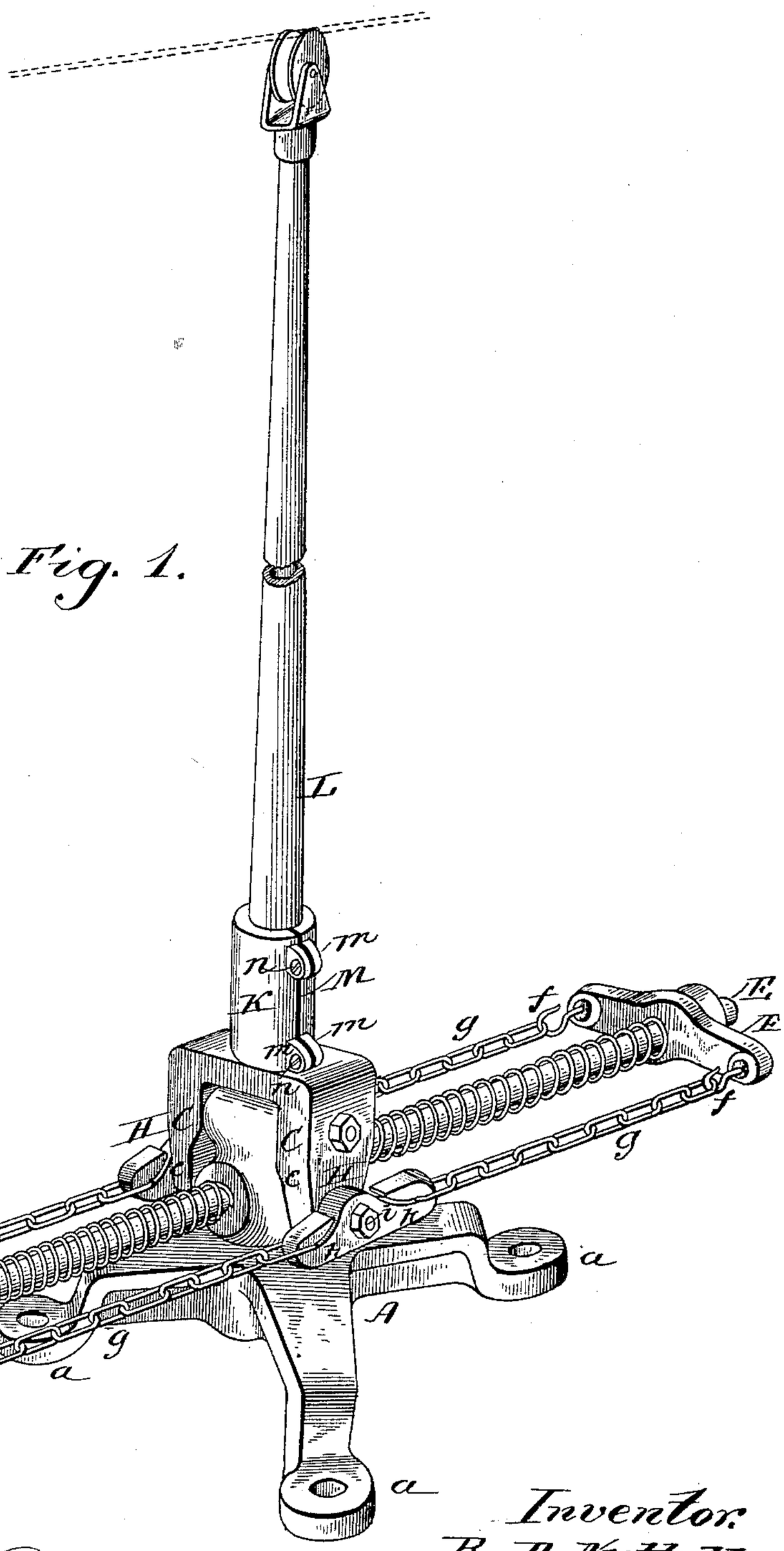
(No Model.) 2 Sheets—Sheet 1.

R. D. NUTTALL.

TROLLEY FOR ELECTRIC CARS.

No. 462,578. Patented Nov. 3, 1891.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

R. D. NUTTALL.

TROLLEY FOR ELECTRIC CARS.

No. 462,578. Patented Nov. 3, 1891.

Fig. 2.

