C. O. ANDERSON.

SLACK ADJUSTER FOR RAILWAY BRAKES.

APPLICATION FILED APR. 14, 1913.

1,125,035. Patented Jan. 19, 1915.

Fig. 1.

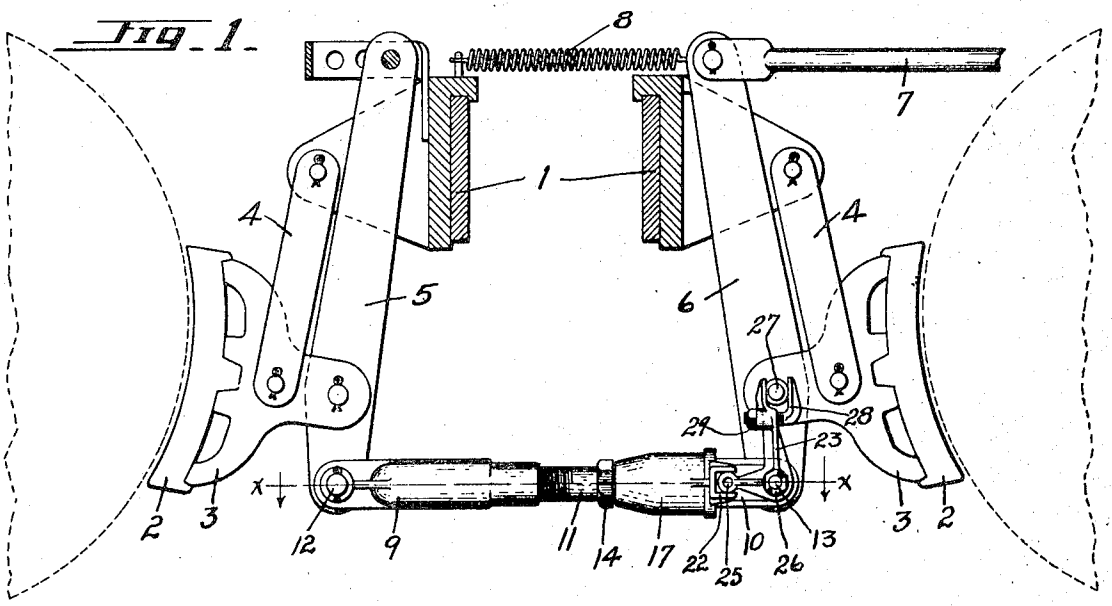


Fig. 2.

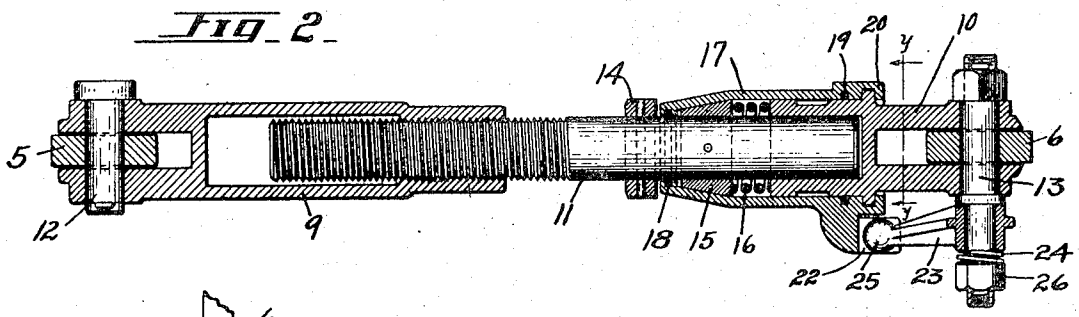
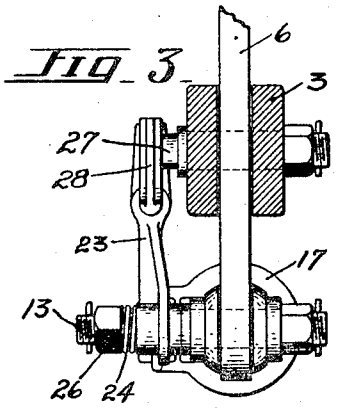


Fig. 3.



