

**Sept. 6, 1938.**

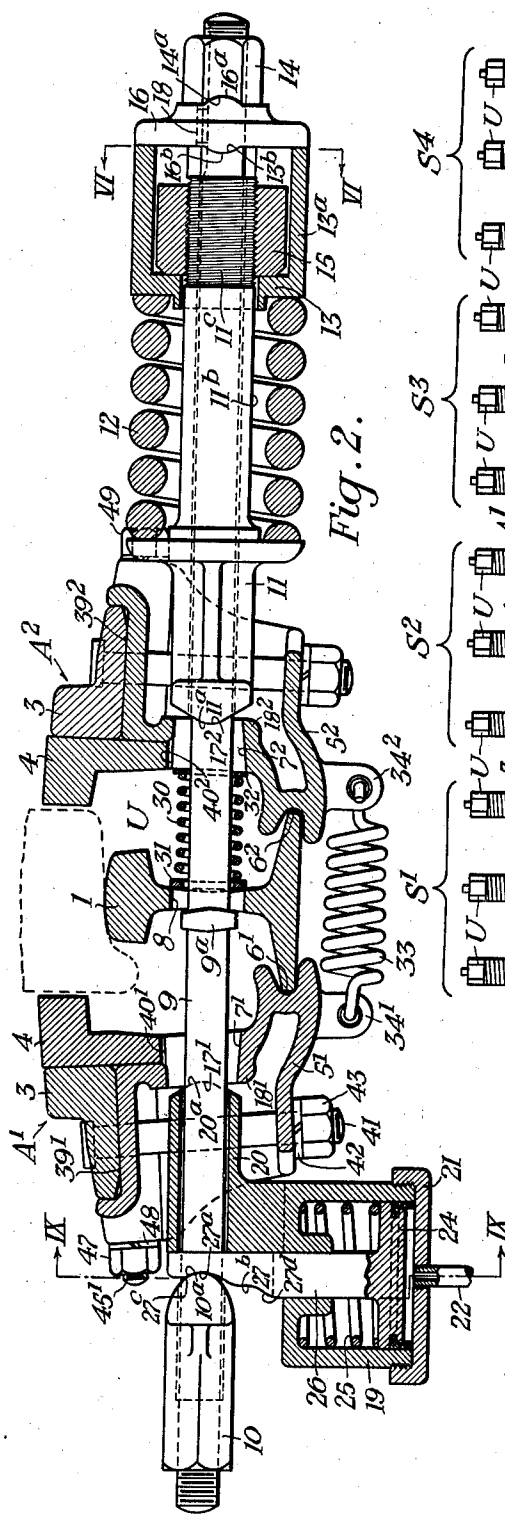
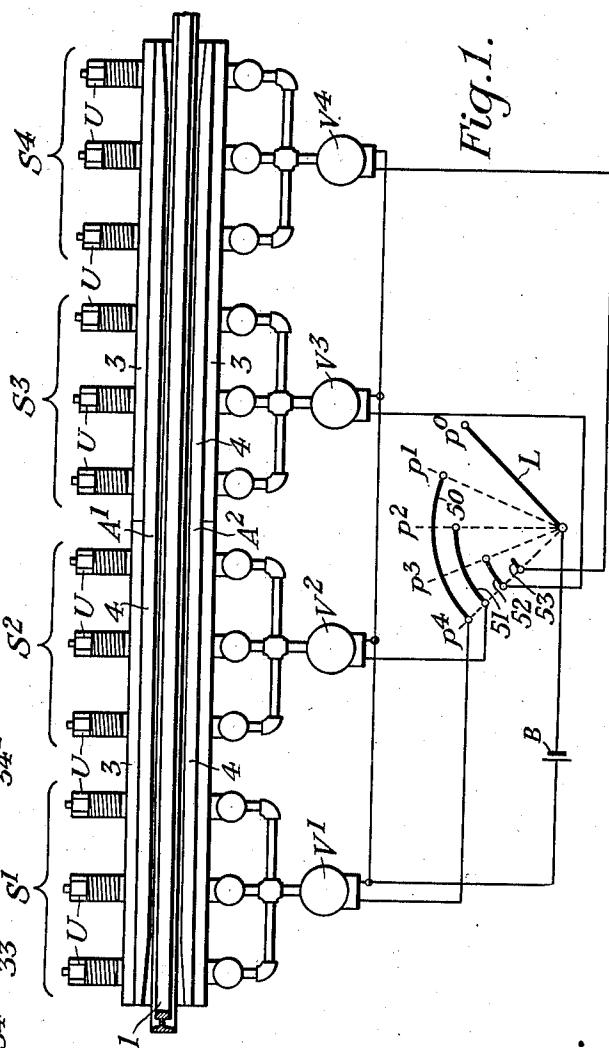
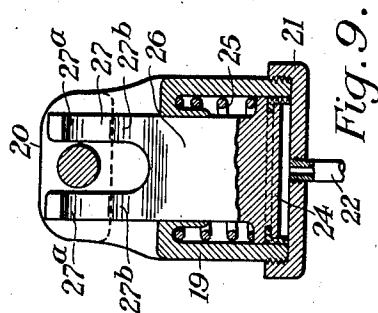
H. L. BONE

**2,129,301**

## RAILWAY BRAKING APPARATUS

Original Filed June 1, 1936

2 Sheets-Sheet 1



INVENTOR  
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2,129,301

RAILWAY BRAKING APPARATUS

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2 Sheets-Sheet 2

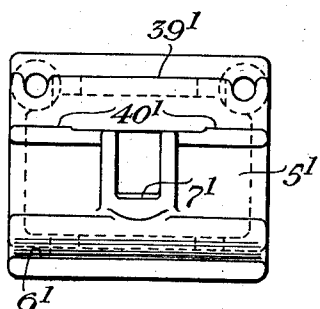


Fig. 3.

