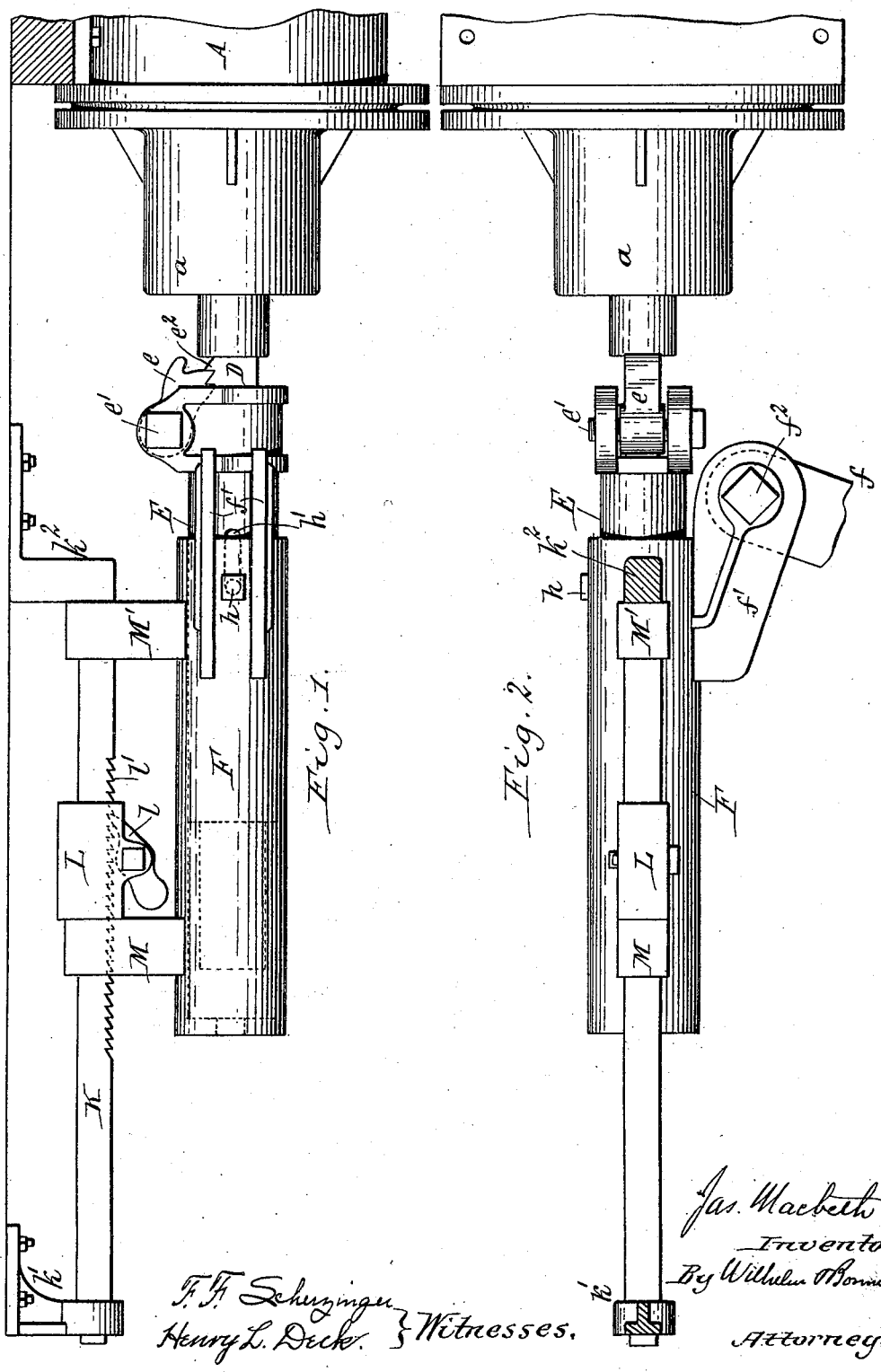
No. 648,129. Patented Apr. 24, 1900.

J. MACBETH.

CAR BRAKE ADJUSTER.

(Application filed Feb. 14, 1900.)

(No Model.) 2 Sheets—Sheet 1.



