

No. 894,212.

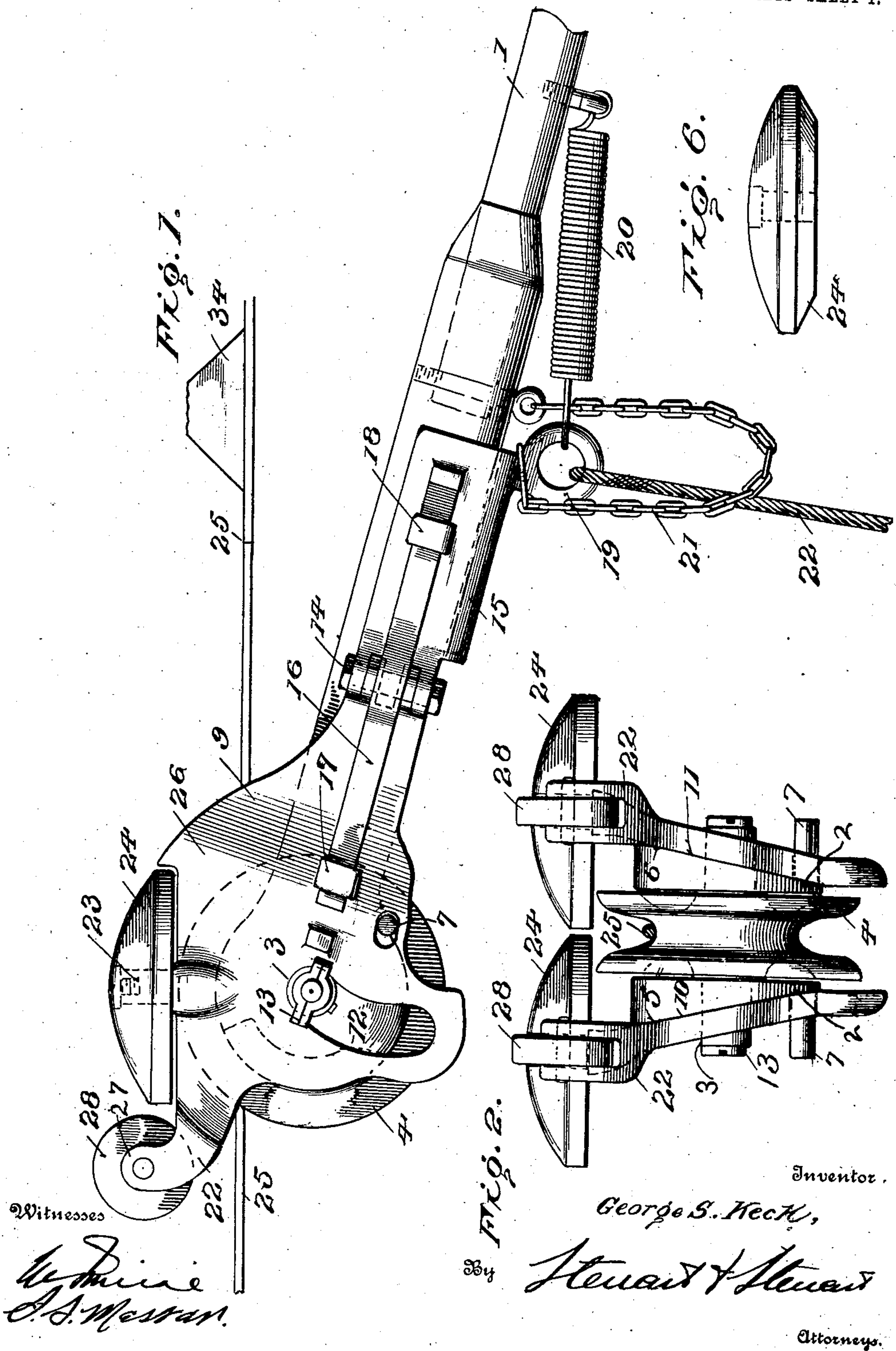
PATENTED JULY 28, 1908.