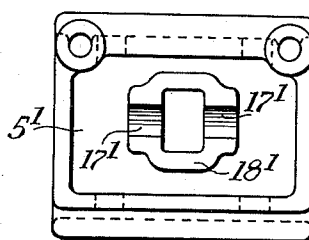


Fig. 4.

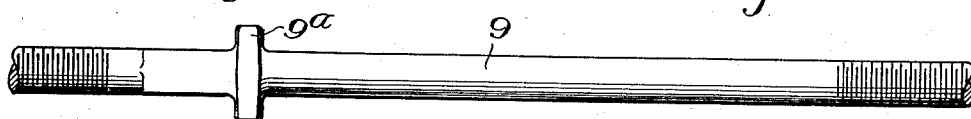


Fig. 5.

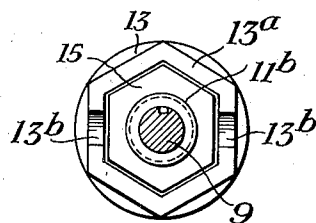


Fig. 6.

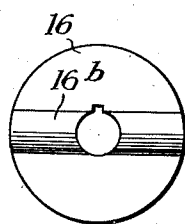


Fig. 7.

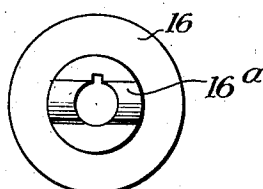


Fig. 8.

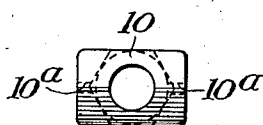


Fig. 10.

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## UNITED STATES PATENT OFFICE

2,129,301

## RAILWAY BRAKING APPARATUS

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Original application June 1, 1936, Serial No.  
82,771. Divided and this application April 13,  
1937, Serial No. 136,626

20 Claims. (Cl. 188—62)

My invention relates to railway braking apparatus, and particularly to that class of braking apparatus known as car retarders. More particularly, my invention relates to inert car retarders, that is to say, to car retarders in which the braking bars are normally constantly biased to braking positions in which they exert a fixed amount of retardation on all cars which pass through the retarder.

One object of my invention is to provide a car retarder of the type described which can be readily adjusted manually when, due to wear or to changes in the weather or traffic conditions, it is desirable to change the amount of retardation.

Another object of my invention is to provide a car retarder of the type described which is inexpensive to manufacture and install, and which at the same time is highly efficient in operation.

A further object of my invention is to provide a car retarder of the type described which may be attached directly to, and supported entirely by, the rail or rails with which it is associated.

Other objects of my invention will appear as the description proceeds.

The present application is a division of my copending application, Serial No. 82,771, filed on June 1, 1936, for Railway braking apparatus.

I shall describe one form of car retarders 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 car retarder embodying my invention. Fig. 2 is an enlarged vertical sectional view of one of the spring units U comprising part of the car retarder shown in Fig. 1. Figs. 3 and 4 are right-hand and left-hand side views, respectively, of the lever 5<sup>1</sup> of the unit U shown in Fig. 2. Fig. 5 is a detail view of the spring bolt 9 forming part of the unit U shown in Fig. 2. Fig. 6 is a sectional view taken on the line VI—VI of Fig. 2. Figs. 7 and 8 are left-hand and right-hand side views, respectively, of the lock washer 16 shown in Fig. 2. Fig. 9 is a sectional view taken on the line IX—IX of Fig. 2. Fig. 10 is a right-hand end view of the nut 10 shown in Fig. 2.

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

Referring to the drawings, the car retarder in the form here shown comprises two braking bars A<sup>1</sup> and A<sup>2</sup> which extend parallel to one track rail 1 of a stretch of railway track, and each of which comprises a plurality of aligned brake beams 3 and a brake shoe 4. The brake beams 3 and brake shoes 4 are preferably made alike in cross

section to decrease the cost of manufacture, and in the form shown in Fig. 2 both the brake beams and brake shoes have L-shaped cross sections. It should be noted, however, that my invention is not limited to the particular shape of the beams and shoes shown in Fig. 2.

The braking bars A<sup>1</sup> and A<sup>2</sup> are supported by a plurality of spring units U which are disposed at intervals along the rail 1, and which serve to at times bias the braking bars toward the rail to braking positions in which the brake shoes 4 frictionally engage the opposite side faces of each car wheel passing through the retarder. These spring units are all alike, and a description of one will therefore suffice for all.

