Nov. 4, 1958 N. C. L. BROWN 2,858,907

CAR RETARDERS FOR RAILWAY CLASSIFICATION YARDS

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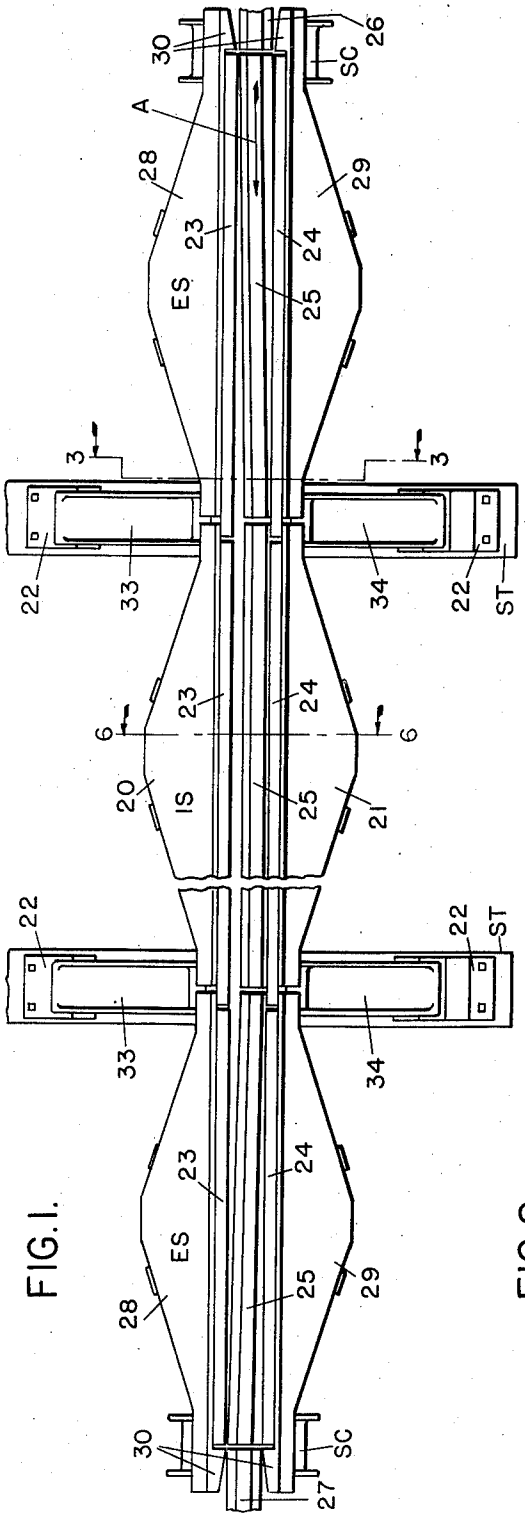


FIG. 1.

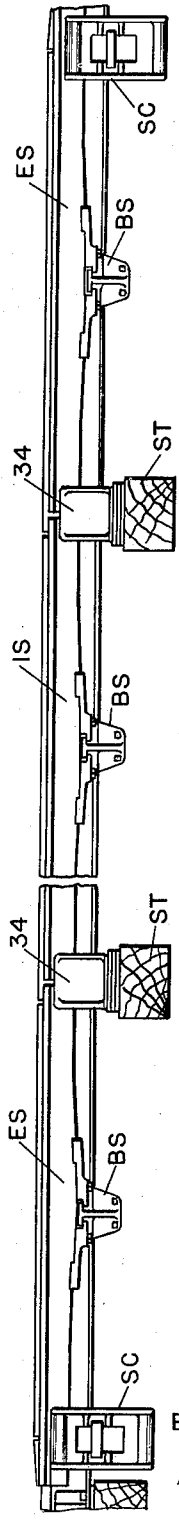


FIG. 2.

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CAR RETARDERS FOR RAILWAY CLASSIFICATION YARDS

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FIG. 6.

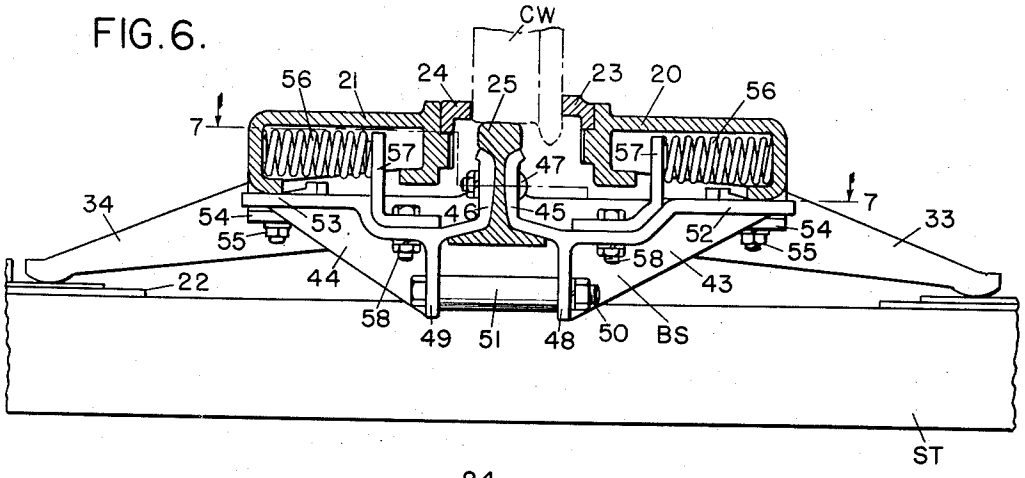


FIG. 7.

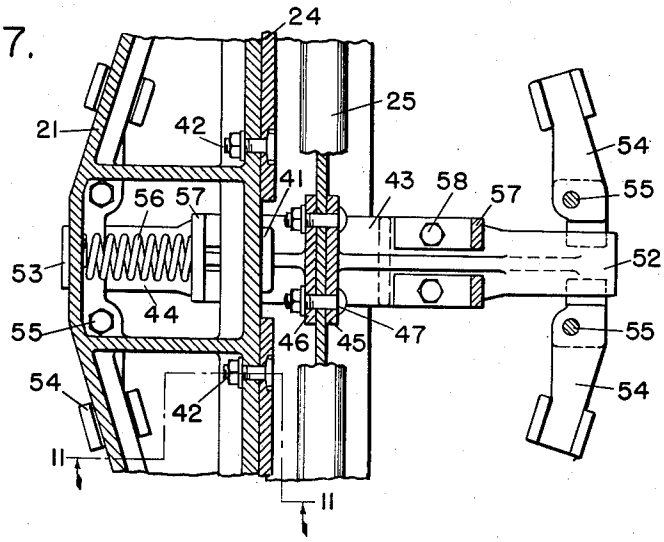
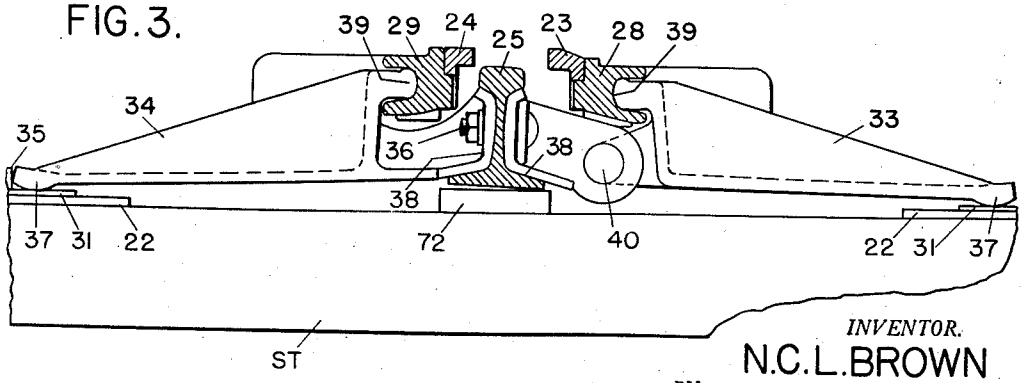


FIG. 3.



