

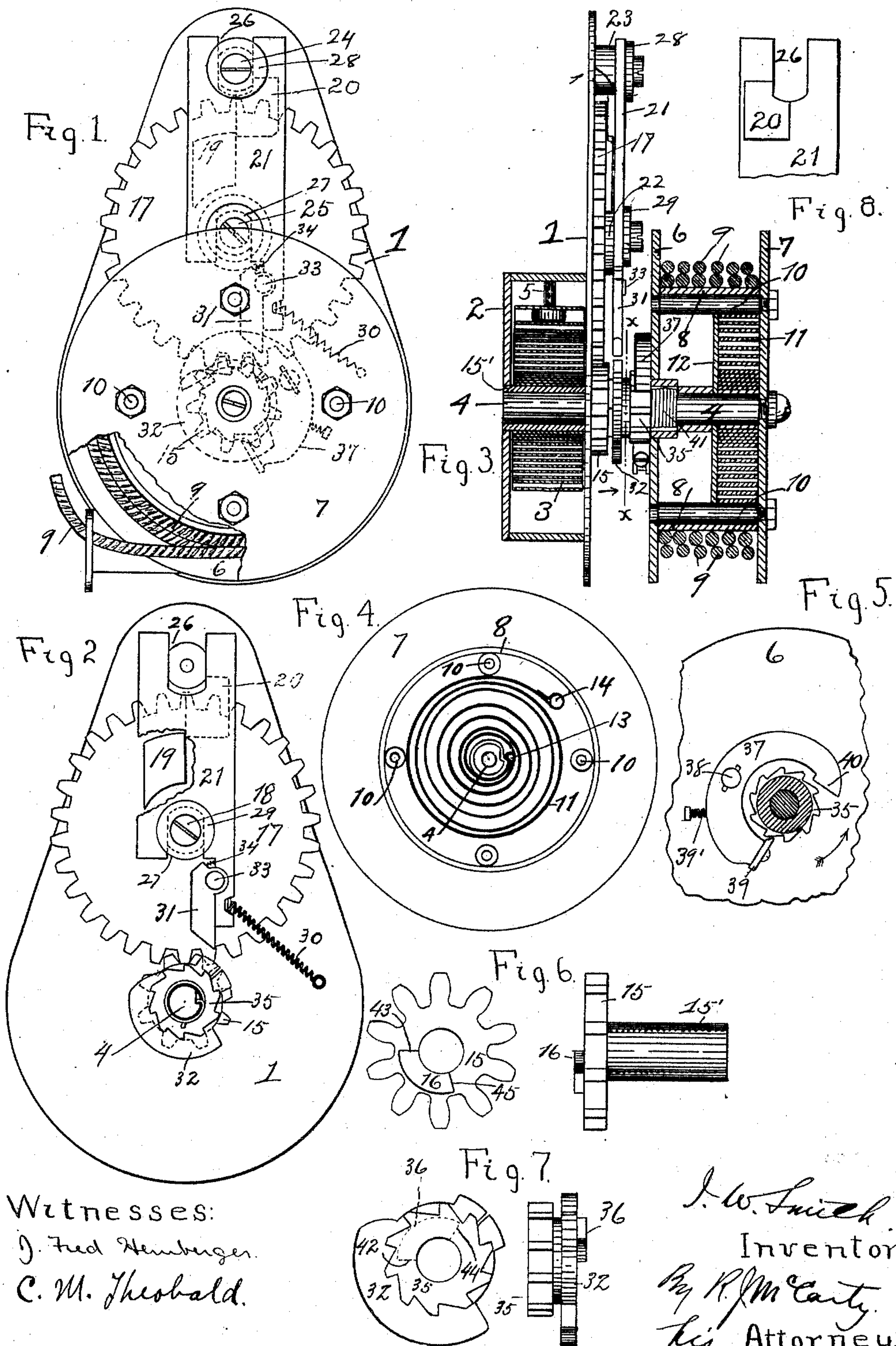
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I. W. SMITH.
TROLLEY CATCHER.

APPLICATION FILED JAN. 25, 1904.

NO MODEL.



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UNITED STATES PATENT OFFICE.

