No. 725,496. PATENTED APR. 14, 1903.

E. G. & H. G. SHORTT.

SLACK ADJUSTER.

APPLICATION FILED JUNE 28, 1901. RENEWED OCT. 25, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 2.

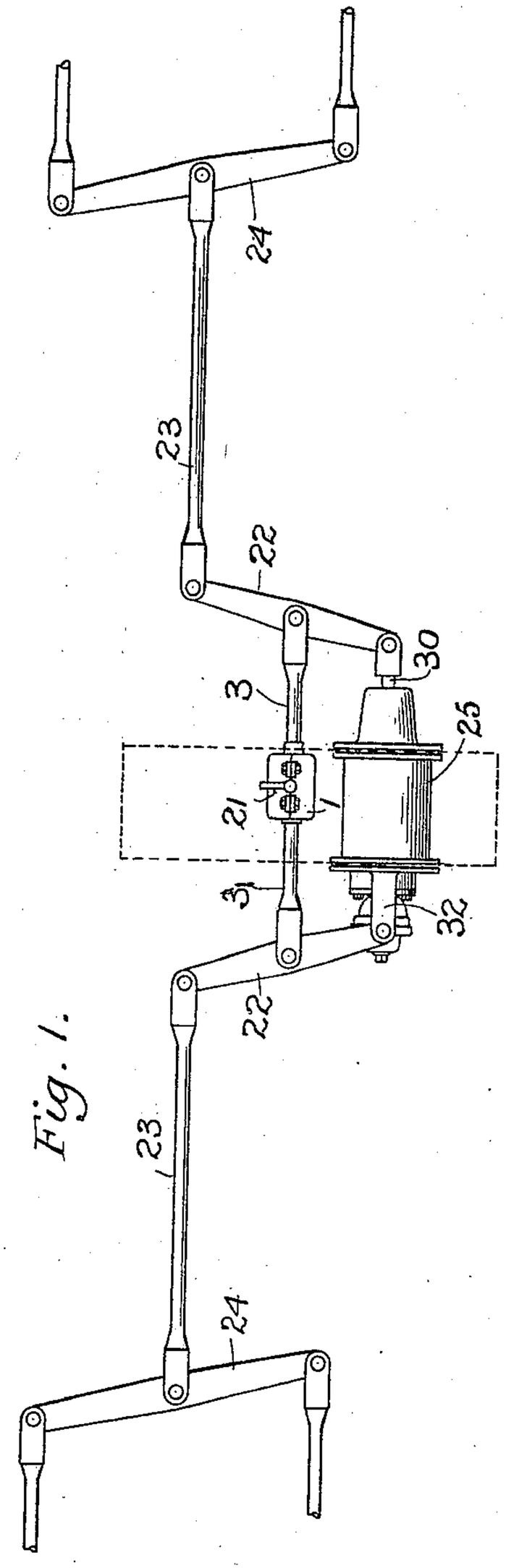

Fig. 1.

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NO MODEL. 2 SHEETS—SHEET 2.