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CAR RETARDERS FOR RAILWAY CLASSIFICATION YARDS

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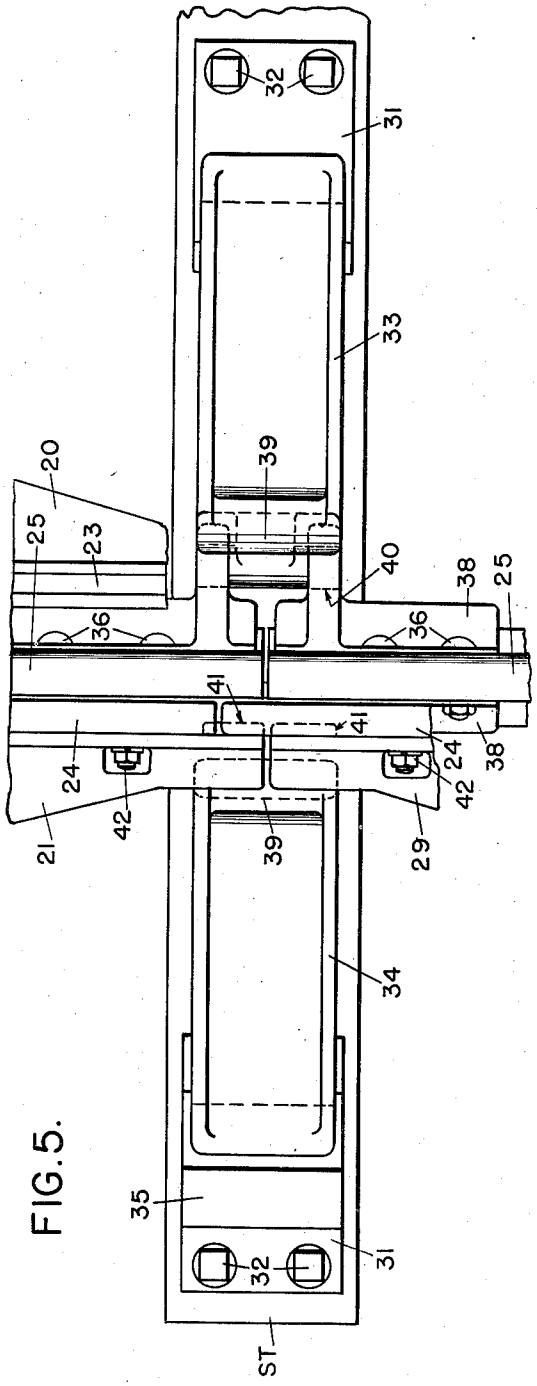


FIG. 5.

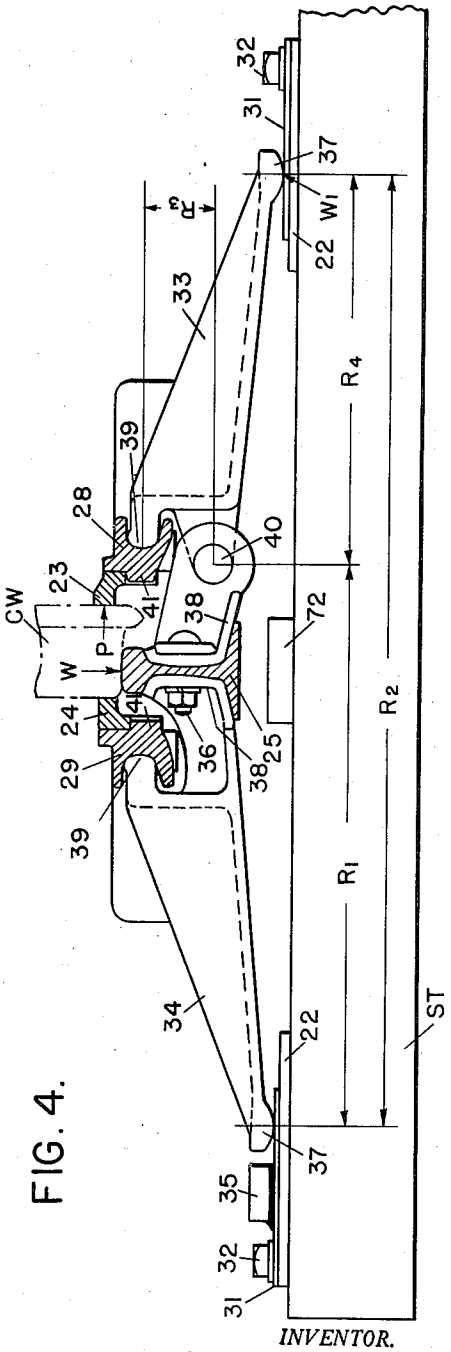


FIG. 4.

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CAR RETARDERS FOR RAILWAY CLASSIFICATION YARDS

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FIG. 8.

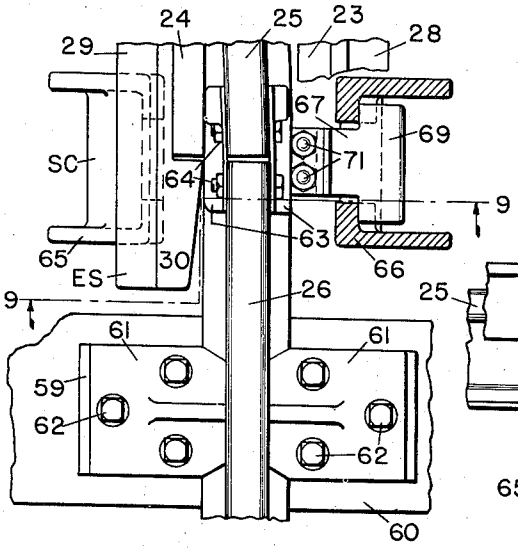


FIG. 10.

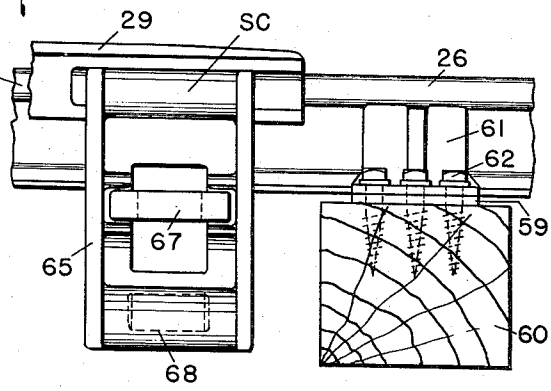


FIG. 9.

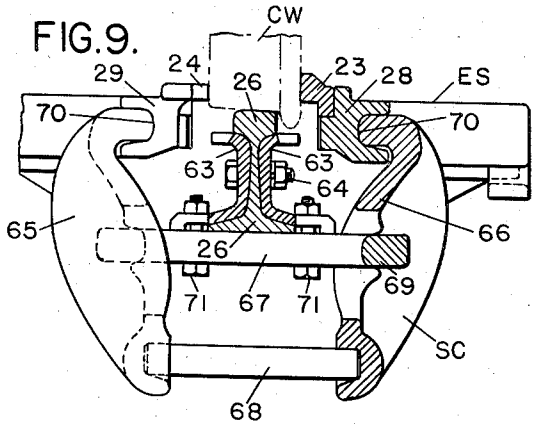
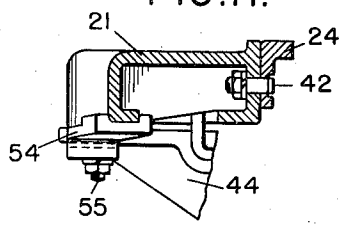


FIG. 11.



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CAR RETARDERS FOR RAILWAY CLASSIFICATION YARDS

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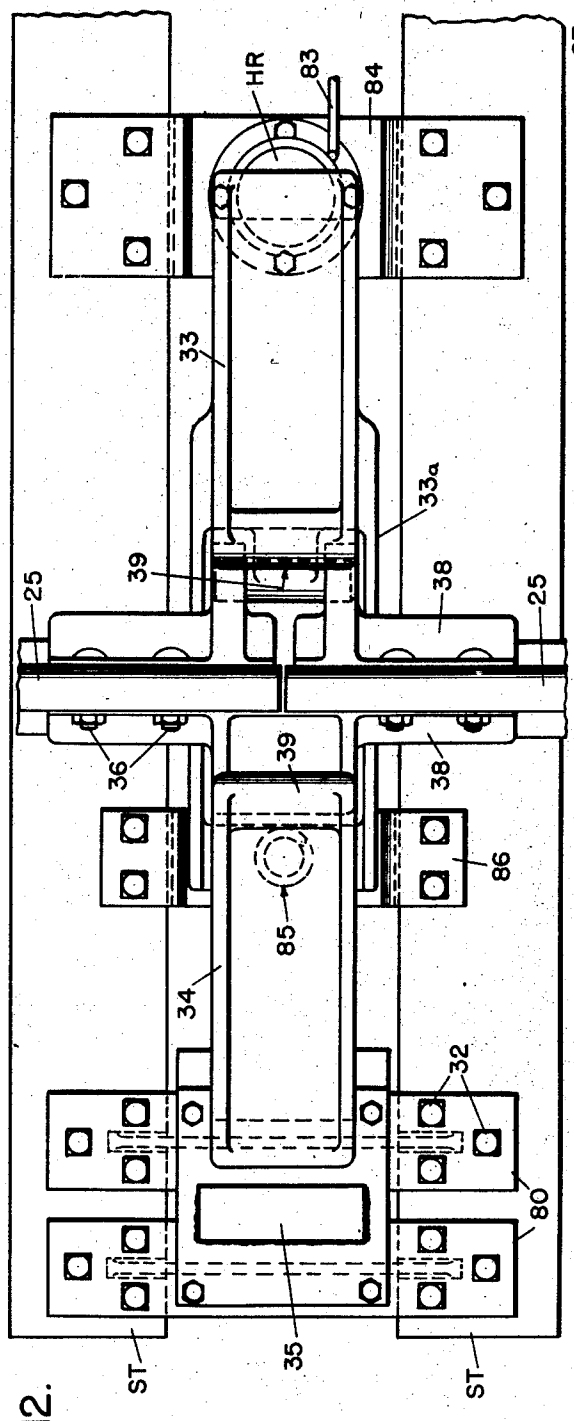


FIG. 12.

