No. 673,209. Patented Apr. 30. 1901.

F. J. LINGEMANN.

BRAKE.

(Application filed July 13, 1900.)

(No Model.) 3 Sheets—Sheet 1.

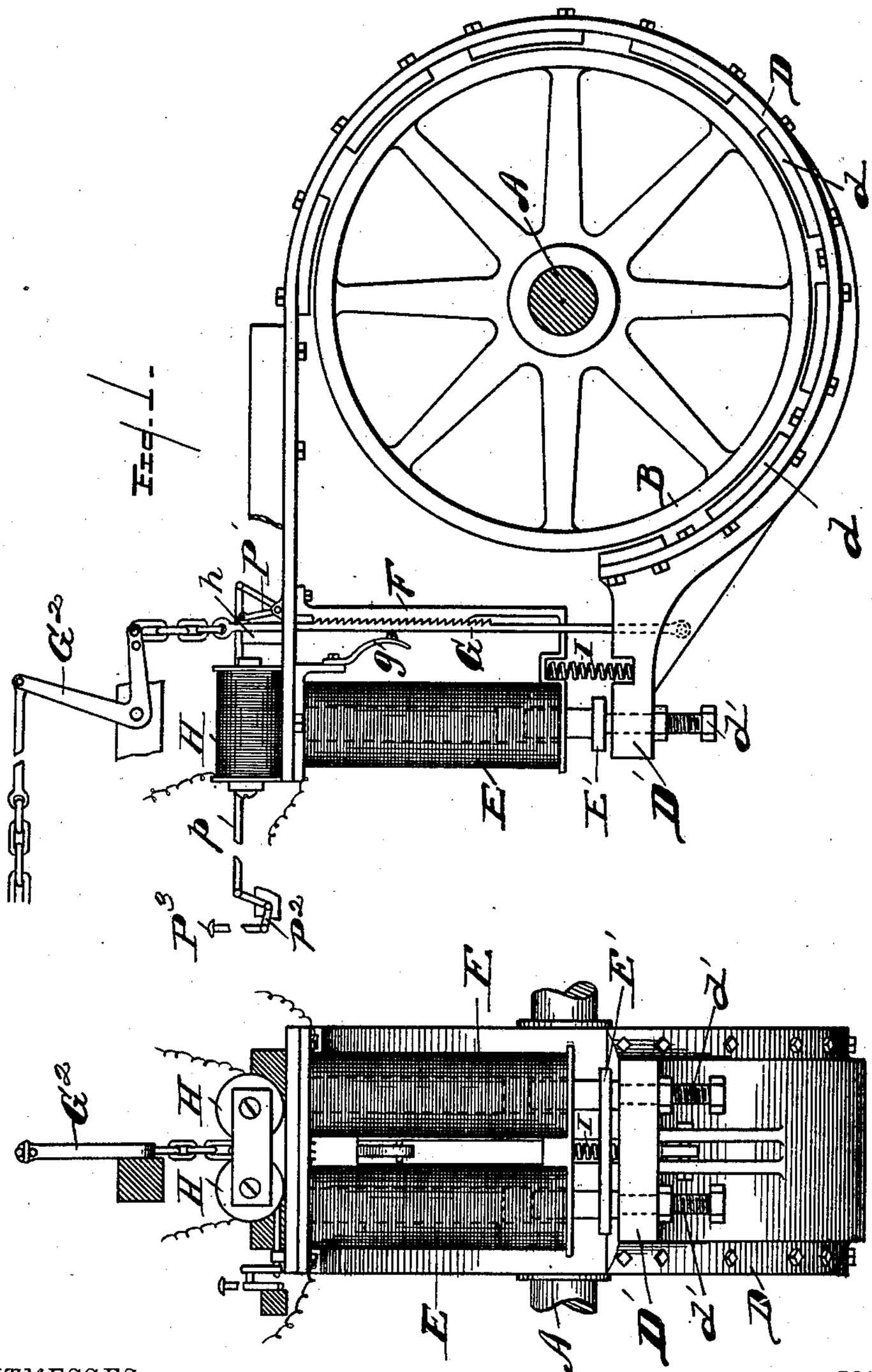


Fig. 1.

