

(No Model.)

J. K. LENCKE.
SLACK ADJUSTER FOR BRAKES.

No. 568,777.

Patented Oct. 6, 1896.

Fig. 1.

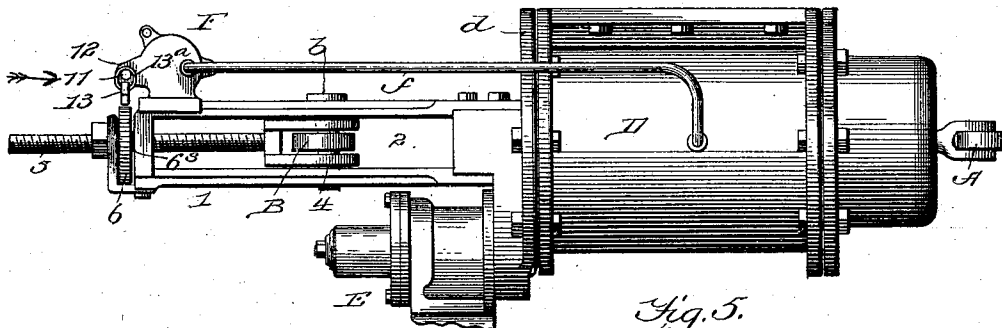


Fig. 5.

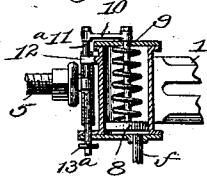


Fig. 6.

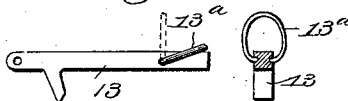


Fig. 3. F

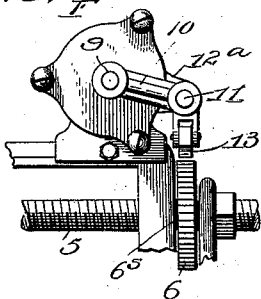


Fig: 2.

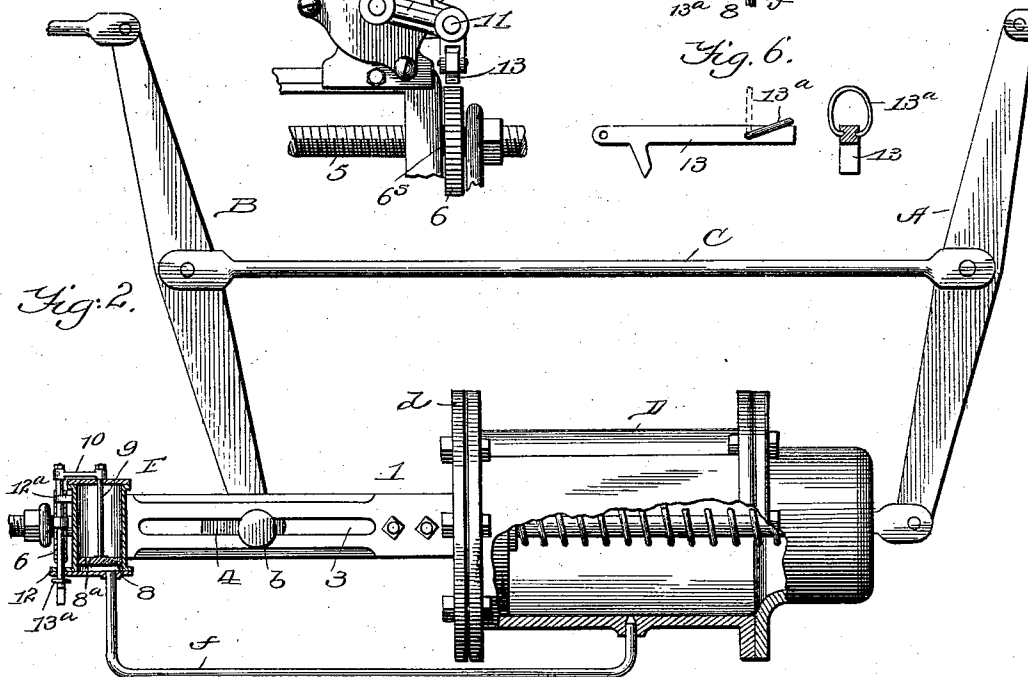
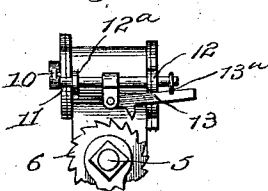


Fig. 4.



