(No Model.) 3 Sheets—Sheet 1.

M. E. McKEE.

CAR BRAKE ADJUSTER.

No. 533,485. Patented Feb. 5, 1895.

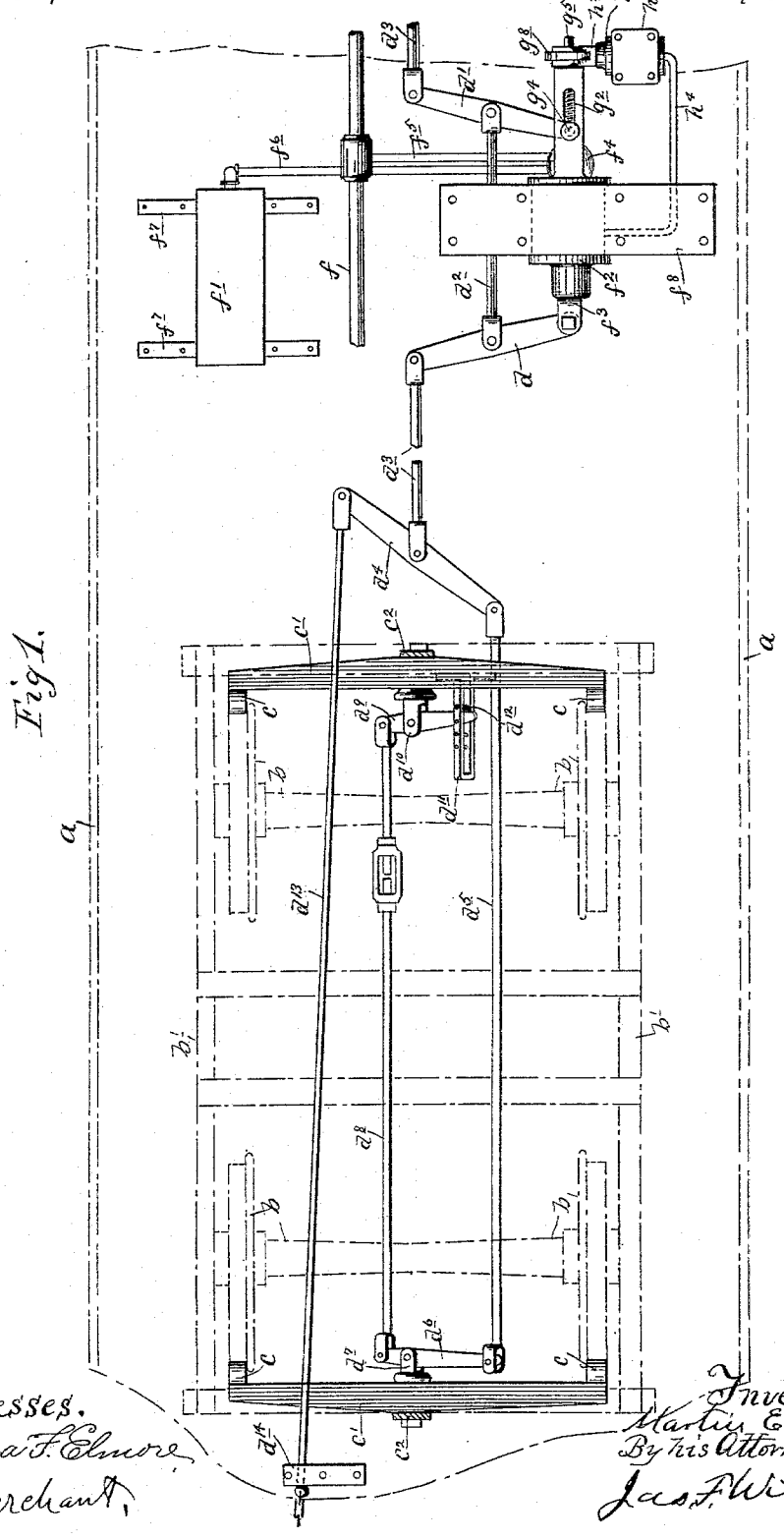

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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Fig 4.

