June 11, 1929. J. F. O'CONNOR 1,716,657

BRAKE

Original Filed Jan. 8, 1925

Fig. 1

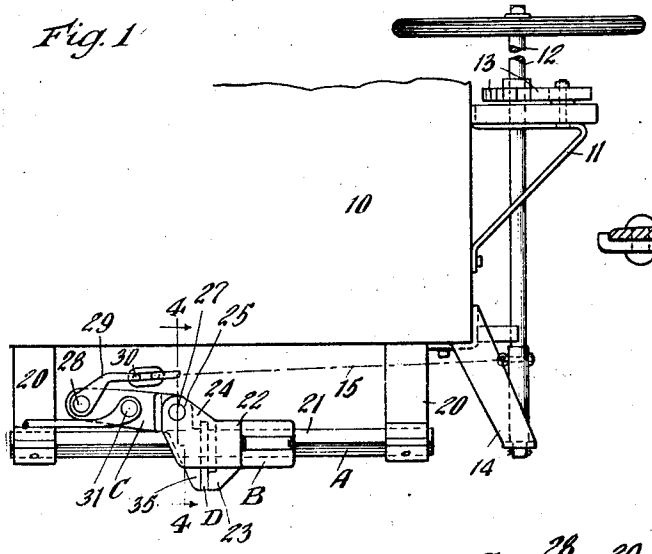


Fig. 4

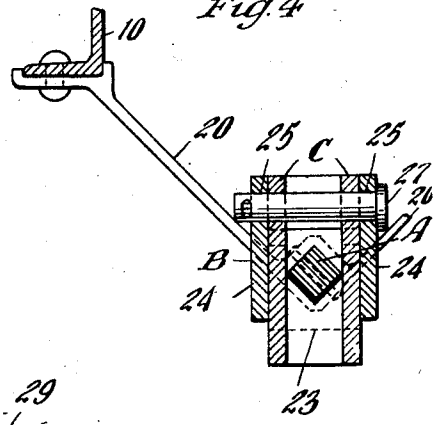


Fig. 2

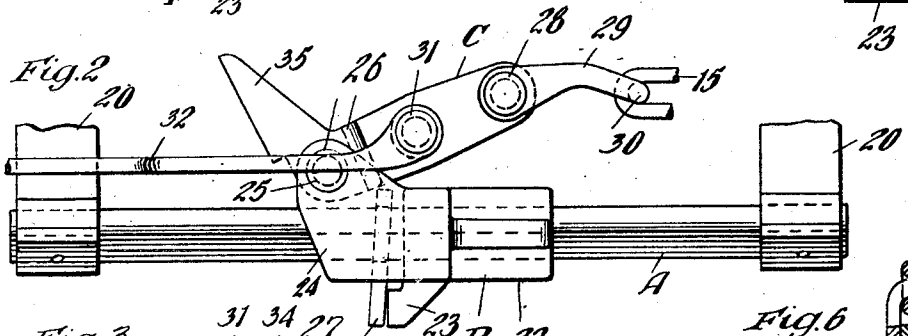


Fig. 3

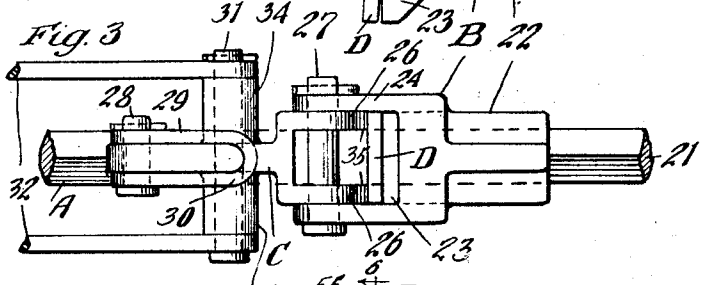


Fig. 6

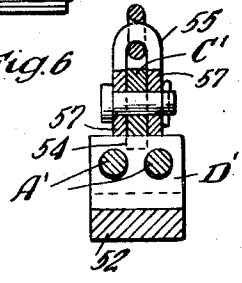
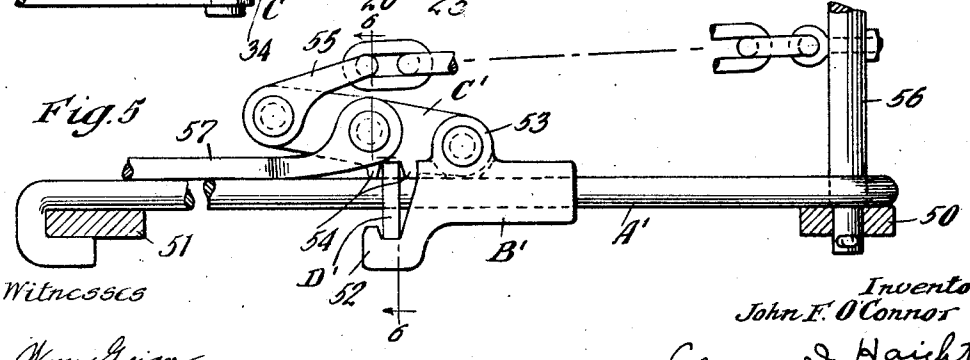


