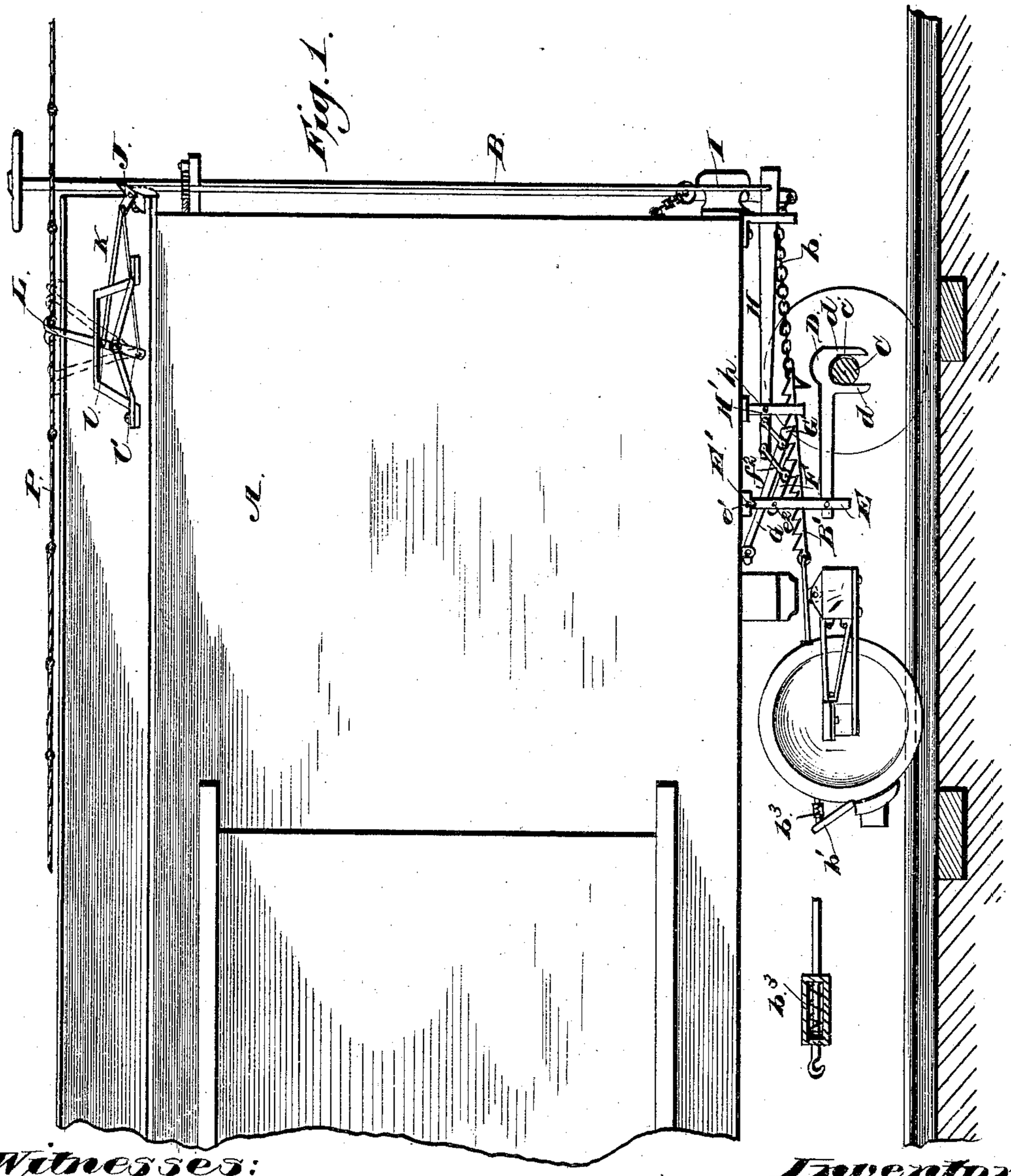
(No Model.) 2 Sheets—Sheet 1.

M. ARMSTRONG.

AUTOMATIC CAR BRAKE.

No. 313,154. Patented Mar. 3, 1885.

Fig. 1.



