

J. GULLAGE.  
SLACK ADJUSTER FOR BRAKES.  
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994,385.

Patented June 6, 1911.

2 SHEETS-SHEET 1.

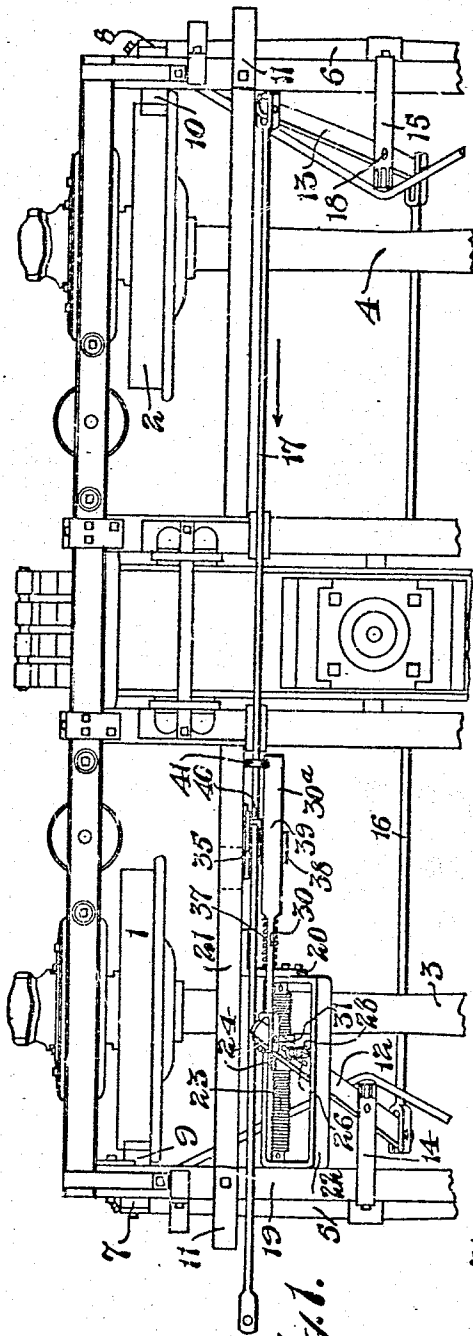


Fig. 1.

Witnesses:  
C. W. Carpenter  
F. R. Paulstone

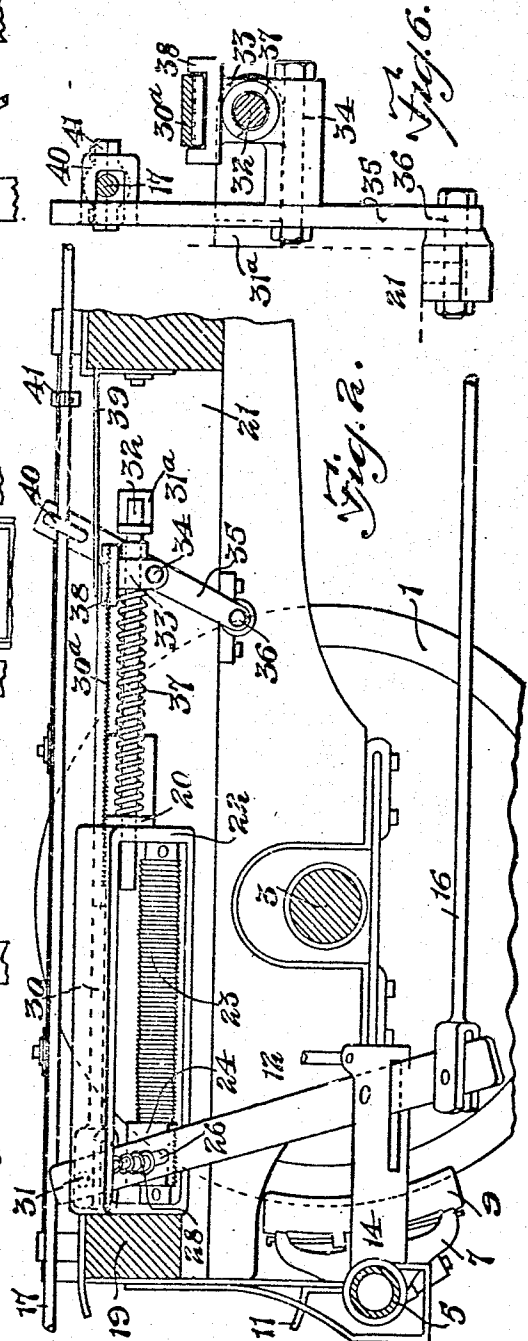


Fig. 2.

