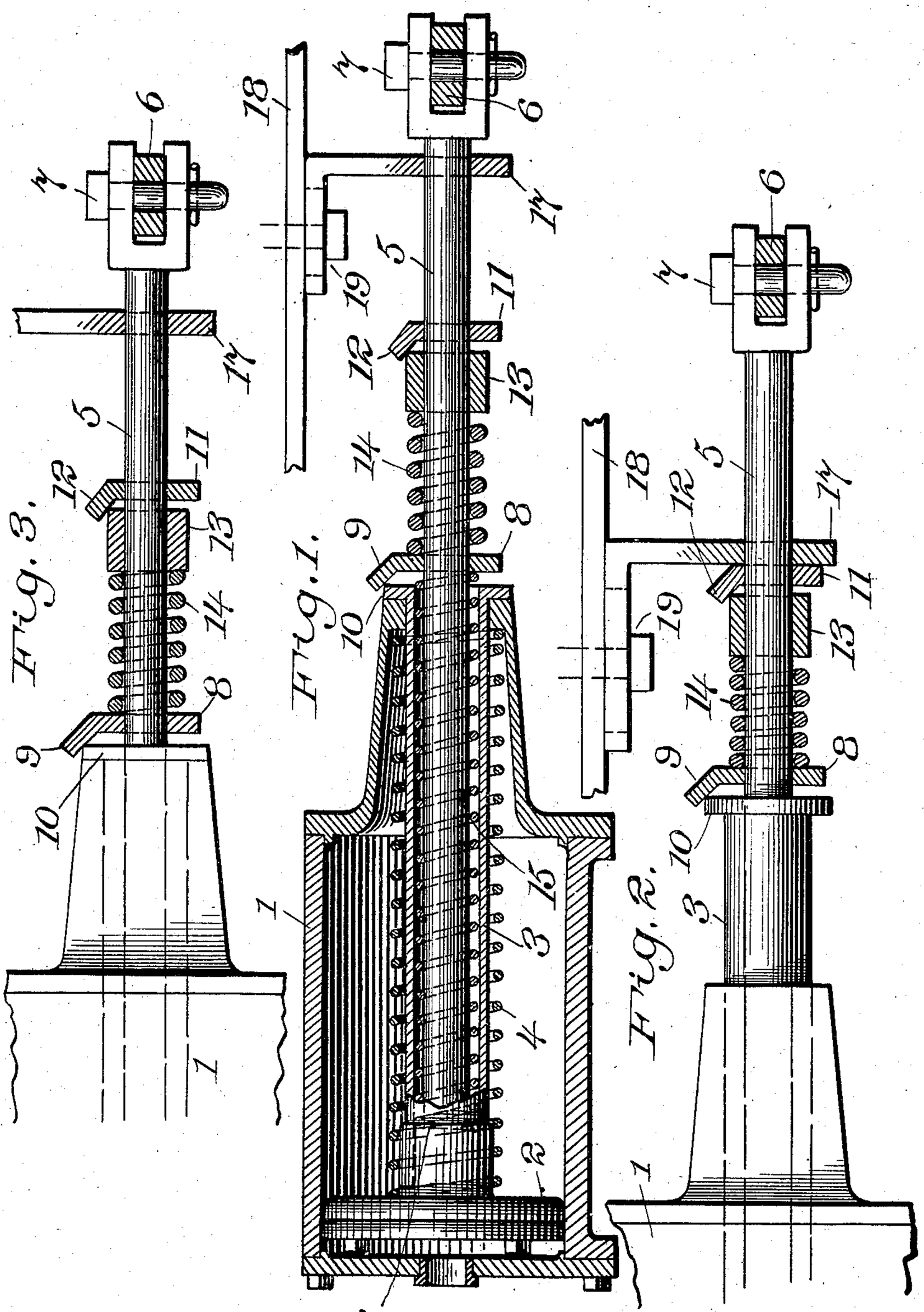
No. 867,672. PATENTED OCT. 8, 1907.