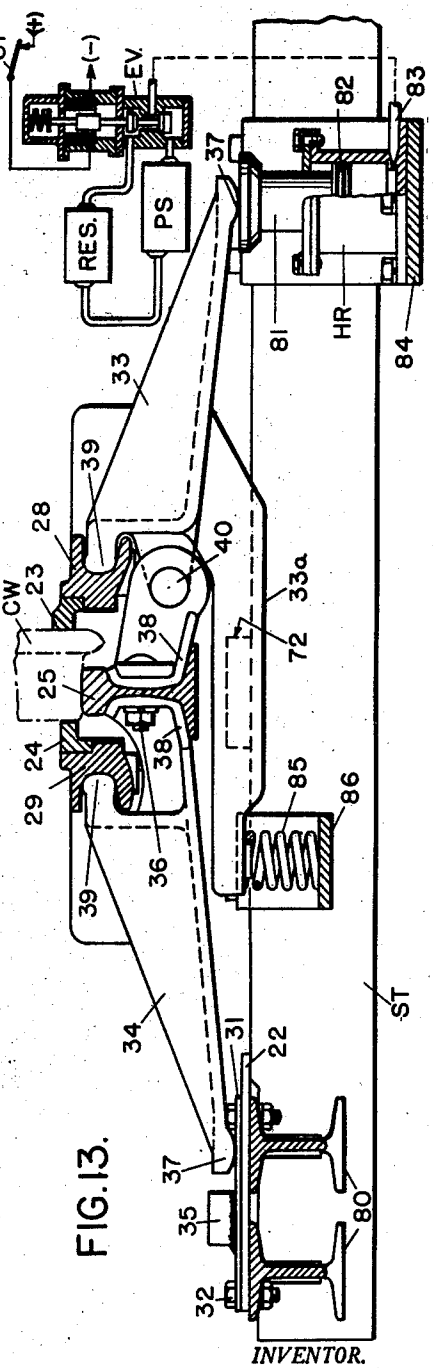


FIG. 13.

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CAR RETARDERS FOR RAILWAY CLASSIFICATION YARDS

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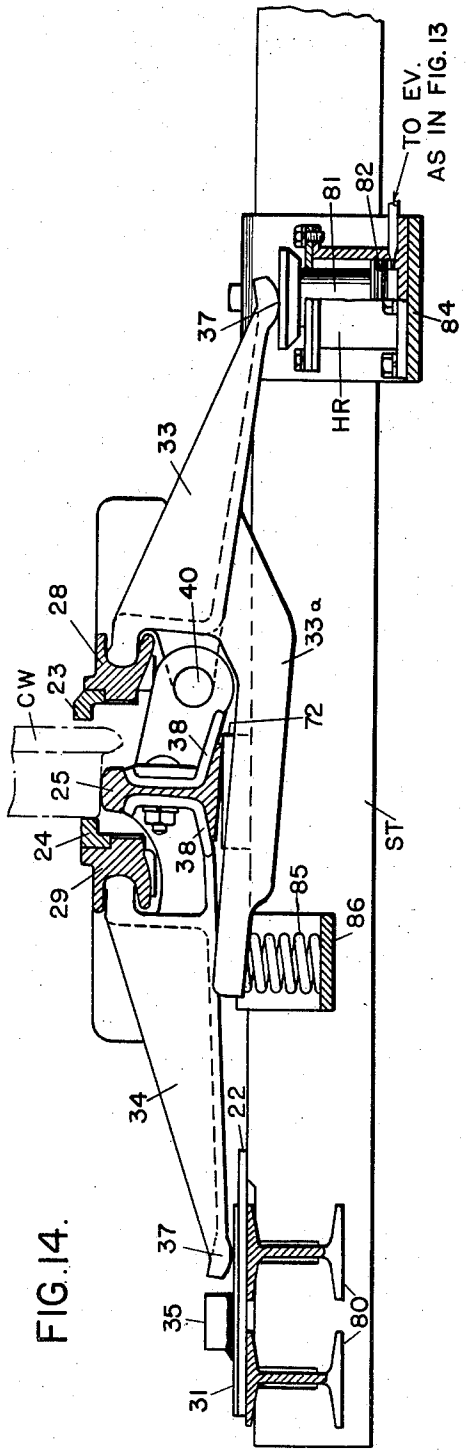


FIG. 14.

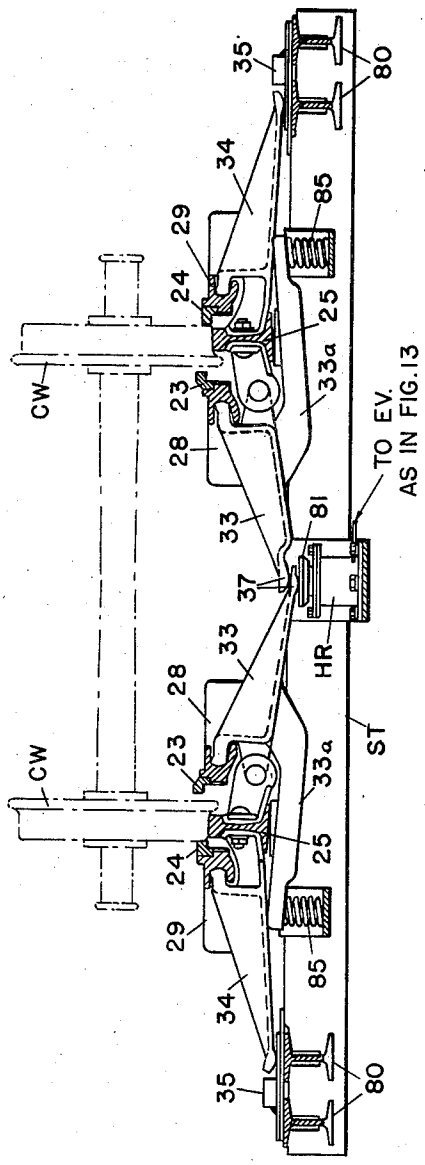


FIG. 16.

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CAR RETARDERS FOR RAILWAY CLASSIFICATION YARDS

Filed Sept. 16, 1955 7 Sheets-Sheet 7

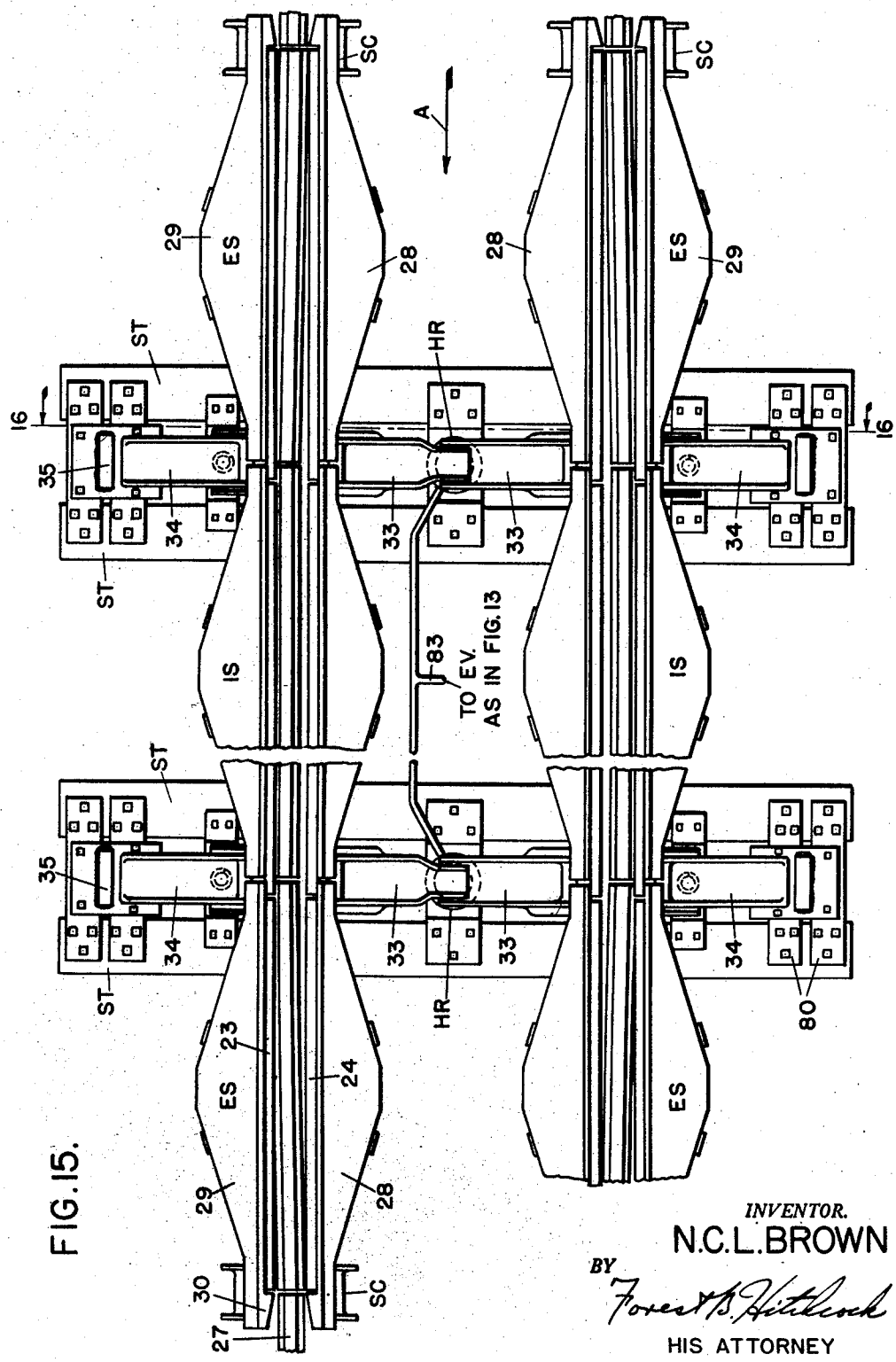


FIG. 15.