Referring particularly to the spring unit U shown in Fig. 2, this unit comprises two similar cast levers 5<sup>1</sup> and 5<sup>2</sup> provided at their lower ends with channel-shaped recesses 6<sup>1</sup> and 6<sup>2</sup> which loosely receive the opposite base flanges of the rail 1 in such manner that the levers are free to pivot about the base flanges as a fulcrum. The levers are also provided with tapered rectangularly shaped openings 7<sup>1</sup> and 7<sup>2</sup> which align with an opening 8 provided in the web of the rail 1, and extending with some clearance through the openings 7<sup>1</sup> and 7<sup>2</sup> and 8 is a spring bolt 9, the left-hand end of which is provided with a gauge adjusting nut 10, and the right-hand end of which is provided with a gauge adjusting nut 14. Mounted on the spring bolt 9 between the braking bar A<sup>2</sup> and the gauge adjusting nut 14 is an inner spring seat 11, a compressed coil spring 12, an outer spring seat 13, a spring tension adjusting nut 15, and a lock washer 16. The inner spring seat 11 bears at its inner end against a boss 18<sup>2</sup> which is formed on the lever 5<sup>2</sup> adjacent the outer end of the opening 7<sup>2</sup>, and to facilitate rotation of the lever 5<sup>2</sup> relative to the spring seat, the inner spring seat is provided, on opposite sides of the bolt 9 with longitudinally aligned rounded bulges 11<sup>a</sup>, and the boss 18<sup>2</sup> is provided on opposite sides of the opening 7<sup>2</sup> with horizontally aligned rounded grooves 17<sup>2</sup> (see Fig. 4), which grooves receive the bulges. The bulges 11<sup>a</sup> and grooves 17<sup>2</sup> also serve to prevent the inner spring seat 11 from turning. Formed on the inner spring seat 11 is an integral tubular extension 11<sup>b</sup> which receives the spring bolt 9 with some clearance, and which is provided at its right-hand end with a screw threaded portion 11<sup>c</sup>. The outer spring seat 13 is slidably mounted on the tubular extension 11<sup>b</sup>, and is biased by means of the spring 12 to the position on the tubular extension in which it engages the spring

adjusting nut 15, which nut is adjustably screwed onto the screw threaded portion 11<sup>c</sup> of the tubular extension. The spring adjusting nut is made polygonal in shape to facilitate adjusting it, and is enclosed within a similarly shaped polygonal extension 13<sup>a</sup> provided on the outer spring seat. The parts being so proportioned that the spring adjusting nut is free to slide longitudinally within the tubular extension, but that, rotation of the spring seat will cause corresponding rotation of the adjusting nut. The right-hand end of the hexagonal extension of the outer spring seat abuts against the lock washer 16, and the lock washer 16, in turn, abuts against the gauge adjusting nut 14. The inner face of the lock washer 16 is formed with aligned bulges 16<sup>b</sup> (see Fig. 7) which are held, by the compression of the spring 12, in engagement with aligned recesses 13<sup>b</sup> (see Fig. 6) formed in two opposite sides of the outer end of the extension 13<sup>a</sup> of spring seat 13, and the outer face of the lock washer 16 is similarly provided with aligned bulges 16<sup>a</sup> which are held, by the compression of the spring 12, in engagement with aligned recesses 14<sup>a</sup> formed in the inner face of the nut 14, whereby the outer spring seat 13, the lock washer 16, and the nut 14 are all automatically locked against relative rotation. Lock washer 16 is free to slide endwise on the spring bolt 9, but is keyed to the spring bolt by means of a feather key 18 in order to prevent rotation of the lock washer relative to the spring bolt. Spring bolt 9 is prevented from rotating by engagement of a shoulder 9<sup>a</sup> which is provided on the bolt on the left-hand side of the rail 1 with either the head or the base of the rail. It will be apparent that the spring 12 constantly biases the inner and outer spring seats to the relative positions in which the nut 15 engages the right-hand side of the spring seat 13, and that the initial compression of the spring 12 of each unit, therefore, depends upon the adjustment of the nut 15. This adjustment may be varied by turning the outer spring seat 13 by means of a wrench or other suitable tool, it being noted that due to the fact that the lock washer 16 is keyed to the spring bolt 9, the rotation of the spring seat will not cause any rotation of the outside gauge adjusting nut 14.

The retarder also comprises a fluid pressure cylinder 19 formed integral with a combined support and cam guide 20 which is mounted on the spring bolt 9 between the gauge adjusting nut 10 and a boss 18<sup>1</sup> formed on the inside of the lever 5<sup>1</sup>. The cylinder 19 is closed at its lower end by a cylinder head 21, and is arranged to be at times supplied with fluid pressure through a pipe 22 which is screwed into a suitable opening provided in the cylinder head 21. Mounted in the cylinder 19 is a reciprocable piston 24 which is biased to a retracted position in which it is shown in the drawing by means of a compressed coil spring 25. The piston 24 drives a piston rod 26, the upper end of which is formed with an integral bifurcated cam 27 which is disposed for vertical sliding movement between the combined support and cam guide 20 and the gauge adjusting nut 10. The bifurcations of the cam 27 are provided on the side adjacent the nut with horizontally aligned low portions 27<sup>a</sup> and with horizontally aligned high portions 27<sup>b</sup> which low and high portions cooperate with horizontally aligned rounded bulges 10<sup>a</sup> (see Fig. 10), provided on the nut 10 on opposite sides of the bolt 9, in such manner that the bulges 10<sup>a</sup> will engage the bifurcations at the low or the high portions according

