March 28, 1944. J. W. LOGAN, JR 2,345,488

RAILWAY BRAKING APPARATUS

Filed May 30, 1942 2 Sheets-Sheet 1

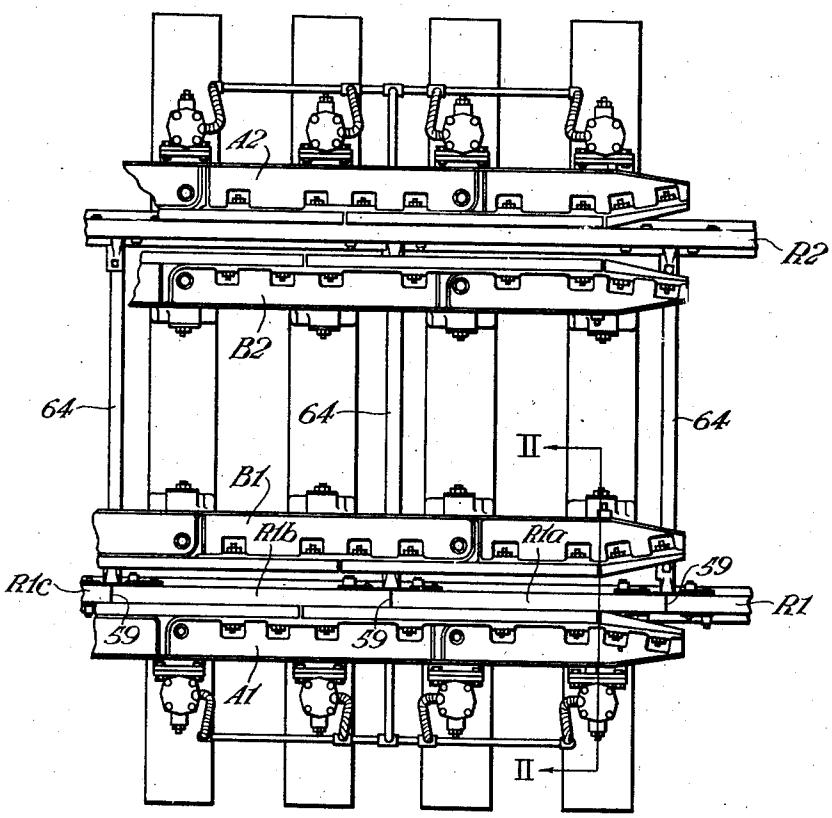


Fig. 1.

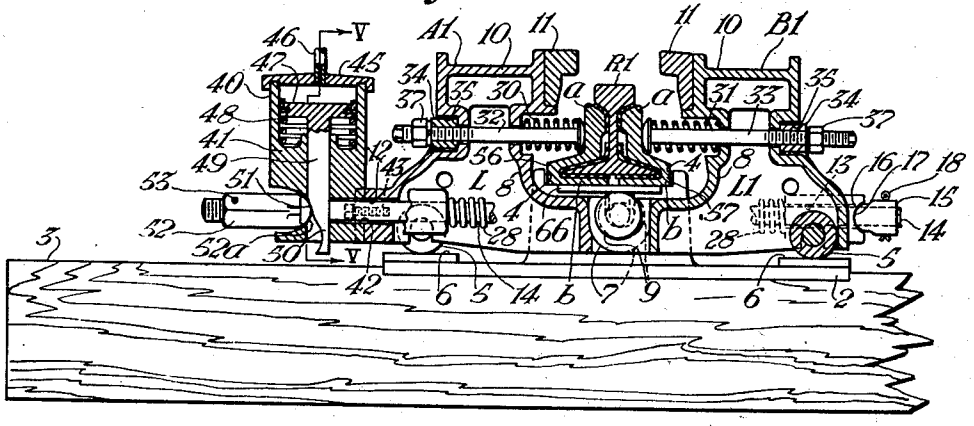


Fig. 2.

