PATENT OFFICE.

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SLACK ADJUSTER FOR RAILWAY BRAKES.

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To all whom it may concern:

Be it known that I, BRODERICK HASKELL, a citizen of the United States, residing at Franklin, in the county of Venango and State of Pennsylvania, have invented certain new and useful Improvements in Slack Adjusters for Railway Brakes, of which the following is a specification.

The invention relates to railway brakes, and more particularly to an attachment for automatically compensating for the wear of the brake shoes in air or other type of brakes.

The objects of the invention are:

First, to provide a device of the character above indicated which is capable of being quickly, easily and cheaply installed on all present forms of braking systems.

Second, to devise an attachment having the functions above cited in which no gears or clutches are employed, and in which the load on the spring is not increased as the brakes are applied but taken up by an incompressible and non-freezing liquid.

Third, a slack adjuster which is capable of easy and automatic adjustment and at all times accessible and in sight for quick inspection, testing and repairs.

Fourth, other objects and advantages of construction and operation will appear from the detailed description and mode of applying the invention which will be hereinafter more fully given.

The invention consists of structural characteristics and relative arrangements of elements which will be hereinafter more fully and clearly disclosed and particularly pointed out in the appended claims.

In the drawings in which similar reference characters indicate the same parts in the several figures:

Figure 1 is a fragmentary and vertical longitudinal central section partly in elevation through a brake cylinder and its accessories embodying the invention, and

Figure 2 is a section similar to Figure 1 of a modified form.

Referring to Figures 1 and 2, 10 is a brake cylinder provided with the usual trunk piston 11, having its hollow extension 12 surrounded by the return or release spring 13, and 14 is a push rod within said extension 12 and so arranged that its inner end abuts against the piston 11, as shown in Figure 2.

Referring to Figure 1, the outer end of the push rod 14 is provided with a piston head 15 having a packing ring 16. Said push rod 14 and piston head 15 travel back and forth within a movable and closed compensating cylinder 17. The closed cylinder 17 has its outer end 18 or section farthest removed from the brake cylinder 10 extended and forked and pivotally connected by means of pin 19 to a brake lever 20 operating the usual or common form of braking mechanism applying the brake shoes, not shown.

Within the cylinder 17 is a coil spring 21, one end of which reacts against the piston head 15 while its other end is seated preferably about a hollow conical extension 22 within cylinder 17 and abuts against the closed end 18 of said cylinder 17. The closed end 18 of the cylinder 17 is provided with an opening closed by a plug 23 for the purpose of filling said cylinder 17 between the piston head 15 and end 18 with oil or other non-freezing fluid.

Secured by straps 24 or any other suitable means to the upper side of the movable compensating cylinder 17 is a storage tank 25 for receiving any surplus of oil or other non-freezing fluid, for purposes as will be presently described, said tank 25 being provided at its upper section with a vent opening 26, as indicated.

The lower portion of the compensating cylinder 17 is provided with an opening 27 having a suitable valve seat on which a check valve 28 is adapted to be seated and unseated, said opening 27 being in communication by means of a coupling 29 and pipe 30, with the bottom or lowest portion of the storage tank 25. 31 is a screw plug in said coupling 29 directly below valve 28, and is adapted to engage the stem 33 of said valve 28 and unseat the valve from its seat, as will be readily understood.

The parts being constructed and arranged as shown in Figure 1, in which the brake cylinder piston 11 has reached the extreme limit of travel by reason of the brake shoes having been worn out, the manner of adjusting and operating the invention is as follows:—

The plug 23 is removed and oil or other non-freezing fluid is deposited into the cylinder 17 after the valve 28 has been unseated by means of adjusting the screw plug 31. Said oil or other suitable fluid is introduced by pressure or any other suitable manner into the cylinder 17 until the level of the...
oil in the storage tank 25 is preferably on the line a—a.

The worn out brake shoes having been removed and new ones put in their place, force or pressure is then applied or exerted on the brake lever 20 in such a direction as to compress the spring 21 to such an extent as to cause the piston head 15 to abut against the inner end of the conical extension 22 and properly adjust brake lever 20. During this movement of the piston head 15, the oil within the cylinder 17 is forced through the opening 27 beyond the check valve 28 into pipe 30 and storage tank 25, as will be readily understood. The screw plug 31 is then turned down so as to permit the check valve 28 to be seated, and when the force applied to the end of brake lever 20 is removed, the spring 21 will react against the piston head 15 and force or adjust the compensating cylinder end 18 in such a position with respect to the head 15 as to take up any slack between the end of push rod 14 and its seat on piston 11 to properly and unyieldingly apply the brake shoes. During the foregoing adjustment of the movable compensating cylinder 17 and movement of the conical extension 22 from the piston head 15, oil is withdrawn from the storage tank 25 into the cylinder 17, and hence when air pressure is applied to the piston 11, the push rod 14 through head 15 acts against an immovable and incompressible fluid due to the seating of valve 28, and transmits its motion to the cylinder end 18 and through the brake lever 20 to the brake shoes. As the brake shoes wear or any slack is developed, the spring 21 immediately and automatically adjusts the piston head 15 with respect to the conical extension 22, with a corresponding inflow of oil into the cylinder 17, as herebefore described, and again restores a constant and rigid connection between piston head 15 and brake lever 20.

