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L. O. GRONDAHL

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RAILWAY CAR RETARDER

Original Filed Sept. 11, 1930

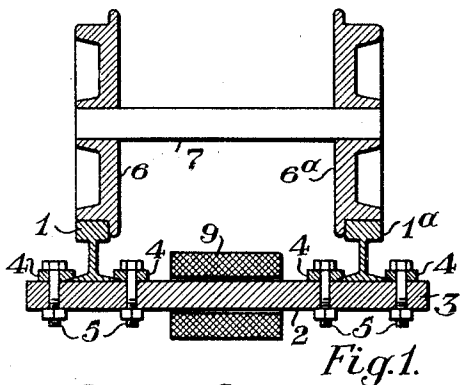


Fig. 1.

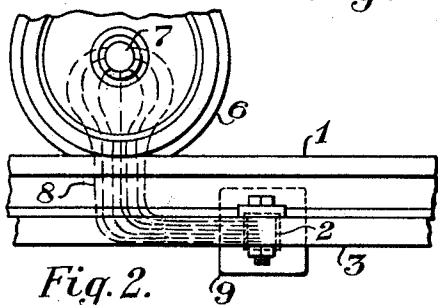


Fig. 2.

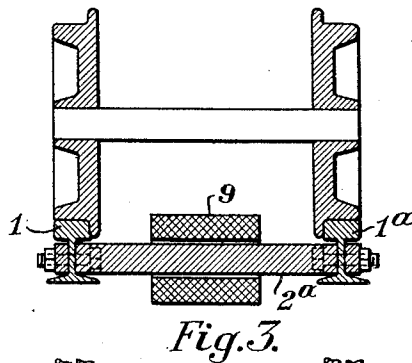


Fig. 3.

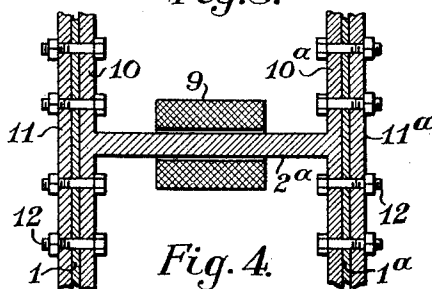


Fig. 4.

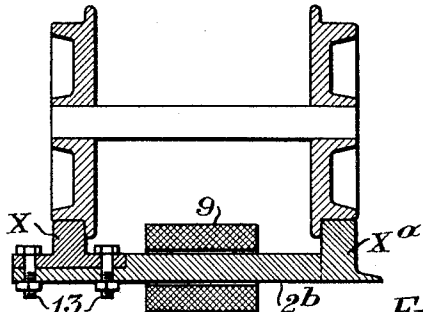


Fig. 5.

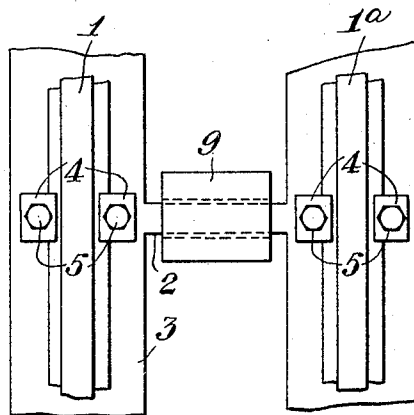


Fig. 1a

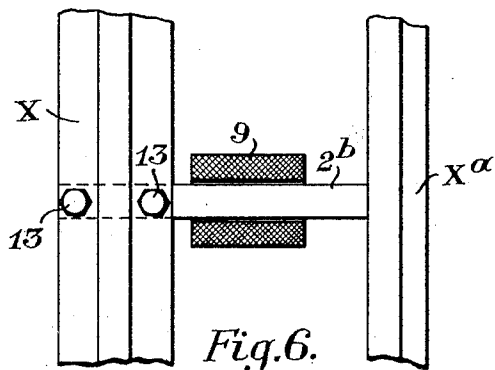


Fig. 6.

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RAILWAY CAR RETARDER

Application filed September 11, 1930, Serial No. 481,163. Renewed December 3, 1932.

My invention relates to railway car retarders, and has for an object the provision of novel and improved retarders of the electro-magnetic type.

I will describe several forms of retarders embodying my invention, and will then point out the novel features thereof in claims.

