No. 850,856. PATENTED APR. 16, 1907.

E. M. SWIFT.

# AUTOMATIC SLACK ADJUSTER FOR BRAKES.

APPLICATION FILED NOV. 9, 1906.

2 SHEETS—SHEET 1.

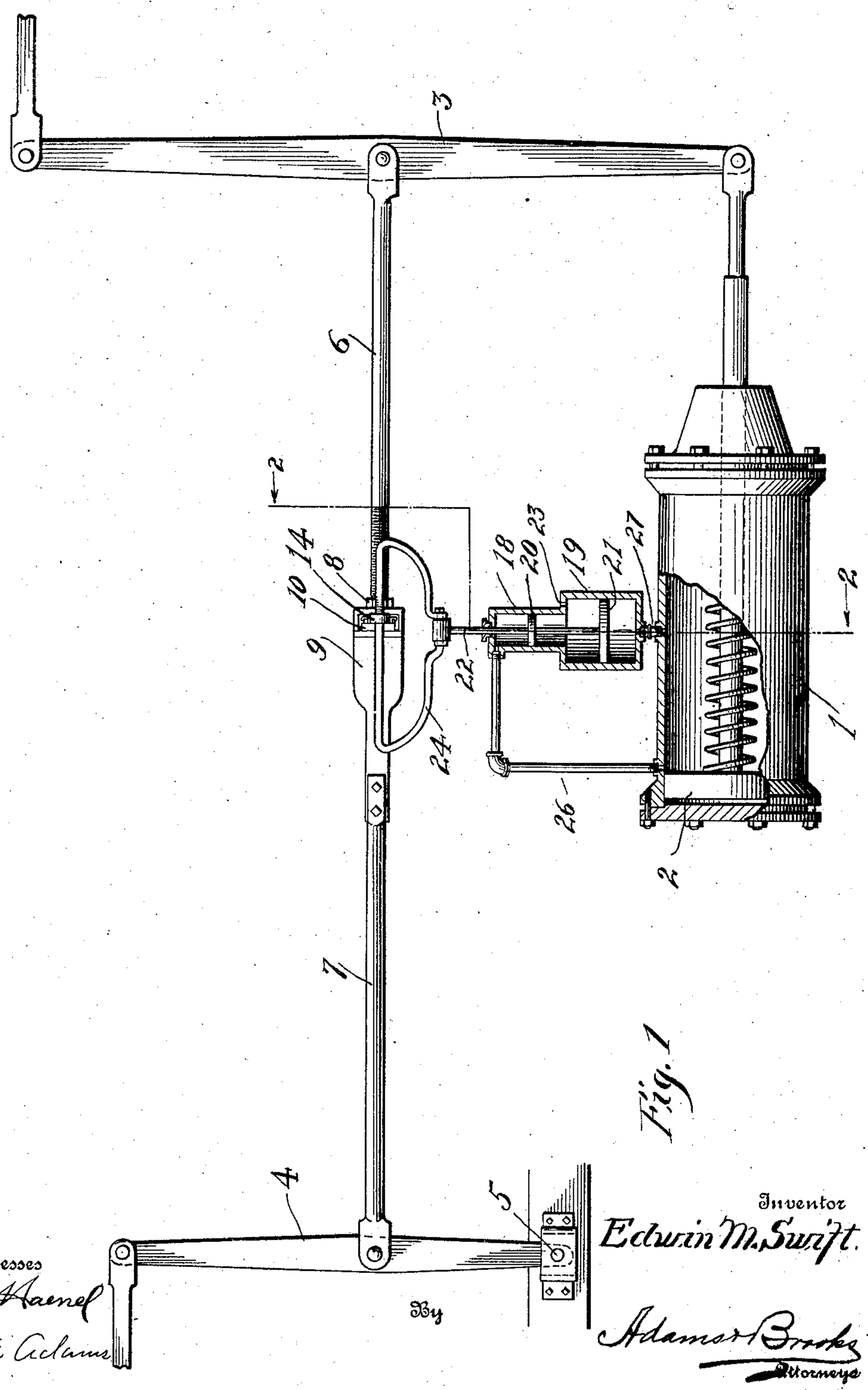


Fig. 1.

