R. F. HAMILTON.

AUTOMATIC SLACK ADJUSTER FOR BRAKES.

APPLICATION FILED MAY 9, 1908.

939,018. Patented Nov. 2, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

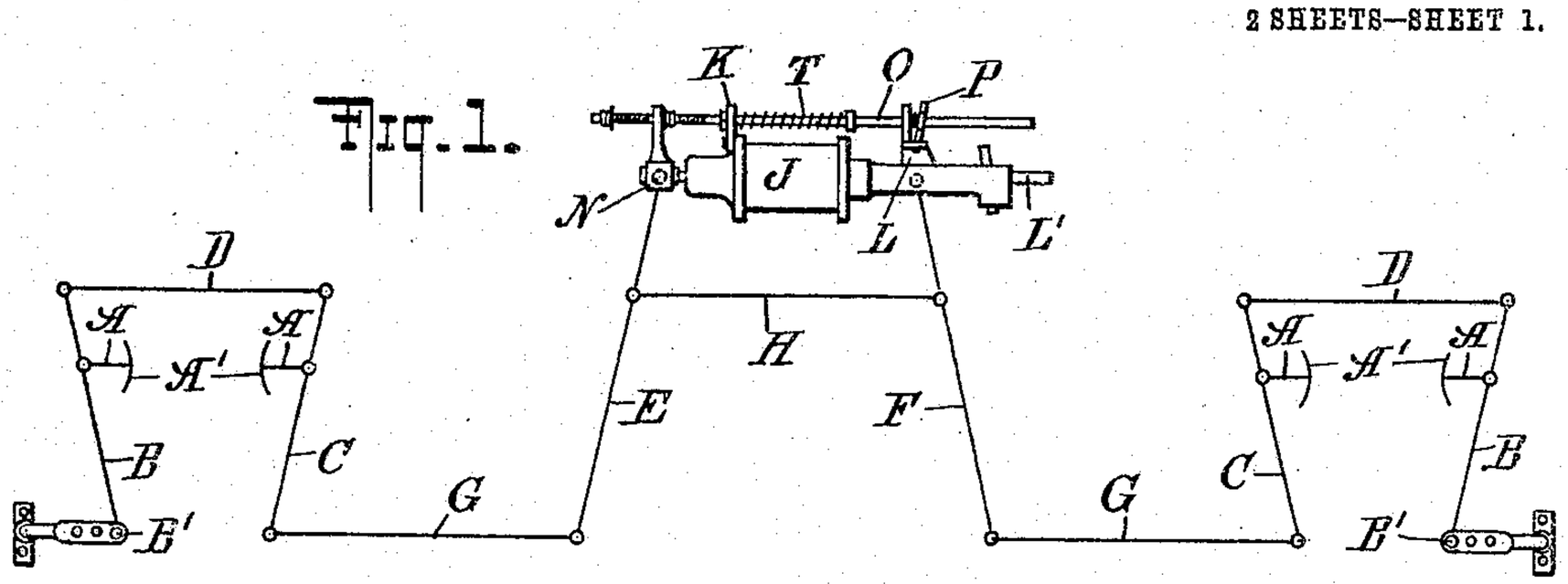


Fig. 2.