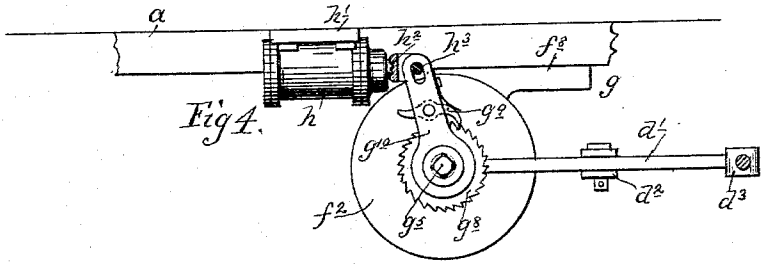


Fig 2.

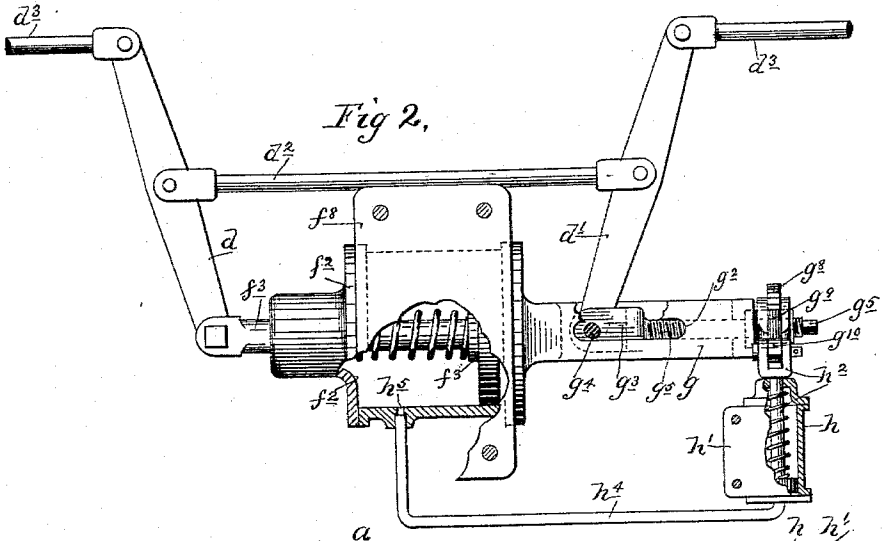
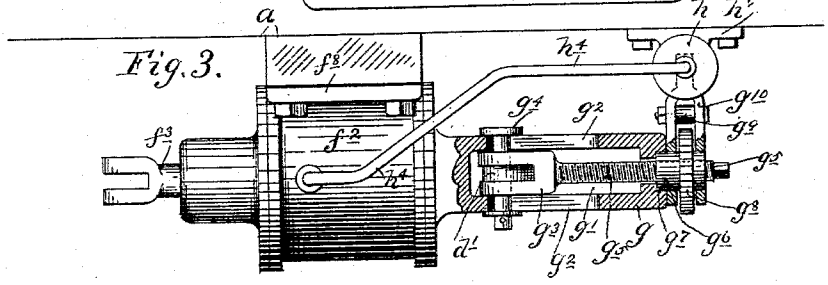


Fig 3.



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(No Model.) 3 Sheets—Sheet 3.

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Fig 5.

