B. SCHECHTER.

SLACK ADJUSTER.

APPLICATION FILED SEPT. 14, 1920.

1,395,738.

Patented Nov. 1, 1921.

2 SHEETS—SHEET 1.

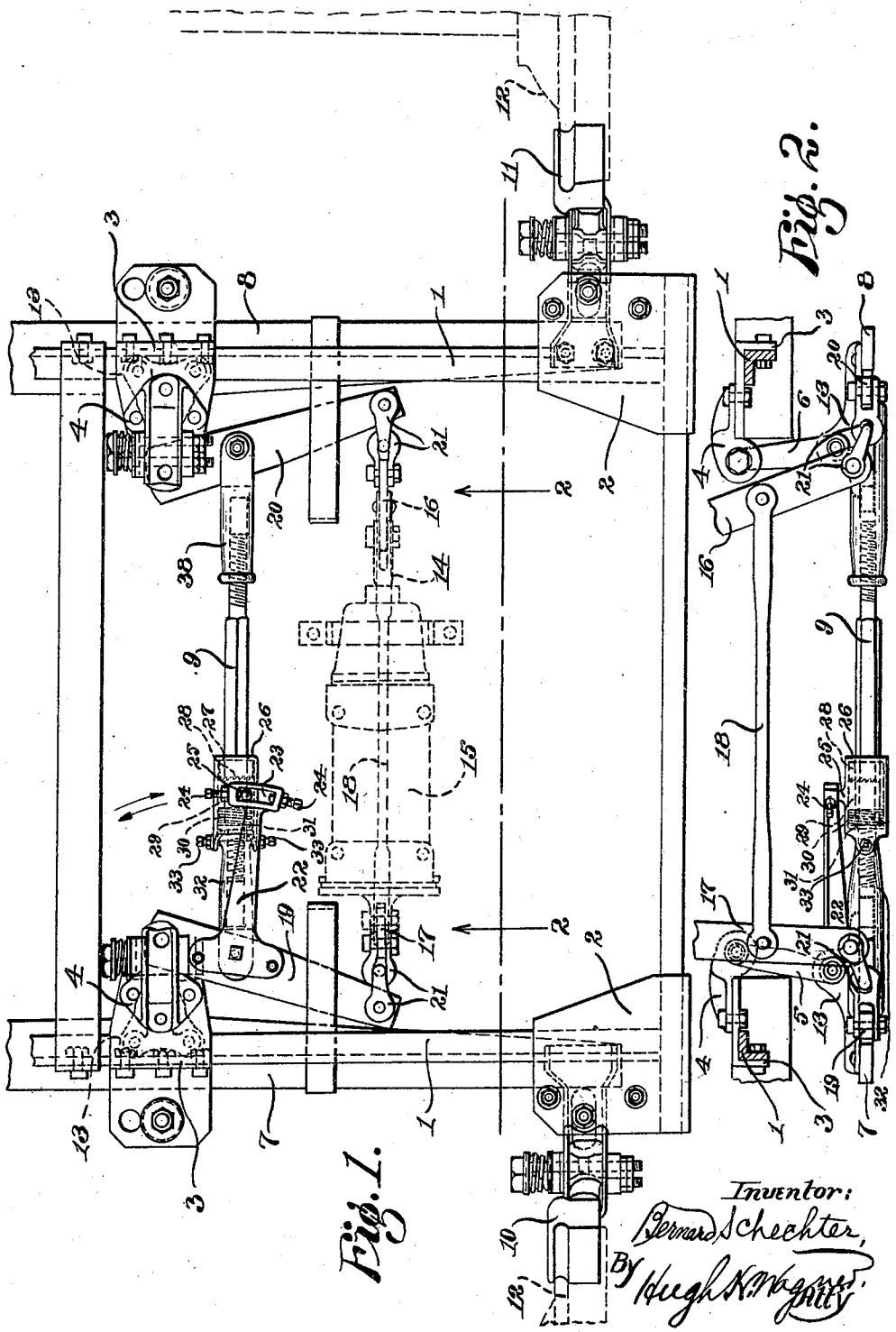


Fig. 1.

Fig. 2.

