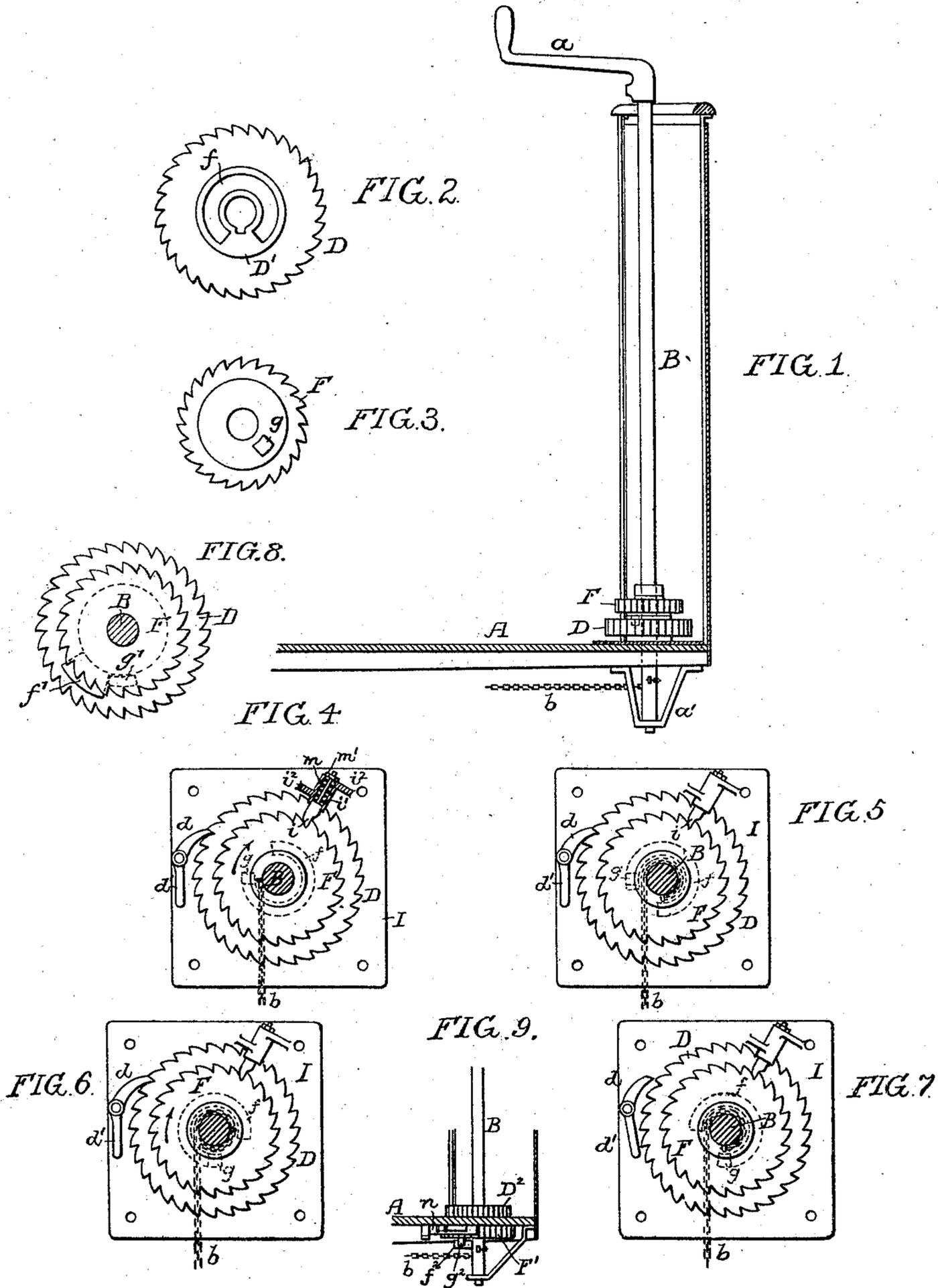


(No Model.)

C. LINDSTRÖM.  
SLACK ADJUSTER.

No. 545,860.

Patented Sept. 3, 1895.