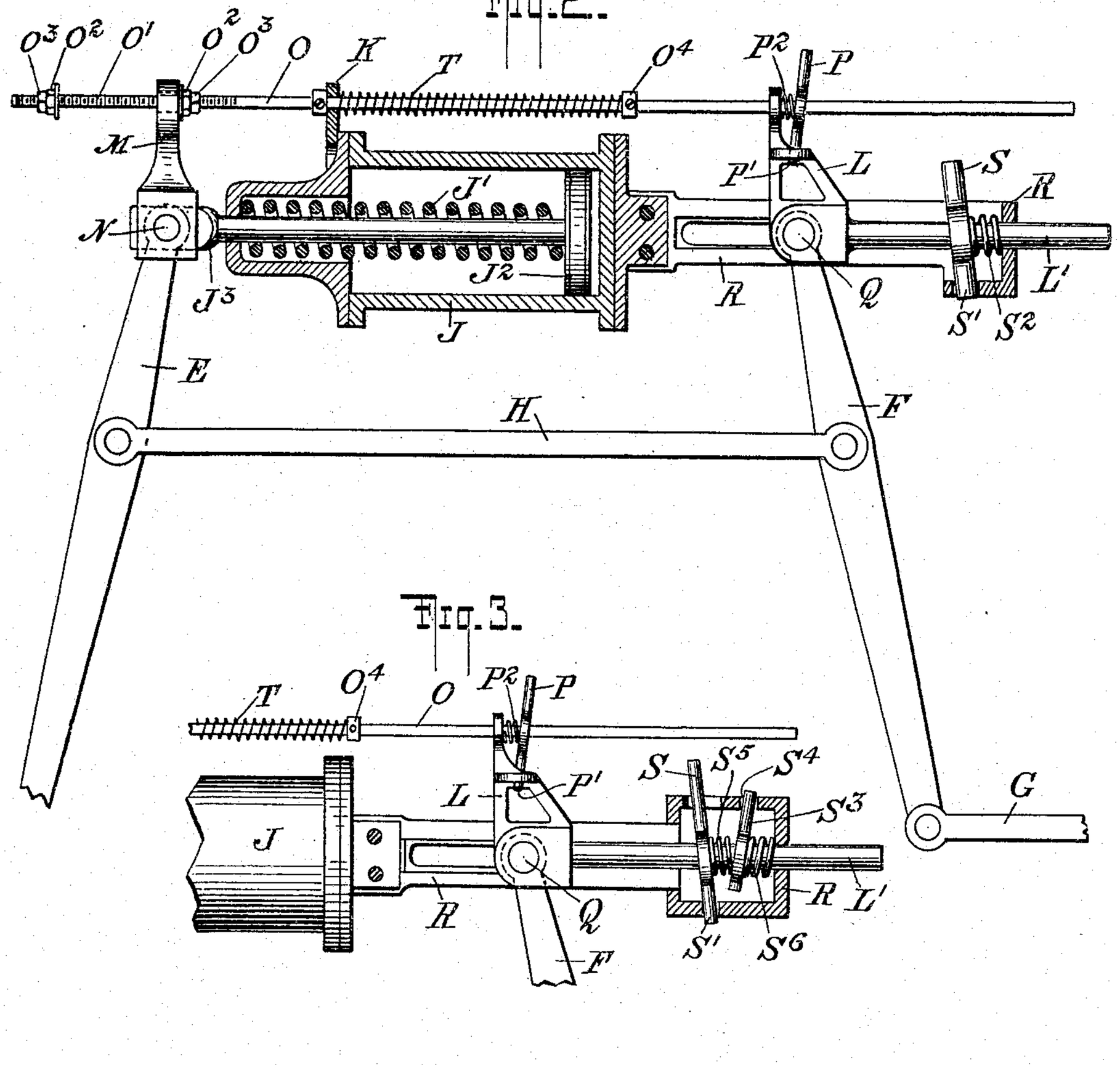
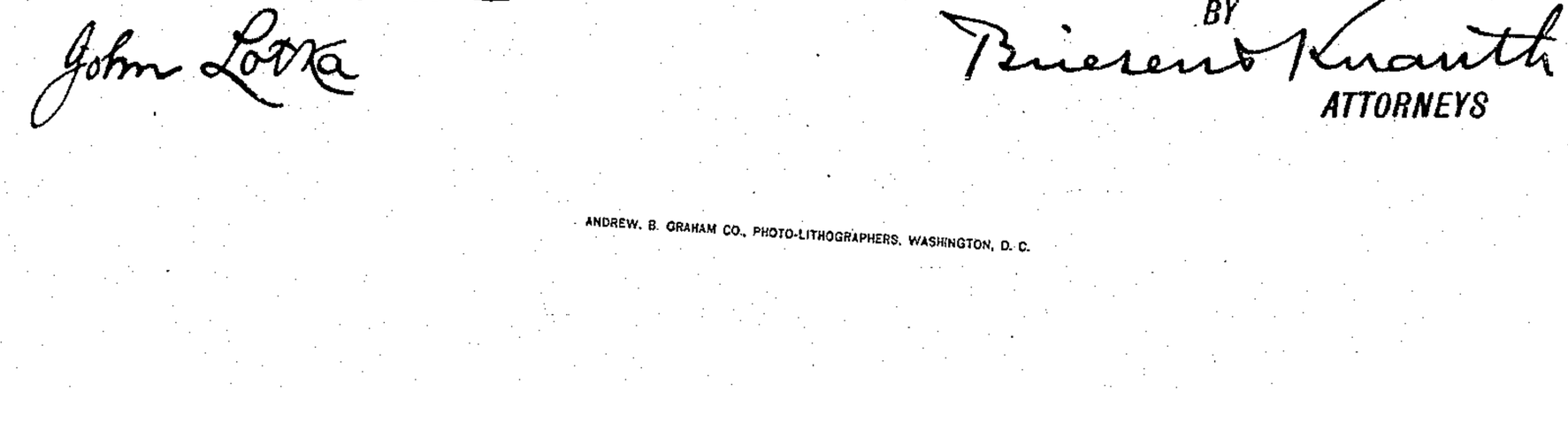


