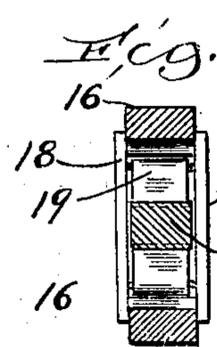
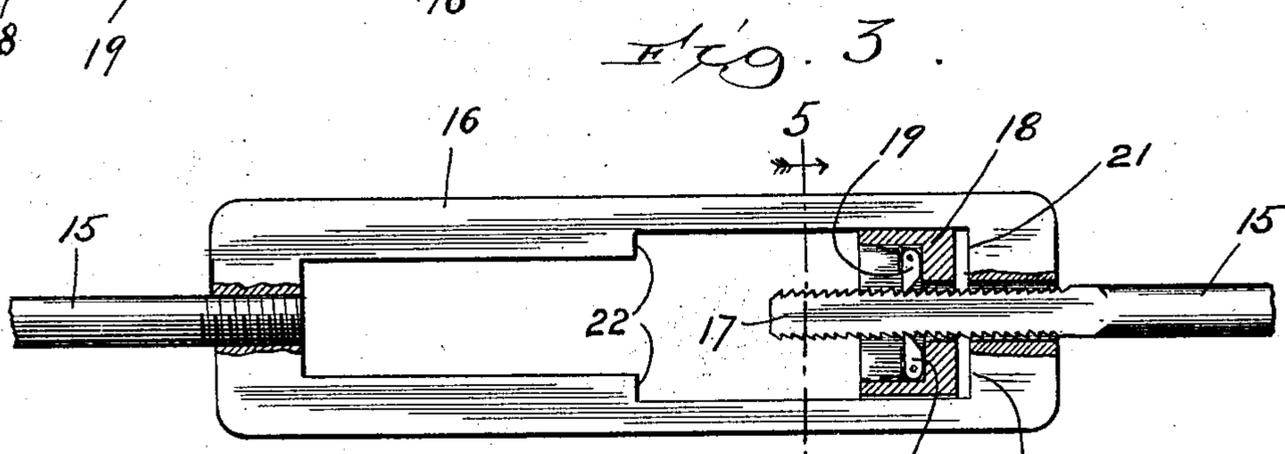
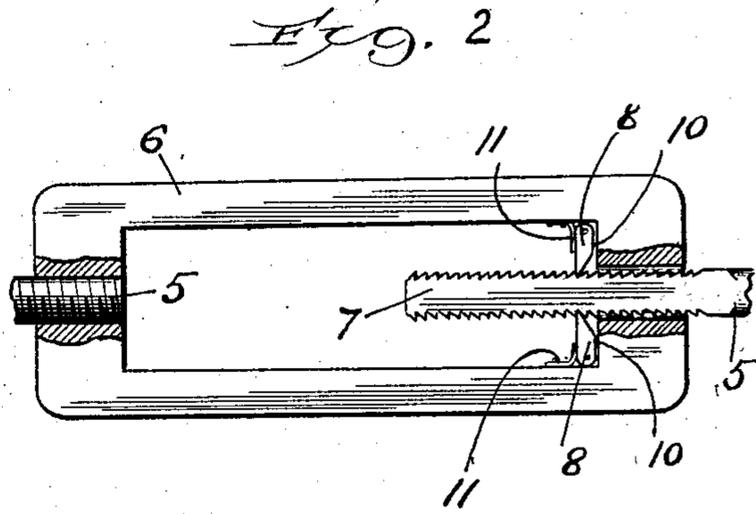