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TROLLEY-CATCHER.

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To all whom it may concern:

Be it known that I, IRWIN W. SMITH, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Trolley-Catchers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in trolley-catchers or devices for controlling the trolley-poles of electric cars when the trolley-wheel chances to jump the trolley-wire or become disconnected therefrom.

The object of the invention is to provide a trolley catcher or controller which is positive and accurate in controlling the pole at such times.

To this end the invention possesses the new and useful features hereinafter described and claimed.

Preceding a detail description of the invention reference is made to the accompanying drawings, of which—

Figure 1 is a side elevation of my improved trolley-catcher detached from the car. Fig. 2 is a similar view with the rope-reel and its spring removed. Fig. 3 is a partial sectional view. Fig. 4 is a view of the minor spring and its housing detached. Fig. 5 is a sectional view on the line $x-x$ of Fig. 3; Fig. 6, views of the center pinion detached; Fig. 7, views of the united cam and ratchet-wheel detached; Fig. 8, view of a portion of the sliding plate.

In a detail description of the invention similar reference characters indicate corresponding parts.

1 designates a supporting-plate, to one side of which a housing 2 is attached, within which the main spring 3 is secured, one end of said spring being secured to the hub 15 of pinion 15, which will be again referred to, and the other end of said spring is secured to a pin 5, which is fastened to a suitable point of the housing. The function of this spring is to

assume control of the trolley-pole when the trolley-wheel becomes detached from the wire, as will hereinafter more fully appear. The rope-reel is located on the other side of the plate 1, and consists of plates 6 and 7, with an interposed cylinder 8, upon which the trolley-rope is reeled. The plates 6 and 7 are secured in position by a suitable number of stud-bolts 10, on the inner side of which the minor spring 11 is placed within a housing 12. One end of said spring 11 is secured to the shaft 4 at 13, while the other end is secured to a pin 14, which is made fast to the inner plate 6. The function of said spring is to prevent any slack occurring in the trolley-rope while the trolley wheel and wire are in their normal relation. In other words, while the trolley-wheel is running upon the wire this spring 11 maintains the rope taut and prevents any slacking or sagging thereof. The shaft 4 passes entirely through the two spring-housings and has suitable bearings therein. Fixed to the shaft adjacent to the plate 1 is a spur-pinion 15, before referred to, having a clutch 16 on a face thereof, to be again referred to. This pinion engages a spur-wheel 17, of considerably larger diameter, the ratio of movement being three revolutions of the pinion to one of the wheel 17. The latter wheel is mounted on a stub-shaft 18, secured to the plate 1, and the said wheel has a locking-lug 19 on a face thereof which engages a locking-lug 20 on a sliding plate 21 to hold the main spring 3 out of action. The slide 21 incloses the outer side of the spur-wheel 17 and is held a suitable distance away from said spur-wheel by means of bosses 22 and 23, the former of which surrounds the shaft of said wheel, and the latter boss—to wit, 23—is secured to the plate 1 adjacent to the outer circumference of the wheel. The slide is maintained in an operative position by means of guide-studs 24 and 25, which lie within slots 26 and 27 in the ends of said slide, said studs having washers 28 and 29.

30 designates a coil-spring, one end of which is secured to the plate 1, and the other is secured to the slide 21, so that said slide is normally maintained in the inward position in order that the flexible pawl 31 may be normally

in a position to be engaged by a rotary cam 32. The pawl 31 is pivoted to the slide 21 at 33 and is normally maintained in a position parallel with said slide by means of a compression-spring 34. The rotary cam 32 is fixed to a ratchet-wheel 35, and both of these are loosely mounted upon the shaft 4. The face of said cam which lies adjacent to the spur-pinion 15 is provided with a clutch 36, which interlocks with the clutch 16 on the pinion when the main spring 3 is released, and at which time the cam, ratchet-wheel, and pinion rotate together under the action of said spring.