Fig. 3.



WITNESSES:

G. V. Rasmussen

John Lorka

INVENTOR

RICHARD F. HAMILTON

BY

Brierend & Knauth

ATTORNEYS

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

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2 SHEETS—SHEET 2.

Fig. 4.

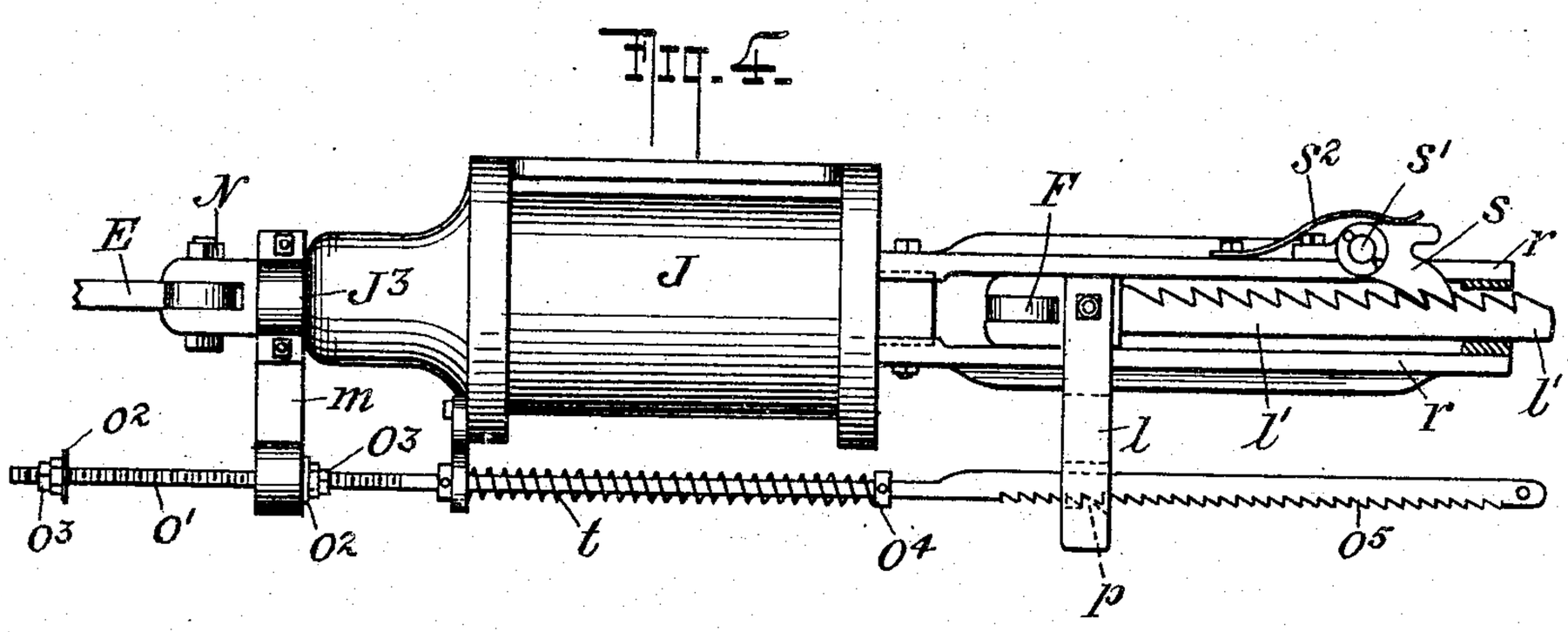


Fig. 5.