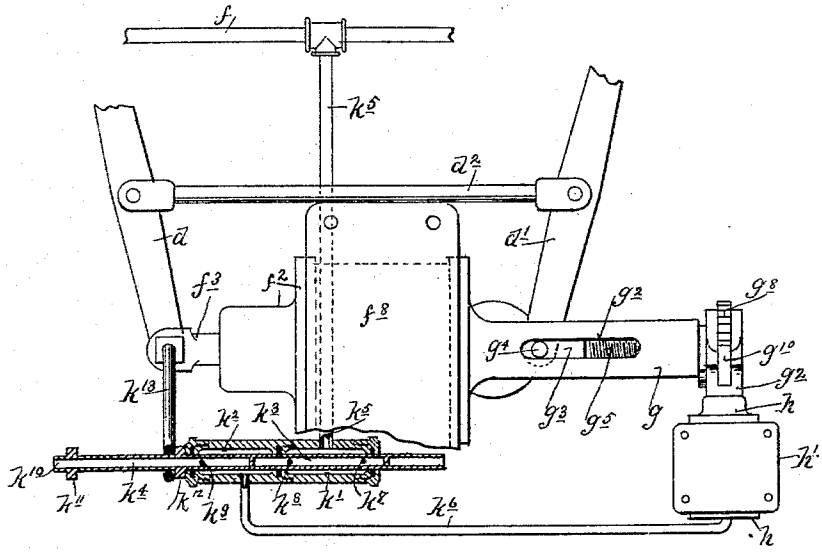
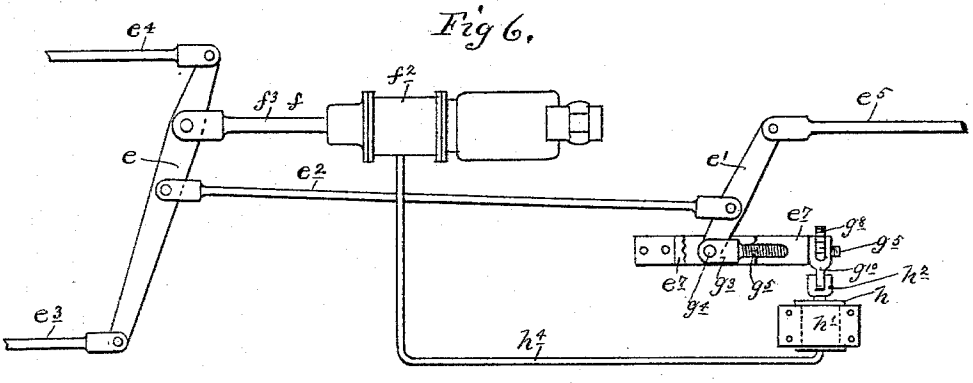


Fig 6.



Witnesses.
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UNITED STATES PATENT OFFICE.

MARTIN E. McKEE, OF ST. PAUL, MINNESOTA.

CAR-BRAKE ADJUSTER.

SPECIFICATION forming part of Letters Patent No. 533,485, dated February 5, 1895.

Application filed December 26, 1893. Renewed October 29, 1894. Serial No. 527,323. (No model.)

To all whom it may concern:

Be it known that I, MARTIN E. McKEE, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Brake-Adjusters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to brake-adjusters; and is in the same line as the constructions described in former United States patents of mine, identified as follows:—No. 487,636, of date December 6, 1892; and No. 489,494, of date January 10, 1893.

In my present device, I employ the take-up motor, operating under the control of the brake-motor, with either of the two forms of valve-mechanism, as described and broadly claimed in the last of the above noted patents.

My present invention is directed to the take-up device proper, as distinguished from the said take-up motor, shown in my prior patents, which I employ for operating the take-up device; and has for its object to simplify the construction of the take-up device and apply the same at a particular part of the brake rigging, with a view of economy in first cost and durability in use.

To these ends, my invention consists of the novel devices and combinations of devices hereinafter fully described and defined in the claims.

The general purpose of brake-adjusters is well understood. It is desirable to charge the auxiliary reservoirs with a constant pressure. Hence, the pressures in the reservoirs and brake-motors will equalize, at a constant point, in the travel of the brake-motor piston. It is, therefore, necessary to maintain a substantially uniform stroke on the brake motor piston, in order to be able to set the brakes, when necessary, under maximum pressure. Otherwise, the braking power will be decreased, by the resulting increased expansion permitted in the brake-motor cylinder, when the piston travels beyond the predetermined limit for equalization of pressure between the brake-motor cylinder and the auxiliary reservoir. Brake-adjusters are designed to take up the slack produced by the wear and tear on the brake shoes, so as to preserve a substantially uniform stroke, for the brake-motor piston, in order to make it possible to always have available the full braking power. There is, of course, a slight range of variation permitted to the brake-motor piston before the slack is taken up, which is usually about a half or five-eighths of an inch.

