

905,444.

2 SHEETS—SHEET 1.



*Inventor.*  
Edward Sydney Sears  
By Whitaker & Treva *Attys.*

E. S. LUARD.  
BRAKE MECHANISM FOR RAILWAY AND LIKE VEHICLES.  
APPLICATION FILED JULY 6, 1908.

905,444.

Patented Dec. 1, 1908.  
2 SHEETS—SHEET 2.

Fig. 2.

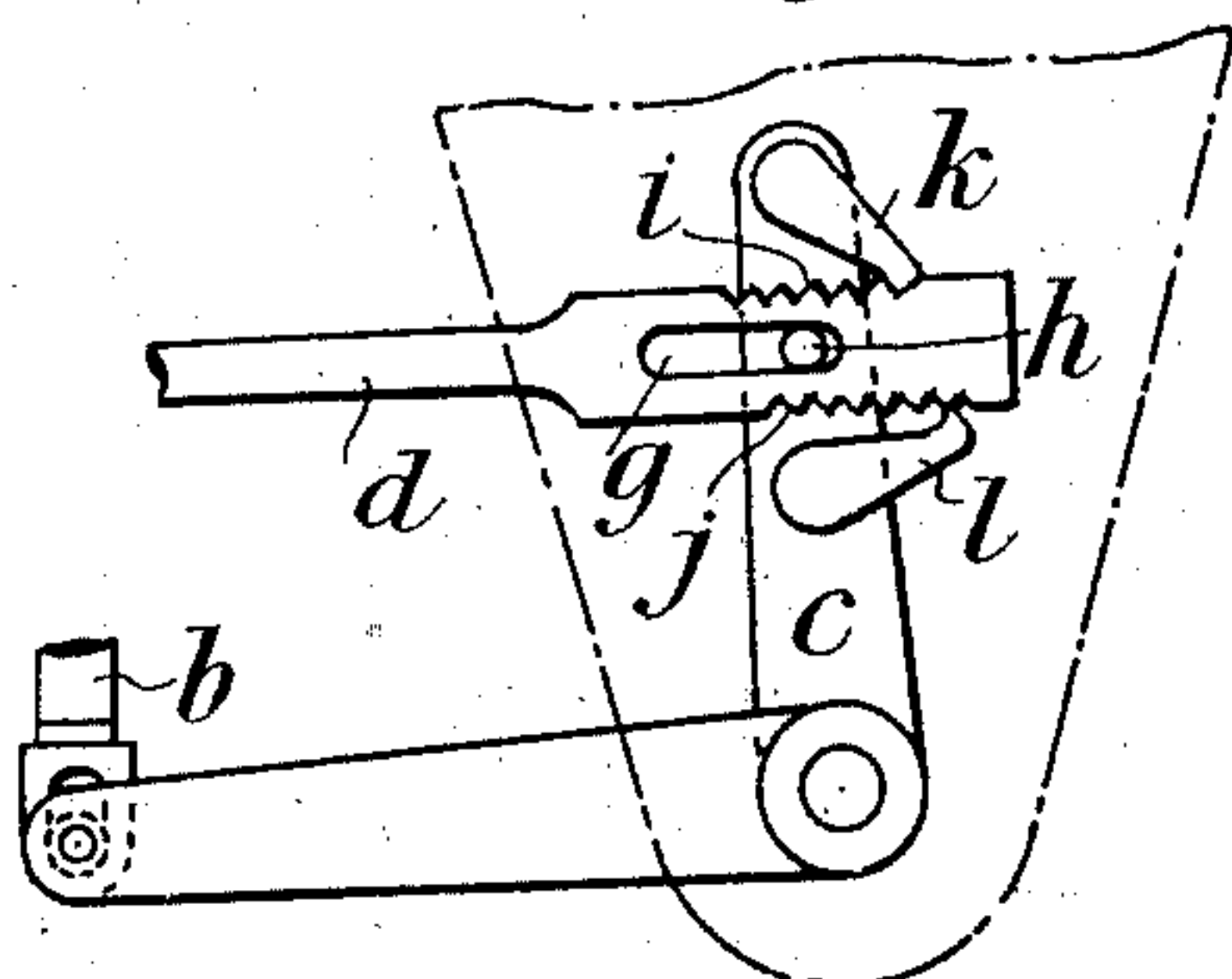


Fig. 3.

