May 17, 1932. H. C. CLAUSEN 1,859,073

RAILWAY CAR RETARDER

Filed April 8, 1930

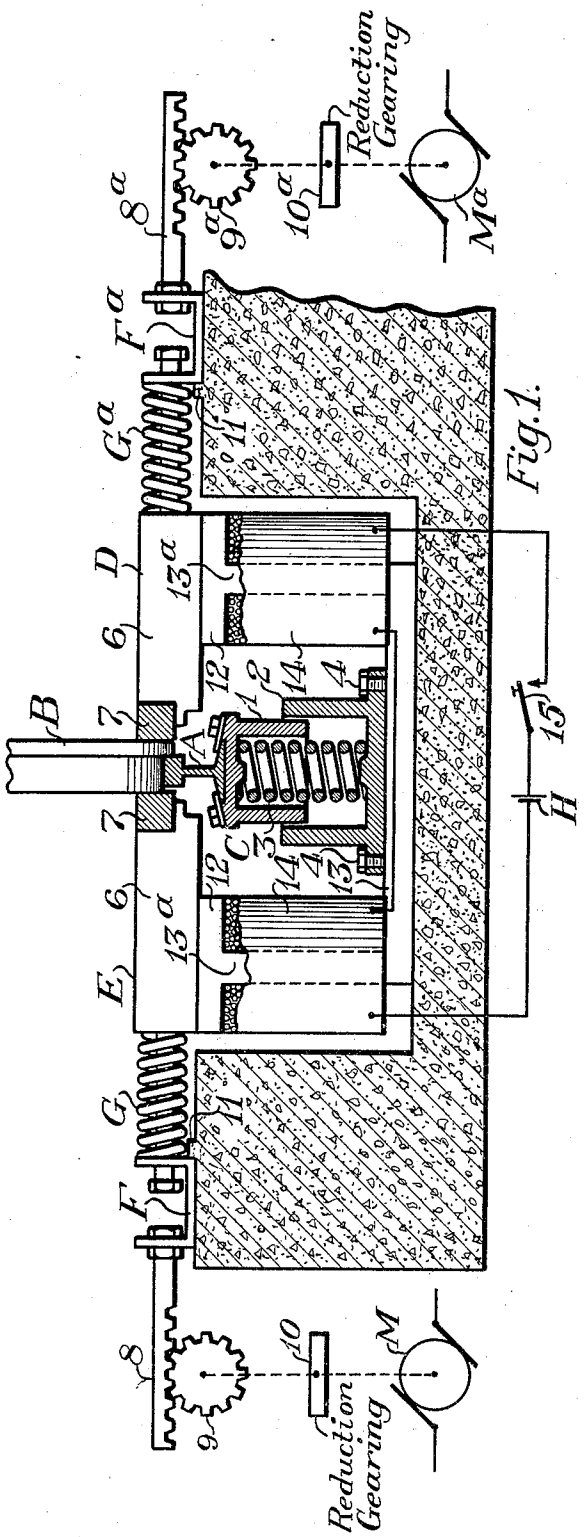


Fig. 1.

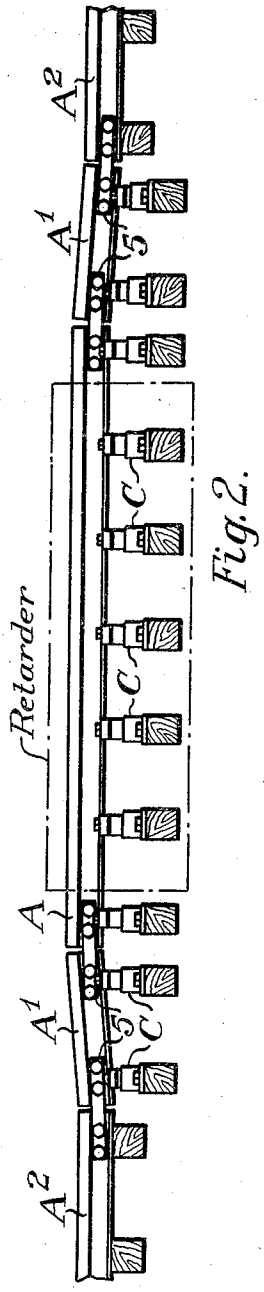


Fig. 2.

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UNITED STATES PATENT OFFICE

HAROLD C. CLAUSEN, OF SWISSVALE, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH & SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

RAILWAY CAR RETARDER

Application filed April 8, 1930. Serial No. 442,525.

My invention relates to railway car retarders, and particularly to car retarders of the type comprising electromagnetic means located in the trackway and arranged for cooperation with the wheels or other parts of cars for reducing the speed of cars.

I will describe one form of car retarder embodying my invention, and will then point out the novel features thereof in claims.

In the accompanying drawings, Fig. 1 is a vertical sectional view, partly diagrammatic showing one form of car retarder embodying my invention. Fig. 2 is a diagrammatic view showing one arrangement for connecting the movable track rail section A associated with the car retarder illustrated in Fig. 1 with the fixed track rail section A^2 on either side of the retarder.

Similar reference characters refer to similar parts in both views.

Referring to the drawings, the reference character A designates a section of one of the running rails of a stretch of railway track upon which is shown a car wheel B in Fig. 1. The section A is mounted on a plurality of resilient supports, each designated by the reference character C, and is connected with the fixed rail sections A^2 on either side of the rail section A by means of movable intermediate approach rail sections A^1, as shown in Fig. 2, in such manner that the vertical position of the section A will vary in accordance with the weight of a car on the section A. The approach sections A^1 are also mounted on resilient supports C, and are each fastened to the movable section A and to the associated fixed rail section A^2, by means of splice bars 5 which permit the approach sections to move vertically but restrain lateral movement of these sections.

