No. 867,676. PATENTED OCT. 8, 1907.

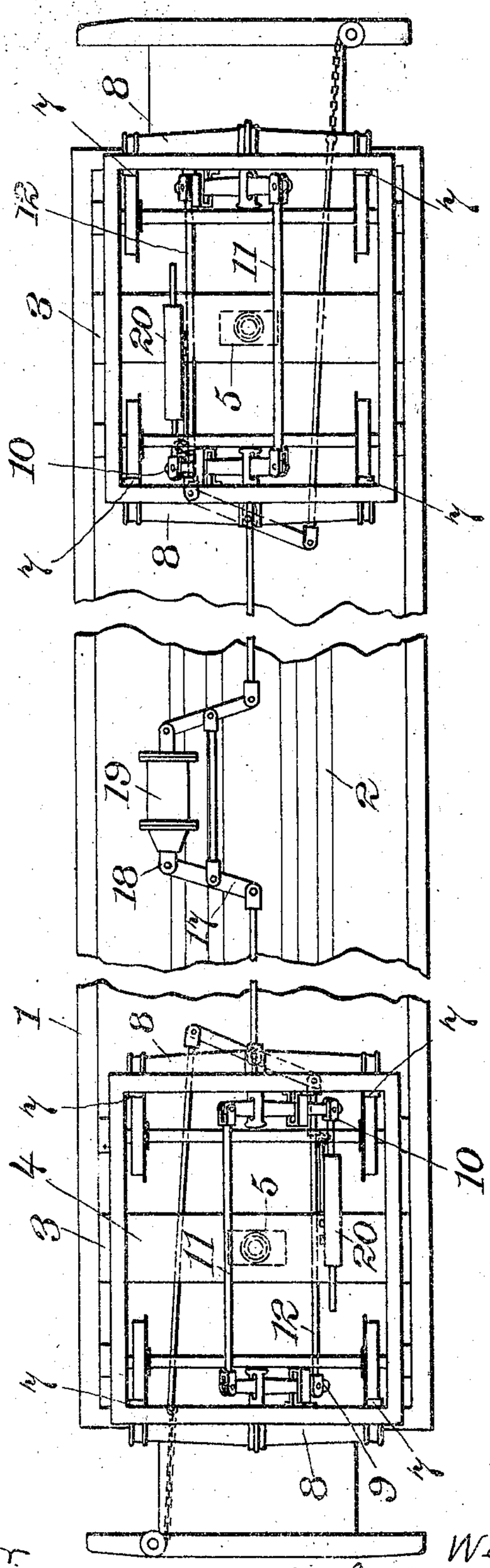
W. H. SAUVAGE.

SLACK ADJUSTER.

APPLICATION FILED JAN. 27, 1906. RENEWED JAN. 11, 1907.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses
Frank O'Connor
M. G. Crawford

Inventor
William H. Sauvage
By his Attorney
P. Eickemeyer

No. 867,676. PATENTED OCT. 8, 1907.

W. H. SAUVAGE.

SLACK ADJUSTER.

APPLICATION FILED JAN. 27, 1906. RENEWED JAN. 11, 1907.

