Jan. 14, 1930. W. H. SAUVAGE 1,743,981

HAND BRAKE

Filed Dec. 27, 1926

FIG. 1

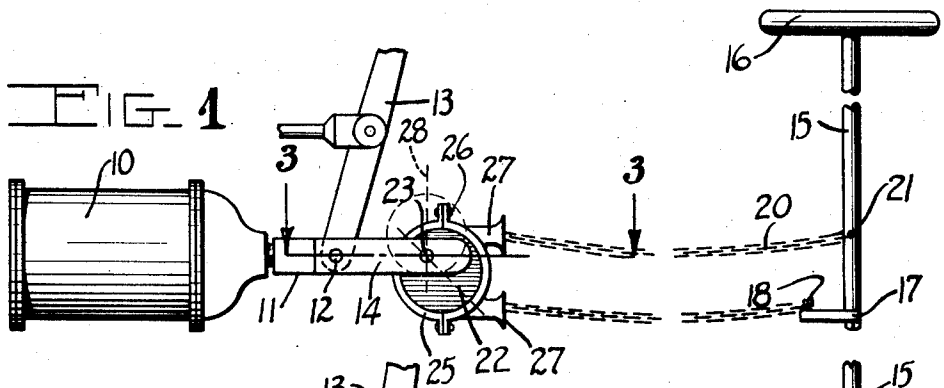


FIG. 2

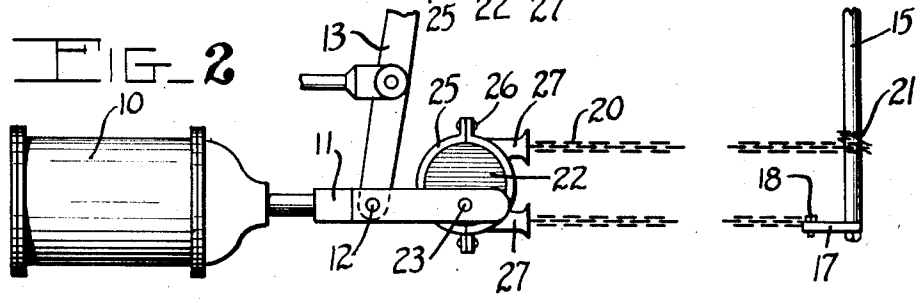
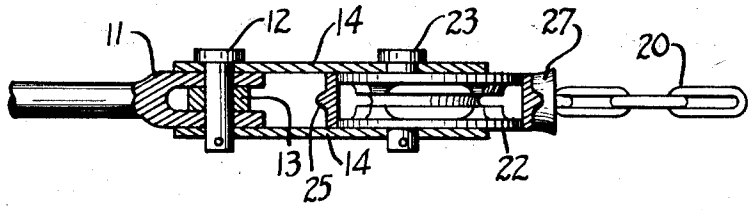


FIG. 3



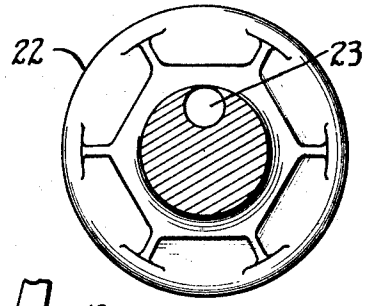
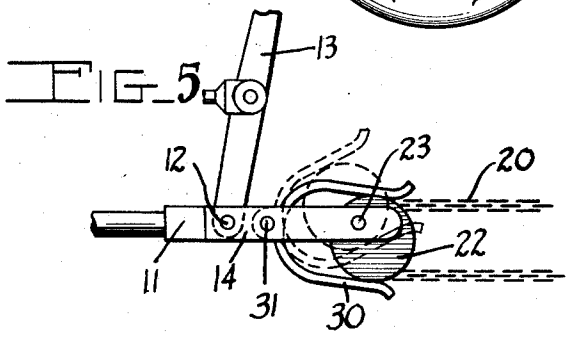


FIG. 4

FIG. 5



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UNITED STATES PATENT OFFICE

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HAND BRAKE

Application filed December 27, 1926. Serial No. 157,169.

