Sept. 10, 1957 L. A. PAULSEN 2,805,736

ROTOR BRAKE

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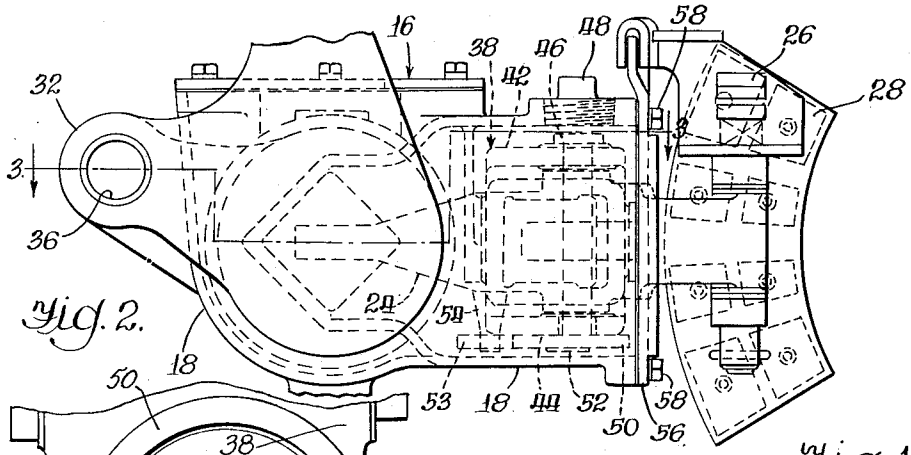

Fig. 2.

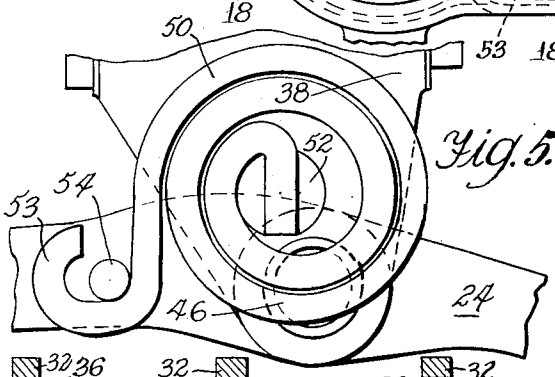

Fig. 5.

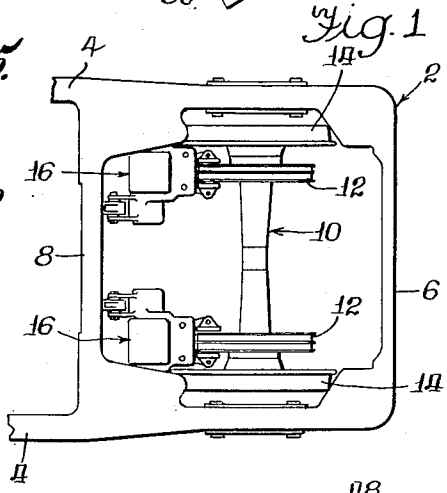

Fig. 1

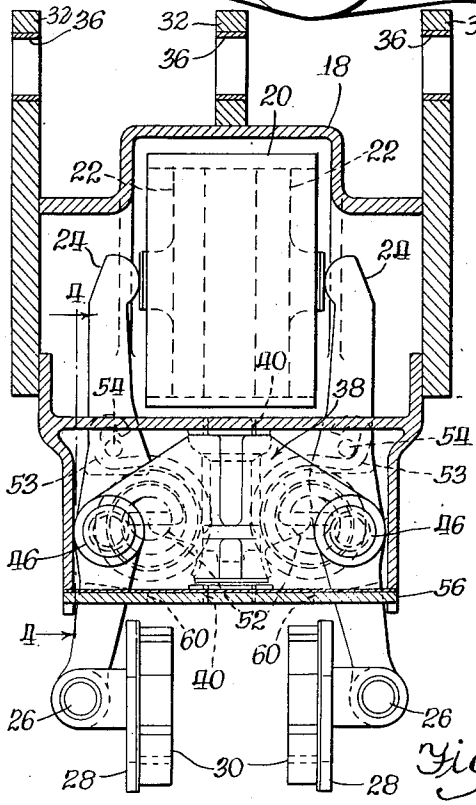

Fig. 3.

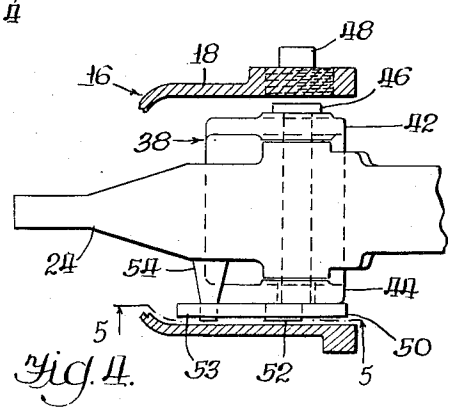

Fig. 4.