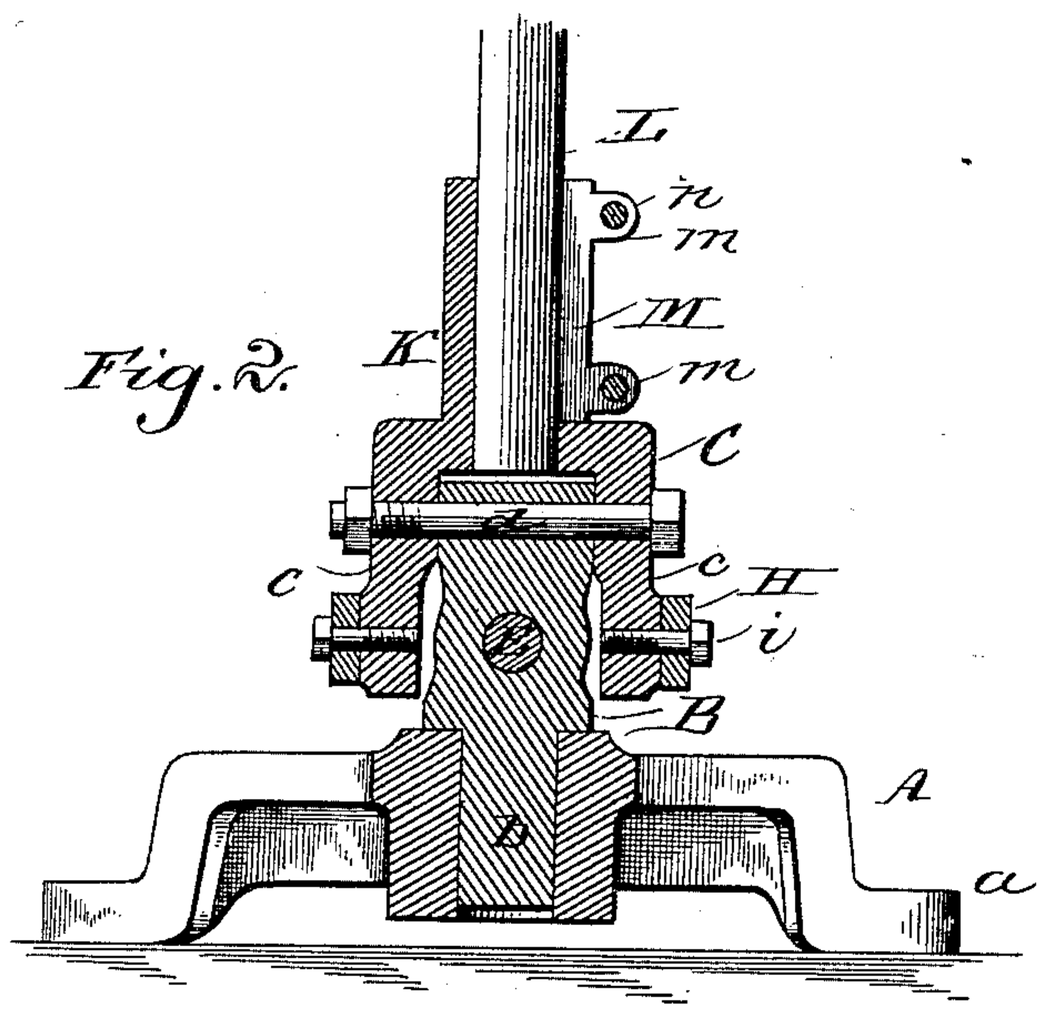
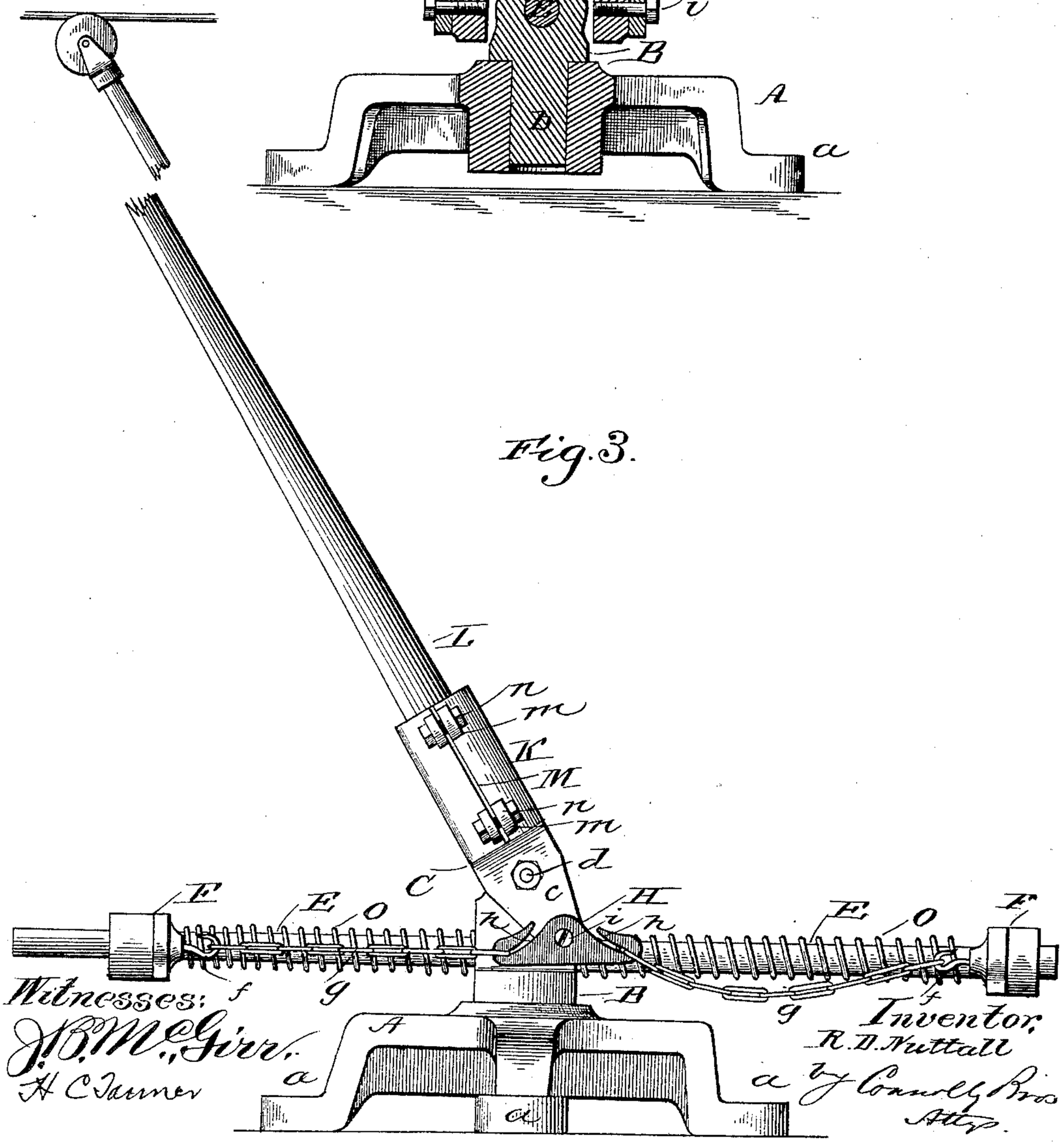