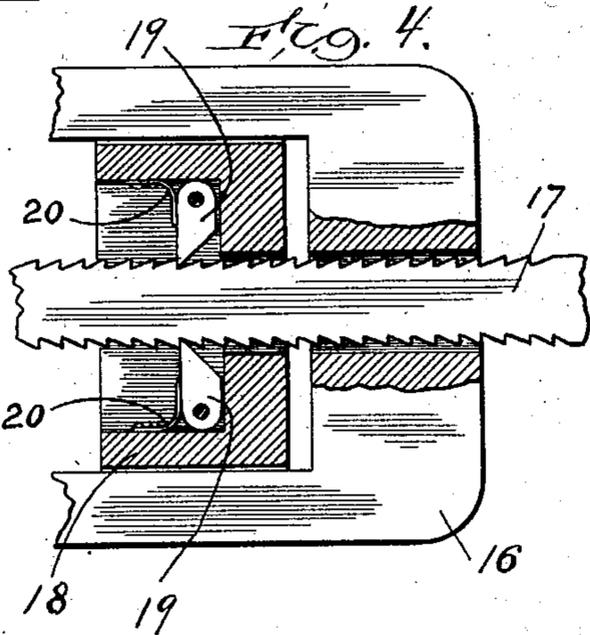
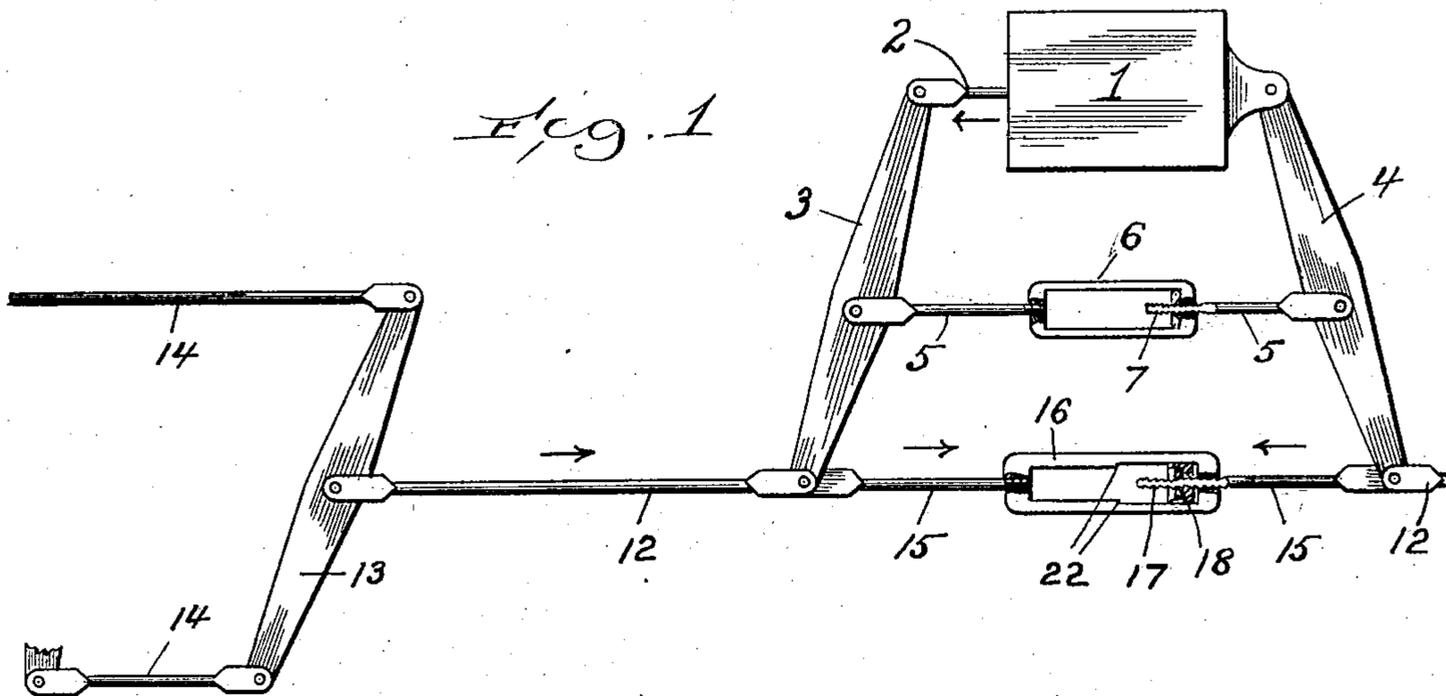