In the accompanying drawing, Fig. 1 is a vertical transverse sectional view showing one form of car retarder embodying my invention. Fig. 1^a is a horizontal plan view of the retarder shown in Fig. 1. Fig. 2 is a side view of the retarder shown in Fig. 1. Fig. 3 is a vertical transverse sectional view showing a modified form of retarder embodying my invention. Fig. 4 is a horizontal sectional view of the retarder shown in Fig. 3. Fig. 5 is a vertical transverse sectional view showing another modified form of retarder also embodying my invention. Fig. 6 is a horizontal plan view of the retarder shown in Fig. 5.

Similar reference characters refer to similar parts in each of the views.

Referring first to Figs. 1 and 2, the reference characters 1 and 1^a designate the two rails of a railway track. These rails are connected by a magnetizable bar 2 carrying an energizing winding 9. The bar 2 is attached to the underside of each rail by cleats 4 and bolts 5, and extending in each direction from the bar 2 along the under side of each rail is a member 3 which is also of magnetizable material. A railway car traveling along the track rails 1 and 1^a is represented by wheels 6 and 6^a and an axle 7.

It will be obvious that when a car is present, the path of the magnetic flux created by current in winding 9 will be through the bar 2, track rail 1, wheel 6, axle 7, wheel 6^a and rail 1^a to the bar 2. As the car travels past the retarder, eddy currents will be produced in the wheels and in the rails. The members 3 have low magnetic reluctance compared to the track rails, so that the greater part of the flux will follow these members until it reaches a point approximately under the car wheels, as illustrated by the flux lines 8 in Fig. 2. It will be seen, therefore, that as the wheels pass the retarder, the magnetic flux

will follow the wheels, and that the flux in the wheels constitutes a rotating field in the material of which the wheels are made. The result will be eddy current losses produced in the members 3, the track rails, and the car wheels, the energy for which losses is absorbed from the moving car.

These eddy current losses are highly effective in producing braking action, and the action is extremely uniform, because the magnetic circuit contains no variable air gaps.

Referring now to Figs. 3 and 4, the retarder is substantially the same as that shown in Figs. 1 and 2, but the structural details are somewhat different. In Figs. 3 and 4 the bar, which is here designated 2^a, is provided with members 10 and 10^a, which extend along the inner sides of the webs of rails 1 and 1^a, respectively, and the outer sides of the webs of these rails are provided with similar members 11 and 11^a, respectively. The members 10 and 11 are attached to rail 1 by bolts 12, and the members 10^a and 11^a are attached to rail 1^a by similar bolts, these bolts, of course, extending through the webs of the rails. The bar 2^a, the members 10 and 10^a and the members 11 and 11^a are all made of magnetizable material. The operation of the retarder shown in Figs. 3 and 4 is the same as that of the retarder shown in Figs. 1 and 2.

Referring now to Figs. 5 and 6, the retarder, in the form here shown, comprises two special rail sections X and X^a connected by a bar 2^b, all of which parts are made of material having lower permeability and lower specific resistance than ordinary track rails. The bar 2^b is integral with the special rail section X^a, but the special rail section X is detachable from the bar 2^b in order to enable the winding 9 to be applied to the bar. As here shown, the bar 2^b is attached to the special rail section X by bolts 13. The advantage of the retarder shown in Figs. 5 and 6 is that it eliminates some of the air gaps that might prove troublesome under actual operating conditions.

In connection with all three forms of retarders embodying my invention, it is understood that when a car is to be retarded,

the winding 9 is energized as the car approaches the retarder and remains energized until the car has left the retarder, or until the desired retardation has been attained. The
5 control of the winding 9 forms no part of my present invention, and, consequently, the controlling circuits are omitted from the drawing.

Although I have herein shown only three
10 forms of car retarders embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.
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Having thus described my invention, what I claim is:

1. A railway car retarder comprising a magnetizable member extending along the
20 inner side of the web of each track rail, a magnetizable bar connecting an intermediate point in one of said members with an intermediate point in the other, and an energizing winding on said bar.

25 2. A railway car retarder comprising a magnetizable member extending along each side of the web of each track rail, a magnetizable bar connecting an intermediate point of the member on the inner side of one rail with
30 an intermediate point on the member on the inner side of the other rail, and an energizing winding on said bar.

3. A railway car retarder comprising two magnetizable members extending along and
35 in contact with the two track rails respectively, a magnetizable bar connecting an intermediate point in one of said members with an intermediate point in the other, and an energizing winding on said bar.

40 In testimony whereof I affix my signature.
LARS O. GRONDAHL.

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