as the piston 24 occupies its retracted or its projected position. The nut 10 is rendered self-locking while it is engaging the bifurcations at the low portions 27<sup>a</sup> by engagement of the upper surfaces of the bulges 10<sup>a</sup> with outwardly sloping surfaces 27<sup>c</sup> which are formed on the bifurcations above the low portions, and while it is engaging the bifurcations at the high portions 27<sup>b</sup> by engagement of the lower surfaces of the bulges 10<sup>a</sup> with outwardly sloping surfaces 27<sup>d</sup> which are provided on the bifurcations below the high portions. The cylinder 19 and cam 27 are maintained in the desired vertical position by the force of gravity and by providing the combined support and cam guide 20 with horizontally aligned bulges 20<sup>a</sup> which fit into grooves 17<sup>1</sup> formed in the boss 18<sup>1</sup>, the grooves 17<sup>1</sup> being similar to the grooves 17<sup>2</sup> formed in the boss 18<sup>2</sup>.

The retarder further comprises a compressed coil spring 30 which is mounted on the spring bolt 9 on the right-hand side of the rail 1 between a washer 31 which abuts against the web of the rail, and a washer 32 which abuts against the lever 5<sup>2</sup>, and which spring serves to constantly bias the spring bolt assembly as a whole toward the right to the position in which the shoulder 9<sup>a</sup> of the spring bolt 9 engages the web of the rail, as well as a coil spring 33 which is stretched between two depending lugs 34<sup>1</sup> and 34<sup>2</sup> formed on the levers 5<sup>1</sup> and 5<sup>2</sup>, respectively, and which serves to maintain the levers 5<sup>1</sup> and 5<sup>2</sup> in proper engagement with the rails at the recesses 6<sup>1</sup> and 6<sup>2</sup>, and the lever 5<sup>1</sup> in engagement with the cam guide 20 and the cam 27 in engagement with the outside adjusting nut 10.

The lever 5<sup>1</sup> is provided with an L-shaped upper surface 39<sup>1</sup> which supports the adjacent brake beam 3 of the braking bar A<sup>1</sup>, and with two laterally spaced horizontally aligned shoulders 40<sup>1</sup> (see Fig. 3) which partly supports the brake shoe 4 of the braking bar A<sup>1</sup>. The lever 5<sup>2</sup> is likewise provided with an L-shaped upper surface 39<sup>2</sup> which supports the adjacent brake beam 3 of the braking bar A<sup>2</sup>, and with two spaced horizontally aligned shoulders 40<sup>2</sup> which are similar to the shoulders 40<sup>1</sup> on the lever 5<sup>1</sup>, and which partly support the brake shoe 4 of the braking bar A<sup>2</sup>. The brake beam 3 of the braking bar A<sup>1</sup> is secured to the lever 5<sup>1</sup> by means of two vertical bolts 41 which extend downwardly through clearance holes in the brake beam and in the lever on opposite sides of the nut 10, and which are provided at their lower ends with lock washers 42 and nuts 43, and the brake beam 3 of the braking bar A<sup>2</sup> is similarly secured to the lever 5<sup>2</sup>. The brake shoe 4 of the braking bar A<sup>1</sup> is secured to the lever 5<sup>1</sup> by means of a pair of horizontally disposed studs 45<sup>1</sup> which extend inwardly through clearance holes in the lever and are screwed into tapped holes formed in the brake shoe, in such manner that the inner ends of the studs are substantially flush with the inner surface of the lower portion of the brake shoe. The outer ends of the studs 45<sup>1</sup> are provided with nuts 47 and lock washers 48. The brake shoe 4 of the braking bar A<sup>2</sup> is secured to the lever 5<sup>2</sup> by means of a pair of stud bolts 49 in the same manner that the brake shoe 4 of the braking bar A<sup>1</sup> is secured to the lever 5<sup>2</sup>.

As best seen in Fig. 1, the brake shoes 4 are flared outwardly at each end of the retarder in accordance with well-known practice to provide a smooth entrance of the car wheels between the brake shoes when a car passes through the retarder.

The outside gauge adjusting nut 14 of each unit is so adjusted that when the shoulder 9<sup>a</sup> of the bolt 9 is engaging the rail web, the braking bar A<sup>2</sup> will occupy its inactive position in which the associated brake shoe 4 is just clear of the wheels of cars passing through the retarder, and the inside gauge adjusting nut 10 of each unit is so adjusted that when the shoulder 9<sup>a</sup> of the bolt 9 is engaging the rail web and the bulges 10<sup>a</sup> of this nut are engaging the bifurcations of the associated cam 27 at the low portion 27<sup>a</sup>, the braking bar A<sup>1</sup> will occupy its inactive position in which the associated brake shoe 4 is just clear of car wheels passing through the retarder. It should be noted that each of the two gauge adjustments of each unit is independent of the other adjustment, and that a change in either adjustment will, therefore, have no effect on the other adjustment. It should also be noted that since the washers 16 of the spring units are prevented from turning by the keys 18, adjustment of the outside adjusting nuts 14 will not affect the adjustment of the initial compression of the springs 12.