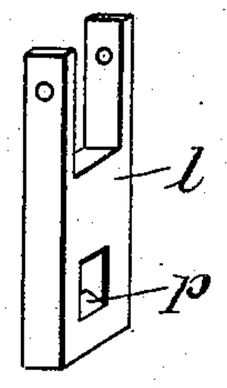


Fig. 6.

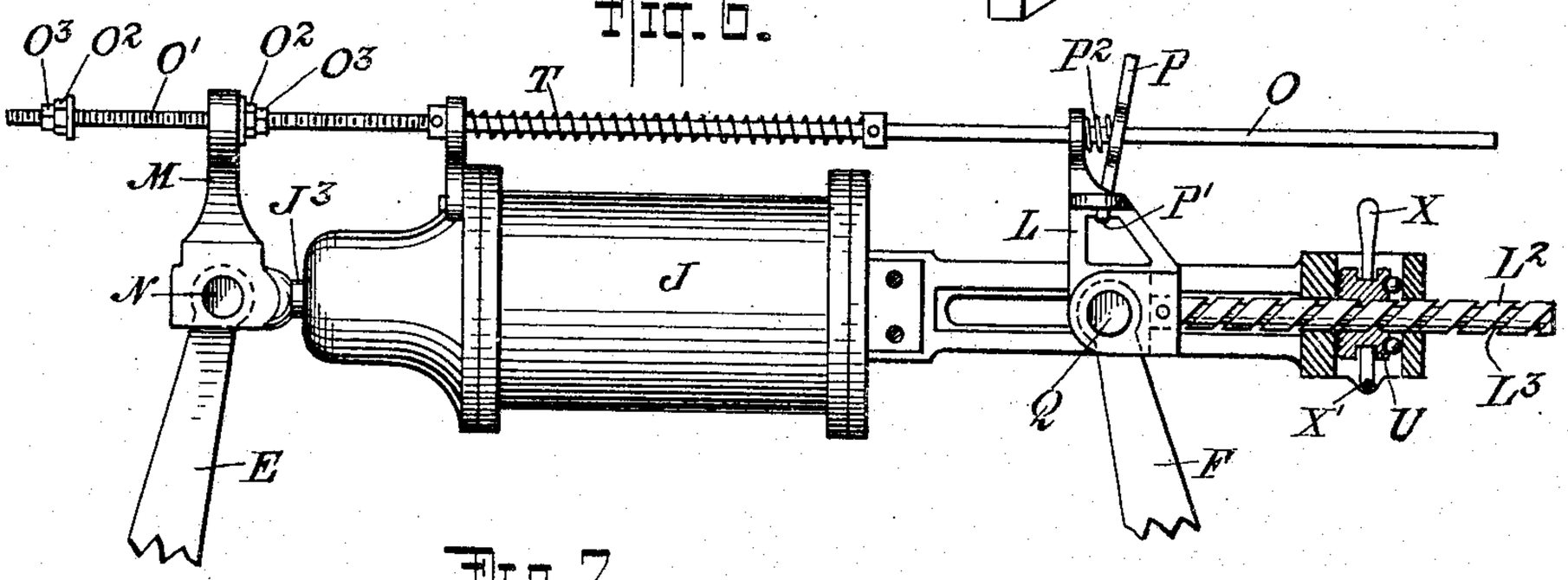


Fig. 7.

