1,298,576.

W. H. SAUVAGE.

SLACK ADJUSTER.

APPLICATION FILED JAN. 31, 1918.

Patented Mar. 25, 1919.

2 SHEETS—SHEET 1.

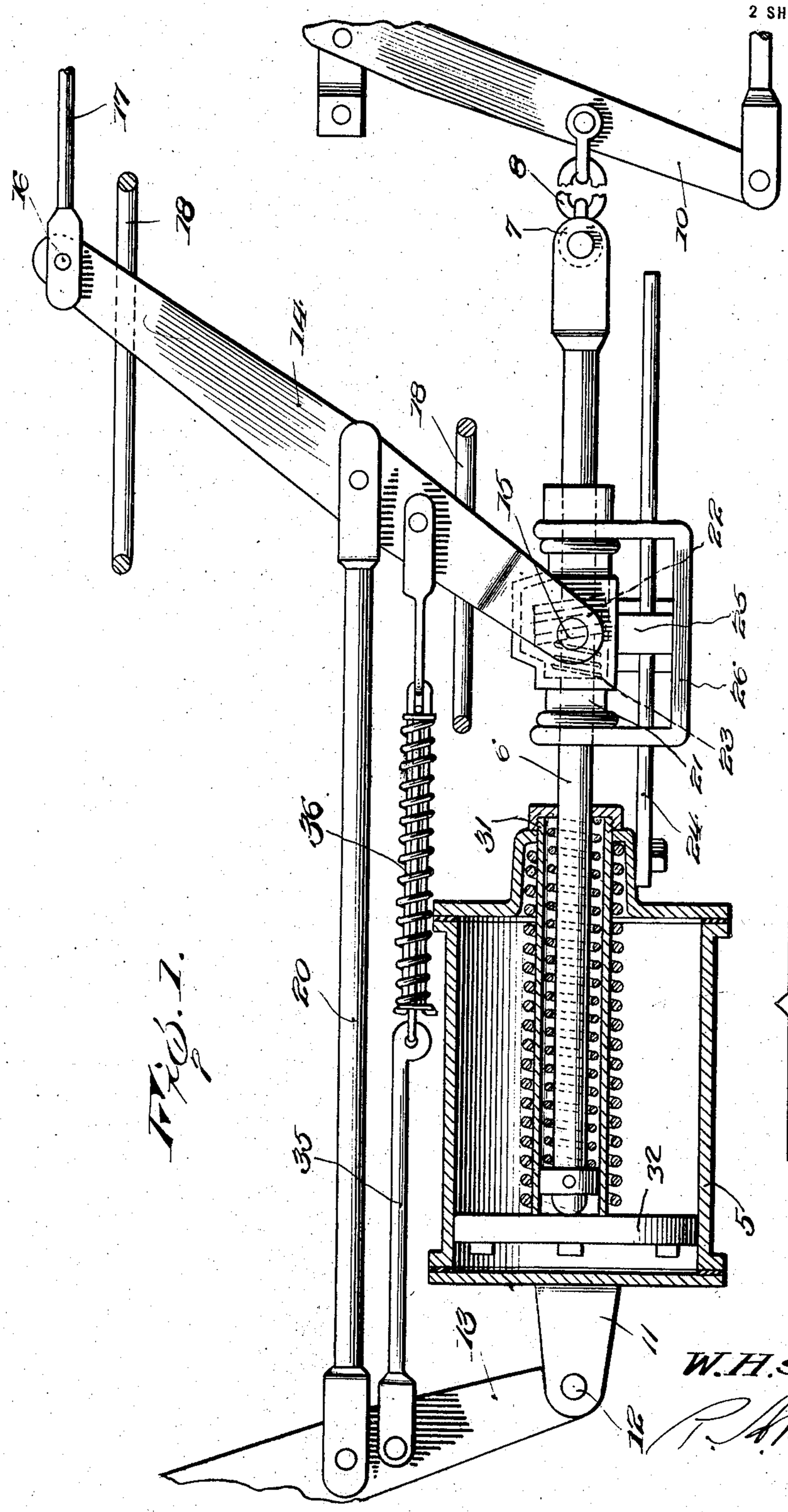

Fig. 1.