INVENTOR.
Lewis A. Paulsen
BY
Orrin O. B. Garner
Atty

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ROTOR BRAKE

Lewis A. Paulsen, Glenview, Ill., assignor to American Steel Foundries, Chicago, Ill., a corporation of New Jersey

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This invention relates to railway brakes and more particularly to a novel disk or rotor brake mechanism wherein pivoted levers are actuated to apply brake means such as friction shoes to opposite sides of a disk or rotor rotatable with a wheel of a railway car truck.

In brake devices of this type, the levers are generally urged to their released position by one or more springs connected to both levers or by one or more springs compressed between the levers and portions of their supporting casing.

A primary object of the present invention is to devise a novel compact brake device wherein the release means are carried by a fulcrum block which is pivoted in the casing to accommodate tilting of the rotor during a brake application, the levers being pivoted to the block.

Another object of the invention is to provide independent release springs for the respective levers in an arrangement wherein the levers and springs may be removed as a unit together with the fulcrum block during servicing of the brake, a feature which has heretofore only been possible with the release spring connected to both levers so that failure of the spring resulted in complete failure of the release means for both levers.

A different object of the invention is to provide torsion coil springs for releasing the levers.

A more specific object of the invention is to devise connections between the coil springs and the levers so arranged as to accommodate removal of the fulcrum block and springs from the casing by pulling the levers therefrom.

A further object of the invention is to devise sliding connections between the levers and the torsion coil springs so that the axes of the springs may be offset from the pivotal axes of the levers in order to afford maximum spring capacity within the available space in the casing.

The foregoing and other objects and advantages of the invention will become apparent from a consideration of the following specification and the accompanying drawings, wherein:

Figure 1 is a fragmentary top plan view of a railway car truck embodying a preferred form of the novel brake mechanism;

Figure 2 is an enlarged side elevational view of one of the brake devices shown in Figure 1;

Figure 3 is a top plan view of the structure shown in Figure 2 with the casing partly broken away on the line 3—3 of Figure 2;

Figure 4 is a sectional view on the line 4—4 of Figure 3; and

Figure 5 is a sectional view on the line 5—5 of Figure 4.

Describing the invention in detail and referring first to the general assembly view of Figure 1, the truck comprises a frame generally designated 2 having spaced side rails 4 interconnected by an end rail 6 at each end of the truck and by a transom 8 intermediate the ends of the truck. The frame is supported in the conventional manner by a wheel and axle assembly 10 comprising rotors

or disks 12 arranged to rotate with wheels 14 of the wheel and axle assembly 10. Associated with each rotor 12 is a novel brake device generally designated 16.

One of the devices 16 is illustrated in detail in Figures 2 to 4 wherein it will be seen that the device comprises a brake support or cylinder casing 18 containing a conventional cylinder 20 having pistons 22 operatively associated with the inner ends of brake levers 24. The outer ends of the brake levers are pivotally connected as at 26 to brake heads 28 carrying brake shoes 30 for frictional engagement with opposite sides of the associated rotor 12 upon actuation of the pistons 22 by any desired fluid pressure medium, such as compressed air, introduced into the cylinder 20, as is well known in the art.

The casing 18 is provided with a plurality of lugs or arms 32 having suitable openings 36 for the reception of any convenient means for attaching the casing 18 to the truck frame 2. The casing 18 at its forward extremity contains a fulcrum block generally designated 38 and preferably pivoted to the casing 18 by coaxial substantially horizontal trunnions 40 received within complementary openings of the casing 18 to accommodate pivotal movement of the fulcrum block 38 on a substantially horizontal axis during tilting of the wheel and axle assembly 10 during a brake application.

The block 38 is provided at each side thereof with top and bottom jaws 42 and 44 defining a recess or aperture receiving the related brake lever 24 which is pivoted to said jaws as by a pivot pin 46. As best seen in Figure 4, the casing 18 is provided with a threaded plug 48 above each pivot pin 46 to accommodate insertion and removal thereof. It is to be noted that because of the pivotal connections between the fulcrum block 38 and the casing 18, and the levers 24 and the fulcrum block, the levers are pivotal about axes extending longitudinally of the truck and normal to the axis about which the block is pivotal.

The brake levers 24 are resiliently biased to their release position illustrated in the drawings by torsion coil springs 50, each of which is anchored at the inner end thereof to a depending anchor member 52 of the fulcrum block 38. The anchor members 52 are illustrated in the drawings as lugs on the bottom of the fulcrum block 38, however, it will be understood that they may, if desired, be formed as separable members such as cap screws. The outer end of each spring 50 is provided with a hook 53 slidably engaged with a depending anchor member 54 of the associated brake lever 24, said member 54 being preferably formed as a lug on the bottom of the leg 24. However, it will be understood that the member 54 may, if desired, be formed as a separable member such as a cap screw.