3 SHEETS—SHEET 2.

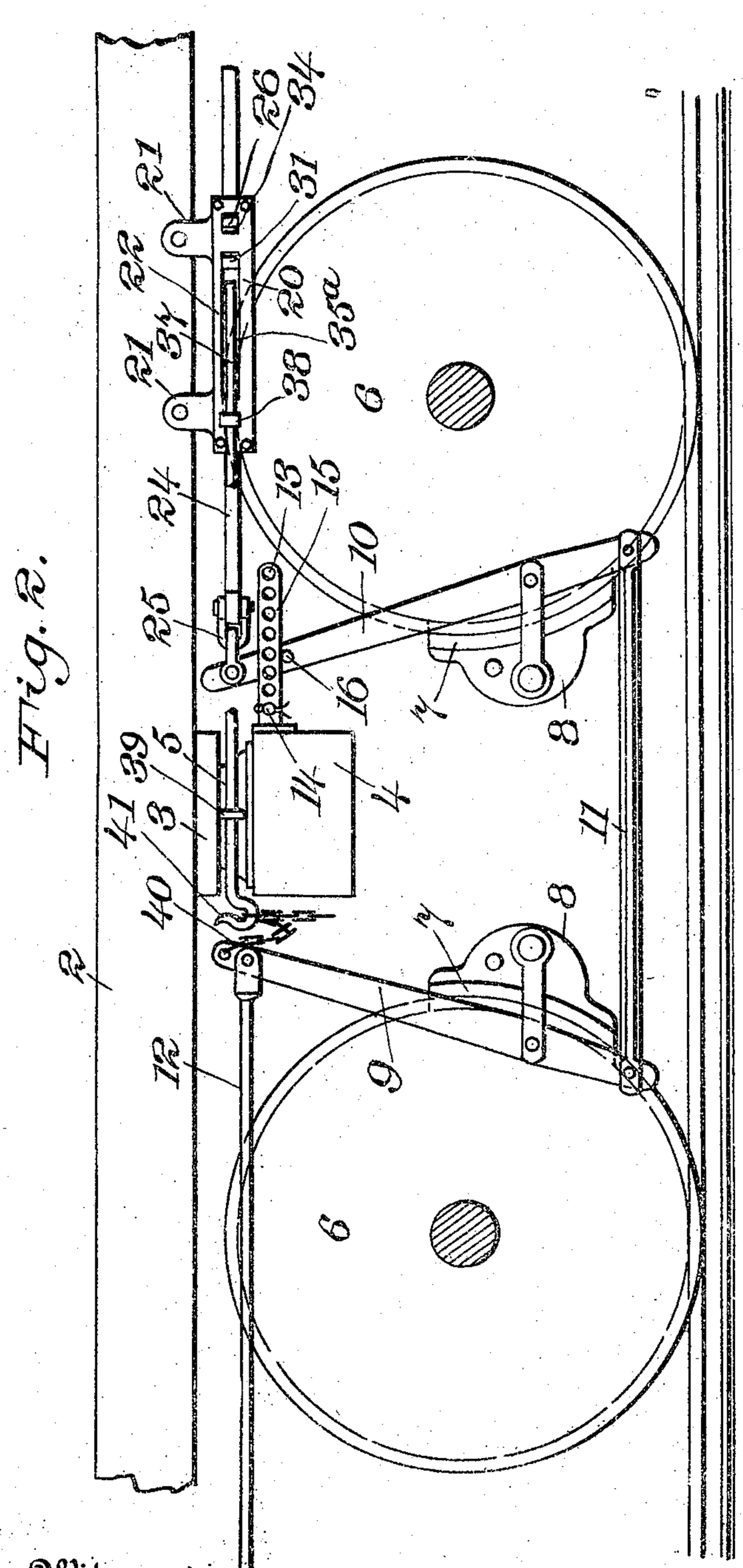


Fig. 2.

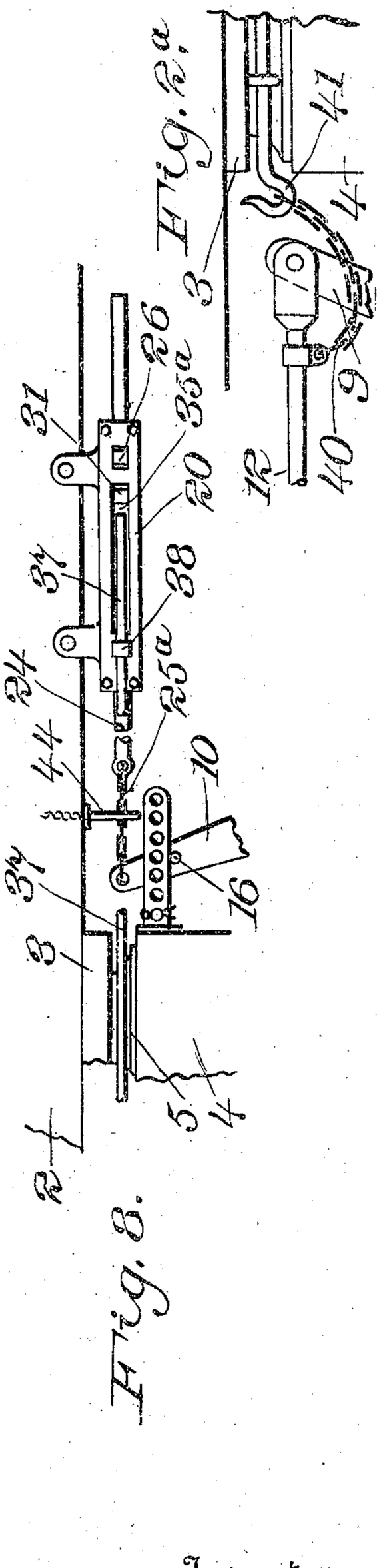


Fig. 3.

Witnesses,
Thos. C. O'Connor
M. F. Crawford

Inventor
William H. Sauvage
By his Attorney A. Parkerhurst

No. 867,676. PATENTED OCT. 8, 1907.

W. H. SAUVAGE.

SLACK ADJUSTER.

APPLICATION FILED JAN. 27, 1906. RENEWED JAN. 11, 1907.

3 SHEETS—SHEET 6.

Fig. 3.

