Jan. 26, 1937. N. C. L. BROWN 2,068,731

CAR RETARDER FOR RAILROADS

Filed Dec. 26, 1930 2 Sheets-Sheet 1

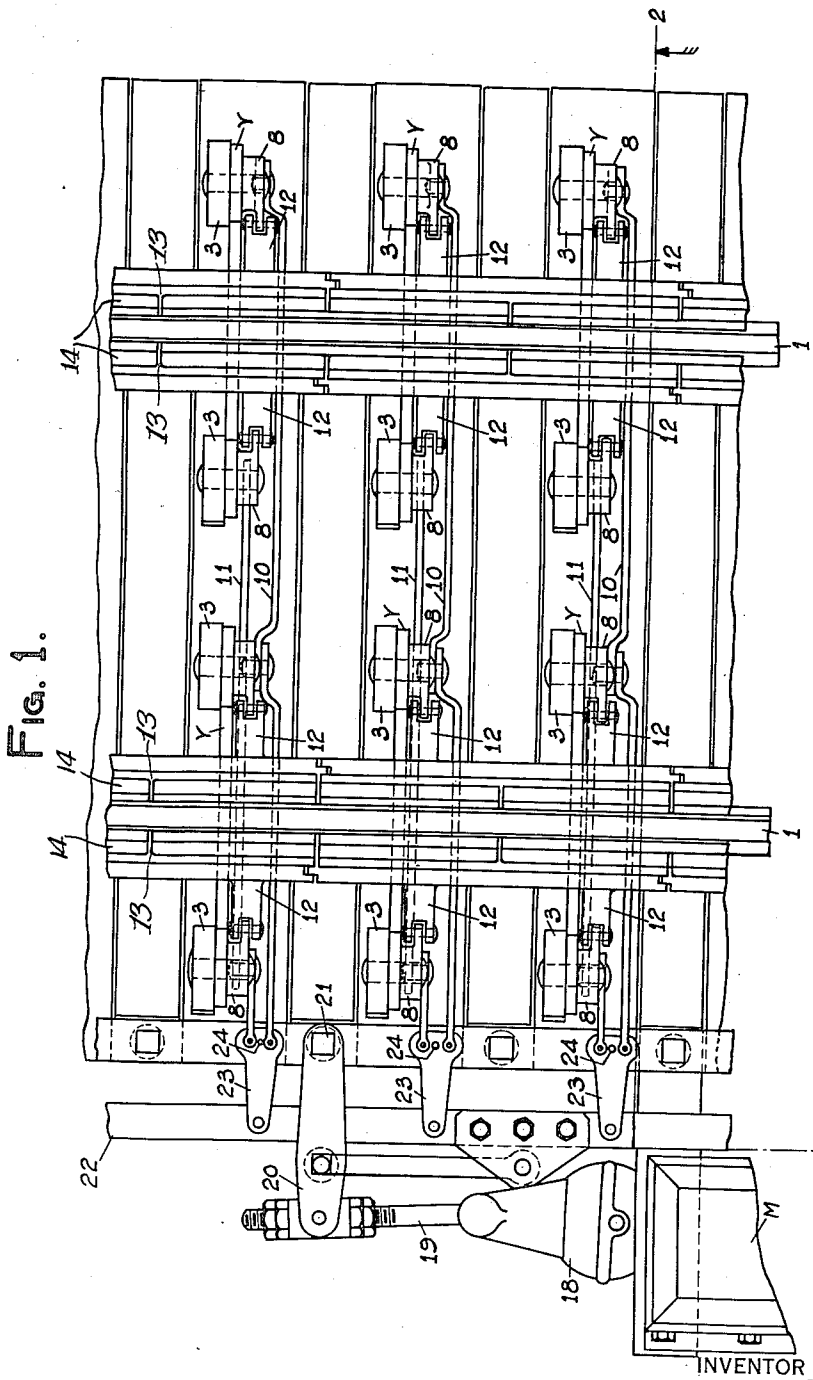


FIG. 1.