G. S. KECK.

TROLLEY GUARD.

APPLICATION FILED AUG. 12, 1907.

2 SHEETS—SHEET 1.



Witnesses

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Fig. 2.

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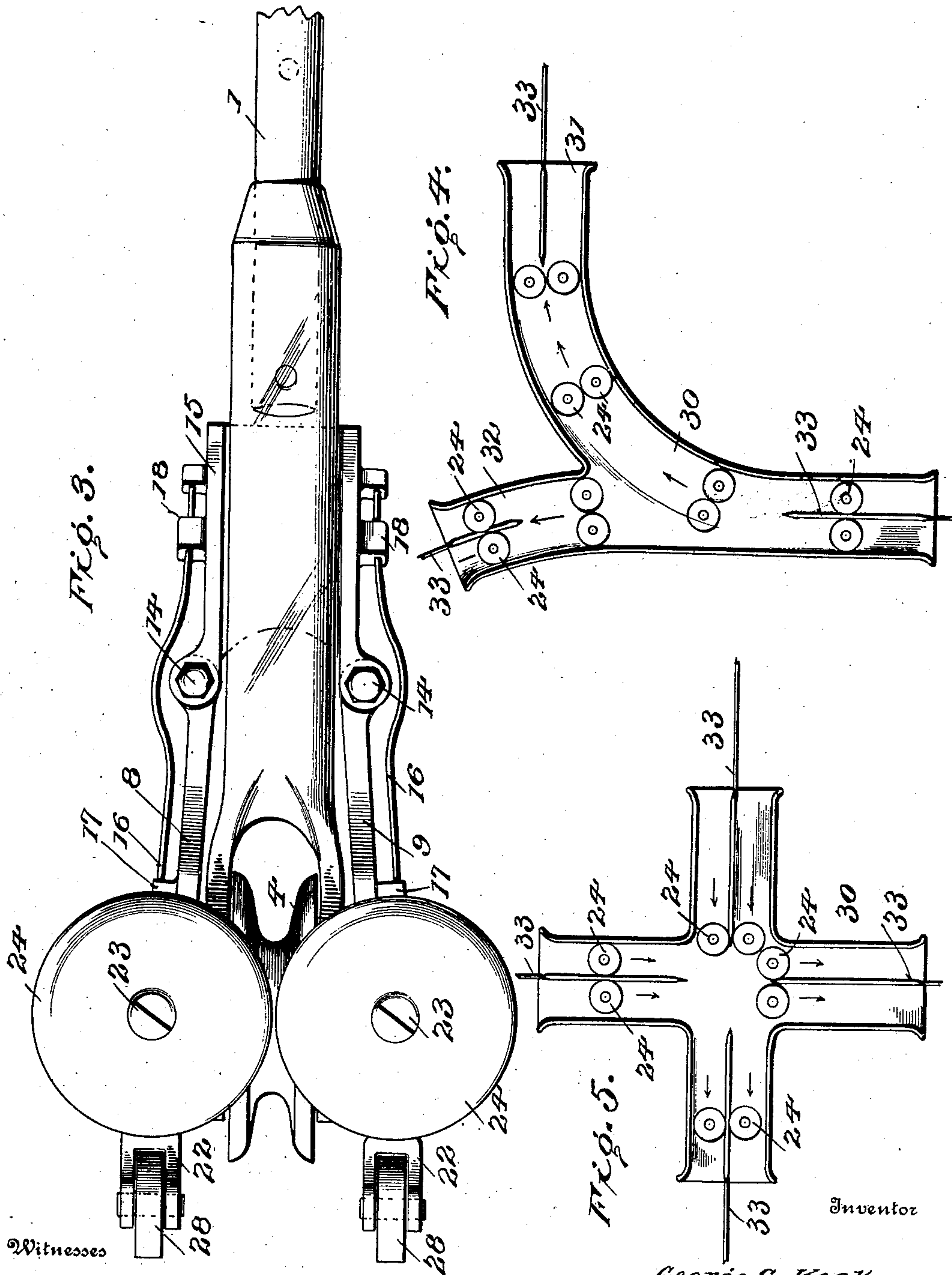
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Witnesses

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Fig. 5.