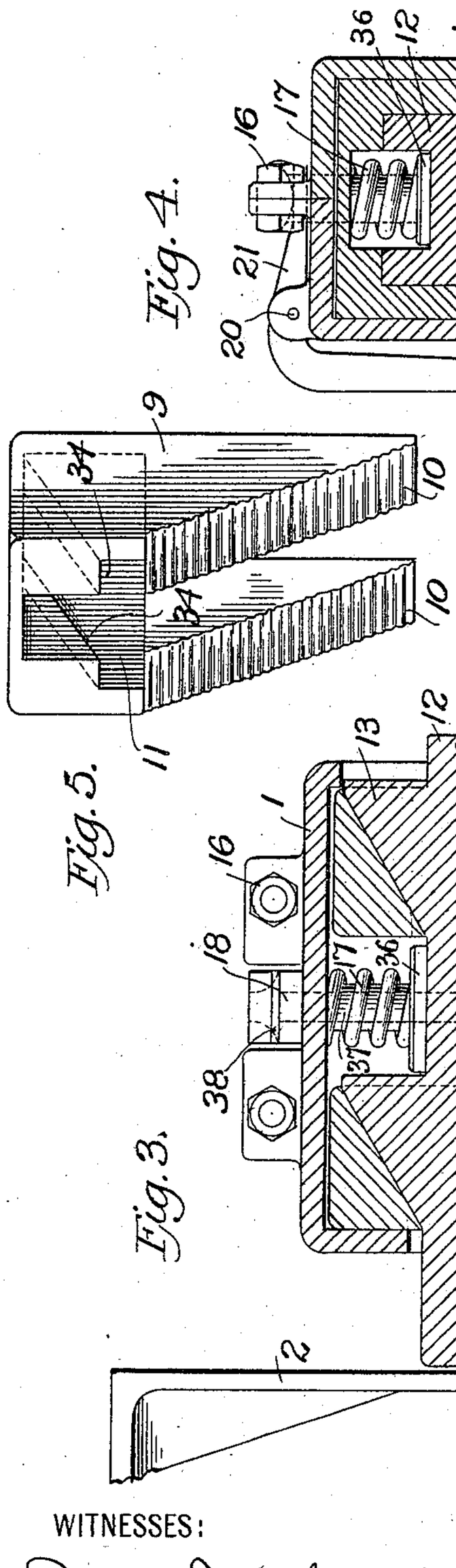

Fig. 4.

Fig. 5.

Fig. 3.

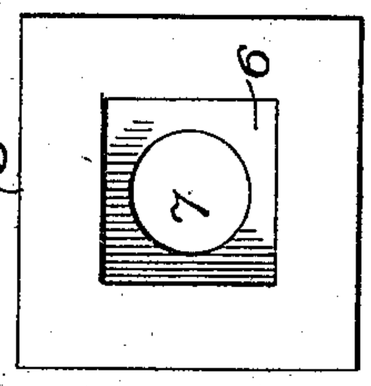

Fig. 7.

Fig. 8.

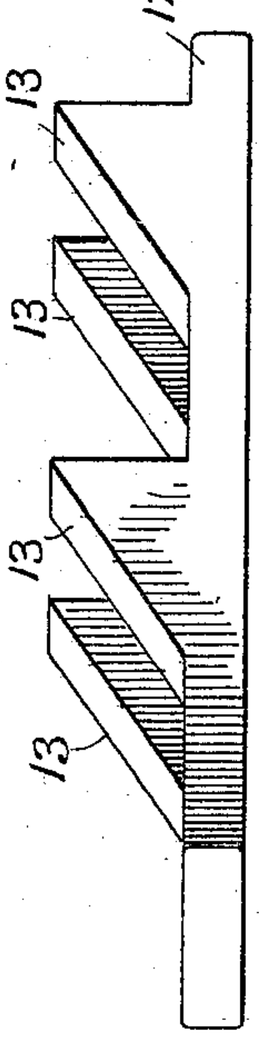

Fig. 6.

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UNITED STATES PATENT OFFICE.

EDWARD G. SHORTT AND HOWARD G. SHORTT, OF CARTHAGE, NEW YORK, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO INTERNATIONAL AIR BRAKE COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SLACK-ADJUSTER.

SPECIFICATION forming part of Letters Patent No. 725,496, dated April 14, 1903.

Application filed June 28, 1901. Renewed October 25, 1902. Serial No. 128,824. (No model.)

To all whom it may concern:

Be it known that we, EDWARD G. SHORTT and HOWARD G. SHORTT, citizens of the United States of America, and residents of Carthage, county of Jefferson, and State of New York, have invented certain new and useful Improvements in Slack-Adjusters, of which the following is a specification.