Witnesses:
Charles S. Hyer.
Russell H. Scott

By

Inventor:
Martin Armstrong
Attorney.

(No Model.) 2 Sheets—Sheet 2.

M. ARMSTRONG.

AUTOMATIC CAR BRAKE.

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Fig. 2.

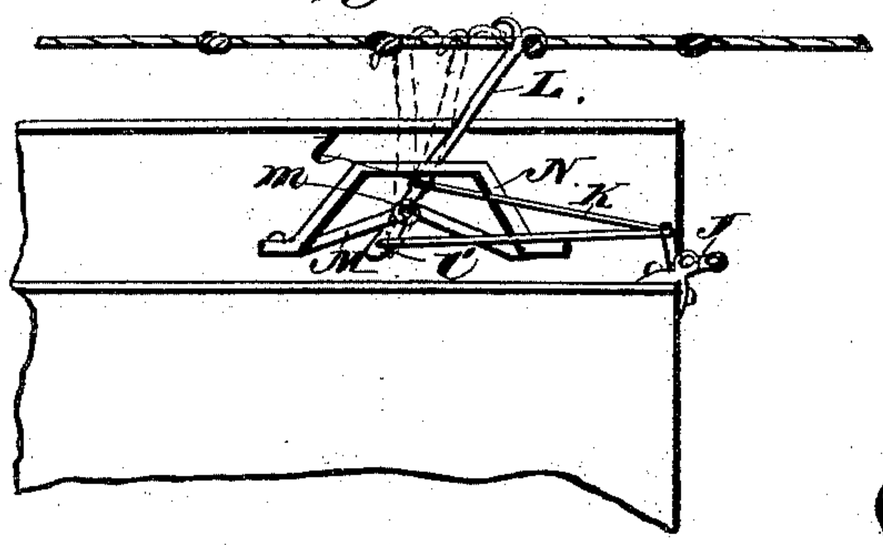


Fig. 3.

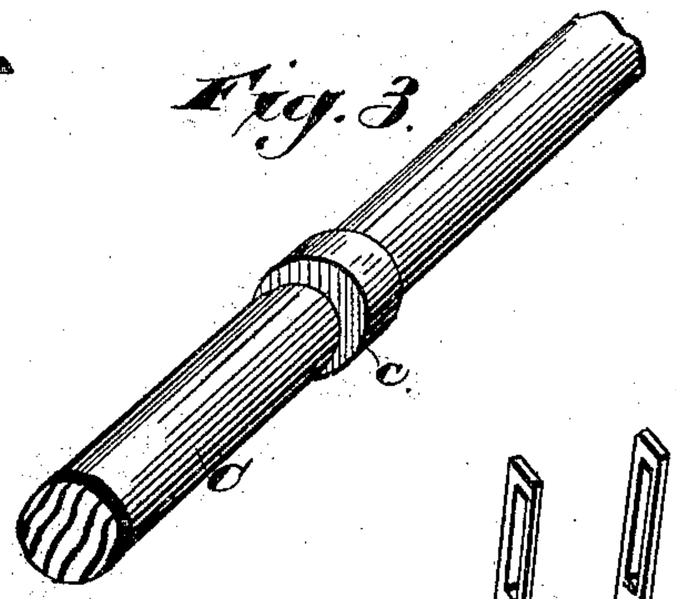


Fig. 4.

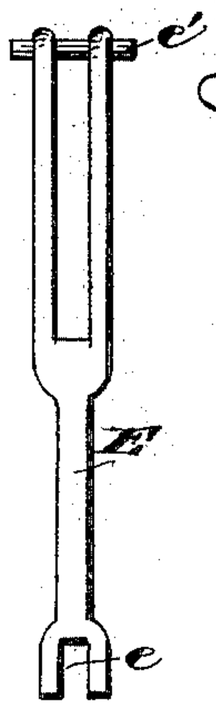


Fig. 5.