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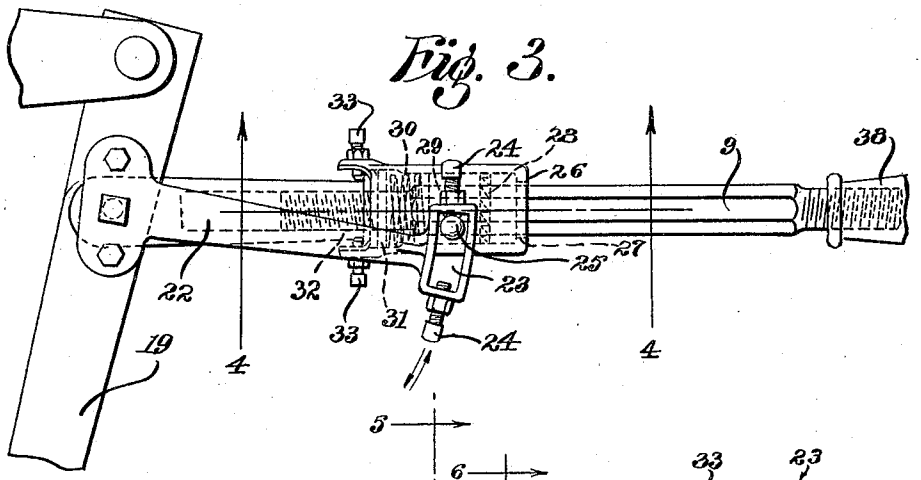
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2 SHEETS—SHEET 2.

Fig. 3.



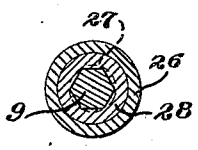
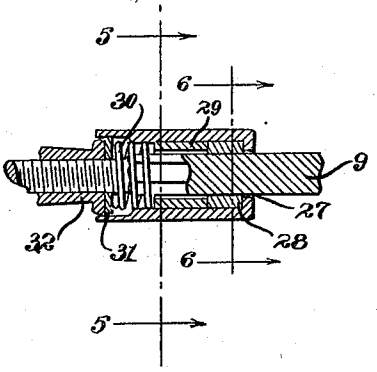


Fig. 6.



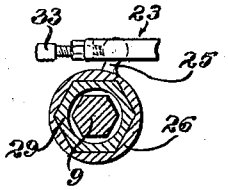


Fig. 5.

Fig. 4.

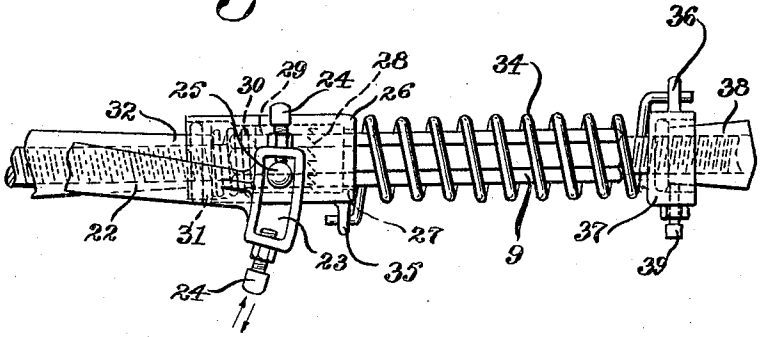


Fig. 7.

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UNITED STATES PATENT OFFICE.

BERNARD SCHECHTER, OF ST. LOUIS, MISSOURI.

SLACK-ADJUSTER.

1,395,738. Specification of Letters Patent. Patented Nov. 1, 1921.

Application filed September 14, 1920. Serial No. 410,238.

To all whom it may concern:

Be it known that I, BERNARD SCHECHTER, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Slack-Adjusters, of which the following is a specification.

This invention relates to slack adjusters used on the brake riggings of street cars and railroad coaches, and has for its object an automatic means for adjusting the slack caused by the wearing of the brake shoes, that is, means whereby constant attention to the adjustment of the rigging is unnecessary. Heretofore it has been the practice to make these adjustments with wrenches at different intervals of time, all of which required much unnecessary expense and loss of use of the car, and furthermore was inefficient mechanically, in so far as just before adjustment the brakes were not equalized. This invention brings about an adjustment while the car is in use, does away with the human element in making adjustments and never lets the brakes get into an extremely unadjusted condition; in fact, it keeps them equalized always, a feat which could not be accomplished in the old manner of making adjustments. Furthermore a simple and easily applied mechanical equipment is provided for bringing this about.