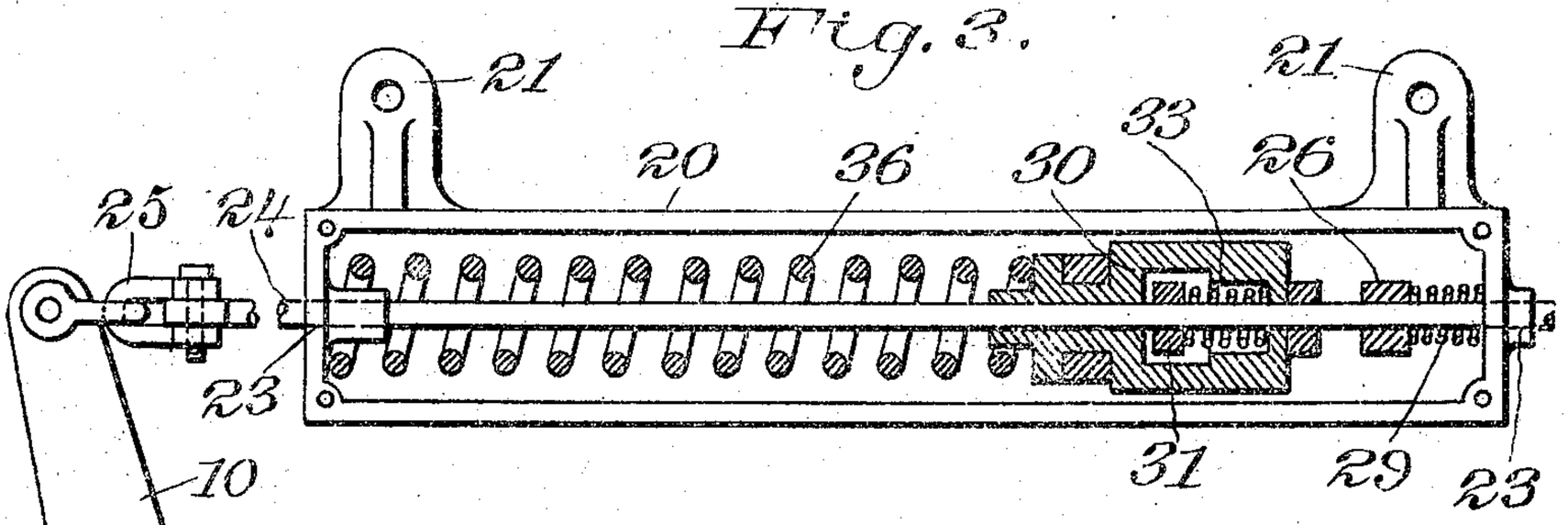


Fig. 4.

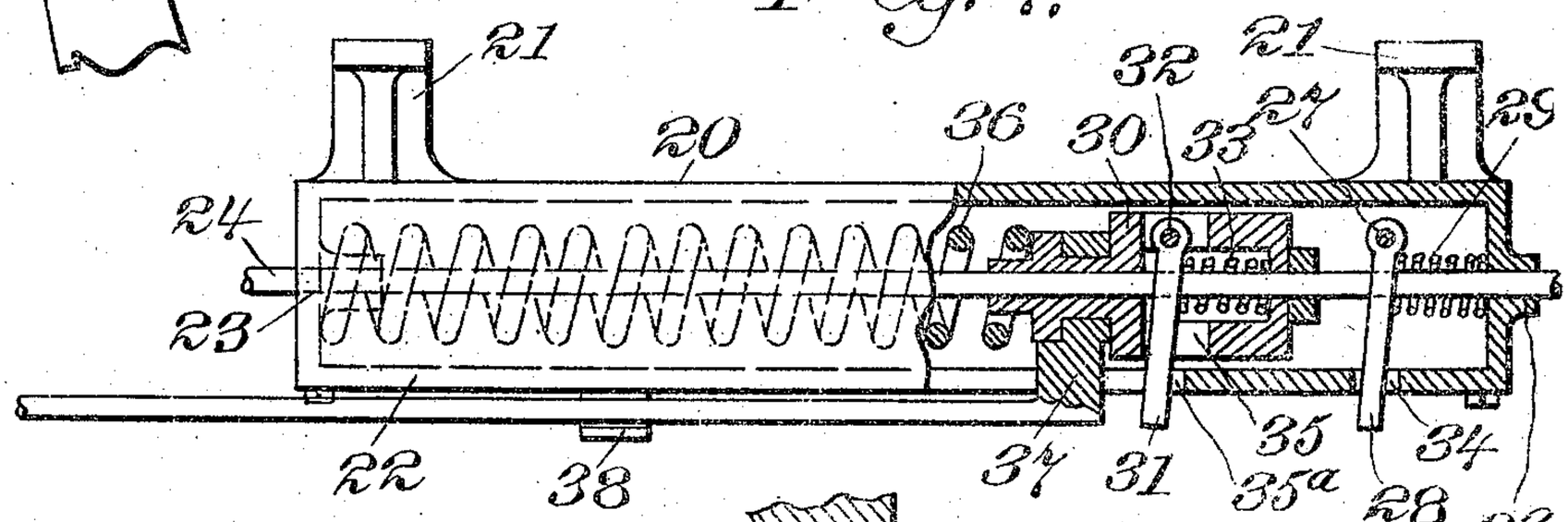


Fig. 5.