41 is a spring coiled around shaft 4, with one end attached to the ratchet-wheel 35 and the other end to the shaft. The function of this spring is to maintain the end 42 of its clutch 36 against the end 43 of the pinion-clutch 16, which positions are maintained while the main spring 3 is wound for action. When the trolley-wheel leaves or jumps the wire, the ratchet-wheel is caused to move the cam 32 to impart movement to the slide 21 to disengage the locking projections 19 and 20, and thus permit the main spring 3 to come into action to pull down the trolley-pole. When the cam has thus performed its function, the end 44 of the cam-clutch 36 engages the end 45 of the pinion-clutch 16, and the pinion, cam, and ratchet-wheel move in unison during the winding-down operation of the main spring. The ratchet-wheel is rotated and therewith the cam 32 to unlock the large gear 17 through the instrumentality of a double-acting pawl 37, which has the curvature substantially as shown in Fig. 5, and is pivoted at 38 to the inner plate of the rope-reel. One end—to wit, 39—is normally in contact with the teeth of said ratchet-wheel through the pressure of a spring 39', and the said end 39 rides freely over the teeth thereof and is adjustable in order that a proper normal contact between the two may be preserved during the periods in which the operative relation between the trolley wheel and wire is maintained. At such times the other end, 40, of said pawl is free from the engagement with said ratchet-wheel. In the event that the trolley-wheel should jump or leave said wire the sudden jerk or motion imparted to the pawl 37 by the pull upon the reel will throw outwardly the end 39 of said pawl and cause the end 40 to engage the ratchet-wheel. The pull upon the reel will maintain this engagement, and the cam 32, moving with the ratchet-wheel, will operate upon the slide 21 to unlock the gear 17 and allow the main spring 3 to come into action, as hereinbefore stated. The rope-reel is then reversed in its movement to wind down the trolley-pole. At the termination of one revolution of wheel 17 the locking-lugs 19 and 20 become again engaged through the releasing of the pawl 31 by the cam 32. When the main spring has performed

its function of drawing down the trolley-pole, the pawl 37 acts as a retaining-pawl. The end 40 thereof engaging the ratchet-wheel 35, as before stated, holds the pole down at the point to which it was drawn by the main spring. In order to release this engagement, the trolley-rope is pulled upon, allowing the minor spring 11 to turn the rope-reel a sufficient extent to release the end 40 of the pawl from engagement with the ratchet-wheel, after which the trolley-wheel may be placed on the wire. After this is done and in order to rewind the main spring 3 the rope is pulled upon by a quick jerk, which causes the end 40 of the pawl to engage the ratchet-wheel, and a continued pull upon the rope causes the pinion 15, ratchet-wheel, shaft, and cam to rotate, and to thereby turn the gear-wheel 17 one revolution, and thus the main spring is rewound and prepared to assume control of the trolley-pole in the event the wheel again jumps from the wire.

It will be understood that the moment the trolley-wheel jumps from the wire the end 40 of the pawl flies in contact with the ratchet-wheel and locks the rope-reel and prevents the trolley-pole from flying upwardly a further extent.

It is thought that the novelty and importance of the ratchet-pawl 37 both from a structural point of view and from a functional point of view will be readily comprehended and appreciated. The said pawl may be placed in operation with the ratchet-wheel by imparting to the ratchet-wheel a sudden jerk or motion to throw out the end 39 and cause the end 40 to engage, and such motion may be imparted to the support upon which the pawl is pivoted, which in the present instance is the inner plate 6 of the rope-reel. I desire to claim, broadly, this ratchet mechanism in so far as the functions performed thereby are related to it.

It will be understood that when spring 11 is performing its function and maintaining the trolley-rope taut the rope-reel is capable of rotating in either direction, and at such time the adjustable end 39 of the pawl 37 rides over the teeth of the ratchet 35. The adjustment of the engaging end 39 of said pawl is such to insure a slight contact thereof with the ratchet-wheel. From Fig. 5 of the drawings it will be apparent that when the pawl is carried around by the reel in one direction it will ride over the tapering surfaces of the ratchet-wheel without the least obstruction whatever, but that when carried in the opposite direction by said reel there is some slight resistance between the end 39 of said pawl and the said ratchet-teeth. This is compensated for, however, by the proper adjustment of the end 39 of said pawl to offer the least possible resistance to the passage of that end, and, further, the spring 39', which normally holds the pawl inwardly, will be

compressed to a sufficient extent to enable the end 39 to pass freely over the ratchet-teeth when said pawl is carried in the said opposite direction.