Fig. 2.

WITNESSES:

Frank L. Ower.

Irene Gilbert

INVENTOR.

Frank J. Lingemann

By Fisk & Thomas

Attorneys.

No. 673,209. Patented Apr. 30, 1901.

F. J. LINGEMANN.

BRAKE.

(Application filed July 13, 1900.)

(No Model.) 3 Sheets—Sheet 2.

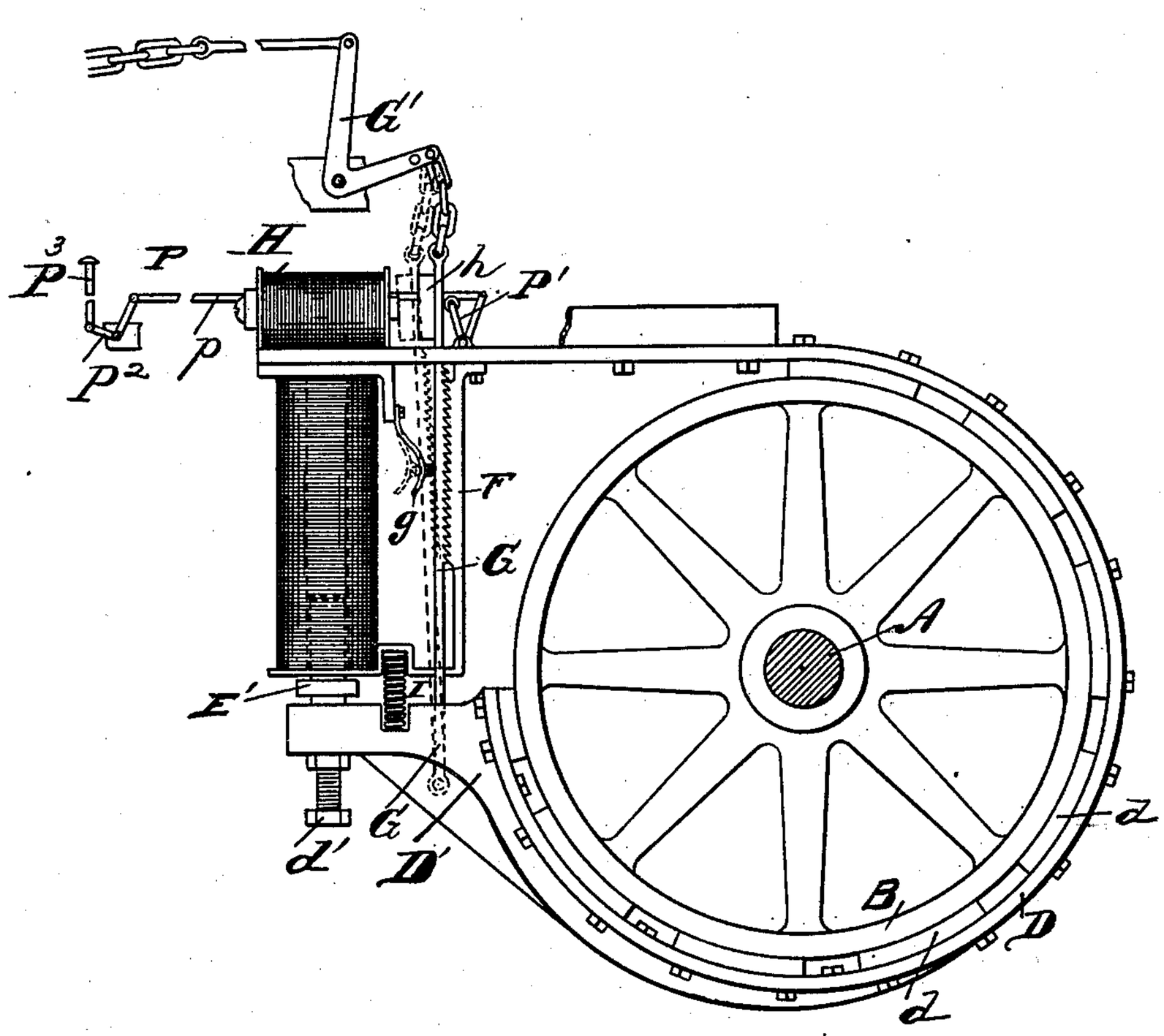


Fig. 3.

WITNESSES.

Frank A. Howe.

Irene Gilbert

INVENTOR.

Frank J. Lingemann

By Fisk & Thomas

Attorneys.

No. 673,209. Patented Apr. 30, 1901.

F. J. LINGEMANN.

BRAKE.

(No Model.) (Application filed July 13, 1900.) 3 Sheets—Sheet 3.

Fig. 4.