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CAR RETARDER FOR RAILROADS

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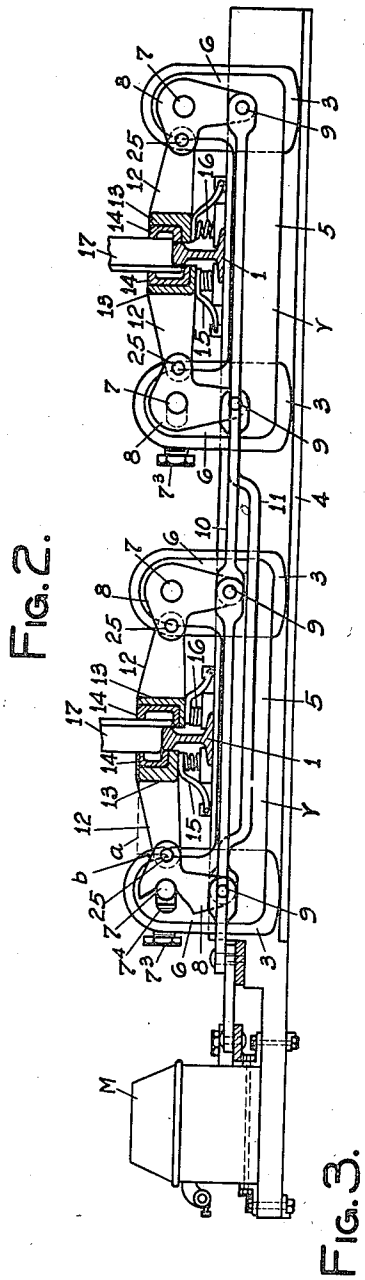


FIG. 2.

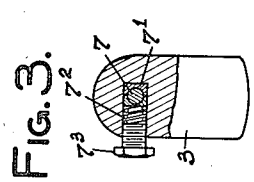


FIG. 3.

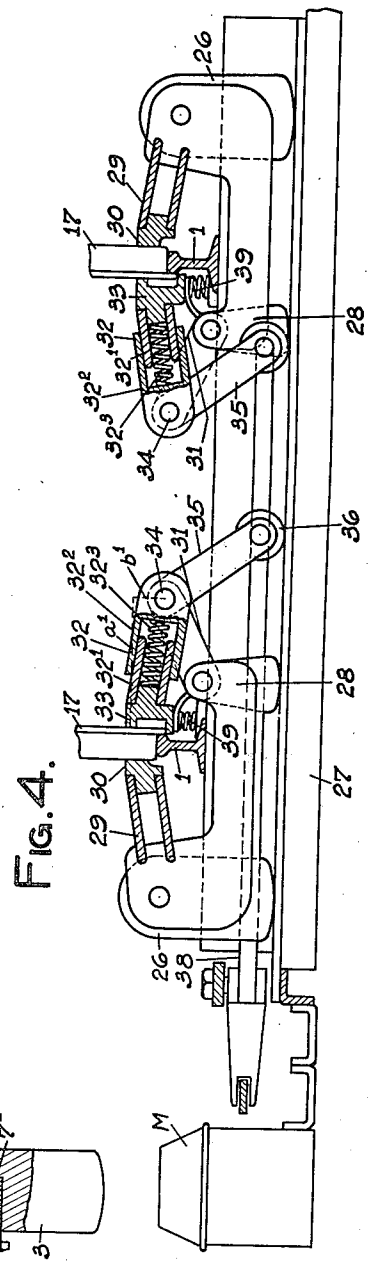


FIG. 4.

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Patented Jan. 26, 1937 2,068,731

# UNITED STATES PATENT OFFICE

2,068,731

## CAR RETARDER FOR RAILROADS

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Application December 26, 1930, Serial No. 504,674

18 Claims. (Cl. 188—62)

This invention relates in general to a car retarder of the track brake type, and has more particular reference to an improved means for varying the degree of retardation exerted by the retarder on the sides of passing car wheels.

In hump yard operation, and in other connections, it is desirable in using track brakes to be able to readily vary the degree of retardation exerted, in order to care for various speeds and various weights of cars which it is desired to brake.

