from the friction shoe and rotationally mobile relative to the shoe holder, around an axis perpendicular to a main plane of the shoe holder.

According to a second aspect, the present disclosure refers to a railway disk brake system for railway rolling stock with one or two directions of movement comprising a disk secured to an axle or a wheel and two friction sets according to the first aspect arranged on either side of the disk.

According to an example of the present disclosure, a friction couple for a railway disk brake system for railway rolling stock with one or two directions of movement is provided where said friction couple is characterized in that it comprises:

- a shoe holder comprising a receiving slideway;
- a friction shoe comprising a brake pad and a profiled shape configured for being slid into the receiving slideway, where the friction shoe comprises a pneumatic conduit connecting a first space delimited by a first surface of the friction shoe to a second space delimited by a second opposite surface the friction shoe;
- at least one through hole arranged in the shoe holder and laid out so as to be facing the

pneumatic conduit; and

A pneumatic connector mounted on the shoe holder, pneumatically connected with the through hole and extending away from the friction shoe and rotationally mobile relative to the shoe holder, around an axis normal to a main plane of the shoe holder.

Thus, the particles released during braking can reach the pneumatic conduit of the friction shoe, and then the through hole arranged in the shoe holder. Next, they reach the pneumatic connector. Thus, by connecting the pneumatic connector, for example by means of a hose, to a system for recovery of braking particles, it is possible to connect these two. Further, since the pneumatic connector is rotationally mobile around the axis normal to the main plane of the shoe holder, it is possible to easily arrange it within the railway rolling stock.

Further, in various examples of the present disclosure, use can also be made of one and/or another of the following provisions:

- the profiled shape is a dovetail;
- the friction couple comprises a hose pneumatically connected with the pneumatic connector and extending away from the friction shoe;
- the friction couple comprises a pump connected, directly or indirectly, to the

hose and configured for creating reduced pressure in the through hole;

- the receiving slideway of the shoe holder is blind, specifically with one closed end and one open end forming an opening for the extraction and insertion of the friction shoe, where the friction set further comprises a removable member for locking the friction shoe in the receiving slideway;

- the friction shoe comprises a first member and a second member configured for being slid in the receiving slideway until contact of each other in an area of butting of the first and second members while leaving a passage therebetween so as to form the pneumatic conduit;

- the first and second members each form one half of the friction shoe;

- the friction shoe can also be single piece;

- the first and second members are juxtaposed in a direction tangential to a breaking disk of the railway rolling stock;

- the passage left at the interface of the first and second members is arranged in an intermediate part of the butting zone;

- the butting zone is substantially defined as a butting plane, the first and second members have similar lengths in a longitudinal direction of the shoe holder, and the through hole has a center defining an axis separated from the butting plane by at least 5 mm or coincident with the butting plane;

- the friction set comprises a pneumatic junction ring laid out in the pneumatic conduit forming a pneumatic guide between the through hole of the shoe holder and the pneumatic conduit;

- the pneumatic junction ring comprises a flange resting on a bottom of the receiving slideway and a cylindrical portion;

- the cylindrical portion has a height equivalent to a height of the dovetail profiled shape.

According to an example, a railway disk brake system can finally be provided for railway rolling stock with two directions of movement comprising a disk secured to an axle or a wheel and two friction couples as previously described and arranged on either side of the disk.

Also according to an example, a friction couple for a railway disk

brake system for railway rolling stock with one or two directions of movement is provided where said friction couple is characterized in that it comprises:

- a shoe holder comprising a receiving slideway;

- a friction shoe comprising a brake pad and a profiled shape configured for being slid into the receiving slideway, where the friction shoe comprises a pneumatic conduit connecting a first space delimited by a first surface of the friction shoe to a second space delimited by a second opposite surface the friction shoe;
- at least one through hole arranged in the shoe holder and laid out so as to be facing the pneumatic conduit; and
- a pneumatic junction ring laid out in the pneumatic conduit forming a pneumatic guide between the through hole of the shoe holder and the pneumatic conduit of the friction shoe.

Thus, the friction shoe comprises a pneumatic conduit which forms, with the through hole arranged in the shoe holder, a pneumatic circuit with which to aspirate the particles released, by the brake pad of the friction shoe, during braking. Further, the pneumatic junction ring serves to guide the particles coming from braking from the pneumatic conduit of the friction shoe to the through hole of the shoe holder. The pneumatic junction ring therefore serves to limit possible leaks out of the pneumatic circuit. In particular, the junction ring serves to limit the quantity of particles coming from braking which slide in an interstice located between the friction shoe and the shoe holder. The friction set according to an example therefore serves to aspirate a larger quantity of particles coming from braking for the same aspiration force. It is therefore more effective. The friction couple according to an example therefore serves to simply lay out a pneumatic circuit for removing the particles from braking.