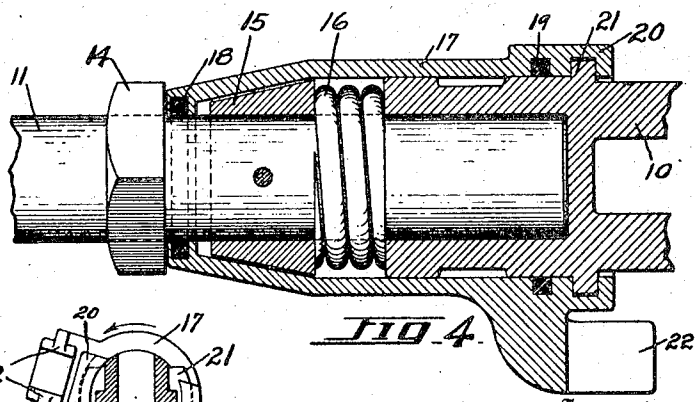
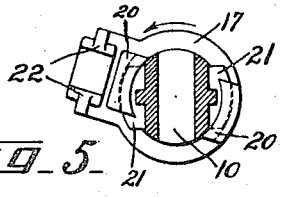


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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SLACK-ADJUSTER FOR RAILWAY-BRAKES.

1,125,035. Specification of Letters Patent. Patented Jan. 19, 1915.

Application filed April 14, 1913. Serial No. 761,055.

To all whom it may concern:

Be it known that I, CHARLES O. ANDERSON, a citizen of the United States, and a resident of Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Slack-Adjusters for Railway-Brakes, of which the following is a specification.

My invention relates to mechanism for automatically adjusting the slack of railway brake rigging and compensating for wear thereof, especially for wear of the brake-shoes.

It is the object of my invention to provide a simple, reliable, durable and economical mechanism for this purpose.

Constructions embodying my invention are illustrated in the accompanying drawings, wherein—

Figure 1 is a side view of the adjusting mechanism and the associated parts of the brake-rigging, Fig. 2 is a longitudinal horizontal section of the adjuster, the section being on the plane of the line *x*—*x* of Fig. 1, Fig. 3 is a detail end view of the same, Fig. 4 is a detail section through the clutch-parts, taken on the same plane as in Fig. 2, and Fig. 5 is a detail transverse section on the line *y*—*y* of Fig. 2, illustrating the assembling of the clutch-sleeve and head.

Referring to Fig. 1, there is shown a part of the frame 1 of a truck, brake-shoes 2, heads 3 carrying the shoes, hangers 4 for supporting the heads, dead and live truck-levers 5 and 6, a brake-rod 7 for applying power to the live truck-lever, and a release spring 8 for actuating the live-lever to release the brakes. All of the foregoing parts are of ordinary construction and arrangement and operate in a well-known manner.

In the illustrated construction my slack-adjusting mechanism provides a variable connecting member between the lower ends of the dead and live truck-levers 5 and 6, and depends for its operation upon the varying angular relations between one of the truck-levers and said connecting member during the application and releasing of the brakes, the length of the connecting member being automatically changed to compensate for wear of the parts.

The connecting member comprises three parts, which are movable relatively to each other and are arranged serially between the connected ends of the truck-levers. The said parts are the end-pieces or heads 9 and 10, and the intermediate part or threaded rod 11. The head 9 is forked at one end and straddles the dead-lever 5, being pivotally connected therewith by the pin 12. The other end of said head is of tubular form and is internally threaded to receive the threaded part of the rod 11. The head 10 is also forked at one end, the forked portion straddling the live-lever 6 and being pivotally connected therewith by the pin 13. The opposite end of the head 10 has a cylindrical recess therein in which the plain cylindrical end of the rod 11 fits slidably and rotatably.

Upon the central part of the rod 11 is secured a hexagonal collar 14, for use in rotating the rod manually when the mechanism is assembled, or when it is reset after a period of operation. A conical clutch-collar 15 is also secured upon the rod, adjacent to the end of the head 10, and between the head and clutch-collar a spring 16 is disposed around the rod.

A clutch-sleeve 17 fits revolubly upon the end portion of the head 10 and extends out over the clutch-collar 15 and spring 16 so as to inclose them. The portion of the sleeve adjacent to the collar 15 is of conical form so that the collar will fit therein, and the collar is normally held in frictional engagement with the sleeve by the pressure of the spring 16. The portion of the sleeve extending beyond the collar fits easily upon the rod 11 and is provided with a packing-ring 18 disposed in an annular groove adjoining the rod, as shown. The other end of the sleeve has a similar packing-ring 19 which fits against the head 10. On the latter end of the sleeve are two projecting lips 20 which are grooved annularly on their inner sides, so that they will fit over the lugs 21 on the sides of the head 10. In assembling the head and sleeve, the latter is passed longitudinally over the head with the lips 20 not in longitudinal alinement with the lugs 21. After the end of the sleeve engages the lugs the sleeve is rotated as indicated in Fig. 5 so that the lugs pass into the annular grooves in the lips. The sleeve and head are thus retained in fixed longitudinal relation to each other, but so that the sleeve may be rotated relatively to the head.