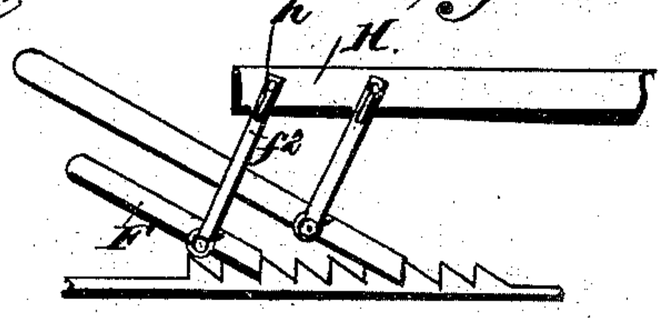


Fig. 6.

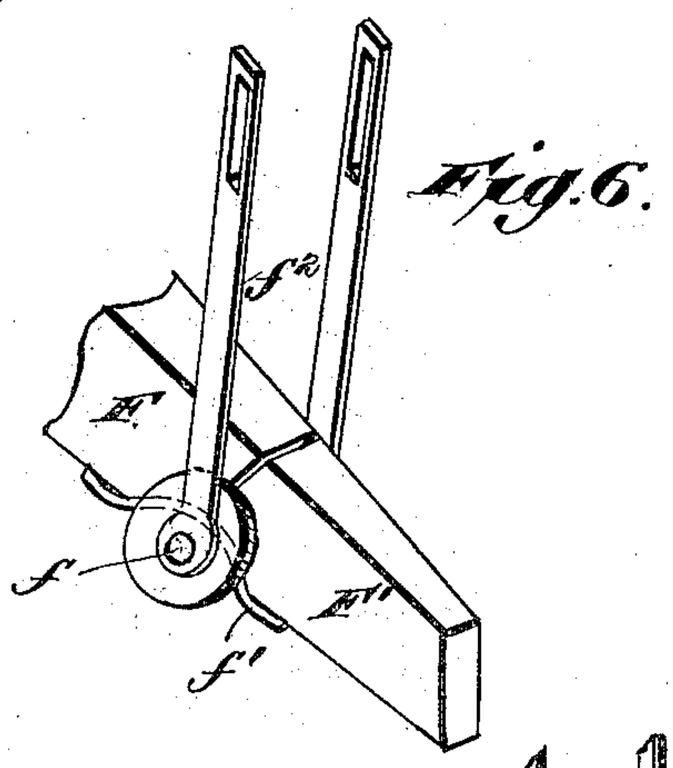
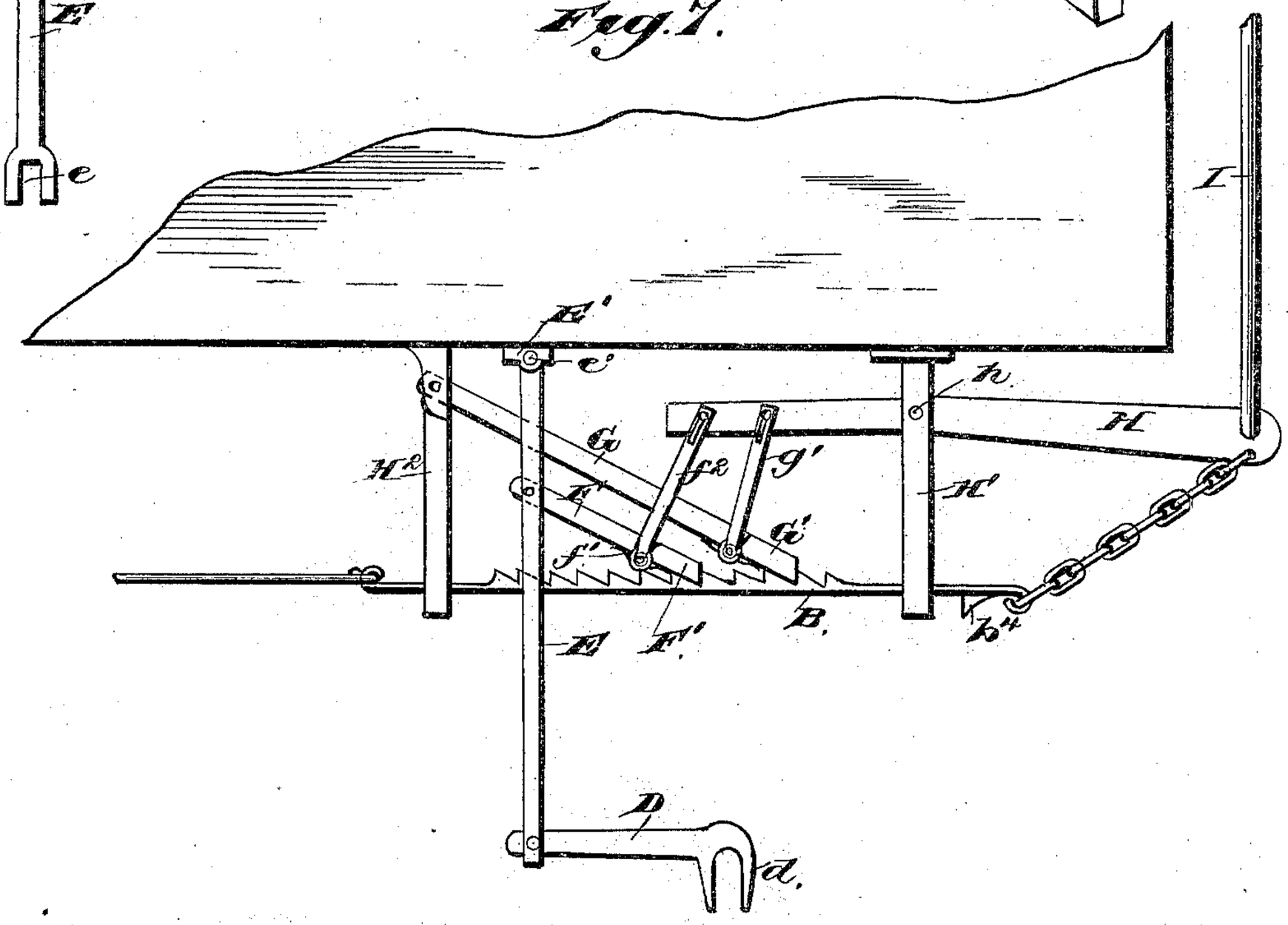