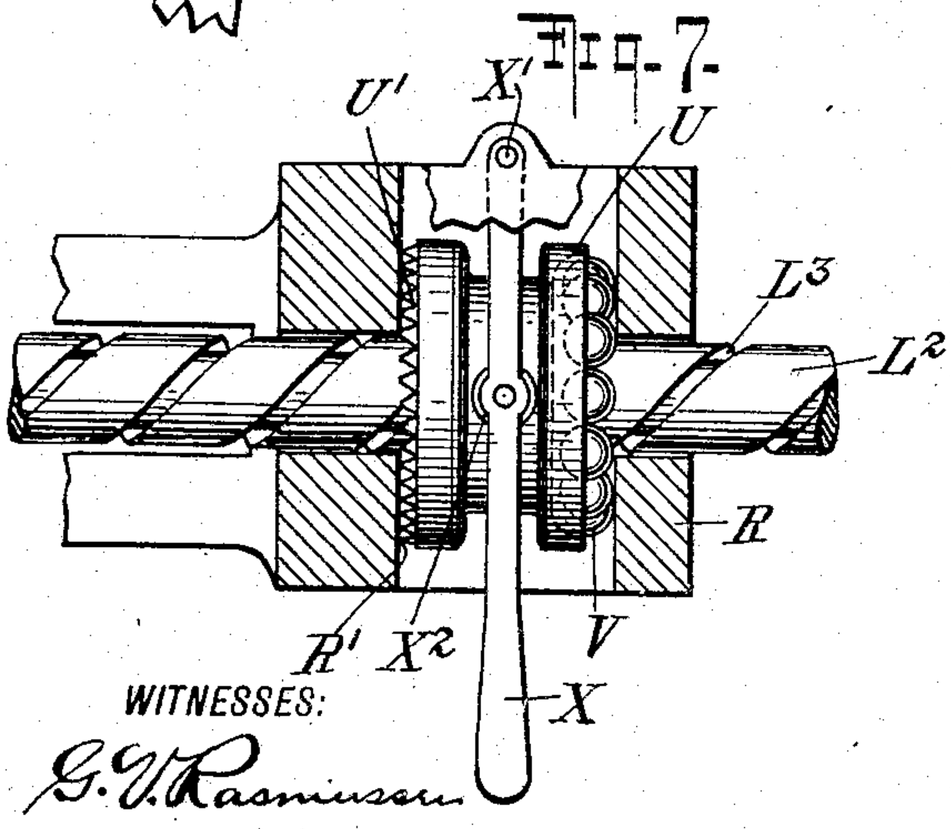
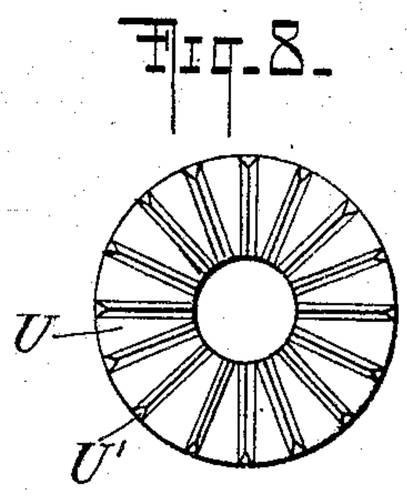


Fig. 8.



WITNESSES:

G. U. Rasmussen

John Lotka

INVENTOR

RICHARD F. HAMILTON

BY

Bierend & Knauth

ATTORNEYS

UNITED STATES PATENT OFFICE.

RICHARD F. HAMILTON, OF NEW YORK, N. Y.

AUTOMATIC SLACK-ADJUSTER FOR BRAKES.

939,018. Specification of Letters Patent. **Patented Nov. 2, 1909.**

Application filed May 9, 1908. Serial No. 431,766.

To all whom it may concern:

Be it known that I, RICHARD F. HAMILTON, a citizen of the United States, and resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Automatic Slack-Adjusters for Brakes, of which the following is a specification.

My invention relates to automatic slack adjusters particularly for air brakes such as are used on railroads and the object of my present invention is to provide a simple and strong construction for the above indicated purpose, which will take up the entire slack or lost motion upon a single application of the brakes.

Reference is to be had to the accompanying drawings in which—

Figure 1 is a diagrammatic view of the entire mechanism; Fig. 2 is a detail view of the slack adjuster and its connections, drawn upon an enlarged scale; Fig. 3 illustrates a slightly different form of the mechanism; Fig. 4 illustrates still another form of my invention; Fig. 5 is a perspective view of the slide employed in the construction shown in Fig. 4; Fig. 6 illustrates still a further form of my invention; Fig. 7 is an enlarged detail view of the take-up rod shown in Fig. 6 and of the mechanism for holding and releasing it; and Fig. 8 is a face view of the retaining member shown in Figs. 6 and 7.