Our present invention relates to improvements in automatically-operating adjusting mechanisms for taking up the slack or wear on the brake-shoes of railway brake mechanisms or similar mechanical parts that are adapted to become worn or for effecting adjustment in various forms of power-transmitting devices.

Although the invention is primarily intended for use in connection with a railroad car-brake system and although the office of the adjuster is to compensate for wear on the brake-shoes, the connection between the shoes and the operating brake-piston being regulated by the intervening component parts of the adjusting mechanism, so that the faces of the brake-shoes will be kept in proper relative position to the tread of the wheels, yet we do not intend to confine ourselves to the use of the adjusting mechanism in a location of this character, for the same is applicable to a multitude of different forms of machinery and power-transmitting devices for the purpose of adjusting the same and compensating for wear of the parts, taking up the slack or looseness in the rigging, &c.

The invention consists, essentially, in means for regulating the length of one of the connecting-rods constituting a portion of the means that intervene between the shoes and the brake-piston, and also in numerous details and peculiarities in the construction, combination, and arrangement of the various parts of the adjusting mechanism and the mechanisms that coöperate therewith for enabling the adjuster to efficiently perform its duty, all substantially as will be hereinafter described, and then pointed out in the claims.

In the accompanying drawings, illustrating our invention, Figure 1 is a plan view, of a somewhat conventional character, of a portion of an automatic air-brake mechanism belonging to a railway-car, together with a portion of the brake-shoe rigging, the same being provided with one form of our adjusting mechanism arranged and adapted to compensate for the wear on the brake-shoes. Fig. 2 is a detail view showing the position of the adjusting mechanism relatively to a fixed stop or bracket on the car-body, in connection with which stop or bracket a sliding device, forming a part of the adjusting mechanism, is designed to contact for a purpose hereinafter fully explained. Fig. 3 is a vertical section of our improved slack-adjusting mechanism. Fig. 4 is a transverse section of the same. Fig. 5 is a detail perspective view of one of the slotted bevel-sided gravity-weights. Fig. 6 is a detail perspective view of the bevel-faced slide that operates in conjunction with the gravity-weights. Fig. 7 is a side elevation, and Fig. 8 a cross-section, of one of the blocks carried by the rod whose length is susceptible of regulation by the adjusting means, which block has a bevel-face adapted to be acted upon by a gravity-weight.

Similar numerals of reference designate corresponding parts throughout all the different figures of the drawings.

25 denotes the brake-cylinder of an automatic fluid-pressure-brake apparatus for railway-cars, which cylinder in practice is rigidly secured to the car-body, a portion of the latter being represented in Fig. 2 at 31.

30 represents the piston-rod attached to a piston contained within the brake-cylinder 25, and said piston-rod is pivotally fastened to the leverage mechanism, whereby the brake-shoes are carried and operated. This lever system may be of any suitable or well-known construction, and we do not desire to be confined to what is herein specifically portrayed and described, for this is given merely by way of example in order to explain the practical application of our improvements. For the purposes of this explanation, therefore, this lever system may be considered as a type of other forms of power-transmitting devices arranged between a source of power and the place of work to be done and containing or

adjustably controlled by the adjuster mechanism.

Proceeding now to describe the example of lever system herein set forth for explanatory purposes merely, it may be stated that 22 22 are floating levers, one of which is pivotally attached to the end of the piston-rod 30, while the other is pivotally attached to a rigid arm 32 on that end of the power-cylinder 25 opposite to that through which the piston-rod 30 projects. The floating lever 22, which is pivoted to the piston-rod 30, connects by a link 23 with the brake-lever 24, that is designed to connect with and operate the brake-shoes at one end of the car, and the other floating lever 22, which is pivoted to the rigid arm 32, connects by a similar link 23 with a similar brake-lever 24, that is adapted to be connected to and to operate brake-shoes at the other end of the car. The two levers 22 are connected together by a link or rod 3, in the length of which is situated our improved slack-adjusting mechanism, the design of which is to lengthen or shorten the said rod or link 3, so as to bring the floating levers 22 closer together or push them farther apart in order that the wear on the brake-shoes may be compensated for at the proper time.