The operation of the retarder as a whole is as follows: When the cylinders 19 are connected with atmosphere, as will be the case when it is desired to render the retarder inactive, the springs 25 will hold the pistons 24 in their lower positions in which the bulges 10<sup>a</sup> on the inside adjusting nuts 10 engage the bifurcations on the cams 27 at the low portions 27<sup>a</sup>, and as was previously pointed out, when the nuts 10 are engaging the cams 27 at the low portions 27<sup>a</sup>, both braking bars will be held in their inactive positions in which the brake shoes are out of the path of the car wheels by means of the springs 30 and 33, so that the retarder will then be ineffective to retard cars passing through the retarder. When, however, fluid is supplied to the cylinders 19, if no car is then passing through the retarder, the pistons 24 will be forced upwardly in the cylinders, in opposition to the bias of the springs 25, to their upper positions in which the bulges 10<sup>a</sup> on the nuts 10 engage the bifurcation of the cams 27 at the high portions 27<sup>b</sup>, and the parts are so proportioned that under these conditions the braking bar A<sup>1</sup> will be moved toward the rail 1 to a position in which the associated brake shoe 4 will project partway into the path of car wheels traversing rail 1. If, however, a car is passing through the retarder at the time fluid is supplied to the cylinders 19, the pistons will be prevented from moving to their upper positions because the cylinders 19 are of such size that sufficient force to force the pistons to their upper positions can only be obtained when there is no car in the retarder. Assuming that the pistons have been moved to their upper positions and a car enters the retarder, the forward wheel of the car will engage the inside braking bar A<sup>1</sup> and will move it toward the left, thus causing the inside lever 5<sup>1</sup> of the unit nearest the wheel to rotate in a counterclockwise direction. The rotation of the lever 5<sup>1</sup> will act through the nut 10, spring bolt 9, nut 14, washer 16, outer spring seat 13, spring 12, and inner spring seat 11 to cause the lever 5<sup>2</sup> of this unit to rotate in the same direction that the lever 5<sup>1</sup> was rotated, and will thus cause the outside braking bar A<sup>1</sup> to move into engagement with the outside surface of the car wheel. As soon as the outside braking bar has moved into engagement with the car wheel, the further separation of the levers 5<sup>1</sup> and 5<sup>2</sup> of the adjacent

spring unit by the car wheel will cause the spring 12 of such unit to become compressed beyond its initial compression, whereupon the nut 15 of the unit will move away from the outer spring seat 13, and will thus cause the two braking bars to be held into frictional engagement with the forward wheel of the car by a force which depends upon the characteristics and adjustments of the springs 12. The braking bars are flexible, and as the wheels of the car move through the apparatus, the spring units will operate in succession to cause the braking bars to exert a braking force on the wheels. The high portions 27<sup>b</sup> of the bifurcations are so shaped that any forces which are transmitted to the pistons 24 through the gauge adjusting nuts 10 and the cams 27 at the high portions while a car is passing through the retarder will be insufficient to force the pistons to their retracted position if the cylinders 19 continue to be supplied with fluid pressure, but that, if the fluid pressure is exhausted from the cylinders 19 while a car is passing through the retarder, the forces which are then transmitted to the pistons 24 through the gauge adjusting nuts 10 and the cams 27 combined with the biasing force of the springs 25 will be sufficient to drive the cams and pistons downwardly, and thus allow the retarder to open. The parts are still further so proportioned that when there is no car in the retarder and air is exhausted from the cylinders 19, the springs 25 will exert sufficient force on the pistons 24 to return them to their retracted positions.

It will be readily understood that the fluid to operate the cylinders of the spring units can be controlled either manually at the retarder, or remotely by electropneumatically controlled means in a well-known manner. Only one fluid pressure is required, and it follows, therefore, that only one degree of retardation can be obtained automatically for a given length of retarder. It should be pointed out, however, that the one degree of retardation that can be obtained can be adjusted manually as conditions require either adjusting the spacing between the braking bars A<sup>1</sup> and A<sup>2</sup> when they occupy their normal positions, or by adjusting the initial compression of the retarder springs 12.

It is possible to arrange a retarder of the type just described in sections in such manner that different lengths of the retarder may be rendered effective to retard a car passing through the retarder, thus making it possible to automatically obtain different degrees of retardation from the retarder, and in Fig. 1 I have shown a retarder arranged in this manner. As illustrated in Fig. 1, the retarder is divided into four sections S<sup>1</sup>, S<sup>2</sup>, S<sup>3</sup>, and S<sup>4</sup>, each comprising a group of three spring units. Associated with each section is an electropneumatic valve designated by the reference character V with a distinguishing exponent, which valve controls the supply of fluid pressure to the cylinders 19 of all three units of the associated section in such manner that these units will be connected with a suitable source of fluid pressure, or with atmosphere, through the medium of suitable piping according as the associated valve V is energized or deenergized. The valves V are of well-known construction, and since the construction of these valves is immaterial to my present invention, it is believed to be unnecessary to describe their construction herein. The valves V are selectively controlled by means of a manually operable lever L capable of assuming an off position p<sup>0</sup> and a plurality