On the side of the sleeve adjacent to one

of the lips 20 is a laterally projecting lug from which the spaced parallel jaws 22 extend out longitudinally of the sleeve. A bell-crank 23 is pivotally mounted on the projecting end-portion of the pin 13. The bell-crank is retained on the pin by means of a nut 26 screwed onto the end of the pin, and a spring 24 is disposed around the pin between the nut and bell-crank, as shown in Figs. 2 and 3, said spring frictionally engaging the bell-crank to prevent undue movement and rattling of the same. One arm of the bell-crank extends approximately horizontally and has at its end a ball 25 which fits between the jaws 22 on the clutch-sleeve. The other arm of the bell-crank extends upwardly adjacent to the truck-lever fulcrum-pin 27 and is, in effect, forked so as to straddle the projecting end of said pin. One side of the forked end of the arm is formed by a finger 28, the same having a threaded stem which is screwed through the main part of the arm, so that by turning the same the space between the forks may be varied. A suitable lock-nut 29 is provided for holding the threaded stem and finger in adjusted positions.

By suitable adjustment of the finger 28, the width of the space between the forks is made such that a normal movement of the truck-levers, in applying and releasing the brakes, may occur without causing movement of the bell-crank, the pin 27 merely passing from one side of the space to the other. When, however, a movement of the levers greater than the normal is required to apply the brakes, then the bell-crank will be moved in one direction as the brakes are applied, and moved in the opposite direction when the brakes are again released, the amount of movement being proportional to the excess movement of the levers over the normal. The said movements of the bell-crank are communicated to the clutch-sleeve and cause an oscillating or alternating rotative movement thereof about the head 10. When the brakes are in release position, the connecting member formed by the heads 9 and 10 and the rod 11 is not under compression, and the spring 16 pressing against the clutch-collar holds the end of the rod 11 slightly away from the bottom of the recess in the head 10, as shown in Fig. 2, the clutch-collar and sleeve being held in frictional engagement with each other. As the brakes are moved to applied position, however, the connecting member is placed under a compressive stress, and before the application of the brakes is completed the spring 16 yields until the end of the rod 11 engages the bottom of the recess in the head, as shown in Fig. 4. When in the latter position, the clutch-collar is disengaged from the clutch-sleeve, and the rotative movement of the sleeve caused at this time by the bell-crank will have no tendency to turn the clutch-collar and the rod 11. Then as the brakes are released the spring 16 moves the rod and clutch-collar longitudinally away from the head until the collar engages the sleeve, so that the rotative movement of the sleeve occurring at this time is communicated to the collar and the rod. The rod is thus rotated more or less relatively to both of the heads 9 and 10. The relative rotation between the head 9 and the threaded part of the rod lengthens the connecting member slightly and thus compensates for a part of the excessive slack which permitted the increased or excessive movement of the truck-levers necessary to actuate the bell-crank and clutch-sleeve. Subsequent application and releasing of the brakes will cause further compensatory lengthening of the connecting member, until the movement of the truck-levers is reduced to the normal, after which no further action of the adjusting mechanism will occur until there is further wear of the parts with a consequent increase in the amount of movement of the truck-levers necessary to apply the brakes.

The rotation of the threaded rod to lengthen the connecting member, being made when the member is under only a slight longitudinal stress, requires but a relatively small force, which is supplied by the release spring 8. Accidental turning of the threaded rod is prevented at all times, since the friction between the threaded parts when the brakes are applied is too great to permit relative movement of the said parts, and when the brakes are in release position the clutch-sleeve is held stationary by the bell-crank, while the sleeve and clutch-collar are held in engagement by the spring 16 with a force sufficient to prevent turning of the rod.

The hollow portion of the head 9 may be filled with a lubricant to facilitate the turning of the rod. It will be noted also that the movements of the rod are always outward from said head except when the mechanism is being reset before applying new brake-shoes, so that there is no tendency to carry foreign matter between the threaded parts to interfere with their movement. Lubricating material may also be placed within the clutch-sleeve to facilitate free movement of the same and the parts inclosed by it, and the packing-rings 18 and 19 serve effectually to exclude foreign matter from within the sleeve.

By the use of the frictional clutch members for actuating the threaded rod, it is not necessary that there be any considerable excess of slack in the brakes before the mechanism can be adjusted to compensate therefor, since any excess movement of the truck-levers which results in a corresponding movement of the clutch-sleeve, however

slight, will be communicated thereby to the threaded rod. In fact, in practical tests of the adjuster under service conditions, it has been observed that no measurable variation of slack occurred during the period in which a set of brake-shoes were worn out.

