(No Model.) 2 Sheets—Sheet 1.

R. EICKEMEYER.

TROLLEY FOR ELECTRIC RAILWAYS.

No. 448,831. Patented Mar. 24, 1891.

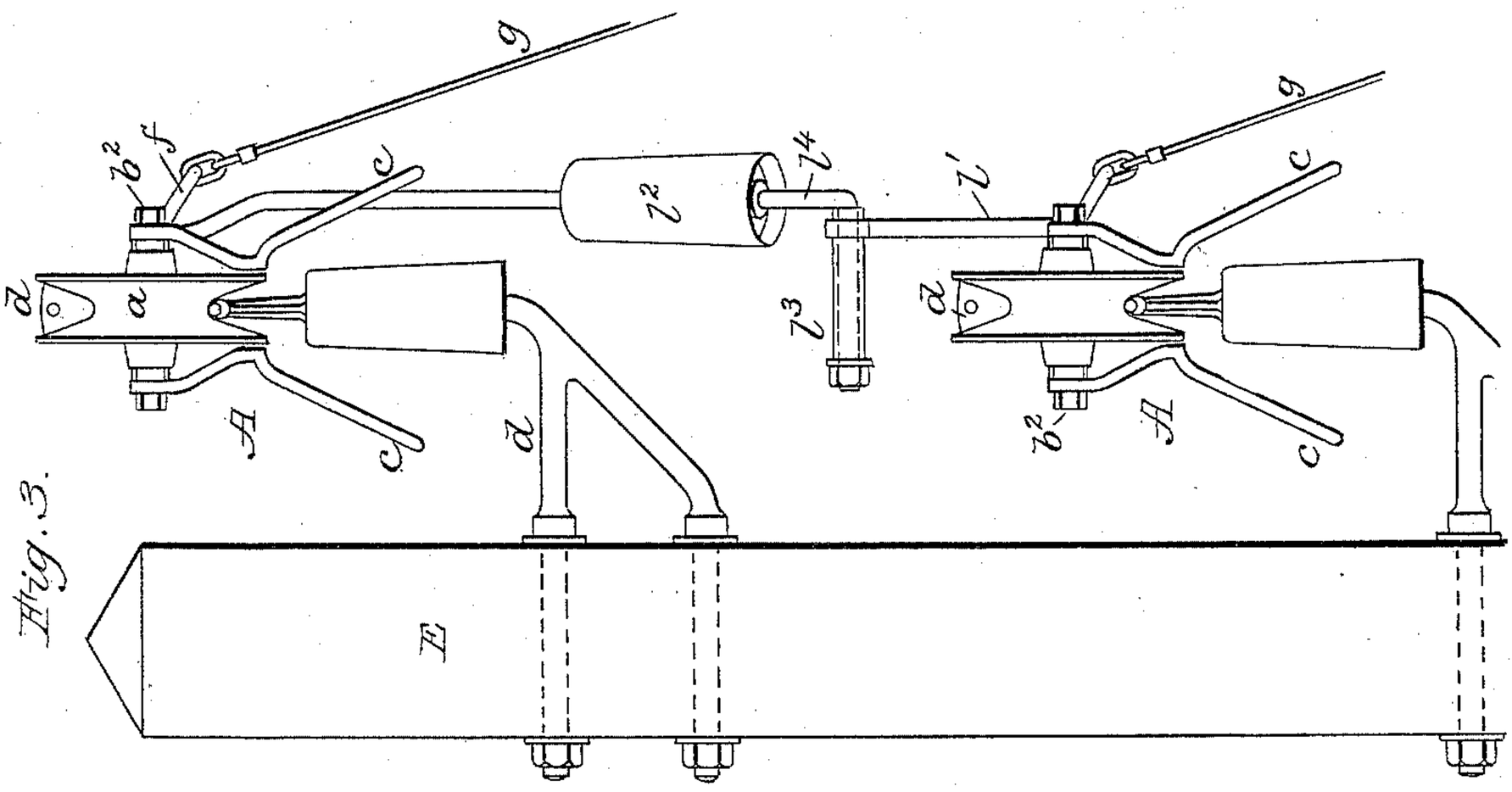

Fig. 3.