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United States Patent Office 2,858,907
Patented Nov. 4, 1958

2,858,907

CAR RETARDERS FOR RAILWAY CLASSIFICATION YARDS

Ned C. L. Brown, Scottsville, N. Y., assignor to General Railway Signal Company, Rochester, N. Y.

Application September 16, 1955, Serial No. 534,750

12 Claims. (Cl. 188—62)

This invention relates to car retarders of the track brake type for use generally in railway hump classification yards, and it more particularly pertains to car retarders of the weight-automatic type, wherein the amount of retardation is automatically proportional to the respective weights of cars passing therethrough.

A railway hump classification yard comprises a main feeder track extending over a hump at the entrance end of a yard which diverges into several classification tracks, these classification tracks in turn generally converging into one or more exit tracks. Usually, one or more hump car retarders is located on the entrance track a short distance off of the hump and other car retarders, commonly known as group car retarders, are located at various points in approach of the classification tracks to control the speed of the rolling cars as they approach their destinations in the various classification tracks.

Track skates are generally placed at the ends of these classification tracks to stop and hold the first cars in line, so that the cars which are being classified according to destinations are built up into trains in the respective tracks. The train is then pulled out of the exit end of the yard by a locomotive. These track skates are usually hand placed and removed by skate men with the result that considerable time and expense is involved over a period of time.

The present invention provides a relatively inexpensive car retarder structure that can be used for stopping cars at the ends of the classification tracks in place of the above mentioned skates. The car retarder is fully automatic when used for this purpose as compared to the skates which require manual placement and removal. The braking pressure applied by the car retarder is substantially proportional to the weight of a car, and, when used for this purpose, no provision need by made for the opening of the car retarder as the cars can be readily pulled through the car retarder when they are removed from the associated classification track.

Like most car retarders of the track brake type, shoe beams are disposed end to end at both sides of one of the track rails, and an operating unit is provided at each point where the ends of shoe beams are adjoining. The operating units are disposed on the tops of conventional railway ties as compared to prior art car retarders where the operating units are disposed between two of the ties.

The car retarder according to the present invention is simplified in that each of the operating units is rigidly secured to the associated track rail, thus eliminating the need for heavy end thrust and lateral bearing plates. The track rail with which the car retarder is associated cannot move longitudinally because of it being tied to the fixed rails in approach of the car retarder. The track rail associated with the car retarder is kept on gauge partly by flanges of the car wheels and partly by limiting stops on tie plates at the outside ends of the respective operating units.

Each of the operating units comprises a pair of supporting levers disposed normal to the associated track

rail and on the respective sides thereof, each lever being rigidly secured at one end to the track rail and being supported at the other end on a plate on one of the ties. The lever on the inside of the track rail includes an intermediate journal whereby the inside lever is articulated elevationally. The levers of each pair engage the adjoining ends of inside and outside shoe beams respectively. Because of the only support for the track rail being the bearing points at the ends of the levers, the presence of a car wheel between the shoe beams applies pressure against the rim of the wheel in an amount substantially proportional to the weight of the car.

This car retarder can also be used as a double rail car retarder in the tracks which feed the classification tracks. When used in these tracks, it is generally desirable to be able to open the car retarder when the speed of a car has been reduced to a particular desired speed, and in order to accomplish this, it is provided that the inside support points for the respective inside levers can be selectively raised and lowered so that the car retarder can be opened as desired wherein the entire weight of the car becomes supported on the ties when the car retarder is opened, and the shoe beams become spread apart.

An object of the present invention is to provide a simple and inexpensive weight-automatic car retarder that can be used for stopping and holding cars at the exit end of the classification tracks, instead of using the more expensive and less efficient method of placing and removing track skates by hand.

Another object of the present invention is the provision of a weight-automatic car retarder wherein the construction permits the use of sectional units which can be fastened together and built up to any desired length, the complete retarder floating on beams and standard railroad ties and requiring no anchoring means other than the extreme ends of the two end sections being fastened to the connecting stock rail.

Another object of the present invention is the provision of a weight-automatic retarder which can be built up in sections but wherein the brake shoes are overlapped from one section to the other to prevent the car wheels from climbing out from between the brake shoes.

Another object of the present invention is the provision of an improved means for releasing a weight-automatic car retarder. Weight-automatic car retarders with such release operating means could be used as hump and group car retarders.

A still further object of the present invention is the provision of weight-automatic car retarders which can be applied to either or both rails and have a separate release operating means for each section of each retarder or they can be applied to both rails and have one operating means for every two oppositely located retarder sections.

Other objects, purposes and characteristic features of the invention will be in part obvious from the accompanying drawings and in part pointed out as the description of the invention progresses.

In describing the invention in detail, reference will be made to the accompanying drawings in which like parts, or parts having similar functions, are generally identified by similar reference characters and in which:

Fig. 1 is a plan view of a weight-automatic car retarder in accordance with the present invention showing two end sections and only one intermediate section as applied to a single track rail;

Fig. 2 is a side elevation of the car retarder apparatus shown in Fig. 1;

Fig. 3 is an enlarged sectional end view of the car retarder, taken on the line 3—3 of Fig. 1 as viewed in the direction of the arrows, this view showing the beam sup-

porting structure which is located on railroad ties at the points where two sections are joined together;

Fig. 4 is a view of the car retarder similar to Fig. 3 except that the apparatus has been shown in a braking position due to the presence of a car wheel;

Fig. 5 is a plan view of the car retarder apparatus shown in Fig. 4, parts being broken away for the sake of clearness;

Fig. 6 is an enlarged sectional end view of the car retarder taken through the brake beams, brake shoes, track rail and supporting structure showing the apparatus in a braking position due to the presence of a car wheel, this section being taken substantially through the mid-section of a car retarder section as indicated by the line 6—6 of Fig. 1 as viewed in the direction of the arrows;

Fig. 7 is a sectional plan view of the car retarder taken on the line 7—7 of Fig. 6 as viewed in the direction of the arrows;

Fig. 8 is a plan view of the car retarder, partly in section, showing the structure at a point where an end section of the retarder is fastened to the main stock rail;

Fig. 9 is a sectional end view of the car retarder structure shown in Fig. 8, the section being taken on the line 9—9 of Fig. 8 as viewed in the direction of the arrows;

Fig. 10 is a side elevational view of the car retarder structure shown in Figs. 8 and 9;

Fig. 11 is a sectional end view of the car retarder taken on the line 11—11 of Fig. 7 as viewed in the direction of the arrows;

Fig. 12 is an enlarged plan view of the car retarder similar to Fig. 5 showing a beam supporting structure modified to incorporate a means for opening the retarder normally or releasing the brake pressure when a car is present;

Fig. 13 is a sectional end view of the car retarder similar to Fig. 4 except modified to show the apparatus shown in Fig. 12 as well as a schematic showing of a typical hydraulic means for opening the retarder;

Fig. 14 is a sectional end view of the car retarder similar to Fig. 13 except that the retarder is shown in an inactive position to permit free passage of a car therethrough;

Fig. 15 is a plan view of operable weight-automatic car retarders shown applied to both rails, one hydraulic operating means being used to operate both retarder sections located on opposite rail sections; and

Fig. 16 is a sectional end view of the operable car retarder taken substantially on the line 16—16 of Fig. 15 as viewed in the direction of the arrows, showing a double rail car retarder in an inactive position similar to that shown in Fig. 14.

Referring now more particularly to Figs. 1 and 2, there has been shown a general layout of a weight-automatic car retarder in accordance with the invention, with no attempt being made to show the detailed structure. The car retarder has been shown as it would be applied to one rail, although it should be understood that each rail may have a car retarder applied thereto. In the particular illustration shown, the car retarder has been shown as applied to the left-hand rail of a stretch of railroad track as viewed from right to left. A similar car retarder applied to the right-hand rail would be turned end for end to that as shown for the left-hand rail, as explained hereinafter.