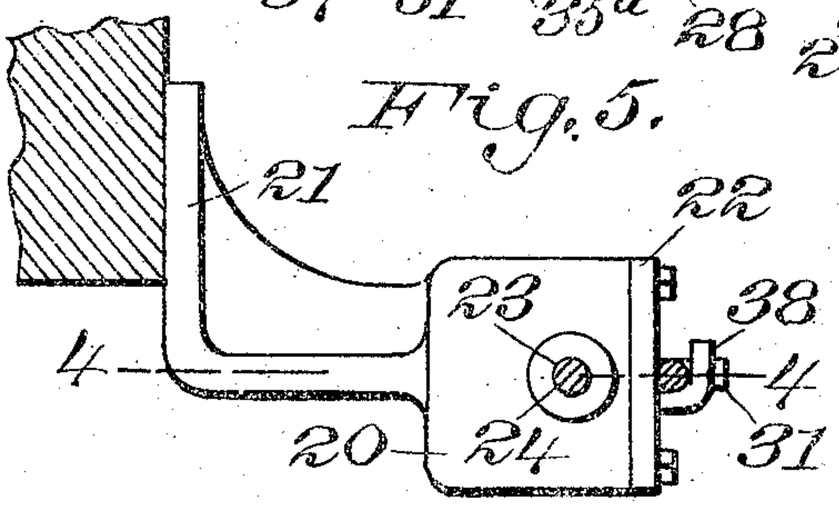


Fig. 6.

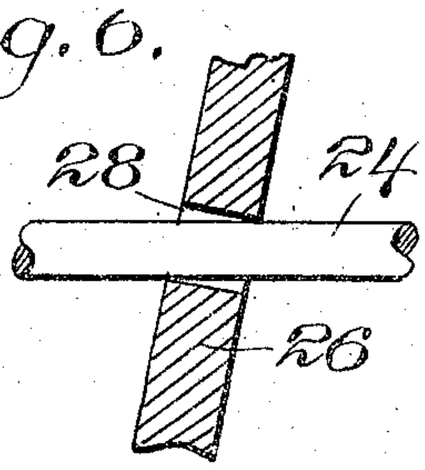
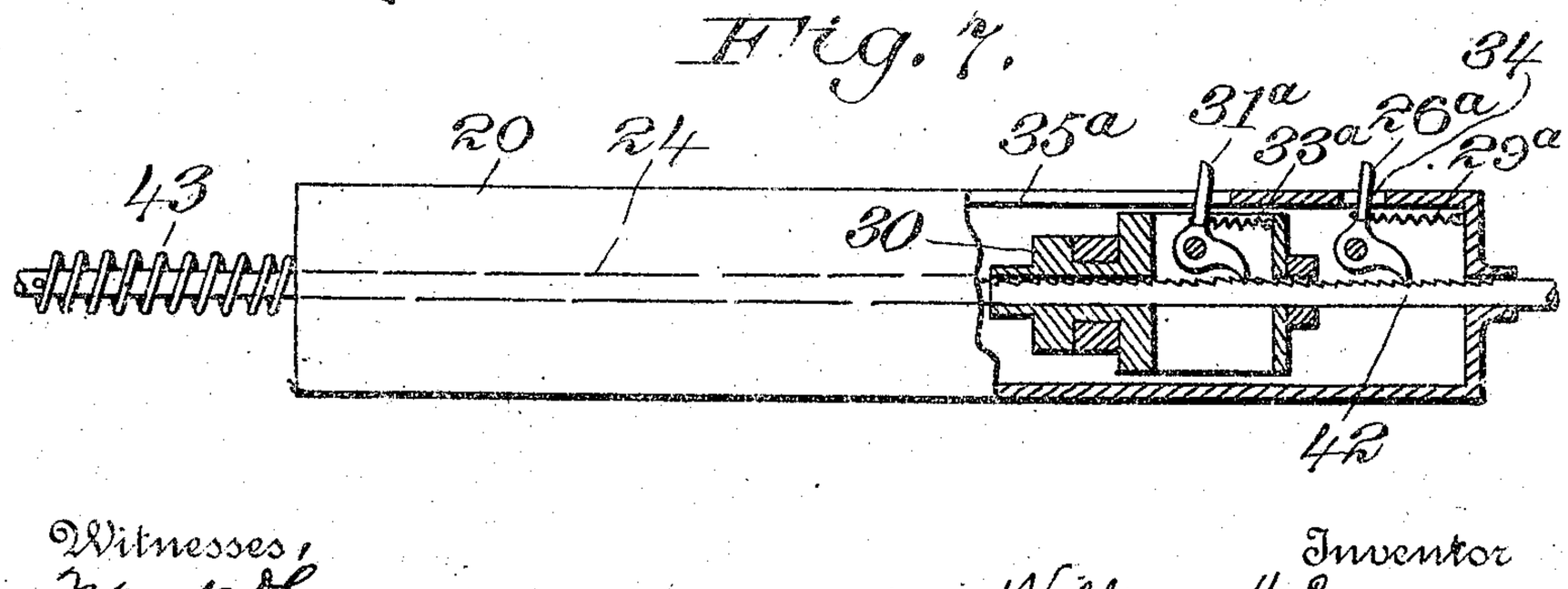


Fig. 7.