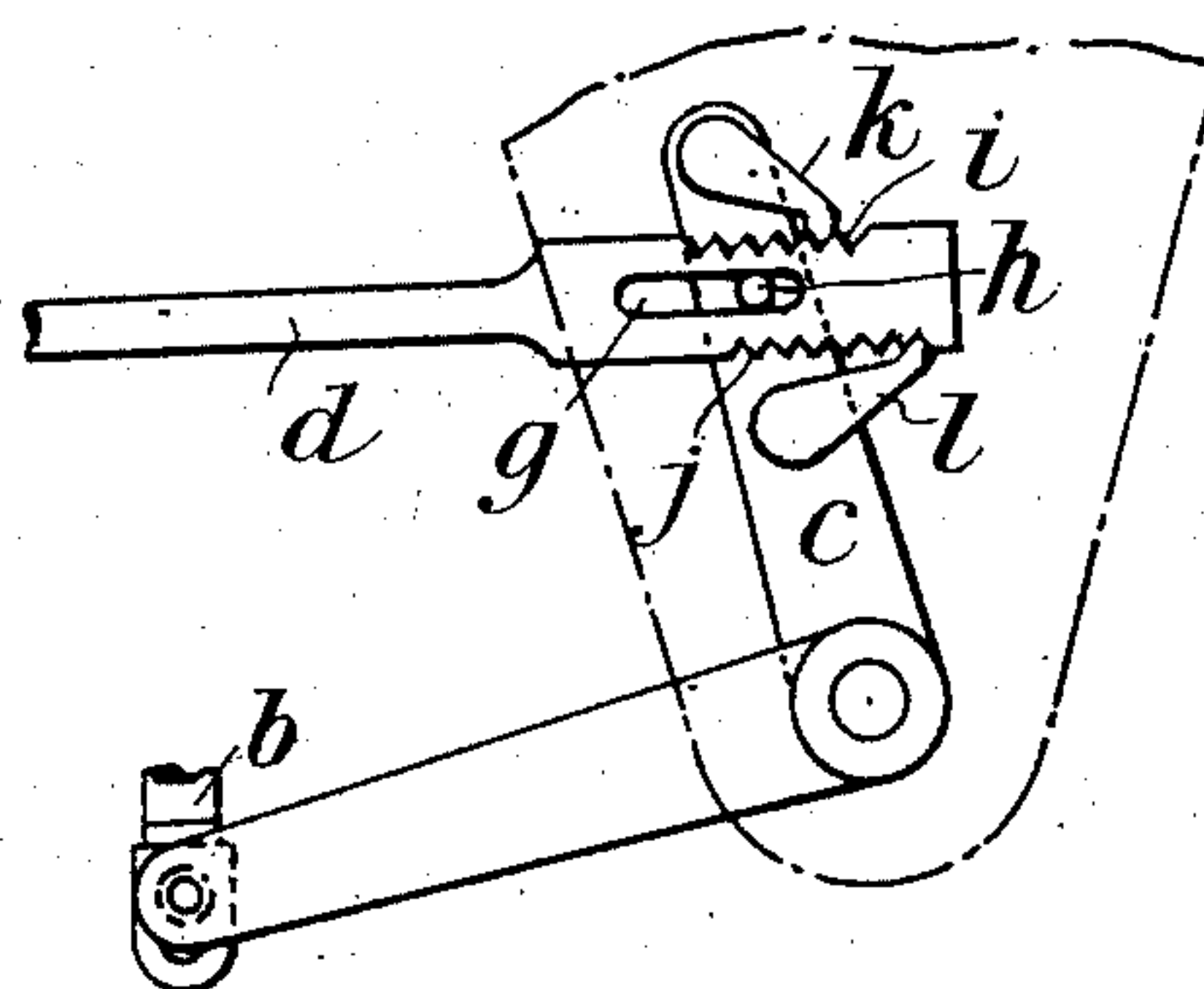


Fig. 5.