A. PARKER-SMITH.

SLACK ADJUSTER.

APPLICATION FILED JUNE 25, 1906. RENEWED JUNE 21, 1907.

2 SHEETS—SHEET 1.



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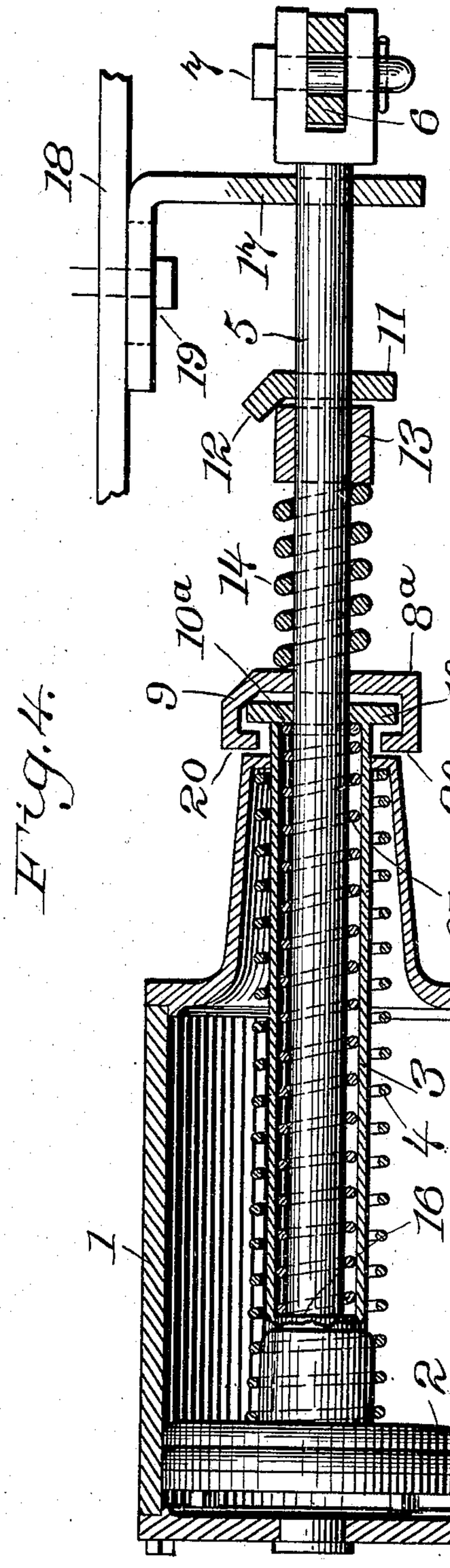

Fig. 4.

