No. 632,033. Patented Aug. 29, 1899.

C. L. WEYAND.

TROLLEY.

(Application filed Apr. 29, 1899.)

(No Model.)

Fig. 1.

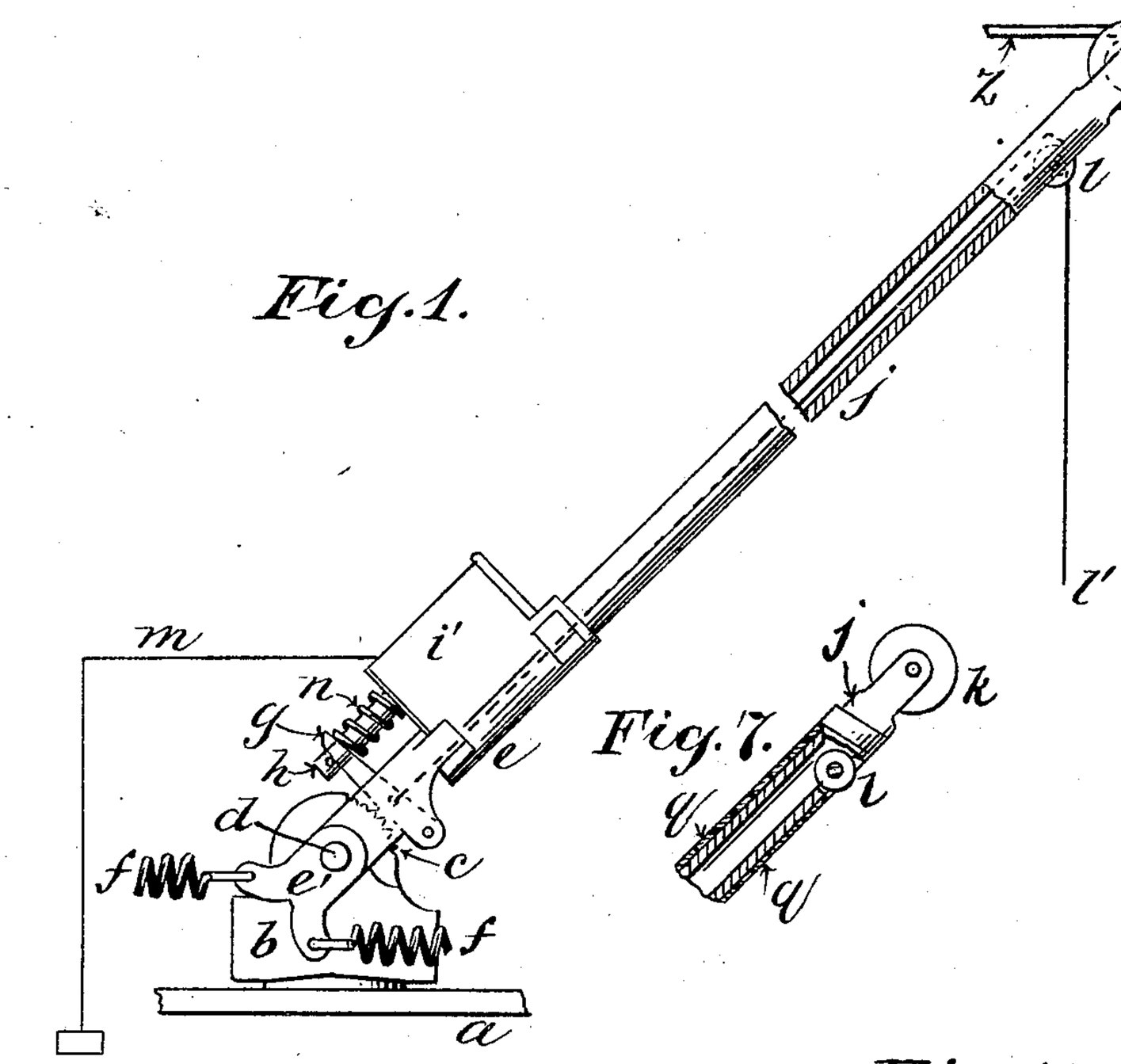

Fig. 7.

Fig. 4.

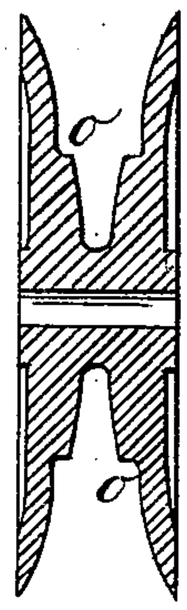

Fig. 5.