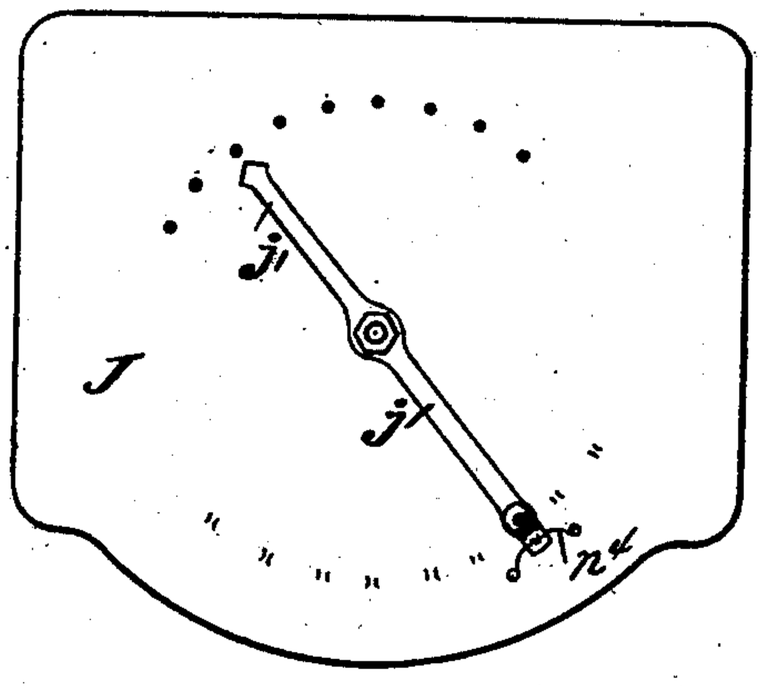
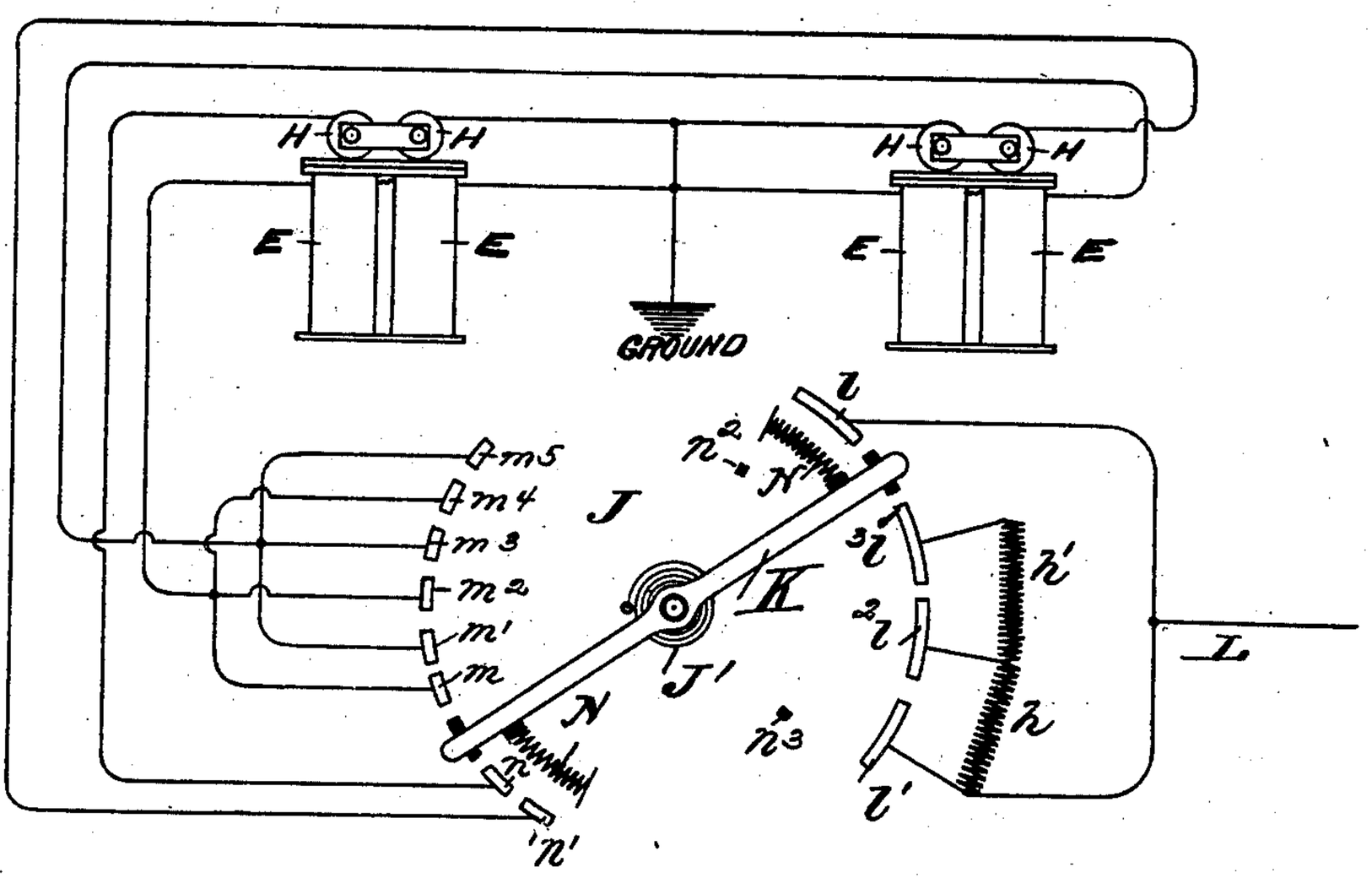


Fig. 5.



WITNESSES.

Frank L. Ower.

Irene Gilbert

INVENTOR.

Frank J. Lingemann

By Fisk & Thomas

Attorneys.

UNITED STATES PATENT OFFICE.

FRANK J. LINGEMANN, OF DETROIT, MICHIGAN.

BRAKE.

SPECIFICATION forming part of Letters Patent No. 673,209, dated April 30, 1901.

Application filed July 13, 1900. Serial No. 23,464. (No model.)

To all whom it may concern:

Be it known that I, FRANK J. LINGEMANN, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Brakes; and I 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 pertains to make and use the same, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in car-brakes, wherein the brake mechanism is applied to an auxiliary wheel or wheels mounted upon the axle or axles, and also in the means employed for setting the brakes.