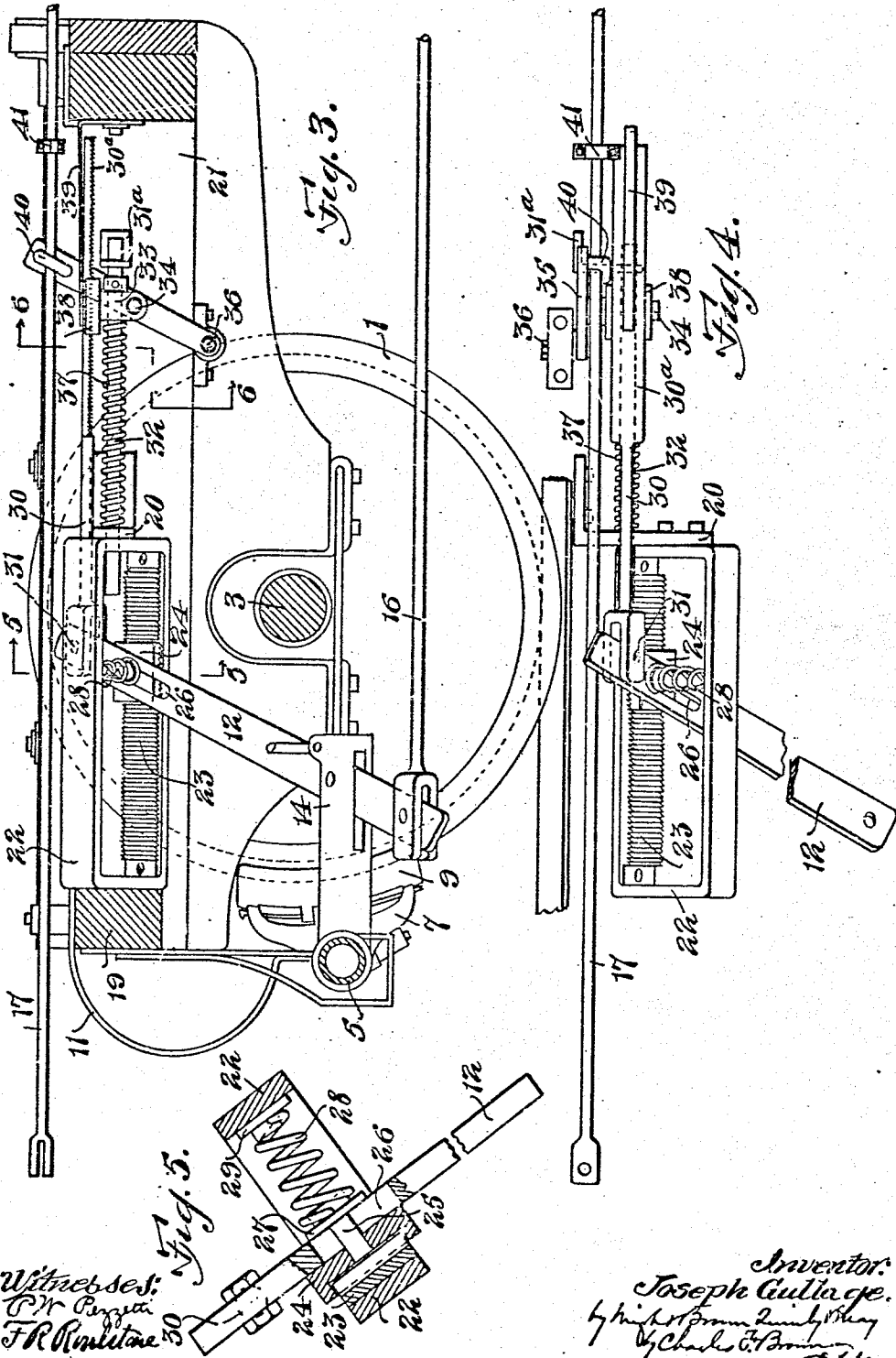
Fig. 6.

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2 SHEETS-SHEET 2.



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# UNITED STATES PATENT OFFICE.

JOSEPH GULLAGE, OF SOMERVILLE, MASSACHUSETTS.

SLACK-ADJUSTER FOR BRAKES.

994,385.

Specification of Letters Patent.

Patented June 6, 1911.

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*To all whom it may concern:*

Be it known that I, JOSEPH GULLAGE, of Somerville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Slack-Adjusters for Brakes, of which the following is a specification.