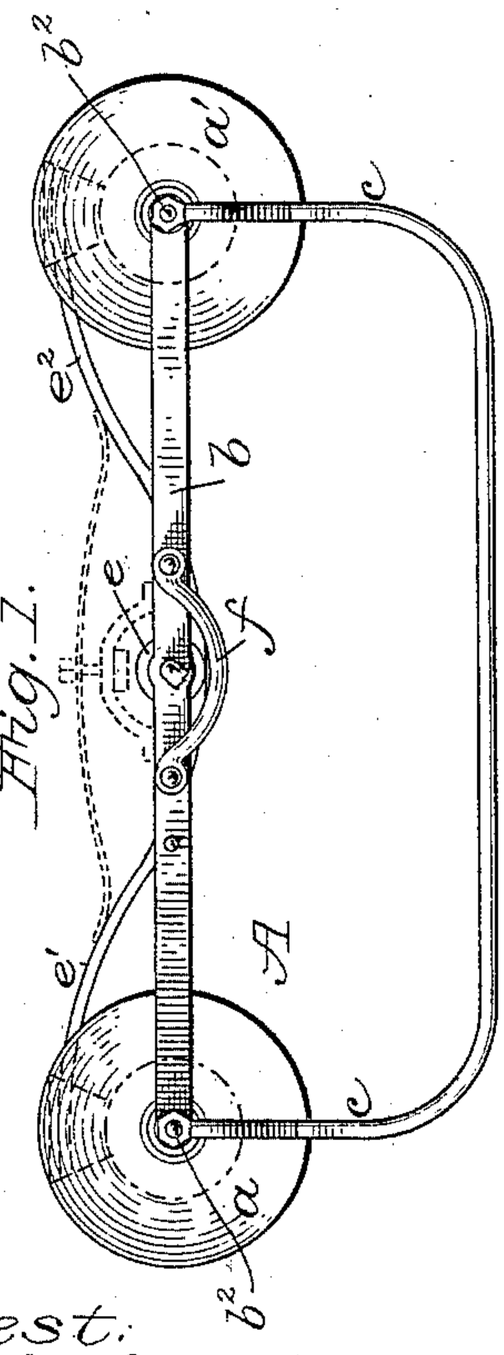

Fig. 1.

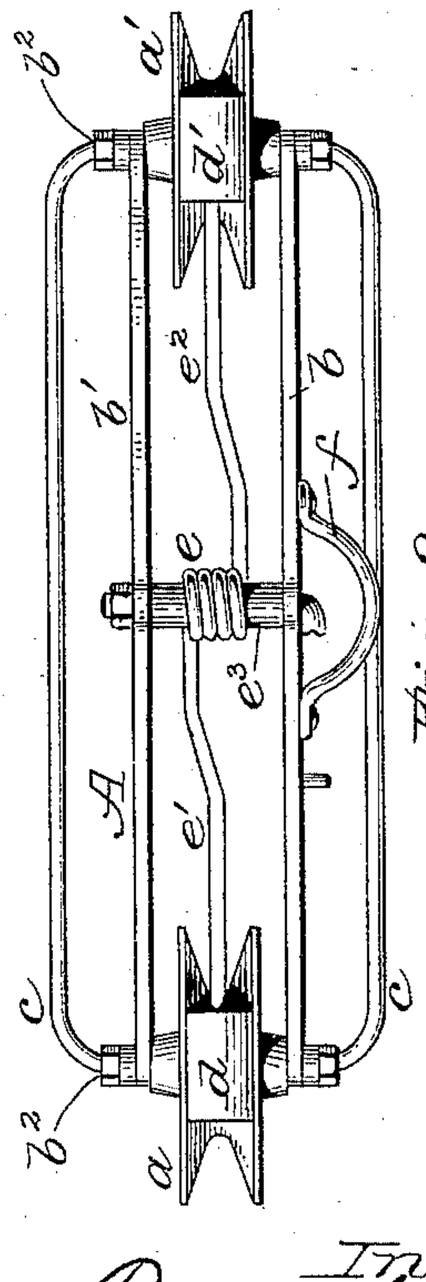

Fig. 2.

Attest:
Philip F. Larner.
Lowell Lasett.