Witnesses:  
Will. A. Bann  
J. D. Goodwin

Inventor:  
Charles Lindström  
by his Attorneys  
Howman & Howman

# UNITED STATES PATENT OFFICE.

CHARLES LINDSTRÖM, OF ALTOONA, ASSIGNOR OF ONE-HALF TO MARY R. LOUGHRIDGE, OF PHILADELPHIA, PENNSYLVANIA.

## SLACK-ADJUSTER.

SPECIFICATION forming part of Letters Patent No. 545,860, dated September 3, 1895.

Application filed June 10, 1895. Serial No. 552,250. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES LINDSTRÖM, a citizen of the United States, and a resident of Altoona, Pennsylvania, have invented certain Improvements in Slack-Adjusters for Railway-Car Brakes, of which the following is a specification.

My invention relates especially to hand-operated brakes—such, for instance, as those of street-cars—the object of my invention being to provide simple and efficient means for taking up the slack in the braking mechanism due to wear of the brake-shoes or other causes, so that the brakes can always be applied with full force by a partial turn of the brake-handle.

This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section of sufficient of a street-car to illustrate my invention. Fig. 2 is a plan or top view of a retaining ratchet-wheel forming part of the device. Fig. 3 is an inverted plan or bottom view of a stop-wheel which operates in conjunction with said retaining-wheel. Figs. 4, 5, 6, and 7 are diagrams illustrating the operation of the mechanism, and Figs. 8 and 9 are views illustrating modifications of the invention.

A represents part of the platform of a car, and B the usual vertical brake-shaft having a wheel or handle *a* at the upper end, said brake-shaft passing through the platform and being supported below the same in a suitable bearing *a'*, that portion of the shaft below the platform constituting a winch upon which can be wound the chain *b*, which is intended to be attached to braking mechanism of any ordinary character, the brakes being applied by winding up this chain upon the winch and released by the unwinding of the same.

Secured to the shaft B, above the platform A, is a ratchet-wheel D, which can be engaged by a pawl *d*, so as to retain the shaft in position when the chain *b* has been wound up and the brakes are applied, the pawl having an arm *d'*, so that it can be readily tripped by the foot of the motorman or driver when it is desired to release the brakes, this being the usual construction. On the top of the wheel D, however, is in the present instance a projection or boss *D'*, in which is formed a segmental re-

cess *f*, and loosely mounted on the brake-shaft, above the wheel D, is a second ratchet-wheel F, which has on the under side a projecting lug or tooth *g*, adapted to enter the segmental slot *f* of the wheel D. The teeth of both wheels D and F face in the same direction; but the wheel F is at all times prevented from turning backward by means of a spring-pawl *i*, which can slide radially in a box *i'*, suitably supported upon the base-plate I and properly braced against distortion by means of supporting-brackets *i<sup>2</sup>*, one of which projects laterally in one direction from the box near one end of the same, while the other projects laterally in the opposite direction from the box, near the opposite end of the same. The pawl *i* is projected by means of a spring *m*, contained in the box and coiled around the stem of the pawl, the projection of said pawl being limited by a nut *m'*, applied to the rear end of the stem.

The operation of the parts will be understood on reference to Figs. 4, 5, 6, and 7.

The normal position of the parts is that represented in Fig. 4, the brakes being off and the lug *g* of the stop-wheel F being in contact with the shoulder formed by the front end of the slot or recess *f* of the wheel D.

In order to apply the brakes, the shaft B is turned in the direction of the arrow, Fig. 4, and when the brake-shoes are new and there is a minimum amount of slack in the braking-gear the brakes will be applied with a slight wind of the chain upon the lower end of the brake-shaft, the movement not being in excess of that permitted by the slot *f*, so that the shoulder formed at the rear end of said slot does not come in contact with the lug *g*, and there is consequently no forward movement of the ratchet-wheel F. (See Fig. 5.) When, however, the brake-shoes become worn or there is slack due to stretching or loosening of other parts of the braking-gear, the shaft B will, before the shoes are applied to the wheels, be turned to such an extent that the shoulder at the rear end of the slot *f* will come in contact with the lug *g* of the wheel F, and will consequently turn the latter forward to the extent of one or more teeth, depending upon the amount of slack. As the pawl *i* prevents any back movement of the wheel F, it follows that when the brake is released the

shaft B can turn backward only through that fraction of a complete turn which is represented by the segmental slot  $f$ —that is to say, the wheel D can turn backward only far enough to bring the shoulder at the front end of its slot  $f$  into contact with the lug  $g$ . The excess of chain wound on the brake-shaft during the forward movement and represented by the forward movement of the ratchet-wheel F to the extent of one or more teeth will, therefore, remain permanently wound on the shaft B. Consequently there will be a taking up of the slack in the braking mechanism to the extent of this permanently-wound chain, the latter being added to as slack is again formed, and further forward movement of the ratchet-wheel F is permitted. Hence a movement of the brake-handle to the extent of a fractional turn will always be sufficient to apply the brakes with full force.