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34

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# UNITED STATES PATENT OFFICE.

GEORGE S. KECK, OF BALTIMORE, MARYLAND.

## TROLLEY-GUARD.

No. 894,212.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed August 12, 1907. Serial No. 388,216.

*To all whom it may concern:*

Be it known that I, GEORGE S. KECK, a citizen of the United States of America, residing in the city of Baltimore, State of Maryland, have invented certain new and useful Improvements in Trolley-Guards, of which the following is a specification.

In the operation of electric railroads using the overhead trolley one of the difficulties universally encountered is due to the frequent escape of the follower or trolley from contact with the wire. Numerous devices have been provided for overcoming this difficulty, but these have not proved successful and no one of them is now in use.

The common type of follower employed in connection with overhead trolley systems is in the form of a grooved wheel journaled on a trolley pole. The latter is pivoted to the top of the car to swing vertically and impelled upward by a spring which pressed the follower against the wire. Jolting of the car frequently displaces the trolley so that it is disengaged from the wire and the pole actuated by the spring swings up and supports the follower above the wire. On these occasions it is necessary for the operator to pull the pole down against the tension of the spring and guide the follower to the wire. In this operation traffic is much delayed and a great deal of the operator's time is wasted.

The present invention relates to a device by which this difficulty is overcome and contemplates the provision of a trolley guard whereby the follower is maintained in contact with the wire. This guard, while normally engaging the wire, is automatically opened when the pole is depressed, so that the trolley may be pulled off by the operator and reengaged with the wire with as great facility and in the same manner as if the guard were not present. The trolley guard also coöperates with a trolley switch in connection with which it is shown. The wire-engaging members of the guard act as contact members for the switch.

Referring to the drawings,—Figure 1 is a side view of the trolley guard and follower and part of the support. Fig. 2 is a rear elevation of the same. Fig. 3 is a top plan view of the same. Fig. 4 is a bottom plan of the switch, showing the anti-friction roll in various positions. Fig. 5 is a similar view of a trolley crossing. Fig. 6 is an elevation of a modified jaw roller.

The trolley pole 1 is pivotally mounted on

the roof of the car to swing in a vertical plane and is supported by the usual pole spring, not shown, which tends to swing the pole upward about its pivot. The end of the pole remote from the car is bifurcated to form two arms 2—2 between which is journaled on a stud 3 a contact or follower wheel 4. The arms are provided on their external surfaces with lateral cam tracks 5 and 6, concentric with pins 7. These cams have the general outline of a wedge held point down as seen from the rear in Fig. 2, and will be hereinafter termed releasing cams.

On each side of the trolley pole slotted to receive the pins 7 and swing vertically thereon are the jaw levers 8, 9. These levers are provided with wiper surfaces 10, 11, adapted to coöperate with the releasing cams 5 and 6. The jaw levers 8, 9 are slotted at 12 concentric with the pins 7 to receive the stud 3. This stud is provided with heads 13 to limit the swing of the levers 8, 9. Each of the levers is journaled to swing laterally on one of two parallel pins 14 carried by the jaw block 15 which is grooved to receive the trolley pole and maintain the pins one on each side of the latter. Each jaw lever is provided with a spring 16 which engages a lug 17 on the lever and is mounted in a second lug 18 on the lateral face of the block. The block 15 is provided with an eye 19 which is engaged by a coil spring 20, hereinafter called the block spring, secured at its opposite end to the trolley pole and tends to swing the inner ends of the levers 8 and 9 and the block 15 upward about the jaw pivot 7 and maintain the block in contact with the trolley pole. The downward motion of the inner arms of the levers and the block is limited by a chain 21 engaging at one end the trolley pole and at the other the eye 19 of the block. A tension member or rope 22 is also secured to the eye as shown. When tension is put upon the rope 22 the block 15 is drawn down till the chain 21 limits the stretch of the spring. The jaw levers 8 and 9 swing about the pivots 7 in right handed rotation, the inner end of the levers moving upward over the cam surfaces into engagement with the thick portion of the wedge, and the wiper surfaces on the jaw levers coöperating with the cams on the pole swing outward laterally about their parallel pivots 14 on the block. The strength of the block spring 20 is less than that of the pole spring, so that it will yield and allow the