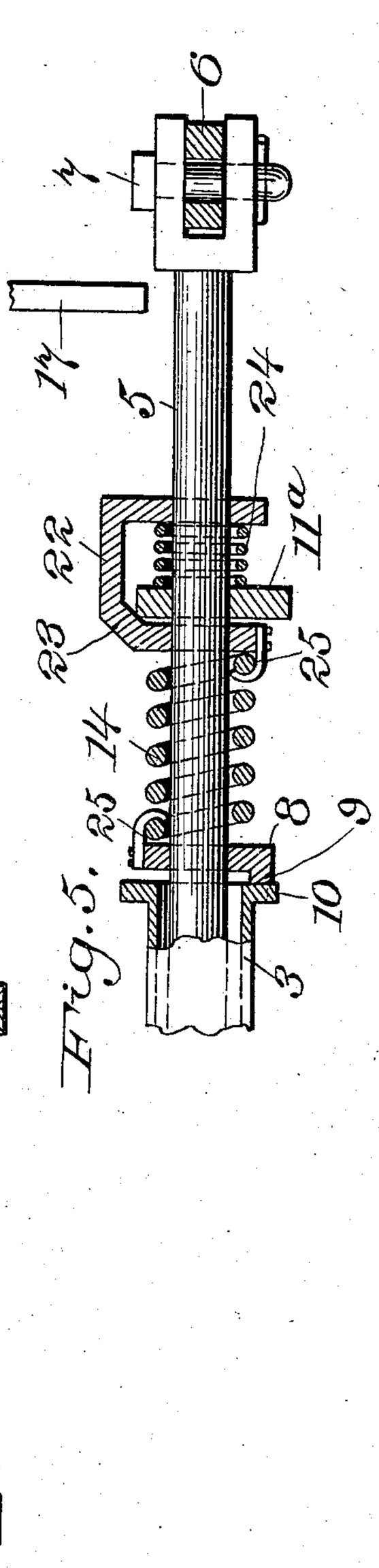

Fig. 5.

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UNITED STATES PATENT OFFICE.

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SLACK-ADJUSTER.

No. 867,672. Specification of Letters Patent. Patented Oct. 8, 1907.

Application filed June 25, 1906, Serial No. 323,388. Renewed June 21, 1907. Serial No. 380,048.

To all whom it may concern:

Be it known that I, AUGUSTUS PARKER-SMITH, 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 fluid pressure brakes in general, and more specifically consists of an improved apparatus for automatically taking up the slack produced by the wearing down of the brake shoes, or otherwise, and thereby insuring a substantially uniform maximum piston travel in the brake cylinder.

Various devices have been heretofore designed for producing this result, but they have been in many cases costly in construction, uncertain in action, and more or less complicated. I have invented an arrangement which is absolutely positive and accurate in its action and is believed to contain the fewest possible number of parts.

The best form of apparatus at present known to me embodying my invention, with some modifications, is illustrated in the accompanying two sheets of drawing, in which:

Figure 1 is a section of the brake cylinder with my invention applied thereto, the piston being in its inmost position. Fig. 2 is a detail view showing the position of the piston rod and other parts when the piston is on its out stroke and the slack adjusting apparatus is in operation. Fig. 3 is a similar view showing the piston rod in its inmost position after the apparatus has operated to take up the slack. Fig. 4 shows a modified arrangement of gripping device, and Fig. 5 shows a minor modification.

Throughout the drawings, like reference figures indicate like parts.

1 is an ordinary cylinder, 2 the piston, 3 the hollow piston rod common in freight equipment, and 4 the spring which retracts the piston when the brake is released.

5 is the ordinary push rod, though made a little longer than is usual, and 6 one of the brake levers to which the push rod is pivoted by the pin 7.

8 is a friction dog, loosely mounted on the push rod and having a bent end 9, or other projection which engages a flange 10 on the end of the hollow piston rod. 11 is another similar dog also mounted on the push rod 5 and having bent end 12, which engages the thimble 13 which is loose on the push rod.

14 is a stiff spring confined between the thimble 13 and the dog 8.

15 is a spring more flexible than the spring 14, which is placed on the other side of the dog 8 and confined between it and the shoulder 16 formed by the enlarged end of the push rod 5.

17 is a perforated plate or other convenient form of combined stop for the dog 11 and support for the push rod 5, rigidly supported with reference to the cylinder in any convenient manner, as by the plate 18. Preferably, this stop is adjustable on the plate by means of the bolt and slot connection 19.