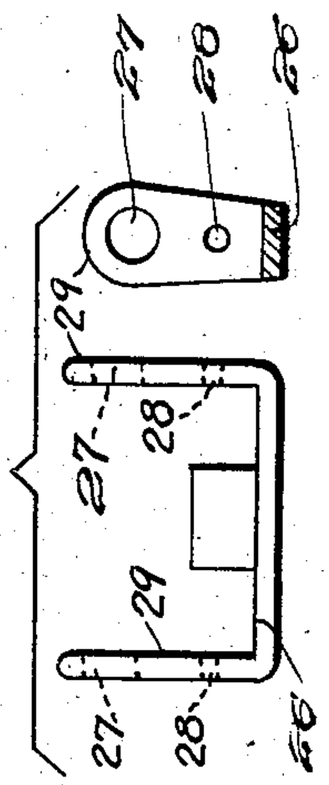

Fig. 3.

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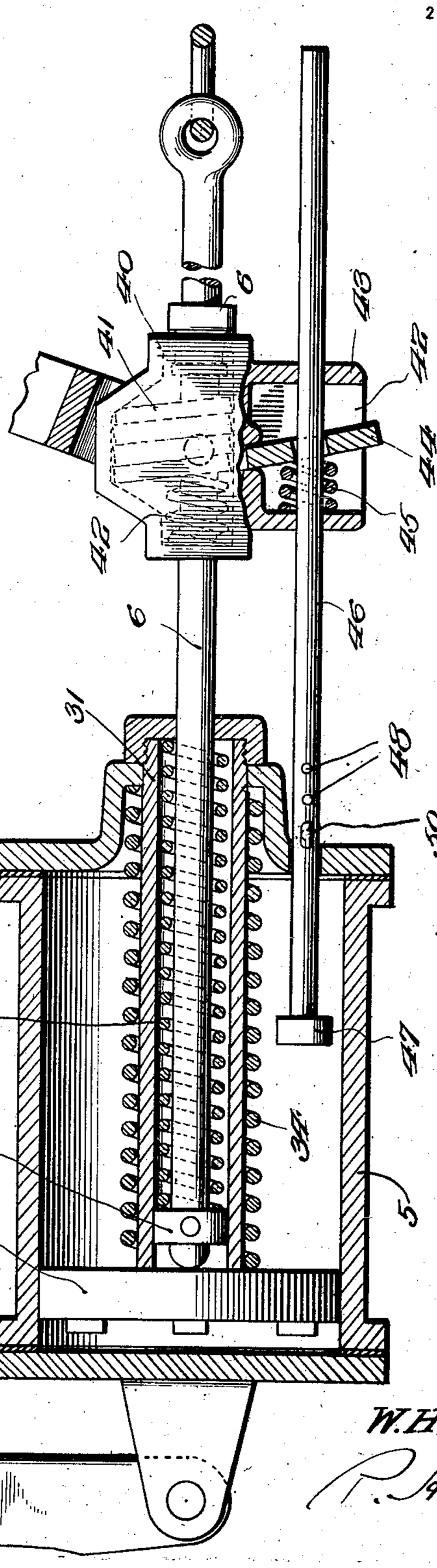

Fig. 2.

Fig. 4.

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UNITED STATES PATENT OFFICE.

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SLACK-ADJUSTER.

1,298,576. Specification of Letters Patent. Patented Mar. 25, 1919.

Application filed January 31, 1918. Serial No. 214,689.

To all whom it may concern:

Be it known that I, WILLIAM H. SAUVAGE, a citizen of the United States of America, residing at Flushing, Long Island, in the county of Queens and State of New York, have invented certain new and useful Improvements in Slack-Adjusters, of which the following is a specification.