The object of the present invention is to provide means by which the wear of brakes or brake shoes and other parts of a braking mechanism may be taken up as soon as the space between the brake and the wheel on which it acts becomes, when the brake is relaxed, more than a certain amount.

The invention has particular reference to the braking appliances of railway rolling stock, wherein the brakes are provided with metal shoes which are subject to great and rapid wear, and are retained in use until worn out before being discarded. Such shoes when new are given considerable thickness in order that their life may not be so short as to require constant renewal, and as a consequence, the amount of stock which may be removed before they are worn out is so great that relatively large spaces are finally left between the wheels and shoes in the relaxed position of the brakes, requiring correspondingly great motion of the brake-operating mechanism every time the brakes are applied to the wheels. It is desirable that this wear should be taken up in order to avoid the excessive motion of the operating mechanism caused thereby, and with this end in view I have devised an improved form of mechanism for shifting the fulcrum of one of the brake levers automatically as soon as excessive wear occurs, and by amounts sufficient to take up such wear.

The specific embodiment of my invention which I have chosen for illustration is the form in which it is adaptable to the standard brake system employed on the trucks of railway rolling stock, though it is to be understood that I do not thereby intend to limit my invention to a device constructed to apply only to this particular type of brake.

Referring to the drawings, Figure 1 represents a partial plan view of a railway truck with the invention applied thereto. Fig. 2 is a longitudinal sectional view of one end of the truck on an enlarged scale illustrating the invention more in detail. Fig. 3 is a similar view showing the adjustment

automatically secured after the brake shoes have become worn. Fig. 4 is a plan view in detail of the parts which are required to be added to the brake mechanism, in order to apply my invention thereto. Fig. 5 is a detail sectional view on line 5—5 of Fig. 3. Fig. 6 is a sectional elevation on line 6—6 of Fig. 3, showing only the parts which relate to the present invention.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings, the characters 1 and 2 represent the wheels on one side of the truck, such wheels being mounted upon axles 3 and 4 respectively. The truck represented is one of the common or standard 4-wheel trucks in which there are two sets of brakes, one set for each pair of wheels arranged at respectively opposite sides of the wheels. It is in reference to a truck of this general character that the present invention has been designed, but the principles of the invention are applicable to brakes otherwise arranged. At the ends of the truck are brake beams 5 and 6 carrying on their ends the brake heads 7 and 8 which are provided with detachable brake shoes 9 and 10 arranged to bear directly against the rims of the several wheels. The brake beams are hung in the manner usual in this type of truck and are held away from the wheels when released, by springs 11. The usual means for setting the brakes is provided and consists of levers 12 and 13 respectively, connected to the two brake beams by brake lever fulcrums 14 and 15, being pivoted to said fulcrums between their ends, and having their corresponding arms connected by a link rod 16. A brake rod 17 is connected to the second or longer arm of the lever 13 and is operated either by compressed air of the air brake system, or by a hand-braking apparatus. The corresponding long arm of the lever 12 is held stationary at a fulcrum point, so that when the rod 17 is moved in the proper direction (which, in the embodiment shown is that represented by the arrow in Fig. 1), the lever 13 is so moved as to draw the brake beam 6 and brake shoes carried thereby toward the wheels on which they act, through the pivotal connection 18 of the lever with the fulcrum 15. The reaction of the brakes directly controlled by the lever 13 causes said lever to move the link 16 endwise and swing the lever 12 about

its fixed fulcrum point, thereby drawing the beam 5 and brake heads 7 with their shoes 9 against the wheels 1.

As thus far described, the brake mechanism is the same as the standard type.

My present invention as embodied in brake mechanisms of this type relates to the fulcrum for the lever 12 and the means by which said fulcrum is automatically shifted whenever the brakes become unduly loose with respect to the wheels by reason of wear on their shoes and elsewhere. Secured to the frame of the truck in a rigid and immovable manner, as by being bolted to the end sill 19 of the truck and to a bracket 20 bolted to one of the longitudinal beams 21, is a frame 22 secured to which is a ratchet-toothed rack 23. The end of the lever 12 passes through the frame 22 and carries a clamp or clutch 24 having teeth shaped in proportion to fit the teeth of the rack bar. This clutch lies between the lever 12 and rack, and is provided with a stem 25 which passes through a slot 26 in the lever 12 and has a cap 27 against which a spring 28 bears. The reaction of the spring is taken by a plate 29 which rests against the outer member of the frame 22. The inclination of the teeth on the rack and clutch is such that the latter may slip over the former in response to pressure applied in one direction, and is prevented from slipping in the other direction by the entire strength of the teeth. That is, it is possible by applying pressure to the lever to move its end carrying the clutch in the direction necessary to draw the brakes toward the wheels 1, that is toward the right, in the illustration here given, but cannot be moved in the opposite direction. The stem or pin 25 of the clutch constitutes the fulcrum for the lever 12, which fulcrum is movable or adjustable in the manner described to take up looseness of the mechanism and reduce the distance between the brake shoes and the wheels.