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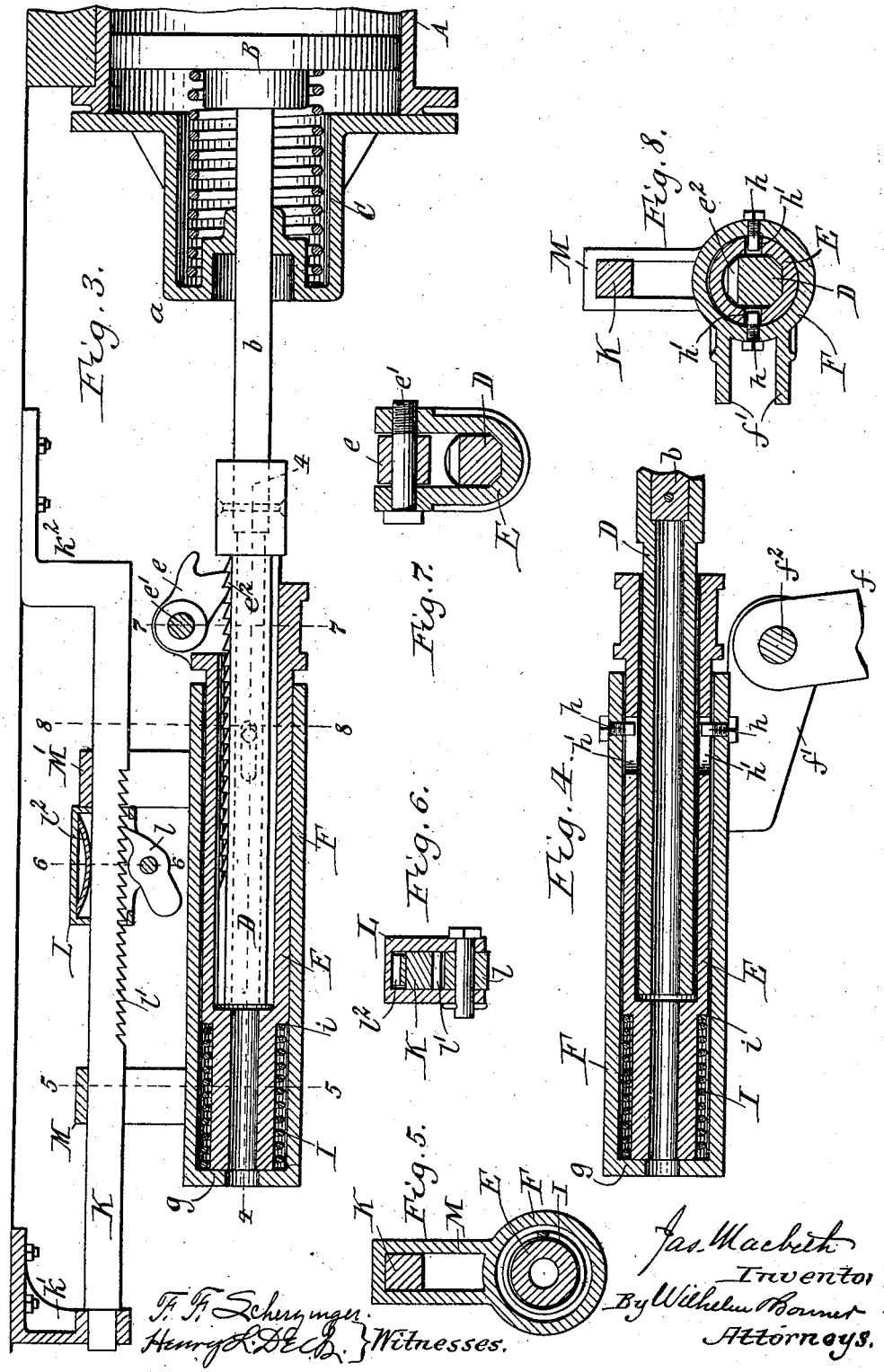

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UNITED STATES PATENT OFFICE.

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CAR-BRAKE ADJUSTER.

SPECIFICATION forming part of Letters Patent No. 648,129, dated April 24, 1900.

Application filed February 14, 1900. Serial No. 5,135. (No model.)

To all whom it may concern:

Be it known that I, JAMES MACBETH, a citizen of the United States, and a resident of Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Car-Brake Adjusters, of which the following is a specification.

This invention relates to that class of car-brake adjusters which are more particularly designed for taking up the slack in the brake-gearing of passenger-cars. In this class of car-brake adjusters as heretofore constructed the parts usually were numerous and liable to be disarranged easily, and when the brake-shoes or other parts were worn out it required considerable skill to replace the worn parts by new parts and place the brake-adjusting device in its proper working order. Furthermore, the construction was such that the adjusting mechanism was liable to get out of order by reason of the parts becoming clogged with snow or rusted by undue exposure to rain.