In the accompanying drawings forming part of this specification, in which like numbers of reference denote like parts wherever they occur,

Figure 1 is a top plan view of the slack adjuster as applied to the brake rigging of a car truck;

Fig. 2 is a sectional view of the truck taken approximately along the line 2—2 showing the adjusting mechanism in elevation;

Fig. 3 is an enlarged top plan view of the slack adjuster as applied to the adjusting rod;

Fig. 4 is a sectional view taken longitudinally through Fig. 3 approximately along the line 4—4;

Fig. 5 is a sectional view taken along the line 5—5 Fig. 4;

Fig. 6 is a sectional view taken along the line 6—6 Fig. 4; and

Fig. 7 is a top plan view of the device showing a modification.

Referring more particularly to the numerals, 1 denotes the angle iron frame supporting the brake rigging and is mounted on the under side of the railway coach or street car by the angle-plates 2. Near the middle of the frame pieces 1 are bolted angle plates 3 on which are bolted forked overhanging brackets 4. These brackets are located opposite each other on the opposite side angle irons of the frame. Pivotally mounted in the forked ends of these brackets 4 are corresponding supporting links 5 and 6. These links are used to support the brake beams 7 and 8 in such a manner that the links 5 and 6 and the adjustable rod 9 (which will be explained later) connecting them substantially, form a parallelogram which in effect moves the brake shoes 10 and 11 against the car wheels 12 and in a horizontal plane. The links 5 and 6 are pivotally connected to the brake beams 7 and 8 by the upwardly extending brackets 13 preferably bolted to the brake beams 7 and 8 and pivotally connected to the links 5 and 6.

This explains the usual connections of the brake shoes to the frame which is attached to the car. The actuating mechanisms for applying the brakes will now be described and the adjustable compensating mechanism now used on brake rigging to insure a correct and uniform pressure of all four shoes on their respective wheels.

In connection with the piston 14 of the ordinary air pressure cylinder 15 and pivotally disposed thereon is the flat connecting link 16 and from the opposite end of the cylinder 15 is a corresponding link 17 pivotally mounted in the forked ends of a bracket extending out horizontally from the closed end of cylinder 15. This link 17 is a dead or idle connecting link, while the link 16 is the actuating link working in connection with the piston rod 14. These two links 16 and 17 are pivotally connected by tie-bar 18 (see Fig. 2). It can be seen that the tie-bar 18, the link or cylinder lever 17 with its upper end pivotally fixed to the closed end of the cylinder 15 and the link or cylinder-lever 16 with its upper end pivotally mounted in the forked end of the movable piston rod 14 forms a free swinging quadrilateral frame and such that when

the piston rod 14 moves out under the pressure of the air in cylinder 15, the link 16 will move away from the cylinder, drawing with it the tie-bar 18 which in turn will pull the central portion of the idling link or cylinder-lever 17 over toward the air cylinder, or toward the right. At the same time, link 16 pivots on the tie-bar 18 which causes its lower end, that is, the lower end of link 16, to move to the left. The lower ends of the connecting links 16 and 17 are linked to oppositely disposed draw-bars or truck-levers 19 and 20 through links 21. These draw-bars are pivotally connected near their middle and the inner ends are connected to the brake beams 7 and 8 respectively. As the brake shoes 10 and 11 wear down from use the brake beams 7 and 8 must be regulated to take up this slack and for this purpose the hexagonal threaded rod 9 is used as a turnbuckle having right hand threads on one end and left hand threads on the other end, all threaded into suitable forked ends connected pivotally to the draw-bars 19 and 20. Obviously it can be seen that turning the slack adjusting hexagonal rod 9 in one direction will increase the distance of the pivotal connections on the draw bars 19 and 20, thus causing the brake beams to be moved out from the center thus taking up any slack in the bearing of the brake shoes 10 and 11 on the wheels 12.

