(No Model.)

E. S. AMROCK.

BRAKE FOR ELECTRIC OR OTHER CARS.

No. 549,094. Patented Nov. 5, 1895.

Fig. 1.

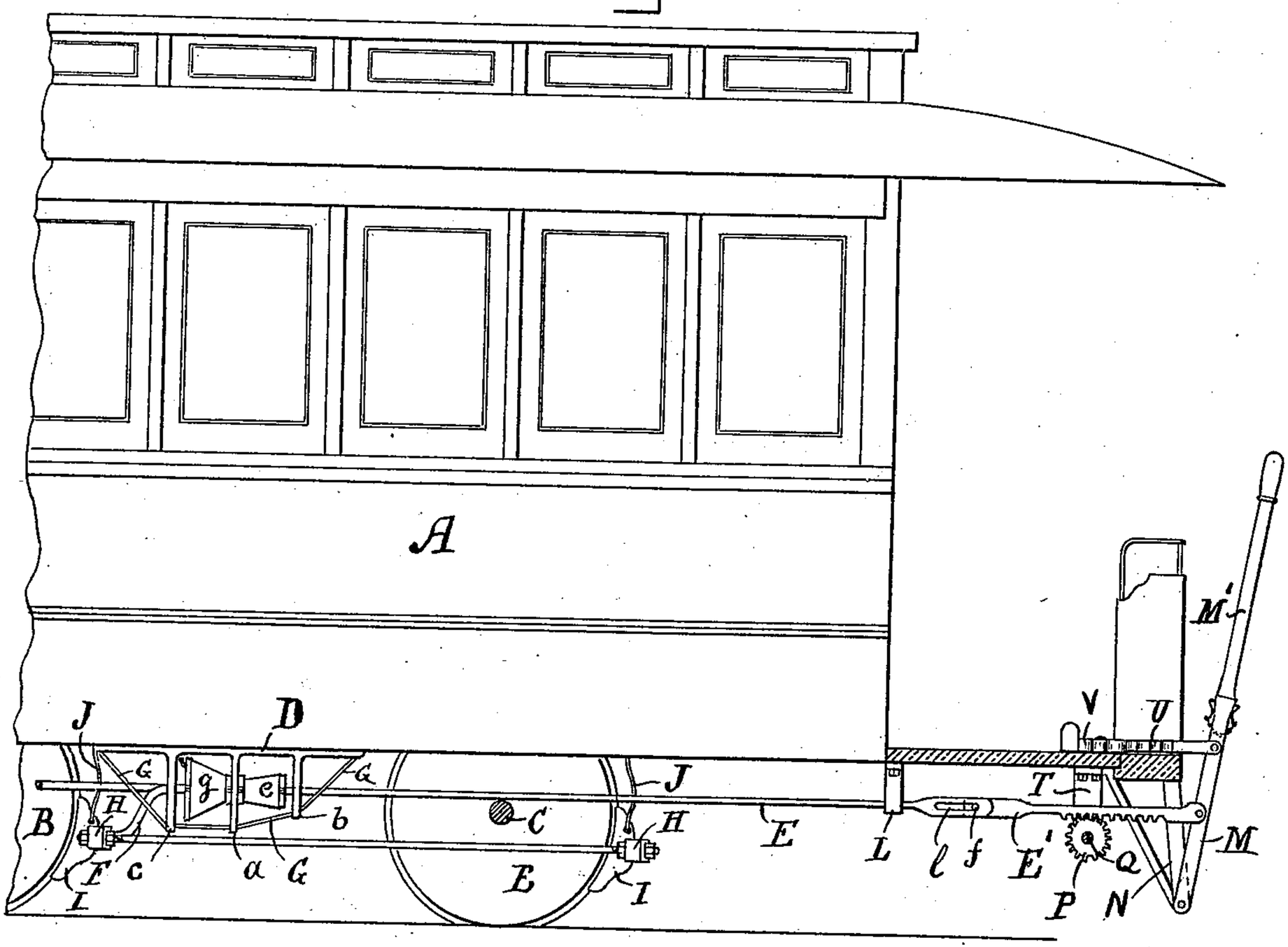


Fig. 2.