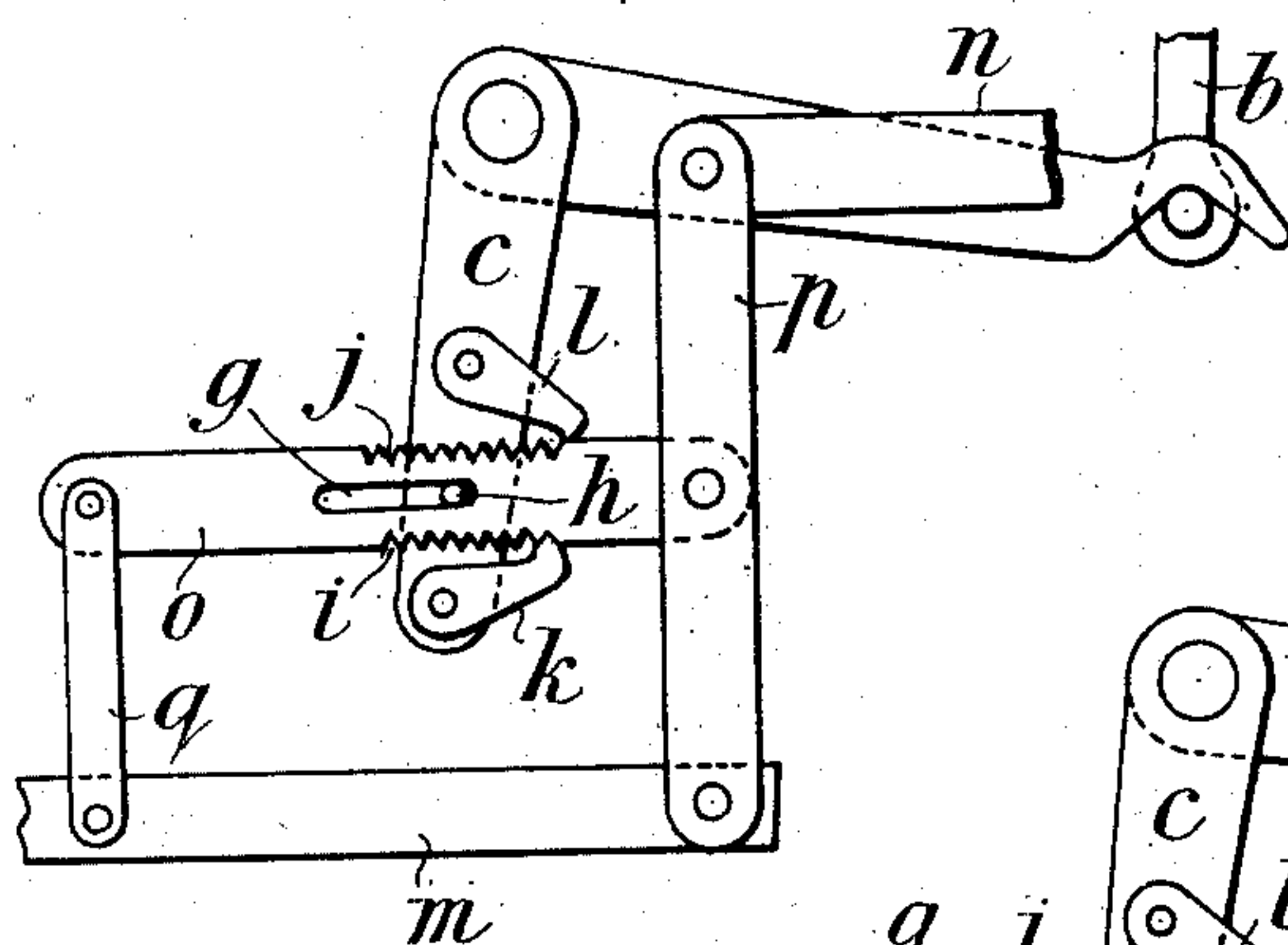
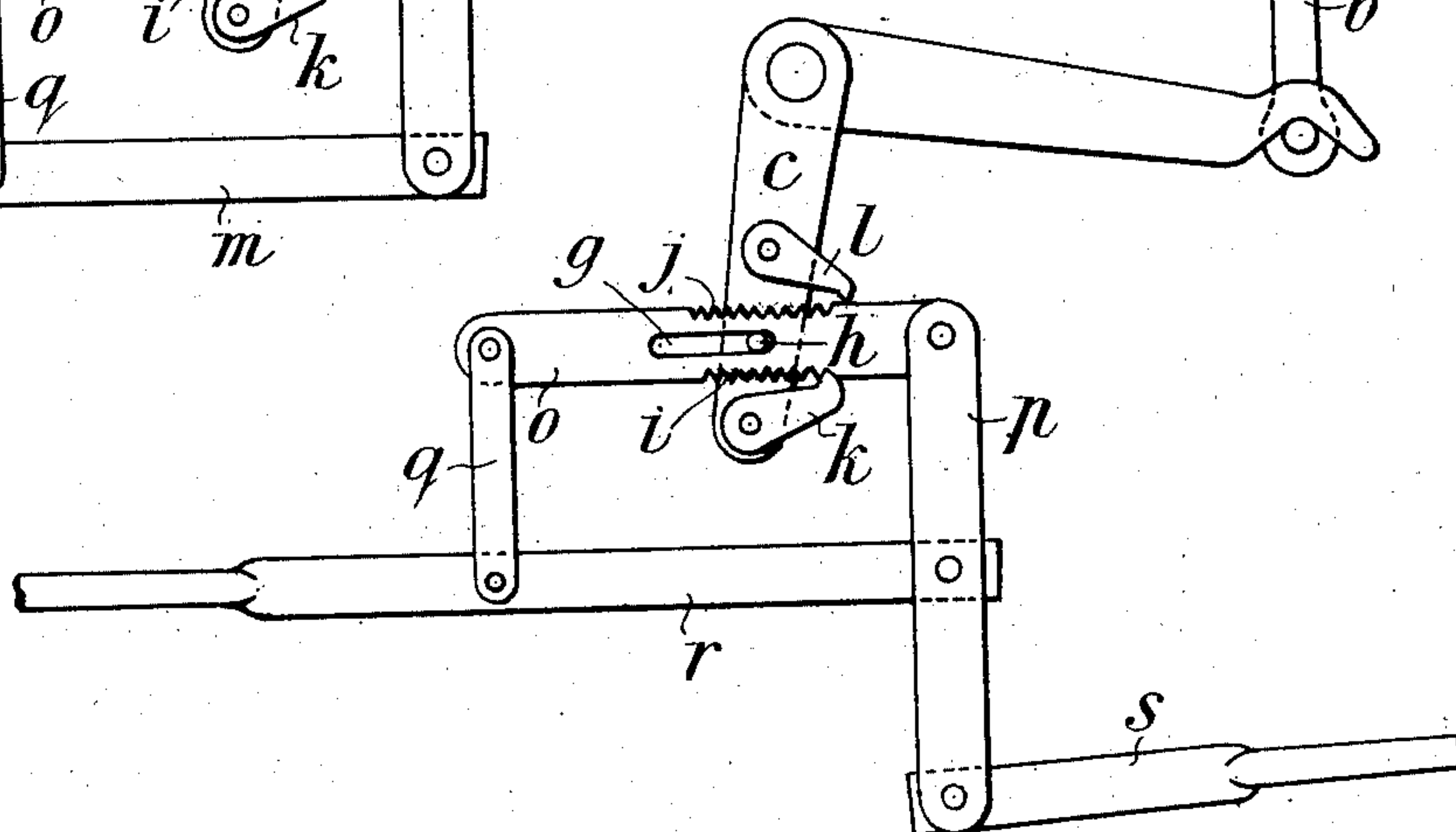