For the purpose of simplification of the disclosure the car retarder as shown in Fig. 1 comprises two end sections ES and only one intermediate section IS, although preferably in practice it is proposed to have at least three intermediate sections IS. It should be understood, however, that the number of intermediate sections IS used is a matter of choice, depending upon the amount of retardation required at a particular location.

Generally speaking, each intermediate car retarder section IS comprises an inside brake beam 20 and an outside brake beam 21 which are identical in structure. These brake beams 20 and 21 are supported at a central point lengthwise by a brake beam support BS which is located underneath the beams and fastened to the rail. The ends of the brake beams 20 and 21 are pivotally supported by transverse supporting beams or levers 33 and 34 which are located in pairs at the junction points of the various car retarder sections. The supporting levers 33 and 34 in turn each have one end resting on a tie plate 22. The tie plates 22 are fastened to and supported on wooden supporting ties ST which are located under the car retarder and extend under both rails in the usual manner. The brake beams 20 and 21 have brake shoes 23 and 24 respectively fastened thereto with a section of rail 25 positioned therebetween, all as described more in detail hereinafter.

The end car retarder sections ES are similar in structure in most respects to the intermediate car retarder sections IS. The inner ends of the end sections ES which join the intermediate sections IS are identical as to structure and supporting means. The outer or extreme ends are different due to the fact that they must be specially mounted and fastened to the ends of the regular stock rails 26 and 27.

Assuming that the direction of traffic is from right to left in Fig. 1 as is indicated by the arrow A, the stock rail 26 is fastened to the entrance end of the retarder. At this particular junction point, the end of the stock rail 26 adjoins the outer end of the entrance end car retarder section ES and is joined thereto by a stirrup clamp SC, with the ends of the stock rail 26 and the car retarder rail 25 being fastened together. The fastening together of the rails support the outer end of the end car retarder section ES and the stirrup clamp SC provides a vise-like clamp so that the entrance end of the car retarder forms a permanent setting to receive the car wheels CW as they enter the car retarder, all as shown and described more in detail hereinafter. The outer ends of the brake beams 28 and 29 of the end car retarder sections ES are provided with tapered ends 30 to insure proper entrance of the car wheels CW into the car retarder. The exit end section ES of the car retarder is constructed and mounted in a manner corresponding to the entrance end section ES.

Referring now more particularly to Figs. 3, 4 and 5 in which there has been shown plan and sectional views in enlarged scale of a pair of the supporting levers 33 and 34 and a car retarder section to bring out more in detail the structure and assembly at one of the junction points where two car retarder sections are joined together. As previously mentioned, the complete structure rests upon wooden supporting ties ST which are suitably anchored in ballast or rest on a concrete foundation or such (not shown). Tie plates 22, having hardened pads 31 welded or otherwise fastened thereto, are mounted on the ties ST under each end of the supporting levers 33 and 34 by means of lag screws or bolts 32.

The respective pairs of supporting levers in general comprise inside levers 33 and an outside lever 34. The inner ends of these two levers 33 and 34 are fastened to the rail section 25 by means of bolts 36. The other ends of these two levers 33 and 34 are formed with hardened rounded bearing surfaces 37 which rest on the hardened tie plate pads 31. These two supporting levers 33 and 34 are hollowed out at their inner ends as shown so that the lower parts 38 are shaped to simulate rail brace supports while the upper parts 39 are shaped to form rounded projecting lugs. The rail brace portions 38 provide the means for fastening the two levers 33 and 34 to the rail section 25 as mentioned above, whereas the rounded projecting lug portions 39 provide a support and pivot bearing for mounting and operating the brake shoe beams 28—29 and 20—21. The inner supporting levers 33 are each articulated, the inner lower rail brace portion 38 being rigidly secured at one end to the track rail 25 by bolts 36, and the other portion of the lever 33 which carries the lug 39 being hinge coupled to the

rail brace portion 38 by a journal pin 40. The outside tie plate pad 31 has a stopping block 35 suitably secured thereto as by welding which acts as a stop for the outside supporting lever 34 to butt against under certain conditions for keeping the rails on gauge as will be explained hereinafter.

Each of the brake beams 21, 29, etc. are provided with projecting lugs 41 at each end and at their mid points (see Figs. 5 and 7). These lugs 41 project into grooves or cut out portions in the brake shoes 23 and 24 so that the brake shoes fit snugly against the brake beams and rest upon the lugs 41. The brake shoes 23 and 24 are then bolted to the brake beams 21, 29, etc. by means of bolts 42, as shown more in detail in Figs. 7 and 11. The brake shoes 23 and 24 are positioned so that they bear against both sides of a car wheel CW when a car is present in the retarder.

As shown more in detail in Fig. 5, the adjoining ends of two car retarder sections are supported by the levers 33 and 34 which in turn are secured by bolts 36 to the rail sections 25 which are adjoining end to end except for a slight gap between them. The brake shoes, however, overlap so that the brake shoes 23 and 24 of one retarder section rest on the projecting lugs 41 of the brake beams which form a part of the other retarder section. This arrangement reduces the possibility of a light car climbing out of the car retarder upon passing from one section to the next.

The brake beams 21, 29, etc. are shaped so that their adjoining end portions at the junction point where they are supported by the rounded lug portions 39 of the levers 33 are relatively narrow, whereas their mid-portions (see section line 6—6 of Fig. 1) are much wider and are slidably mounted on the brake beam support BS. Referring now more particularly to Figs. 6 and 7, the mid-portions of the typical brake beams 20 and 21 shown are box-like in cross section with openings in the bottom wall to facilitate assembly. The brake beam support BS comprises an inside bracket 43 and an outside bracket 44. The top innermost portions of these brackets 43 and 44 are shaped to form a rail brace support and these rail brace portions 45 and 46 are fastened to the rail section 25 by means of bolts 47. The bottom lugs 48 and 49 of these brackets 43 and 44 are tied together by bolts 50 with spacing bushings 51 inserted therebetween. The outermost portions 52 and 53 of these brackets 43 and 44 extend underneath the outer edges of the brake beams 20 and 21 and provide supports therefor. Upward movement of the brake beams 20 and 21 is limited by clamps or guide pieces 54 which are fastened to the brake beams 20 and 21 by means of bolts 55 (see Figs. 7 and 11). These clamps 54 have offset portions at one end which extend under the brackets 43 and 44 and forked portions at their other ends which fit around the underside of the brake beams 20 and 21. It can be seen that this structure supports the brake beams 20 and 21 at their mid-sections but allows them to move in toward or away from the rail 25.

These brake beams 20 and 21 are normally held apart away from the track rails 25 by coil springs 56. Angle brackets 57 are attached to the brake beam supporting brackets 43 and 44 by bolts 58. These angle brackets 57 extend up into the brake beams 20 and 21 through the openings in the bottom thereof and the coil springs 56 are positioned between the brackets 57 and the outer walls of the brake beams 20 and 21. As the coil springs 56 tend to force the brake beams 20 and 21 away from each other as previously mentioned, they also tend to hold the ends of the brake beams 20 and 21 tightly against their pivotal bearing supports 39 which form a part of the supporting levers 33 and 34.

It is believed that from the foregoing detailed description and with reference to the drawings, it should be understood how the various individual car retarder sections IS and ES are constructed and how these sections are inter-connected and supported by the supporting levers 33 and 34. As previously mentioned the entrance end of one and the exit end of the other of the two end car retarder sections ES are fastened to and supported by the regular stock rails 26 and 27 respectively and are specially mounted and held together by the stirrup clamps SC, as is about to be described in detail. As both the entrance end and the exit end of the car retarder are alike, only the entrance end will be described.

Referring now particularly to Figs. 8, 9 and 10, the end of the regular stock rail 26 rests upon the usual tie plate 59 mounted on a regular tie 60 forming a part of the conventional section of railroad track, previously described as one of the classification tracks. The rail 26 is securely fastened to the tie 60 and held in alignment by means of rail braces 61 and lag screws 62. Rail anchors (not shown) are also used to prevent longitudinal creepage of the rail 26. This stock rail 26 extends beyond the edge of the tie 60 and into the stirrup clamp SC where it butts against, and is joined to, the rail section 25 of the end retarder section ES, by means of rail brace type connecting plates 63 and bolts 64.

The stirrup clamp SC comprises an inside jaw 66, an outside jaw 65, a tie bar yoke 67 and a spacing bar 68. The tie bar yoke 67 is I-shaped in design and passes through openings in the jaws 65 and 66 and is positioned so that rounded lug portions 69 on the ends of the tie bar yoke 67 fit into sockets located on both sides of the jaws 65 and 66. These sockets are near the midpoint of the jaws 65 and 66 and when the lugs 69 are in the sockets they form pivot points whereby the jaws 65 and 66 may pivot on the yoke 67 but are prevented from moving outward. The spacing bar 68 extends between sockets located at the bottom ends of the jaws 65 and 66 and limits the inward movement of these jaw bottom ends. The top ends of the jaws 65 and 66 are formed with rounded projecting lugs 70 which fit into sockets located in the entrance ends of the brake beams 28 and 29, similar to the manner already described in connection with mounting the other ends of the brake shoe beams 28 and 29 on the rounded projecting lugs 39 of the supporting beam arms 33 and 34. The rail brace type connecting plates 63 are provided with feet which are fastened to the tie bar yoke 67 by means of bolts 71. As these connecting plates 63 are the means whereby the ends of the rails 25 and 26 are fastened together and whereas these rails rest on the tie bar yoke 67 and are fastened thereto by the bolts 71, it can be seen that the tie bar yoke 67 is anchored rigidly to the permanently positioned stock rail 26.

