G. WESTINGHOUSE, Jr.

Slack Taking-up Apparatus for Steam and Air-Brakes.

No. 144,582. Patented Nov: 11, 1873.

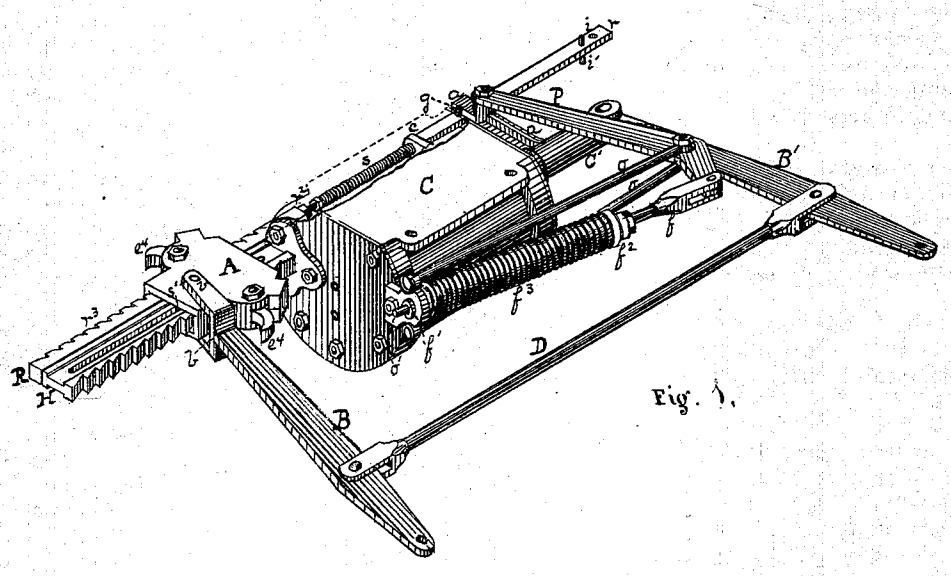

Fig. 1.

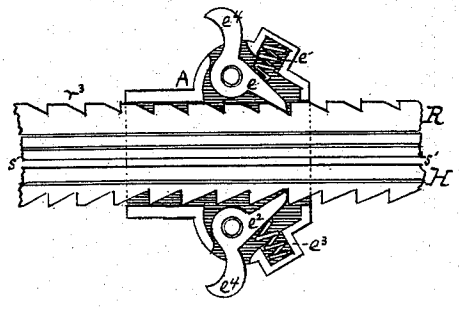

Fig. 2.

Witnesses
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Inventor George Westinghouse Jr.
by Bakewell, Clinsly & Kerr,
his Attys.

UNITED STATES PATENT OFFICE.

GEORGE WESTINGHOUSE, JR., OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN SLACK-TAKING-UP APPARATUS FOR STEAM AND AIR BRAKES.

Specification forming part of Letters Patent No. **144,582**, dated November 11, 1873; application filed September 27, 1873.

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, Jr., of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Taking-Up Apparatus in Railroad-Car Brakes; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a view in perspective from the upper side of my improved apparatus; and Fig. 2 is a sectional view of the ratchet device employed therein.

Like letters of reference indicate like parts in each.

My present invention relates to certain improvements in the taking-up apparatus described in Letters Patent granted to me December 24, 1872, No. 134,178; and the nature of it consists in certain improvements in the details of construction, substantially as hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and manner of operation.

The brake-cylinder C with its piston and stem C′, the brake-levers B B′, tie-bar D, ratchet-box A, ratchet-bars R and H, pawls e e^2, springs e^1 e^3, racks r^3, spring s, bracket c, shoulder r^2, stem r, holes i, and stop-pin i', except as hereinafter noted, are substantially the same in construction and operation as the corresponding parts similarly lettered in the patent above referred to. But, in my present improvement, instead of causing the extended end of the lever B′ to play on the stem r, I attach an arm, a, rigidly to the piston-stem C′, and let it, by a box, mortise, slot, or bifurcation, play on the stem r, and, as the piston moves out and in while the brakes are being operated, come against (when sufficient slack has accumulated to be taken up) the stop-pin i', and back against the stop-pin g in the same manner. Also, instead of pivoting the lever B to the outer edge of the ratchet-box A, I bifurcate it, as at b, pass the bifurcated end up to or toward the middle of the box, and there attach it by a pivoting-pin, v, which, in order that it may not interfere with the operation indicated, plays in a slot, s', which extends longitudinally along one or between the two ratchet-bars R H. I also make use of a bent lever, p, pivoted at the extremity of the longer end to the arm a, fulcrumed at or near the angle or bend by the rods o to brackets o', and with a stem, f, pivoted to the extremity of the shorter end, which stem f passes freely through a guide, f^1, and by a shoulder, f^2, has a bearing against a spiral spring, f^3, the elasticity of which operates against such shoulder at one end and the guide f^1 at the other.