Now to do this automatically as described hereinabove, an arm 22 mounted rigidly on the draw-bar 19 is provided and extending out from the draw-bar as shown in the drawings. On the outer free end of the arm 22 is an arcuate slot 23 having adjusting bolts 24 threaded in the ends thereof to adjust the length of the slot 23. In this slot 23 rides the knob end portion of an upwardly extending dog 25. This dog 25 is an extension and is cast integrally with a cylindrical casing or housing 26. The construction of this casing or housing 26 is as follows: A hole 27 admits the threaded hexagonal bar 9 upon which is slidably mounted a cylindrical ratchet block 28 having a hole through it in the shape and size to accommodate the hexagonal rod 9. The teeth of the ratchet extend from the face of the ratchet block 28 parallel with the rod 9 and engage similar teeth on an opposing ratchet block 29. This ratchet block 29 is slidably mounted horizontally but fixed with respect to its rotation with the casing 26, that is to say, the ratchet block 29 is hexagonally shaped to fit into a correspondingly shaped portion of the cylindrical housing 26, but the hole through this ratchet block 29 is large enough to allow the hexagonal rod 9 to turn within it. Therefore, it may be said that the interior of the cylindrical housing 26 is cylindrical for the length of the ratchet block 28 whose outside face is cylindrical and moves freely within this portion of the housing 26, and is hexagonally shaped to correspond to the hexagonal outside shape of the ratchet block 29, throughout this block's length so that any rotation of the housing will move this block 29. The two ratchet blocks 28 and 29 are yieldingly held and engaged by a coil spring 30, the other end of which is held in place by a washer 31 bearing against the threaded socket 32. To hold the housing in place there are provided adjustable locking set bolts 33 loosely bearing on the threaded socket 32, which is flared out beyond the bolts so that the housing, because of the bearing of the bolts behind the flare, cannot slip along the shaft 9.

In practice this invention as applied operates as follows:

As air is applied to operate the brakes the piston rod 14 slides forward or out of its cylinder and actuates the link 16 and link 17, the latter through the connecting link 18, link 16 being a live link and therefore capable of pivoting on link 18 and, also, of moving it along its longitudinal axis, thus actuating the dead link 17 on a pivot integrally mounted on the cylinder 15. The result of this action is the drawing together of the two pairs of connecting links 21 and consequently of the extreme ends of the draw-bars 19 and 20. Said draw-bars 19 and 20 are connected pivotally and adjustably by the bar 9 and its appendages and consequently their opposite ends tend to depart from one another and as these ends are connected by suitable means to the brake beams, which carry by means of suitable connections the brake shoes themselves, cause these shoes to press against their respective wheels (see Fig. 1). Now when this action takes place, the arm 22, which is rigidly attached to the draw-bar 19, swings in a direction indicated by an arrow in the drawings, thereby causing the adjusting bolt 24 to come into contact with the dog 25 formed integrally with the rotatable housing 26, this aforesaid contact causes the housing to rotate, it being now journaled on the threaded socket 32 and the ratchet block 28. In so far as the ratchet block 29 has an outer hexagonal shape such as the inward side has along the length of the said block 29, the block rotates with the housing about the adjustable rod 9. In the meanwhile the ratchet block 28 in so far as its inner surface is hexagonally formed to conform to the shape of the rod 9 and its outer surface, a rotatable bearing surface, remains stationary. It is then evident that the rotation of the housing and the ratchet block 29 will cause the teeth of the latter block to ride over the teeth of block 28, thereby forcing the block 29 to slide along its hexagonal ways horizontally and against the pressure of the spring 30. As the teeth

of ratchet block 29 cross the points of the teeth on ratchet block 28, they are forced back horizontally into their gripping position by means of the pressure of the spring 30 reacting from the washer 31. If the motion of the bar 32 continues the teeth slide over one another again and repeat the action just explained. Now as the air is released from the brake cylinder and the arm 22 reverses its direction of movement causing the oppositely disposed adjusting bolt 24 to come into contact with the round headed dog 25, the housing consequently reverses its direction of rotation, carrying with it ratchet block 29 by means hereinbefore described, which block 29 causes the ratchet block 28 to take up the rotation because of the connection caused by the teeth of the ratchets. Also, because the ratchet block 28 has an inner surface conforming to that of the rod 9, the block 28, and the rod 9 rotate together, the ratchet block 28 forcing the rotation and thereby causing the rod 9 to make the adjustment it is designed for, that is, to lengthen the distance between the draws 19 and 20. This is brought about immediately by the fact that right and left hand threads are cut on opposite ends of the bar 9.