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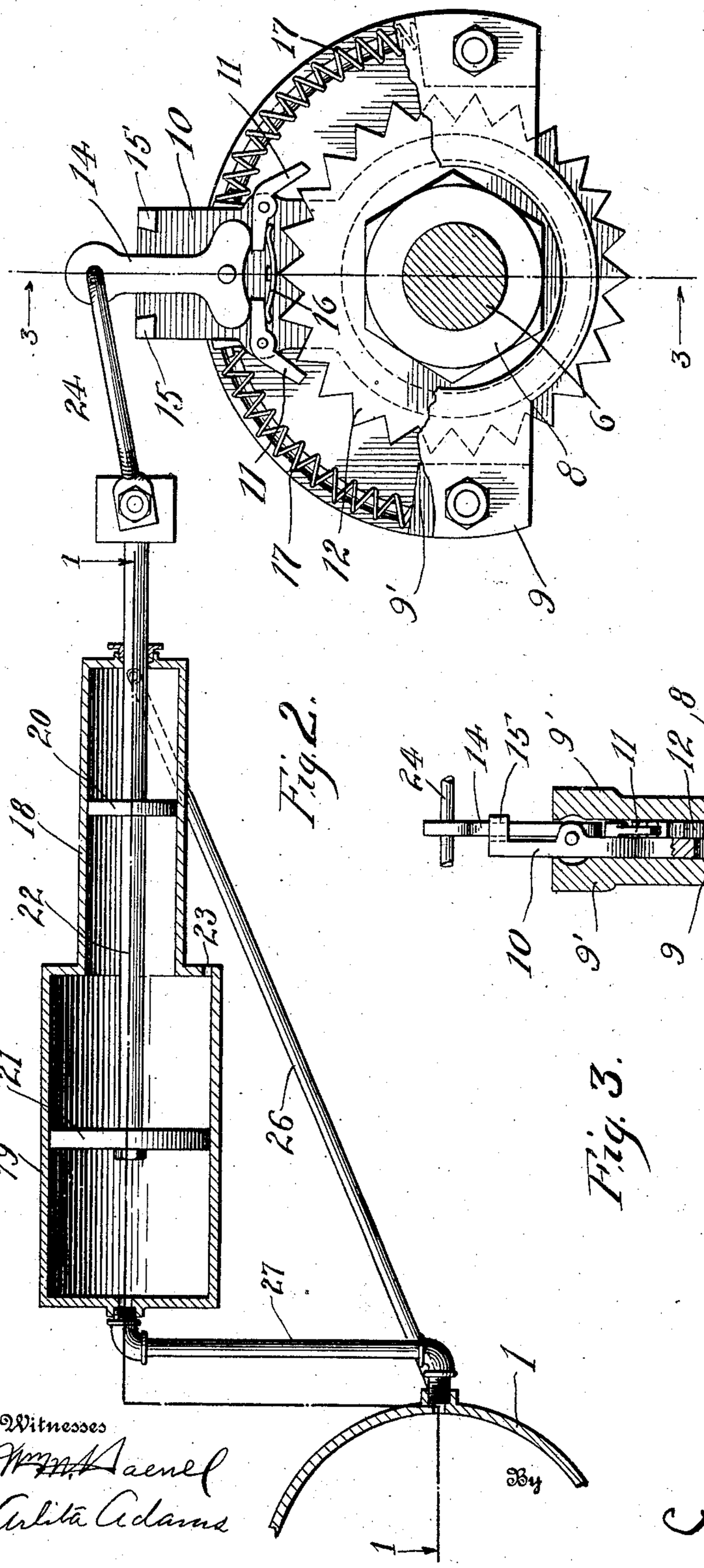


Fig. 2.




Fig. 3.

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# UNITED STATES PATENT OFFICE.

EDWIN M. SWIFT, OF BALLARD, WASHINGTON.

## AUTOMATIC SLACK-ADJUSTER FOR BRAKES.

No. 850,856. Specification of Letters Patent. Patented April 16, 1907.

Application filed November 9, 1906. Serial No. 342,740.