This invention relates to improvements in handbrakes for railway vehicles, and is a continuation in part of the invention disclosed in my prior United States Patent, No. 1,612,781, dated December 28, 1926.

One of the objects of the present invention is to provide a simple and practical handbrake mechanism for railway vehicles which will be highly reliable and efficient in use and operation regardless of its position on a car or of the shocks and jars to which it is subjected.

Another object of the present invention is to provide an improved power multiplying device for use with handbrakes of the quick take up type, that is, one which will bring the brake shoes quickly into engagement with the peripheries of the wheels and thereafter exert great and multiplied pressure even tho the truck rigging is not in properly and accurately regulated position.

A further object is to provide a strong and durable brake mechanism of the above mentioned character applicable in any position or location of the car and in which the brake shoes are given a high initial velocity at low power followed by a progressively decreasing rate of movement with a progressively increasing pressure for constant movement of the actuating means.

A further object is to provide a mechanism which will be substantially fool-proof in its operation and thoroughly protected from the dust and dirt of the road as well as the atmospheric elements.

A further object is to provide a mechanism of the last above mentioned character having relatively few parts, which may be easily and quickly assembled, and applied to railway brake equipment now in use without material alterations or changes therein.

A further object is to provide a brake mechanism of the last above mentioned character which will be effective in use and operation even tho the foundation brake rigging or piston travel is not in properly adjusted condition.

Other objects will be in part obvious and in part hereinafter pointed out in connection with the accompanying sheet of drawings illustrating two of the various possible embodiments of the present invention, and in which similar parts are designated by corresponding reference characters.

In these drawings—

Figure 1 shows the invention in normally inactive position and associated with such parts of the foundation brake rigging as is necessary to understand the same.

Figure 2 is a view similar to Figure 1 showing the invention in applied position.

Figure 3 is a longitudinal sectional detail view of the power multiplying device.

Figure 4 is a similar view of one of the parts taken at right angle to Figure 3.

Figure 5 is a detail elevational view showing a modification of the invention.

Referring now to the drawings in detail and more particularly to Figures 1 and 2, 10 indicates the usual airbrake cylinder provided with a hollow, telescoping piston rod 11 pivotally connected at 12 with a lever 13. In the form herein shown, the lever 13 may be considered the live cylinder lever, altho in certain types of cars, such as gondola coal cars, this may also be the live truck brake lever. The end of the piston rod 11 is for convenience provided with two supporting clevis plates 14 secured one at each side thereof and adapted to carry the power multiplying device interposed between the piston rod and the handbrake mechanism. It is, of course, to be understood that the clevis plates 14 may be integrally formed with the piston rod if desired, altho with standard forms of equipment now in use, it is preferable to make these as separate parts so that they may be attached to such standard equipment at minimum expense.

There is herein shown a brake staff 15 which is provided with a hand wheel or actuating means 16 at its upper end while its lower end is seated in any fixed part of the car frame such as the plate 17.

This is, however, merely a conventional showing of hand operated brake means for exerting a pull on one end of the chain and obviously may be of any desired type adapted to accomplish this purpose. Accordingly the

term "staff" as hereinafter used is to be construed with this idea in mind.

This plate 17 is provided with an anchoring means or bolt 18 to which one end of a chain 20 is secured. This chain 20 then passes freely around the power multiplying device hereinafter described, and its opposite end is secured by means of bolt or pin 21 to the brake staff. As the brake staff is turned, of course, the chain 20 winds up thereon as indicated in Figure 2.

The power multiplying device as shown in detail in Figures 3 and 4 includes an eccentric block chain sheave or bodily moving rolling lever 22 pivoted at 23 between the clevis plates 14. It is preferred to use a block chain sheave as they are easier to construct or cast and co-operate with an ordinary link chain much more efficiently than other types of similar constructions and are considerably less expensive to make. The sheave is preferably entirely enclosed or surrounded by a guard which may be made in two parts 24 and 25 secured together as by means of pins or rivets 26. The guard is of sufficient width to rest on the side flanges of the sheave as shown in Figure 3. The parts of the guard are easy to assemble and install when made this way, altho obviously a single continuous guard ring could be used, if desired.