As previously described, each car retarder section ES and IS is provided with compression springs 56 (see Fig. 6) which tend to force the brake shoe beams 28—29 and 20—21 outward away from the rails 25 when the car retarder sections are in their normal unoccupied positions. With the brake shoe beams 28 and 29 being forced outward, the entrance ends of these brake beams and their associated brake shoes 23 and 24 are separated their full distance as determined by the stirrup clamp spacing bar 68. This amount of separation between brake shoes is enough to allow free entrance of the car wheels CW into the car retarder. Furthermore, as previously mentioned, the entrance ends of the brake beams 28 and 29 are provided with tapered ends 30 to facilitate entrance.

Before considering mode of operation, adjustments and the like, consideration will be given as to the relative amounts of braking pressure applied to the car wheels as compared to the car weights. With reference to Fig. 4, W represents the weight applied through a car wheel CW to a typical car retarder pressure applying unit and W_1 represents the load applied to the right-hand support of the car retarder pressure applying unit at the point 37. P represents the pressure applied by the brake shoes 23 and 24, R_1 represents the moment arm from the left-

hand pivot point 37 to the center of the pivot pin 40, R_2 represents the moment arm from the left-hand pivot point 37 to the right-hand pivot point 37 at which the weight W_1 is applied, R_3 is the moment arm from the center of the pivot pin 40 to the center of the pivot lug 39, and R_4 represents the moment arm from the center of the pivot pin 40 to the right-hand point of support 37.

Since all of the parts are in equilibrium, I can take moments about the left-hand pivot point 37 wherein:

$$W_1R_2=WR_1$$

$$W_1=\frac{WR_1}{R_2}$$

also by moments:

$$PR_3=W_1R_4$$

Substituting for W_1,

$$PR_3=\frac{WR_1}{R_2}\times R_4$$

and

$$P=W\frac{R_1R_4}{R_2R_3}$$

thus the lever ratio is:

$$\frac{R_1R_4}{R_2R_3}$$

and

$$P:W=R_1R_4:R_2R_3$$

In this manner, the desired pressure is obtained by the lengths of the moment arms being chosen to give the desired lever ratio. For most effective operation, the ratio should be such as to just approach the point where the frictional effort equals the wheel load. When the friction effort is greater than the wheel load, the wheel tends to lift out of the shoes and ride on top.

Referring now to the drawings and the detailed description of Figs. 1 to 11 inclusive, the type of car retarder shown and described thus far is intended to be used to stop and hold the cars at the end of a classification track. In actual practice, the speed of these cars has been controlled by the main car retarders located along the route so that they approach their destination at the end of the classification tracks at a very low speed of about 5 M. P. H. The car retarder in general would be in its inert position as shown in Figs. 1, 2 and 3, with its rails 25 resting upon the stop plates 72 which are suitably fastened to the ties ST (see Fig. 3). The entrance and exit ends of the two end retarder sections ES always remain in the same position as shown in Figs. 8, 9 and 10 due to the fact that the retarder rails 25 are fastened to the stock rails 26 and 27. The rails 26 and 27 support the stirrup clamps SC which in turn support and control all movement of the brake beams 28 and 29 at their extreme entrance and exit ends. However, with no car in the retarder, the inner ends of the end retarder sections ES and the intermediate retarder sections IS will collapse due to their weight and permit the rails 25 to flex until they rest on the stop plates 72. The connections between the rails 25, 26 and 27 previously described are purposely made somewhat loose to permit the rails 25 to sag rather than bend and distort.

With reference to Fig. 3, it can be seen that when the rail 25 is in position on the stop plate 72, the distance between the brake shoes 23 and 24 is less than the width of a car wheel CW. This condition is due to the fact that the inner ends of the supporting levers 33 and 34 are fastened to the rail 25 and as the rail 25 assumes its position on the stop plate 72, the inner ends of the supporting levers 33 and 34 move accordingly while the outer ends pivot on their rounded bearing surfaces 37. The hinged connection 40 in the inner supporting lever 33 permits the levers and rail to assume this collapsed position and also allows the brake shoes 23 and 24 to move inward toward each other and narrow the distance therebetween. In other words, in this collapsed position, the complete car retarder assembly tends to flatten out, that is, the center portion drops, the sides spread out and the brake shoes come closer together.

With the car retarder in this position, let us assume that a car enters the car retarder. The opening between the brake shoes 23 and 24 at the entrance end is set as governed by the springs 56 which separate the brake beams 28 and 29 and the stirrup clamp SC so that the leading car wheel CW enters between the brake beam tapered ends 30 and is positioned between the brake shoes 23 and 24. No braking is yet effective because the weight on the car wheels CW is supported by the stock rail 26 and its associated supporting structure. As the car proceeds into the car retarder end section ES to a point about midway in its length (dependent upon the width of the wheel), the car weight begins to transfer to the car retarder rail 25 and the leading car wheel CW tends to force its way between and spread the brake shoes 23 and 24. As the friction between the car wheel CW and the brake shoes 23 and 24 increases, the rail is lifted from its collapsed position off of the stop plate 72, as shown in Figs. 4 and 6, an amount dependent upon the width of the wheel. At the same time, however, the weight of the car on the rail 25 tends to collapse the articulated lever 33, thus causing the brake shoes 23 and 24 to apply a pressure against the sides of the car wheel CW substantially proportional to the weight applied by the car wheel CW to the rail 25.

In weight automatic car retarders the braking distance is about the same for both light and heavy cars entering the car retarder at the same speed because of the amount of braking pressure being determined by the weight of the car. Thus the number of intermediate car retarder sections required is dependent upon the maximum speed at which a car may be expected to enter the car retarder, and sufficient sections will be provided to stop a car at their maximum speed. When the car finally does come to a stop, it is held in position by the brake shoes 23 and 24 bearing against the sides of the car wheels CW, the braking pressure being supplied by the weight of the car itself.

Referring now to the overlapping the brake shoes 23 and 24 from one car retarder section to another, as more particularly shown in Figs. 1 and 5, this is done to prevent the car wheels CW from climbing out from between the brake shoes 23 and 24 at the time the car is passing through the location where two car retarder sections are joined together. As shown and previously described, at each junction location the rail sections 25 are fastened together, the ends of the brake beams such as 21 and 29 are pivotally supported on a common supporting beam SB, and the brake shoe 24 of one retarder section overlaps and rests on the brake beam lug 41 of the adjoining car retarder section. Considerable movement of the car retarder parts takes place as a car passes therethrough and with the brake shoe 24 overlapped from one section to the other as shown, the leading car wheel CW positions the forward brake shoe 24 before it leaves its present brake shoe 24. In effect, the braking action is the same as though one continuous brake shoe were used, no abrupt change being noticeable as the car passes from one car retarder section to another.

Considerable use of the car retarder causes wear on the brake shoes 23 and 24 which require replacement when completely worn out. However, as this wear is taking place, the car retarder is self adjusting, the only reaction being that the car retarder rises a lesser distance from the stop plate 72 as the distance between the brake shoes 23 and 24 increases due to wear on the braking side of the shoes. When the car retarder fails to rise from the stop plate 72 during the presence of a car, the braking effect is lost. If the brake shoes 23 and 24 are not completely worn out, the car retarder can be made

active again by increasing the distance between the bottom of the rail 25 and the stop plate 72 to allow more movement. This can be done by either decreasing the thickness of the stop plate 72 or increasing the thickness of the plates 31, or both.

It will be noted that the rails 25 are normaliy positioned closer to the outside brake shoe 24 than to the inside brake shoe 23 (see Fig. 4), thus leaving a gap between the rail 25 and the flange of the car wheel CW. The structure is so designed that the position of the outside brake beam 29 with relation to the rail 25 never changes while the position of the inside brake beam 28 with relation to the rail 25 does change upon vertical movement of the car retarder, this being due to the hinged connection 40 in the inside supporting lever 33. As previously mentioned, during operation of the car retarder the track rail 25 drops closer to the stop plate 72 as the brake shoes wear, and this type of structure allows the rail 25 and all associated car retarder parts to move inward toward the other rail as this wear takes place.

Due to the fact that the complete assembled car retarder practically floats on the supporting ties ST and is anchored only at its entrance and exit ends, there may be a tendency for slight side movement to occur. The presence of the stopping blocks 35 limits this side movement in an outward direction while the car wheel flange limits this side movement in an inward direction, the wheel flange on the other track rail bearing against the inside of the other stationary track rail.

