(No Model.) 2 Sheets—Sheet 1.

J. GIBBONS.

RAILWAY CAR BRAKE.

No. 550,962. Patented Dec. 10, 1895.

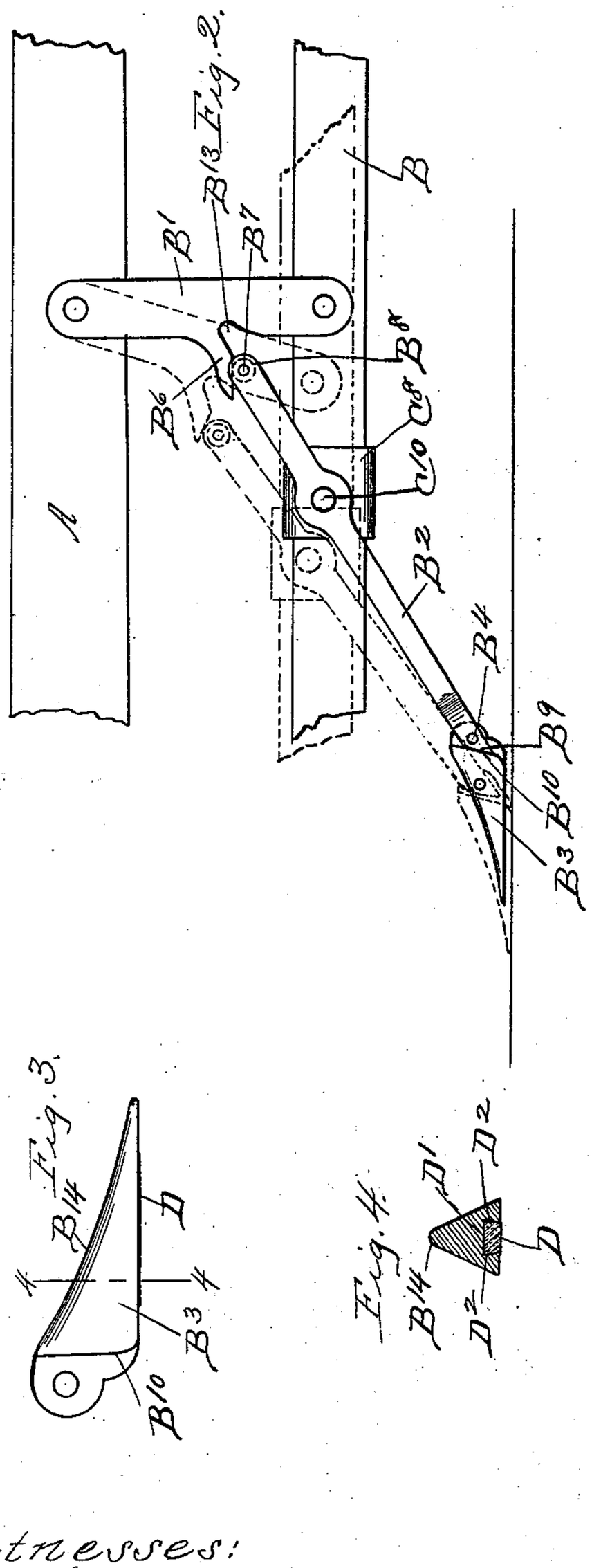

Fig. 2.

Fig. 3.

Fig. 4.