Should the brake-releasing force not be strong enough to take care of the reverse rotation which does the adjusting, a modification of this device is provided, which involves the following changes and additions. On the rod 9 is placed longitudinally and surrounding the same a strong spiral spring 34 (see Fig. 7) reaching from a catch 35 formed integrally with housing 26 to a catch 36 formed integrally on a collar 37, said collar being so formed as to slip over the end of a threaded socket 38 not holding other parts of this improvement, and is rigidly attached thereto by a set bolt 39. Now as the housing 26 performs the first part of its revolution this spring coils more tightly and as the pressure on the brakes is released tends to uncoil and in so doing reverses the direction of rotation of the housing and brings about the adjusting movement already set forth. The use of a spring 34 does away with the need of bolts 33 in so far as the longitudinal expansive tension of the spring 34 is greater than that of the spring 30 and therefore keeps the housing 26 in its proper position without the need of the gripping bolts 33.

Having thus described this invention, I hereby reserve the benefit of all changes in form, arrangement, order, or use of parts, as it is evident that many minor changes may be made therein without departing from the spirit of this invention or the scope of the following claims.

I claim:

1. A slack adjuster including a horizontally swinging slotted arm, a cylindrical housing equipped with a dog extending into the slot of said arm, and means to vary the length of said slot for correspondingly adjusting the extent of movement of said dog.

2. In a slack adjuster, the combination of an adjusting rod, a surrounding cylindrical ratchet block fixed thereto with respect to rotation, a second cylindrical ratchet block not fixed thereto with respect to rotation, each block having teeth which may engage those of the other.

3. In a slack adjuster, the combination of an adjusting rod, a surrounding cylindrical ratchet block fixed thereto with respect to rotation, a second cylindrical ratchet block not fixed thereto with respect to rotation, each block having teeth which may engage those of the other, a hollow cylindrical rotatable housing surrounding and operating rotatably the second aforementioned ratchet block.

4. In a slack adjuster, the combination of an adjusting rod, a surrounding cylindrical ratchet block fixed thereto with respect to rotation, a second cylindrical ratchet block not fixed thereto with respect to rotation, each block having teeth which may engage those of the other, a hollow cylindrical rotatable housing surrounding and operating rotatably the second aforementioned ratchet block, a dog formed integrally and extending outwardly and upwardly from the cylindrical housing, and a horizontally swinging arm provided with an arcuate slot which receives said dog.

5. In a slack adjuster, the combination of an adjusting rod, a surrounding cylindrical ratchet block fixed thereto with respect to rotation, a second cylindrical ratchet block not fixed thereto with respect to rotation, each block having teeth integrally formed at its end which may engage the teeth of the other, a hollow cylindrical rotatable housing surrounding and operating rotatably the second aforementioned ratchet block extending longitudinally from said housing, a socket equipped with a flared end which is embraced by said ears and into which the adjusting rod screws, set bolts threaded in said ears and gripping lightly behind said flare, an outwardly and upwardly extending dog integrally formed with the cylindrical portion of said housing, a horizontally swinging arm, provided with an arcuate slot formed in the end thereof and engaged by said dog.

6. In a slack adjuster, the combination of an adjusting rod, a surrounding cylindrical ratchet block fixed thereto with respect to rotation, a second cylindrical ratchet block not fixed thereto with respect to rotation, each block having teeth integrally and longitudinally formed at its end which engage the teeth of the other, a hollow cylindrical rotatable housing surrounding and operating

the second aforementioned ratchet block, ears extending longitudinally from said housing, a socket equipped with a flared end which is embraced by said ears and into which the adjusting rod screws, set bolts threaded in said ears and gripping lightly behind said flare, an outwardly and upwardly extending dog integrally formed with the cylindrical portion of said housing, a horizontally swinging arm provided with an arcuate slot in the end thereof and engaged by said dog, adjusting set bolts screwed through the end walls of the slot whereby it may be adjusted in length, a pivoting draw-bar carrying rigidly and rotatably operating the aforesaid horizontally swinging arm.

