No. 719,006. PATENTED JAN. 27, 1903.

A. J. JOHNSON.

TROLLEY.

APPLICATION FILED APR. 14, 1902.

NO MODEL.

Fig. 1,

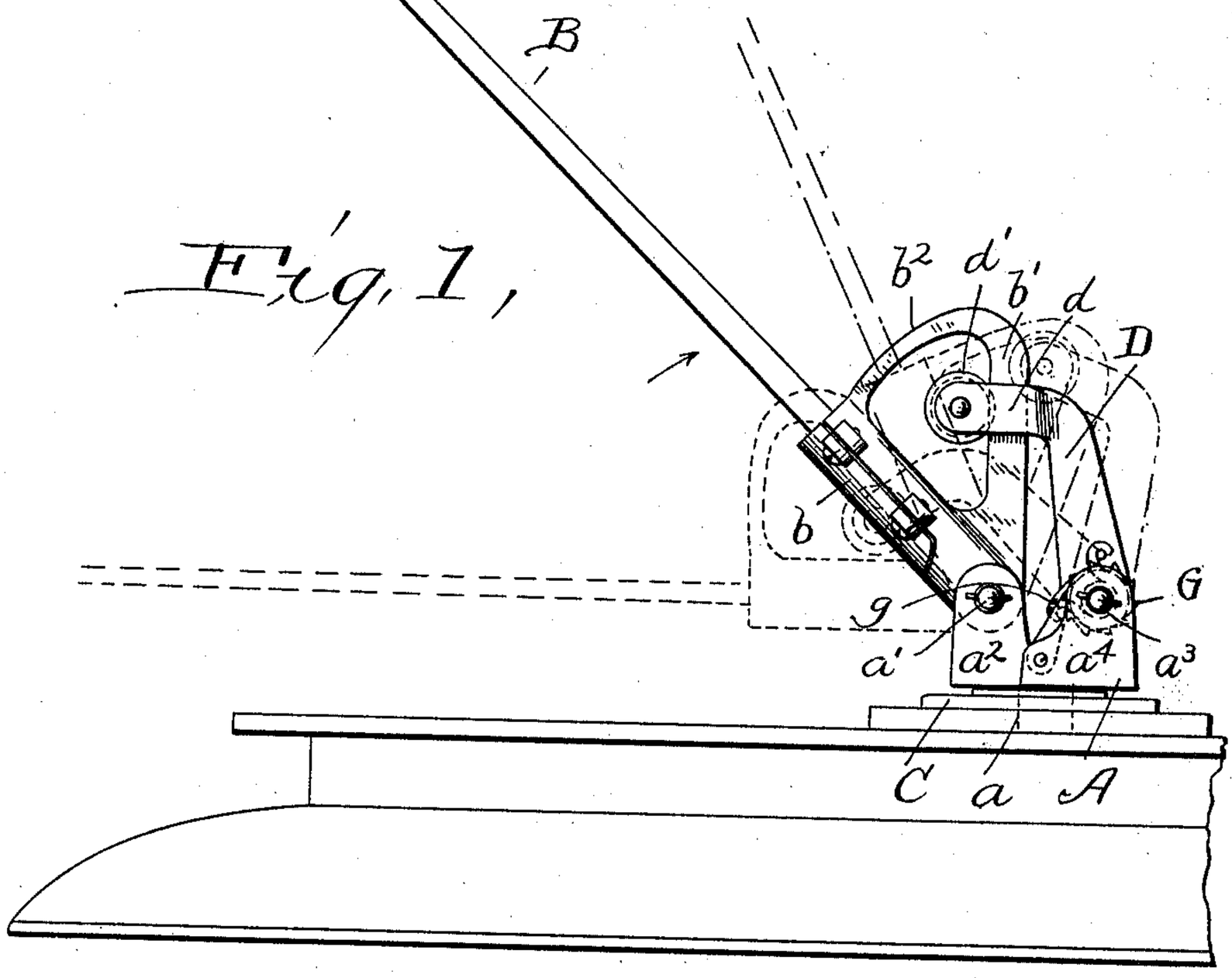


Fig. 2,

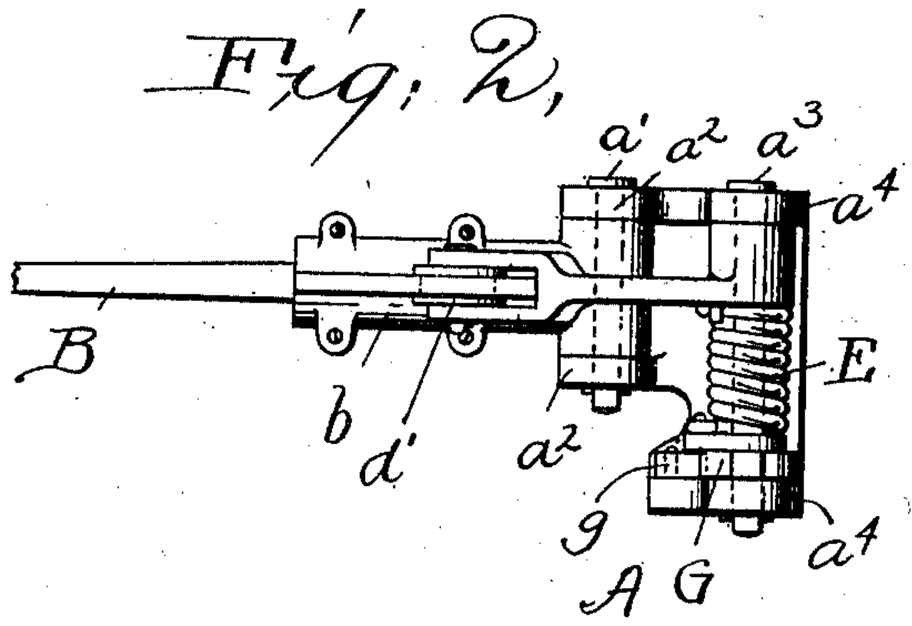
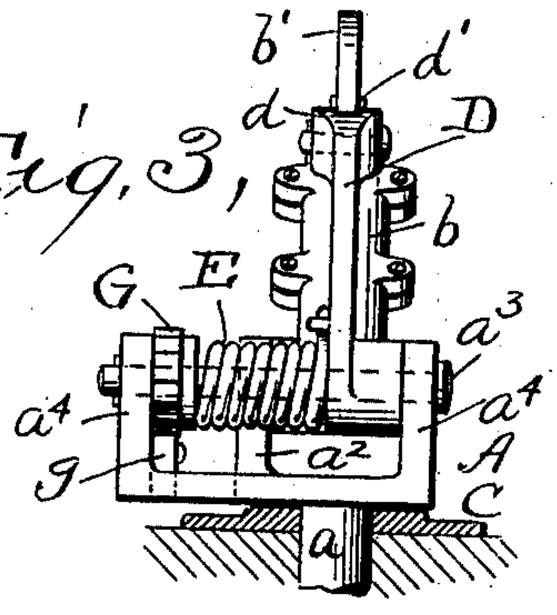


Fig. 3,



Witnesses.
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UNITED STATES PATENT OFFICE.

ANDREW J. JOHNSON, OF CLEVELAND, OHIO.

TROLLEY.

SPECIFICATION forming part of Letters Patent No. 719,006, dated January 27, 1903.

Application filed April 14, 1902. Serial No. 102,712. (No model.)