The operation of taking up the slack chain will be understood on reference to Figs. 6 and 7, Fig. 6 showing the chain wound on the brake-shaft to the extent of both the normal wind and the excess, while Fig. 7 shows the brakes released, the normal wind of the chain delivered, and the excess remaining permanently wound on the brake-shaft.

The extent of the fractional turn of the brake-handle necessary to apply the brakes may be three-quarters, two-thirds, one-half, or other fraction of a full turn, as desired, depending upon the length of the segmental slot  $f$ .

Instead of providing the wheel D with a segmental slot for the reception of a lug on the wheel F, both wheels may have lugs adapted to engage one with the other—as shown, for instance, at  $f'$   $g'$ , Fig. 8—the amount of free motion of the wheel D in this case being dependent upon the size of the lugs.

While I prefer in carrying out my invention to employ the co-operating ratchet-wheels in the manner which I have described, other constructions within the scope of my invention can readily be devised. For instance, in Fig. 9 I have illustrated a construction in which the ordinary retaining ratchet-wheel  $D^2$  above the platform is used and in which there is loosely mounted on the brake-shaft below the platform a ratchet-wheel  $F'$ , prevented from moving backward by means of a suitable pawl  $n$ , this ratchet-wheel having on the under side a projecting lug  $g^2$ , which is struck and moved forward by an arm  $f^2$  on the brake-shaft when any movement of the same beyond the normal is permitted, thereby effecting a permanent winding of the excess chain upon the shaft in the same manner as before.

In this construction the retaining ratchet-wheel  $D^2$  does not aid in the taking up of the slack, but simply performs its usual function of a retainer to prevent loosening of the brakes after they have been set. Hence it will be apparent that so far as concerns the main combination constituting my invention the

retaining ratchet-wheel may be omitted altogether. In order to slacken the chain for the application of new brake-shoes or for other purposes, it is only necessary to withdraw the pawl  $i$  from engagement with the teeth of the wheel F, so as to permit the latter to turn backward.

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

1. The combination of the shaft upon which the brake chain or other connection is wound to apply the brake, a stop adjustable around the axis of the shaft and serving to limit the backward movement of said shaft, and provision for engaging the shaft with said stop, but permitting a certain amount of forward motion of the shaft independently of the stop.

2. The combination of the shaft upon which the brake chain or other connection is wound to apply the brakes, a ratchet wheel free to move forward with the shaft and carrying a stop lug, a pawl for preventing back movement of said ratchet, and provision whereby the brake shaft is caused to engage with said stop lug, but has a certain amount of forward movement independently thereof.

3. The combination of the shaft upon which the brake chain or other connection is wound to apply the brake, a retaining ratchet and pawl to hold said shaft in position when the brakes are set, an adjustable stop for limiting the backward movement of said brake shaft and a lug whereby the brake shaft is caused to engage said stop so as to permit a certain amount of independent forward movement, substantially as specified.

4. The combination of the shaft upon which the brake chain or other connection is wound to apply the brakes, a ratchet and pawl for retaining the brake shaft in position when the brakes are set, said ratchet wheel having a shoulder, a ratchet wheel loosely mounted on the brake shaft and having a lug engaging with said shoulder, and a pawl for preventing back movement of said loose ratchet wheel, substantially as specified.

5. The combination of the brake shaft and its fixed and loose ratchet wheels having portions adapted to engage with each other as described, whereby a forward movement of the brake winch and fixed ratchet to a limited extent independently of the loose ratchet is permitted with the engaging pawl for said loose wheel, and a box or casing carrying said pawl and having oppositely projecting brackets, one near each end, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES LINDSTRÖM.

Witnesses:

FRANK E. BECHTOLD,  
WILL. A. BARR.