In Fig. 1, A indicates the brake beams having brake shoes A′; these beams are connected with the dead levers B and live levers C respectively, each live lever being connected with the corresponding dead lever by a bottom-rod D; E and F are the cylinder levers connected with the live levers by the top rods G; H is the tie rod connecting the two cylinder levers, and J is the brake cylinder containing the release spring J′ (Fig. 2) and the piston J^2, the rod J^3 of said piston being connected pivotally with the cylinder lever E by means of the pin N. These parts may be constructed in substantially the usual way, but I prefer to have the fulcrum B′ of each dead lever secured to the car bolster or car body and not to the truck bolster, as it is generally arranged. The fulcrum is adjustable in any approved manner, for instance by having the fulcrum bracket or block provided with a series of openings for the fulcrum pin as shown in Fig. 1.

According to my present invention the piston rod J^3 is connected positively with an arm so that said arm will move in the same line as the piston rod and to the same extent, or in other words, said arm is rigidly connected with the piston or piston rod. In the particular construction illustrated by Fig. 2 the arm M is secured to the piston rod J^3 through the medium of the same pin N which also connects said piston rod with the cylinder lever E. The arm M is apertured for the passage of a reach rod O extending therethrough loosely so that the arm may travel along said reach rod without affecting its position, except under certain circumstances presently to be explained. That portion O′ of the reach rod O, along which the arm M is adapted to travel, is screw-threaded so as to receive nuts O^2 forming stops limiting the independent movement of the arm M. These stops may be adjusted to any desired position on the portion O′ and may then be locked in position by means of check nuts O^3. The reach rod is guided in a suitable stationary member or bracket K which may be secured to the cylinder J. A spring T coiled on the reach rod O between said bracket K and the collar O^4, rigidly secured to said rod, tends to throw the rod toward the right in Fig. 2. The reach rod is further guided in a slide L, guided in a bracket R to move in a direction parallel to the movement of the piston J^2, and preferably in line with said piston. This slide also carries a dog P pivotally supported at P′ and pressed toward the right by a spring P^2. These parts are so arranged that the reach rod O may move toward the left in Fig. 1 without moving the slide L, but when the reach rod moves toward the right, the dog P will grip the reach rod and will thus cause the slide L to move in unison with the reach rod to the same extent. The slide L is provided with a take-up rod L′ guided in the support or bracket R and connected with the cylinder lever F pivotally as by means of a pin Q. A perforated dog S pivotally supported on the bracket R at S′ and pressed toward the left in Fig. 1 by a spring S^2 surrounds the rod L′ of the slide L and holds the slide against movement toward the left, but permits it to move toward the right.

The distance between the stops O^2 is adjusted until it is equal to the normal travel of the piston J^2. Thus in the normal operation of the device the reach rod will remain sta-

tionary. After the brake shoes A′ have worn a longer travel of the piston will be required to apply the brakes, and (to the extent that the piston travel exceeds the distance between the stops O^2) the reach rod will be carried to the left with the piston, the dog P allowing such movement to take place without affecting the position of the slide L which is held by the dog S against any accidental motion toward the left. When the piston J^2 returns under the influence of the release spring J′, the dog P will securely grip the right-hand portion or end of the reach-rod O and thus the slide L carrying said dog will be moved toward the right in unison with the reach rod, thereby shifting the fulcrum of the cylinder lever F toward the right and taking up the slack in the entire lever mechanism at both ends of the car. The fulcrum Q will remain in this new position until the brake shoes have worn again, when the adjusting operation described above will be repeated automatically. Whenever any excess slack exists in the lever mechanism, it will be taken up entirely at the next release of the brakes. The spring T and collar O^4 might be omitted in view of the fact that the spring J′ will return the reach rod toward the right owing to the engagement of the arm M with the right hand stop O^2.

The construction shown in Fig. 3 is substantially the same as that illustrated in Fig. 2, the difference lying exclusively in the retaining device connected with the take-up rod L′. The bracket R carries the retaining dog S swung from the point S′ as before described, but in addition to this I employ a second retaining dog S^3 pivoted at S^4 on the opposite side of the rod L′. A spring S^5 is interposed between the two retaining dogs or members S, S^3 and another spring S^6 is interposed between the bracket R and the retaining dog S^3. The operation is the same as before described, that is, the dogs S, S^3 keep the slide L from moving toward the left but allow it to move toward the right. The two dogs pivoted on opposite sides are somewhat more reliable in operation than the single dog of Fig. 2.