With the above and other considerations in mind it is proposed, in accordance with the present invention, to provide a car retarder which operates on the weight principle whereby the weight of the car itself produces the braking pressures, together with means for varying the lever arms for applying the retarding force, whereby to vary the degree of retardation.

In the present invention, up to the entire weight on a car wheel can be used in producing retardation on such wheel, and the effectiveness of the weight is variable, dependent upon the adjustable lever ratio through which the retarding force is applied.

Further objects, purposes and characteristic features of the present invention will appear as the description progresses, reference being made to the accompanying drawings showing, solely by way of example, and in no manner whatsoever in a limiting sense, two forms which the invention can assume. In the drawings:—

Fig. 1 is a top plan view of one form of the invention, as applied to a stretch of single track.

Fig. 2 is a transverse sectional view on line 2—2 of Fig. 1.

Fig. 3 is a fragmentary view of a portion of Fig. 2.

Fig. 4 is a sectional side view, similar to Fig. 2, of a slightly modified embodiment of the invention.

Referring now to the drawings, and first to Figs. 1 and 2, there is here shown a stretch of single track constituted by track rails 1. At each side of each track rail 1 is a rocker 3, supported on a rigid member 4, which rests on the track ballast. Interconnecting each pair of rockers 3, for each rail, is a U-shaped yoke Y, having a generally horizontal portion 5 passing under the track rail, and two arms 6, pivoted at their upper ends by pivots 7 to the upper ends of the rollers 3.

As shown in Fig. 3, one pivot 7 for each yoke Y, is carried in a block $7^1$, slidable in the rocker 3, against a strong compression spring $7^2$, held in place by a plug, or the like, $7^3$. A slot $7^4$ is formed in the corresponding end of yoke 6, as in Fig. 2, to permit sliding of 7 and $7^1$.

Also carried on the pivots 7, are bell crank levers 8 each, with its lower arm connected, as by pivots 9, to positioning rods 10 and 11, whereby movement of these rods moves the bell crank levers.

Connected to the inner end of each of the upper arms of the bell crank levers, is a carrier arm 12, carrying a brake beam 13, and brake shoe 14, the brake beams and brake shoes preferably being articulated, as most clearly shown in Fig. 1, to form a continuous flexible braking means, although they can be entirely separate, if desired.

The brake beams and brake shoes 13 and 14 are supported by pivoted arms 15, and springs 16, somewhat below the tops of the track rails whereby when a car passes through the retarder, the car wheels by raising beams 13, can be supported above and out of contact with the track rail, by means of the lower horizontal portions of the brake shoes 14, as shown, so that the wheels 17 are supported thereby at the flange and the tread edge.

The positioning rods 10 and 11, can be moved by any desired mechanism such for example, as that shown in Fig. 1, in a manner similar to that of Patent 1,757,428, granted to W. K. Howe, on May 6, 1930. This operating mechanism includes a motor M, having a gear box 18, by means of which an operating rod 19, can be moved to rock lever 20 on its fixed pivot 21, to thereby move rod 22 in either direction, parallel to the track rails, to thereby rock the double lever arms 23 about their fixed pivots 24, whereby to move the rods 10 and 11, the rod 10, for example, moving to the right, and rod 11 to the left.

As shown most clearly in Fig. 2, rod 10 is connected to the lower arms of the two right hand bell crank levers while rod 11 is connected to the two left hand bell crank levers 8, respectively, of each set of bell crank levers associated with each track rail 1. In this manner, the motor M can operate the rods 10 and 11 to either raise or lower all of the pivot points 25 of the connection between the brake beam arm 12 and the inner ends of the upper arms of the bell crank levers 8, to thereby vary the degree of retardation exerted by a passing car wheel, as explained below.

Considering Fig. 2, it will be seen that when a car wheel is supported entirely out of contact with the track rail, by having its flange and tread carried by the brake shoes 14, it exerts a downward pressure tending to rotate the shoe beam

arm 12 downwardly, to thereby press the upper face of the brake shoe against the sides of the wheels and cause a braking effect. If we consider the weight carried by a particular wheel to be $w$, then by taking moments about the pivot point 25 we have the equation

$$\frac{w}{2} \times a = f \times b$$

where $f$ equals the pressure applied to the side of the wheel by one of the brake shoes,

$$\frac{w}{2}$$

equals the weight supported by a single brake shoe, and the quantity $a$ and $b$ are the lever arms about the pivot 25, as shown in Fig. 2.

