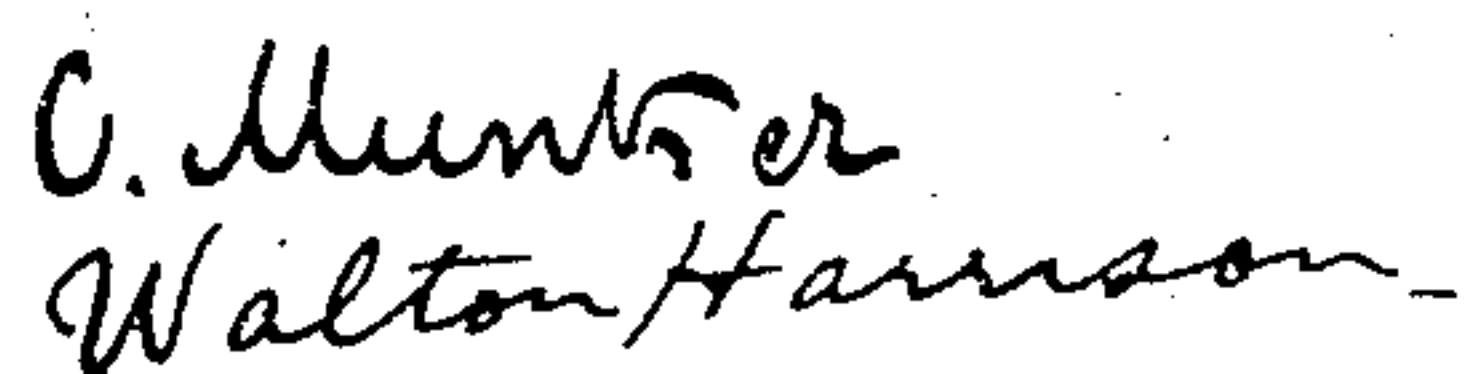


PATENTED NOV. 1, 1904.

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NO MODEL.



INVENTOR
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BY *Mumme*
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UNITED STATES PATENT OFFICE.

WILLIAM RUSSELL COOPER, OF EAST ST. LOUIS, ILLINOIS.

TROLLEY.

SPECIFICATION forming part of Letters Patent No. 774,043, dated November 1, 1904.

Application filed May 21, 1904. Serial No. 208,993. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM RUSSELL COOPER, a citizen of the United States, and a resident of East St. Louis, in the county of St. Clair and State of Illinois, have invented a new and Improved Trolley, of which the following is a full, clear, and exact description.

My invention relates to trolleys, my object being to produce certain improvements in construction and operation, as hereinafter described, and pointed out in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation showing my invention as applied to an electric car used for purposes of switching. Fig. 2 is a vertical section through the trolley-pole and its accompanying parts. Fig. 3 is a fragmentary elevation of the trolley-harp and a portion of the trolley-pole; and Fig. 4 is a plan view of the pivot-plate, showing certain parts in section upon the line 4 4 of Fig. 2 looking in the direction of the arrow.

The pivot-plate is shown at 5 and is secured rigidly in position by means of bolts 6. This pivot-plate is provided with a circular raised portion 7, provided with a recess 8 of angular form, as shown in Figs. 2 and 4. A swinging frame 9 is provided with a base 10 and with a projecting boss 10^a of the shape indicated in Figs. 2 and 4, this boss normally occupying a portion of the recess 8 and being free to move angularly therein, so as to allow the frame 9 to have a limited degree of motion relatively to the pivot-plate 5. This swinging frame is pivoted upon a pin 11, provided with a head 12. Integrally connected with the frame 9 and projecting upwardly therefrom are walls 13. A horizontal pivot 14 passes through these walls and supports a tubular member 15, which is free to rock thereupon. Mounted within the tubular member 15 is a head 15^a, secured thereto by means of bolts 16 and free to swing longitudinally of the general direction of the frame 9. Spiral springs 16 17 are connected with opposite portions of the head 15^a and are secured

to eyebolts 18 19, mounted within the respective ends of the frame 9. An inner telescopic member 17^a is encircled by a sleeve 18^a, of insulating material, this sleeve fitting into the member 15. Metallic bolts 19^a pass through the telescopic member 17^a and also through the member 15, being insulated from these parts by means of insulating-sleeves 20, as indicated more particularly in Fig. 2. A key 21 is rigidly connected with the telescopic member 17^a, which is of tubular form. An outer telescopic member 22, also of tubular form, is provided at its lower end with a gland 23, and in this gland are disposed a metallic collar 24 and a graphite packing 25. The gland is threaded upon the telescopic member 22 and when screwed firmly into position grips the metallic collar and graphite ring closely together, the arrangement being such that the graphite ring exerts a general pressure upon the inner telescopic member 17^a, so as to form a water-tight joint. The gland 23 is provided with an ear 26, preferably integral therewith, and a rope 27 engages this ear for the purpose of drawing downward the gland and the outer telescopic member 22. A spool-like member 28 is provided with a threaded portion 31, engaging the inner telescopic member 17^a. A metallic collar 29 and a packing-ring 29^a, which may be made of leather, rubber, or any preferred packing material, partially encircle the portion 31, as indicated in Fig. 2. A pair of split rings 30, preferably of copper, encircle the spool-like member 28 and also engage the outer telescopic member 22. A ring 32, of metal, loosely encircles the inner telescopic member 17^a and is concentric with the outer telescopic member. This ring normally rests upon the upper member of the key 21. Disposed within the outer telescopic member 22 is a disk 33, rigidly connected thereto by means of screws 34. A spiral spring 35 is partially compressed and engages the disk 33 and the spool-like member 28.