7. In a slack adjuster, the combination of an adjusting rod, a surrounding cylindrical ratchet block fixed thereto with respect to rotation, a second cylindrical ratchet block not fixed thereto with respect to rotation, each block having teeth integrally formed at its end which engage the teeth of the other, each of said teeth being formed with one face askew to the longitudinal axis of the ratchet blocks and one face parallel thereto, a coil spring surrounding the aforementioned adjusting rod and within the housing pressing at one end a socket into which the adjusting rod screws and one of the ratchet blocks at the other.

8. In a slack adjuster, the combination of an adjusting rod, a surrounding cylindrical ratchet block fixed thereto with respect to rotation, a second cylindrical ratchet block not fixed thereto with respect to rotation, each block having teeth integrally formed at its end which engage the teeth of the other, each of said teeth being formed with one face askew to the longitudinal axis of the ratchet blocks and one face parallel thereto, a coil spring surrounding the aforementioned adjusting rod a socket arranged within the housing one end of which is engaged by said spring and receives the adjusting rod while the opposite end receives one of the ratchet blocks, a hollow cylindrical rotatable housing surrounding and operating one of the ratchet blocks, longitudinally extending ears from said housing extending over one of the aforementioned sockets, set bolts threaded through the ears, and gripping the socket, an outwardly and upwardly extending dog integrally formed with the cylindrical portion of said housing, a horizontally swinging arm provided with an arcuate slot in the end thereof and engaged by the aforementioned dog of the cylindrical housing, adjusting set bolts threaded through the end walls of the slot, a pivoted draw-bar carrying rigidly and rotatably operating the aforesaid horizontally swinging arm.

9. In a slack adjuster, the combination of an arm, a draw-bar rigidly attached to the arm, a turn-buckling device equipped with a socket on one end, a hollow cylindrical housing rotatably mounted on said socket, an interval cylindrical ratchet block, a hexagonal adjusting rod rigidly attached to said block with respect to its rotation, a second interval ratchet block having teeth thereon fitting into teeth of the first mentioned block and having a hexagonally shaped outside to conform with a hexagonal inner shape of the housing along the length of the second block thereby making said second block integral with the housing in respect to its rotation, the second block having a hole accommodating rotatably the aforementioned adjusting rod, and a hole in the end wall of the housing rotatably accommodating the adjusting rod.

10. In a slack adjuster, the combination of a rotatably swinging actuating arm, a housing which said arm rotatably operates to and fro, two coördinating cylindrical ratchet blocks within the housing, one of which, by means of being formed circularly cylindrical outside journals a cylindrical inner portion of the aforesaid housing and by means of a non-circular shape on the inside grips a corresponding non-circular shape of an adjusting rod, the other of which cylindrical ratchets is formed non-circularly on the outside to conform to a non-circularly formed inner portion of the housing at its arm of contact with said ratchet block and having a hole through its center large enough to allow the aforesaid non-circular shape of the adjusting rod to rotatably pass through, the whole housing and its appendages being rotatably mounted on one cylindrical ratchet block and a socket into which the adjusting rod screws.

11. In a slack adjuster, the combination of a rotatably swinging actuating arm, a housing which said arm rotatably operates to and fro, two coördinating cylindrical ratchet blocks within the housing, one of which, by means of being formed circularly cylindrical outside journals a cylindrical inner portion of the aforesaid housing and by means of a hexagonal shape on the inside grips a corresponding hexagonal shape of an adjusting rod, the other of which cylindrical ratchets is formed hexagonally on the outside to conform to a hexagonally formed inner portion of the housing at its arm of contact with said ratchet block and having a hole through its center large enough to allow the aforesaid hexagonal shape of the adjusting rod to rotatably pass through, the whole housing and its appendages being rotatably mounted on one cylindrical ratchet block and a socket into which the adjusting rod screws.

12. In a slack adjuster, the combination of an arm, a draw bar rigidly attached to

said arm, one end of said arm being provided with a slot, said slot being made adjustable by means of adjusting set bolts screwed through its end walls, an adjusting rod and a dog rigidly attached to a cylindrical housing, said dog being rotated by means of its rounded end working with the moving slot of the aforesaid arm and said housing rotating freely in its forward movement but drawing with it on its return rotation said adjusting rod.