Automatic means for shifting the fulcrum is provided and consists of a link or connecting rod 30 pivoted at 31 to the lever 12 and formed as or provided with at one portion a ratchet-toothed rack bar 30<sup>a</sup>. Passing through the bracket 20 previously mentioned, and a second bracket or guide 31<sup>a</sup>, is a guide rod 32 on which a traveler 33 is mounted, such traveler being connected by a bolt 34 with a lever 35 pivoted upon a stud 36. A spring 37 surrounding the rod 32 and abutting against the bracket 20 tends to hold the traveler 33 and lever 35 in the position shown in the drawings. The traveler 33 carries a clutch 38 having teeth arranged to grip with the teeth of the rack 30<sup>a</sup>, which latter is retained in engagement with the clutch by a spring 39 fixed upon the truck. The operating rod or brake rod 17, previously described, passes through an eye 40

on the lever 35 and carries an adjustable stop 41 which projects laterally too far to pass through the eye 40 and is set at some distance therefrom.

When the brakes are provided with new unworn shoes, the position of the parts in the relaxed condition of the brakes is that represented in Fig. 2, the fulcrum of the lever 12 being at one extreme of its adjustment. The clearance between the wearing surfaces of the brake shoes and the wheel rims is then comparatively slight when the brakes are off, and the movement of the brake rod 17 in setting the brakes is comparatively slight. Such movement is in fact less than the distance between the stop 41 and the lever 35. As the shoes become worn away the clearance between them and the wheels, when returned to their inoperative position by the springs 11, becomes greater and the movement of the operating rod constantly increases. After a time, the length of which is determined by the setting of the stop 41, the latter is brought into engagement with the lever 35 or its eye 40 when setting the brakes, and moves the lever and traveler 33 against the tension of the spring 37. At the same time the clutch 38 is moved along the rack 30<sup>a</sup>. Upon the release of the brakes the spring 37 returns the traveler 33 and lever 35, but as the clutch of the traveler has caught the rack at a point nearer the lever 12, the latter is moved also, thereby shifting the fulcrum 25 and clutch 24 into engagement with other teeth of the stationary rack 23. Thus the clearance between the brake shoes and wheels is diminished whenever and as soon as it is increased by wear so much that the increased movement of the operating rod causes the stop 41 to move the traveler 33 by the space of one tooth on the rack 30<sup>a</sup>, and the latter causes the fulcrum clutch of the lever 12 to be advanced by the space of one tooth on the rack 23. The adjustment is entirely automatic and takes place without personal attention as soon as a certain slight amount of wear occurs, and again as soon as the wear, once compensated for, increases. The travel of the operating rod 17 is thereby made practically constant, varying no more than the amount of the tooth spacing on rack 30<sup>a</sup> (which, as appears from the drawings, is a very small amount) and not increasing more than this small amount beyond the total travel for which it is designed and adjusted when the apparatus, with new brake shoes, is first set up, during the entire life of the shoes.

I claim,

1. In a car truck two sets of brakes, two levers, each engaged with one set of brakes, a link connecting corresponding arms of both levers, a shiftable fulcrum for one of said levers, a series of fixed ratchet teeth

constructed and arranged to hold the fulcrum in any one of a number of positions, a connecting rod attached to said lever; an operating rod arranged to act on the other lever, a traveler operable by said operating rod to engage the connecting rod at points successively nearer to said fulcrum, and a spring acting on the traveler to shift the fulcrum in the direction necessary to diminish the spaces between the brakes and wheels when the motion of said mechanism becomes more than a predetermined amount, the fulcrum being held by engagement with said ratchet teeth in the new position against the pull of the brake-setting mechanism.

2. In combination with a car truck having wheels, a brake arranged to act on a wheel thereof, a lever having a pivotal connection with said brake, means for acting on the lever to force the brake against the wheel, a frame secured to the truck, having on one side thereof a ratchet-toothed bar, a ratchet-toothed clutch engaging said bar, a plate engaging the opposite member of said frame, a spring between said plate and clutch pressing them apart and holding the teeth of the clutch and bar in engagement, a pin on the clutch passing through said lever and forming a fulcrum therefor, and means for shifting the clutch and pin to compensate for wear on the brake.