We now proceed to describe in detail the construction of the adjuster means with which the connecting-rod 3 is provided.

1 indicates a casing or housing, preferably of a general rectangular shape, although its form and size may vary within wide limits, the object of this casing being to incase and protect the moving mechanical parts of the adjuster and prevent any false or undesired manipulation of the same. Said casing consists of halves bolted together at the top by the bolts 16 and at the bottom by the bolts 15. The bottom portion 14 of the casing is built with suitable side openings to permit the gravity-weights to depend partially therethrough, as shown in Fig. 3, and the casing is also furnished with lateral openings of proper size and shape to permit the horizontally-movable slide 12 to perform its proper functions therethrough, and inside of the casing 1 is a horizontal table or platform connecting with the ends of the casing, on which table, as on a support, the slide 12 is adapted to rest, as well as to perform its movements, said table being designated by the reference-numeral 33.

The connecting-rod 3 consists of two parts, one end of each of which is pivoted to one of the floating levers 22, while the other end has a square head 4 thereon. Carried on each head-provided end of the sections of this connecting-rod 3 is a block 5, having a round passage 7 therein, through which the rod 3 passes, and having also a square recess 6 of greater size than the passage 7 for receiving the head 4. Each block 5 is firmly secured to the rod 3, and in addition to the peculiarities of construction already pointed out each block 5 has an inclined and serrated or roughened face 8. The two blocks 5 5 are situated inside of casing 1 between the bottom plate 14 and the interior shelf 33. The sections of the connecting-rod 3 pass through the ends of the casing 1, as shown in Fig. 3, and there is consequently a space of greater or less size between the vertical opposing faces of the blocks 5 5, as shown in Fig. 3, it being noted that these blocks 5 are designed to come closer to each other or to be withdrawn farther from each other, accordingly as the length of the connecting-rod 3 is shortened or elongated in consequence of the drawing together or pulling apart of its two sections.

Within the casing 1 are also two gravity-weights 9. These have the general form and construction delineated in Fig. 5. They occupy the space between the inclined faces 8 of the rod-carrying blocks 5 and the adjacent vertical ends of the casing 1, and they are arranged and adapted to have a vertical adjustment in consequence of the action of gravity, dropping downwardly as they do when the agency which normally holds them supported in their upper position is removed or partially so. When the block 9 is in its normal position after the adjusting mechanism has been properly set to do its duty and before it has commenced to shorten up the rod 3, said block will occupy the position indicated in Fig. 3, where its upper end is nearly in contact with the top plate of casing 1. During the operation of the device the block 9 gradually descends. Referring to Fig. 5, it will be noted that the construction of this block has two parallel bevel-faced shank portions 10 10, whose bevel-faces are corrugated, serrated, or roughened for the purpose of causing them to better engage with the correspondingly-roughened faces 8 of the rod-carried blocks 5, and these shanks 10 straddle the rod 3. The space between the shanks 10 communicates with an angular passage 11 transversely through the weight 9, said angular passage having incline faces 34 therein.

A sliding wedge device 12 (represented in detail in Fig. 6 and hereinabove alluded to) is arranged horizontally in the casing 1, having one end projecting through a slot in the left-hand end of the casing 1, while the other end projects through a slot in the right-hand end of said casing, and this sliding wedge device rests and slides on the table or shelf 33 within the casing 1, as we have already hereinabove suggested. This device 12 is provided with two pairs of inclined projections 13, there being slots or spaces between the members of said pairs, as indicated in Fig. 6, which inclined projections are situated within the transverse passages 11 of the gravity-weights 9, with their inclined faces in contact with the inclined faces 34, formed on the sides of said passages 11. The normal position of the slide 12 is indicated in the sectional view of Fig. 3. The beveled projections 13 serve to uphold the gravity-weights 9 in their normal upper position and to operate