The part 25 is provided at one side with two oblong bell shaped openings or ports 27 thru which the chain 20 passes to and from the sheave thereby to prevent binding of the chain as the line of pull changes due to the winding of the chain up or down on the staff, for example. By means of this construction, the rolling lever is completely enclosed, and in that way protected from the dust and dirt of the road as well as snow and ice, which might otherwise fill the recesses for receiving the chain links and thereby cause a slippage of the chain relative to the eccentric. This is very important, for if the chain and sheave do not occupy a predetermined position when the brakes are released, then the effectiveness and efficiency of the power multiplying device are changed accordingly.

This construction of eccentric rolling lever and guard is also very important from a practical commercial aspect, inasmuch as it permits these elements to occupy any position in space or in location on or beneath the car body and still operate with the highest reliability and efficiency. For instance, were the eccentric placed horizontally beneath the car without a guard, there would be a strong probability that the chain would drop clear of the eccentric under the impact of coupling the cars or during starting and stopping, thereby changing its relative position of adjustment or even render the device completely inoperative.

While I have herein referred to the flexible connection between the power multiplying device and the brake staff as being a chain 20, it is, of course, to be understood that connecting links or rods may be more desirable or necessary where there is a considerable distance intervening between the staff and eccentric or in such constructions in which the eccentric is not mounted directly upon the end of the cylinder piston.

In assembling the present device, the brakes are released, the piston put in retracted position, the handbrake staff unwound, and the chain 21 disconnected from its anchorage. The free end of the chain is then passed thru the ports or openings 27 of the part 25, thence freely around the drum and anchored loosely at its free end to the plate 17 with the eccentric drum substantially in the position shown in Figure 1. Then the other part 24 of the guard is secured to the part 25 and the brakes are ready to be applied. As the chain winds up on the staff 15, then the eccentric 22 moves relatively towards the right and also about its eccentrically disposed pivot 23 until it approaches the dotted line position shown in Figure 1 or full line position shown in Figure 2.

The eccentric being positioned as shown causes the cylinder piston to move out rapidly or at a relatively high initial velocity, thus actuating the foundation brake rigging quickly to take up the brake shoe clearance and bring the shoes into engagement with the peripheries of the wheels. As this eccentric is turned, its rate of movement gradually decreases, but due to the eccentricity and the leverage indicated by the dotted line, 28 the power increases as this leverage approaches its position of maximum efficiency, thus applying the brakes at a relatively slow rate of movement but under great pressure, thereby to bring the car quickly to rest without locking or slipping the wheels or requiring the use of clubs in the hand wheel.

To explain further the effect of the power multiplying device as herein shown, let it be assumed that power is applied to the handbrake mechanism to move the point 21 and to exert a load on the chain of one thousand pounds. If the eccentricity of the sheave 22 is in the ratio of three to one, then a pull of three thousand pounds would be delivered to the lower part of the chain, and the sum of these or a four thousand pound pull would be exerted upon the piston. Thus it will be seen that any predetermined load desired can easily, effectively and rapidly be produced in a most simple and powerful manner. By changing the ratio of eccentricity, the power delivered may be modified accordingly.

Heretofore in foundation brake rigging, a lever has been interposed between the handbrake mechanism, and the piston in which one end of the lever was fulcrumed to a fixed part of a car while the other or free end was attached to the handbrake. With an eight

inch piston travel such mechanism required the winding up of approximately twenty-four inches of chain around the brake staff and because of the overlapping of this excess chain, the rated or theoretical power usually falls short about seventy-five per cent. With the present construction, however, it is only necessary to wind up less than half of this amount of chain or give the brake staff one and a quarter to one and a half turns, and the actual power delivered to the piston is substantially equal to the theoretical power expected.