In the drawings, Figure 1 is a cross-sectional view through the car-axle, showing the brake-shoes and the magnets for controlling the same. Fig. 2 is an end elevation of the same. Fig. 3 is a similar view to Fig. 1, the brake being set. Fig. 4 is a plan view of the controller. Fig. 5 is a diagrammatic view showing the controller, the magnets for setting the brakes, the magnets for releasing the same, and the means by which the circuit may be closed through the magnets.

Referring to the letters of reference used upon the drawings, A represents the car-axle.

B is a wheel mounted on the axle.

D is a flexible brake-shoe rigidly secured at one end and arranged to partially encircle the wheel B and provided throughout a portion of its length with segments *d*, which engage the wheel when the brake is set.

D′ is a bracket bolted to the free end of the brake-shoe D.

E represents magnets secured in a suitable frame and located directly above the bracket D′.

E′ is an armature mounted in the bracket D′ and provided with set-screws *d*′ for adjusting the same with reference to the magnets E.

F is a fixed ratchet-bar secured in the frame, and G is a bar pivoted to the bracket D′ and adapted to engage the fixed bar when it is desired.

g is a spring, which may be provided with a friction-roll adapted to bear against the pivoted ratchet-bar G and force the same into engagement with the ratchet-bar F.

H H are magnets located above the magnets E E and when the circuit is closed through them, as will be hereinafter explained, are designed to act upon the armature *h*, secured to the free end of the ratchet-bar G, to withdraw it from engagement with the bar F when it is desired to release the brake.

I is a spring supported in the frame and adapted to bear upon the bracket D′ to force the brake-shoe out of contact with the wheel B when the brake mechanism is released. Additional springs may be provided if found necessary, arranged to engage the brake-shoe at several points to assist in freeing the wheel B of the shoe.

I will now proceed to explain how the current is applied.

Referring to the diagrammatic view, described as Fig. 5, J represents the controller, inclosed within a suitable sheet-steel or other jacket and provided on the outside with a lever *j*, adapted to operate a suitable switch K within the case, the position of the switch being indicated by the hand *j*′ of the lever *j* pointing to the graduated stops on the top of the case, their respective positions indicating certain conditions of the switch as the lever is operated. Surrounding the pivot on the arc of a circle are a number of long and short contact-points, to *l l*′ of which leads the wire L from the trolley or supply conductor. *h h*′ are resistance-coils connecting the conductor L with the contact-blocks l^2 l^3. On the opposite side of the switch are a number of contact-blocks of shorter length than those just described, leading from which are wires bringing in circuit the several magnets as the switch is operated. It will be seen by reference to Fig. 5 that I have shown two sets of operating-magnets E and two sets of the releasing-magnets H in order that the braking apparatus may, if desired, be applied to one of the axles of each truck or to both axles of a single truck. When it is desired to apply the brake, the lever is moved so as to close the circuit between the contact-block l^3 and the contact-block *m*. This acts through the magnet E upon the armature engaged to

the brake-shoe on one of the axles. The switch is then moved to connect the contact-block m' with the block l^3. It then brings in circuit the magnet E, operating the brake-shoe on the second axle through the same resistance-coil h' as in the case of the brake-shoe before referred to. The motion of the car is now checked. A further movement of the switch will close the circuit between the point l^2 and the contact-block m^2, thereby reducing the resistance between the conductor L and the operating-magnet E, and a still further movement brings in circuit the second operating-magnet E with the same resistance. The switch may now be moved to the third position, connecting the contact-block l' with the terminals or blocks m^4 m^5, thereby giving the operating-magnets E E, controlling their respective brake-shoes, the maximum current. To insure the return of the switch to its inital position, as shown in Fig. 5, I provide a coiled spring J', wound around the shaft and engaged with the switch, the action of the spring being adapted to return the switch to its starting-point. To release the brake, the switch is moved so as to connect the contact-blocks l and n. This brings in circuit the releasing-magnet H and draws the pivoted ratchet out of engagement with the fixed ratchet, controlling one of the brake-shoes, and a further movement of the switch will connect the contact-blocks l and n', bringing in circuit the second releasing-magnet H, thereby releasing the brake-shoe under its control. To return the switch to its starting-point after releasing the brakes, springs N N are provided, adapted to act upon the switch to return the same. Stops n^2 n^3 are also provided to limit the throw of the switch in either direction. On the outside of the controller-case I provide a suitable spring-catch n^4 to hold the lever against accidental displacement when the current is thrown off.