Now, having described my invention, what I claim and desire to secure by Letters Patent is:

1. In a slack adjuster for brakes, brake-levers, a member connecting said levers, said member comprising end-parts connected with the respective levers, and an intermediate threaded part rotatable to vary the length of the member, a clutch-member fixedly secured to the threaded part, a second clutch-member engageable with the first and held in fixed longitudinal relation to one of the end-parts, means for actuating said second clutch-member in directions alternating as the brakes are applied and released, and resilient means normally holding the clutch-members in engagement with each other but yieldable to permit disengagement of the cluch-members while the actuating means moves in one direction.

2. In a slack-adjuster for brakes, a variable connecting member comprising end-parts and an intermediate threaded part rotatable to change the length of the member, a clutch-member secured to the threaded part, an actuating clutch-member held in fixed longitudinal relation to one of the end-parts, means for rotating said actuating member in directions alternating as the brakes are applied and released, and means for moving the threaded member longitudinally relative to the actuating clutch-member to engage the clutch-members with each other as the brakes are released.

3. In a slack-adjuster for brakes, a brake-lever connection comprising a rod having a threaded portion and carrying a clutch-member, a head engaged by the threaded rod-portion, and a head having an abutment to engage an unthreaded part of the rod, an oscillating clutch-member carried by the latter head, and means for normally holding the rod away from the abutment and with the clutch-member carried by the rod in engagement with the oscillating clutch-member, the clutch-members being disengaged when the rod is engaged with the abutment.

4. In a slack-adjuster for brakes, a brake-lever connection including a pair of threaded parts relatively rotatable to vary the length of the connection, and a part slidable longitudinally upon one of the threaded parts, a spring tending to separate said threaded part and said slidable part, said parts being movable toward each other as the brakes are applied, clutch-members carried by said parts and arranged so as to be disengaged as the parts move toward each other and to be engaged as the spring moves the parts away from each other, and means for actuating one of the clutch-members as the brakes are released.

5. In a slack-adjuster for brakes, a brake-lever connection comprising a head having a threaded part, a threaded rod engaging said part, and a head slidable longitudinally of the rod and having an abutment to limit the longitudinal movement, a spring tending to disengage the rod and abutment, clutch-members carried respectively on the rod and the latter head, the one clutch-member being rotatable relatively to the head, and means for oscillating said clutch-member, the clutch-members being engageable when the rod and abutment are out of engagement, and being disengaged when the rod and abutment are engaged.

6. In a slack-adjuster for brakes, a brake-lever connection comprising two heads and an intermediate threaded rod rotatable relatively to the heads and longitudinally slidable relatively to one of the heads, a clutch-member secured to the rod, a clutch-member held in fixed longitudinal relation to the latter head, means for rotating the latter clutch-member in directions alternating as the brakes are applied and released, and resilient means for moving the rod longitudinally to engage the clutch-members with each other as the brakes are released, said means being yieldable to enable the clutch-members to be disengaged as the brakes are applied.

7. In a slack-adjuster for brakes, a brake-lever connection comprising two heads and an intermediate rod having a screw connection with one of the heads whereby rotation of the rod will vary the length of the connection, the rod and the other head being connected so as to enable a limited relative longitudinal sliding movement thereof, clutch-members carried by the rod and the latter head, means for rotating the clutch-member on the head in directions alternating as the brakes are applied and released, and means for moving the clutch-members into engagement with each other during the rotation of the actuating clutch-member in one direction.

8. In a slack-adjuster for brakes, a connecting member having a rotatable part by movement of which the length of the member is variable, a clutch-member carried by said part, an actuating clutch-member engageable with the first, the clutch-members being separable by longitudinal stress in the connecting member, and means for moving the clutch-members into engagement with each other when the longitudinal stress in the connecting member is less than a predetermined amount.

9. In a slack-adjuster for brakes, a connecting member having a part rotatable to vary the length of the member, a clutch-

member carried by said rotatable part, an actuating clutch-member held in fixed longitudinal relation to another part of the connecting member and rotatable in directions alternating as the brakes are applied and released, the parts carrying the clutch-members being movable by longitudinal stress in the connecting member to separate the clutch-members, and means for moving the said parts to engage the clutch-members with each other as the longitudinal stress in the connecting member is reduced.

In testimony whereof I have hereunto subscribed my name in the presence of two witnesses.

CHARLES O. ANDERSON.

Witnesses:
M. ENGLER,
M. L. HYDE.