F. K. HOWARD.
SLACK ADJUSTER.

APPLICATION FILED MAY 26, 1902.

NO MODEL.



Witnesses:
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UNITED STATES PATENT OFFICE.

FREDERICK K. HOWARD, OF CHICAGO, ILLINOIS.

SLACK-ADJUSTER.

SPECIFICATION forming part of Letters Patent No. 720,147, dated February 10, 1903.

Application filed May 26, 1902. Serial No. 109,068. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK K. HOWARD, a citizen of the United States, residing in the city of Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Slack-Adjusters, of which the following is a specification.

My invention relates to slack-adjusters for railway-brakes; and the object of my invention is to provide simple and positive acting means for automatically taking up the slack resulting from wear on the brake-shoes and other parts of the mechanism. I attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a general plan of the mechanism. Figs. 2 and 3 are enlarged views, partially in section, showing separately the main and auxiliary take-up links. Fig. 4 is a detail view of the sliding housing of the auxiliary take-up. Fig. 5 is a sectional view looking in the direction of the arrows on the line 5 5, Fig. 3.

Similar numerals refer to similar parts throughout the several views.

1 represents the cylinder, which is supported in any suitable manner from the car-body and furnishes the power for operating the brake mechanism. The piston 2 is operated by said cylinder and is pivotally connected at its outer extremity to the cylinder-lever 3. It is usual to employ a single cylinder for operating the brakes at both ends of the car, and therefore a second cylinder-lever 4 is provided, which corresponds to said lever 3, but is pivotally attached at a fixed point, preferably at the rear extremity of the cylinder 1.

The main tie-rods 5 5 are pivotally attached to the levers 3 and 4 between the extremities thereof and operate to set up fulcrum-points in said levers. One of said rods 5 is screwed into or otherwise rigidly attached to the main take-up link 6. The free extremity of the second rod 5 has a portion 7 provided with ratchet-teeth adapted to engage the pawls 8 8, pivotally mounted within said link. Said link is apertured at its extremity opposite to the first rod 5, as best shown in Fig. 2. Said pawls and ratchet-teeth are so arranged that the ratchet portion 7 is permitted to move

farther into the link 6, but is prevented from moving outwardly by the engagement of said pawls with the ratchet-teeth. In order that said pawls may have a firm bearing to resist the tension in the rods 5, they are so placed as to contact the shoulders 10, formed at the extremity of said main link. The springs 11 are so mounted as to tend to force said pawls to a bearing against said link, thereby preventing accidental disengagement from the teeth on the ratchet portion 7. The remaining extremities of the levers 3 and 4 are pivotally attached to the connecting-rods 12.

In the drawings a lever 13 is shown to be pivotally attached at its extremities to the brake-rods 14 14 and to be attached intermediate of its extremities to the said connecting-rod 12. The precise mode of attachment to the brake-shoes, however, is not essential, as various arrangements are well known to those skilled in the art, and it is sufficient for an understanding of my invention to state that the brake parts are so arranged that the movement of the levers 3 and 4, so as to draw the rods 12 12 toward each other, tends to set the brakes. The movement of the rods 12 in the opposite direction—that is to say, in the direction opposite to the adjacent arrows—tends to release the brakes.

The auxiliary tie-rods 15 15 are each pivotally connected to one of the levers 3 4 at a point non-intermediate of the point of attachment of the rods 5 and cylinder connections. One of said rods 15 is screwed or otherwise rigidly attached to the auxiliary take-up link 16, while the second of said rods terminates at its inner extremity with a portion 17, provided with ratchet-teeth. The extremity of said link 16 opposite to the point of attachment of the first-mentioned auxiliary tie-rod is apertured to receive the ratchet portion of said second auxiliary tie-rod, as best shown in Fig. 4. The housing 18, which is slidingly mounted within said link 16, is also apertured to receive said ratchet portion 17 of the rod 15. Said housing is by preference chambered out to receive the pawls 19 and springs 20 acting thereon. The chief advantage in thus chambering the housing lies in the protection thereby afforded to the said pawls and springs. The arrangement of the said springs and

pawls is such that the ratchet portion 17 of rod 15 is permitted to enter farther into the housing, but is prevented from withdrawing therefrom by the said pawls. The springs 20 tend to force their pawls into engagement with the teeth of the ratchet portion 17 for preventing accidental releasing of the latter. The travel of the housing on the link 16 is limited by the shoulders 21, formed at the extremity of said link, and by the shoulders 22, formed intermediate of the extremities of said link. The springs 20 are made stiff and strong enough to enable their pawls to engage the ratchet portion 17 with sufficient pressure to cause the housing 18 to maintain its location on said ratchet portion during the free sliding of said housing on the link. When, however, the ratchet-bearing tie-rod 15 continues to move inward toward the shoulders 22 after the housing has come to a stop against said shoulders, the springs permit the pawls 19 to release the ratchet portion and allow the same to continue its motion. The continued motion of the ratchet-bearing rod 15 after the housing has contacted the shoulders 22 causes the housing to permanently move farther up on said rod, thereby shortening the distance which said rod can be subsequently withdrawn from the link.