I will now describe the means shown for operating the brake mechanically in place of the electrical equipment. To the swinging ratchet-bar G is engaged by chain or other connection the bell-crank G^2, which is connected to the ordinary hand brake-wheel by a suitable chain connection. By operating the hand-wheel in the ordinary way the ratchet-bar G will be drawn up and the spring g will force the ratchet-bar into engagement with fixed ratchet F, setting the brake.

P is the brake-releasing mechanism and consists of a bell-crank lever P', having a friction-roll designed to bear against the ratchet-bar G. To the other end of the bell-crank lever P' is connected a rod p, leading to a similar bell-crank lever P^2, located below the car-platform, rising up from which is the plunger P^3 through the floor of the car and in a convenient position for the motorman to operate by the pressure of his foot. It will be readily seen that when so operated the swinging ratchet will be thrown out of engagement with the fixed ratchet F, thus releasing the brake.

What I claim is—

1. In a brake mechanism the combination of the frame, the axle, a brake-wheel mounted on the axle, a flexible brake-shoe for controlling said wheel having one end secured to the frame, the other engaging the armature of an electromagnet or solenoid, a rack pivoted to the free end of the brake-shoe, a fixed rack secured in the frame, and means for bringing the swinging rack into engagement with the fixed rack, substantially as described.

2. In a brake mechanism, the combination of the frame, the axle, a brake-wheel mounted on the axle, a flexible brake-shoe for controlling said wheel, having one end secured to the frame, the other or free end engaging the armature of an electromagnet or solenoid, a rack pivoted to the free end of the brake-shoe, a fixed rack secured to the frame, means for bringing the swinging rack into engagement with the fixed rack and an electromagnet the armature of the same secured to the free end of this swinging rack, whereby the swinging rack may be disengaged from the fixed rack by energizing said magnet, substantially as described.

3. In a braking mechanism for cars, the combination of a brake-wheel, a flexible brake-shoe adapted to control said wheel having one end fixed the other free to move whereby it may be brought into frictional contact with the wheel, a rack pivoted to the free end of the brake-shoe, a fixed rack adapted to engage the swinging rack, means for drawing the brake-shoe into frictional contact with the wheel, means for bringing the racks into locking engagement, and means for releasing the racks when engaged, substantially as described.

4. In a braking mechanism for cars, the combination of a brake-wheel, a flexible brake-shoe adapted to control said wheel having one end fixed, the other free to move whereby it may be brought into frictional contact with the wheel, a rack pivoted to the free end of the brake-shoe, a fixed rack adapted to engage the swinging rack, means whereby the racks may be brought into locking engagement consisting of an electromagnet or solenoid mounted in the frame, the armature for the same adjustably secured to the free end of the brake-shoe, substantially as described.

5. In a braking mechanism for cars, the combination of electromagnets for setting the brake mechanism, electromagnets for releasing the brake mechanism, a controller in circuit with the source of electric supply having contact-blocks in circuit with suitable resistance-coils adapted to be thrown successively in contact with contacts in circuit with the magnets controlling the braking mechanism, contact-points in circuit with the magnets for releasing the brake mechanism, a controller-lever adapted to be rotated in one direction

to engage one series of contact-points and in the opposite direction to engage the other series of contacts, and springs engaging said controller-lever whereby when released from manual control it will return to its initial position regardless of the position it occupied, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

FRANK J. LINGEMANN.

Witnesses:
S. E. THOMAS,
FRANK DUWE.