Assuming now that the first car to enter the car retarder has been properly stopped and is being held as described above, other cars being routed to this same classification track will be properly braked on the way down and will come to a stop as they come into contact with the car or cars already being held by the car retarder. Whenever desired, presumably at a time when a train is built up for movement to a certain destination, a locomotive may be backed into the exit end of the car retarder and coupled to the train, which may then be moved through the car retarder. As there will probably never be more than one car at a time in the car retarder as the train passes through, the braking pressure exerted by the car retarder on this one car is not considered enough to materially bother the pulling power of the locomotive.

With reference to the weight-automatic car retarder structure already shown and described for use in the respective classification tracks, it is obvious that its function is primarily to stop and hold a railroad car as it attempts to pass therethrough. This same general type of car retarder structure, however, may be readily adapted for use as an operable car retarder wherein the car retarder can be selectively opened or closed in response to either manual or automatic control. For instance, it may be desirable to release the classified cars previously described as held in the car retarder at the end of a classification track so that the locomotive can remove them freely and save the wear on the brake shoes caused by each car being pulled therethrough. Also, as this sectional type of car retarder can be built up to any desired length and can be applied to either rail or both rails, the addition of an operable means for each section makes it suitable for use anywhere in a classification yard as either main or auxiliary car retarder. Such an operable car retarder structure as applied to a single rail has been shown in Figs. 12, 13 and 14.

Generally speaking, the car retarder operating units are located on supports mounted between two supporting ties ST rather than being located directly on a tie, as space is required for the additional apparatus. The car retarder structure as a whole is supported by springs capable of carrying the weight of the car retarder only so that the car retarder does not collapse when it is not occupied. The outside levers 34 of the car retarder operating units rest on respective stationary tie plates extending between adjoining ties whereas the inside levers 33 rest on respective elevationally movable plungers or pistons which form a part of the car retarder operating means.

As the car retarder structure in general is identical to that previously described, it is not deemed necessary to go into a detailed explanation of the parts that have already been described and the same reference numbers have been used on like parts. With reference to Figs. 12, 13 and 14, the supports for the outside levers 34 of the car retarder operating units comprises respective pairs of "I" beams 80 which straddle adjoining supporting ties ST and are fastened thereto. The tie plate 22, hardened pad 31 and stopping block 35 are fastened to the "I" beams 80 by means of the bolts 32. The hardened rounded bearing surfaces 37 of the levers 34 rest on the hardened pads 31, providing pivotal supports at these points.

The inside levers 33 of the respective car retarder operating units have hardened rounded bearing surface 37 resting on respective piston plungers 81 of hydraulic rams HR. The hydraulic rams HR are mounted on supporting brackets 84 which straddle adjoining pairs of ties ST and are fastened thereto. Associated with the hydraulic rams HR is an electric valve EV, a reservoir RES and a pump and storage unit PS. Each of the hydraulic rams HR comprises a casing in which is mounted a piston 82, the piston 82 forming part of a plunger 81 which supports the associated lever 33 of the car retarder. The lower part of the casing below the piston 82 is provided with an opening having a pipe 83 connected thereto, so that fluid pressure can be supplied to operate the plunger 81.

The spring supporting means for normally carrying the weight of the car retarder comprises a coil compression spring 85 which is located between a supporting bracket 86 and an arm 33*a* on the supporting lever 33. This arm 33*a* extends underneath the rail 25 to a point beyond the center of the car retarder. The supporting bracket 86 straddles the supporting ties ST and is fastened thereto. When the car retarder is set in a position to receive a car for braking purposes, the springs 85 hold the car retarder operating mechanism and the rails 25 in a suspended position so that the brake shoes 23 and 24 are separated to receive the car wheels CW and the distance between the bottom of the rail 25 and the stop plate 72 is at a maximum.

The setting of the car retarder to a braking position is determined by positioning the height of the bearing surface portion 37 of the inside supporting levers 33. As this bearing surface portion 37 of the lever 33 rests upon the piston plunger 81 of the hydraulic ram HR, it can be seen that the amount of pressure applied to the underside of the piston 82 determines the height of the piston plunger 81 and the arm 33. Assuming that the pumping unit PS and the reservoir RES are set to deliver the required pressure, energization of the electric valve EV by the closure of contact 87 would open the proper port and allow this fluid pressure to be delivered to the underside of the piston 82 through pipe 83, thus raising the piston plunger 81 to the height required for rendering the car retarder effective upon a car.

With the car retarder set in a braking position as just described, let us assume that a car has entered the car retarder as shown in Fig. 13. The weight of the car has now depressed the rail 25 and its associated supporting levers 33 and 34 downward against the compression of the springs 85, thus causing the brake shoes 23 and 24 to exert braking pressure against the sides of the car wheels CW in accordance with the weight of the car. This braking pressure is present as long as there is a gap between the bottom of the rail 25 and the stop plate 72. If a condition arises wherein the rail 25 comes into contact with the stop plate 72 due to wear on the brake shoes 23 and 24 or because of insufficient hydraulic pressure

application to the underside of the piston 82, an increase in this hydraulic pressure will again raise the car retarder to a height sufficient to restore braking pressure to the brake shoes. When the brake shoes 23 and 24 are completely worn out, they must be replaced.

When it is desired to position the car retarder so that no braking effect will be present, deenergization of the electric valve EV will cut off the fluid pressure and allow the fluid to return to the storage unit PS through the pipe 83, thus permitting the weight of the car retarder to return the piston plungers 81 to their lowermost position. This will allow the inside supporting levers 33 to drop and open up the gap between the brake shoes 23 and 24 and the car retarder will assume a position as shown in Fig. 14, with the rail 25 resting on the stop plate 72. In this position of the car retarder, a car which has had braking pressure applied thereto in the car retarder will be released and this car or any other cars may be moved freely without further retardation.

Referring now more particularly to Figs. 15 and 16, there has been shown an application of the operable type car retarders to both rails of a classification track. Assuming the direction of traffic to be as indicated by the arrow A, the application of the car retarder to the left-hand rail is the same as already described. However, as previously mentioned, when the car retarder is applied to the right-hand rail it must be turned end for end, the reason being that the hinged supporting levers 33 must be located on the inside of the rail next to the flange side of the car wheels CW. The car retarders have been shown in an open non-braking position similar to that shown in connection with Fig. 14.

As the car retarder structures are similar to that already described, it is believed unnecessary to go into a detailed description. The bearing points 37 of the inside supporting levers 33 are modified to the extent that they overlap one another when they are mounted directly opposite each other, thus making it possible to operate two oppositely mounted car retarder sections with the same hydraulic ram HR. Application of hydraulic fluid pressure to the underside of the piston of the hydraulic ram HR would raise the piston plunger 81 and the supporting levers 33 to a position similar to that shown in Fig. 13, thus rendering the car retarders active for braking duties.

Having shown a certain typical form and modifications thereto which the invention can assume, and having described certain specific embodiments of the present invention in connection with these illustrations, it is to be understood that these forms were selected principally to facilitate the disclosure rather than to limit the number of forms the invention may assume. It should be further understood that various adaptations, modifications and alterations may be made to the structure of the specific forms shown in accordance with the requirements of practice, except as limited by the appending claims.

What I claim is:

1. A car retarder having a plurality of car retarder sections disposed end-to-end in a stretch of railway track, each of the car retarder sections comprising, a section of track rail, shoe beams disposed along the inside and the outside of the track rail respectively, an outside lever operably engaging one end of the outside shoe beam and disposed normal to the track rail, said outside lever being rigidly secured at one end to the outside of the track rail and having its other end supported on a railway tie, and an inside lever engaging one end of the inside shoe beam and disposed normal to the track rail, said inside lever being pivotally connected at one end to the inside of the track rail and having its other end supported on a railway tie, in a rail brace, a journal, and coupling means for interconnecting said inside lever to said rail brace and said journal, said journal being responsive to the weight of a vehicle wheel, said inside lever being articulated elevationally by said journal in response to entrance or exit of a vehicle wheel, whereby braking pressure is applicable to the rims of a railway car wheel in passing through the car retarder in accordance with the weight of the car.

2. A car retarder associated with a track rail in a stretch of railway track comprising in combination, a plurality of shoe beams disposed end-to-end longitudinally on both sides of a track rail, support points along the trackway laterally spaced from the track rail on the respective sides thereof, respective pairs of opposing levers disposed normal to the track rail at the adjoining ends of the shoe beams and operatively engaging the shoe beams, one lever of each of said pairs of levers being rigidly secured at one end to one side of the track rail and bearing on one of said support points at the other end, and the other lever of each of said pairs of levers being pivotally connected at one end to the other side of the track rail and bearing on one of said support points at the other end, a weight actuated journal coupled to said inside lever and said track rail, said other lever being articulated elevationally by said journal, whereby braking pressure is applicable to the rims of a railway car wheel in passing through the car retarder substantially proportional to the weight of the car.