This invention relates to slack adjusters particularly adapted for use in connection with the power cylinders of the foundation brake rigging beneath the central part of the car floor, although it is not to be limited to such application.

One of the objects of the present invention is to provide an automatic slack adjuster which will be reliable and efficient in use and operation. Another object is to provide a simple and practical slack adjuster which may be conveniently applied to the brake rigging now in use without material alteration. A further object is to provide an inexpensive slack adjuster adapted to insure uniform piston travel at all times. A further object is to provide a slack adjuster which is operable when either the hand brakes or the power brakes are applied to insure uniform piston travel.

Other objects will be in part obvious from the annexed drawings and in part indicated in connection therewith by the following analysis of this invention.

This invention accordingly consists in the several steps and the relation of each step to each of several of the others both individually and in combination; all as more completely outlined herein.

To enable others skilled in the art so fully to comprehend the underlying features thereof that they may embody the same by the numerous modifications in structure and relation contemplated by this invention, drawings depicting several desired forms of apparatus have been annexed as a part of this disclosure, and in such drawings, like characters of reference denote corresponding parts throughout all the views, of which:—

Figure 1 is a plan view of such parts of the foundation brake rigging and a slack adjuster attachment applied thereto as is necessary to understand the present invention, certain parts being shown in section for clearness.

Fig. 2 is a similar view showing a modification.

Figs. 3 and 4 are detail views of certain parts.

Referring now to the drawing in detail and more particularly to Fig. 1, 5 denotes a brake power cylinder centrally supported beneath the floor of the car and provided with a piston rod 6 adapted to reciprocate in the usual manner as the brakes are applied and released. The end of this piston rod 6 is provided with a clevis 7 adapted to be connected by means of a chain 8 with a lever 10 forming a part of the hand brake operating mechanism, the parts being so constructed, positioned and arranged that as the hand brakes are applied, the piston rod 6 will be moved relatively to the right in the same manner as though the air cylinder were being operated for the same purpose.

One end of the cylinder 5 is provided with a support 11 to which is pivotally connected at 12 one end of a dead lever 13, the opposite end being connected with the brake rigging at one end of the car in the usual manner, but not herein shown. A live lever 14 is connected indirectly to the piston rod by means of the slack adjuster mechanism hereinafter described, at the point 15. The opposite end is connected at 16 with a pull rod 17 extending to the opposite end of the car where it is adapted to actuate the truck brake rigging. Suitable U-shaped stop brackets 18 extending downwardly from the car body are provided wherever necessary to support these levers and insure uniform angularity. The central parts of the live and dead levers 13 and 14 are connected by means of a rigid push rod 20. This mechanism with the exception of a slack adjuster attachment is substantially the same as that now in general use and it is believed that further detailed description of its construction and operation are unnecessary.

The slack adjuster in the modification shown in Fig. 1 comprises a housing 21 having a longitudinal opening through which the piston rod 6 is adapted to pass. This housing which is substantially the same as

shown in my prior Patent #1,227,940, May 29, 1917, contains a plurality of take up and holding means such as dogs 22 normally held in canted position by means of a spiral spring 23 surrounding the push rod 6. Suitable dog release mechanism, as shown in my above referred to patent may also be applied to this housing, if desired. The parts are so positioned and arranged that as the piston rod 6 is moved relatively toward the left, it will coact with the dogs within the housing and cause the same to move equally therewith thereby carrying the adjacent end of the live lever 14 which is bifurcated and trunnioned at the point 15 to opposite sides thereof, into braking position.

Parallel to the piston rod 6 and flexibly secured to the cylinder is an adjusting rod 24 carrying a friction clamp 25. A U-shaped member 26, as shown more clearly in Fig. 3, is provided with openings 27 and 28 in each of its upstanding legs 39 through which the piston rod 6 and adjusting rod 24 are adapted to pass freely.