Witnesses,
Theo. H. Connor
M. G. Crawford

Inventor
William H. Sauvage
By his Attorney A. Van Kirkbride

UNITED STATES PATENT OFFICE.

WILLIAM HENRY SAUVAGE, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO ATLAS SLACK ADJUSTER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SLACK-ADJUSTER.

No. 867,676. Specification of Letters Patent. Patented Oct. 8, 1907.

Application filed January 27, 1906, Serial No. 298,191. Renewed January 11, 1907. Serial No. 351,898.

To all whom it may concern:

Be it known that I, WILLIAM HENRY SAUVAGE, a citizen of the United States of America, and a resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Slack-Adjusters, of which the following is a specification.

My invention relates to railway brakes and comprises an improved apparatus for automatically taking up the slack in power operated brakes so that the amount of piston travel in the power cylinder will remain substantially constant as the brake shoes wear down or other parts of the brake rigging yield.

The best form of apparatus embodying my invention at present known to me is illustrated in the accompanying three sheets of drawing in which:

Figure 1 is an outline plan view of the bottom of a car and the brake rigging, showing the location of my automatic take-up apparatus. Fig. 2 is a side elevation of a single truck showing my invention attached thereto, the position of the brake shoes and connected parts being different from that in the arrangement of Fig. 1. Fig. 2ª shows a minor modification. Fig. 3 is an enlarged side view of the automatic take-up apparatus, with the face plate removed, a section being taken upon a vertical plane through the clutch mechanism. Fig. 4 is a detail section taken on a horizontal plane on line 4—4 of Fig. 5 showing the two clutches. Fig. 5 is a detail end view of the automatic take-up apparatus. Fig. 6 is an exaggerated detail of one of the clutch dogs. Fig. 7 illustrates a modification in which pawl and ratchet clutches are substituted for the friction clutches. Fig. 8 is a detail modification.

Throughout the drawings, like reference figures indicate like parts.

1 is the car body, and 2 one of the draft timbers or other conveniently located portion of the car body to which my automatic take-up device may be attached.

3 is the bolster on which one end of the car body is supported by means of the truck bolster 4 and center plates 5.

6, 6, represent two of the truck wheels, and 7, 7, the brake shoes coöperating therewith, carried by brake beams 8, 8.

9 is the "live" lever pivoted to one of the brake beams, 10 is the "dead" lever pivoted to the other brake beam, the lower end of said levers being connected by bottom rod 11, and the top rod 12 being connected to the upper end of the "live" lever in the manner now in use in the standard brake rigging of the present day. 13 is the usual adjusting lug carried by the truck bolster to which the upper end of the "dead" lever is usually adjustably pivoted by means of the pin 14 passing through one of the series of holes 15. When my invention is employed, the pin 14 is placed in one of the perforations 15, out of use as shown, but ready to be brought into use in case the take-up device should be put out of operation by an accident. When my invention is employed the adjusting lug 13 serves as a guide for the "dead" lever coöperating with the guide pin 16, carried by such lever. 17 is the usual brake lever connected to the other end of the top rod 12. 18 is the piston connected to the other end of said lever 17, 19 the power cylinder for compressed air or other fluid by which the brakes are operated.

20 is the main frame or shell of the automatic take-up mechanism provided with lugs 21, 21, by which it may be attached to the timber 2, or other convenient portion of the car body. This main frame is provided with any convenient form of cover plate 22, and has a hole 23 at each end, which serves as a guide for the take-up rod 24, which passes through them. Preferably this take-up rod is a solid cylindrical rod of about an inch in diameter and upwards, one end of which is attached to the upper end of the "dead" lever 10 by means of the clevis 25, or other flexible series of tension links. The take-up rod 24 passes through two friction clutches, which preferably consist of pivoted perforated clutch dogs, such as are used in the well known form of mechanical lifting jacks.

26 is the main clutch dog pivoted at 27 to the main frame 20 by a pivot pin having a vertical axis. 28 is the opening of circular or slightly elliptical shape, through which the take-up rod 24 passes. 29 is a spring which normally holds said clutch dog 26 in the position shown in Fig. 4, so as to cause it to grasp the take-up rod 24 and prevent the same from being pulled towards the left.

30 is a movable clutch which may be made in the form of a casting cored out to contain the movable clutch dog 31, pivoted to it at 32 upon a vertical axis, and a spring 33 normally holding said clutch dog in engagement with the take-up rod 24, which passes through it. Such engagement is of a nature to prevent the take-up rod from being pulled through the movable clutch toward the left, but permitting the movable clutch to be pulled on the take-up rod toward the left.