of on positions  $p^1$ ,  $p^2$ ,  $p^3$ , and  $p^4$ , respectively. When the lever occupies its  $p^0$  position, the valves V are all deenergized and the entire retarder is then inactive. When, however, the lever L is moved to its  $p^1$  position, it closes a contact 50 and, under these conditions, valve  $V^1$  is supplied with current from a suitable source, here shown as a battery B, over a circuit which is obvious from the drawings, thus causing the cylinders 19 of the units of section  $S^1$  to be supplied with fluid pressure, and hence rendering this section effective to retard a car passing through the apparatus. When the lever L is moved to its  $p^2$  position, the contact 50 remains closed and another contact 51 becomes closed, and, as a result, the valves  $V^1$  and  $V^2$  are then both energized over circuits which are obvious from an inspection of the drawings. The cylinders 19 of the units of sections  $S^1$  and  $S^2$  are then all supplied with fluid pressure, so that the sections  $S^1$  and  $S^2$  are both rendered effective to retard a car passing through the retarder. When the lever L is moved to its  $p^3$  position, the contacts 50 and 51 both remain closed and another contact 52 becomes closed, thus causing the valves  $V^1$ ,  $V^2$ , and  $V^3$  to become energized, and hence rendering the sections  $S^1$ ,  $S^2$ , and  $S^3$  effective to retard cars. When the lever L is moved to its  $p^4$  position, the contacts 50, 51, and 52 are then all closed and a contact 53 is also closed, with the result that all four valves are energized so that the entire retarder is then effective for retarding cars.

It should be pointed out that with the retarder constructed in the manner shown in the drawings, a relatively small amount of fluid is required to move the braking bars to their normal positions, and the retarder is therefore economical to operate. It should also be pointed out that while, with the retarder constructed as shown, the fluid pressure cylinders 19 are not large enough to actually move the braking bars to their closed or normal positions at a unit which is directly opposite a car wheel, the braking bars are sufficiently flexible so that they can be moved to their braking positions at the unit next in advance. The spring units are spaced fairly close together, and it follows, therefore, that the ability to close the retarder up against a car wheel is not a great disadvantage since the full retarding effect will be available as soon as the car has moved a relatively short distance.

Although I have herein shown and described only a few forms of 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. Railway braking apparatus comprising two levers pivotally supported at their lower ends on the base flanges of a railway track rail on opposite sides of the rail for swinging movement toward and away from the rail, brake shoes secured to the upper ends of said levers, spring means for at times biasing the levers to positions in which said brake shoes will frictionally engage the wheels of a car traversing said rail, and cam means for rendering said spring means effective or ineffective to bias the levers to the positions in which the brake shoes frictionally engage the wheels of a car traversing said rail.

2. Railway braking apparatus comprising two levers disposed on opposite sides of a track rail

and each provided at its lower end with a recess which receives the base flange of the rail in such manner that the levers are free to pivot about the base flanges as a fulcrum, wheel engaging means secured to the upper ends of said levers, and cam controlled means for at times biasing the levers to positions in which the wheel engaging means are effective to retard the speed of a car traversing said rail.

3. Railway braking apparatus comprising two levers disposed on opposite sides of a track rail and pivotally supported at their lower ends on the base flanges of the rail for swinging movement toward and away from the rail, wheel engaging means secured to the upper ends of said levers, and power operated cam controlled means for at times biasing the levers to positions in which the wheel engaging means are effective to retard a car traversing said rail.

4. Railway braking apparatus comprising two levers disposed on opposite sides of a track rail and pivotally supported at their lower ends on the base flanges of the rail for swinging movement toward and away from the rail, brake shoes secured to the upper ends of said levers, spring means associated with said levers, and cam operated means for rendering said spring means effective or ineffective to bias said levers to positions in which the brake shoes will frictionally engage the wheels of cars traversing said rail.

5. Railway braking apparatus comprising two levers pivotally supported at their lower ends on the base flanges of a track rail on opposite sides of the rail for swinging movement toward and away from the rail, brake shoes secured to the upper ends of said levers, spring means associated with said levers, and power operated cam controlled means for rendering said spring means effective or ineffective to bias said levers to positions in which said brake shoes will frictionally engage the wheels of cars traversing said rail.

6. Railway braking apparatus comprising two levers pivotally supported at their lower ends on the base flanges of a track rail on opposite sides of the rail for swinging movement toward and away from the rail, brake shoes secured to the upper ends of said levers, spring means associated with said levers, cam means for rendering said spring means effective or ineffective to bias said lever to positions in which the brake shoes will frictionally engage the wheels of cars traversing said rail, and manually controlled means for operating said cam means.

7. Railway braking apparatus comprising two levers pivotally supported at their lower ends on the base flanges of a track rail on opposite sides of the rail for swinging movement toward and away from the rail, brake shoes secured to the upper ends of said levers, spring means associated with said levers, cam means for rendering said spring means effective or ineffective to bias said levers to positions in which the brake shoes will frictionally engage the wheels of cars traversing said rail, and manually controlled fluid pressure operated means for operating said cam means.

8. Railway braking apparatus comprising two levers pivotally supported on opposite sides of a track rail for swinging movement toward and away from the rail, a brake shoe secured to the upper end of each lever, a spring bolt passing with clearance through an opening in the rail web and through aligned openings in the levers, a gauge adjusting nut screwed onto one end of said spring bolt, a cam member interposed between said nut and the adjacent lever for move-

ment between a first position in which a low portion of the cam member is disposed between the nut and the lever and a second position in which a high portion of the cam member is disposed between the nut and the lever, means for moving said cam member between its two positions, and spring means mounted on said bolt and effective when and only when the cam is moved to its second position for biasing the levers to such positions that the brake shoes will frictionally engage the opposite side faces of a car wheel traversing said track rail.