Fig. 5



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UNITED STATES PATENT OFFICE.

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BRAKE.

Application filed January 8, 1925, Serial No. 1,140. Renewed February 3, 1927.

This invention relates to improvements in brakes.

An object of the invention is to provide a brake for railway and other vehicles having means for quickly taking up the slack in the brake chain, and thereafter automatically increasing the leverage ratio pull on the brake chain during the final application of the braking pressure.

Another object of the invention is to provide a power increasing device of this character, comprising movable supporting means, together with lever means carried thereby, such lever means being connected with the brake rigging in such a manner that during the initial application of power to the brake rigging, the lever means travel in inoperative position with the support, and when the tension is increased thereon, such lever means moves releasing clamping device which fixes the lever pivot with respect to guiding members, and further action is by swinging of lever on pivot, automatically putting into action, the power-multiplying ratio of the arms of the lever. The parts are arranged so that upon release of the brake rigging they will automatically resume their original positions.

Other and further objects of the invention will more fully and clearly appear from the description and claims hereinafter following.

Figure 1 is a fragmentary side, elevational view of a railway car having the usual brake winding mechanism, and showing my invention used in connection therewith, the parts being shown in fully released position. Figure 2 is an enlarged, side elevational view of my invention, part of the same being broken away, showing the power multiplying mechanism at the limit of its operative stroke. Figure 3 is an enlarged top plan view of the invention corresponding to Fig. 2, certain parts of the same being broken away. Figure 4 is a transverse sectional view of the line 4—4 of Figure 1. Figure 5 is an enlarged side elevational view, generally similar to Figure 1, showing a slightly different embodiment of my invention. And Figure 6 is a sectional view of the invention illustrated in Fig. 5 on the line 6—6 thereof.

In the drawings, 10 represents a fragment of a railway car, 11 a supporting bracket attached thereto, 12 the usual brake winding staff, 13 ratchet mechanism for preventing retrograde rotation of the staff 12, 14 the usual supporting stirrup and 15 a portion of the brake rigging.

My invention is shown in connection with the elements above enumerated, but, of course, may be used with any kind of means for applying power to brake riggings, and such invention broadly includes guiding means A, supporting means B, power multiplying lever means C, and clamping means D, for preventing reverse movement of the supporting means B when the power multiplying means C are actuated.

The guide means A comprise suitable supporting hangers 20, which may be attached to the under surface of the railway car 10 by any suitable means, the hangers 20 supporting a preferably rectangular bar A in such position as to present the corners thereof in horizontal and vertical planes. Slidably mounted upon the bar 21 is the supporting device or carriage B, having a body portion 22 provided with a rectangular opening adapted to have a sliding fit upon the bar 21, the shape of the bar 21 and of the opening in the support B preventing twisting of the parts relatively to each other. Formed on the portion 22 of the carriage is a depending hook shaped abutment 23, and disposed forwardly of such abutment is a bifurcated member 24, the furcations 25 of such member being disposed on each side of, and extending a suitable distance above the guide bar 21, as shown.

Pivotally mounted in the portions 25 of the member 24 are the legs 26 of the lever means C, such pivotal mounting being accomplished by a suitable pivot pin 27. Secured to the outer end of the lever C by means of a pivot pin 28 is a looped link or connecting member 29, such member being curved as shown at 30 and having its outer end 31 connected with the brake rigging 15 which extends to the winding staff 12. Extending through the lever C intermediate its ends, is a pivot pin 31 to the outer ends of which are secured connecting links 32, there preferably being spacing members 34 disposed between the links 32 and the sides of the lever C, the links 32 being secured to the brake rigging (not shown) which extends to the brake shoes proper. The legs of the lever C are extended downwardly to provide spaced holding fingers 35, such holding fingers in one position being adapted to engage the plate D and

in conjunction with the member 26 to hold the plate D in upright position, during which time it will not bind upon the guide rod 21, in a manner hereinafter more fully described.