in connection with the faces 34, so that accordingly as the slide 12 is adjusted by small degrees of movement toward the right, and thereby gradually moves its beveled projections 13 on the faces 34, the effect will be to cause the gravity-weights 9 to drop lower and lower by degrees, and the result of their downward movement is to force the ends of the rod 3 toward each other, and thus shorten the length of said rod 3, this shortening being proportioned to the movement of the slide 12. The left-hand end of slide 12, which projects through a slot in the casing 1, is preferably formed with a lug 26, which limits the movement of the slide 12 toward the right and also furnishes a handle that can be grasped for the purpose of restoring the slide to its normal position, as indicated in Fig. 3, where it is at the extreme left.

On the under side of the car-body 31, at a proper point relatively to the adjuster-casing 1 and in the path of movement of said casing, is arranged a fixed bracket, stud, or other projection 2, which lies directly in the path of the slide 12 and adapted to be struck by the end 26 of said slide at certain times, the result of which contact is to move the slide 12 toward the right endwise for a distance proportioned to the amount of wear on the brake-shoes that is to be taken up. Adverting again to the arrangement of the slide 12 within the casing 1, it is to be noted that a platen 36 rests upon the upper face of slide 12 and is adapted to pass between the projections 13. This platen 36 is carried on the lower end of the pin 37, which projects upwardly through the casing and is formed with a head 38, that is engaged by the end 21 of a lever 19, pivoted to the stud 20 on the top of the casing. A spring 17 surrounds the pin 37 and is tensioned between the platen 36 and the opposite part of casing 1, so as to exert a pressure on the platen 36 and keep it firmly upon the slide 12. Thus it will be seen that under normal conditions the slide 12 is held on the shelf 33 under a strong pressure, and consequently whenever it is adjusted slightly toward the right it will remain in the position to which it has been adjusted until some agency removes it to another position—that is to say, the spring-power is sufficient to keep the slide from slipping loosely, and thus disarranging the parts of the mechanism. By pressing the handle 19 toward the casing 1 the pin 37 will be slightly lifted and the spring 17 sufficiently compressed to release the pressure of platen 36 on slide 12, so that the latter when this is done may be easily slid toward the left and restored to its left position, an adjustment which must necessarily be made when worn-out shoes are replaced by new shoes and it is desired to increase the rod to its maximum length, so as to provide for the minimum travel of the leverage parts.

From what we have said concerning the construction and relative arrangement of the various parts of our adjuster mechanism the operation will now be plain. When the brake-piston is moved to apply the brakes, the rod 3 will likewise be moved, carrying thereon the adjuster device. When the piston returns to its first position after braking application, the slide 12 will contact with the fixed bracket 2 sufficiently to move the slide 12 enough to allow the gravity-weights 9 to drop a trifle, thus causing a shortening of the length of the rod proportionate to the wear that may have taken place on the brake-shoes. We assume that at each application of the shoes a certain amount of the surface thereof will be worn off. To compensate for the wear each time application is made, it will be obvious that the movement of the slide 12 must be slight but accurate and proportioned to the duty required. When the brakes are new and unworn, the slide will be so adjusted as to first contact with the bracket 2 without making any movement; but after there has been a wearing on the shoes there will be a movement of the slide 12 after contact, and there will be a consequent shortening of the rod 3 each time there is a contact of the slide 12 with the bracket after a further wearing of the shoes. The change of movement of the leverage device in consequence of the shortening of the rod 3 will cause the adjuster to operate to correspondingly move the connections between the brake-piston and the shoes, so that all the wear will be compensated for and as firm a contact made with a worn shoe as with a new one.

When it is desired to readjust the mechanism, as in the case of substituting new and thicker shoes in lieu of worn and thin shoes, it will be apparent that simply by pressing the lever 19 toward the casing 1 and releasing the spring-pressure on the slide 12 said slide can be restored to the position where it will support the weights 9 at their upper limit.