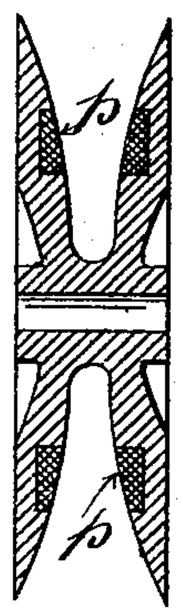

Fig. 2.

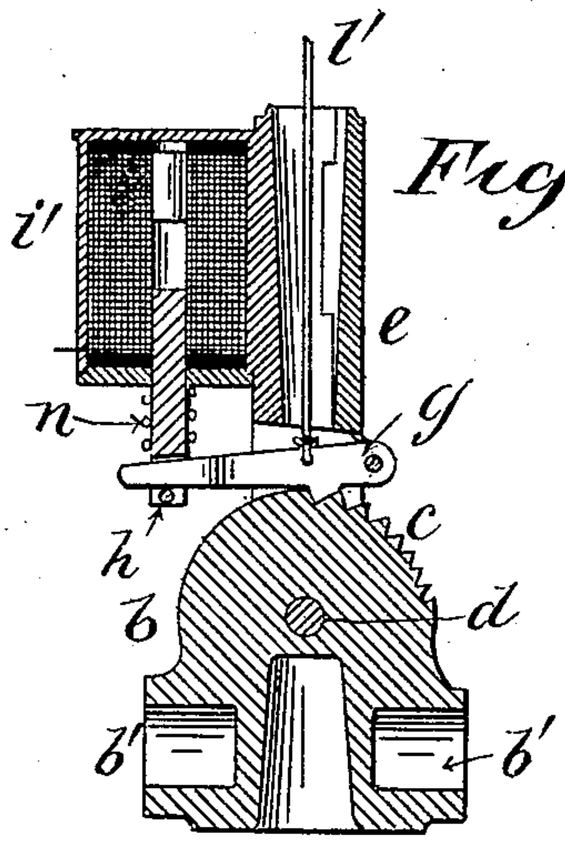

Fig. 3.

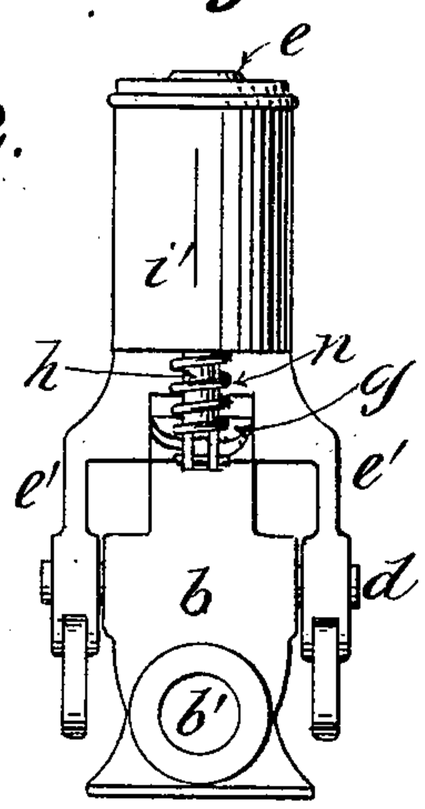

Fig. 6.

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UNITED STATES PATENT OFFICE.

CHARLES L. WEYAND, OF NEW YORK, N. Y.

TROLLEY.

SPECIFICATION forming part of Letters Patent No. 632,033, dated August 29, 1899.

Application filed April 29, 1899. Serial No. 714,939. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. WEYAND, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Trolley Devices for Electric Railways, of which the following is a specification.

This invention relates to certain new and useful improvements in trolley devices for electric railways, and has for its objects the maintenance of a more perfect contact between the trolley-wheel and the line-wire and the prevention of the trolley-pole from assuming a perpendicular position when the wheel has left the wire, wherein it is liable to injury by and to inflict injury upon objects with which it may come in contact.

To these ends, therefore, my said invention consists in means for instantly and automatically locking the trolley-pole in its then position upon a break or interruption of the current and for instantly and automatically unlocking said pole and rendering the same operative and pliant upon the reëstablishment of said current, of means for unlocking and operating said pole manually and for breaking the current before the line-wire has entirely left the groove in the trolley-wheel, as well as in the arrangement and combination of parts and the details of construction, all as hereinafter more fully specified, and pointed out in the claims.