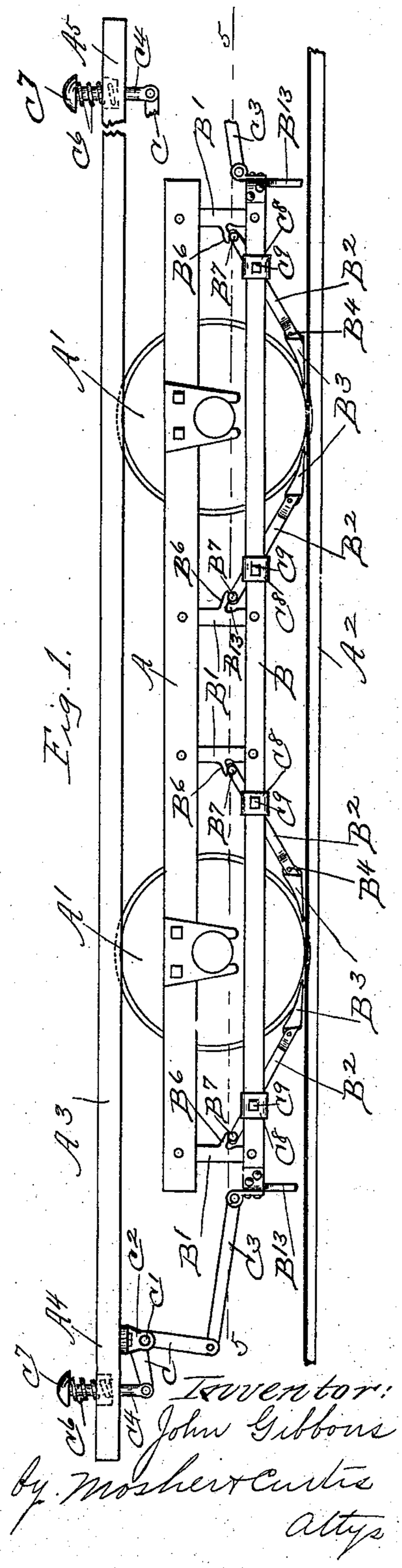

Fig. 1.

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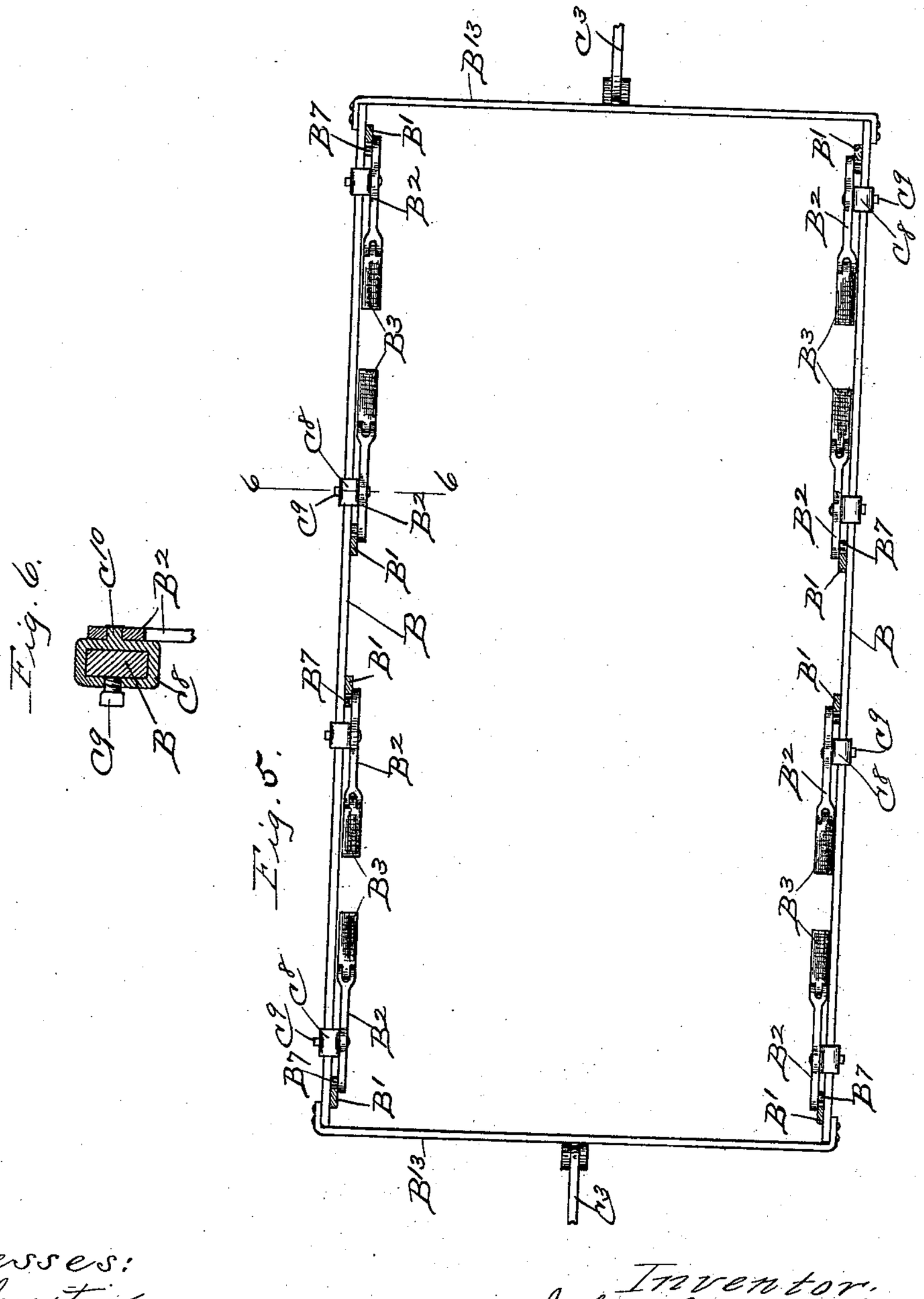