In the construction illustrated by Figs. 4 and 5 the arm *m* is rigidly secured to the piston-rod J^3 between the cylinder J and the connecting pin N. The reach rod *o* is provided with a threaded portion *o′*, stops o^2, check-nuts o^3 and a collar o^4 for the retaining spring *t*, in the same manner as described above. The right hand portion of this reach-rod has a rack o^5, engaged by a pawl or tooth *p* upon a slide *l*. This slide is connected rigidly with the take-up rod *l′* arranged in line with the piston rod J^3 and having rack teeth engaged by a pawl *s* pivoted at *s′* on the guide *r* and pressed by a spring s^2. The direction of the rack teeth of the rods *o* and *l′* and the position of the pawls *p* and *s* is such as to secure the same operation which I have described with reference to Fig. 2, that is, when the reach-rod *o* moves toward the left, the pawl *p* slips, and the slide *l* and take-up rod *l′* remain stationary, being held against any accidental movement by the pawl *s;* and when the reach-rod *o* moves toward the right it takes the slide *l* and take-up rod *l′* with it, thus adjusting the fulcrum Q to a new position and taking up the slack as before described.

The construction illustrated by Fig. 6 differs from that of Fig. 2 only by the construction of the take-up rod L^2 and of the retaining device working in conjunction therewith. This take-up rod is provided with a spiral groove L^3 engaged by a nut U. This nut is provided on one side with teeth U′ engaging corresponding teeth R′ on the bracket R so that the nut can turn in one direction only, as long as it is engaged with said teeth. On the other face the nut is preferably provided with a race to be engaged by balls V interposed between said nut and the adjacent portion of the bracket R. This construction will, like those described before, allow the take-up rod to move toward the right, but not toward the left. When it is desired to entirely release the take-up rod so that the initial adjustment may be made, the nut U is disengaged from the teeth R′ by moving it to the right, it being understood that sufficient play is allowed in the ball race for this purpose and if desired a shifting handle X pivoted at X′ and having a roller X^2 may be provided for this purpose.

I claim:

1. In air brake mechanism, the combination with the brake cylinder, its piston and piston rod, and brake mechanism operated thereby, of a take-up rod connected with the brake mechanism and movable in line with the piston rod, a reach rod located to one side of the piston rod which latter has a limited independent movement after which the piston and reach rod move in unison to the same extent, retaining means for holding the take-up rod against movement in one direction, and retaining means engaging the reach rod adjacent to its axial line and carried by said take-up rod to move therewith yet allow the reach rod to move relatively to said second-named retaining means in the direction opposite to that in which the first-named retaining means allows the take-up rod to move.

2. In air brake mechanism, the combination with the brake cylinder, its piston and piston rod and brake mechanism operated thereby, of a take-up device connected with the brake mechanism, a retaining means carried by a relatively stationary part of the structure for holding the take-up device

against movement in one direction, a reach rod relatively to which the piston has a limited independent movement after which the piston and the reach rod move in unison to the same extent, and retaining means carried by said take-up device to move in unison therewith in both directions and engaging the reach-rod to allow it to move relatively to the take-up device only in the direction opposite to that in which the first named retaining means allows the take-up device to move.

3. In air brake mechanism, the combination with the brake cylinder, its piston and piston rod, and brake mechanism operated thereby, of an arm connected with the piston rod rigidly, a reach-rod having two stops adapted to be engaged by said arm, a take-up rod movable parallel with the piston's path, and connected with the brake mechanism, retaining means for holding the take-up rod against movement in one direction and retaining means for compelling the reach-rod and take-up rod to move in unison in the opposite direction, while leaving the reach-rod free to move independently in the same direction in which the take-up rod is prevented from moving.

4. In air brake mechanism, the combination with the brake cylinder, its piston and piston rod, and brake mechanism operated thereby, of a take-up device connected with the brake mechanism and movable in line with the piston rod, an arm rigidly secured to the piston rod and projected therefrom laterally, a reach-rod arranged laterally of the piston rod and relatively to which the said arm has a limited movement after which the arm and reach-rod move in unison to the same extent, retaining means for holding the take-up device against movement in one direction, and retaining means for holding the reach-rod against movement relatively to the take-up device in the opposite direction.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses this tenth day of April, 1908.

RICHARD F. HAMILTON.

Witnesses:
JOHN LOTKA,
JOHN A. KEHLENBECK.