The object of this invention is the production of an adjusting device for car-brake gearing which is comparatively simple and durable in construction, which can be easily set back without much skill when the worn parts of the brake-gearing are replaced by new parts, and which is not liable to be rendered inoperative by the effects of snow and rain.

In the accompanying drawings, consisting of two sheets, Figure 1 is a fragmentary side elevation of the brake-gearing of a passenger-car provided with my improved adjusting device, the parts being shown in the position when the brake-gearing is fully relaxed. Fig. 2 is a top plan view thereof, partly in section. Fig. 3 is a vertical longitudinal section of the brake-adjusting device and connecting parts, showing the parts in the position when the brake-gearing is applied for stopping the car. Fig. 4 is a fragmentary horizontal section in line 4 4, Fig. 3. Figs. 5, 6, 7, and 8 are vertical cross-sections in lines 5 5, 6 6, 7 7, and 8 8, Fig. 3, respectively.

Like letters of reference refer to like parts in the several figures.

A represents the usual brake-cylinder, secured to the under side of the car and connected with the air-pressure devices in a well-known manner.

B represents the brake-piston, arranged in the cylinder and provided with a piston-rod *b*, extending through the front head *a* of the cylinder, and C the spring, which is arranged between the piston and the head and which tends to move the piston backwardly or toward the rear end of the cylinder.

D represents a reciprocating thrust bar or member which is secured with its rear end to the piston-rod and forms practically an extension of the latter.

E represents a reciprocating adjusting sleeve or member arranged upon the thrust-bar and connected with the latter by a clutch device which compels the adjusting-sleeve to move forward with the thrust-bar, but which permits the thrust-bar at times to move backwardly independent of the adjusting-sleeve. A clutch device suitable for this purpose and shown in the drawings consists of a pawl *e*, arranged above the thrust-bar and pivoted at its front end to the rear end of the adjusting-sleeve by a transverse pin *e'*, while its rear end engages with a longitudinal row of ratchet-teeth e^2, arranged on the upper side of the thrust-bar and having inclined rear sides and abrupt front sides.

F represents a reciprocating brake sleeve or member which receives the front portion of the adjusting-sleeve and which is connected with the brake-shoes by intermediate connecting-gearing of any suitable or well-known construction. In the drawings a portion of the primary lever *f* of this intermediate connecting mechanism is represented, which is pivoted to lugs *f'* on the side of the adjusting-sleeve by a vertical pin f^2. The adjusting and brake sleeves are coupled by a slack connection which permits the adjusting-sleeve to move independently of the brake-sleeve to a limited extent, but which compels the sleeves to move together when the extent of the slack between these sleeves has been exhausted. As shown in the drawings, the forward movement of the adjusting-sleeve with reference to the brake-sleeve is limited by an internal shoulder *g*, which is arranged in the front end of the brake-sleeve and which is adapted to be engaged by the front end of the adjusting-sleeve. The backward movement of the adjusting-sleeve with reference to the

brake-sleeve is limited by screws or studs *h h*, arranged on opposite sides of the brake-sleeve, and longitudinal slots *h' h'*, which are arranged on opposite sides of the adjusting-sleeve and which are adapted to engage with their front ends against the screws or studs *h h*. A yielding pressure is constantly applied to the adjusting-sleeve for moving the same backwardly with reference to the brake-sleeve by means of a spring I, arranged between the front parts of the adjusting and brake sleeves and bearing with its ends against the internal shoulder *g* of the brake-sleeve and an external shoulder *i* on the adjusting-sleeve.

K represents a horizontal take-up bar or support which is arranged lengthwise above the brake and adjusting sleeves and which is secured by front and rear hangers *k' k²* to some stationary part on the under side of the car-body.

L represents a take-up sleeve or member which is mounted on the take-up bar and which is permitted to move forwardly on said bar, but is held against backward movement thereon by a clutch device. The clutch device for this purpose shown in the drawings consists of a pawl *l*, pivoted on the under side of the take-up sleeve and engaging with a longitudinal row of ratchet-teeth *l'*, which are arranged on the under side of the take-up bar and which have inclined rear sides and abrupt front sides. The pawl *l* is weighted, so that it is held in its operative position by gravity.

l² is a spring which is interposed between the take-up sleeve and the take-up bar and whereby this sleeve is prevented from being displaced on the bar by the vibrations of the car.

M M' represent two tappets which are arranged on the front and rear portions of the brake-sleeve and adapted to engage with the front and rear ends of the take-up sleeve. These tappets are preferably formed in the shape of eyes or loops and embrace the take-up bar in front and in rear of the take-up sleeve, so that they support the brake-sleeve and the parts connected therewith.