Further, in various examples of the present disclosure use can also be made of one and/or another of the following provisions:

- the profiled shape is a dovetail;
- the pneumatic junction ring comprises a flange resting on a bottom of the receiving slideway and a portion which preferably has a conical shape; with this arrangement the pneumatic guide can be shaped simply;
- more generally it will be noted that the portion can have any type of shape and can in particular have an arbitrary shape;
- the conical portion is cylindrical;
- the conical portion has a height equivalent to a height of the profiled shape; with

this configuration, the particles coming from braking can be effectively guided from the pneumatic conduit of the friction shoe towards the through hole of the shoe holder;

- the receiving slideway of the shoe holder is blind, specifically with one closed end and one open end forming an opening for the extraction and insertion of the friction

configured for creating reduced pressure in the through hole; the friction couple therefore serves to aspirate the particles coming from braking, through the pneumatic circuit formed by the pneumatic conduit of the friction shoe and the through hole arranged in the shoe holder.

According to an example, a railway disk brake system can also be provided for railway rolling stock with two directions of movement comprising a disk secured to an axle or a wheel and two friction sets as previously described and arranged on either side of the disk.

It will further be noted that features of the friction couple comprising the junction ring and the friction couple comprising the pneumatic connector can of course be combined.

Brief Description of the Drawings

As a nonlimiting example, four embodiments of the invention are now going to be described with the help of the following figures:

- Figure 1 is a perspective view of a railway disk brake system according to the invention.
- Figure 2 is a perspective view of two friction couples according to the invention;
- Figure 3 is a section view of the friction couple along a plane normal to a longitudinal axis of the friction shoe;
- Figure 4 is a top view of the friction set;
- Figure 5 is an exploded top view of the friction couple;
- Figure 6 is a perspective view of a pneumatic junction ring according to the invention.
- Figure 7 is a section view of a friction couple, according to a second embodiment of the invention, along a plane normal to a longitudinal axis of a friction shoe;
- Figure 8 is a top view of the friction couple, according to this second embodiment;
- Figure 9 is a section view of a friction shoe of the friction couple according to the second embodiment along a plane normal to a longitudinal axis of the friction shoe;
- Figure 10 is a section view of a friction couple, according to a third

CLAIMS

1. A friction set for a railway disk brake system for railway rolling stock with one or two directions of movement is provided where said friction set is characterized in that it comprises:

- a shoe holder comprising a receiving slideway;
- a friction shoe comprising a brake pad and a profiled shape configured for being slid into the receiving slideway, where the friction shoe comprises a pneumatic conduit connecting a first space delimited by a first surface of the friction shoe to a second space delimited by a second opposite surface the friction shoe;
- at least one through hole arranged in the shoe holder and laid out so as to be facing the pneumatic conduit; and
- a pneumatic connector mounted on the shoe holder, pneumatically connected with the through hole, extending away from the friction shoe and rotationally mobile relative to the shoe holder, around an axis perpendicular to a main plane of the shoe holder.

2. The friction set according to any one of the preceding claims comprising a hose pneumatically connected with the pneumatic connector and extending away from the friction shoe.

3. The friction set according to the preceding claim comprising a pump connected to the hose and configured for creating reduced pressure in the through hole.

4. The friction set according to any one of the preceding claims, wherein the receiving slideway of the shoe holder is blind, specifically with one closed end and one open end forming an opening for the extraction and insertion of the friction shoe, where the friction set further comprises a removable member for locking the friction shoe in the receiving slideway.

5. The friction set according to any one of the preceding claims, wherein the friction shoe comprises a first member and a second member configured for being slid in the receiving slideway until contact of each other in an area of butting of the first and second members while leaving a passage therebetween so as to form the pneumatic conduit.

6. The friction set according to the preceding claim, wherein the first and second

members each form one half of the friction shoe.

7. The friction set according to any one of claims 5 and 6, wherein the butting zone is substantially defined as a butting plane, the first and second members have similar lengths in a longitudinal direction of the shoe holder, and the through hole has a center defining an axis coincident with the butting plane.

8. The friction set according to any one of claims 1 to 4, wherein the friction shoe is unitary.

9. The friction set according to any one of the preceding claims comprising a pneumatic junction ring laid out in the pneumatic conduit forming a pneumatic guide between the through hole of the shoe holder and the pneumatic conduit.

10. A railway disk brake system for railway rolling stock with one or two directions of movement comprising a disk secured to an axle or a wheel and two friction sets according to any one of the preceding claims arranged on either side of the disk.