3. A brake apparatus comprising a brake, a wheel against which said brake acts, a lever pivotally connected with the brake for forcing the same against the wheel, a brake rod having a connection with said lever for operating the same, a fulcrum for the lever comprising in its construction a clutch element, a cooperating stationary clutch member with which such clutch element is adapted to engage to hold the lever fulcrum, an independent lever operated by the brake rod when the motion in the latter becomes greater than a predetermined amount due to wearing away of the brake, a link or connecting rod engaged with said brake lever, means by which said independent lever is clutched to said link at varying distances from the brake lever, and means acting on said intermediate lever for causing the said fulcrum clutch element to engage the complementary clutch member in an advanced position.

4. The combination of a brake, a wheel against which said brake acts, a lever for operating said brake, a fulcrum carried by said lever and having a clutch element, a complementary clutch member with which said element is adapted to engage and with respect to which it may be moved in a direction such as will move the lever in the brake-setting direction, and a brake-operating member having a connection with said lever and movable to operate the same, a link connected with said lever near its fulcrum

point and having a clutch portion, a traveler having a clutching element arranged to engage the clutch portion of said link, resilient means tending to move said traveler in such a direction as to move the lever fulcrum in the manner above described, and means by which said brake-operating member may cause the traveler to move in opposition to the spring when the travel of said operating member becomes greater than a predetermined amount.

5. A slack adjusting means for brakes, comprising, in combination with brakes, brake levers therefor, a rod connecting corresponding arms of said brake levers, and an operating rod connected to one of said brake levers, a link connected to another of said levers, a clutching device adapted to engage said link at different points, provisions by which said rod advances the clutching device along the link in consequence of increased motion due to wear of the brakes, resilient means acting on said clutching device to move the same, and therewith the link and lever in such a direction as will bring the levers and brakes nearer to the wheels, and clutching means engaged with said lever independently of the link for retaining the point of the lever acted upon by such link approximately at the position to which it is brought thereby.

6. A slack adjusting means for brakes, comprising in combination with brakes, brake levers therefor, a rod connecting corresponding arms of said brake levers, and an operating rod connected to one of said brake levers, a link connected to another of said levers, having inclined teeth, a traveler guided approximately parallel to said link and having oppositely inclined complementary teeth, means yieldingly holding said teeth in mesh and permitting relative movement in one direction, yielding means acting on said traveler and tending to move the same, and thereby the link, and brake lever in the direction necessary to bring the brakes nearer to the wheels, provisions whereby the operating rod is enabled to move said traveler along the link in the opposite direction, a clutch member carried by the brake lever at a point near the point of attachment thereto of the link, and means for causing such clutch member to remain at the position to which it has been brought by the link.

7. A slack adjusting means for brakes, comprising in combination with brakes, brake levers therefor, a rod connecting corresponding arms of said brake levers, and an operating rod connected to one of said brake levers, a link connected to another of said levers, having ratchet teeth, a guide parallel to said link, a traveler mounted movably on said guide and having complementary teeth adapted to mesh with those of the link, a

spring pressing the link toward said traveler and holding the complementary teeth in engagement, a spring bearing on the traveler and tending to move it and the link in such a direction as will cause the levers and brakes to be brought nearer to the wheels, said teeth being so formed as to prevent motion of the traveler relatively to the link in this direction, but to permit such relative motion in the opposite direction, and means by which the operating rod moves the traveler in the latter direction.

8. A slack adjusting means for brakes, comprising, in combination with brakes, 15 brake levers therefor, a rod connecting corresponding arms of said brake levers, and an operating rod connected to one of said brake levers, a link connected to another of said levers, a clutching device adapted to engage

said link at different points, a lever to which 20 said clutching device is connected, having an eye through which the operating rod passes, an enlargement on the rod adapted to engage the eye and move the lever and clutching device along the link into grip- 25 ping relation therewith at another point, resilient means acting on the clutching device to move the same, and therewith the link and brake lever, oppositely, and means independent of the link for retaining the 30 fulcrum point of the brake lever at the position to which it is brought by the link.

In testimony whereof I have affixed my signature, in presence of two witnesses.

JOSEPH GULLAGE.

Witnesses:

ARTHUR H. BROWN,  
P. W. PEZZETTI.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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