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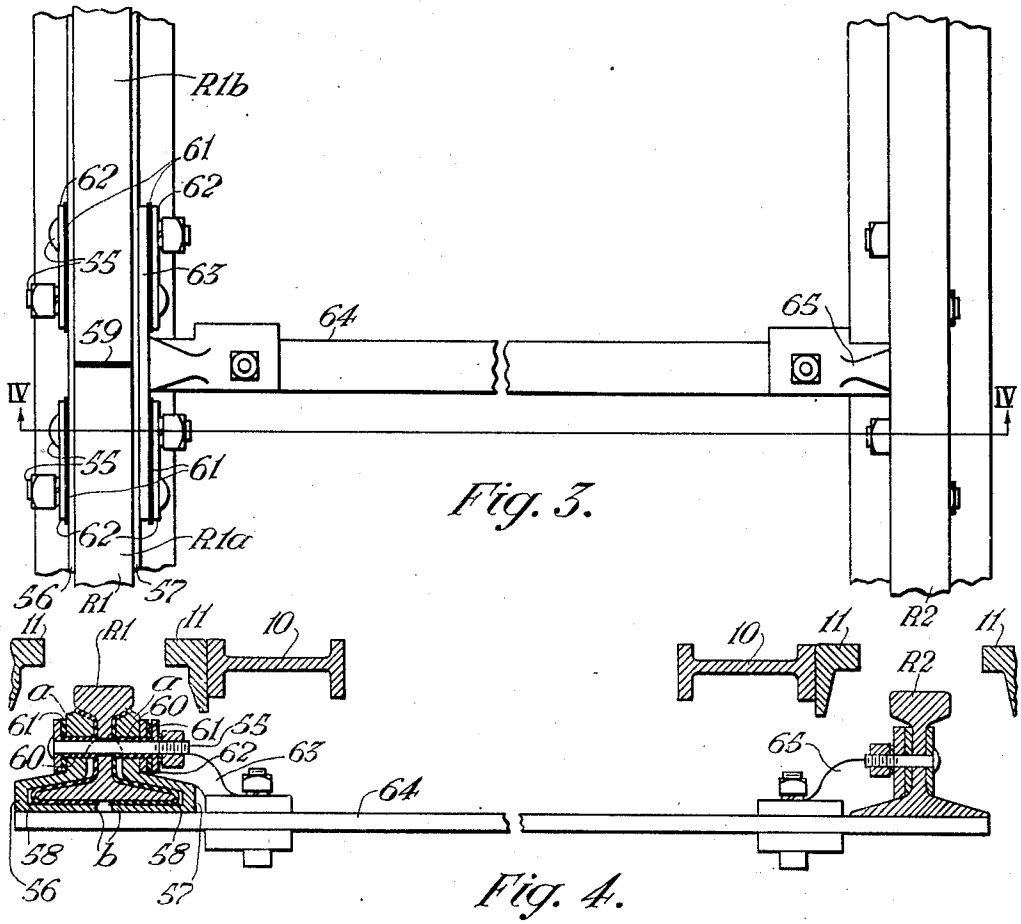


Fig. 3.

Fig. 4.

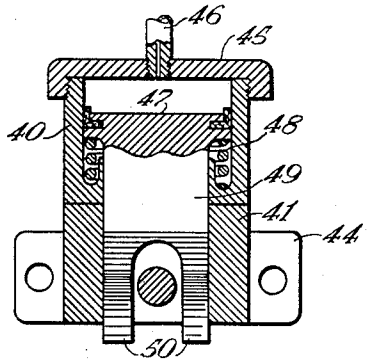


Fig. 5.

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UNITED STATES PATENT OFFICE

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RAILWAY BRAKING APPARATUS

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Application May 30, 1942, Serial No. 445,215

3 Claims. (Cl. 188—62)

My invention relates to railway braking apparatus, and particularly to braking apparatus of the type described in Letters Patent of the United States No. 2,273,481, granted to Herbert L. Bone on February 17, 1942.