Many changes may be made in the precise construction and arrangement of the various parts without departing from the invention. The primary feature of our improvements is the use of a weight that descends to cause a shortening of one of the connections in a lever system interposed between the power-piston and a brake-shoe and the utilization in connection with such weight of inclined faces engaging with each other to proportion the movement of the descending weight to the extent of wear to be compensated for.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a slack-adjuster for compensating for wear, slack or similar variation in power-transmitting machinery, the combination with a brake-shoe, or other movable part, and means for actuating said part, of connections between the two, said connections having a link or rod whose length is variable, and adjusting means comprising inclined surfaces and a weight or weights engaging them for regu-

lating the length of such rod for the purpose of compensating for the wear on the shoe.

2. In a slack-adjuster for compensating for wear or variation, the combination with a brake-shoe, or other movable part, and means for effecting an application of said shoe, of interposed leverage between the two, one element of said leverage being a link or connection whose length is variable, and means for regulating the length of said link or connection consisting essentially of inclined surfaces on the sections of said connection and means for drawing said inclined surfaces toward each other at times and moving them away from each other at other times.

3. In a slack-adjuster for compensating for wear or variation, the combination with the brake-shoe, or other movable part, and means for effecting an application of said shoe, of interposed leverage between the two, one element of said leverage being a link or connection whose length is variable, and means for regulating said length of the rod consisting essentially of means for drawing sections of the rod together composed of the following elements: beveled faces on the rod-sections, gravity-weights engaging said faces, and a releasing bevel-faced slide for permitting the gravity-weights to drop by degrees.

4. In a slack-adjuster for compensating for wear and similar variation, the combination with a brake-leverage mechanism, of a rod or link forming a part of said mechanism, and having its length capable of being shortened or elongated, together with means for effecting such shortening or elongation consisting of a casing carried by sections of the rod, bevel-faces on said rod-sections, weights having bevel-faces engaging the aforesaid faces, a bevel-faced slide for releasing the weights, and a fixed projection on the car-body with which the said slide contacts.

5. In a slack-adjuster for compensating for wear and similar variation, a rod or connecting-link consisting of two sections in combination with gravity descending weights arranged to draw said sections together, a slide device for releasing the weights, and a fixed projection into contact with which the slide device comes in releasing.

6. In a slack-adjuster for compensating for wear or similar variation, the combination with a link or rod forming part of a brake-leverage system, said rod being divided, of gravity descending weights, bevel-faced blocks on the rods engaged by said weights, a bevel-faced releasing-slide for permitting the weights to act, a casing inclosing the weights, slide and rod-carried blocks, and a fixed projection in contact with which the slide comes in its operation.

7. In a slack-adjuster, the combination with a rod or link and forming a part of a brake-shoe-leverage system, said rod being divided, of bevel-blocks on the rod-sections, gravity descending weights engaging blocks, a bevel-faced slide which acts to automatically release the weights, a fixed projection lying in the path of movement of the slide, and a pressure device on the slide, together with means for releasing the pressure when the slide is to be restored to its original position.

8. In a slack-adjuster for compensating for wear and similar variation, a rod or connecting-link consisting of two sections having beveled faces thereon in combination with weights that slide on said faces to draw the sections together.

9. In a slack-adjuster for compensating for wear and similar variation, a rod or connecting-link consisting of two sections having beveled faces thereon in combination with weights that slide on said faces at times under the action of gravity, and a bevel-faced releasing-slide engaging the weights.

10. In a slack-adjuster for compensating for wear and similar variations, a rod or connecting-link consisting of two sections, each section having an inclined face thereon, weights resting on said faces, means for sustaining the weights at times and means for guiding the vertical descent of the weights when released so that their action on the inclined face may draw the rod-sections together.

Signed at Carthage, New York, this 19th day of June, 1901.

EDWARD G. SHORTT.
HOWARD G. SHORTT.

Witnesses:
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F. E. SHORTT.