Inventor:
Rudolf Eickemeyer
By Wm. C. Wood
Attorney.

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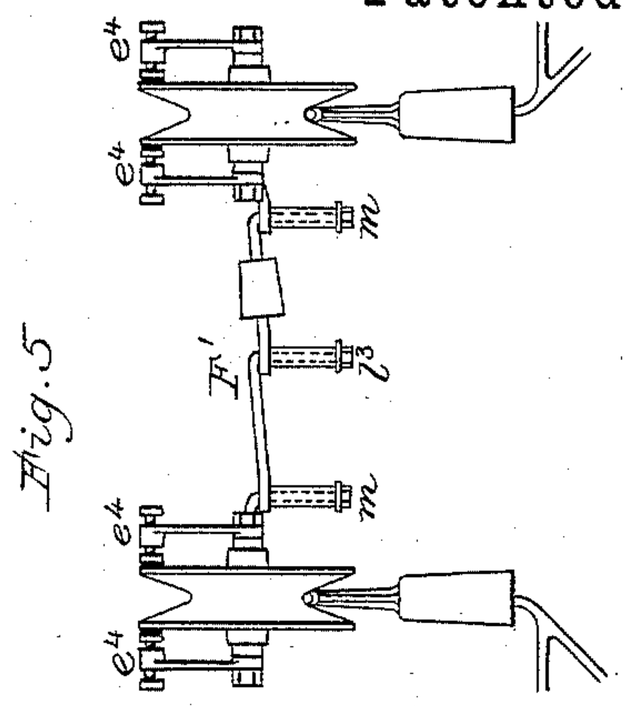

Fig. 5.