34 is a slot formed in cover plate 22 through which the main clutch dog 26 projects. The slot 34 is so located as to leave clutch dog 26 free to swing to the left far enough to firmly grasp the take-up rod 24, as shown in Fig. 4, but does not permit said clutch dog to swing to the right beyond a position at right angles to said take-up rod, in which position the rod may be freely slid through the clutch toward the right. 35 is a similar slot formed in the casting 30 of the movable clutch, which similarly permits the clutch dog 31 to swing to the left far enough to grasp the take-up rod

24, as shown in Fig. 4, but does not permit said clutch dog to swing to the right beyond a position at right angles to the take-up rod, in which position the movable clutch may slide freely over the take-up rod 24 toward the left.

36 is a take-up spring, preferably made in the shape of a spiral spring, surrounding the take-up rod 24, and having one end abutting against the end of the main end plate of the frame or casing 20, and the other end against the movable clutch 30.

37 is any convenient form of take-up hook, which seizes the movable clutch 30 and extends outside of the casing 20, through the slot 35ª through which the movable clutch dog 31 also projects.

38 is any convenient form of guide lug for the take-up hook 37, and 39 is a guide for the other end of said take-up hook set in the car body bolster 3. The other end of the take-up hook is connected with the upper end of the "live" lever 9, or to the top rod 12, or other moving portion of the brake system, by some convenient form of "lost motion" connecting mechanism such as the chain 40, one of the links of which catches over the hook 41 on the end of the take-up hook rod. This chain is preferably made with a number of extra links, as shown in Fig. 2, so as to permit of adjustment of the "lost motion" connection. The constructions indicated in Fig. 1 and Fig. 2ª have take-up chain 40, as shown, attached to the top rod 12, which is obviously a mechanical equivalent of fastening it to the "live" lever 9.

In the modification shown in Fig. 7, pawls 26ª, and 31ª, are substituted for the friction clutch dogs 26 and 31, and these coöperate with the ratchet teeth 42 on the take-up rod and are held in such engagement by springs 29ª and 33ª, the same as are the friction dogs. As there is no possibility of slipping in such ratchet mechanism, it would also be possible to use the constant tension spring 43, shown in Fig. 7, which will always hold the ratchet teeth up against the pawls and prevent any slipping of the take-up rod toward the right when the apparatus is slack, with the friction clutch form, however, I find that the friction dog 26 bites the rod 24 with sufficient force under action of the spring 29 to hold the rod in any position, unless the same is driven in with considerable force. 25ª is a chain of considerable length (see Fig. 8) substituted for the clevis attachment 25 and run through a guide 44, which guide will take up all the strain due to any angularity of pull upon the take-up rod, which might result from an extreme position of adjustment of the "dead" lever, rocking of the car, or displacement of the parts when under tension of a heavy brake application.

The construction of parts being as above described, one mode of operation of my invention is as follows: The parts being arranged as shown, a full application of the brakes is made by the application of power to the piston 18. If the piston travel so produced does not conform to the standard to be maintained (say 6 inches), the brakes are released, the clutch dogs moved by hand so as to compress springs 29 and 33, and release take-up rod 24, and said rod is slid by hand to left or right a distance sufficient to permit the desired piston travel to occur when the power is again applied. After the required adjustment is thus secured, all the slack of take-up chain 40 is eliminated by hooking the proper link into hook 41 during a full application of the power, and the apparatus is then ready for automatic action. So long as the brake shoes and other parts remain in a condition to permit only the standard piston travel or less, no operation of the take-up mechanism will result. The moment such standard piston travel is exceeded, however, (as would result from a wearing down of the brake shoes), a movement of the "live" lever 9 in excess of the slack provided in take-up chain 40 occurs whenever a heavy application of brakes is next made and the hook 37 and movable clutch 30 are pulled toward the left a distance proportional to the excess travel of the piston. When the brakes are next released, the clutch 30 is forced back to its normal position by take-up spring 36 and pulls take-up rod 24 along with it, shifting the fulcrum of dead lever 10 to the left a distance sufficient to reduce the possible piston travel on the next brake application down to the standard amount previously provided for. The take-up rod is held in its new position by main clutch dog 26, and thus a standard maximum piston travel is maintained.