The clamping plate D is of such character that the same fits between the furcations 25 of the supporting means B, and is provided with a centrally disposed rectangular opening through which the guide bar A extends, the plate D being arranged to slide freely upon said bar when held in vertical position by the abutment 23 and the portions 35 of the lever means, tilting of said plate D due to the engagement at one side thereof of the abutment means 23, when the lever means are removed from holding position, causing the plate to bind upon the bar A, and thus prevent retrograde movement of the supporting means, while the lever means is operating.

In operation, upon initial winding of the brake staff 12, power is applied to the lever multiplying means C through the connecting member 30, such movement, of course, being transmitted through the links 32 to the brake shoes proper. By reason of the disposition of the parts, that is, by disposing the lever C in such position that the initial pressure is applied longitudinally thereof, such pressure is transmitted to the supporting member B, causing the same to travel along the guide bar 21, providing in effect a movable fulcrum for said lever means thereby taking up the slack in the brake rigging. This sliding movement of the supporting means B is permitted by reason of the fact that the clamping plate D is held in vertical position by the extensions 35 of the lever means so long as such lever means do not move relatively to the supporting means B. Upon increased tension being encountered after the slack has been taken up, the lever means C swings on its pivot and moves relatively to the support B. During the swinging movement of the lever, the tendency of the fulcrum of the lever is to cause a retrograde movement of the supporting means B, as will be readily appreciated, and this movement is prevented by reason of the clamping or binding of the plate D upon the guide rod 21, this binding action occurring when the extensions 35 on the lever means are turned out of contact with the clamping member D, permitting a tilting action of the clamping member which causes it to bind on the guide bar A. Upon release of the brake rigging, by the unwinding of the brake staff, the rigging is drawn to its original position, causing the reengagement of the fingers 35 with the clamping plate D, when in conjunction with the member 23 serve to restore the plate to an upright position, which releases the supporting means and permits the same, along with the lever means, to resume its original position.

Referring to Figures 5 and 6, a slightly different embodiment of the invention is illustrated. In this embodiment A′ represents a suitable guide member which may be in the form of a yoke secured upon the brake stirrup 50 at one end, and to a suitable carry iron 51 secured to the car structure, this construction providing spaced bars upon which is slidably mounted supporting carriage B′, such arrangement serving to prevent twisting of the carriage relative to the yoke during operation. The supporting carriage B′ is provided with a hooked portion 52 at its lower side and spaced ears 53 at its upper side. Pivotally mounted within the ears 53 is the lever C′, such lever being provided with a pair of spaced projections 54 on its under surface, as shown. To the outer end of the lever is pivotally secured a connecting member 55, which is secured to the brake rigging extending to the brake staff 56. Pivotally connected intermediate the ends of the lever C are the links 57 in the same manner as illustrated in Figure 3, which links are connected to the rigging extending to the brake shoes proper.

Slidably mounted on bars provided by the guide yoke A′, is the clamping member D′; such clamping member being disposed within the hooked portion 52 of the support B′. When the lever means C′ are in inoperative position, such clamping member is held between the projections 54 at its upper end and within the hooked portion 52 at its lower end, normally maintaining said plate D′ in a vertical position to permit the same to be freely slidable upon the guide, until such time as the lever is swung relatively to the supporting carriage, permitting the clamping member D′ to bind on the guide A′.

The operation of the above described embodiment of the invention is identical to that heretofore described with reference to the construction shown in Figures 1 to 4, the only differences residing in the operation of the means for controlling the clamp plate, and the construction of the guide member. Upon initial application of power to the supporting means B′, it will be appreciated that the clamp plate D′ is carried along the guide means A′ in an upright position due to the engagement of the spaced members 54 and the hooked portion 52. Upon relative movement of the lever means C′, due to increased tension, the portions 54 move out of engagement with the clamp plate D′, and due to the tendency to reverse movement of the carriage, the clamp plate D′ is tilted by the hooked portion 52, thereby binding the same on the guide bar A′, and preventing retrograde movement of the supporting means B′. During this movement the guide bars of the yoke prevent twisting of the carriage relative thereto, due to their spaced disposition.

While I have herein shown and described what I now consider the preferred manner of carrying out my invention, the same is merely illustrative and I contemplate all changes and

modifications that come within the scope of the claims appended hereto.

I claim:

1. In a brake, the combination with power applying means and brakes proper; of power multiplying means including a guide; a movable support mounted on said guide and limited to a definite plane of movement thereby; lever means pivotally mounted at one end portion on said support and normally disposed in a direction away from said power applying means; a connection from the other end portion of said lever means to said power applying means; connecting means extending from an intermediate portion of said lever means to said brakes proper; clamping means associated with said supporting means and arranged in one position to move with said supporting means and in another position to hold said supporting means against movement; and means associated with said lever means for controlling the position and operation of said clamping means.