Fig. 3.



UNITED STATES PATENT OFFICE.

ROBERT D. NUTTALL, OF ALLEGHENY, PENNSYLVANIA.

TROLLEY FOR ELECTRIC CARS.

SPECIFICATION forming part of Letters Patent No. 462,578, dated November 3, 1891.

Application filed June 19, 1891. Serial No. 396,862. (No model.)

To all whom it may concern:

Be it known that I, ROBERT D. NUTTALL, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Trolleys for Electric Cars; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification.

My invention has relation to trolleys for electric railway-cars, and has for its object the provision of a novel device for maintaining contact between a trolley-wheel and an electric conductor with equal certainty on straight and curved sections of the line and notwithstanding any variations in the height of the conductor above the road-bed or irregularities in or on the conductor or joints or connections of the same. In order to fulfill the requirements above indicated, it is necessary that the trolley-wheel should be supported upon the end of a rod capable of motion both up and down and in a circle, but always having a tendency to assume a vertical position under the resilient action of a properly-arranged spring or springs, and this has been heretofore accomplished in a somewhat satisfactory manner by pivoting the trolley-rod upon a swiveled frame and attaching springs to the rod near its pivotal point, which, being stretched by any strain upon the rod that would throw the same out of perpendicular, would tend to bear the rod against the strain and return it to the perpendicular position when such strain was released. Many of such structures have been found objectionable, owing to the fact that the constant stretching of the springs has a tendency to weaken them, causing them to break unexpectedly, and, besides, such structures, or most of them, are complex, cumbersome, and expensive.

In carrying out my invention I provide a suitable base adapted to be fastened on top of a car, a swivel-head mounted on such base, a yoke secured to such head by a horizontal pivot and formed with a socket for the reception of the trolley-rod, a horizontal rod projecting out from each side of the swivel-head and carrying spiral springs and sliding cross-heads, the latter being connected to the pivoted yoke by suitable flexible connections, and the whole constituting a comparatively simple and inexpensive trolley-fixture, in which the expansive force, exclusively of coiled springs, is utilized to give the desired resiliency to the trolley-rod.