The same functions and operations are carried out in Figure 2 as just described, with the exception that oil or fluid is on both sides of the piston head 151, and in said Figure 2, cylinder 171, cylinder end 181, conical extension 221, pin 191, brake lever 201, coil spring 211, plunger 281, storage tank 251 and vent 261 are substantially the same as shown and described with reference to Figure 1. In Figure 2, the piston head 151 is provided with one or more check valves 281, which will unseat themselves and permit the two separated chambers in the cylinder 171 formed by the piston head 151 to be in communication with each other when the piston head 151 moves to the left and in the direction of the brake cylinder 10. The interiors of both ends of the cylinder 171 are connected with each other by a pipe 301 and the communication through said pipe 301 can be cut off by a valve 302 during the normal operation of the compensating device. 303 is a pipe connecting the interior of the tank 251 with the end of the movable compensating cylinder 171 nearest to the brake cylinder 10.

The operation of this last referred to modification is as follows:—

When it is desired to adjust the compensating device after the piston head 151 is at the extreme left of the cylinder 171, as shown for example in Figure 1, and brake shoes are worn out, communication is established between the ends of cylinder 171 through pipe 301 by opening valve 302. Then force or pressure is applied to the brake lever 201 to compress the spring 211, when the oil in the cylinder chamber on the right of piston head 151 is forced through pipe 301 into cylinder chamber on the left of piston head and through pipe 303 into storage tank 251, and after all slack is taken up by no further movement of brake lever 201 and compensating cylinder can be affected, the valve 302 is closed leaving the cylinder chamber on right of piston head 151 completely filled with entrapped oil, and all the parts will assume the position shown in Figure 2. Now as the brake shoes wear, the spring 211 immediately and automatically pushes the piston head 151 against the confined oil in cylinder chamber on the left of said piston head 151 and forces said oil through the check valves 281, and on applying the brakes the actuation of the piston 11 moves the push rod 14 and piston 100 head 151 to the right, which operation forces the check valves 281 on their seats and the motion of said piston head 151 is transmitted through the incompressible fluid to the cylinder 171 and through the brake lever 201 to the brake shoes, as previously outlined with respect to the operation of the form shown in Figure 1.

From the foregoing description of the combination, mode of adjusting and operating the same, it will be seen that all of the objects and advantages recited in the statement of invention have been fully and efficiently carried out, and while I have shown my preferred form of the invention, many other modifications would readily suggest themselves and yet be within the spirit of the present invention and scope of the claims, as for example, should the push rod 14 be attached to a brake cylinder piston 11 as is the custom in passenger service, then the spring 21 or 211 would not be necessary as the release spring 13 in brake cylinder 10 would perform the same function as said spring 21 or 211.

What I claim is:—

1. An automatic slack adjuster for railway brakes comprising a fixed brake cylinder, a piston in said brake cylinder, a push rod actuated by said piston, a piston head on
one end of said push rod, a brake lever, a movable compensating cylinder fitted fluid-tight upon and reciprocating on said piston head and connected with said brake lever, means normally tending to force said compensating cylinder from the piston head, and means for entrapping a fluid in the compensating cylinder between one side of the piston head and one end of said compensating cylinder.

2. An automatic slack adjuster for railway brakes comprising a fixed brake cylinder, a piston in said brake cylinder, a push rod actuated by said piston, a piston head on one end of said push rod, a brake lever, a movable compensating cylinder fitted fluid-tight upon and reciprocating on said piston head and connected with said brake lever, means normally tending to force said compensating cylinder from the piston head, and means for automatically entrapping different volumes of a fluid in the compensating cylinder between one side of the piston head and one end of said compensating cylinder as said compensating cylinder is forced from said piston head.

3. An automatic slack adjuster for railway brakes comprising a fixed brake cylinder, a piston in said brake cylinder, a push rod actuated by said piston, a piston head on one end of said push rod, a brake lever, a movable compensating cylinder fitted fluid-tight upon and reciprocating on said piston head and pivotally connected with said brake lever, a spring normally tending to force said compensating cylinder from the piston head, a storage tank, and means for automatically entrapping a fluid received from the storage tank in the compensating cylinder between one side of the piston head and one end of said compensating cylinder.

4. An automatic slack adjuster for railway brakes comprising a fixed brake cylinder, a piston in said brake cylinder, a push rod actuated by said piston, a piston head on one end of said push rod, a brake lever, a movable compensating cylinder fitted fluid-tight upon and reciprocating on said piston head and connected with said brake lever, a spring within the compensating cylinder and reacting against said piston head and one end of the compensating cylinder, and means for entrapping a fluid within the compensating cylinder between the piston head and said one end of the compensating cylinder.

5. An automatic slack adjuster for railway brakes comprising a fixed brake cylinder, a piston in said brake cylinder, a push rod actuated by said piston, a piston head on one end of said push rod, a brake lever, a movable compensating cylinder fitted fluid-tight upon and reciprocating on said piston head and pivotally connected with said brake lever, a coil spring within the compensating cylinder and abutting against said piston head and one end of the compensating cylinder, and means for automatically drawing in and entrapping a fluid within the compensating cylinder between the piston head and said one end of the compensating cylinder.

6. An automatic slack adjuster for railway brakes comprising a fixed brake cylinder, a piston in said brake cylinder, a push rod actuated by said piston, a piston head on one end of said push rod, a brake lever, a movable compensating cylinder fitted fluid-tight upon and reciprocating on said piston head and pivotally connected with said brake lever, a spring within the compensating cylinder and abutting against said piston head and one end of the compensating cylinder, a storage tank, means for automatically withdrawing fluid from said tank and entrapping said fluid within the compensating cylinder between the piston head and said one end of the compensating cylinder, and means for releasing said entrapped fluid from said compensating cylinder.

In testimony whereof I affix my signature.

BRODERICK HASKELL.