The advantages of my invention comprise among other things, the following: The mounting of the automatic take-up device connected to the "dead" lever on the car body insures the accurate working of the slack adjusting devices under all conditions. I am aware that heretofore it has been proposed to employ an automatic take-up device including two friction clutches operating upon the general plan above described, but these and all other automatic take-up devices connected to the "dead" lever have heretofore been mounted on the swiveling wheel truck of the car. The result has been to destroy all accuracy of take-up action. This has been due to two causes; first, the varying amount of play existing between car body and truck as the center plates and king bolts wear, and, second, the connecting of the top rod to the "live" lever carried by the swiveling truck a considerable distance to one side of a vertical plane passing through the pivotal point of the truck suspension, and parallel to the top rod, as clearly shown in Fig. 1. It is evident that with this arrangement the total pull on the top rod, amounting to from one to six tons in a heavy brake application, tends to draw the trucks toward the middle of the car body and to twist them around on the king bolts as centers. The varying amount of play so produced by wear of the center plates, and of the wheel flanges, would not be compensated for by the take-up device and would produce irregularity of piston travel. Furthermore, the swing of the trucks on curves would to a still greater degree disturb the accuracy of the slack adjuster action. If the truck be swung through a considerable angle going around a sharp curve and a brake application be made, such position of the truck will materially increase or decrease the piston travel and so cause the automatic slack adjuster to take up too much slack or on the other hand, permit excessive piston travel without any take-up action. This might result in the brakes being taken up so close in a heavy application on a sharp curve that the shoes would still drag on the wheels when released on a straight track or on a reversed curve. All of these possibilities are avoided by my invention. The take-up

device being mounted on the car body, its position relative to the power cylinder is fixed and unaffected by any movement of the truck. The jointed link system formed by the "live" lever, the "dead" lever and the bottom rod connecting the take-up device to the piston will freely adjust itself to the movements of the truck without varying the brake shoe clearance or pressure. The clutches being mounted on the spring supported car body are less subject to wearing and loosening of the parts by jarring. The same are most accessible for adjustment. The two clutch dogs are located adjacent one to the other so that both can be grasped by the operator with one hand while the other hand adjusts the take-up rod thus released. The springs positively hold the clutches in engagement so that there is little possibility of the take up rod being jarred out of adjustment, there is no rattling and wearing of the parts by the jarring of the car. The clutch dogs being pivoted on vertical axes, the wear produced by sliding the take-up rod in and out will not affect the adjustment of the clutch biting surfaces. The take-up rod being a substantially solid rod passing through the clutch dogs, will not be bent or buckled by their action, as is the case where such powerful clutching action is applied to cylindrical parts telescoping one into the other. The working parts of my invention are all incased so as to protect them from snow and ice, and yet they are freely accessible by removing the face plate or cover 22, and do not fit together so tightly as to be prevented from normal operation by any ordinary collection of rust or dirt.

It is evident, of course, that various changes could be made in the details of construction shown and described without departing from the spirit and scope of my invention, so long as the principle of operation be preserved.

Having, therefore, described my invention, I claim:

1. In an automatic slack adjuster for railway brakes, the combination of the wheel truck and brake system therefor, comprising a "live" lever and a "dead" lever, the car body, the brake cylinder mounted on said car body, and an automatic take-up device mounted on the car body and connected to the "dead" lever on the wheel truck.

2. In an automatic slack adjuster for railway brakes, the combination of the wheel truck and brake system therefor, comprising a "live" lever and a "dead" lever, the car body, the brake cylinder mounted on said car body, and an automatic take-up device mounted on the car body and connected to the "dead" lever on the wheel truck by a flexible series of tension links.

3. In an automatic slack adjuster for railway brakes, the combination of the wheel truck and brake system therefor, comprising a "live" lever and a "dead" lever, the car body, the brake cylinder mounted on said car body, and an automatic take-up device mounted on the car body and connected to the "dead" lever, and means operated by excessive movement of the "live" lever to actuate said automatic take-up device.

4. In an automatic slack adjuster for railway brakes, the combination of the wheel truck and brake system therefor, comprising a "live" lever and a "dead" lever, the car body, the brake cylinder and piston mounted on said car body and operatively connected to the "live" lever of the brake system and an automatic take-up device mounted on the car body and connected to the "dead" lever of the brake system, said take-up device comprising a holding clutch, an adjusting clutch, and a "lost motion" connection from the adjusting clutch to the "live" lever.

5. In an automatic slack adjuster for railway brakes, the combination of the car body and swiveling wheel truck for same, the brake cylinder and piston mounted on said car body, the brake system carried by the truck, comprising a "live" lever and a "dead" lever, the "live" lever and top rod connecting it to the piston of the brake cylinder, the connection to the "live" lever being at a point to one side of a vertical plane passing through the swivel bearing of the truck and parallel to the "top" rod, and an automatic take-up device fastened to the car body and connected to the "dead" lever to form an adjustable fulcrum for said dead lever.

6. In an automatic slack adjuster for railway brakes, the combination with the standard brake rigging of the main frame of the take-up mechanism provided with guides, a take-up rod sliding in said guides, a stationary friction clutch mounted on said frame and operating to prevent motion of the rod in one direction, but permitting motion in the other direction, a movable friction clutch grasping said rod to move it in the direction permitted by the first clutch, a spring normally tending to force said movable clutch in the same direction, connections from said take-up rod to the "dead" lever of the brake rigging and a "lost motion" connection from the movable clutch to the "live" lever.