Solving the above equation for $f$, we find

$$f = \frac{w}{2} \times \frac{a}{b}$$

This shows that the braking force is proportional to the weight carried by one of the brake shoes, multiplied by the ratio

$$\frac{a}{b}$$

By lowering the pivot point 25 this ratio is decreased, while by raising the pivot point 25 it is increased, to thereby vary the effectiveness of the car weight in producing retardation or braking effect on itself.

By moving the pivot point 25 downwardly far enough, the brake shoes and shoe beams can be moved backward and downwardly on the supports 15, so as to move the car wheel supporting portions of the brake shoes below the tops of the track rails, to thereby allow a car to pass through the retarder without any retardation.

As the pivot points 25 are raised, more and more of the weight of a car is taken from the rails and supported by the brake shoes 14, until, as per above, the car wheels can be raised clear of the rails. As the weight carried by shoes 14 increased from $o$ to $w$, the ratio

$$\frac{a}{b}$$

gradually increases, so that the braking force increases more rapidly than does the weight carried by the brake shoes.

In the form of invention shown in Fig. 4, the same general arrangement of parts is employed, in that there are rollers 26, carried on a fixed support 27, and having pivoted thereto, yokes 28. Each of the yokes 28, however, has a fixed shoe beam arm 29, carrying a brake shoe 30, while at the other end of the yoke 28, is a lever 31 carrying the pivoted shoe beam arm 32, and a wheel supporting brake shoe 33. Shoe beam 32 has telescoping parts $32^1$ and $32^2$ inclosing a heavy compression spring $32^3$, serving, as does spring $7^2$ of the first form, to permit varying the lever ratio

$$\frac{a^1}{b^1}$$

as is to be explained. The pivot point 34, between members 31 and 32, is maintained in position by an adjusting arm 35, having pivoted thereto a roller 36 carried on the support 27, whereby movement of a rod 38, causes movement of the roller 36, and either raises or lowers the pivot point 34. Spring $32^3$ could equally well be placed in lever 31.

In this case, the brake shoe 30 does not support any weight, but all, or part only, of the weight on a car wheel, can be supported by the brake shoe 33, whereby the retardation caused by the brake shoe 33 is in proportion to the total weight supported by the brake shoe, multiplied by the ratio

$$\frac{a^1}{b^1}$$

The supporting thrust of the brake shoe 30 is, of course, equal to that exerted by the brake shoe 33, as the device is in stable equilibrium during operation. Thus it is seen that in the case of the form shown in Fig. 4, the retardation exerted on a given weight of car, is approximately double that exerted by the form shown in Fig. 2, under conditions of equal weight supported by the brake shoe.

Of course, the pivoted shoe could be placed at the outer side of the track rail in each case, if desired, so that the tread of the wheel would support the weight, instead of the flange. Here again, the brake shoe 33 is held in position, by a spring 39, and the pivot point 34 can be lowered sufficiently to move the brake shoe 33 out of the way of a car wheel so that no retardation is exerted on a passing car.

In the case of each form of invention, the rocker supported yoke permits each pair of brake shoes to move laterally as a unit, to adjust for varying spacing of two car wheels on an axle, without thereby varying the degree of retardation.

Also, since the retardation is due to the weight of a car, if a wheel tends to climb out of the retarder, the retarding force is at once sufficiently relieved to allow the car wheel to drop back between the shoes.

From the above description it will be seen that a retarder has been provided which in operation supports part of, or the entire, weight of the car, and through a system of levers, applies retardation of varying intensity depending on the position of the lever system. Furthermore, the lever system is very simple and rugged in construction, and the degree of retardation can be varied by merely changing the position of one pivot point in the lever system for each brake shoe, and then holding the pivot point in the adjusted position.