The resilient supports C may have any suitable form. For example, as shown in Fig. 1, each support C comprises a cylindrical member 1 to which the rail section A is secured, and which is arranged to slide vertically in a cylindrical member 2 against the bias of a compression spring 3. The cylindrical members 2 are each fastened by means of bolts 4 to a suitable support, such for example, as the usual cross ties.

Located on opposite sides of the track rail section A are two braking bars D and E each comprising a brake beam 6 of magnetizable material and a replaceable friction brake shoe 7 also of magnetizable material. The braking bars D and E are mounted for sliding motion toward or away from the rail section A upon the pole pieces 12 of a suitable electromagnet by means of which the braking bars may at times be magnetized. As here shown, this electromagnet comprises a U-shaped yoke or core 13 of magnetizable material extending transversely beneath the rail section A, and connecting the pole pieces 12. The legs 13^a of the core 13 are each provided with a winding 14, which windings are connected in series, and are arranged to be supplied with current from a suitable source such as a battery H, over a manually operable switch 15. With the braking bars arranged in this manner, it will be apparent that when the windings 14 are energized, a concentrated magnetic field is created between the brake shoes 7 which field extends at right angles to the rail A, and which is cut by the wheel B as the wheel moves through the retarder.

The braking bar E is operatively connected with a channel F by means including a spring G and, in a similar manner, the braking bar D is operatively connected with a channel F^a by means including a spring G^a. The channels F and F^a, in turn, are operated by pinions 9 and 9^a which are driven by motors M and M^a through suitable reduction gearing 10 and 10^a and racks 8 and 8^a operatively connected with the associated channels. It will be apparent, therefore, that by energizing the motors M and M^a in the proper directions, the channels F and F^a may be moved toward or away from the rail section A, thereby moving the braking bars D and E into or out of engagement with the side faces of the car wheel B. Stops 11 are provided to limit the motion of the channels towards the rail section A. In actual practice, the channels F and F^a will usually be operated by a single motor.

The operation of the apparatus is as follows: When it is desired to retard a car, the braking bars are first moved to their braking

positions in which they are illustrated in the drawings by energizing the motors M in the proper directions, and switch 15 is then closed. When switch 15 is closed, current is supplied to the windings 14, and the braking bars D and E become magnetized so that flux lines now thread the wheel B. As a result, a magnetic attraction is exerted between the braking bars D and E and the wheel B which acts, in addition to the springs G and G^a, to urge the braking bars into frictional engagement with the side faces of the wheel. Furthermore, as the wheel B rotates, eddy currents are generated in the wheel which react with the field created by the magnet windings to oppose this motion of the wheel. It will be apparent, therefore, that the motion of the wheel B is retarded both by the force of friction and as a result of the eddy currents generated in the wheel. The force exerted on the braking bars due to the magnetic attraction between the braking bars and the wheel depends upon the number of flux lines which thread the wheel, which, in turn, depends upon the area of the wheel faces between the brake shoes 7, and hence, upon the vertical position of the wheel with respect to the braking bars D and E. Since the rail A is mounted on resilient supports in the manner previously described, it will be apparent that the vertical position of the wheel with respect to the braking bars D and E varies in accordance with the weight of the car, and it follows that the retarding force exerted on the wheel B by the braking bars due to friction, therefore varies with the weight of the car, this force increasing as the weight of the car increases, and decreasing as the weight of the car decreases. Furthermore, the amount of the eddy currents generated in the wheel depends upon the speed of the car, and also upon the amount of the flux lines which thread the wheel, so that the retarding force due to the eddy currents generated in the wheel increases both with the weight of the car and with the speed of the car. It follows that with a car retarder embodying my invention, cars having different weights and different entering speeds are retarded by different forces, so that by properly proportioning the parts, the retarder may be constructed in such manner that all cars will leave the retarder at approximately the same speed.

It should be particularly pointed out that while in illustrating my invention, I have shown and described only one electromagnet associated with the braking bars D and E, these braking bars may be made of considerable length and may be magnetized by a number of electromagnets as conditions may require.

Although I have herein shown and described only one form of railway car retarder 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.

Having thus described my invention, what I claim is:

1. In a car retarder of the electromagnetic type comprising two brake shoes of magnetizable material extending parallel to a track rail on opposite sides of the track rail and movable into engagement with the wheel of a car for retarding the motion of the car, and magnetic means for moving said shoes into engagement with said wheel, the combination, with the aforementioned instrumentalities of resilient means for supporting the track rail whereby the vertical position of said rail varies with the weight of the car and varies the position at which said shoe engages said wheel and the frictional force between said shoes and said wheel

2. A car retarder of the electromagnetic type comprising fixed means for creating a magnetic field adjacent a track rail in such manner that the wheels of a car traversing said rail will pass through said field, and resilient means for supporting said track rail in such manner that the vertical position of said rail with respect to said field will vary in accordance with the weight of the car and vary the position of the car wheel with respect to said field when said wheel is passing through said field.

3. In combination, a first section of a running rail of a stretch of railway track supported by resilient supports in such manner that the vertical position of said section varies in accordance with the weight of a car traversing said section, two movable approach sections one located between each end of said first section and the adjacent fixed end of said running rail and each mounted on resilient supports in such manner that the vertical position of one end of each said approach section will vary in accordance with the weight of a car on said approach sections, splice bars for connecting said approach sections with said first section and the adjacent fixed ends of the running rail in such manner that lateral movement of said first section and said approach sections is prevented, two brake shoes of magnetizable material one located on each side of said first section and each movable into engagement with the wheel of a car traversing said section, and means for creating a magnetic field between said shoes and said wheel for moving said shoes into engagement with said wheel to retard the motion of said car.

In testimony whereof I affix my signature.

HAROLD C. CLAUSEN.