7. In an automatic slack adjuster for railway brakes, the combination with the standard brake rigging of the main frame of the take-up mechanism provided with guides, a take-up rod sliding in said guides, a stationary friction clutch mounted on said frame and operating to prevent motion of the rod in one direction, but permitting motion in the other direction, a movable friction clutch grasping said rod to move it in the direction permitted by the first clutch, a spring normally tending to force said movable clutch in the same direction, connections from said take-up rod to the "dead" lever of the brake rigging and an adjustable "lost motion" connection from the movable clutch to the "live" lever.

8. In an automatic slack adjuster for railway brakes, the combination with the standard brake rigging of the main frame of the take-up mechanism provided with guides, a take-up rod sliding in said guides, a stationary friction clutch mounted on said frame and operating to prevent motion of the rod in one direction, but permitting motion in the other direction, a movable friction clutch grasping said rod to move it in the direction permitted by the first clutch, a spring normally tending to force said movable clutch in the same direction, connections from said take-up rod to the "dead" lever of the brake rigging and a "lost motion" connection from the movable clutch to the "live" lever, together with a spring mounted in the movable clutch for normally holding same in engagement, and a spring mounted in the main frame normally holding the stationary clutch in engagement.

9. In an automatic slack adjuster for railway brakes, the combination with the standard brake rigging of the main frame of the take-up mechanism provided with guides and lugs for attachment to a car body, a take-up rod sliding in said guides, a stationary friction clutch mounted on said frame and operating to prevent motion of the rod in one direction, but permitting motion in the other direction, a movable friction clutch grasping said rod to move it in the direction permitted by the first clutch, a spring normally tending to force said movable clutch in the same direction, connections from said take-up rod to the "dead" lever of the brake rigging and a "lost motion" connection from the movable clutch to the "live" lever.

10. In an automatic slack adjuster for railway brakes, the combination with the standard brake rigging of the main frame of the take-up mechanism provided with guides, a take-up rod sliding in said guides, a stationary friction clutch mounted on said frame and operating to prevent motion of the rod in one direction, but permitting motion in the other direction, a movable friction clutch grasping said rod to move it in the direction permitted by the first clutch, a spring normally tending to force said movable clutch in the same direction, connections from said take-up rod to the "dead" lever of the brake rigging and a "lost motion" connection from the movable clutch to the "live" lever, each of said clutches having tripping means projecting outside of the main frame.

11. In an automatic slack adjuster for railway brakes, the combination with the standard brake rigging of the main frame of the take-up mechanism provided with guides, a take-up rod sliding in said guides, a stationary friction clutch mounted on said frame and operating to prevent motion of the rod in one direction, but permitting motion in the other direction, a movable friction clutch grasping said rod to move it in the direction permitted by the first clutch, a spring normally tending to force said movable clutch in the same direction, connections from said take-up rod to the "dead" lever of the brake rigging and a "lost motion" connection from the movable clutch to the "live" lever, each of said clutches having tripping means projecting outside of the main frame and located adjacent one to the other.

12. In an automatic slack adjuster for railway brakes, the combination with the standard brake rigging of the main frame of the take-up mechanism provided with guides, a take-up rod sliding in said guides, a stationary friction clutch mounted on said frame and operating to prevent motion of the rod in one direction, but permitting motion in the other direction, a movable friction clutch grasping said rod to move it in the direction permitted by the first clutch, a spring normally tending to force said movable clutch in the same direction, connections from said take-up rod to the "dead" lever of the brake rigging and a "lost motion" connection from the movable clutch to the "live" lever, the swinging members of said friction clutches being pivoted on vertical axes.

13. In an automatic slack adjusting mechanism for railway brakes, the combination of the brake rigging, an automatic take-up mechanism mounted on the car body comprising an endwise adjustable take-up rod, flexible connecting means extending from such rod to the "dead" lever of the brake rigging and guiding means for such flexible connecting means also mounted on the car body.

14. In an automatic slack adjusting mechanism for railway brakes, the combination of the main frame of the take-up mechanism, a take-up rod sliding therein, clutching means mounted on said main frame and engaging the take-up rod to prevent motion of it in one direction and a tension spring normally tending to force said rod in the direction in which motion is prevented by the clutching means.

15. In an automatic slack adjuster for railway brakes, the combination of the car body, the wheel truck provided with brake rigging, an automatic take-up device mounted on the car body, a flexible connection from the same to the "dead" lever of the brake rigging, and means for manually adjusting the fulcrum of the dead lever which also serve as guiding means for said "dead" lever when the automatic take-up device is in use and manual adjustment is dispensed with.

Signed at New York, N. Y. this 24th day of January, 1906.

WILLIAM HENRY SAUVAGE.

Witnesses:
FRANK O'CONNOR,
M. G. CRAWFORD.