WITNESSES:

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INVENTOR

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John K. Lencke
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UNITED STATES PATENT OFFICE.

JOHN K. LENCKE, OF CHICAGO, ILLINOIS, ASSIGNOR TO CHARLES F. QUINCY,
OF SAME PLACE.

SLACK-ADJUSTER FOR BRAKES.

SPECIFICATION forming part of Letters Patent No. 568,777, dated October 6, 1896.

Application filed May 9, 1896. Serial No. 590,910. (No model.)

To all whom it may concern:

Be it known that I, JOHN K. LENCKE, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have
5 invented certain new and useful Improvements in Slack-Adjusters for Brakes; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in
10 which—

Figure 1 is a side elevation of a brake-cylinder, triple valve, and slack-adjuster mechanism embodying my invention. Fig. 2 is a top plan view of a brake-cylinder, a "take-up" motor, and brake-adjuster mechanism embodying my invention. Fig. 3 is an enlarged end view of the take-up motor, showing its position on the slack-adjuster mechanism—part of the latter broken away—the
15 same being the opposite end of the take-up motor from that shown in Fig. 1. Fig. 4 is an end view, partly broken away, of the slack-adjuster mechanism, looking in the direction of the arrow, Fig. 1. Fig. 5 is a top
20 plan view of a portion of the slack-adjuster mechanism and of a take-up motor mounted thereon, said motor having the common form of spring-retracted piston, which may be used instead of the form of take-up motor shown
25 in Fig. 2, if desired; and Fig. 6 is an enlarged detached detail view in side elevation and in section of the pawl or dog which actuates the ratchet-nut of the slack-adjuster.

Like symbols refer to like parts wherever
35 they occur.

My invention relates to the construction of that class of brake-adjusters wherein a take-up motor is provided to actuate the take-up mechanism, said motor operated by fluid-pressure derived either from the train-pipe, the brake-cylinder, or other suitable source of fluid-pressure, and wherein are combined with the front cylinder-lever of the brake system a movable fulcrum-block controlled
40 by the take-up mechanism; and the invention, though generally applicable to brake-adjusters employing a take-up motor, has been especially directed to certain improvements on constructions for which patents have been
45 granted to Martin E. McKee, as illustrated in United States Patents No. 487,636, dated De-

cember 6, 1892, No. 489,494, dated January 10, 1893, and No. 533,485, dated February 5, 1895, whereby all liability of the devices to become
55 inoperative from derangement of the coacting parts shall be obviated.

The coacting elements of this class of brake-adjuster embrace the "front" and "back" cylinder-levers of a brake system, a brake-cylinder whose piston-stem actuates the back
60 cylinder-lever of the system, a movable fulcrum-block for the front cylinder-lever, a screw and ratchet nut or their equivalents for moving the fulcrum-block, and a cylinder and piston (take-up cylinder) for actuating the
65 take-up mechanism.

Heretofore, so far as I am aware, the brake-cylinder, the take-up cylinder, and sometimes the screw and ratchet nut devices or take-up mechanism have been separately supported
70 from the car-body, though at other times the screw and ratchet nut or take-up mechanism has been attached to and supported from the brake-cylinder.