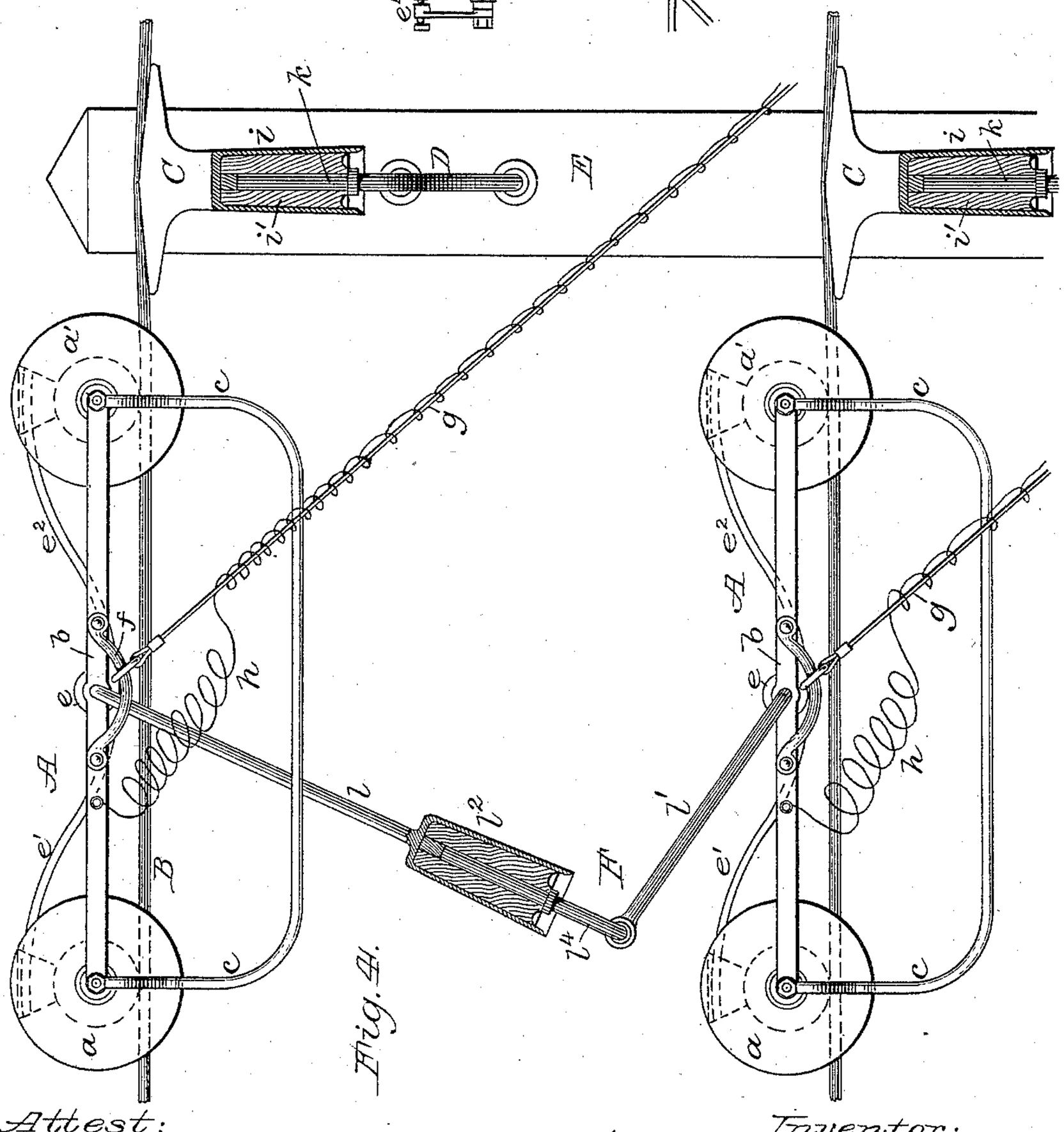

Fig. 4.

Attest:
Philip F. Larner.
Lowell Battle.

Inventor:
Rudolf Eickemeyer.
By Munn & Wood
Attorney.

UNITED STATES PATENT OFFICE.

RUDOLF EICKEMEYER, OF YONKERS, NEW YORK.

TROLLEY FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 448,831, dated March 24, 1891.

Application filed July 19, 1890. Serial No. 359,245. (No model.)

To all whom it may concern:

Be it known that I, RUDOLF EICKEMEYER, of Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Electric Locomotion; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of my invention.

My said improvements pertain to those systems of electric locomotion which involve the imparting of electric energy to the locomotive from line-wires on which an electric trolley, or some form of traveling contact conductor, is mounted and caused to travel with the locomotive to which the trolley is connected, as by means of a cord or chain and suitable electric conductors, and said improvements have been, as a whole, devised with reference to their use with two line-wires occupying the same vertical plane, although portions thereof are of value in connection with line-wires otherwise arranged.

One feature of my invention, which is applicable to the widest range of service, consists in providing a trolley with a braking device, which, while it does not materially increase the draft or pull, as between the locomotive and the trolley, causes the latter to promptly check its speed upon the slowing down of the locomotive, thus guarding against displacing tendencies and obviating deranging strains on the line-wire and trolleys, all of which are incident to the sudden pulls and jerks to which trolleys are subjected while in service.

Another feature of my invention is restricted to a pair of trolleys, each having its own line-wire, and this consists in coupling them together by means of a complex link, which freely permits them to separate or approach each other while maintaining all of the trolley-wheels in a uniform vertical position. In other words, the joints in the link and between it and the frames of the two trolleys are hinge-joints, and inflexible with respect of permitting either trolley to cant or rock on its wire independently of the other trolley, while readily permitting both trolleys to freely and firmly ride upon the line-wires regardless of variations in their spacing. This part of my invention is of special value upon line-wires which occupy the same vertical plane, because the wheels of both trolleys are always maintained by the complex link in substantially the same vertical plane.

After describing my several improvements as illustrated in the drawings, the features deemed novel will be duly set forth in the several clauses of claims hereunto annexed.

Figures 1 and 2 illustrate in side and top view one of my improved trolleys. Fig. 3 illustrates a pair of my trolleys in end view, as when coupled and mounted for service on line-wires in accordance with the main features of my invention. Fig. 4 is a side view of the trolleys and line-wires shown in Fig. 3. Fig. 5 is an end view of a pair of my trolleys mounted on line-wires occupying the same horizontal plane.