Referring to the accompanying drawings, in the several figures of which like parts are similarly designated, Figure 1 is a trolley-pole, partly in section, and its connections embodying my invention. Fig. 2 is a vertical sectional view of the pole-socket, the base, and the locking and unlocking devices. Fig. 3 is a front elevation thereof. Figs. 4 and 5 are vertical sectional views of two different forms of trolley-wheels adapted for use with and forming a part of my invention. Fig. 6 is a side view of the locking-pawl, and Fig. 7 illustrates a modification of construction.

a is the car-roof, having mounted thereon in any usual manner, such as on a vertical pivot post or standard, (not shown,) the rotatable base *b*, the top portion of which is preferably an arc of a circle in side view, and on the rear segment of such circular part are the ratchet-teeth *c*. To said base *b* is journaled, as by the transverse pin *d*, the bifurcated ends *e'* of the swinging-trolley-pole socket *e*, to which ends *e'* are secured the usual tension-springs *f*, fragments of which are shown in Fig. 1, or in place of said springs arms or links may connect said ends *e'* with central tension-springs working over a rod inserted in the recesses *b'* of the base, or any other suitable arrangement may be followed, this forming no part of my invention. Journaled in the base of said socket *e* and at the rear thereof is the latch or pawl *g*, adapted to engage the teeth *c* on the rear of the base *b*, the front arm of said pawl projecting beyond the socket *e* and being engaged by and loosely retained in the lower end of the core *h* of the solenoid *i*, which is located, preferably, within a casing *i'*, secured to the front of or cast integrally with a part of the pole-socket *e*, as shown.

The trolley-pole *j* is preferably hollow and may be cast integrally with its socket or may be separate and confined therein, as preferred. Said pole carries at its free end the trolley-wheel *k* in the usual manner and is provided on its lower side and near its free end with the pulley *l*, over which the wire, chain, or rope *l'* leads from the latch or pawl *g*, to which it is secured, to the rear platform of the car.

The operation of my invention as so far described is as follows: When the trolley-wheel *k* is in contact with the line-wire *z*, a current passes through said wheel, and the pole *j* and a part of said current passes through the solenoid *i*, one end of the coil of which is in connection with said pole and the other end (wire *m*) of which is grounded, preferably by connection with the usual ground-wire of the lighting system of the car. The solenoid is thus normally energized while there is contact between the trolley-wheel and the line-wire, and its core *i* is drawn within it, retracting the latch or pawl *g* against the tension of the coil-spring *n* between said pawl and the casing of said solenoid and holding said latch or pawl out of engagement with the teeth *c* on base *b*. The trolley-pole is thus operative and pliable, free to oscillate and swing in the usual manner and with the usual tension of its trolley-wheel against the line-wire. Immediately, however, upon a break or interrup-

tion of the circuit, such as is caused by the wheel and the wire separating, the solenoid *i* is instantly deënergized, and its core *h*, by gravity and the spring *n*, is forced outwardly and downwardly, carrying with it the latch or pawl *g*, which engages one of the teeth *c* on base *b*, firmly locking the pole in the position it may then be in and preventing it from rising above the line-wire and assuming a vertical or a more vertical position.

When it is desired to unlock the pole while the current is still off, this can be accomplished by raising the latch or pawl *g* out of engagement with the teeth by the rope *l'*, running through the hollow pole over the pulley *l* to the rear platform of the car.

From the foregoing it will be apparent that if the current is broken before the trolley-wheel and the line-wire have entirely separated the pole will be rigidly locked, and the natural tendency of the wire to sag upon being relieved from the pressure exerted against it by the tension-springs of the pole will cause it to drop back into place and reëstablish the circuit. In Figs. 4 and 5 I have illustrated two modes of effecting this interruption or break. In Fig. 4 the inner faces of the wheel are formed comparatively thin for a little distance from the periphery, joining the thicker central portion by a comparatively abrupt shoulder *o*. In Fig. 5 the opposite inner faces of the wheel are provided with annular grooves, within which are confined rings of any suitable insulating material *p*—such, for example, as molded mica, vulcanized asbestos, &c. In either case the normal position of the line-wire is of course in the lowest part of the grooved inner face of the wheel. If now the wire rides up either side of the wheel, it will, before it leaves the wheel entirely, encounter in the one case the shoulder *o*, and in the interval between its leaving said shoulder and before it comes in contact with the narrow peripheral part of the wheel the circuit will be broken. In the other case when the wire reaches the insulated portion *p* of the inner wheel-face the current will also be broken, the immediate result in both cases being that the pole is locked in its then position in the manner and through the devices described, the tension of the wheel against the wire is relieved, and the latter again sags down into the lowest part of the grooved inner face of the wheel, reëstablishing the circuit and releasing the locking mechanism of the pole.