In order to be at all times operative, the
75 relation of the take-up motor to the take-up mechanism must be fixed and unchangeable, and in case of a screw and ratchet nut it should always be maintained at right angles thereto.
80

By the present methods of independent support or attachment of the take-up motor and the take-up mechanism, and of the take-up motor and brake-cylinder, it is difficult, if not impossible, to maintain in service the proper
85 relation of the coacting parts, because the brake-cylinder bolts are liable to become loose and the brake-rigging to draw and strain the brake-cylinder, thus disturbing the alinement and causing the adjuster
90 mechanism to bind and become inoperative. Further, and especially in the case of freight equipments, intervening timbers frequently prevent the proper support of the take-up motor from the car-body in such relation to
95 the brake-gear as will produce the best results and secure the effective operation of both the air-brake and the adjuster mechanism. To overcome these objections I attach the take-up motor to and support it from the
100 take-up mechanism, which enables the relative adjustment to be effected in the shop,

avoids the necessity of employing skilled labor for applying the devices to the car-body, and, when the devices are thereafter applied in proper relation to the brake-gear, secures
5 and maintains alinement, and such a construction embodies one feature of my invention.

As at present constructed and operated the slack in the brake system is commonly taken
10 up when the brakes are on or applied, so that the operation of the take-up motor is resisted by the brake-cylinder or force which applies the brakes, from which method of operation several disadvantages result.

15 It is impracticable to lubricate the take-up mechanism, because it is necessarily exposed to the dust and flying sand, but even in the absence of a lubricant some dust and fine sand will adhere to the screw and be drawn
20 into the ratchet-nut as the nut is rotated to take up the slack. When the ratchet-nut is operated to take up the slack while the gear is under the strain caused by the operation of the brake-cylinder in applying the brakes,
25 this dust and fine sand is caused to grind and cut into the take-up devices, creating a friction which necessitates the use of great power (a large take-up motor) and in addition thereto renders the take-up mechanism
30 liable to chafe and bind, rapidly wears out the ratchet-nut and detracts from the durability of the devices. To overcome these objections I combine with the take-up motor and ratchet-nut a rod and ratchet, so arranged
35 that the ratchet-nut shall be operated and the slack taken up on the inward movement of the piston of the take-up motor and brake-piston, or when the brake mechanism is relieved from the strain, so that a much
40 smaller take-up motor will be required. There will be no high friction to be overcome, and any fine sand drawn into the ratchet-nut will be crushed by the weight being
45 thrown onto the screw and ratchet nut as heretofore, and such a construction and operation of the devices embody a second feature of my invention.

The take-up motor, by means of which the
50 slack-adjuster mechanism is actuated, may have the usual spring-retracted piston, if desired, but inasmuch as the spring force may not remain constant and uniform I prefer that the piston of the take-up motor be re-
55 tracted by fluid-pressure, and to accomplish this I provide a port through or around the piston, said port being less in area than the inlet-port of the cylinder, whereby air under pressure shall pass the piston and by its subsequent expansion effect the return move-
60 ment of the piston of the take-up motor, and a take-up motor of the character specified in combination with and interposed between a brake motor and take-up mechanism embodies a third feature of my invention.

There are other minor features of invention, all as will hereinafter more fully appear.

I will now proceed to describe my invention more fully, so that others skilled in the art to which it appertains may apply the
70 same.

In the drawings, A indicates the back cylinder-lever; B, the front cylinder-lever; C, the tie-rod; D, the brake-cylinder, and E the triple valve of any approved form of fluid-
75 pressure brake.

For purposes of illustration the passenger system—or that wherein the front cylinder-lever is fulcrumed on the brake-cylinder—has been chosen, and said fulcrum for the
80 front cylinder-lever consists of a stirrup or fulcrum - guide 1, bolted or otherwise attached to and supported from the cylinder-head *d*, and having a longitudinal slot 2 for the passage of the front cylinder-lever B and
85 slots 3 at right angles thereto for the passage of the fulcrum-pin *b*, which may also constitute the guides of the fulcrum-block.