*To all whom it may concern:*

Be it known that I, EDWIN M. SWIFT, a citizen of the United States of America, and a resident of the city of Ballard, in the county of King and State of Washington, have invented certain new and useful Improvements in Automatic Slack-Adjusters for Brakes, of which the following is a specification.

The primary object of my invention is to provide a simple and efficient mechanism for embodiment in brake systems to eliminate slack or lost motion and to insure a more equal movement of the brake-piston.

With the above and other desirable objects hereinafter set forth in view my invention resides in the construction, combination, and arrangement of parts, as set forth in this specification and defined in the appended claims.

With reference to the accompanying drawings, wherein similar reference-numerals designate corresponding parts throughout, Figure 1 is a sectional plan view taken on line 1 1 of Fig. 2, showing my invention applied to the brake-cylinder and adjacent levers of an ordinary brake system. Fig. 2 is a vertical section taken on line 2 2 of Fig. 1, and Fig. 3 is a fragmentary longitudinal section taken on line 3 3 of Fig. 2.

In the drawings, reference-numeral 1 designates the brake-cylinder, 2 the piston thereof, and 3 and 4 the cylinder-levers of an ordinary brake system, the lever 3 being connected to the rod of piston 2 and the lever 4 being fulcrumed, as at 5, in any convenient manner.

Connected with the lever 3 and 4, respectively, are rods 6 and 7, the former of which has screw-threaded engagement with a nut 8, rotatably seated in a head 9 of the rod 7, whereby the relative positions of these levers may be adjusted by turning said nut.

Reference-numeral 10 designates a carrier rotatably mounted between cheeks 9′ of the head 9 and carrying oppositely-disposed pawls 11, which are related to a ratchet 12, rotatable with the nut 8. These pawls are normally held from engagement with the ratchet by a stem 14, pivotally mounted on the carrier 10 between stops 15 thereof, which are spaced apart to permit the stem to be swung independently of the carrier a suitable distance in either direction to release one or the other of the pawls, so that the spring 16 may act to set the same for engagement with the ratchet 12. Mounted on the head 9 are springs 17, which are suitably arranged to return the carrier 10 after it has been swung from normal position in either direction.

Reference-numerals 18 and 19 designate fluid-motor cylinders which have relatively small and large cross-sectional areas, respectively, and are conveniently arranged in alinement with their respective adjacent ends open to each other. In the cylinders 18 and 19 are pistons 20 and 21, respectively, which are secured to a common piston-rod 22 at opposite sides of a vent 23, common to both of said cylinders.

Swingably connected with the outer end of the piston-rod 22 is a link 24, which is formed with an elongated side bar slidably engaged in a suitable aperture provided in the stem 14, so that the latter may slide along the link when the brake-levers are operated.

While fluid for operating the motor-piston 20 and 21 may be otherwise introduced, I preferably connect the cylinders 18 and 19 with the brake-cylinder 1 in such a manner that when motive fluid is admitted thereto and imparts a primary movement to piston 2 fluid will then pass to cylinder 18 and act upon its piston to move rod 22 in one direction, and when the movement of piston 2 exceeds that required to apply the brakes under normal conditions fluid will pass to cylinder 19 and act upon the piston to move rod 22 in the opposite direction. For the purpose of admitting fluid to the cylinders 18 and 19, as above described, I have shown a pipe 26 leading from the intake end of the brake-cylinder to the outer end of cylinder 18 and a pipe 27 connected with the brake-cylinder intermediate its ends and leading to the outer end of cylinder 19.