When the brakes are off or not applied, the brake-sleeve is moved rearwardly by the relaxation of the brake-gearing, so that its front tappet M engages with the front side of the take-up sleeve, the adjusting-sleeve is moved backward by the spring I, so that the front ends of its slots *h' h'* bear against the studs *h h* of the brake-sleeve, and the thrust-bar, piston-rod, and piston are moved by the spring C into their rearmost position, as shown in Figs. 1 and 2. Upon admitting the air-pressure into the brake-cylinder for applying the brakes the piston, piston-rod, and thrust-bar are moved forwardly, together with the adjusting-sleeve, which is coupled by the pawl *e* and teeth *e²* with the thrust-bar. The forward movement of these parts continues independent of the other parts of the brake-gearing until the front end of the adjusting-sleeve engages with the internal shoulder *g* of the brake-sleeve, after which the latter, together with the brake-gearing connected therewith, is also moved forward. Upon applying the brakes when the brake-gearing is in normal condition the brake-sleeve is moved forwardly to such an extent that its rear tappet M' engages or nearly engages the rear side of the take-up sleeve, as shown in Fig. 3, when the brake-shoes bear against the wheels. During the forward movement of the adjusting and brake sleeves the spring I is compressed and the slots *h' h'* in the adjusting-sleeve are moved with their front ends forwardly from the studs *h h* and the front tappet M is moved forwardly away from the take-up sleeve.

When it is desired to release the brakes, the air-pressure is shut off from the rear end of the brake-cylinder, and the air in this end of the cylinder is permitted to escape in the usual manner, thereby permitting the spring C to move the piston backward and the brake-gearing to relax into its inoperative position. During the first part of the backward movement of the piston and the parts connected therewith the brake-sleeve and the adjusting-sleeve are moved backwardly with the piston by the relaxation of the brake-gearing. When the brake-sleeve has been moved backward so that its front tappet M strikes the front side of the take-up sleeve, the brake-sleeve is held against further backward movement. During the continued backward movement of the piston and connecting parts the adjusting-sleeve is moved with the same by the resilience of the spring I. When the brakes are in normal condition, the adjusting-sleeve moves with the piston to the end of its backward movement, and when the adjusting-sleeve reaches this position the front ends of its slots *h'* just engage or nearly engage the studs *h* of the brake-sleeve, as represented in dotted lines, Fig. 1.

Upon applying the brakes when the brake-shoes or other parts of the brake-gearing have become worn considerably the brake-piston and connecting parts move forward a greater or abnormal distance before the brakes are applied. During the first part of the forward movement of the piston under these abnormal conditions the adjusting-sleeve is also moved forwardly until the front end of the latter engages the internal shoulder of the brake-sleeve in the same manner as when the brakes are applied while in a normal condition. After the adjusting-sleeve has so engaged the brake-sleeve the latter is moved forwardly until the brake-shoes have been moved against the wheels. During the last part of the forward movement of the brake-sleeve the rear tappet M' engages the take-up sleeve and moves the same forward on the take-up bar, the extent of this movement of the take-up sleeve being equal to the abnormal slack in the brake-gearing which has been produced

by the wearing of the brake shoes or gearing. When the wear in the brake-gearing is such that the take-up sleeve is moved forward by the rear tappet M′ the extent of one or more teeth on the take-up sleeve, the pawl of the take-up sleeve is advanced and engages with one of the forward teeth of the take-up bar, whereby the take-up sleeve is locked one or more spaces in advance of its former position. During the subsequent backward movement of the brake-sleeve upon releasing the brake-piston the brake-sleeve moves backwardly with the actuating mechanism until the front tappet M engages the front side of the take-up sleeve, when the further movement of the brake-sleeve in this direction is arrested and prevented from moving backwardly to the place where it began its previous forward stroke. After the backward movement of the brake-sleeve has been thus arrested the spring I causes the adjusting-sleeve to continue its backward movement with the actuating mechanism until the front ends of the slots h' in the adjusting-sleeve engage the studs h of the brake-sleeve, when the further backward movement of the adjusting-sleeve is also arrested. After the backward movement of the adjusting-sleeve has been thus arrested the piston and thrust-bar complete the last part of their backward movement independent of the adjusting-sleeve. This causes the toothed part of the thrust-bar to be moved rearwardly with reference to the pawl of the adjusting-sleeve, thereby disengaging the operative tooth of the thrust-bar from said pawl and engaging one of the teeth forward or in advance of the operative tooth with said pawl, whereby the connection between the piston and the adjusting-sleeve is lengthened to compensate for the slack contained in the brake-gearing. The parts of the brake mechanism are now in a normal position ready to apply the brake-shoes by a normal movement of the parts. For the purpose of permitting the worn brake-shoes or other parts to be replaced by new ones the brake-adjusting mechanism is set back to its initial position by moving the adjusting and brake sleeves into their rearmost position, (shown in Fig. 1,) while the pawls $e\ l$ are disengaged from the teeth $e^2\ l'$.