4 indicates the fulcrum-block in which the front cylinder-lever is pivoted, said block
90 movably arranged within the fulcrum-guide or stirrup 1, and provided or connected with a screw-rod 5, whose free end projects longitudinally through an opening in the end of the stirrup and is engaged by a ratchet-nut 6, hav-
95 ing its seat on the outer end of the stirrup or fulcrum-guide, as at 6^a, so that the rotation of the ratchet-nut will cause the endwise movement of the screw-rod 5 and the movement of the fulcrum-block 4 (and the end of front
100 cylinder-lever B) within the fulcrum-guide or stirrup 1. In the case of the well-known "freight systems" of fluid - pressure brakes this stirrup or fulcrum-guide 1 and its ad-
105 juncts will be in all respects substantially of the construction above set forth; but instead of being attached to or supported from the brake-cylinder it will commonly be a separate structure supported directly or attached directly to the body of the car. 110

F indicates the take-up motor, which, in either of the cases above noted, will be attached or supported upon the stirrup or fulcrum-guide 1, adjacent to the ratchet-nut 6 and its seat 6^a, and in case of a screw and
115 ratchet nut or equivalent take-up mechanism the length of the cylinder or stroke of its piston will be at right angles to the stirrup or fulcrum-guide 1 and screw-rod 5.

The take-up motor F, which is composed
120 of cylinder 7 and piston 8, provided with piston-rod 9, is connected with brake-cylinder D by pipe *f*, which pipe opens into the brake-cylinder D just forward of the limit of the
125 "normal" travel of the piston for the predetermined stroke thereof in applying the brakes where there is no lost motion or slack in the system from wear of brake-shoes or other cause. The piston 8 of cylinder 7 of the take-up motor F may, if desired, be the
130 usual and well-known spring-retracted piston illustrated in Fig. 5 of the drawings, but I prefer to operate the piston 8 positively in both directions by fluid-pressure, and this I

accomplish, preferably, by making a port or passage 8^a through the piston, the area of said port being less than the inlet-port of the cylinder 7 or pipe *f*, so that a leakage under pressure will take place forward or in front of the piston 8 without interfering with its regular idle or outward stroke, and the subsequent expansion of said leakage will, on the exhaust taking place, effect the return and working stroke of said piston 8.

Secured to the projecting end of piston-rod 9 of the take-up motor by an arm 10 or otherwise is a rod 11, which extends backward externally of the cylinder 7, parallel with the piston-rod 9 in the plane of the ratchet-nut 6 and through suitable ways 12 and 12^a, and said rod 11 carries a pawl 13 to operate the ratchet-nut 6. The rod 11 is of such length that when the piston-rod is at the extreme of its outward movement the end of rod 11 will be flush with way 12, and secured to pawl 13 is a link or ring 13^a, which is of such length as, when down, to rest upon and be carried by pawl 13. (See Fig. 6.) If, therefore, it is desired for any reason to disengage the pawl 13 from ratchet-nut 6—as, for instance, when reversing the rotation of the ratchet-nut 6 to reset the slack-adjuster mechanism—the pawl is raised and ring or link 13^a is hooked over the end of rod 11, which will hold the pawl 13 out of engagement with ratchet-nut 6. If, by reason of forgetfulness, the ring 13^a is not removed from rod 11 after the cause for the suspension of pawl 13 has passed, the next operation or outward movement of piston-rod 9, carrying with it rod 11, will trip ring 13^a and allow pawl 13 to drop into engagement with ratchet-nut 6, ready for service on the return movement of piston 8.

The pawl 13 may be a spring-pressed pawl, but is preferably a gravity-pawl, as shown, and pawl and ratchet-nut 6 are so arranged and constructed that the pawl shall engage and operate the ratchet-nut 6 only on the return (inward) stroke of the piston.

The construction and combination of the take-up mechanism and take-up motor being substantially as hereinbefore pointed out, it follows that when the take-up mechanism is applied to the car-body all that is necessary is to properly position it with relation to the lever whose fulcrum-block is to be controlled thereby, which can be done by unskilled labor, and that the position of the take-up motor and its alinement will be correct and will remain constant, as the motor is free from any deranging cause which does not act upon and through the stirrup or take-up mechanism.