The accompanying drawings illustrate my construction for this purpose, as applied both in passenger and freight service, therein like letters referring to like parts throughout the several views.

Figure 1 is a plan view, with some parts in diagram, showing my device as applied on a passenger car, some parts being broken away. Fig. 2 is a plan view of the brake-motor and adjuster as shown in Fig. 1, on a larger scale, with some parts broken away. Fig. 3 is a side elevation of the motor and adjuster, as shown in Fig. 2, with some portions broken away; and Fig. 4 is a right end elevation of the adjuster, as shown in Figs. 2 and 3. Fig. 5 is a plan view of the adjuster, as applied to a passenger car detached, with some parts broken away, and others in section, wherein a different form of valve mechanism is employed, to control the take-up motor. Fig. 6 is a view in plan, showing the same device as illustrated in Figs. 1 to 4, as applied on a freight car.

The car-body a, the trucks b and truck-frame b', are shown in Fig. 1, in dotted lines only.

c represents the brake-shoes, c' the brake-beams and c^2 the retracting springs which normally hold the shoes away from the wheels.

d and its powers, from d to d^{14} inclusive, represent the parts of the well-known Hodge system of brake-rigging, as applied to passenger cars. Of these parts, it is only necessary to distinguish the primary brake-levers $d\,d'$ and to state that the said lever d' differs from the standard construction, in being provided with a shifting fulcrum, hereinafter more fully noted for the application of my take-up device. The levers $d\,d'$ are sometimes called the cylinder levers, but are herein

termed the primary brake levers, to preserve a common term for denoting the corresponding levers e e', to which the brake-motor piston is directly applied in the rigging, as modified for freight cars, and herein illustrated in Fig. 6 of the drawings. It should also be noted, that the lever d' and the lever e' are treated as the rear members of the respective pairs of the so-called primary brake-levers. In other words, that member, of the respective pairs of primary brake-levers, to which the brake-motor piston is directly applied is treated as the front member; and the member operated therefrom, by the tie-rod, as the rear member.

Having regard to the motive power appliances, f represents the train-pipe, f' the auxiliary reservoir, f^2 the cylinder, and f^3 the piston of the brake-motor, f^4 the triple valve, f^5 the pipe from the train-pipe to the triple-valve, and f^6 the pipe from the triple-valve to the auxilary reservoir; all of which parts are of the well-known Westinghouse construction. The auxiliary reservoir f' is shown as supported from the car-body, by brackets f^7, and the brake-motor cylinder f^2 is shown as supported from the car-body, by foot-plates f^8.

Turning now to the brake-adjuster, I will first describe the take-up device proper.

Referring to Figs. 1 to 5, inclusive, a fulcrum block-guide g, is formed integral with the rear end of the brake-motor cylinder, and is provided with a horizontal slot g' and a vertical slot g^2. In the said guide is mounted a fulcrum block g^3, to which the brake-lever d' is pivotally secured by fulcrum pin g^4. As shown, the fulcrum block g^3 is formed integral with a screw-threaded rod g^5, which passes out through the end of the guide g and is engaged by a nut g^6, which bears against a suitable seat g^7, on the outer end of the guide g, as a base of resistance. The nut g^6, as shown, has formed integral therewith, a ratchet g^8, which is engaged by a spring-held pawl g^9, carried by a pawl-lever g^{10}, which is pivoted on the nut g^6. As shown, the pawl lever g^{10} is forked; and the prongs of the same, straddle the ratchet and are pivoted on the extended portions of the nut g^6, or what might be called the hubs of the ratchet g^8.