3. A car retarder associated with a track rail in a stretch of railway track comprising in combination, a plurality of shoe beams disposed end-to-end longitudinally on both sides of the track rail, respective pairs of opposing levers disposed normal to the track rail at the adjoining ends of shoe beams for supporting the track rail, one of said levers of each pair being articulated elevationally and having an operating lug engaging the associated shoe beams, a weight actuated pivotal member interconnected to said one lever and effective when actuated to articulate said one lever elevationally in response to the presence of a vehicle wheel, and a compression spring normally supporting each of said articulated levers whereby the shoe beams are maintained normally open for the reception of a car wheel, and whereby braking pressure is applied by the shoe beams to the rims of a car wheel substantially in proportion to the weight of the car.

4. A car retarder having a plurality of car retarder sections disposed end-to-end in association with a track rail in a stretch of railway track, each of the car retarder sections comprising, shoe beams disposed respectively along the inside and outside of the track rail, an outside lever supporting the outside shoe beam, an inside lever having a lug supporting and engaging the inside shoe beam, a weight responsive journal rotatably connected to said inside lever, said inside lever being secured to the track rail at one end and bearing on a point of support at the other end, said inside lever being articulated elevationally between said lug and its connection to the track rail when said weight responsive journal is actuated whereby the shoe beams are pressed against the rim of a car wheel by a pressure substantially proportional to the weight of a car.

5. A car retarder associated with a track rail in a stretch of railway track comprising in combination, a plurality of shoe beams disposed end-to-end longitudinally on both sides of the track rail, supporting brackets for supporting the shoe beams disposed at intermediate points in the length of the shoe beams, said brackets extending beneath the associated shoe beams and being secured to the track rail, respective pairs of opposing levers disposed normal to the track rail at the adjoining ends of the shoe beams for directly supporting the track rail, one of said levers of each pair rotatably connected to said track rail and being capable of being articulated elevationally in response to the presence of a vehicle, said one lever having an operating lug engaging an associated shoe beam, whereby braking pressure is applied by the shoe beams to the rims of car wheels in accord-

ance with the application of the weight of a car through said articulated levers.

6. In a car retarder of the weight-automatic track brake type, a plurality of car retarder sections joined together end-to-end, each car retarder section comprising a track rail, a brake beam on each side of said track rail and a brake shoe on each brake beam positioned next to said track rail, a movable supporting structure including a plurality of lever arms located at each intermediate junction point of said retarder sections, a weight responsive member rotatably connected at one end to at least one of said plurality of levers and connected to said track rail at said intermediate points whereby said movable supporting structure is actuated in cooperation with said weight responsive member to in turn actuate said brake shoe, a fixed supporting structure located at each end junction point where the outer ends of each end retarder section join the main track rail, said fixed supporting structure comprising a pair of jaw arms, a tie bar yoke, a spacing bar and a pair of rail brace brackets, said jaw arms being pivoted on said tie yoke near their midsections and being spaced apart by said spacing bar at their lower ends and by said brake beams at their upper ends, the outer ends of said brake beams being pivotally supported on said upper ends of said jaw arms, said rail brace brackets being fastened to said tie bar yoke, said main track rail and said retarder track rail, compression springs for maintaining said outer ends of said brake beams in position on said jaw arm pivotal supports; whereby, said retarder track rail is supported by and held in alignment with said main track rail and said brake shoes are held spaced apart a distance slightly greater than the width of a car wheel to permit free entrance of said car wheel into said end retarder section.

7. A car retarder of the weight-automatic track brake type comprising a plurality of car retarder sections positioned end-to-end, each car retarder section comprising a track rail, a brake beam located on each side of said track rail and a brake shoe fastened to each of said brake beams, said track rails of the end car retarder sections being fastened to the main track stock rail and said other track rails being fastened together, a fixed support at the junction points where said end car retarder sections join said main track stock rail and an articulated support at the intermediate junction points of said other car retarder sections, said articulated supports having their midsections fastened to said car retarder track rails and one outer end bearing on fixed road bed supports and the other outer end bearing on movable vertical plunger supports, said brake beams being pivotally mounted on said fixed supports and said articulated supports, compression springs for maintaining said brake beams in position on said pivot mountings, other compression springs cooperating with said articulated supports to support the weight of said car retarder sections and maintain them in an open active position, a pivot connection actuated by the weight of a vehicle and interconnected to each of said articulated supports for permitting vertical movement of said retarder sections, means for operating said movable vertical plunger supports to vary the position of said articulated supports; whereby, said car retarder may be lowered to a point where said track rail rests upon a road bed support to render it inactive, or said car retarder may be raised to a point where said track rail is above said road bed support to render it active, the degree of height being determined by the spread between said brake shoes caused by wear.

8. A car retarder of the weight-automatic track brake type comprising, two end sections and one or more intermediate sections positioned end-to-end, each section including a track rail, a brake beam on each side of said track rail and a brake shoe mounted on each brake beam adjacent said track rail, said brake shoe of one car retarder section overlapping said brake beam of the car retarder section next in advance, supporting and fastening means at each junction point of an end section and the main stock rail for maintaining said end sections in alignment with said main stock rail, an outside rigid supporting arm and an inside two piece pivot connected supporting arm at each intermediate car retarder section junction point, said two-piece pivot being actuated in response to the weight of a vehicle, said supporting arms having rail brace portions at their inner ends to provide a means for fastening said supporting arms and said car retarder rails together, said outside supporting arm having its outer end bearing on a fixed tie plate road bed support and said inside supporting arm having its outer end bearing on a vertical movable plunger device, a pivotal supporting means on said supporting arms for mounting said brake beams, said pivotal supporting means cooperating with said two-piece pivot to render said brake beams effective when said two-piece pivot is actuated by the weight of a vehicle, compression springs for separating said brake beams and holding them against said pivotal supporting means when said retarder section is unoccupied, compression springs for supporting said car retarder sections in a normal active position, said pivot connection in said supporting arm permitting vertical movement of said car retarder rail and associated elements, said movable plunger device having an operating means whereby said car retarder sections may be raised or lowered to vary the space between said brake shoes to render said car retarder active or inactive.

9. A double rail car retarder associated with the track rails of a stretch of railway track comprising, a plurality of shoe beams disposed end-to-end longitudinally on both sides of each of the track rails, inside support points disposed substantially midway between the track rails, outside support points disposed outside of the track rails, respective pairs of opposing levers disposed normal to the track rails at the adjoining ends of the shoe beams and operably engaging the shoe beams, one lever of each of said pairs of levers being rigidly secured at one end to one side of the associated track rail and bearing on one of said support points at the other end, and the other lever of each of said pairs of levers being rotatably connected at one end to the inside of the associated track rail and bearing on one of said support points at the other end, said other lever being articulated elevationally in response to the weight of a vehicle by a journal located at an intermediate point, whereby braking pressure is applicable to the rims of a railway car wheel in passing through the car retarder substantially proportional to the weight of the car.

10. A double rail car retarder associated with the track rails of a stretch of railway track comprising in combination, a plurality of shoe beams disposed end-to-end longitudinally on both sides of each of the track rails, inside support points disposed substantially midway between the track rails, outside support points disposed outside of the track rails, respective pairs of opposing levers disposed normal to the track rails at the adjoining ends of the shoe beams and operably engaging the shoe beams, one lever of each of said pairs of levers being rigidly secured at one end to the outside of the associated track rail and bearing on one of said outside support points at the other end, the other lever of each of said pairs of levers being rotatably secured at one end to the inside of the associated track rail and bearing on one of said inside support points at the other end, said other lever being articulated elevationally by a journal at an intermediate point, said journal being located on the inside of said track rail and actuated in response to the weight of a vehicle, and means for selectively raising and lowering said inside support points, said inside support cooperating with said means for selectively raising and lowering said inside support to distinctively control said shoe beams.

11. A car retarder of the weight automatic track brake type comprising, two end sections and one or more intermediate sections positioned end-to-end, each section

including a track rail, a brake beam on each side of said track rail and a brake shoe mounted on each brake beam adjacent said track rail, interconnecting means for supporting and fastening the junction of each end section and the main stock rail thereby maintaining said end sections in alignment with said stock rail, respective pairs of opposing levers disposed normally to the track rails at adjoining ends of said brake beams for supporting the track rail, one of said levers of each pair having an operating lug engaging the associated brake shoes, a weight actuated pivotal member interconnected to said one lever and effective when actuated to articulate said one lever elevationally, means for selectively adjusting the outside end of said one lever whereby said brake shoes will effectively contact said vehicle wheel, said car retarder application being proportional to the weight of said vehicle present within the section.

12. A car retarder having a plurality of car retarder sections disposed end-to-end in association with a track rail in a stretch of railway track, each of the car retarder sections comprising, shoe beams disposed respectively along the inside and outside of the track rail, supporting brackets for supporting the shoe beams disposed at intermediate points in the length of said shoe beams, said brackets extending beneath the associated shoe beams and being secured to the track rail, an outside lever supporting the outside shoe beam, an inside lever having a lug supporting and engaging the inside shoe beam, said inside lever being rotatably connected to said track rail and capable of being articulated elevationally in response to the weight of a vehicle, the outside end of said inside lever resting upon a support, adjustable means including said support for raising or lowering the outside end of said inside lever whereby said adjustable means permits said shoe beams to make effective contact with a vehicle wheel, said effective contact being proportional to the weight of the vehicle.

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