In braking apparatus of the type referred to the track rails are supported for vertical movement by means of a plurality of lever units disposed at spaced intervals along the rails. Each lever unit includes two levers pivoted on opposite sides of the associated rail, and each lever is provided with one arm which engages the underside of the track rail and another arm which extends upwardly along the side of the track rail and supports a braking bar for engagement with the sides of car wheels traversing the rail. The braking bars are normally spaced apart a distance which is less than the widths of car wheels, and when a car enters the apparatus, the wheels force the braking bars apart, which causes the rail to rise vertically and hence causes the weight of the car to act through the levers to exert on the braking bars a force which is proportional to the weight of the car. The points about which the levers pivot are free to shift laterally relative to the rail to permit the braking bars to accommodate themselves to the different lateral positions the different car wheels assume relative to the rail and to at times permit the braking bars to move away from the rails to non-braking positions in which the apparatus is ineffective to retard cars, but are normally restrained from shifting except in unison by pneumatic means which when supplied with fluid pressure acts to move the braking bars to, and retain them in, their braking positions.

Systems of yard operation have recently been proposed which make it desirable to be able to divide at least one of the track rails within the limits of braking apparatus of the type described into a plurality of relatively short insulated control sections, and at the same time enable this one rail to be fastened to the opposite rail by a series of tie rods to prevent both rails from tipping. One object of my present invention is to provide means whereby this desirable result may be accomplished.

According to my invention, the relatively short control sections of the one rail are clamped between splice bars which extend underneath the heads of the control sections and into the fishing spaces, overlie the flanges of the control sections, and also underlie the bottom surfaces of the control sections so that a very rigid construction is provided. The splice bars are insulated from the control sections by one or more insulating members of such shape that they will snugly engage at least that portion of the outer surface of the control sections which would be engaged by the splice bars if the insulating members were not provided, and insulating end posts are interposed between the abutting ends of the control sections. The rail sections are so disposed that the abuting ends of alternate sections will be located approximately midway between lever units, and clamped against the outer sides of the inner splice bar opposite the adjoining ends of certain ones of the sections by means of insulated bolts extending through the sections and the splice bars are angle brackets to which one end of a tie rod is fastened. This tie rod extends transversely of the rails and is secured at its opposite end to the opposite rail and serves to prevent both rails from tipping.

Other objects and characteristic features of my invention will become apparent as the description proceeds.

I shall describe one form of braking apparatus embodying my invention, and shall then point out the novel features thereof in claims.

In the accompanying drawings, Fig. 1 is a top plan view showing one form of braking apparatus embodying my invention. Fig. 2 is an enlarged sectional view taken on the line II—II of Fig. 1. Fig. 3 is an enlarged top plan view of a portion of the apparatus illustrated in Figs. 1 and 2. Fig. 4 is an enlarged fragmentary sectional view taken on the line IV—IV of Fig. 3. Fig. 5 is a sectional view taken on the line V—V of Fig. 2.

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

Referring first to Fig. 1, the braking apparatus here illustrated comprises two braking bars A1 and B1 supported on opposite sides of one track rail R1 of a stretch of railway track by means of a plurality of lever units disposed at spaced intervals along the rail, and two similar braking bars A2 and B2 supported on opposite sides of the other track rail R2 of the stretch by means of a plurality of other lever units disposed at intervals along the rail.

The lever units are each similar to the lever unit shown in Fig. 2, and it is believed therefore that a description of this unit will suffice for all. Referring to Fig. 2, the unit here shown comprises two levers L and L1 pivotally supported on opposite sides of the rail R1 by means of rollers 5 which ride on flat surfaces 6 provided on a supporting member 2 mounted on a crosstie 3. The

levers are substantially L-shaped, and each is provided with a horizontal arm 7, and with a vertical arm 8. The horizontal arm 7 of each lever extends underneath the rail R1 and carries a roller 9 which cooperates with a wear plate 66 associated with the rail in a manner and for a purpose which will be made clear presently. The vertical arm 8 of each lever terminates at its upper end in a brake beam 10 cast integrally with the lever. Each brake beam 10 comprises a part of the associated braking bar A1 or B1, and in the preferred construction of the braking apparatus, this beam is also cast integrally with the vertical arm of at least one adjacent lever unit. Removably secured to each brake beam 10 is a brake shoe 11 disposed in a position to frictionally engage the adjacent side faces of car wheels traversing the rail R1. The brake shoes 11 also comprise part of the associated braking bars.