The trolley A has two deeply-grooved wheels *a a'*, either or both composed of good conducting metal, and provided with metalline journal-boxes which not only afford good conductivity but require little if any lubrication. These wheels are mounted in a frame composed of two side bars *b* and *b'* and bolts or rods b^2, which also serve as journal-bearings or fixed axles for the wheels. The frame is laterally braced centrally either by a bolt or one end of a link which couples one trolley with another, and in either case a support is thereby afforded for the braking devices, as will be hereinafter described. At each side there is attached to the ends of the axle rods or bolts (or to the side bars *b*) a light pendent guard *c*, which closely approaches the lower edges of both wheels, and thence flares outwardly and downwardly, so that should the usual twisting and displacing tendency cause a wheel to jump from the wire the trolley would be retained thereon and the wheel be promptly caused to resume its proper position on the wire.

As a specially novel feature, my trolley is provided with a braking device which by constantly acting upon the wheels will cause the trolley to maintain a substantially uniform position with relation to the traveling motor, so that in the slowing down of the latter the trolley cannot unduly run forward, and there-

fore the trailing cord will always remain taut or nearly so, and thus obviate the quick jerking pulls which are so liable to displace trolleys and to strain the line-wires in starting after each halt of the locomotive.

A simple and effective form of brake is here shown, and it consists of two brake-shoes d and d', accurately fitted to the grooves of the wheels a a'. A single length of spring-wire is bent to form a central coiled spring e and also two brake-handles e' e^2, each of which is secured to a brake-shoe. The coiled spring portion serves also as a means for pivotally mounting the brakes upon a sleeve e^3 on a central cross-bar, and the sleeve may be dispensed with, although desirable when said cross-bar is a part of a hinged link which couples two trolleys together. It will be seen that the spring can be initially adjusted to afford proper pressure at the brake-shoes, and that an adjustment may thereafter be readily effected from time to time by slightly bending the brake-handles. Although further capacity for adjustment of the spring will seldom be needed, it may be readily provided for—as, for instance, as indicated in dotted lines in Fig. 1, showing a bow-spring bearing at its ends upon both brake-handles and adjusted by means of a central post having a screw-thread and an adjusting-nut.

The brake-shoes may be composed of wood or any other good frictional material not liable to unduly wear the wheels or to impair the conductivity of their surfaces, and in some cases hard carbon may be used to advantage with springs which exert a greater pressure than would be needed with shoes composed of fibrous material.

At one side of the trolley-frame there is a bent bar or loop f, to which the usual trolley-cord g is connected by means of a ring, and the electric conductor h is attached to the inner side bar, and at a proper distance from the frame it merges with the trolley-cord.

The line-wires B are mounted upon T-shaped standards which are but little thicker than the wire and of sufficient length to afford a firm support, and each has a tubular stem i open at its bottom and closed at its top. The bearing-surface of the standard is concaved sufficiently to receive the wire, which may be fastened thereto by means of solder. These standards C are supported upon brackets D, which are firmly secured to the posts E, each bracket having a spindle k, which tightly occupies a hole in a piece of wood or other suitable insulating material i' within the tubular stem of the standard. As thus mounted, the line-wires are well insulated from the posts, and they can be readily detached and applied.

As shown in the drawings, Figs. 3 and 4, two line-wires occupy the same vertical plane, and on these two co-operative trolleys are carried, each having its own trolley-cord g. These two trolleys are coupled together in a novel manner by means of the complex link F, the two ends of which serve as central cross-bars in the trolley-frames. This link is flexibly jointed to the two trolleys, and it has also a hinge-joint located between the trolleys; but it is rigid laterally, and it is also so coupled to the two trolleys that both are confined against undue swinging movements on their wires. This complex link is composed of two end pieces or parts l and l', each of which is bent at right angles at its outer end, as at bars b b', and is journaled in both of the side bars of its appropriate trolley. The part l at its inner end terminates with a tubular socket l^2 filled with insulating material, provided with a central hole. The inner end of the part l' is provided with a tubular socket l^3, which is parallel with the axes of the trolley-wheels, and these two parts of the link l and l' are united by a third part l^4 in the form of a rectangular elbow, one end occupying the tubular socket l^3, and the other the insulated socket l^2. Being thus coupled the trolleys are free to vary in their traveling movements within certain properly-restricted limits, and also free to follow the variably-spaced line-wires; but both trolleys are maintained by the complex link in the same vertical plane as that occupied by the line-wires. It will be seen that neither trolley can be tilted on its wire out of a vertical plane, and that it will be practically impossible for either to leave its wire, although both can be readily dismounted and replaced by means of a pole, having a hook to engage with the cord-loop f of the upper trolley with or without a properly-spaced hook, for simultaneously engaging with the lower trolley. With trolleys thus coupled together the pendent guards are seldom actually needed, and especially so when the brakes are employed, and all sudden jerks or pulls with their displacing tendencies are reduced to a minimum.