When a metallic pole *j* is used, if for any reason the special forms of wheel shown in Figs. 4 and 5 fail to act and the wheel and the line-wire separate, or where an ordinary trolley-wheel is used, there is danger of said metallic pole touching said line-wire after such separation, thus reëstablishing the circuit and causing the latch or pawl *g* to be retracted and the pole to become unlocked. To guard against this contingency, I prefer to insulate the upper part of said pole, which may be done in a variety of ways, such as by painting, enameling, cementing on rubber or other non-conducting substances, &c. In Fig. 7 I have shown the upper end of the pole insulated by winding spirally about its upper end a strip of adhesive tape *q*, which upon coming in contact with the line or feed wires will prevent transmission of the current to the locking devices described and to the car-motor.

I do not desire to be limited to the precise features herein shown and described, as obviously many changes and alterations may be made therein without departing from the principle and scope of my invention. For example, the trolley-pole *j* may be solid instead of tubular, in which case of course the manual controlling-rope *l'* would be led along the outside thereof, and said pole may be constructed of wood, in which case suitable metallic connections would be made between the trolley-wheel *k* and the car-motor and with the solenoid *i*. Again, an electric magnet may be used instead of a solenoid, in which case its armature would control the latch or pawl *g*, and many other changes and modifications may be made by an electrician or mechanic skilled in the art and still be within the scope and purview of my invention.

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

1. A base having rearward teeth; a vertically-swinging trolley-pole journaled in said base and carrying a latch or pawl adapted to engage the said teeth; in combination with an electromagnetic device controlling said latch or pawl, and itself controlled by the current from the line-wire, substantially as described.

2. A rotatable base having rearward teeth; a vertically-swinging trolley-pole journaled in said base and carrying a latch or pawl near its lower end, adapted to engage the teeth of said base and to lock said pole in varying positions in a vertical plane; in combination with an electromagnetic device controlling said latch or pawl and adapted to be energized and deënergized upon the making and breaking of the circuit with the line-wire; and means for manually removing said latch or pawl from engagement with said teeth, substantially as described.

3. A base having rearward ratchet-teeth arranged vertically in an arc of a circle; a vertically-swinging trolley-pole carrying a trolley-wheel and journaled in said base; a latch or pawl journaled in said pole and adapted to be moved into and out of engagement with said ratchet-teeth; in combination with a solenoid mounted on said pole, in circuit with said trolley-wheel and ground, and having a core engaging with and operating the said pawl or latch; and a rope extending from said pawl along said trolley-pole to the car-platform, substantially as described.

4. A vertically-swinging trolley-pole journaled in a base having ratchet-teeth; a latch

or pawl pivoted on said pole and adapted to engage the teeth on said base; a grooved trolley-wheel journaled at the free end of said pole and adapted to complete the circuit with the line-wire; an electromagnetic device mounted near the lower end of said pole, controlling said latch or pawl and being in electrical connection with said trolley-wheel; and means for breaking the circuit between said wheel and the line-wire before the latter has entirely left the groove in the former, substantially as described.

5. A vertically-swinging trolley-pole journaled in a base having ratchet-teeth; a latch or pawl pivoted on said pole and adapted to engage the teeth on said base; a grooved trolley-wheel journaled at the free end of said pole and adapted to receive and transmit the current from the line-wire; an electromagnetic device mounted near the lower end of the pole, controlling said latch or pawl and adapted to be energized and deënergized upon the making and breaking of the contact of said wheel with the line-wire; means, located within the groove of said wheel, for breaking said contact before the wire has entirely left said groove, and a rope secured to said latch or pawl and extending along the trolley-pole and to the car-platform, substantially as described.

6. A grooved trolley-wheel of conducting material provided on the opposite inner faces of said groove with annular contact-breaking surfaces, substantially as described.

7. A vertically-swinging trolley-pole journaled in a base having ratchet-teeth; a latch or pawl pivoted on said pole and adapted to engage the teeth on said base; a grooved trolley-wheel journaled at the free end of said pole and adapted to receive and transmit the current from the line-wire; said wheel being provided on the opposite inner faces of said groove with annular contact-breaking surfaces; an electromagnetic device mounted on the lower end of said pole, controlling said latch or pawl and adapted to be energized and deënergized upon the making and breaking of contact of the trolley-wheel with the line-wire, substantially as described.

8. A base having rearward teeth; a vertically-swinging trolley-pole journaled in said base, insulated at its upper end and carrying a latch or pawl near its lower end adapted to engage the teeth of said base and to lock the pole in varying positions in a vertical plane; in combination with an electromagnetic device controlling said latch or pawl and adapted to be energized and deënergized upon the making and breaking of the circuit with the line-wire; and means for manually removing said latch or pawl from engagement with said teeth, substantially as described.

Signed at New York, in the county of New York and State of New York, this 19th day of April, A. D. 1899.

CHARLES L. WEYAND.

Witnesses:
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