jaws to open before the trolley pole moves down against the tension of its spring. When the tension of the rope is released the block spring contracts and rotates the jaw levers and the block about the pins 7 and the levers are permitted to close in response to the pressure of the jaw springs 16. Each jaw lever carries substantially in the vertical plane of the axis of the trolley wheel a vertical stud 23 upon which is mounted an anti-friction jaw roller 24, having a flat lower horizontal surface which occupies a position just above and parallel to a plane tangent to the trolley wheel at its upper point. In their normal position the juxtaposed points of the circumference of the jaw rollers are separated by a distance which in the closed position of the jaw levers is only a small fraction of the diameter of the wire 25. Fig. 6 shows a jaw roller the lower edge of which is beveled to release the wire in case of an unusual stress being put upon it by the guard. Each jaw lever is provided with an upwardly extending guard 26, the surface of which is continuous with the upper surface of the jaw roller. This prevents the jaw roller acting as a hook to engage any obstacle with which it may come in contact.

The bifurcated brackets 27, which support on a horizontal pivot the rollers 28, are formed by the extension of each jaw lever upward and to the rear. The upper bearing surface of each roller is slightly above the top of the anti-friction jaw rollers.

A trolley switch adapted to cooperate with this device is shown in bottom plan in Fig. 4. This consists of a trough 30, having two branches 31 and 32, corresponding to the branches of the track. This switch is placed several feet to the rear of the junction of the tracks, that is, in the opposite direction to that in which the arrows point in Fig. 4. The branches of the trough are made considerably wider at the junction than at other points and are of such configuration that the rollers are maintained in contact with the side of the trough on the inside of the curve which the car takes in passing the switch, that is, with the side having the shorter radius of curvature. The inner walls of the diverging troughs are at a more obtuse angle to each other than are the outer walls. The ends of the wires are shown at 33 at the terminus of each branch of the trough supported on the usual knife edges of plates (see 34 in Fig. 1), which pass between the anti-friction rollers. The current passes from the wire to the trough and contact is made between the anti-friction rollers and the side of the trough in place of the contact between the wheel and the wire, which is broken when the wires terminate. When the switch is passed the follower again engages the wire.

Fig. 5 shows a crossing of the wires at

right angles. Contact is maintained at this point by means of a trough in the form of a four-armed cross, the operation of which is obvious in view of the above description.

The function of the anti-friction jaw rollers 24 is to maintain the follower wheel in contact with the wire. These rollers are separated, as previously set forth, by pulling on the rope 22 which rotates the block 15 and the levers 8 and 9, pivoted thereto about the pin 7 sliding the wiper surfaces 10 and 11 of the jaw levers over the cam surfaces 5 and 6 of the pole, spreading the jaw levers 8 and 9 and swinging them about their pivots 14 and opening the jaws against the tension of the springs 16. As the strength of the spring 20 is less than that of the trolley pole spring it is obvious that the jaws must always be open when the trolley pole is pulled down. This cannot occur until the slack of the chain is taken up by revolution of the jaws 9 about the pin 7 against the tension of the spring 20, so that when the operator depresses the pole to bring the follower in contact with the wire he necessarily opens the jaws to receive the wire. It is only when the slack of the chain 21 is taken up that the pole is pulled down and the contact wheel removed from the wire. When the trolley wheel is again brought in contact with the wire and the rope released the spring 20 revolves the block 15 and the jaw levers 8 and 9 about the pin 7 sliding the wipers 10 and 11 over the cams 5 and 6 to the thin portion of the wedge, so the jaws are closed by springs 16 and the wire is engaged by the guard. The vertical rollers 28 are adapted to engage the horizontal surface of the trough and prevent friction between it and the jaw rollers. This also gives a more even electrical contact between the follower and the trough.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A trolley guard comprising jaws, a block to which the jaws are mounted to swing laterally, means for closing the jaws, a releasing cam, wipers on the jaws, a jaw pivot about which the block and the jaws may be rotated to move the wiper over the cam and open the jaws.