It is to be understood that the braking mechanism may be widely varied in its character without departure from my invention; and also that the grooved wheels need not be conductors if trailing contact-brushes be employed, as is common in trolleys, and also that the complex link will render good service, even if the line-wires be side by side instead of one above the other, for instance, as illustrated in Fig. 5.

On tunnel lines and beneath elevated steam-railways, and in other connections where head-room is limited the two line-wires generally occupy substantially the same horizontal plane, as illustrated in said Fig. 5. In this instance the complex hinged link F′ is precisely as before described; but its pivotal ends occupy fixed vertical sleeves m centrally located on the coincident or inner sides of the two trolley-frames, and hence the hinging action of the frames with relation to the link is not precisely the same as when one trolley is above the other; but as in that case these two trolleys are coupled and maintained with their wheels in a vertical plane and they are

free to vary the space between them and to safely follow such lateral curves in the line-wires, as are often desirable, as well as the vertical variations incident to sagging, although the latter may be cheaply reduced to a minimum when the line-wires are supported by an overhead structure instead of being mounted on poles, it will be seen that the central hinge-joints of the complex links in both pairs of trolleys are rigid on the line of their axes, and also that the hinge-joints between the ends of the links and the trolley-frames are also rigid on their pivotal lines, and that the axes or pivot-lines of the three hinge-joints are parallel with each other, thus providing in each case for the constant parallelism of the wheel-axles in the trolley of each pair, and rendering it almost impossible for either trolley to depart from its proper position on the line-wire, and enabling either trolley to freely travel a little in advance of or behind the other. These trolleys of Fig. 5 may or may not be provided with pendent guards; but braking devices are important. In this instance two brake-shoes e^4 are provided for each wheel, one on each side, and in contact near its periphery, and each is mounted on the end of a screw tapped into the upper end of a spring-standard confined at its base to the frame at the axle of the wheel.

In the operation of a trolley provided with constantly-operating brakes, there will of course be more or less tendency of the grooved wheels to slip on the line-wires, thus maintaining good conductivity. In practice I find that my trolleys operate as smoothly and successfully when the locomotive to which they are attached is running on an outer track, as when running on an inner track alongside the wire-supporting poles, without any change in the length of the trolley-cords.

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

1. The combination, with the wheels of an electric trolley or traveling contact, of constantly-applied braking mechanism, substantially as described.

2. In a system of electric locomotion, the combination, substantially as hereinbefore described, of a line-wire, a traveling contact or trolley, and braking mechanism for checking or retarding the speed of the trolley on the line-wire upon the slackening of speed by a motor connected with the trolley.

3. In a system of electric locomotion, the combination, substantially as hereinbefore described, of a pair of line-wires, a trolley on each wire, and a complex link which couples said trolleys together, is flexible in one direction and rigid in the opposite direction, and maintains both trolleys in a vertical position on the line-wires, permits them to freely move toward and from each other, and also permits each to freely travel independently of the other within prescribed limits.

4. In a system of electric locomotion, the combination, substantially as hereinbefore described, of a pair of line-wires, a pair of trolleys on said wires, and an intermediate complex link having a central hinge-joint and coupled to both trolleys by other hinge-joints, all of said joints being rigid in the line of their axes, and all of said axes being parallel.

5. In a system of electric locomotion, the combination, substantially as described, of two line-wires, one above the other, a grooved wheel-trolley on each wire, and a complex link having a central hinge-joint, coupled to the two trolleys by other hinge-joints, the axes of the wheels in both trolleys being parallel with the axes of the several hinge-joints.

RUDOLF EICKEMEYER.

Witnesses:
JOHN D. IHLDER,
JAMES S. FITCH.