Fig. 7.



Witnesses:
Charles S. Hoyer.
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UNITED STATES PATENT OFFICE.

MARTIN ARMSTRONG, OF MILAN, KANSAS.

AUTOMATIC CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 313,154, dated March 3, 1885.

Application filed December 30, 1884. (No model.)

To all whom it may concern:

Be it known that I, MARTIN ARMSTRONG, a citizen of the United States, residing at Milan, in the county of Sumner and State of Kansas, have invented certain new and useful Improvements in Automatic Car-Brakes, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to a self-acting or automatic car-brake; and the novelty consists in the construction, arrangement, and adaptation of parts, as will be more fully hereinafter set forth, and specifically pointed out in the claims.

The essential object of the invention is to provide a car-brake which may at will, either singly or in series, be applied, and the momentum of the car be utilized to brake its speed.

An important feature of my invention is that it may be used as an auxiliary or safety brake to cars now in use, with very slight change of parts, and in any event the novel features are additional to the ordinary brake mechanism.

My improved brake may be instantly placed into operation without the exercise of any degree of strength, and when in operation it applies a force many times greater than that which could be given by a brakeman.

My improved brakes may be connected in series, as in a train of cars, and may be operated by the engineer from his place on the engine, or may be operated automatically, as in case of accidental uncoupling.

For convenience I will describe and illustrate the invention as applied to ordinary freight-cars; but it will be obvious that the important features will be successful in other relations.

The invention is illustrated in the accompanying drawings, which form a part of this specification, and in which Figure 1 is an elevation, partly in section, of an ordinary freight-car with my improvement attached, the new features and the ordinary brake mechanism being in elevation. Fig. 2 is a perspective of the cramp-weight and its connections, located upon the top of the car. Fig. 3 is a perspective detail of one of the car-axles, showing the operating-cam. Fig. 4 is a detail view of the oscillating pawl-lever, to which the dog which operates over the axle-cam is pivoted, the said view being taken at right angles to the position shown in Fig. 1. Fig. 5 is a detail side view of the trip-lever and its connections with the operating-pawl. Fig. 6 is an enlarged detail view of one of the jointed pawls. Fig. 7 is an enlarged view of the principal novel features detached from a car, including the trip-lever and its connections with the jointed pawls, the said pawls, the ratcheted brake-bar, the oscillating lever, and its dog.