The cylinder h of the take-up motor is supported, as shown, from the car-body, by bracket h'; and the piston member h^2 of the said motor, is connected to the pawl-lever g^{10} by slot and pin, as shown at h^3. The cylinder h of the take-up motor, is in communication, behind the piston h^2, with the brake motor cylinder f^2, by pipe h^4 and a port h^5, through the wall of the brake-motor cylinder. This port h^5 is located at such a point, with respect to the travel of the brake-motor piston f^3, that under the normal stroke of the said piston, for maximum brake setting action, and within the normal variation permitted to the said stroke, the port h^5 will not become uncovered and open to air-pressure behind the brake-motor piston f^3; but as soon as the slack, from the wear and tear on the shoes, becomes sufficiently great, to require an excessive stroke of the brake-motor piston f^3, beyond its permissible limit of variation, the said port will be uncovered behind the piston f^3 and air pressure from the brake motor cylinder f^2 will become available, through the port h^5 and pipe h^4, to operate the take-up motor h h^2. This opening of the take-up motor cylinder h to air-pressure will occur when the brakes are set; and owing to the increased power afforded by the pawl-lever and the nut and screw, the slack may be taken up, when the brakes are thus set, with a comparatively small take-up motor, so as to set the brakes under maximum pressure. When the brakes are released, by the operation of the triple-valve, the port h^5 will become uncovered on the stem side of the brake-motor piston f^3, thereby permitting the exhaust to take place from the cylinder h of the take-up motor through the pipe h^4, port h^5 and the piston passage of the brake-motor cylinder.

Looking more closely to the action of the take-up device proper, it is well-known, and is also obvious from the drawings, that the tension on the brake-rigging, from the beam-springs c^2, tends to hold the fulcrum ends of the primary brake-levers d d', or e e', in their innermost position with respect to the brake-motor cylinder. Hence, it is obvious, that if the fulcrum end of the rear member of said primary levers be moved outward, the brake-beams and shoes will be thrown toward the wheels to a corresponding extent. In other words, the slack will be taken up. That this will be the effect, of shifting outward the fulcrum of the said lever d' or e', will be apparent, by noting that it must have precisely the same effect, as a corresponding movement outward of the brake-motor piston f^3. On account of the inward strain on the primary brake-levers, the nut g^6, for operating the rod g^5, may be located external of the guide g, and have its base of resistance against the outer end of the said guide. In other words, the said nut g^6 only needs to be held from longitudinal movement in one direction.

While the fulcrum-block g^3 and the rod g^5, with the nut g^6 are arranged for a pulling action, it is obvious that they might be arranged for a pushing action, on the fulcrum end of the lever d' or e', to which the same are applied. To this end, it would only be necessary to apply the rod g on the other side of the fulcrum end of the said lever d' or e'; in which event, the rod g might be separate from the fulcrum-block g^3, instead of being formed integral therewith, as shown.

It is, of course, obvious, that the take-up device can be operated by hand, by simply lifting the pawl g^9 and turning the ratchet

and nut g^6 g^8. It is thus operated to restore the fulcrum block and end of the lever to its normal position, when new shoes are substituted for the old or worn out shoes on the brake-beams.

As shown in Figs. 1 to 4, inclusive, the brake-motor piston f^3 and the port h^5, is a form of valve mechanism for the take-up motor.