The above explanation and operation is, of course, based upon the assumption that the brakes are in properly adjusted position, and when this device is used with the regulator and stops as disclosed in my above mentioned prior patent, the entire system works with the highest and maximum efficiency. If, however, the regulator is not employed and the brakes are not in accurately adjusted position, the power multiplying device nevertheless has a very high degree of efficiency and effectiveness in applying the brakes. For example, should the piston travel exceed the normal standard distance of seven inches standing travel or eight inches running travel, then the chain being unattached to the sheave there is nothing to prevent the eccentric from continuing its rotative movement. To be sure, the high leverage decreases as it passes its maximum position as shown in dotted line 28 in Figure 1, yet its rate of movement gradually increases, and the excess piston travel is speedily taken up and the brakes are still applied with a high degree of effectiveness which would be impossible were the chain not freely mounted on the sheave.

In Figure 5, there is shown a modification of a guard for the eccentric, the other parts being substantially the same as above described. Here we have a substantially U-shaped oscillating guard 30 pivoted on a stud 31 intermediate or between the side clevis plates 14 attached to the end of the cylinder piston. The vertical distance between the two embracing arms of the guard 30 is substantially equal to the maximum diameter of the eccentric 22 so as to slightly clear the chain 20 passing there-around. The guard 30, being pivoted, permits the eccentric 22 freely to move to its upper and lower maximum positions as the brakes are applied and always securely hold the chain in place. While this guard 30 does not as effectively protect the eccentric, nevertheless it holds the chain firmly in place in the block recesses and prevents displacement thereof under shocks and jars so frequently occurring when the cars are coupled or emergency application of the brakes takes place. As previously stated, it is highly important that the chain and eccentric maintain a constant engagement and the same relative position in all positions of rest, for otherwise should relative slipping movement occur, then the eccentric is improperly positioned to exert maximum pressure and minimum rate of travel at the point of brake application and pressure of the shoes upon the peripheries of the wheel.

The present invention, which has already been exhaustively tested in actual service on several prominent railroads, has been shown to be the most rapid and powerful handbrake of simple construction yet applied to railway cars. Its application movement is not only of the highest efficiency, but it permits the full and quick release of the brake rigging, instantly allowing the levers to go to full release or normal position, thereby avoiding the objection of dragging brakes. It has been repeatedly demonstrated that with one and a half turns of the brake staff under manual power of approximately one hundred pounds, the same load or pressure has been delivered to the brake shoes and wheels as could be produced by full service airbrake application.

It is thus seen that the present invention provides a simple and practical mechanism for transmitting power from the handbrake staff to the brake rigging, as well as one which is reliable and efficient at all times, not likely to get out of order and fully protected from atmospheric and other injurious conditions, which might otherwise affect its efficiency.

I claim:

1. In combination with an air brake cylinder having a piston rod, a power multiplying device for association with the handbrake rigging of railway cars comprising an eccentrically mounted bodily movable sheave directly connected with said piston rod, a flexible member adapted to pass freely around said sheave, and a guard embracing said sheave and flexible member adapted to hold the same in engagement at all times, said guard being formed in two parts to completely enclose the sheave and flexible member and having openings thru which said flexible member passes to and from said sheave.

2. An attachment for the handbrake rigging of railway cars comprising two spaced supporting members adapted to be attached to the foundation brake rigging, an eccentric sheave pivotally mounted between said members and about which a chain is adapted to pass, and a guard embracing said sheave and positioned between said supporting members, said guard comprising two semi-circular rings adapted to be secured together at their adjacent ends and provided with openings thru which the chain is adapted to pass to and from said sheave.

3. An attachment for the handbrake rigging of railways cars comprising two supporting plates adapted to be secured to the end

of a piston rod, an eccentric block chain sheave pivotally mounted between said supporting members, and a guard completely surrounding engaging and enclosing the periphery of said sheave and held between said side supporting means.

4. A power multiplying device for association with hand brake rigging of railway cars comprising a freely movable rotatable member pivoted off center, whereby as it rotates its effective leverage changes, a chain having a direct coaction and non-slipping relation with said member but passing freely around said member, and means movable with and coacting with the engaged portions of said member and chain adapted to keep them constantly in non-slipping engagement at all times regardless of their position and location on a car.

Signed at New York, New York, this 15th day of December, 1926.

W. H. SAUVAGE.