My invention consists in the novel construction, combinations, and arrangements of parts, and is fully shown in the accompanying drawings, wherein—

Figure 1 is a perspective view, Fig. 2 a vertical sectional view, and Fig. 3 a side elevation, of my improvements.

A designates the base of the structure, having feet *a a a a*, through which pass bolts securing the base to the roof of a car when the device is in use. The base A is formed with a central hole, which receives the shank *b* of a swivel-head B, the shank fitting the hole loosely enough to allow the head to turn easily. A yoke C is fitted to embrace loosely with its depending arms *c c* the swivel-head B, and is pivotally attached to said head by a horizontal bolt *d*, passing through the arms *c c* and the upper part of the swivel-head. A long rod E passes through the swivel-head B below, and at right angles to the pivoting-bolt *d* projects out an equal distance on each side of the swivel-head, and is fitted on each end with a sliding cross-head F, having bolts *f f* through their ends, the bolts being formed with hooked ends that engage with the ends of chains *g g*. The chains *g g* extend to and are hooked into inclined slots *h h* in the links H H, which latter are pivotally attached to the lower ends of the depending arms *c c* of the yoke C by pivoting screws or bolts *i i*.

The yoke C, which consists of a single piece of metal, is cast with a socket K, which receives the end of the trolley-rod L, and the socket is formed with a saw-kerf M on one side and with lugs *m m* on each side of the kerf, through which said lugs pass bolts *n n*, that serve to draw the walls of the socket together, so as to tightly embrace and firmly hold the trolley-rod.

Between each of the cross-heads F and the swivel-head B and surrounding the rod E are strong spiral springs O O, the resiliency of which is exerted to press the cross-heads out from the swivel-head and strain the chains *g g*. The springs on each side of the swivel-

head being of equal strength, they will, when the trolley is inactive, serve to maintain the trolley-rod in a perpendicular position; but when the end of the trolley-rod is bent down (as when the trolley-wheel is on the wire) the spring on one side will be compressed, as is clearly shown in Fig. 3 of the drawings, while the pressure upon the other spring will be relaxed. When the trolley-rod is bent down in the opposite direction, the spring which has been compressed will be released from pressure and the pressure exerted upon the spring on the other side of the swivel-head. The trolley-rod being supported in a pivoted yoke which is carried on a swiveled head, it is obvious that the free end of the trolley-rod is capable of universal motion within a very considerable range, and the springs which give the required elasticity to the trolley-rod, being also supported and carried by the swiveled head, exert their power with equal certainty whatever the position of the trolley-rod may be. As the springs act by expansion solely, being loose upon the rod E and not attached to the cross-heads or the swivel-head, there is little or no danger of the springs being broken however severe the usage the trolley may have.

Having fully described my invention, I claim—

1. In a trolley for electric cars, the combination of a pivoted yoke provided with a socket for the trolley-rod, a swivel-head upon which said yoke is pivoted, with a horizontal rod extending out from each side of the said swivel-head, spiral springs surrounding said horizontal rod, cross-heads sliding on the same, and flexible connections attaching said cross-heads to the yoke, substantially as described.

2. In a trolley for electric cars, the combination of a suitable base, a swivel-head mounted thereon, a yoke adapted to receive a trolley-rod and pivotally secured to said head, with movable cross-heads attached to said yoke by flexible connections, and springs abutting against said cross-heads and so arranged that one of them will be compressed when the trolley-rod is moved out the perpendicular, substantially as described.

3. In a trolley for electric cars, the combination of base A, head B, swiveled thereon, yoke C, pivotally attached to said head, rod E, extending horizontally from each side of the swivel-head, and cross-heads F F, sliding on said rod and flexibly connected to said yoke, with the spiral springs O O interposed between the cross-heads and the swivel-head, substantially as described.

4. In a trolley for electric cars, the combination of a base, a swivel-head supported on said base, a trolley-rod horizontally pivoted on said head, a compression-spring abutting against said head, and suitable connections between the trolley-rod and the outer end of said spring, all constructed and arranged substantially as described, whereby the movement of the trolley-rod will compress the spring.

In testimony that I claim the foregoing I have hereunto set my hand this 16th day of April, 1891.

ROBERT D. NUTTALL.

Witnesses:
A. E. ANDERSON,
JOHN JACKSON.