The mode of operation of the construction shown in Figs. 1, 2, and 3, is as follows: The parts are so designed preferably that when new brake shoes are in place the push rod 5 will extend throughout the whole length of the hollow piston rod 3 with which it forms a telescoping joint and have its inner end resting against the piston 2. The distance between the dog 11 and the stop 17 is the distance predetermined on as the maximum piston travel. It is evident then that for all ordinary brake applications, no change will take place in the relative position of the parts of the take-up apparatus, until the shoes having worn down a certain amount, and a heavy application of the brakes causes the predetermined maximum piston travel to be exceeded. This will result in the dog 11 being forced up against the stop 17 whose face is at right angles to the axis of the push rod 5. This will trip the dog 11 and allow the push rod to pass through it a distance equal to the excess of piston travel over the predetermined maximum. This in turn will result in compressing the spring 14 the same distance, as shown in Fig. 2. On the release of the brakes, when the piston 2 is forced in by the spring 4, the dog 8 will be left free and the spring 14 expanding to its normal extent will force the dog 8 to the left a distance equal to that which the dog 11 has been previously forced. The next time the brake application is made the flange 10 will strike the projection 9 on the end of the dog 8, cause it to grip the push rod in its adjusted position and carry the same out in its extended position, as shown in Fig. 3. Thus, every time the maximum allowable piston travel is exceeded, the push rod 5 will be subsequently shoved out a distance equal to the excess and held in that extended position, thereby holding the piston travel down to the maximum or less than maximum until the further wearing of the shoes will cause any heavy application to produce a new adjustment. In putting in new brake shoes the dogs 8 and 11 are simply released and the push rod 5 shoved all the way in. The first application of the brakes thereafter will take up the necessary amount of slack and start the series of operations before described.

Fig. 4 shows a modification designed for use on passenger cars, or other cars where it is not important to leave the push rod 5 free so that the brakes may be conveniently applied by hand operated apparatus. In this construction, the dog 8^a is connected to the hollow piston rod 3 by means of the bent ends 20, 20. This change renders it necessary to insure the retracting of the push rod 5 with the piston 2. This is most conveniently done by means of the spring 21, which is

compressed between the shoulder 16 on the inner end of the push rod and the inner flange 10^a on the hollow piston rod 3. The operation of the device so far as the action of the two friction clutches is concerned is otherwise similar to that previously described, with reference to Figs. 1, 2 and 3.

If desired, the thimble 13 may be replaced by the frame 22 shown in Fig. 5. One corner of this frame is flattened down, as shown at 23 so as to serve as a fulcrum for the dog 11^a, which can then be made straight. A spring 24 should then be employed to hold the dog 11^a in engagement. With this form of apparatus it is not necessary that the stop 17 should surround the push rod 5. Any stop which will engage the frame 22 on the outward stroke of the piston is sufficient.

It is understood, of course, that on the release of the brakes after an application in which the spring 14 has been compressed as previously described, the dogs 11 and 11^a will immediately grip the push rod 5 again, and serve as a rigid abutment from which the spring 14 acts to thrust the dogs 8 or 8^a to the left. All the dogs 11, 11^a, 8 and 8^a are so designed as to slide only to the left along the push rod 5, unless tripped by the operator.

In the construction shown in Fig. 5, the spring 24 may be made powerful enough to clamp frame 22 and dog 11^a in any position on the push rod and so prevent its jarring or jolting to the left out of any position of adjustment under any condition short of a strong thrust such as it would receive from the stop 17, and in such case the spring 15 may be dispensed with by fastening the adjacent ends of the spring 14 to the frame 22 and the dog 8 by any convenient means such as hooks 25, 25, as shown in Fig. 5.

The advantages of my invention comprise its cheapness, but few and simple parts being required; its simplicity and non-liability to get out of operative condition, and its adaptability to present constructions without substantial modification of standard apparatus.

It is evident, of course, that various changes could be made in the details of construction illustrated and described other than those shown in the modifications without departing from the principle of my invention so long as the feature of a telescoping extensible piston rod with means for automatically expanding the same to compensate for the wear of the brake shoes be retained.

Having, therefore, described my invention, I claim:—

1. In a fluid pressure brake apparatus, the combination with the usual cylinder, piston and foundation brake rigging of a telescoping piston rod connecting the piston with one of the brake levers, and automatic means for lengthening the telescoping piston rod to compensate for the wearing down of the brake shoes, said means comprising a friction dog having a bearing on the hollow member of the telescoping joint and gripping the other at any portion of its length.