I claim as my invention—

1. The combination with the brake cylinder and piston, of a thrust bar or member connected with the piston, an adjusting sleeve or member movable lengthwise of said thrust-bar, a clutch which connects said thrust-bar and adjusting-sleeve and which permits the thrust-bar to move backwardly independent of the adjusting-sleeve but which compels the adjusting-sleeve to move forward with the thrust-bar, a brake sleeve or member connected with the brake-gearing and having a slack connection with said adjusting-sleeve which permits a limited longitudinal movement of the adjusting-sleeve on the brake-sleeve, a take-up sleeve or member mounted on a stationary support, a clutch which permits the take-up sleeve to move forward on said support but holds the same against backward movement on the support, and tappets arranged on the brake-sleeve and adapted to engage the front and rear ends of the take-up sleeve, substantially as set forth.

2. The combination with the brake cylinder and piston, of a thrust-bar connected with the piston and provided with a longitudinal row of teeth, an adjusting-sleeve arranged on the thrust-bar and provided with a pawl engaging with the teeth of the thrust-bar, a brake-sleeve connected with the brake-gearing and having a slack connection with the adjusting-sleeve which permits the latter to have a limited movement with reference to the brake-sleeve, a take-up sleeve guided on a stationary support and provided with a pawl which engages with the teeth on said support, and tappets arranged on the brake-sleeve and adapted to engage with the front and rear ends of said take-up sleeve, substantially as set forth.

3. The combination with the brake cylinder and piston, of a thrust-bar connected with the piston, an adjusting-sleeve connected by a clutch with the thrust-bar, a brake-sleeve connected with the brake-gearing and provided with a stud which engages with a longitudinal slot in the adjusting-sleeve, a movable take-up sleeve connected by a clutch with a stationary support, and tappets arranged on the brake-sleeve and adapted to engage with the front and rear ends of said take-up sleeve, substantially as set forth.

4. The combination with the brake cylinder and piston, of a thrust bar or member connected with the piston, an adjusting sleeve or member connected with said thrust-bar by a clutch which compels the adjusting-sleeve to move forwardly with the thrust-bar but which permits the thrust-bar to move backwardly independent of said adjusting-sleeve, a brake sleeve or member connected with the brake-gearing and having a slack connection with said adjusting-sleeve, a spring which is interposed between the brake-sleeve and adjusting-sleeve and which tends to move the adjusting-sleeve backward with reference to the brake-sleeve, a take-up sleeve or member mounted on a stationary support, a clutch which permits the take-up sleeve to move forward but holds the same against backward movement on the support, and tappets arranged on the brake-sleeve in front and in rear of the take-up sleeve, substantially as set forth.

5. The combination with the brake cylinder and piston, of a thrust-bar connected with the piston and provided with a longitudinal row of teeth having abrupt front sides and inclined rear sides, an adjusting-sleeve arranged on the thrust-bar, a pawl pivoted on the adjusting-sleeve and engaging with the teeth of the thrust-bar, a brake-sleeve connected with the brake-gearing and inclosing the adjusting-sleeve, an internal shoulder arranged on

the brake-sleeve and adapted to be engaged by the front end of the adjusting-sleeve, a spring interposed between the internal shoulder of the brake-sleeve and an external shoulder on the adjusting-sleeve, a stud arranged on the brake-sleeve and projecting into a longitudinal slot in the adjusting-sleeve, a stationary take-up bar provided with a longitudinal row of teeth having abrupt front sides and inclined rear sides, a take-up sleeve guided on the take-up bar, a pawl pivoted on the take-up sleeve and engaging with the teeth of the take-up bar, a friction-spring whereby the take-up sleeve is frictionally held against displacement on the take-up bar, and tappet eyes or loops arranged on the brake-sleeve and mounted on the take-up bar in front and in rear of the take-up sleeve, substantially as set forth.

Witness my hand this 5th day of February, 1900.

JAMES MACBETH.

Witnesses:
THEO. L. POPP,
CLAUDIA M. BENTLEY.