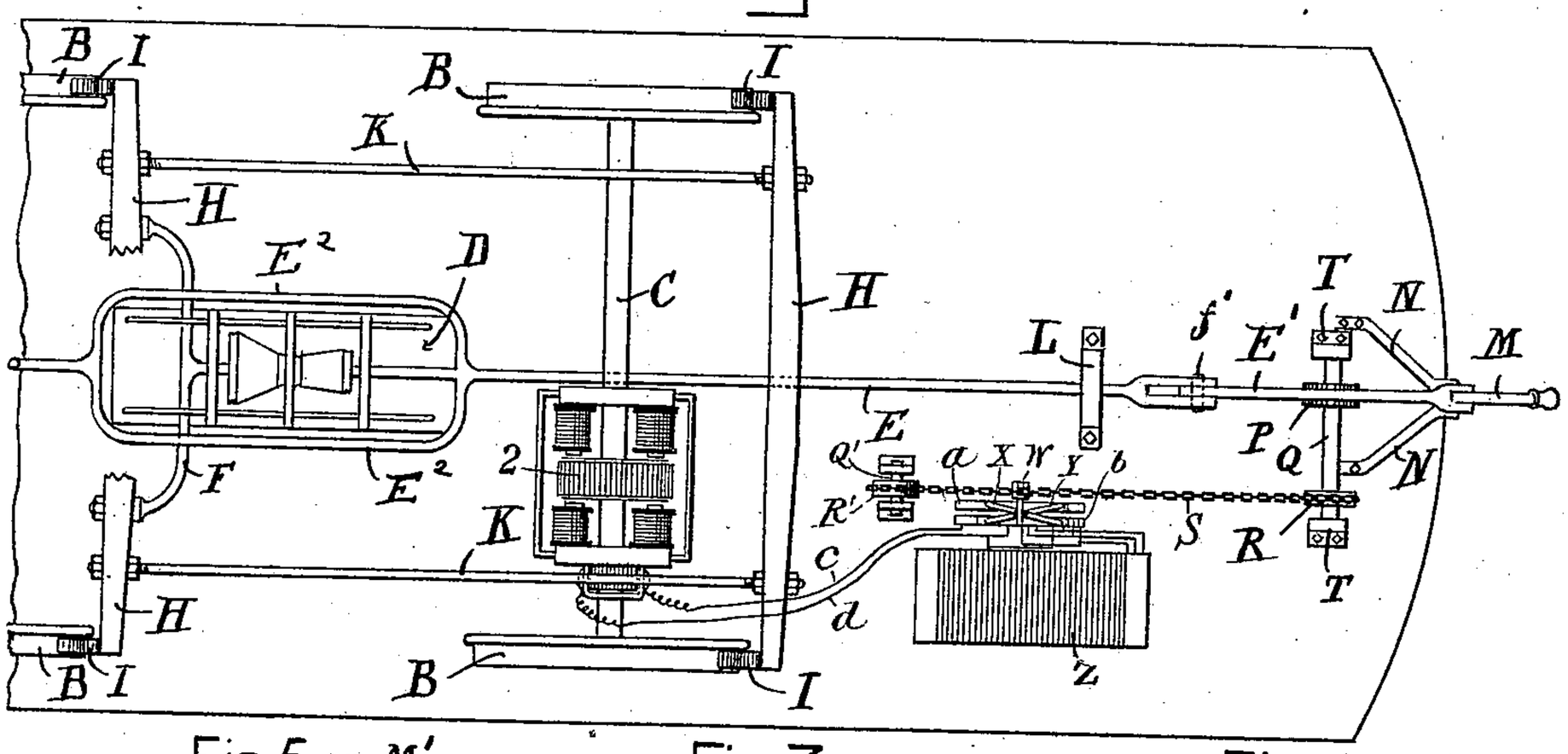


Fig. 5.

Witnesses.
Winfield S. Townsend
Oscar A. Hillard

Fig. 3.