9. Railway braking apparatus comprising two levers pivotally supported on opposite sides of a track rail for swinging movement toward and away from the rail, a brake shoe secured to the upper end of each lever, a spring bolt passing with clearance through an opening in the rail web and through aligned openings in the levers, a gauge adjusting nut screwed onto one end of said spring bolt, a cam member interposed between said nut and the adjacent lever for movement between a first position in which a low portion of the cam member is disposed between the nut and the lever and a second position in which a high portion of the cam member is disposed between the nut and the lever, fluid pressure operated means for moving said cam member between its two positions, and spring means mounted on said bolt and effective when and only when the cam is moved to its second position for biasing the levers to such positions that the brake shoes will frictionally engage the opposite side faces of a car wheel traversing said track rail.

10. Railway braking apparatus comprising two levers pivotally supported on opposite sides of a track rail for swinging movement toward and away from the rail, a brake shoe secured to the upper end of each lever, a spring bolt passing with clearance through an opening in the rail web and through aligned openings in the levers, a gauge adjusting nut screwed onto one end of said spring bolt, a cam member interposed between said nut and the adjacent lever for movement between a first position in which a low portion of the cam member is disposed between the nut and the lever and a second position in which a high portion of the cam member is disposed between the nut and the lever, means for biasing said cam member to its first position, fluid pressure operated means for moving said cam member to its second position, and spring means mounted on said bolt and effective when and only when the cam member is moved to its second position for biasing the levers to such positions that the brake shoes will frictionally engage the opposite side faces of a car wheel traversing said track rail.

11. Railway braking apparatus comprising two levers pivotally supported on opposite sides of a track rail for swinging movement toward and away from the rail, a brake shoe secured to the upper end of each lever, a spring bolt passing with clearance through an opening in the rail web and aligned openings in the levers and provided with a shoulder between the one lever and the rail which is larger than the opening in the rail web, an adjusting nut adjustably screwed onto the end of said spring bolt adjacent said one lever, adjustable spring means mounted on the other end of said spring bolt, a cam interposed between said adjusting nut and said one lever for movement between a first position in which a low portion of the cam is disposed between the nut and the

lever and a second position in which a high portion of the cam is disposed between the nut and the lever, means for biasing said spring bolt assembly to a position in which said shoulder engages the rail web and said one lever to a position which depends upon the position of said cam, adjustable means for limiting the movement of the other lever toward the track rail; said adjusting nut, said spring means and said limiting means being so adjusted that when said shoulder is engaging the rail web and said cam occupies its first position both said levers will occupy positions in which the brake shoes carried thereby are out of the path of car wheels traversing said track rail but that when said cam occupies its second position said spring means will be effective to move the levers to positions in which the brake shoes carried thereby will frictionally engage the wheels of cars traversing said track rail, and means for moving said cam means between its two positions.

12. Railway braking apparatus comprising two levers pivotally supported on opposite sides of a track rail for swinging movement toward and away from the rail, a brake shoe secured to the upper end of each lever, a spring bolt passing with clearance through an opening in the rail web and aligned openings in the levers and provided with a shoulder between the one lever and the rail which is larger than the opening in the rail web, an adjusting nut adjustably screwed onto the end of said spring bolt adjacent said one lever, adjustable spring means mounted on the other end of said spring bolt, a cam interposed between said adjusting nut and said one lever for movement between a first position in which a low portion of the cam is disposed between the nut and the lever and a second position in which a high portion of the cam is disposed between the nut and the lever, means for biasing said spring bolt assembly to a position in which said shoulder engages the rail web and said one lever to a position which depends upon the position of said cam, adjustable means for limiting the movement of the other lever toward the track rail; said adjusting nut, said spring means and said limiting means being so adjusted that when said shoulder is engaging the rail web and said cam occupies its first position both said levers will occupy positions in which the brake shoes carried thereby are out of the path of car wheels traversing said track rail but that when said cam occupies its second position said spring means will be effective to move the levers to positions in which the brake shoes carried thereby will frictionally engage the wheels of cars traversing said track rail, fluid pressure operated means carried by said spring bolt and effective for moving said cam from its first position to its second position, and spring means for moving said cam from its second position to its first position.

13. Railway braking apparatus comprising two levers pivotally supported on opposite sides of a track rail for swinging movement toward and away from the rail, a brake shoe secured to the upper end of each lever, a spring bolt passing with clearance through an opening in the rail web and aligned openings in the levers and provided with a shoulder between the one lever and the rail which is larger than the opening in the rail web, an adjusting nut adjustably screwed onto the end of said spring bolt adjacent said one lever, adjustable spring means mounted on the other end of said spring bolt, a cam interposed between said adjusting nut and said one lever for

movement between a first position in which a low portion of the cam is disposed between the nut and the lever and a second position in which a high portion of the cam is disposed between the nut and the lever, means for biasing said spring bolt assembly to a position in which said shoulder engages the rail web and said one lever to a position which depends upon the position of said cam, adjustable means for limiting the movement of the other lever toward the track rail; said adjusting nut, said spring means and said limiting means being so adjusted that when said shoulder is engaging the rail web and said cam occupies its first position both said levers will occupy positions in which the brake shoes carried thereby are out of the path of car wheels traversing said track rail but that when said cam occupies its second position said spring means will be effective to move the levers to positions in which the brake shoes carried thereby will frictionally engage the wheels of cars traversing said track rail, fluid pressure operated means carried by said spring bolt and effective for moving said cam from its first position to its second position, and spring means for moving said cam from its second position to its first position, the high portions of said cam being so shaped and the parts being so proportioned that said fluid pressure means is effective to move the cam to its second position when and only when no car wheel is engaging the brake shoes and that when said cam has been moved to its second position it will be held there if and only if fluid pressure is then supplied to said fluid pressure means.