The above rather specific description of two forms of this invention, has been given solely by way of example, and is not intended, in any manner whatsoever, in a limiting sense. Obviously, the invention can assume many different physical forms, and is susceptible of numerous modifications, and all such forms and modifications are intended to be included in this application, as come within the scope of the appended claims.

Having described my invention, I now claim:—

1. In a car retarder of the track brake type, in combination with a track rail, a brake shoe at each side of the rail, a lever system for supporting a passing car wheel and causing the weight carried by the shoes to force them into frictional engagement with the sides of the wheel, and means for adjusting the position of the lever system without varying the weight receiving position of any shoe thereby, to thereby adjust the degree of retardation exerted.

2. In a car retarder, in combination with a track rail, a brake shoe, and a lever system for positioning the brake shoe to receive weight of a passing car wheel and thereby force the shoe into frictional engagement with the wheel, and means

for adjusting the lever system to thereby vary the effectiveness of any given supported weight in producing braking.

3. In a car retarder of the track brake type, in combination with a track rail, a roller positioned at each side of the rail, a rigid yoke pivotally connected across the rollers to tie them together, a lever system carried by the yoke, a brake shoe carried by the lever system in a position to receive a passing car wheel thereon and support weight on the wheel, a brake face on the shoe pressed against the side of the wheel by the weight of the wheel whose weight is carried by the shoe, and means adjusting the position of the lever system to adjust the effectiveness of the supported wheel weight in producing braking.

4. In a car retarder of the track brake type, in combination with a track rail, a roller positioned at each side of the rail, a rigid yoke pivotally connected across the rollers to tie them together, a lever system carried by each end of the yoke, a brake shoe carried by each lever system in a position to receive a passing car wheel thereon and support weight on wheel, a brake face on each shoe pressed against the side of the wheel when weight on the wheel is carried by the shoe, and means for adjusting the position of the lever systems to adjust the effectiveness of the supported wheel weight in producing braking.

5. In a car retarder of the track brake type, in combination with a track rail, a roller positioned at each side of the rail, a brake shoe at each side of the rail, one of the brake shoes having a portion positioned to receive a passing car wheel and support its weight and a portion for braking the wheel, a pivoted lever system for supporting said one brake shoe, and means for adjusting the position of the pivot of said lever system, according to the weight supported, to vary the degree of retardation.

6. In a car retarder of the track brake type, in combination with a track rail, a roller positioned at each side of the rail, a brake shoe at each side of the rail, each of the brake shoes having a portion positioned to receive a passing car wheel and jointly support weight thereof and a portion for braking the wheel, a pivoted lever system for supporting said brake shoes so that the weight on the car wheel forces the braking portions of the shoes into contact with the sides of the wheel, and means adjusting the position of the pivots of said lever systems whereby to vary the degree of resulting retardation.

7. In combination, a track rail, a roller supported yoke having an end at each side of the rail, a brake shoe fixed to one end of the yoke, a movable brake shoe having a wheel receiving portion and a brake head, pivoted levers connecting the movable brake shoe to the other end of the yoke so that a passing wheel can ride onto the brake shoe and the weight of the wheel on the brake shoe causes the shoes to press inwardly against the sides of the wheel, and means adjusting the position of said levers to thereby vary the effectiveness of the supported weight in pressing the shoes against the wheel sides.

8. In a car retarder, in combination with a track rail, a rigid yoke having its ends positioned at each side of the rail, rollers supporting the yoke, a lever system carried by each end of the yoke, a brake shoe with a wheel receiving portion and a brake head, carried by each lever system in position to jointly receive the full weight on a passing wheel and rock the shoes to press the brake shoes against the wheel sides, and means adjusting the lever systems to vary the degree of retardation exerted according to the weight supported.

9. In a car retarder, in combination with a track rail, a rigid yoke having its ends positioned at each side of the rail, rollers supporting the yoke, an adjustable lever system carried by each end of the yoke, a brake shoe with a wheel receiving portion and a brake head, carried by each lever system and positionable by the lever system to receive weight on a passing wheel, and to rock the shoes to press the brake shoes against the wheel sides, and means for automatically adjusting the lever systems to vary the degree of retardation exerted, in various proportions to the weights supported, and for moving the shoes out of the path of a passing wheel.