Formed in the levers L and L1 at one side of the associated roller 5 a little above the axis of the roller are aligned openings 12 and 13 and extending with clearance through these openings is a spring bolt 14 one end of which is provided with a rocker nut 15 having rounded projections 16 disposed on opposite sides of the bolt and fitting into mating grooves 17 formed in the lever L1 adjacent the outer end of the opening 13. The nut 15 is arranged to be locked against rotation relative to the bolt by means of a cotter key 18.

The other end of the spring bolt 14 is provided with a fluid pressure cylinder 40 formed integrally with a combined cam guide and mounting bracket 41. The combined cam guide and mounting bracket is provided with a through hole 42, which receives the spring bolt 14 with some clearance, and is secured to the lever L on opposite sides of the spring bolt by means of mounting bolts 43 which extend through laterally spaced apertured lugs 44 (see Fig. 5) provided in the bracket and are screwed into tapped holes formed in the lever. The cylinder 40 is closed at its upper end by a cylinder head 45, and is arranged to be at times supplied with fluid pressure through a pipe 46 which is screwed into a suitable opening provided in the cylinder head 45. Mounted in the cylinder 40 is a reciprocable piston 47 which is biased to a retracted position by means of a compressed coil spring 48. The piston 47 drives a piston rod 49, the lower end of which is formed with an integral bifurcated cam 50 which straddles the spring bolt 14. The cam 50 is formed on the side farthest from the lever L with inclined cam surfaces 51, and these cam surfaces cooperate with horizontally aligned rounded bulges 52*a* provided on a gauge adjusting nut 52 screwed onto the outer end of the spring bolt 14. The nut 52 is arranged to be locked in an adjusted position by means of a cotter key 53.

The levers L and L1 are biased to the positions in which the rounded bulges 52*a* on the nut 52 engage the cam surfaces 51, and the lever L1 engages the nut 15, by a spacing spring 28 disposed on the bolt 14 between the levers. This spring is sufficiently stiff to move the levers L and L1 laterally away from the rails when the piston 47 is moved to its retracted position.

The lever unit illustrated also comprises means for positioning the brake shoes laterally with respect to the rail when no car is traversing the rail R1 to facilitate the smooth entry of car wheels into the retarder. As here shown, these means comprise springs 30 and 31 mounted on spring bolts 32 and 33. The spring bolts extend through clearance holes in the levers and are provided adjacent their outer ends with non-circular nuts 34 which fit into non-circular recesses 35 in the levers in such manner that the nuts are prevented from rotating in response to rotation of the bolts, but that they are free to move outwardly in the recesses in the event the associated braking bar is moved closer to the rail than the position to which it is biased by the associated springs. The springs are disposed on the bolts between the inner sides of the vertical arms 8 and the heads of the bolts, and serve to bias the bolts to the positions in which the heads of the bolts engage the associated rail assembly opposite the web of the rail. To facilitate adjusting the bolts the outer ends of the bolts are flattened on two sides for the reception of a wrench or equivalent tool, and lock nuts 37 are provided to lock the bolts in their adjusted positions. The bolts are so adjusted that when the bolts are engaging the rail assembly and the nuts are engaging the inner ends of the recesses 35, the levers will occupy the proper positions relative to the rail to cause a smooth entry of car wheels between the brake shoes.

The track rails R1 and R2 are disposed within channels 4 formed on the supports 2, and are free to move vertically through a limited distance when a car enters the retarder, as will be made clear presently.