In order that the present slack adjuster may be more effectively operated by the hand brake mechanism and without necessitating the effort of pulling against the usual return spring within the cylinder, it will be noted that the piston rod 6 is provided at its inner end with an adjusting collar 30 adapted to slide in a sleeve 31 secured to piston head 32 and against the action of a relatively light spiral return spring 33. A main return spring 34 surrounds the sleeve 31 and reacts between the piston head and the end wall of the cylinder. Thus, when the hand brake is actuated only the rod 6 moves toward the left against the action of the lighter spring 33, yet when the air pressure is admitted to the cylinder then the entire piston mechanism, including the piston 32, sleeve 31 and springs 33 and 34 move relatively toward the right.

In order to insure complete return movement of the parts during the operation of the hand brake mechanism, there is provided between the live and dead levers 13 and 14 an extensible connecting link 35 made in two parts and having a spring 36 coacting between the effective ends thereof.

The operation of the modification shown in Fig. 1 is substantially as follows: Assuming the parts to be in position, shown in Fig. 1, the first application of the brakes by either hand or power, assume, however, that it is actuated by power, will cause the piston rod 6 to move relatively toward the right and carry with it the take up and holding dogs 22 and associated housing. This will move the connected end of the live lever 14 toward the right and react in the usual manner upon the dead lever to bring the opposite ends of the live and dead levers toward each other an equal amount and actuate the brake mechanisms on the trucks. If excess travel takes place, for any reason, then the U-shaped adjusting member 26 carried with the box or housing 21 in its movement engages the yielding friction clamp 25 and moves the same relatively toward the right a distance corresponding to the excess travel. On release of the brakes the various return springs coact to restore the parts to full release or normal position and in so doing the take up housing 21 moves relatively toward the left until the friction spring engages the right hand portion of the adjusting device 26. Further relative movement of the take up housing 21 toward the left is then prevented which allows the piston rod 6 to slide freely through the housing 21 to full release position. On the next operation of the brakes, no action will take place, unless excess travel due to further wear of the parts occurs, but no matter how slight this wear may be if it causes excess piston travel or movement greater than the distance provided for between the upstanding legs 29 of the adjusting member and clamp, then the friction clamp is moved along the adjusting rod and consequently moves the housing 21 an equal distance along the piston rod when the brakes are released. From this, it will be seen that by varying the length of the adjusting rod lost motion bracket 26, the piston travel of six, seven or eight inches, as desired may be regulated accordingly.

This variation is obtained in another way by the modification shown in Fig. 2. The construction of the cylinder and general arrangement of the live and dead levers is the same as that above described. The actual take up and holding devices are somewhat different. In this modification a housing 40 is mounted upon the push rod 6 and is provided with two chambers, one of which contains a plurality of holding devices such as dogs 41 normally held in canted position by means of a spiral spring 42 substantially the same as shown in my prior patent above referred to, the parts being so positioned and arranged that on actuation of the piston rod, the housing will be carried along therewith. The outer chamber 43, however, of this housing contains a single dog 44 also held in canted position by means of a spiral spring 45 surrounding an adjusting rod 46 which extends loosely through the end wall of the cylinder and is provided with a buffer 47 at its end. A plurality of holes 48 are adapted to receive a cotter pin or other stop device 50 so that the distance between the buffer 47 and the adjacent surface of the piston 32 may be regulated to six, seven or eight inches, according to the piston travel desired.

From this construction, it will be seen that on application of the brakes the piston 32 moves toward the right and carries the

holding dogs 41 therewith and applies the brakes as above described. If excess travel takes place the piston 32 will engage the buffer 47 and move the adjusting rod 46 along with the piston rod 6. On release of the brakes the parts are returned to normal position by means of the several return springs. When the adjusting rod 46 has traveled back until the stop 50 in one of the openings 48 is arrested by the end wall of the cylinder, then the dog 44 within the chamber 43 bites the adjusting rod 46 and prevents further retractive movement of the housing 40 which will then slip along the piston rod 6 to its newly adjusted position an amount equal to the excess travel.