5 The device is attached in its operative position to any suitable point at the rear of the car and is provided with a suitable casing, (not herein shown,) which conceals the mechanism.

10 It has not been deemed necessary to illustrate the well-known features of the trolley, as it will be readily understood that the rope 9 from the reel is connected with the trolley-pole.

Having described my invention, I claim—

15 1. A double-acting pawl, in combination with a ratchet-wheel, the pivot of said pawl being eccentric to the axis of said wheel and the pawl partially encompassing said wheel, one end of said pawl being normally in contact with the teeth of said wheel, and the other end of said pawl engaging the teeth of said wheel to lock it when a sudden impetus is given said wheel or said pawl.

25 2. A double-acting pawl, in combination with a ratchet-wheel, the pivot of said pawl being eccentric to the axis of said wheel and the pawl encompassing said wheel for at least one-half of its circumference, one end of said pawl being normally in contact with the teeth of said wheel, said end being adjustable to maintain a proper normal contact, and the other end of said pawl engaging the teeth of said wheel to lock it when a sudden impetus is given said wheel or said pawl.

35 3. In a trolley-catcher, a minor spring to maintain the trolley-rope taut while the trolley-wheel is in operative relation with the wire, a main spring to assume control of the trolley-pole to wind it down in the event said wheel should leave said wire, spur-wheels, a slide having means thereon to engage similar means on one of said spur-wheels to maintain the main spring out of action while the trolley wheel and wire are in their operative relation, a cam to engage said slide to release the control of the main spring when the trolley-wheel leaves said wire, and ratchet devices located between said cam and the rope-reel, said ratchet devices being placed in operation by the jerk due to the trolley-wheel leaving the wire, substantially as set forth.

45 4. In a trolley-catcher, a minor spring to maintain the trolley-rope taut while the wheel and wire maintain their operative relation, a main spring to wind down the trolley-pole in the event of the wheel leaving the wire, said springs being mounted upon a common shaft, a spur-pinion fixed to said shaft, a cam loose upon said shaft, clutch devices interposed be-

tween said cam and said pinion, a ratchet-wheel fixed to said cam, a slide actuated by said cam, a spur-wheel engaged by the pinion, interlocking means between said spur-wheel and said slide to maintain the main spring out of action when the trolley wheel and wire are in their operative relation, and a double-acting pawl interposed between the rope-reel and the ratchet-wheel for imparting movement to the cam when the trolley-wheel leaves the wire, substantially as set forth.

5. In a trolley-catcher, a main spring to wind down the trolley-pole, a shaft to which said spring is connected, spur-wheels trained to said shaft, a slide, interlocking means between said slide and one of said gear-wheels to maintain the said spring out of action, and means for actuating said slide to disengage the locking mechanism, substantially as set forth.

6. In a trolley-catcher, a main spring to assume control of a trolley-pole when the wheel leaves the wire, a minor spring to maintain the rope taut during the operations of the trolley, spur-wheels geared to a common shaft upon which said springs are mounted, a slide to maintain said spur-wheels stationary while the trolley-wheel engages its wire, and means on said shaft set in action by the jerk due to the trolley-wheel leaving the wire whereby said slide is actuated to free its control of the gearing and thus give the trolley-pole over to the influence of the main spring, substantially as set forth.

7. A rope-reel containing a spring for maintaining the trolley-rope taut during the operation of the trolley, a main spring to wind down the trolley-pole when the trolley-wheel leaves the wire, a slide, interlocking means upon said slide, spur-wheels trained to the shaft upon which said springs are mounted, interlocking means on one of said spur-wheels to engage the similar means on the slide to maintain the main spring out of action, a cam to actuate said slide to free the locking engagement between it and said spur-wheel, a ratchet-wheel fixed to said cam, a double-acting pawl carried upon the rope-reel, one end of said pawl having adjustable means to maintain a normal contact with the ratchet-wheel, substantially as set forth.

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

IRWIN W. SMITH.

Witnesses:

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