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UNITED STATES PATENT OFFICE.

JOHN GIBBONS, OF WEST TROY, NEW YORK, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF TWO-THIRDS TO JOHN H. JONES, OF SAME PLACE, AND STEPHEN J. BROWN, OF TROY, NEW YORK.

RAILWAY-CAR BRAKE.

SPECIFICATION forming part of Letters Patent No. 550,962, dated December 10, 1895.

Application filed May 5, 1894. Serial No. 510,172. (No model.)

To all whom it may concern:

Be it known that I, JOHN GIBBONS, a citizen of the United States, residing at West Troy, county of Albany, and State of New York, have invented certain new and useful Improvements in Railway-Car Brakes, of which the following is a specification.

My invention relates to such improvements; and it consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings and the letters of reference marked thereon, which form a part of this specification.

Similar letters refer to similar parts in the several figures therein.

Figure 1 of the drawings is a view in side elevation of a car-truck and a portion of the car-bottom with my improved brake attached. Fig. 2 is a view in side elevation, on an enlarged scale, of a portion of the brake mechanism, showing by dotted lines the limit of movement of some of the movable parts when the brake is in use. Fig. 3 is a side elevation, on an enlarged scale, of the brake-shoe detached. Fig. 4 is a vertical cross-section taken on the broken line 4 4 in Fig. 3. Fig. 5 is a horizontal section taken on the broken line 5 5 in Fig. 1, showing the oscillatory frame and parts supported thereby in top plan view. Fig. 6 is a vertical cross-section taken on the broken line 6 6 in Fig. 5.

A is a car-truck frame which is supported by wheels A′, resting on the rail A^2.

A^3 represents the bottom of a car, including the end platforms A^4 and A^5. As the platforms are alike, one is partially broken away.

A rectangular frame B, having about the same dimensions in length and breadth as the car-truck, is suspended from the truck by means of the links B′, pivoted at their upper ends to the truck-frame and at their lower ends to the side rails of the rectangular frame, whereby the latter frame is adapted to be oscillated lengthwise of the car.

Pivotally secured to the side rails of the oscillatory frame intermediately of their ends are the brake-levers B^2, which severally support at their lower ends a shoe B^3, adapted to engage the wheel and rail, one on each of the opposite sides of each wheel, as shown in Fig. 1. Each shoe is pivoted at its thicker end, as at B^4, upon its supporting-lever. When the movable parts occupy the position shown by solid lines in Figs. 1 and 2, the shoes are held in a position free from engagement with the rail by means of a spur B^6, projecting laterally from the several frame-supporting links B′, which are engaged by a pin B^7, projecting laterally from the several brake-supporting levers and inwardly beneath the spurs.

The pins B^7 may each be provided with a friction roll or sleeve B^8, which engages the spur B^6.

The lower end of each brake-supporting lever is provided with the inclined end B^9, adapted to engage with a stop, as the projecting edge B^{10}, on the shoe and support the pivoted shoe in an approximately horizontal position, as shown by the solid lines in Fig. 2.