In Fig. 5, I have shown a modified form of valve mechanism, controlled by the brake motor, but rendering train-pipe pressure available, to operate the take-up motor. In this modification, a two-chambered valve case k' k^2 is fitted with a two-chambered hollow piston valve k^3 k^4. The valve-case chamber k' is in communication with the train-pipe by pipe k^5; and the valve-case chamber k^2 connects with the cylinder h of the take-up motor, by pipe k^6. The valve chamber k^3 has two ports k^7 k^8; and the valve chamber k^4 has also two ports k^9 k^{10}, of which the latter is the open end of the valve external of the valve case. On the valve section k^4 are located two collars k^{11} k^{12}, suitably spaced apart from each other. Between the said collars, loosely works the lower end of a rigid arm k^{13} carried by the outer end of the brake-motor piston f^3. When the parts are in their normal position, as shown in Fig. 5, the take-up motor will be open to exhaust, through the pipe k^6 and valve-ports k^9 k^{10}. The valve k^3 k^4 will remain in this innermost position, so long as the brake-motor piston f^3 does not move outward beyond its normal limit of variation; but when it makes an excessive stroke, on account of the slack from the wear and tear on the shoes, the said valve k^3 k^4 will be thrown into its outermost position, by the arm k^{13}, striking the collar k^{11}. When this occurs, the ports k^7 k^8 will stand on opposite sides of the partition between the two valve-case chambers k' k^2, and the valve port k^9 will be external to the valve case. Hence, air from the train-pipe can enter, through the parts k^5 k' k^7 k^8 k^2 and k^6, the cylinder h of the take-up motor. If the take-up motor be sufficiently powerful, working under train-pipe pressure, to operate the take-up device, the slack will be at once taken up, while the brakes are set; but this form of the valve mechanism permits the take-up motor h h^2 to be made very small. If so made, the take-up motor will not operate until the brakes are released. On the release of the brakes, the valve k^3 k^4 will remain in its outermost position, until the brake-motor piston f^3 and the arm k^{13} approximately reach the limit of their inward stroke; and during this time, the take-up motor will operate the take-up device and take up the slack. When the brake-motor piston f^3 and arm k^{13} reach the limit of their inward stroke, the valve k^3 k^4 will be thrown back inward into its normal position, and the cylinder of the take-up motor be open to exhaust.

The take-up motor h h^2, with the two forms of valve mechanism, as described, are identical with the corresponding parts described and broadly claimed, in my Patent No. 489,494, of date January 10, 1893.

In the brake-rigging for freight cars, the levers e e', as shown in Fig. 6, correspond, as hitherto noted, to the levers d d', shown in the other views, and the tie-rod e^2 to the tie-rod d^2.

e^3 e^4 e^5 represent other parts of the brake-rigging, as modified on freight cars, for communicating the motion to the brake-beams from the primary levers e e'. For applying the take-up device, to this rigging, as shown in Fig. 6, the only material difference is the use of a fulcrum-block guide e^7, which is independent of the brake-motor cylinder f^2, and is secured to the car-body in the required position, for applying the take-up device to the lever e'. All the other parts are identical with the corresponding parts shown in the principal views of Figs. 1 to 4 inclusive.

It is, of course, obvious, that instead of the pawl lever g^9 g^{10}, as shown, the take-up motor piston h^2, might be made to act, on the combined nut and ratchet g^6 g^8, either directly by a spring pawl carried on the piston or through rack teeth cut on the piston and a pawl-carrying pinion on the rod g^5. The construction shown is, however, the most satisfactory.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. A take-up device, for brakes, comprising a shifting fulcrum block for the rear member of the primary brake-levers, a fixed guide for said fulcrum block, a screw-threaded rod for moving said fulcrum block and a nut held by said guide for operating said rod, substantially as described.

2. The take-up device, comprising the shifting fulcrum block, for one of the brake levers, a fixed guide for said block, a screw threaded rod, for moving said block, and a pawl and ratchet device held against longitudinal movement by said guide with its ratchet member working on said rod as a nut, for adjusting said fulcrum block and taking up the slack, substantially as described.

3. The combination with the fixed fulcrum block guide, of the fulcrum block g^3 having the screw threaded rod g^5, the combined nut and ratchet g^6 g^8, working on said rod and held by said guide, as described, and the pawl lever g^{10} pivoted on said nut and provided with a spring held pawl g^9 engaging said ratchet g^8, substantially as described.

4. An automatic brake-adjuster, comprising a take-up device, applied to shift the fulcrum of the rear member of the primary brake-levers, and a pawl and ratchet device, controlled by the brake motor, for operating said take-up device, substantially as described.

5. The automatic brake-adjuster, compris-

ing the take-up device applied to shift the fulcrum of the rear member of the primary brake-levers, the pawl and ratchet device, for operating the take-up device, and the take-up motor controlled by the brake-motor, for operating said pawl and ratchet device and take-up device, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

MARTIN E. McKEE.

Witnesses:
JAS. F. WILLIAMSON,
FRANK D. MERCHANT.