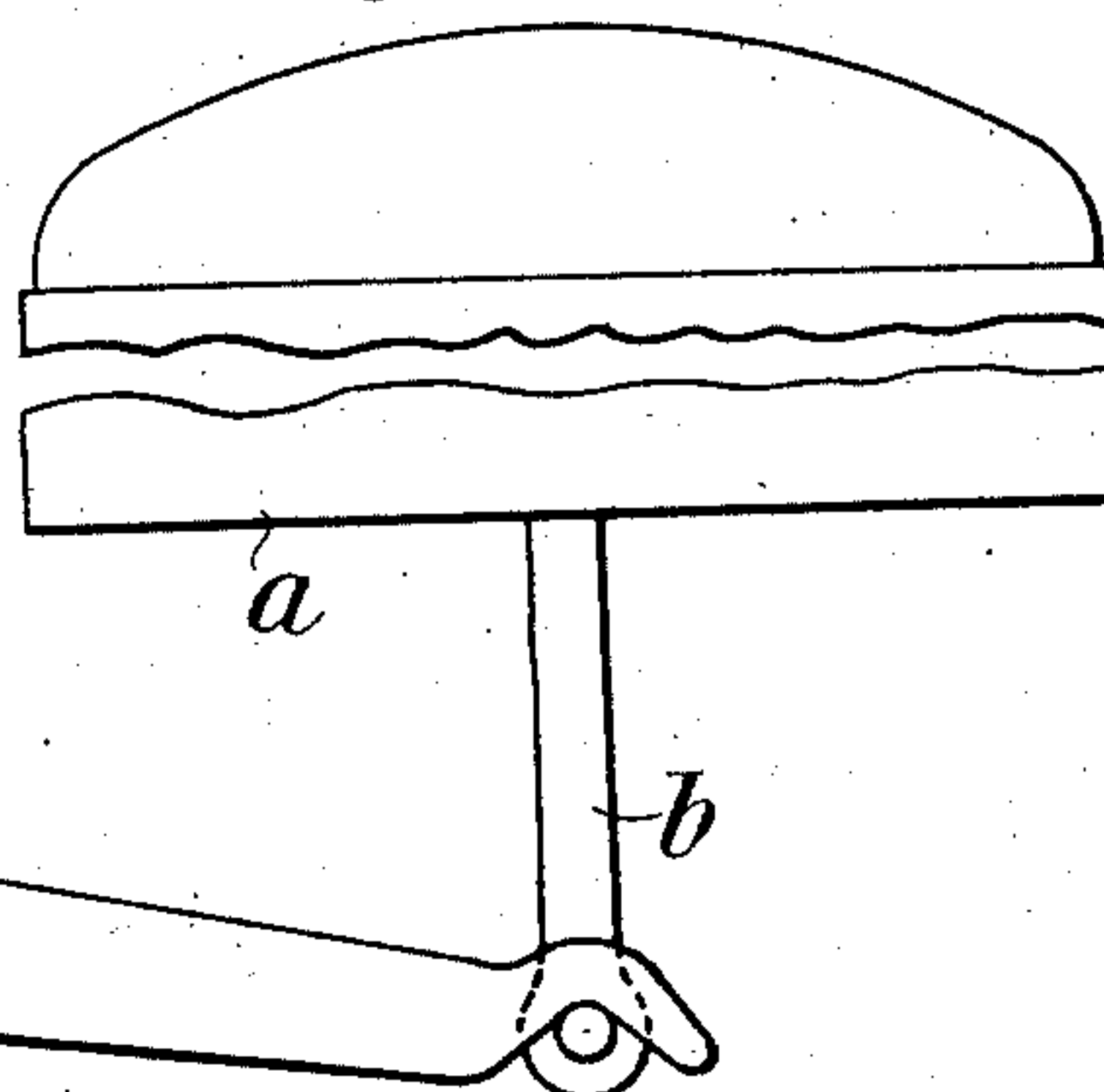