When the brake-shoes are properly adjusted, the levers and rods should be so proportioned that the piston in the brake-cylinder C will have a travel of about ten inches, when the brakes are applied with the greatest power. In the movement of the piston C′ the arm a attached thereto slides freely on the stem r of the bar R. At a point not inside of the extremity of its longest motion a stop or pin, i', is inserted in one of the holes of the stem r, and a like pin or stop, g, is inserted just back of the position which the arm a occupies when the brakes are fully released. Then the arm a will, in the operation of the brake, slide back and forth between these stops or pins. As the shoes wear away by friction, or as the levers spring or bend, the piston-stem C′, and with it the arm a, will necessarily have a longer travel, and hence, with each outward thrust, will engage the stop or pin i', and thereby shift the bar R in the same direction, and, in doing so, compress the spring s. When the length of increased travel thus occasioned is equal to the distance between two of the notches of the rack r^3, the bar will be shifted one notch to the right, and the pawl e will engage the next tooth. When the brakes are released and the piston-stem C′ travels back, the elasticity of the spring s forces the bar R to the left, and, by means of the pawl e, carries with it the box A an equal distance to the left, and causes the pawl e^2 to shift its position to the next notch in the ratchet-bar H, and thereby increases the distance between the pivoting-points of the levers B B′, and draws the opposite ends of the levers which are attached to the brake-rods so much nearer together. In this way the pivoting-points of

the brake-levers relatively to each other are shifted to an amount such that the brake-shoes will have the same position relative to the wheels as when first adjusted, and the slack motion, caused by the wearing away of brake-shoes, cannot at any one time be greater than the distance between two adjacent notches of the ratchet-bar, which is an inch and a quarter, representing about three-thirty-seconds of an inch to each shoe. As the arm *a* comes back, it strikes the pin *g* and assists the spring *s* in shifting the position of the bar R, in the manner above described, and this operation is further facilitated by means of the lever *p*.

When the brakes are released, the spring f^3, acting on well-known principles, at first imparts a rapid reverse motion to the piston and its stem C′, so as to release the brake-shoes quickly; and it also brings the arm *a* with more force against the pin *g*, and thereby effects the readjustment, or the taking up of the slack motion with greater certainty.

It will be observed that the lever *p* is bent, and that, as the piston-stem C′ comes back, the spring f^3, though weaker toward the latter end of the backward stroke, still acts more nearly at a right angle to the shorter arm of the lever, and consequently with greater force, so as to be most efficient at the conclusion of the reverse stroke of the piston, at which time there is little or no co-operation of other agencies in effecting this reverse movement.

In this apparatus no adjustment of the brake-shoes is required, except that which is made when they are put on new.

For convenience in effecting a readjustment when the brake-shoes are renewed, I extend the pawls, by their stems c^4, outside the box A, so that the pawls may be thrown out of gear with their racks by the hand of the operator.

Other suitable means for communicating motion from the piston-stem C′ to the longer arm of the lever *p* may be substituted for the connection shown, the operation remaining substantially the same.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The arm *a*, fixedly connected with the piston-stem *c′*, in combination with the ratchet-bar R and lever *p*, substantially as set forth.

2. The lever *p*, with a suitable connection from its longer arm to or with the piston-stem C′, in combination with the rods *o o*, stem *f*, and spring f^3, substantially as set forth.

3. The bifurcated brake-lever B, pivoted to the box A, in combination with the slot *s′* in the ratchet-bar, arranged substantially as described.

In testimony whereof I, the said GEORGE WESTINGHOUSE, Jr., have hereunto set my hand.

GEORGE WESTINGHOUSE, Jr.

Witnesses:

T. B. KERR,

G. H. CHRISTY.