The portion of the braking apparatus thus far described is identical to that described and claimed in Letters Patent of the United States No. 2,273,481, referred to hereinbefore, and its operation is as follows: When it is desired to retard cars by means of the braking apparatus, fluid pressure is admitted to the fluid pressure cylinder 40 of each of the lever units, so that the piston 47 of each of these units is moved to and held in its lower or projected position. With the pistons 47 in their projected positions, the nut 52 of each unit engages the cam surfaces 51 on the associated cam 50 at their high portions, and these units are so adjusted and the parts are so proportioned that under these conditions the levers L and L1 will be moved toward each other to positions in which the spacing between the brake shoes 11 is less than the widths of car wheels. If, now, with the parts in these positions, a car enters the retarder, the wheels of the car will force the brake shoes apart. This movement of the brake shoes will, of course, tend to cause the levers L and L1 to move laterally away from the rail, and will also tend to cause the levers to pivot about the axes of the rollers 5. Lateral movement of the levers away from the rail, however, is resisted by the action of the fluid pressure cylinders 40, and the parts are further so proportioned that when the pistons 47 are held in their projected positions by fluid at the proper pressure, the force exerted by the pistons 47 on the cams 50 will be sufficient to limit movement of the levers to rotation about the axes of the rollers 5 for all vehicles having a weight less than a predetermined weight, for example, 70 tons, but that, if a vehicle having a weight in excess of this predetermined weight traverses the retarder, the reaction force will move the pistons 47 upwardly a sufficient amount to prevent damage to the apparatus. The reaction force necessary to cause the pistons 47 to move upwardly depends in part on the slope of the cam surfaces 51, and this slope may be varied in the manner shown so that after the pistons have once started to move upwardly, the force

required to complete the movement will decrease. Rotation of the levers about the axes of the rollers 5 will act through the rollers 9 to raise the rail R1 a distance which depends upon the original spacing between the brake shoes 11, as determined by the adjustment of the nuts 52, and which distance is proportional to the width of the car wheels. The raising of the rail R1 will lift the car with it, and it will be seen, therefore, that the car will act through the rail to exert on the levers a force which urges the brake shoes into frictional engagement with the opposite side faces of the car wheels to thereby cause the brake shoes to exert on the car wheels a frictional force which is proportional to the weight of the car.

If the car weighs enough to force the pistons 47 upwardly, the levers will move laterally away from the rail and no raising of the rails will take place.

When air is exhausted from the cylinders 43, the springs 48 will move the pistons 47 to their upper positions and permit the springs 28 to move the braking bars away from the rail to inactive or non-braking positions.

It has recently been proposed to control the supply of fluid pressure to the fluid pressure motors of braking apparatus of the type described by means of speed responsive apparatus in such manner that the motors will be supplied with fluid to cause the braking apparatus to retard cars, or will be vented to atmosphere to render the apparatus ineffective to retard cars, according as the speed of a car passing through the apparatus is above or below a predetermined speed. One form of speed responsive apparatus which has been suggested for obtaining the desired control requires that at least one of the track rails be divided into a plurality of relatively short sections which are effectively insulated from each other and from the remainder of the braking apparatus. My present invention relates to a means which I shall now describe for providing the desired control sections, which means will not interfere with the normal functioning of the retarder, and which at the same time will permit the two track rails to be secured together at spaced intervals by suitable tie rods to prevent the rails from tipping.

The desired control sections may be formed in either one of the rails, but as here illustrated they are formed in the rail R1. These sections which are here designated R1*a*, R1*b*, R1*c*, etc., will usually be of uniform lengths, and their lengths may be varied as conditions require, but the lengths of these sections will preferably be such that two wheels of a car cannot occupy the same section at any one time. The control sections are clamped by means of bolts 55 between two splice bars 56 and 57. These splice bars are of uniform cross section throughout their entire lengths, and may either be made long enough to extend past all of the rail sections, or they may be articulated to facilitate manufacture and handling, if desired. Each splice bar as shown consists of an angle bar portion *a* fitting the fishing spaces of the control sections, and a horizontal inwardly extending rail supporting base portion *b*, which is integral with the angle bar portion *a* and which forms therewith a flange receiving space or pocket for the flanges of the control sections. It will be seen therefore that the splice bars engage underneath the heads of the control sections, extend into the fishing spaces, overlie the flanges of the control sections, and also underlie the bottom surfaces of the control sections, so that a very rigid construction is provided. Interposed between the control sections and the splice bars are one or more insulating members 58 of such shape that they will snugly engage at least all that portion of the outer surface of the control sections which would be engaged by the splice bars if the insulating members 58 were not provided, and interposed between the abutting ends of the control sections are insulating end posts 59. Preferably at least two of the bolts 55 are provided adjacent each end of each section, and these bolts are insulated from the splice bars by means of insulating sleeves 60, which surround the bolts where they pass through the splice bars, and insulating plates 61 which are interposed between the splice bars and the heads or nuts on the bolts, as the case may be. To better distribute the pressure on the insulating plates pressure plates 62 are preferably provided on the outer ends of the bolts.