Referring to the drawings, in which similar letters of reference indicate like parts in all the figures, A designates the body of a freight-car. B designates the brake-shaft; *b*, the chain; B′, the brake-bar, and *b′* the brake-lever. These parts are of ordinary and approved construction, except that the brake-bar B′ is provided with ratchet-teeth upon its upper side, and moves in suitable guides, and that the flexible connections are provided with a cushioning-spring, as shown at b^3. This rack-bar B′ is an important feature of my invention, being the point at which my auxiliary self-acting-brake system combines and connects with the ordinary hand-brake devices now in use. Hence by removing the ordinary brake-bar and substituting the rack-bar B′ in its place, and providing such proper guides that the bar will be only capable of longitudinal movement, my invention may readily and at small expense be applied to freight-cars now in use.

Upon one of the truck-axles, C, is secured an eccentric, *c*, and with this eccentric is engaged a dog, D, which is pivoted between the bifurcated arms *e* of an oscillating lever E, pivoted to a block, E′, upon the bottom of the car. The dog D has a jaw, *d*, which embraces the cam *c*, and it is held by its gravity in constant engagement therewith, giving to the lever E a complete forward and backward oscillatory movement from its pivot with each revolution of the axle. The upper portion of this lever E is bifurcated, both the upper duplex extremities being held by the single bolt *e′*, and in the recess formed between the two arms is pivoted, at e^2, a pawl, F, hinged at *f*, and having a spring, *f′*, as shown, to hold the hinged arm F′ normally in a plane with the body of the pawl. This pawl F, being pivoted, upon a bolt having bearings upon either side, is susceptible of a forward and back movement only, its free end travel-

ing, when in operation, upon the toothed face of the brake-bar B′, and when out of operation being suspended directly above the same.

From the pivot of the hinge between the parts F and F′, which constitute the operating-pawl, a yoke, f^2, extends upward, and is secured to the free or inner end of a trip-lever, H, pivoted at *h* in a duplex frame, H′, which is secured to the bottom of the car and extends downward, having its lower ends connected by a cross-bar. Through this frame H′ the brake-bar B′ operates, and it serves as a guide therefor, as well as a stop to limit the longitudinal movement of said bar in one direction when a tooth, b^4, upon the lower side of the brake-bar comes into contact with the cross-bar. The trip-lever is so arranged that its pivotal point is considerably away from the center, leaving its heavier end away from the pawl F, and the gravity of this heavier end is sufficient to raise the pawl F out of engagement with the brake-bar B′ when the parts are in their normal position.

The operation of the parts thus far described will be obvious. The normal condition of the operating-pawl is out of engagement with the brake-bar, as it is held by the gravity of the trip-lever, and the lever E is continually but idly oscillated when the car is in motion by reason of the dog D with the eccentric *c*.

H^2 designates another frame, similar to the frame H′, before described, and between its vertical arms is pivoted a holding-pawl, G, having hinged arm G′ and spring *g*, similar to the operating-pawl F. The pawl G extends beyond the throw of the pawl F, and it is also connected to the inner end of the trip-lever by a tie, *g*′, which extends from said lever to the hinge-pivot between the parts G and G′. The normal position of this pawl also is out of engagement with the brake-bar, as it is held by the gravity of the trip-lever. If, then, this gravity is overcome, it is obvious that the pawls F and G would be thrown into engagement with the teeth of the brake-bar, and that at every revolution of the car-axle the pawl F will throw the brake-bar one tooth forward, the holding-pawl G will engage and hold the slack thus taken up, the pawl F will retreat and engage the next tooth and again thrust the brake-bar the distance of one tooth, which will again be held by the pawl G, and so on until the last tooth has been engaged by the pawl, and it idly reciprocates upon a smooth portion thereof. By this means the brake is placed very powerfully into engagement with the truck-wheels, and will remain so until the gravity of the trip-lever again asserts itself and "knuckles" the pawls F and G out of engagement. Of course it will be understood that the brake-bar, the brake-shoes, and their connections are so conditioned and proportioned that the maximum or necessary brake force is applied when the last tooth of the brake-bar has been acted upon by the operating-pawl.