To apply the brake it is only necessary to oscillate or swing the oscillatory frame in the opposite direction from that in which the car is moving—that is, rearwardly—to the position indicated by the dotted lines in Fig. 2, or until the toe of a shoe which is forward of the car-wheel is forced into engagement with both wheel and rail, whereupon the weight of the car presses the shoe against the rail with such force that the sliding friction between the bottom of the shoe and rail stops the car, the wheel pushing the shoe before it.

A backward movement of the stopped car will release the shoe and permit the oscillatory frame to be returned to its normal position with its supporting-links in vertical planes.

The movement of the oscillatory frame when restored to its normal position withdraws the shoe from engagement with the wheel, and the spurs B^6, engaging the pins B^7, lift and support the shoes in an elevated position free from engagement with the rail. When the oscillatory frame is thus swung rearwardly to operate the brake in front of a

wheel, the pin B^7 of a brake-supporting lever in rear of the wheel occupies the recess B^{13} at the junction of the spurs and links, so that the level at which the rear shoes are maintained remains practically unchanged.

As a means for communicating the desired oscillating movements to the oscillatory frame I provide beneath each of the end platforms a bell-crank lever C, pivoted at C′ in bracket-ears C^2, secured to the lower side of the platform, connecting one arm of the lever by link C^3 with the oscillatory frame and the other arm with a push C^4, projecting loosely up through the platform within easy reach of the foot of the operator of the car. By pressing downwardly the push on the forward platform the forward shoes are forced into engagement with the wheels and rails, both sides of the oscillatory frame being similarly equipped.

As a means for maintaining the oscillatory frame in its normal vertical position, I provide each push with a coil-spring C^6, bearing at its upper end upon the lower side of the head C^7 and at its lower end upon the platform, as shown in Fig. 1.

In order that the shoes may be so located that all the forward shoes at any time will be engaged by their respective wheels and forced upon the rails simultaneously, I make the fulcrums of the shoe-supporting levers adjustable longitudinally of the oscillatory frame. For this purpose I provide a clip or sleeve C^8, as shown in Fig. 6, which is adapted to slide lengthwise of the side rails of the oscillatory frame, which sleeve is tapped on its outer side and provided with a set-screw C^9, by which the sleeve can be rigidly secured in its adjusted position. The inner side of the sleeve supports the fulcrum-pin C^{10}, projecting outwardly from the outer side of the sleeve to pivotally support its lever B^2.

I have in an experimental test stopped an electric motor weighing six or seven tons, going at full speed on an ordinary street-railway, in a distance of four feet from the point when the brakes were applied, and, as very little power is required to swing the oscillatory frame sufficiently to apply my improved brake, it is obvious that such a frame will serve as a safety-bumper.

The transverse end rails B^{13} of the oscillatory frame extend in front of the wheels at either end of the car a short distance from the plane of the rails. Should the end rails engage an obstacle on the track, the brake would be automatically operated to stop the car before such obstacle could come in contact with the motors of an electric car or other expensive machinery, doing no damage except, perhaps, to the comparatively inexpensive brake mechanism. Should the obstacle chance to be a person, he would escape being mangled by the wheels, and probably with his life.

My improved brake apparatus is designed for use particularly as an emergency-brake, rather than to take the place of the ordinary wheel-brake.

It frequently happens that the track-rails are covered with frost, ice, or mud, which renders the wheel-brakes comparatively useless and materially impairs the efficiency of such rail-brakes as have been used heretofore.

I have ascertained that a metal shoe faced with an abrading material, such as emery, is efficient under all known conditions of the rails.

The abrading material effectually scours the rails and cuts into the surfaces in a manner to produce a maximum frictional resistance.

By making the body part of the shoe of metal it is able to resist the crushing pressure when engaged by both wheel and rail, and by facing the shoe on the rail side with the abrasive material the required frictional resistance is obtained.

As a preferred means of securing the abrasive material D upon the shoe, I cast the body part of the shoe with a recess or well D′ in its rail-face. The side walls D^2 of the recess flare inwardly, so as to present a contracted mouth or opening in the plane of the rail-face. I then fill this well with a plastic composition comprising powdered or granulated abrasive material mixed with a binding element, as cement and water, and bake the inserted composition until sufficiently hardened. A sufficient quantity of the composition is employed to fill the recess and project outwardly a small distance beyond the face of the metal.

Abrasive minerals of various kinds may be thus employed; but I prefer the use of emery or other species of corundum.