Fig. 4.



Witnesses:  
J. K. Moore  
R. E. Barry.

Inventor:  
Edward Sydney Luard  
By Whitaker & Trevellick Attys.



# UNITED STATES PATENT OFFICE.

EDWARD SYDNEY LUARD, OF LONDON, ENGLAND, ASSIGNOR OF ONE-HALF TO THE CONSOLIDATED BRAKE AND ENGINEERING COMPANY, LIMITED, OF LONDON, ENGLAND.

## BRAKE MECHANISM FOR RAILWAY AND LIKE VEHICLES.

No. 905,444.

Specification of Letters Patent.

Patented Dec. 1, 1908.

Application filed July 6, 1908. Serial No. 442,201.

*To all whom it may concern:*

Be it known that I, EDWARD SYDNEY LUARD, a subject of the King of Great Britain, residing at Spencer House, South Place, London, England, have invented new and useful Improvements in Brake Mechanism for Railway and Like Vehicles, of which the following is a specification.

This invention relates to improvements in brake mechanism for use in connection with railway and like vehicles and consists in the provision of improved means for taking up or compensating for wear of the working parts.

According to the invention the push or pull-rod by means of which the brake-blocks are actuated either in hand brake mechanism, vacuum or atmospheric brake mechanism or pressure brake mechanism in lieu of being hinged to the oscillating crank arm in the case of the vacuum brake and to the brake-block arm or lever in both types of brake, is formed at its end with ratchet teeth on its upper and lower faces. With these two racks there engage respectively a pawl and a detent, the said pawl and detent being held in engagement with their respective ratchet teeth by means of gravity or by springs.

The pawl and detent are pivotally mounted upon the aforesaid arm, so that motion is transmitted to or from the pull-rod through the medium of the pawl. Or, the double rack may be fitted or formed upon any other suitable part of the brake mechanism. With this arrangement when the wear of the brake-blocks or of the other connecting parts of the brake mechanism in course of time causes the movement of the pull-rod necessary for applying the brakes to be increased by an amount equal to the pitch of the teeth of the rack then the detent springs forward one tooth in its rack and consequently causes the pawl on the return movement of the pull-rod also to engage with the next adjacent tooth, thus reducing the future stroke of the push or pull-rod by a length equal to the pitch of the teeth of the rack with which it engages.