2. In a brake, the combination with power applying means and brakes proper; of a guide; a clamping member mounted on said guide and arranged to bind thereon in certain positions; a support movably mounted on said guide; a lever having one end portion pivotally mounted on said support and normally extending in a direction away from said power applying means; a connection from the other end portion of said lever and said power applying means; a connection between an intermediate portion of said lever and said brakes proper; said connections being arranged to hold said lever in inoperative position when said brakes are released; and means associated with said lever and said support whereby said clamping member is held in position to move on said guide when said lever is in inoperative position, and to bind on said guide when said lever moves relatively to said support.

3. In a brake, the combination with operating mechanism for tightening the brakes, including a pulling element; of a normally movable supporting means; guide means for said supporting means, normally inactive, power-multiplying, overbalanced lever means pivotally connected to said pulling element, remote from the pivot thereof, and a movable thereby when the pulling force is exerted, said power-multiplying means being mounted on said supporting means for movement bodily therewith; means connecting the power-multiplying lever to the brake mechanism proper to transmit pulling action thereto, said means being connected to the lever intermediate the pivot and the end connected to the pulling element, said lever being bodily movable with the support by the action of the pulling element during the taking up of slack in the brake mechanism, and operative to swing relatively to said support when the tension of the brake mechanism is increased to overcome the overbalanced condition of the lever after the slack has been taken up, to increase the power ratio of the brake mechanism; and means automatically operative for holding said supporting means stationary during the power-increasing phase of the operation of the power-multiplying means.

4. In a brake, the combination with brake operating mechanism including a pulling element; of a normally movable supporting means; guide means for said supporting means, means operative to hold said supporting means stationary; power-multiplying means connected to said operating mechanism through the pulling element and mounted on said supporting means and having movement bodily with said supporting means and relatively thereto, said power-multiplying means being normally disposed in released position and arranged in said position to move bodily with the pulling element and supporting means, and in another phase of the operation to move relatively to said supporting means to increase the power ratio, the relative movement of said power-multiplying means with reference to said supporting means being arranged to actuate the means for holding said supporting means stationary during the power-increasing phase of operation of said power-multiplying means.

5. In a brake, the combination with power-applying means for the brakes proper of the car; of a power-multiplying means including a movable support, a guide for said support and lever means pivotally mounted at one end portion of said support, said lever means being normally in overbalanced condition and movable bodily with the support while slack in the brake mechanism is taken up; a connection from the other end portion of said lever to said power-applying means connecting means extending from an intermediate portion of said lever means to the brakes proper, the overbalanced condition of the lever being overcome when the tension in the brake mechanism is increased after taking up slack, thereby swinging the lever on the support; and means automatically operative by the swinging movement of the lever for arresting movement of the support, thereby increasing the power ratio of the brake mechanism during final application of the brakes.

6. In a brake, the combination with operating mechanism; of a movable supporting means; guide means for said supporting means; a power-multiplying lever swingingly mounted on said supporting means and connected to the operating mechanism, and also connected to the brake mechanism proper for transmitting the power thereto and increasing the applied power, said lever being normally maintained inactive to swing and movable bodily with said supporting means during the taking up of slack in the brake

mechanism, the inactive condition of the lever being overcome when the tension is increased after the slack in the brake mechanism has been taken up to swing said lever on the support, increasing the power ratio of said multiplying means; and clamping means operated by the swinging movement of the lever for locking the supporting means and holding the same against movement.

7. In a brake, the combination with a brake chain; of operating means for winding the chain; a guide member; movable supporting means slidably mounted on said guide member; a power-multiplying lever pivoted on the supporting means, swingable toward and away from said winding means, said brake chain being connected to the lever remote from the pivot thereof; means connected to the brake mechanism proper and secured to the lever intermediate the pivot thereof and its connection with the brake chain, said lever being normally disposed in overbalanced condition with the free end, swung away from the operating means beyond the pivot of the lever, thereby compelling movement of the lever and supporting means in unison while the slack in the brake mechanism is being taken up, said lever being swung upwardly from the overbalanced condition by said chain when the tension in the brake mechanism is increased due to the slack having been taken up; and clutch means operated by said lever to lock the supporting means to said guide while the lever is being swung, thereby increasing the power ratio of said operating means.

In witness that I claim the foregoing I have hereunto subscribed my name this 5th day of January, 1925.

JOHN F. O'CONNOR.