When fluid is admitted to the brake-cylinder in applying the brakes and moves piston 2 past the intake end of pipe 26, it flows into cylinder 18 and acts upon piston 20 to move the rod 22 inwardly, thereby adjusting the stem 14 to release the pawl 11 on the right as viewed in Fig. 2 and swinging carrier 10 to the left. If the brakes are applied before the piston 2 moves past the intake end of pipe 27, the spring 17, depressed by movement of carrier 10, acts when the fluid is released from the brake-cylinder to return said carrier with the released pawl in engagement with the ratchet 12, thereby turning nut 8 to lengthen the connection be-

tween the brake-levers, so that greater travel of the piston 2 is required upon a subsequent operation thereof to set the brakes. Should the piston 2, however, travel past the intake end of pipe 27, fluid will pass into cylinder 19 and act upon piston 21 to move the rod 22 outwardly, thereby reversing the relative positions of the pawls and moving the carrier to the right. The carrier during this setting operation of the pawls is held against rotation by the power applied to rod 6 from the brake-cylinder. When the fluid is released from the brake-cylinder, the spring 17, depressed by the carrier, returns the latter to normal position with the pawl on the left in engagement with ratchet 12, thereby turning nut 8 to shorten the connection between the brake-levers. As the pawls 11 normally lie disengaged from the ratchet 12, it will be apparent that the adjustable connection between the levers 3 and 4 may be lengthened or shortened, as may be desired, by applying a wrench to nut 8 to turn the same.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States of America, is—

1. In a slack-adjuster, the combination of the rods adjustably connected, mechanism for effecting adjustment of said rods, and means operative in reverse directions by fluid to set the said mechanism for operation in opposite directions.

2. In a slack-adjuster, a pair of rods, a head on one rod, a nut on the other rod rotatably seated in said head, a ratchet in said head rotatable with said nut, mechanism for effecting movement of said ratchet, and means operative in reverse directions to set the said mechanism for operation in either direction.

3. In a device of the character described, a nut, a ratchet rotatable with said nut, adjusting mechanism for said ratchet, and means operative in reverse directions by fluid to set the adjusting mechanism for operation in either direction.

4. In a slack-adjuster mechanism, a ratchet supported for rotation in opposite directions, and mechanism for operating said ratchet including two fluid-motors of relatively small and large cross-sectional area.

5. In a slack-adjuster mechanism, a ratchet supported for rotation in opposite directions, adjusting mechanism therefor, two fluid-motors connected with the adjusting mechanism to operate the same in relatively opposite directions, and means for admitting fluid to said motors one after the other.

6. In a slack-adjuster mechanism, a ratchet, adjusting mechanism therefor, the brake-cylinder and piston therein, and fluid-operative means for operating said adjusting mechanism connected with said cylinder to receive therefrom at different points in the travel of the piston.

7. In a slack-adjuster mechanism therefor, a brake-cylinder and the piston therein, and means for operating the adjusting mechanism automatically in relatively opposite directions at different points in the travel of the brake-piston.

8. In a slack-adjuster mechanism, an adjusting-nut, and means for operating the same in reverse directions, said means being normally in a released position relating to the nut so that the latter is free for operation normally.

9. In a slack-adjuster mechanism, an adjusting-nut, a ratchet movable with said nut, a carrier, opposite pawls for engagement with said ratchet, and means connected with the carrier and related to said pawls to normally hold them inactive.

10. In a slack-adjuster mechanism, an adjusting-nut, a ratchet movable with said nut, a carrier, opposite pawls on said carrier, a stem pivoted to said carrier and related to said pawls to release them from engagement with the ratchet, and stops on the carrier on opposite sides of said stem.

11. In a slack-adjusting mechanism, an adjusting-nut, a ratchet movable with said nut, a carrier, pawls on said carrier adapted for alternate engagement with said ratchet, means for setting said pawls, means for operating said carrier, and springs on opposite sides of said carrier for returning the carrier to its normal position.

12. In a slack-adjusting mechanism, an adjusting-nut, a ratchet movable with said nut, a carrier supported for rotation and provided with a pawl for engagement with said ratchet, a stem on the carrier, means for operating said carrier, and a link connection between said means and carrier having an elongated side bar slidably engaged in an aperture in said stem.

13. In a slack-adjusting mechanism, in combination with the brake-cylinder, the piston therein, and the lever-connecting rods, a plurality of cylinders receiving fluid successively from the brake-cylinder, pistons operating in said last cylinders and mechanism for adjusting said rods to lengthen or shorten the same operated by said last-named pistons.

Signed at Seattle, Washington, this 1st day of November, 1906.

EDWIN M. SWIFT.

Witnesses:

STEPHEN A. BROOKS,

ARLITA ADAMS.