As best seen in Figure 3, the axes of the release springs 50 are offset inwardly of the casing 18 with respect to the pivotal axes of the levers 24 about the pins 46 and are approximately parallel to the pivotal axes of the levers 24, thereby affording maximum spring capacity within the available space in the casing 18. To accommodate this arrangement without binding of the springs 50, the hooks 53 thereof are substantially larger than the engaged portions of the anchor members 54 whereby as the levers 24 are actuated from the released position shown in the drawings to applied position whereat the shoes 30 engage opposite sides of the related rotor 12, the members 54 slide within the hooks 53 as the springs 50 are stressed to store up energy for the purpose of returning the levers 24 to release position when energizing fluid within the cylinder 20 is exhausted.

The forward end of the casing 18 is closed by a removable cover plate 56 removably attached thereto as by cap screws 58 (Figure 2). Cover plate 56 is provided with slots 60, as best seen in Figure 3, to accommodate

movement of the levers 24 to brake applied position and to release position. It will be understood that upon detachment of the cover plate 56 by removing the screws 58, the brake levers 24 may be pulled forwardly and outwardly of the casing whereupon the hooks 53 of the springs 50 are engaged by the anchor members 54 to pull the springs 50 and the fulcrum block 38 out of the casing 13 so that the levers 24, the springs 50 and the fulcrum block 38 may thus be removed and replaced as a unit during servicing of the brake mechanism. It may be noted that this feature has heretofore been possible in the prior art only in an arrangement wherein the levers 24 have been interconnected by a release spring with the resulting disadvantage that failure of such a release spring resulted in complete failure of the release means for both of the brake levers 24. In the instant arrangement, on the other hand, failure of either spring 50 does not affect the other spring 50 which is entirely independent thereof insofar as its release function is concerned.

Another advantage of the novel brake arrangement above described resides in the novel mounting of the springs 50 on the fulcrum block 38 to afford an unusually compact release mechanism.

I claim:

1. In a brake arrangement for a railway car truck having a truck frame supported by a wheel and axle assembly including a brake disc; the combination of a housing anchored to the truck for transmitting braking torque thereto, a fulcrum block in said housing pivoted thereto on an axis intersecting said disc and having substantial transverse extent, a brake lever fulcrumed to said block in each of lateral extremities thereof on axes approximately perpendicular to said first mentioned axis, a coil spring at each side of the fulcrum block of substantial diameter extending the greater part of the distance between the associated lateral extremity and said first mentioned axis with its own axis disposed closer to the first mentioned axis than is the associated brake lever axis, each spring having one end thereof anchored to said fulcrum block and its opposite end provided with a hook, each brake lever having a pin engaged by the corresponding hook whereby the hook biases the lever to released position, the hook having substantially greater dimension in radial direction than the pin enabling relative movement therebetween, actuating means for said levers, and brake means operatively connected to said levers for decelerating rotation of said disc.

2. In a brake arrangement for a railway car truck having a truck frame supported by a wheel and axle assembly including a brake disc; the combination of a housing anchored to the truck for transmitting braking torque thereto, a fulcrum block in said housing pivoted thereto on an axis intersecting said disc and having substantial transverse extent, a brake lever fulcrumed to said block in each of lateral extremities thereof on axes approximately perpendicular to said first mentioned axis, said

fulcrum block having portions spaced in the direction of the lever axes and the levers having a dimension in the direction of its said axes substantially equivalent to the spacing of said portions, a coil spring of substantial diameter individual to each lever arm and lying essentially in a single plane and disposed generally flat to one of said portions of the fulcrum block and disposed between the said extremity of the fulcrum block and the first mentioned axis, each spring having one end thereof anchored to said fulcrum block and its opposite end provided with a hook, each brake lever having a pin engaged by the corresponding hook whereby the hook biases the lever to released position, the hook having substantially greater dimension in radial direction than the pin enabling relative movement therebetween, actuating means for said levers, and brake means operatively connected to said levers for decelerating rotation of said disc.

3. For use with a railway car truck having a wheel and axle assembly, a brake disc in the assembly, and a brake housing mounted for transmitting braking torque to the truck, the combination comprising a fulcrum block adapted for mounting on a first axis relative to the block, a brake lever fulcrumed to said block in each of lateral extremities thereof on axis approximately perpendicular to said first mentioned axis, a coil spring at each side of the fulcrum block of substantial diameter extending the greater part of the distance between the associated lateral extremity and said first mentioned axis with its own axis disposed closer to the first mentioned axis than is the associated brake lever axis, each spring having one end thereof anchored to said fulcrum block and its opposite end provided with a hook, each brake lever having a pin engaged by the corresponding hook whereby the hook biases the lever to released position, the hook having substantially greater dimension in direction, radially of the spring, than the pin enabling relative movement therebetween, actuating means for said levers, and brake means operatively connected to said levers for decelerating rotation of said disc.

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