As long as the wear of the brake-shoes or slack in the brake system is insufficient to cause the piston of the brake-cylinder D to exceed the limit of its normal travel pipe *f* will not be open to the fluid-pressure in the brake-cylinder D, and the take-up motor and take-up mechanism will remain passive, but

so soon as (by reason of wear on the brake-shoes or from other cause) the piston of brake-cylinder D exceeds its limit of normal travel the pipe *f* will be open to the fluid-pressure back of the brake-cylinder piston. The fluid-pressure entering the take-up-motor cylinder will actuate the piston thereof, projecting its piston-rod 9, carrying forward the rod 11 and attached pawl 13, which will move idly over the teeth of the ratchet-nut 6, and so remain until the brakes are released.

When the brakes are released, and after the pressure in brake-cylinder D has fallen sufficiently to take the pressure from the brakes and permit the piston of the brake-cylinder to recede (or move inward) sufficient to uncover the port of pipe *f*, the take-up motor will exhaust through pipe *f*, brake-cylinder D, and the piston-rod opening, and the piston of the take-up motor will in its return movement, through the medium of rod 11 and pawl 13, turn the ratchet-nut 6, and thus shift the fulcrum-block 4 on the release of the brakes, or, in other words, at a time when the pressure is off the brake-gear, and the strain is off the take-up mechanism there is the least frictional resistance, and the minimum of power is required to effect the movement of the fulcrum-block and adjustment of the brake mechanism.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a brake-adjuster, the combination with a lever having a movable fulcrum, of a take-up mechanism for shifting said fulcrum, a support for the movable fulcrum and take-up mechanism, and a take-up motor mounted on the support of the take-up mechanism; substantially as and for the purposes specified.

2. In a brake-adjuster, the combination with a fulcrum-guide or stirrup having a movable fulcrum-block arranged therein, of a motor supported by or on the stirrup, and interposed mechanism for actuating the fulcrum-block from the motor; substantially as and for the purposes specified.

3. In a brake system, the combination with the cylinder-levers thereof, of a brake-cylinder, a stirrup or fulcrum-guide supported on or by the brake-cylinder, a fulcrum-block arranged in the stirrup or fulcrum-guide, a take-up motor supported on or by the stirrup or fulcrum-guide, and mechanism interposed between the take-up motor and fulcrum-block for actuating the fulcrum-block from the motor; substantially as and for the purposes specified.

4. In a brake-adjuster, the combination with a lever having a movable fulcrum, of a take-up mechanism for shifting said fulcrum, a cylinder and piston take-up motor for operating said take-up mechanism, and ratchet mechanism interposed between the take-up mechanism and take-up motor and arranged

to be actuated by the inward stroke of the piston of the take-up motor; substantially as and for the purposes specified.

5 In a brake-adjuster, the combination with the take-up mechanism, of a take-up motor having a piston, a pawl-rod parallel with the piston-rod and coupled thereto, and a pawl carried by the pawl-rod and arranged to actuate the take-up mechanism on the inward stroke of the piston of the motor; substantially as and for the purposes specified.

6 In a brake-adjuster mechanism, the combination with a screw and ratchet nut and pawl mechanism for adjusting the fulcrum-block, of a ring or link for supporting the pawl out of engagement with the ratchet-nut during the readjustment of the fulcrum-block, substantially as and for the purposes specified.

20 7. In brake-adjuster mechanism having a screw, a pawl-and-ratchet mechanism, and a

take-up motor, the combination therewith of a reciprocating pawl-rod movable in ways, and a ring or link for suspending the pawl from the pawl-rod, whereby the pawl may be 25 suspended by the link and tripped by the reciprocation of the pawl-rod, substantially as and for the purposes specified.

8. In a fluid-pressure brake system the combination with a take-up device and a brake 30 motor, of an intermediate fluid-pressure take-up motor, having a piston provided with a leakage-port whose area is less than the inlet-port of the cylinder; substantially as and for the purposes specified. 35

In testimony whereof I affix my signature, in presence of two witnesses, this 9th day of May, 1896.

JOHN K. LENCKE.

Witnesses:

FREDERICK GRAY,
F. W. RITTER, Jr.