In order to facilitate an understanding of the device, suppose that the brakes are to be set and that the auxiliary tie-rods 15 and link 16 are not present. To set the brakes, the piston 2 will move outward and cause the brake-rods 14 to move inwardly in the direction of the arrows adjacent to the respective parts, the main tie-rods 5 setting up fulcrums at their points of attachment to the levers 3 and 4. Now if the acting length of the rods 5 is too great the movement in the rods 12 will be too small and the brake-shoes will not operate properly. To remedy such defect and adjust the mechanism, the acting or virtual length of the rods 5 must be shortened, and this adjusting or taking up of the slack is accomplished automatically by the aid of the auxiliary tie-rods 15 and link 16. The oscillation or swinging of the levers 3 4 about their fulcrums will cause the rods 15 to approach and recede toward and from each other. When the mechanism is in proper adjustment, such motion of the rods 15 will cause the housing 18 to slide along the link 16 without striking either the shoulders 21 or 22 thereon. When, however, the brake system has become slack from any cause, the piston 2 when at its extreme outer travel will not have set the brakes sufficiently tight—that is to say, will not have caused the rods 15 to have approached sufficiently near toward each other. In this condition on the return stroke of the piston while traveling backward into the cylinder to release the brakes the housing 18 will strike against the shoulders 21. Now as the rods 15 cannot recede any farther they set up a temporary fulcrum in each of the levers 3 4 where said rods 15 and levers 3 4

are connected. The continued motion of the piston causes the rods 5 to approach each other, with the result that the ratchet portion 7 is engaged by its pawls higher up, thus shortening the virtual or acting length of said rods 5, and thereby taking up slack in the brake system. After the slack is thus taken up in the main tie-rods the subsequent setting of the brakes will cause the auxiliary rods 15 to approach each other; but as the rods 5 are now shortened the housing 18 will strike against the shoulders 22 on the link 16 before the rods 15 have completed their mutual approach. This will result in the ratchet portion 17 being pushed farther into the housing and the pawls 19 will engage said ratchet portion 17 higher up than before. The take-up mechanism is therefore again in condition to operate to again shorten the rods 5 when occasion shall require.

Although I have described my device in its double form, with both levers 3 and 4 movable to set the brakes at the opposite ends of the car, the mechanism would operate in substantially the same manner on either one lever if the other lever were fixed. For example, if lever 4 were fixed or if, which is the same thing, the rods 5 and 15 now connected to said rods were attached to any fixed points the effect of the mechanism on the lever 3 would be unchanged.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a slack-adjuster, the combination of a cylinder, levers connected to said cylinder for operating the brakes, main tie-rods connecting said levers between the ends thereof, a ratchet device connecting said main tie-rods for taking up slack therein, auxiliary tie-rods connected to said levers at a portion non-intermediate of the cylinder and main tie-rods, and an auxiliary ratchet device connecting said auxiliary tie-rods for supplementing the action of said main ratchet device, said auxiliary ratchet device having a definite travel through which it is inoperative.

2. In a slack-adjuster, the combination of a cylinder, levers connected to said cylinder for operating the brakes, main tie-rods connecting said levers between the ends thereof, a ratchet device connecting said main tie-rods for taking up slack therein, auxiliary tie-rods connected to said levers at a portion non-intermediate of the cylinder and main tie-rods, a link rigidly secured to one of said auxiliary tie-rods, and a ratchet device connected to the second of said auxiliary tie-rods, said auxiliary ratchet device being slidingly mounted on said link and having a limited amount of travel thereon.

3. In a slack-adjuster, the combination of a cylinder, levers connected to said cylinder for operating the brakes, main tie-rods connecting said levers between the ends thereof, a ratchet device connecting said main tie-rods for taking up slack therein, auxiliary

tie-rods connected to said levers at a portion
non-intermediate of the cylinder and main
tie-rods, a link rigidly secured to one of said
auxiliary tie-rods, and a housing slidingly
5 mounted and having a definite amount of
travel on said link, ratchet-teeth on the sec-
ond of said auxiliary tie-rods, and pawls

mounted in said housing for engaging the
ratchet-teeth on said second auxiliary tie-rod.

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