The trolley-harp is shown at 36 and is provided with a collar 37, integral therewith, and also with wings 36^a, the collar 37 engaging the outer tubular member 22. A revoluble roller 38 is journaled within the harp 36, be-

ing provided with journals 39 for the purpose. Leaf-springs 40 are connected with the trolley-harp 36 and press gently upon the outer ends of the journals 39. Current is
 5 supplied from the trolley-wire 35^A downward through the pole and from the binding-post 42 and conductor 43 to the motor-brushes 44 of the car 45.

My invention is used as follows: Suppose
 10 the trolley-pole and the contact mechanism carried thereby to be mounted upon a car used for switching. As shown in Fig. 1, the trolley-pole 22 has less inclination than usual, preferably occupying an angle approximating
 15 that indicated in Fig. 1. If now the direction of movement of the car be reversed, the outer telescopic member 22 moves downward in relation to the inner telescopic member
 20 17^a, so that the pole virtually becomes a little shorter, and is thus first raised vertically and then inclined in the opposite direction to that in which it was first inclined. It is not nec-
 25 essary, therefore, to remove the roller 38 from the trolley-wire or, indeed, to move by hand any part of the mechanism, the reversal of the trolley being purely automatic. The
 30 trolley-pole may be shortened by excessive pressure upon its upper end and is free to lengthen to its normal proportion by tension of the spring 35. As the several pack-
 35 ings constitute water-tight joints and as the outer telescopic member 22 is closed at its upper end, no water can enter any of the joints. Neither can the telescopic members
 40 move relatively to each other about a vertical axis, because of the action of the key 21. The wings 36^a extend above the upper sur-
 45 face of the roller 38 and also above the upper surface of the trolley-wire, as indicated more particularly in Fig. 2. The object of
 50 this arrangement is to prevent the roller 38 from striking any of the span-wires. Should the trolley be unable to otherwise pass a span-
 55 wire, the wings 36^a guide the roller downward, so as to prevent engagement of the same. If for any reason it is desired to pull
 60 down the roller 38, all that is necessary is to pull upon the rope 27, which causes the outer telescopic member to travel downwardly in
 65 the general direction of its length.

It will be noted that the graphite packing 25 and the metallic rings 30 constitute very efficient electrical connections between the telescopic members 17^a and 22. By virtue of
 55 this arrangement the conductivity is greatly increased and the tendency to spark is correspondingly lessened.

In Fig. 1 I show a very efficient contact between the inner and outer telescopic mem-
 60 bers. The flexible conductor 35^a is permanently secured to the disk 33 and the spool-like member 28 and is free to be lengthened or shortened, according to the relative move-
 65 ments between the inner and outer telescopic members. By this means the conductivity is

as good as could be attained under any circumstances, there being no loose joints whatever across which the current need flow.

The use of the graphite packing 25 insures thorough lubrication between the inner and
 70 outer telescopic members, so that the device offers a minimum of friction. It will be noted that the springs 16 17 may be comparatively light, for the reason that there are a plurality
 75 of these springs, the cumulative tendency of which is to raise the trolley-pole into a vertical position.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a trolley, the combination of two parts
 80 slidably fitted together, means for rendering said parts water-tight, and contact mechanism mounted upon one of said parts.

2. In a trolley, the combination of inner
 85 and outer telescopic members, contact mechanisms mounted upon one of said members, and metallic rings mounted upon one of said members and loosely engaging the other for the
 90 purpose of increasing the conductivity as between said members.

3. In a trolley, the combination of a contact
 95 member and a pole for supplying current therefrom to a motor, said pole being made in two parts, one of said parts slidably fitting into the other, means for rendering the two
 100 parts of said pole water-tight, and a spring for tensioning said parts relatively to each other.

4. In a trolley, the combination of inner
 105 and outer telescopic members slidably connected together, means for rendering the same water-tight, a key for preventing rotation of one of said parts relatively to the other, means
 110 for tensioning one of said parts relatively to the other, and contact mechanism carried by
 115 one of said parts.

5. In a trolley, the combination of inner
 120 and outer telescopic members, contact mechanism carried by one of said members, means controllable at will for changing the relative
 125 position of one of said members relatively to the other, and a packing for rendering said members water-tight relatively to each other.

6. In a trolley, the combination of a pivot-
 130 plate provided with a recess, a frame pivotally mounted upon said plate and provided with a portion engaging said recess for the purpose of limiting the play of said frame rela-
 135 tively to said pivot-plate, a pivot-pin connecting said pivot-plate and said frame together,
 140 and contact mechanism supported by said frame for the purpose of engaging a conductor.

7. In a trolley, the combination of inner
 145 and outer telescopic members, a flexible conductor in electrical connection with said inner and outer members, and a spring for auto-
 150 matically tensioning said members relatively to each other independent of said flexible member.

8. In a trolley, the combination of inner
and outer telescopic members slidably fitted
together, a key for preventing angular move-
ment as between said members, means for ren-
5 dering said members water-tight, and contact
mechanism mounted upon one of said mem-
bers.

In testimony whereof I have signed my name
to this specification in the presence of two sub-
scribing witnesses.

WILLIAM RUSSELL COOPER.

Witnesses:

MINERVA SCOTT,

H. E. MEINTZ.