14. Railway braking apparatus comprising a plurality of spring units disposed at intervals along a track rail; each said spring unit comprising two levers pivotally supported at their lower ends on the base flanges of the rail for swinging movement toward and away from the rail, spring means associated with the levers, and manually controlled means for rendering the spring means effective or ineffective to bias the levers toward the rail; and two brake shoes one secured to the one lever of each spring unit and the other secured to the other lever of each spring unit, the parts being so proportioned that said brake shoes will frictionally engage the wheels of cars traversing said rail when and only when the spring means of the units are rendered effective to bias the levers toward the rail.

15. Railway braking apparatus comprising a plurality of spring units disposed at intervals along a track rail; each said spring unit comprising two levers pivotally supported at their lower ends on the base flanges of the rail on opposite sides of the rail for swinging movement toward and away from the rail, spring means associated with the levers for at times biasing the levers toward the rail, and cam means for rendering said spring means effective or ineffective to bias the levers toward the rail; brake shoes secured to the upper ends of the levers, and remotely controlled means for controlling the cam means of said spring units.

16. Railway braking apparatus comprising a plurality of spring units disposed at intervals along a track rail; each said spring unit comprising two levers pivotally supported at their lower ends on the base flanges of the rail on opposite sides of the rail for swinging movement toward and away from the rail, spring means associated with the levers for at times biasing the levers toward the rail, and fluid pressure operated cam means for rendering said spring means

effective or ineffective to bias the levers toward the rail; brake shoes secured to the upper ends of the levers, and remotely controlled means for controlling the supply of fluid pressure to said fluid pressure operated means.

17. Railway braking apparatus comprising a plurality of spring units disposed at intervals along a track rail; each said spring unit comprising two levers pivotally supported at their lower ends on the base flanges of the rail on opposite sides of the rail for swinging movement toward and away from the rail, spring means associated with the levers for at times biasing the levers toward the rail, and fluid pressure operated cam means for rendering said spring means effective or ineffective to bias the levers toward the rail; brake shoes secured to the upper ends of the levers, and remotely controlled means for selectively controlling the supply of fluid pressure to said fluid pressure operated means.

18. Railway braking apparatus comprising two braking bars disposed on opposite sides of a track rail, a plurality of spring units for supporting said braking bars, each said unit comprising two levers secured at their upper ends to the braking bars and pivotally supported at their lower ends on the base flanges of the rail by means of recesses in the levers which receive the base flanges, spring means associated with the levers of each unit, cam means associated with the levers of each unit and movable between a first position in which the associated spring means are effective to bias the levers toward the rail to positions in which the braking bars will frictionally engage the wheels of a car traversing said rail and a second position in which the associated spring means are ineffective to bias the levers toward the rail to positions in which the braking bars will frictionally engage the wheels of a car traversing said rail, fluid pressure operated means associated with the levers for moving the associated cam means, and means for selectively supplying fluid pressure to said fluid pressure operated means in a manner to render different lengths of said braking bars effective to retard the car.

19. Railway braking apparatus comprising two braking bars disposed on opposite sides of a track rail, a plurality of spring units for supporting said braking bars, each said unit comprising two levers secured at their upper ends to the braking bars and pivotally supported at their lower ends on the base flanges of the rail by means of recesses in the levers which receive the base flanges, spring means associated with the levers of each unit, cam means associated with the levers of each unit and movable between a first position in which the associated spring means are effective to bias the levers toward the rail to positions in which the braking bars will frictionally engage the wheels of a car traversing said rail and a second position in which the associated spring means are ineffective to bias the levers toward the rail to positions in which the braking bars will frictionally engage the wheels of a car traversing said rail, fluid pressure operated means associated with the levers for moving the associated cam means, and means for selectively supplying fluid pressure to said fluid pressure operated means in a manner to cause said braking apparatus to exert different degrees of retardation.

20. Railway braking apparatus comprising a plurality of spring units disposed at intervals

along a track rail; each said spring unit comprising two levers pivotally supported at their lower ends on the base flanges of the rail on opposite sides of the rail for swinging movement toward and away from the rail, spring means associated with the levers, and means including a fluid pressure motor for rendering the spring means effective or ineffective to bias the levers toward the rail; two brake shoes one secured to the one lever of each spring unit and

the other secured to the other lever of each unit, the parts being so proportioned that said brake shoes will frictionally engage the wheels of cars traversing said rail when and only when the spring means of the units are rendered effective to bias the levers toward the rail, a plurality of valves for controlling the supply of fluid pressure to different groups of said motors, and means for selectively controlling said valves.

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