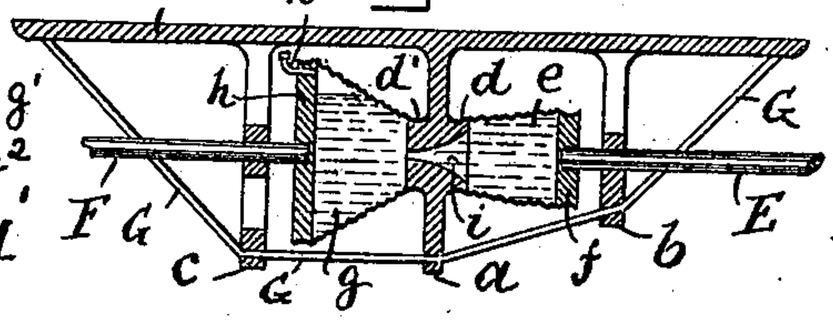
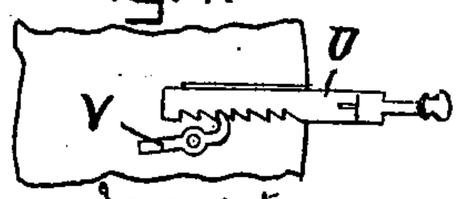


Fig. 4.



Inventor.
Edward S. Amrock
by Edwin Blanton
attorney.

UNITED STATES PATENT OFFICE.

EDWARD S. AMROCK, OF WALTHAM, ASSIGNOR OF ONE-HALF TO JAMES H. WALSH, OF BOSTON, MASSACHUSETTS.

BRAKE FOR ELECTRIC OR OTHER CARS.

SPECIFICATION forming part of Letters Patent No. 549,094, dated November 5, 1895.

Application filed March 16, 1892. Serial No. 425,082. (No model.)

To all whom it may concern:

Be it known that I, EDWARD S. AMROCK, a citizen of the United States, residing at Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Brakes for Electric or other Cars, of which the following, taken in connection with the accompanying drawings, is a specification.

The object of my invention is to produce a hydrostatic bellows for operating the brakes of electric and other cars and also to regulate or cut off the electric current by one and the same lever.

The invention consists of a bellows having a rigid center and two movable heads, one of larger area than the other, the small head being secured to the brake-lever and the large head to the brake-beam, and also in the means for operating the electric switch to regulate the electric current and to cut it off when the brakes are applied, all the operations being performed by means of a single lever.

Referring to the accompanying drawings, Figure 1 represents a side view, partly in section, of a portion of a car fitted with a hydrostatic bellows and means for operating the electric switch embodying my invention. Fig. 2 is a plan of the under side of same. Fig. 3 is a longitudinal vertical section through the hydrostatic bellows and frame. Fig. 4 is a detail view of the lever-retaining device. Fig. 5 is a detail view of the jointed part of the lever.

A represents the car, B the wheels, and C the axle driven by an electric motor, (shown in the drawings,) all of which may be of any desired construction.

To the under side of the floor of the car is secured a frame consisting of a plate D, having three downwardly-projecting pieces *a b c*. The piece *a* has on each side of its center a flange *d d'*. To the flange *d* is secured the small end of a conical cylinder *e*, formed of any suitable flexible material. To the other end of this cylinder is secured a head *f*, to which one end of a rod E is secured, and to the flange *d'* is secured a similar conical flexible cylinder *g*, of larger diameter at its outer end than the cylinder *e*, and to the outer end of this cylinder is secured a head *h*, to which a rod F is attached. The opening *i* in the center of the portion *a* that communicates between the two cylinders is of conical form, the small end opening into the large cylinder. A small piece of pipe *h'* closed by a screw-plug, is attached to the upper end of the head *h*, so that the bellows can be supplied with any suitable liquid. Theportions *a b c* are braced to the plate D by rods G, and the portions *b c* form guides for the rods E and F. The outer end of the rod F is furcated and connected to the brake-beam H, that carries the shoes I, which are supported from the bottom of the car by spring-bars J, so that the shoes are normally kept out of contact with the wheels B. When it is desired to apply the brakes to more than one pair of wheels, the brake-beams may be connected to each other by rods K.