To all whom it may concern:

Be it known that I, ANDREW J. JOHNSON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Trolleys, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

Trolley-poles carried by electric cars are necessarily under the influence of springs which press them upward, so that the trolley-wheel will engage and remain in engagement with the conductor-wires. Various sorts of springs have been used for the stated purpose, but they all have this characteristic defect—viz., that their power increases as the outer end of the pole is lowered and decreases as it swings upward. There is a normal distance above the car at which it is sought to maintain the conductor-wires; but along every line there are places where it is necessary to vary generally to increase this distance. This is especially true at steam-railway crossings, where the conductor-wires are usually elevated a considerable distance above their normal position. It is necessary that the force of the spring operating the trolley-arm shall be sufficient to hold the trolley-wheel in engagement with the conductor-wire when so elevated, especially at railway-crossings, because at such points the most serious consequences might result from the trolley jumping from the wire. It follows, therefore, that the spring must exert unnecessary force under the normal conditions—that is to say, when the conductor-wires are at the normal short distance above the car. This subjects the trolley-wheels and the conductor-wires to serious and expensive wear.

The object of my invention is to provide a spring-actuated trolley-pole which will press with substantially the same force against the conductor-wires whether they be high or low.

The invention consists in the construction and combination of parts shown in the drawings and hereinafter described, and definitely pointed out in the claims.

In the drawings, Figure 1 is a side elevation of the top of a car, a trolley device connected thereto and embodying my invention, and a piece of the overhead conducting-wire with which the trolley contacts. Fig. 2 is a plan view of the mechanism for actuating the trolley-pole, and Fig. 3 is a front view thereof.

Referring to the parts by letters, A represents the trolley-base, which, as is usual, is swiveled to the top of the car on a vertical axis, this result being attained, preferably, by a cylindrical stud *a*, projecting downward from the bottom of the base into a correspondingly-shaped socket in a plate C, secured to the top of the car. The trolley-pole B, or rather a socket-piece *b*, in which the lower end of the pole proper is rigidly secured, is pivoted on a horizontal axis to the base A, so as to be capable of swinging up and down abut said axis. As shown, the trolley-pole socket-piece is loosely mounted on an arbor a', which extends between and is secured to two ears a^2, extending upward from the base.

D represents an operating-arm, which is located in front of the trolley-pole and also pivoted to said base on a horizontal axis parallel with the axis of the trolley-pole. As shown, this operating-arm is loosely hung on an arbor a^3, extending between and secured to ears a^4 on the base. This operating-arm is under the influence of a spring E, acting always to swing it forward and upward, which spring obviously loses in tension as it swings in the direction stated. Preferably this spring is a torsion coiled spring surrounding the arbor a^3 and secured at one end to said arm and at the other end to a ratchet-wheel G, rotatably mounted on the arbor, but held by a pawl *g* against rotation by the force of the spring, which pawl *g* is pivoted to the base A. This ratchet and pawl also afford means for regulating the tension of the spring.

There is a sliding connection between the rigid member, of which the trolley-pole is a part, and this spring-actuated operating-arm, by means of which force of the spring is transmitted to the trolley-pole, but at different distances from its axis, depending upon the position of the pole. The specific form of this

connection shown in the drawings is as follows: The trolley-pole socket-piece b has on its front side an arm b', which when the trolley-pole is in its usual position is approximately vertical, and the upper end of this arm is provided with a rearwardly-extended shoulder or stop, formed, as shown, by means of a brace-bar b^2 extending from the end of said arm b' to the top of the socket-piece. The operating-arm D is bent rearward at its upper end, and this rearward extension d is forked and embraces said arm b'. A friction-wheel d' lies between and is mounted in the said forks of the operating-arm behind the arm b' and bears against the rear side thereof. The force of the spring E upon the operating-arm is transmitted to the trolley-pole through the described mechanism; but since the pole and operating-arm are pivoted on different axes it is obvious as the operating-arm swings upward and forward the friction-wheel will likewise slide upon the arm b' away from the axis of the pole. Therefore as the spring loses tension its force is transmitted to the trolley-pole with greater leverage, and vice versa. The result is that a substantially uniform force derived from the spring, whose force varies, as stated, will operate to hold the trolley in contact with the wire. The shoulder formed on the upper end of the arm b' by the integral brace-bar b^2 will by its engagement with the friction-wheel d' limit the possible movement of the described parts under the influence of the spring in case the trolley should jump from the conductor-wire, and it also prevents the disengagement of the operative connection between the operating-arm and trolley-pole. When the trolley-pole is moved downward, it draws the arm D with it through the described mechanism, thereby putting the spring under greater tension, but causing a corresponding movement of the friction-wheel d' toward the axis of the pole.