10. In a car retarder of the track brake type, in combination, a brake shoe pivotally positioned at each side of a track rail to form a normally open toggle joint with at least one of the shoes positioned to receive weight of a passing car wheel, brake faces on the shoes for pressing against the sides of a wheel when the toggle tends to close, and means for adjusting the position of the toggle joint to be more or less closed, to thereby vary the effectiveness of various supported weights on a wheel in producing retardation.

11. In a car retarder, in combination with a track rail, a brake shoe, a lever system for positioning the brake shoe to receive the entire weight of a passing car wheel and thereby force the shoe into frictional engagement with the wheel, and means for adjusting the lever system to thereby vary the effectiveness of the brake shoe received entire car weight in producing braking.

12. In a car retarder of the track brake type, in combination with a track rail, a roller positioned at each side of the rail, a rigid yoke pivotally connected across the rollers to tie them together, a lever system carried by the yoke, a brake shoe carried by the lever system in a position to receive a passing car wheel thereon and support the wheel above the track rail, a brake face on the shoe pressed against the side of the wheel when the wheel is carried by the shoe, and means for adjusting the position of the lever system to adjust the effectiveness of the wheel weight during the time the wheel is carried solely by the shoe, in producing braking.

13. In a car retarder of the track brake type, in combination with a track rail, a roller positioned at each side of the rail, a rigid yoke pivotally connected across the rollers to tie them together, a lever system carried by each end of the yoke, a brake shoe carried by each lever system in a position to receive a passing car wheel thereon and support the wheel above the track rail, a brake face on each shoe pressed against the side of the wheel when the wheel is carried by the shoe, and means for adjusting the position of the lever systems to adjust the effectiveness of the wheel weight in producing braking.

14. In a car retarder of the track brake type, in combination with a track rail, a roller positioned at each side of the rail, a brake shoe at each side of the rail, one of the brake shoes having a portion positioned to receive a passing car wheel and support its weight and a portion for braking the wheel, and a pivoted lever system for supporting said one brake shoe, and means for adjusting the position of the pivot of said lever system to vary the degree of retardation irrespective of the weight supported.

15. In a car retarder of the track brake type in combination with a track rail, a roller positioned at each side of the rail, a brake shoe at each side of the rail, each of the brake shoes having a portion positioned to receive a passing car wheel and jointly support its weight and a portion for braking the wheel, a lever system for supporting said brake shoes so that the weight on the car wheel forces the braking portions of the shoes into contact with the sides of the wheel, and means for adjusting the position of the said lever system whereby to vary the degree of resulting retardation.

16. In a car retarder, in combination with a track rail, a rigid yoke having its ends positioned at each side of the rail, rollers supporting the yoke, a lever system carried by each end of the yoke, a brake shoe with a wheel receiving portion and a brake head, carried by each lever system in position to jointly receive the full weight on a passing wheel and rock the shoes to press the brake shoes against the wheel sides, and means for adjusting the lever systems to vary the degree of retardation exerted regardless of the weight supported.

17. In a car retarder, in combination with a track rail, a rigid yoke having its ends positioned at each side of the rail, rollers supporting the yoke, an adjustable lever system carried by each end of the yoke, a brake shoe with a wheel receiving portion and a brake head, carried by each lever system and positionable by the lever system in position to receive the full weight on a passing wheel, and to rock the shoes to press the brake shoes against the wheel sides, and means for adjusting the lever systems to vary the degree of retardation exerted, and for moving the shoes out of the path of a passing wheel.

18. In a car retarder of the track brake type, in combination, a brake shoe pivotally positioned at each side of a track rail to form an open toggle joint with at least one of the shoes positioned to receive the weight of a passing car wheel, brake faces on the shoes for pressing against the sides of a wheel when the toggle tends to close, and means for adjusting the normal position of the toggle joint to be more or less closed after the entire weight on a wheel is wholly supported by the shoes, to thereby vary the effectiveness of the said entire supported weight on a wheel in producing retardation.

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