The rod E extends from the hydraulic bellows toward the end of the car, and its end is carried by suitable bearings L. The end of this rod is furcated and in each prong is formed a slot *l*, and in this forked end is inserted the end of a bar E', in the end of which is a pin *f'*, that works in the slot *l*. The outer end of this bar E' is attached to a lever M, fulcrumed at its lower end in a frame N, secured to the under side of the platform. The under side of this bar E' is formed with teeth that work in a pinion P, mounted upon a shaft Q, to which the sprocket wheel or wheels R are secured that carry the endless chain S, which passes over another sprocket-wheel R', mounted upon a short shaft Q', for operating the electric switch. The shafts Q Q' are carried by suitable bearings T. To the chain S is secured a block W, carrying a pair of contact-springs X Y, said springs being insulated from the block W, but having their free ends resting upon contact-pieces *a b*. Z are resistance-coils, and *c d* wires connecting the switch with the motor 2, mounted upon the axle C.

The operating-lever is made in two parts—a lower fixed part M and an upper removable part M'. I prefer to connect these two portions together, as shown in Fig. 5—that is to say, the lower portion M is formed with a conical recess at its upper end and is fitted with two

spring-snaps g', the upper ends of which pass through holes in the upper part of the portion M and into recesses or a groove formed in the lower part of the portion M'. The lower ends of these snaps are connected by a chain g^2, so that by drawing upon the chain the upper ends are drawn clear of the piece M', and it is free to be removed.

To the lower part M of the operating-lever is secured a ratchet-bar U, that rests upon the floor of the platform. A small pawl-lever V is fulcrumed on the platform, so that when the brakes are applied to it the pawl can, by the foot of the driver, be forced into contact with the ratchet-teeth on the bar U and retain it as long as is desired, and when it is desired to release the brakes the pawl is moved so as to be out of contact with the teeth or bar V.

The operation is as follows: Supposing the operating-lever M' to be in the position shown in Fig. 1, then the full current of electricity would be on, and should the driver desire to reduce the speed he (the driver) draws the lever toward him, which, through the ratchet-bar E', ratchet-wheel P, shaft Q, sprocket-wheel R, and chain S, operates the switch so as to cut off a portion of the current. Thus by moving the lever M' back and forth the speed of the car can be regulated without in any way affecting the brake mechanism, as the end of the bar E' is free to travel in the forked end of the bar E; but should the driver desire to stop the car quickly then he draws the lever M,' so as to cause the end of the bar E' to come into contact with the end of the rod E and push it back, thereby exerting pressure upon the head f of the small part of the bellows, which will cause the liquid in that part of the bellows to be compressed and forced through the opening i into the large portion of the bellows, thereby exerting an enormous pressure upon the head h, which, through the rod F and brake-beam H, causes the brake-shoes I to be pressed upon the wheels B, thereby stopping the car.

I prefer to connect the rod E to a similar rod at the other end of the car by means of a loop or saddle E^2, as shown in Fig. 2, that passes around the hydrostatic bellows, so that it can be operated from either end of the car by removing the upper portion M' of the operating-lever from one end and securing it to the other end of the car.

What I claim is—

1. In a hydrostatic brake the combination of two conical cylinders of flexible material of different areas, the inner ends of each cylinder being secured to a fixed flange having a conical opening to communicate between said cylinders and the outer ends of said flexible cylinders being secured to heads of different areas, the larger one of which is connected with and operates the brake beam, and the smaller being by a rod connected to an operating lever substantially as set forth.

2. In combination with a car operated by an electric motor, a hydrostatic bellows having heads of different areas, the large head being connected to the brake beam, and the small head to a rod having a furcated end in which a rack bar is free to slide, said bar being connected to the operating lever and the rack in gear with a pinion on a shaft carrying a sprocket wheel for operating the chain of the electric switch substantially as set forth.

3. In combination with a car provided with and operated by an electric motor, a lever connected to a rack bar, the teeth of which are in gear with a pinion on a shaft carrying a sprocket wheel for operating the chain of an electric switch, the rear end of said rack bar being held and free to slide in a fork on the end of a rod that operates the brakes substantially as set forth.

4. In combination with a car provided with and operated by an electric motor an operating rod or bar formed in two parts the end of one part being free to slide in a fork on the end of the other part whereby the mechanism for controlling the switch can be operated independently of the brake, or the two operated simultaneously substantially as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 10th day of March, A. D. 1892.

EDWARD S. AMROCK.

Witnesses:
CHAS. STEERE,
EDWIN PLANTA.