13. In a slack adjuster, the combination of an arm, a draw bar rigidly attached to said arm, a turn-buckling device, a cylindrical housing rotatably journaled on one end of said turn-buckling device, a cylindrical ratchet block contained within the housing, said ratchet block being rigid with the adjusting bar in respect to its rotation, also, means for causing the aforesaid arm to rotate this housing to and fro.

14. In a slack adjuster, the combination of an arm, a turn-buckle rigidly attached to said arm, a turn-buckling device, a cylindrical housing rotatably journaled on one end of said turnbuckling device, a cylindrical ratchet block contained within the housing, said ratchet block being rigid with the adjusting bar in respect to its rotation, also, means for causing the aforesaid arm to rotate this housing to and fro, together with means for causing the housing and its appendages to not effect rotation during their forward rotation but to rotate the adjusting rod during their reverse rotation, also, means for causing the arm to operate the housing rotatably to and fro.

15. In a slack adjuster, the combination of an arm, a draw-bar rigidly attached to said arm and having formed at its end an adjustable arcuate slot, an adjusting rod, a rotatable hollow cylindrical housing mounted longitudinally on said two meshing toothed cylindrical ratchet blocks, arranged in said housing, one of which rotates with the housing and free of the adjusting rod and the other of which rotates with the adjusting rod and free of the housing, a coil spring longitudinally placed on the adjusting rod and within the aforesaid housing, a threaded socket equipped with a washer which receives the expansive force of said spring to keep the ratchet teeth in mesh.

16. In a slack adjuster, the combination of a swinging arm, provided with an arcuate slot a rotatable hollow housing surrounding an adjusting rod and its socket, an upwardly extending dog fastened integrally on said housing and extending into said arcuate slot to operate the housing, a spiral return spring fastened to the housing, and a collar for retaining the spring on said adjusting rod.

17. In a slack adjuster, the combination of a rotatable housing mounted on the adjusting rod, two meshing ratchets within the housing, one rotatable with it and free of the adjusting rod, the other rotatable with the adjusting rod and free of the housing, meshing teeth on the ratchet blocks, a light coil spring longitudinally mounted on the adjusting rod and within the housing pressing the ratchet block teeth into mesh, a draw-bar, an arm rigidly fastened to said bar and provided with a slot, an upwardly projecting rounded dog integrally formed with the aforesaid housing engaged in said slot, a heavy coil spring fastened to the outside of said housing, a screw threaded socket, a collar fastened rigidly to the said socket, and a heavy coil spring fastened to said socket.

18. In a slack adjuster, the combination of a hollow cylindrical housing, an adjusting rod, an interval cylindrical ratchet block adapted to journal said rod around the housing, longitudinally extending ears formed on said housing, adjustable set bolts threaded through said ears, a socket formed on the housing and provided with a flared end behind which said bolts engage cylindrical ratchet blocks within the housing and around the adjusting rod so formed that when rotated one way the housing and its appendages do not grip the adjusting rod but when the direction of rotation is reversed they do, a horizontally to and fro swinging arm, means for imparting forward and reverse motion of said arm to the rotation of the aforesaid housing and its appendages, means for swinging the arm by motion of the parts actuating the brakes of a car truck.

19. In a slack adjuster, the combination of a hollow cylindrical housing, an adjusting rod, an interval cylindrical ratchet block adapted to journal said rod around the housing, longitudinally extending ears formed on said housing, adjustable set bolts threaded through said ears, a socket formed on the housing and provided with a flared end behind which said bolts engage cylindrical ratchet blocks within the housing and around the adjusting rod so formed that when rotated one way the housing and its appendages do not grip the adjusting rod but when the direction of rotation is reversed they do, a horizontally to and fro swinging arm, means for imparting its forward and reverse motion of said arm to the rotation of the aforesaid housing and its appendages, and a pivoting draw-bar carrying said arm.

20. In a slack adjuster, an adjusting rod, a rotatable hollow cylindrical housing mounted on the adjusting rod, mechanism arranged in said housing and so constructed

that rotation of the housing in one direction does not rotate the adjusting rod but rotation in the opposite direction does rotate the adjusting rod, a dog on said housing extending upwardly and having a rounded head, two set bolts alternately engaging said dog, a pivoting draw-bar, and an arm rigidly attached to said draw-bar and provided with an arcuate slot into which said set bolts extend.

In testimony whereof I hereunto affix my signature.

BERNARD SCHECHTER.