The rail sections are preferably so disposed that the abutting ends of alternate sections will be located approximately midway between lever units, and clamped against the outer sides of the inner splice bar 57 opposite the adjoining ends of certain ones of the sections by means of the four associated clamping bolts 55 is an angle bracket 63 to which one end of a tie bar 64 is secured. These tie bars extend transversely of the braking apparatus below the two inside braking bars B1 and B2, and each is secured at the end opposite to the insulated rail R1 to the other rail R2 by means of an angle bracket 65 which may be similar to the angle bracket 63. It will be apparent that since the rails are secured together by means of the tie bars, they are free to move vertically but are effectively prevented from tipping.

The wear plates 66 referred to hereinbefore serve to provide a flat bearing surface between the bottoms of the splice bars and the rollers 9, and these wear plates may either be welded to one of the splice bars or may be loosely disposed in a rectangular recess formed in the associated support 2 underneath the rail R1. It will be understood, of course, that one wear plate will be associated with each support 2 associated with the rail R1. The wear plates are not required in connection with the rail R2 since the underside of this rail presents a flat surface which may be engaged directly by the associated rollers.

Although I have herein shown and described only one form of braking apparatus 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. A rail construction comprising a plurality of relatively short rail sections disposed end to end, splice bars bolted to the opposite sides of said sections for securing said sections together, means for insulating said sections from each other and from said splice bars, means for insulating said bolts from said splice bars, and a bracket spanning the abutting ends of two of said sections and clamped against the one splice bar by means of the same bolts which secure said sections together, whereby said bracket is in-

sulated from the rail sections, said bracket serving as a means to secure a tie rod to the sections and maintain it insulated therefrom.

2, A rail construction comprising a plurality of relatively short rail sections disposed end to end, splice bars bolted to the opposite sides of said sections for rigidly securing said sections together, each said splice bar comprising an angle bar portion fitting the fishing spaces of the sections and a horizontal inwardly extending rail supporting base portion which is integral with the angle bar portion and which forms therewith a flange receiving space or pocket for the flanges of the sections, whereby the splice bars engage underneath the heads of the rail sections, extend into the fishing spaces, overlie the flanges of the rail sections, and also underlie the bottom surfaces of the rail sections, insulating members interposed between the rail sections and the splice bars, said members being of such shape that they will snugly engage at least all that portion of the outer surface of the sections which would be engaged by the splice bars if the insulating members were not provided, insulating end plates interposed between the abutting ends of the sections, at least two bolts being provided adjacent each end of each section, insulating sleeves surrounding the bolts where they pass through the splice bars, pressure plates disposed between the splice bars and the outer ends of the bolts, insulating plates interposed between the pressure plates and the splice bars, and a bracket spanning the abutting ends of two of said sections and clamped between the insulating plate and the outer side of the one splice bar by means of the same bolts which secure the splice bars to the sections, whereby said bracket is insulated from the rail sections, said bracket serving as a means to secure a tie rod to the sections and maintain it insulated therefrom.

3. The combination with a car retarder comprising a pair of track rails supported for vertical movement by means of a plurality of lever units disposed at spaced intervals along the rails and braking bars supported by the lever units on opposite sides of the rails for frictional engagement with the wheels of cars traversing the rails in response to the weight of the cars, of a plurality of relatively short rail sections formed in one rail, splice bars bolted to the opposite sides of the sections for rigidly securing them together, means for insulating the splice bars from the rail sections, means for insulating the rail sections from each other, said sections being so arranged that the abutting ends of certain sections are disposed between the units, brackets secured to said certain sections by means of the same bolts which secure the splice bars to the sections and overlapping the abutting ends thereof, and tie bars each secured at one end to one of said brackets and at the other end to the opposite rail to prevent the rails from tipping.

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