The abrading material may be secured in the shoe in any known manner.

The wheel-engaging face of the shoe is convexed transversely, as shown at B^{14}, to present a narrow edge to the wheel, which edge will when forced against the wheel cut through any accumulation of mud or ice thereon, insuring contact of the shoe and wheel.

The upper wheel-engaging surface of the brake-shoe is inclined and so shaped that the wheel engaged by it is lifted from the rail and wholly supported by the shoe, thereby preventing the wheel from sliding upon the rail and wearing a flat or plane surface in the tread of the wheel. The wheel-engaging surface of the shoe is also made smooth and of a relatively soft material, as malleable iron, to present a relatively slippery surface to the wheel, for the reason that a too sudden retardation of the rotary movement of the wheels, gears, and motor-armatures of an electrically-propelled car would break the gears.

In tests made by me prior to the date of this application I made use of a shoe having an upper smooth wheel lifting and supporting surface of malleable iron and an under rail-gripping surface of emery. In such tests

the car-wheels would frequently make a quarter-revolution on the shoes after being lifted by the shoes from the rails.

The car could be stopped as quickly with the power on as with it off.

When the power was left on, I have seen the car-wheels continue to revolve on the shoes after the car had stopped.

I have tested brake-shoes having an under rail-gripping surface of hardened serrated steel; but the friction upon the rail, due to the enormous pressure of the lifted car, would so wear such surface as to render the shoe comparatively worthless for subsequent use.

To lift the car one inch in the same time that it advances one inch would require substantially a force in addition to the weight of the car sufficient to stop the car at the end of an advance movement of one inch.

By lifting the car-wheels from the track-rails I put a pressure upon the brake-shoes enormously in excess of the weight of the car.

When a heavy car moving six or eight miles an hour is stopped in advancing four feet, a pressure is applied to my improved shoes such as was never before attempted to be applied to a brake. It is essential, therefore, that the wheel-surface of the shoe should be smooth and comparatively slippery, that the car-wheel may rotatively slip thereon without damage to the machinery, and that the rail-surface should be hard and abrasive—abrasive to grip the rail sufficiently to overcome the inertia of the car both in lifting the car to obtain the necessary pressure and in arresting the advance movement of the car to stop it and hard to resist the wear and strain due to extreme pressure and heat.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a railway-car, the combination with the car-truck; and a rectangular frame; of a pivotal link-connection between the truck and frame; a plurality of brake-levers severally fulcrumed upon the frame; and a plurality of wheel-and-rail-engaging brake-shoes severally supported by a brake-lever; and means for oscillating the frame, longitudinally of the car, substantially as described.

2. In a railway-car, the combination with the truck, of a rectangular frame suspended from the truck and oscillatory longitudinally of the car; wheel-and-rail-engaging brake-shoes on opposite sides of each wheel supported by the frame and operated by its longitudinal movement; springs for maintaining the frame in its normal position; and means for oscillating the frame, substantially as described.

3. In a railway-car, the combination with a movable frame and a plurality of wheel-and-rail-engaging brake-shoes operated by the same movement of the frame; of supports for the brake-shoes severally adjustable upon the frame; and means for securing the supports in adjusted positions, substantially as described.

4. In a railway-car, the combination with the truck of a rectangular frame, a plurality of links pivotally connected at opposite ends with the truck and frame; brake-levers mounted upon the frame; wheel-and-rail-engaging brake-shoes severally supported and operated by the levers; and a spur on each link engageable with the adjacent brake-lever for holding the lever-supported shoe above the plane of the rails in the normal position of the frame, substantially as described.

5. In a brake-shoe, the combination with a metallic casting having a recess in one side, of an abrasive filling baked in such recess, substantially as described.

6. A brake-shoe having an upper relatively-slippery wheel-lifting-and-supporting surface, and an under rail-gripping surface of relatively-hard abrasive material, substantially as described.

7. A brake-shoe having a plane rail-engaging face, and a wheel-engaging face inclined longitudinally and convexed transversely, substantially as described.

In testimony whereof I have hereunto set my hand this 26th day of April, 1894.

JOHN GIBBONS.

Witnesses:
FRANK C. CURTIS,
GEORGE J. MCDONNELL.