To the weighted end of the trip-lever H is secured a tie-rod, I, which, extending vertically, has its upper end secured to an elbow-lever, J, pivoted to the upper edge of the car, and having its other arm loosely secured to a tie-rod, K, which connects said elbow-lever J to different points on a cramp-lever, L, pivoted at *m* to a frame, M. A quadruped frame, N, surrounds and is fixed above the frame M, and it has a recess in which the cramp-lever works loosely, and a bearing upon either side of the center, against which it rests. The upper end of the cramp-lever is weighted, so that as it passes upon either side of the pivotal point its gravity will impel it to its bearing, and hold it in that position until the lever is thrown past its center upon the other side.

The tie-rod K may be attached to the cramp-lever L at *l*, above the pivot *m*, or at *l*′, below said pivot, so that a single motion of the rope P will operate the brake properly, whichever end of the car is forward.

When in the position shown in full lines in Figs. 1 and 2, the heavier end of the trip-lever H is elevated, and when in the position shown in dotted lines the trip-lever assumes its normal position and the pawls F and G are held out of action, the gravity of the cramp-lever being sufficient to overcome that of the trip-lever.

A spring or other proper means may be employed to prevent the accidental displacement of the cramp-lever.

The upper end of the cramp-lever is slotted or otherwise conditioned to receive a knotted rope, P, which may be either operated by the engineer or automatically by the separation of the train, to throw the brake mechanism "on." This rope P may be arranged to work in various ways—for instance, it may be reeved from the engine through or connected with all the cramp-levers and back, so that the engineer may operate it in either direction.

The cramp-levers may be connected with the ordinary brake-shaft B, and other modifications may be made without departing from the principle or sacrificing the advantages of the invention.

If one end of the car is forward, the tie-rod K will have to be connected at the point *l*′, in order to have a "pull" motion overcome the gravity of the trip-lever, while if the other end of the car is forward the tie-rod will be connected to the point *l* for the same purpose.

I am aware that it is not broadly new with me to utilize the momentum of a car to apply a braking force, as it has been before suggested to wind the brake-chain upon a drum which has been connected with an operating-cam upon the car-axle.

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

1. In combination with a cam rigid upon a car-axle, and with a ratcheted brake-bar and connected brake mechanism, a continually-acting operating pawl and suitable connections

with said cam, and a holding-pawl adapted to hold the slack taken up by the operating-pawl, as set forth.

2. In combination with ordinary brake mechanism, and with a cam, as *c*, a ratcheted brake-bar, an operating-pawl connected with said cam, and a pawl for holding the slack taken up, as set forth.

3. The combination, with a brake-bar, as described, and with a cam, as *c*, an operating-pawl, connections between said pawl and cam, and a holding-pawl, of a trip-lever having a weighted end and adapted to hold both pawls out of engagement by gravity, as set forth.

4. In a brake mechanism, substantially as described, the combination of the cam *c* and jawed dog D with the lever E, the pawl F, pivoted thereto, and the pawl G, guided loosely in said lever, as set forth.

5. In a brake mechanism, substantially as described, the knuckle-pawls F and G, hinged as shown, the brake-bar having ratchets, the trip-lever, and connections between said lever and the pivots of the pawl-hinges and springs, as and for the purposes specified.

6. In combination with the ratcheted brake-bar B′, the pawls F G, and trip-lever H, means, as L, and connections whereby the said pawls may be thrown into operation with the brake-bar, singly or in series, by hand or automatically, as set forth.

7. The combination, with the brake mechanism described, the trip-lever H, and cramp-lever L and connections, of the rope P, as and for the purposes specified.

8. In a car-brake, substantially as described, the combination, with the trip-lever, elbow-lever J, and connections, of the cramp-lever L, having a pivotal connecting-point upon either side of its fulcrum, and the tie rod K, as set forth.

9. The combination, with the brake mechanism described, of the cramp-lever L, having connecting-points *l* and *l′*, the tie-rod K, and rope P, as and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

MARTIN ARMSTRONG.

Witnesses:
J. E. CARR,
D. H. MANDIGO.