2. In a fluid pressure brake apparatus, the combination with the usual cylinder, piston and foundation brake rigging of a telescoping piston rod connecting the piston with one of the brake levers, and automatic means for lengthening the telescoping piston rod to compensate for the wearing down of the brake shoes, said means comprising a gripping apparatus having a bearing on one member of the telescoping joint and gripping the other member at any point of its length, and mechanism which after the predetermined maximum of piston travel has been exceeded on any stroke extends the telescopic joint after release of the brakes by an amount equal to the excess travel on such piston stroke.

3. In a fluid pressure brake apparatus, the combination with the usual cylinder, piston and foundation brake rigging of a telescoping piston rod connecting the piston with one of the brake levers, and automatic means for lengthening the telescoping piston rod to compensate for the wearing down of the brake shoes, said means comprising a gripping apparatus having a bearing on one member of the telescoping joint and gripping the other member at any point of its length, and mechanism which after the predetermined maximum of piston travel has been exceeded on any stroke extends the telescopic joint after release of the brakes by an amount equal to the excess travel on such piston stroke, said mechanism comprising a second gripping apparatus mounted on the second member of the telescoping joint, a spring mounted between the two gripping devices, and an adjustable stop for the second gripping apparatus.

4. In a fluid pressure brake apparatus the combination with the usual cylinder, piston and foundation brake rigging of a hollow piston rod, a push rod telescoped therein and connected to one of the brake levers, a friction clutch loosely mounted on the push rod and adapted to bear against the end of the hollow piston, a second friction clutch also loosely mounted on the push rod, a stop therefor rigidly supported with reference to the brake cylinder, and a spring located between the two clutches.

5. In a fluid pressure brake apparatus, the combination with the usual cylinder, piston and foundation brake rigging of a hollow piston rod, a push rod telescoped therein and connected to one of the brake levers, a friction clutch loosely mounted on the push rod and adapted to bear against the end of the hollow piston, a second friction clutch also loosely mounted on the push rod, a stop therefor rigidly supported with reference to the brake cylinder, and a spring located between the two clutches, together with a second but more flexible spring located on the other side of the first mentioned friction clutch and having its outer end confined on the push rod.

6. In a fluid pressure brake apparatus, the combination with the usual cylinder, piston and foundation brake rigging of a hollow piston rod, a push rod having an enlarged inner end telescoped therein and connected to one of the brake levers, a friction clutch loosely mounted on the push rod and adapted to bear against the end of the hollow piston, a second friction clutch also loosely mounted on the push rod, a stop therefor rigidly supported with reference to the brake cylinder, and a spring located between the two clutches, together with a second spring confined between the first mentioned friction clutch and the enlarged end of the push rod.

7. In a fluid pressure brake apparatus, the combination with the usual cylinder, piston and foundation brake rigging of a hollow piston rod, a push rod telescoped therein and connected to one of the brake levers, a friction clutch loosely mounted on the push rod and adapted to bear against the end of the hollow piston, a second friction clutch also loosely mounted on the push rod, a stop therefor rigidly supported with reference to the brake cylinder, and a spring located between the two clutches, said stop also forming a guide for the push rod.

8. The combination of a hollow piston rod, a push rod telescoped therein, and the friction dog having a perforation through which the push rod passes and a bent end which bears on the end of the hollow piston.

9. The combination in a friction clutch of a rod, a perforated member through which the rod passes, and a dog having an opening through which the rod also passes and a projection at one end which bears on the face of the perforated member.

10. The combination in a friction clutch of a rod, a perforated member through which the rod passes, and a dog having an opening through which the rod also passes and a projection at one end which bears on the face of the perforated member, together with a stop located on the other side of the dog having a bearing face in a plane at right angles to the axis of the rod.

Signed at New York, N. Y. this 21st day of June, 1906.

AUGUSTUS PARKER-SMITH.

Witnesses:

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