It is thus seen that the present invention provides a simple and practical automatic slack adjuster adapted to accomplish, among others, all of the objects and advantages herein set forth.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can by applying current knowledge readily adapt it for various applications without omitting certain features that, from the standpoint of the prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and therefore such adaptations should and are intended to be comprehended within the meaning and range of equivalency of the following claims.

I claim:

1. In an apparatus of the character described, in combination, a power cylinder, live and dead levers, a piston within said power cylinder having a piston rod, a housing mounted on said rod capable of moving in one direction relatively thereto and held against movement in the opposite direction, a pivoted connection between said housing and live lever, an adjusting rod associated with said cylinder, and adjusting means operating between said adjusting rod and said housing adapted to temporarily take up the slack due to excess wear and permanently register said slack in said housing when the brakes are released.

2. In an apparatus of the character described, in combination, a power cylinder, a piston and piston rod co-acting therewith, live and dead levers associated with the opposite ends of said cylinder, a housing forming a connecting means between the adjacent end of the live lever and said piston rod, permanent take up and holding means within said housing, an adjusting rod associated with the cylinder and extending parallel with said push rod and friction means associated with said adjusting rod and housing adapted to be actuated on excess travel and to actuate the permanent take up and holding means within the housing when the brakes are released.

3. In an apparatus of the character described, in combination, a power cylinder having a piston and piston rod, live and dead levers associated with the opposite ends of said cylinder, a housing mounted upon said piston rod having permanent take up and holding means therein adapted to co-act with said piston rod, an adjusting rod parallel to said piston rod, a friction device acting on said adjusting rod and means carried by the housing adapted to move said friction means when excess travel occurs.

4. In an apparatus of the character described, in combination, a power cylinder having a piston and piston rod, live and dead levers associated with the opposite ends of said cylinder, a housing mounted upon said piston rod having permanent take up and holding means therein adapted to co-act with said piston rod, an adjusting rod parallel to said piston rod, a friction device acting on said adjusting rod and means carried by the housing adapted to move said friction means when excess travel occurs, said last mentioned means including a U-shaped member slidably mounted upon said piston rod and surrounding said friction device and being of a length substantially equal to the normal piston travel.

5. In an apparatus of the character described, in combination, a power cylinder having a piston and piston rod, a live lever, a housing mounted upon said piston rod to which said live lever is pivotally connected, an adjusting rod associated with said cylinder, a friction device carried by said adjusting rod, a U-shaped member loosely mounted upon said piston rod and embracing said connecting member and a friction clamp associated with the adjusting rod and positioned between the sides of said U-shaped member adapted to be moved by said member on excess travel thereby to act as a stop for arresting movement of said connecting member when the brakes are released.

6. In an apparatus of the character described, in combination, a live lever, a power cylinder having a piston and piston rod telescopically connected and a return spring for each part whereby the piston rod may be moved independently of the piston when the hand brakes are applied and a slack adjuster mechanism forming the connection between the live lever and the piston rod.

7. In an apparatus of the character described, in combination, a power cylinder having a piston and piston rod telescopically connected and a return spring for each part whereby the piston rod may be moved independently of the piston when the hand brakes are applied and a slack adjuster mechanism associated with said piston rod, said slack adjuster mechanism including a housing with a plurality of permanent take up and holding devices therein co-acting di-

rectly with said push rod, and a live lever pivotally connected with said housing and actuated on relative movement of said housing with respect to the cylinder.

8. In an apparatus of the character described, in combination, a power cylinder having a piston and piston rod telescopically connected and a return spring for each part whereby the piston rod may be moved independently of the piston when the hand brakes are applied and a slack adjuster mechanism associated with said piston rod, said slack adjuster mechanism including a housing, a plurality of permanent take up and holding devices therein co-acting directly with said push rod, a live lever pivotally connected with said housing and actuated on relative movement of said housing with respect to the cylinder, an adjusting mechanism associated with said housing adapted to temporarily take up the slack due to excess travel and to register said slack on the permanent take up and holding mechanism when the brakes are released.