To enable the invention to be fully understood it will now be described by reference to the accompanying drawing, in which:—

Figure 1 is a side elevation of vacuum brake gear having the improvements applied thereto, the gear being shown with the brake-blocks not applied. Figs. 2 and 3 are two

views illustrating the method in which the slack is taken up as the brake-blocks become worn, and Figs. 4 and 5 are views illustrating a modification of the invention in which the double rack is formed upon a separate link or rod.

Referring first to the construction illustrated in Fig. 1 *a* represents the brake cylinder and *b* the piston rod thereof, the said rod actuating the oscillating crank arm *c* in the usual way.

*d* is the pull-rod which is actuated by the crank arm *c* so as to apply the brake blocks *e, e* through the medium of the lever and link mechanism *f, f'*. The end of the pull-rod *d* is formed with a slot *g* which engages a pin *h* upon the crank-arm *c* and the said end is formed on its upper face with the ratchet teeth *i* and on its lower face with ratchet teeth *j*. With the teeth *i* there engages a pawl *k* pivoted to the free end of the crank-arm *c* and with the ratchet teeth *j* there engages the detent *l* also pivoted to the said crank-arm *c*.

The pawl *k* and detent *l* are held in engagement with the ratchet teeth *i* and *j* respectively either by gravity or by springs.

The gear operates as follows, that is to say, when the brakes are off the parts are in the position shown in Fig. 1. Assuming the brakes to be applied the piston rod *b* is raised, thus causing the crank-arm *c* to move in the direction of the arrow and by the engagement of the pawl *k* with the ratchet teeth *i* draws the pull-rod *d* backwards until the brake-blocks *e, e* are applied. The brake blocks are released from the wheels in the usual way when the vacuum is again re-established in the cylinder *a*. Should, however, the brake-blocks *e* become worn then the pull-rod *d*, when the brakes are applied, must be caused to travel a greater distance in order to apply the brakes. In this case when the wear has attained an extent which is determined by the pitch of the teeth of the ratchet *j* the detent *l* on the completion of the movement of the pull-rod *d* springs forward one tooth, as shown in Fig. 2, in its rack *j* so that it thereby causes the pawl *k* on the return movement of the pull-rod *d* also to engage with the next tooth, as shown in Fig. 3, which represents the position of the parts when the brakes are off and with the slack due to the wear of the brake-blocks taken off. By this means it will be obvious



that any wear which may take place upon the brake-blocks is automatically compensated for by the automatic adjustment of the pawl  $k$  relatively with the ratchet teeth  $i$  as such wear takes place.

It will be obvious that the double rack  $i$  and  $j$  may be formed upon the other end of the pull-rod  $d$  or upon any other element of the link mechanism such for example as the rod  $f'$ .

In Fig. 4 the invention is illustrated as applied to brake gear in which the two racks  $i$  and  $j$  are made upon a link  $o$  instead of upon the end of the pull-rod as hereinbefore described, the said link  $o$  being secured to the pull-rod  $m$  and push-rod  $n$  by means of the usual adjusting link  $p$  at one end and at the other end to the rod  $m$  by means of the parallel link  $q$ , the object of which is to cause the two rods  $m$  and  $n$  to move in an approximately parallel path. The action of this gear is in principle the same as that hereinbefore described.

Fig. 5 shows gear of the kind illustrated in Fig. 4 but wherein the brakes are controlled by pull-rods  $r$  and  $s$ , the action of the mechanism being otherwise the same.

In order that the pawl and detent shall not at any time become disengaged from their racks so as to permit of the said pawls

slipping over the teeth, the said pawl and detent may be connected by means of a telescopic or collapsible link, the extreme length of which is limited and is such that the pawl and detent lock with their racks should there be a tendency for such a slipping action to take place owing, for example, to the sticking of the brake-block gear.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

In a brake mechanism of the kind described, the combination with the brake blocks, the pull or push rod therefor and a part connected with said rod provided with ratchet teeth on opposite faces, of an oscillating crank arm provided with a pawl and a detent, pivoted thereto on opposite sides of said part and engaging the ratchet teeth thereof, and operating mechanism connected with said crank arm for actuating said pull or push rod to apply and release the brake, whereby the wear of the brake blocks is automatically taken up, substantially as described.

EDWARD SYDNEY LUARD.

Witnesses:

A. ALBUTT,  
A. HARDING.