Having described my invention, I claim—

1. In a trolley, the combination of a pivoted trolley-pole, with a spring-actuated operating-arm which has a sliding engagement with the rear side of a part of said trolley-pole, and which swings about an axis located at such a point in front of the axis of the trolley-pole that, as the tension of the spring is changed by the movement of said operating-arm about its axis, the leverage of said arm upon the trolley-pole is inversely and proportionately changed by the corresponding movement of the free end of said operating-arm along the trolley-pole, substantially as and for the purpose specified.

2. In a trolley, the combination of a base, a member carrying a trolley-pole pivoted to said base on a horizontal axis, a rigid operating-arm pivoted to said base on an axis in front of and parallel to the axis first named, and a spring under tension operating to swing said operating-arm forward, there being a sliding engagement between the free end of said arm and the rear side of a part of said pole-carrying member whereby the leverage exerted by said operating-arm upon the pole-carrying member is increased as the tension of the spring is decreased by the spring-induced movement of said operating-arm, substantially as and for the purpose specified.

3. In a trolley, the combination of a trolley-pole pivoted on a substantially horizontal axis and rigidly carrying a rigid arm, an operating-arm pivoted on a parallel axis, a friction-wheel mounted on said operating-arm and engaging the rear side of said rigid arm on said trolley-pole, and a spring actuating said operating-arm, whereby when the tension of the spring upon said operating-arm is decreased the leverage exerted by said arm upon the rigid arm of the trolley-pole will be increased.

4. In a trolley, the combination of a trolley-pole pivoted on a substantially horizontal axis, an operating-arm pivoted on a parallel axis in front of it, and having its outer end bent rearwardly and bifurcated to embrace a part of the trolley-pole member, a friction-wheel mounted on said bifurcated end of the operating-arm and engaging the rear side of the part referred to, and a spring actuating said arm, substantially as and for the purpose specified.

5. In a trolley, the combination of a base swiveled on a vertical axis to the top of a car, a trolley-pole socket-piece pivoted on a horizontal axis to said base and having an angularly-disposed arm, an operating-arm pivoted to said base on an axis in front of and parallel to the axis of the socket-piece and having its outer end bent rearward, a friction-roller mounted in the end of said arm and engaging with the rear side of the socket-piece arm, and a spring actuating said operating-arm, substantially as and for the purpose specified.

6. In a trolley, the combination of a base swiveled on a vertical axis to the top of a car, a trolley-pole socket-piece pivoted on a horizontal axis to said base and having an angularly-disposed arm which is connected at its upper end by a brace-bar with the socket-piece proper, an operating-arm pivoted to said base on an axis in front of and parallel to the axis of the socket-piece and having its outer end bent rearward and bifurcated and embracing said arm of the trolley-pole socket, a friction-roller mounted in the bifurcated end of said arm and engaging with the rear side of the socket-piece arm, and a spring actuating said operating-arm, substantially as and for the purpose specified.

7. In a trolley, the combination of a base, a trolley-pole socket-piece pivoted thereto on a horizontal axis, and having an angularly-disposed operating-arm, an operating-arm also pivoted to the base on an axis behind and parallel to the axis of the socket-piece and

having a sliding engagement with the angular arm of the socket-piece, a torsion-spring secured at one end to said operating-arm, an independently-rotatable ratchet-wheel to which the other end of said spring is secured, and a pawl engaging with said ratchet, substantially as and for the purpose specified.

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

ANDREW J. JOHNSON.

Witnesses:
E. B. GILCHRIST,
E. L. THURSTON.