2. A trolley guard comprising jaws, a block to which the jaws are attached one being mounted to swing laterally, means tending to maintain the jaws closed, a releasing cam, a cam wiper on one of the jaws, a jaw pivot about which the block and the jaws may be rotated to move the wiper over the cam and open the jaws.

3. A trolley guard comprising jaw levers, a block to which the jaw levers are pivoted to swing laterally, rollers journaled on the jaw levers the levers and rollers forming jaws normally inclosing the wire, means tending to maintain the jaws closed, a releasing cam



and wipers on the levers, and a jaw pivot, about which the jaws may be rotated to move the wipers over the releasing cam to open the jaws.

5 4. A trolley contact device, comprising a pole, a follower thereon, jaws loosely pivoted to the pole, a cam on the pole, wipers on the jaws, means for maintaining the jaws closed to hold the follower in contact with the wire, 10 the whole so combined that the jaws may be rotated about the pivot, thereby moving the wipers over the cams and opening the jaws.

5 5. A trolley contact, comprising a pole, a follower thereon, jaws pivoted to the pole, a 15 block to which the jaws are pivoted to swing laterally, a releasing cam, wipers on the jaw levers, means tending to maintain the jaws closed, and means for swinging the jaws and the block about the pivot in the pole to move 20 the wipers over the releasing cam.

6. A trolley contact, comprising a pole, a trolley follower and a releasing cam, jaws having cam wipers, a block to which the jaws are pivoted to swing laterally, a jaw pivot 25 about which the block and jaws may swing to move the wipers over the cam to open the jaws, and means tending to maintain the jaws in closed position.

7. In combination with a trolley contact 30 comprising a pole, a follower and a releasing cam thereon, jaw levers pivoted to the pole, rollers on the jaw levers inclosing the wires to maintain the follower in engagement therewith, wipers on the jaw levers, a block 35 to which the jaw levers are pivoted to swing laterally, so that the jaw levers and block

may be rotated relatively to the pole to move the wipers over the cam and open and close the jaws, a main trolley wire, a branch wire, and a bifurcated trough connecting the wires, 40 the trough being widened at the point of bifurcation.

8. A trolley guard comprising jaws normally closed, a block to which the jaws are pivoted to swing laterally, means for closing 45 the jaws, a releasing cam, wipers on the jaws, a jaw pivot about which the jaws and the block may be rotated to move the wipers over the cam to open the jaws, and means tending to maintain the jaws and block in 50 normal position on the jaw pivot.

9. In a trolley guard jaws mounted to swing laterally about one axis and vertically about another axis, releasing cams and mean 55 for swinging the jaws about one axis whereby they move over the cams and are rotated about the other axis.

10. In combination with a trolley contact, comprising a pole, a follower thereon, jaws mounted to swing about two axes, rollers on 60 the jaws inclosing the wire, and a cam for opening the jaws, a main trolley wire, a branch wire and a bifurcated trough connecting the wires, the rollers acting as contact members for the trough. 65

Signed by me at Baltimore, Maryland, this 7th day of August, 1907.

GEORGE S. KECK.

Witnesses:

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