9. In an apparatus of the character described, in combination, a power cylinder having a piston and piston rod telescopically connected and a return spring for each part whereby the piston rod may be moved independently of the piston when the hand brakes are applied and a slack adjuster mechanism associated with said piston rod, said slack adjuster mechanism including a housing with a plurality of permanent take up and holding devices therein co-acting directly with said push rod, a live lever pivotally connected with said housing and actuated on relative movement of said housing with respect to the cylinder, an adjusting means associated with said housing adapted to temporarily take up the slack due to excess travel and to register said slack on the permanent take up and holding mechanism when the brakes are released, said adjusting means including a rod associated with said cylinder and a friction device directly coacting with said rod.

10. In an apparatus of the character described, in combination, a power cylinder, a piston and sleeve mounted within said cylinder, a spring surrounding said sleeve and acting against the end wall of the cylinder adapted to restore the piston to normal position after actuation a piston rod slidably mounted within said sleeve, hand power means connected with said piston, and a return spring associated therewith whereby the piston rod may have movement independent of the piston as when the hand brakes are applied, a live lever and slack adjuster mechanism interposed between the piston rod and the live lever and forming a connecting means adapted to take up the slack when excess travel takes place.

11. In an apparatus of the character described, in combination, a power cylinder, a piston and sleeve mounted within said cylinder, a spring surrounding said sleeve and acting against the end wall of the sleeve adapted to restore the piston to normal position after actuation and a piston rod slidably mounted within said sleeve, a return spring associated therewith whereby the piston rod may have movement independent of the piston as when the hand brakes are applied, hand brake mechanism loosely connected with the end of said piston rod, a live lever connected with said piston rod and movable therewith when either said power cylinder or hand brake mechanism is actuated, a return spring connected with said live lever, and automatic slack adjuster mechanism between the piston and live lever adapted to operate on applicating of either hand or power brake actuation mechanisms if excess travel of the piston occurs.

12. In an apparatus of the character described, including in combination, a power cylinder, a piston and sleeve mounted within said cylinder, a spring surrounding said sleeve and acting against the end wall of the sleeve adapted to restore the piston to normal position after actuation and a piston rod slidably mounted within said sleeve, a return spring associated therewith whereby the piston rod may have movement independent of the piston as when the hand brakes are applied, hand brake mechanism loosely connected with the end of said piston rod, a live lever connected with said piston rod and movable therewith when either said power cylinder or hand brake mechanism is actuated and excess travel takes place and a return spring connected with said live lever, said mechanism including a housing pivotally connected with the live lever a plurality of permanent take up and holding means within said housing, an adjusting rod and temporary take up and holding means associated with said adjusting rod adapted to be actuated on excess travel of the piston to in turn actuate the permanent take up and holding mechanism on release of the brakes.

13. In an apparatus of the character described, in combination, a power cylinder, a piston therein, a piston rod loosely connected with said piston, a live lever, hand brake mechanism connected with said piston rod whereby said piston rod may be actuated by said hand brake mechanism without moving said piston, brake rigging connected with said piston rod, intervening slack adjuster mechanism between said piston rod and live lever and a return spring associated with said live lever.

14. In an apparatus of the character described, in combination, a power cylinder, a piston slidably mounted therein, a return spring in said piston, a piston rod loose

connected with said piston, hand brake rigging connected with said piston rod whereby said piston rod may be moved independently of said piston, live and dead levers at opposite ends of said cylinder, said live lever being connected with said piston rod and movable therewith, means for absorbing the slack at the point of connection, and a return spring for restoring said live lever to normal position when the hand brakes are actuated.

In testimony whereof I affix my signature in the presence of a witness.

WILLIAM H. SAUVAGE.

Witness:

G. H. DIETZ.