

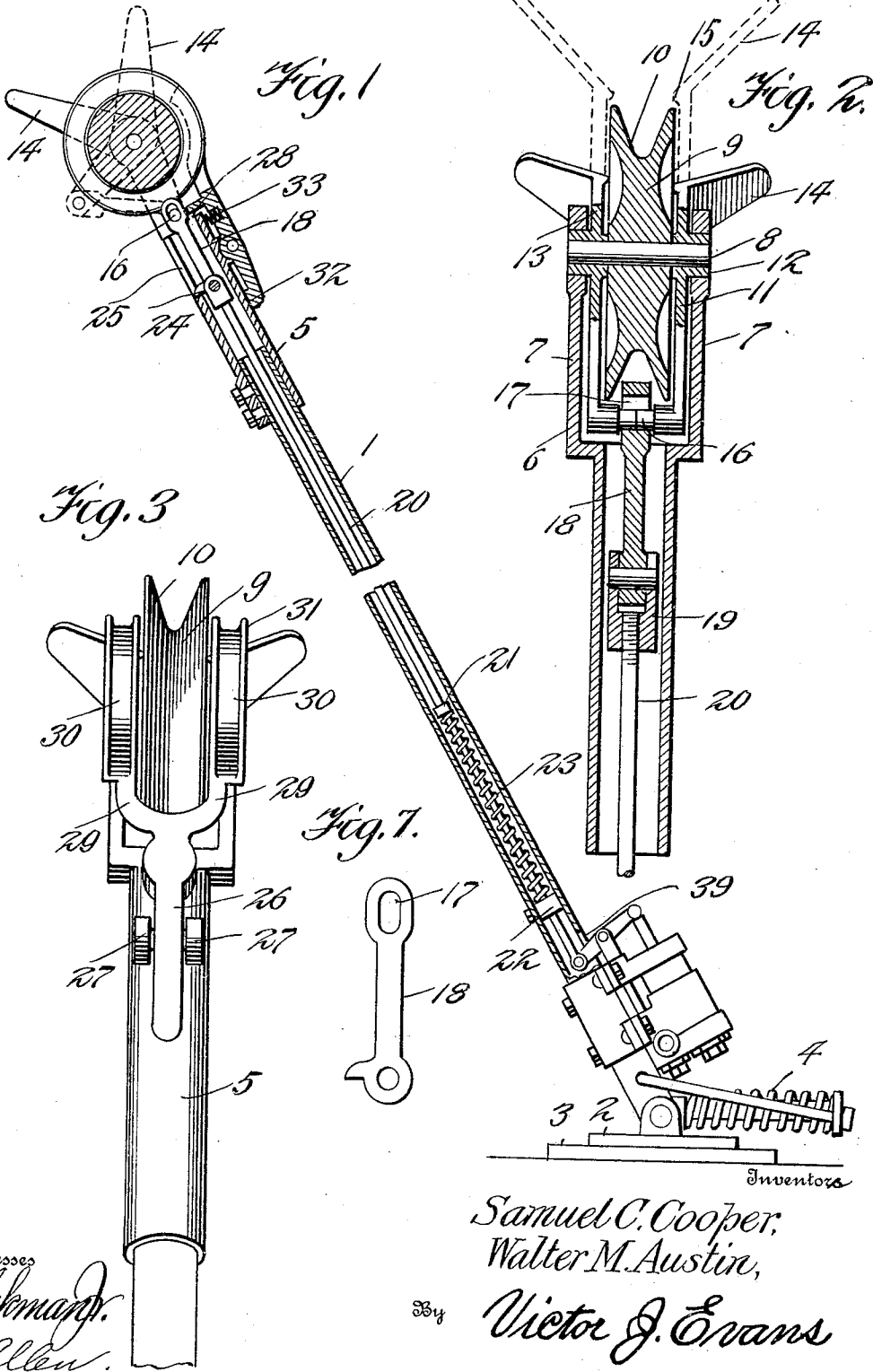
W. M. AUSTIN & S. C. COOPER.
TROLLEY REPLACER.

APPLICATION FILED MAY 3, 1907. RENEWED SEPT. 3, 1908.

932,426.

Patented Aug. 31, 1909.

2 SHEETS—SHEET 1.



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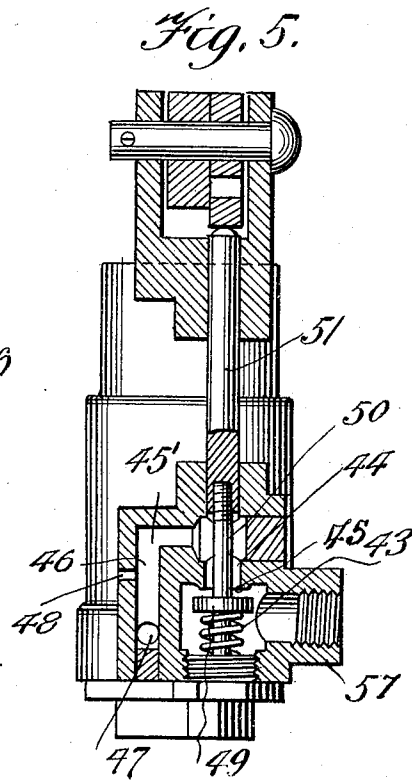
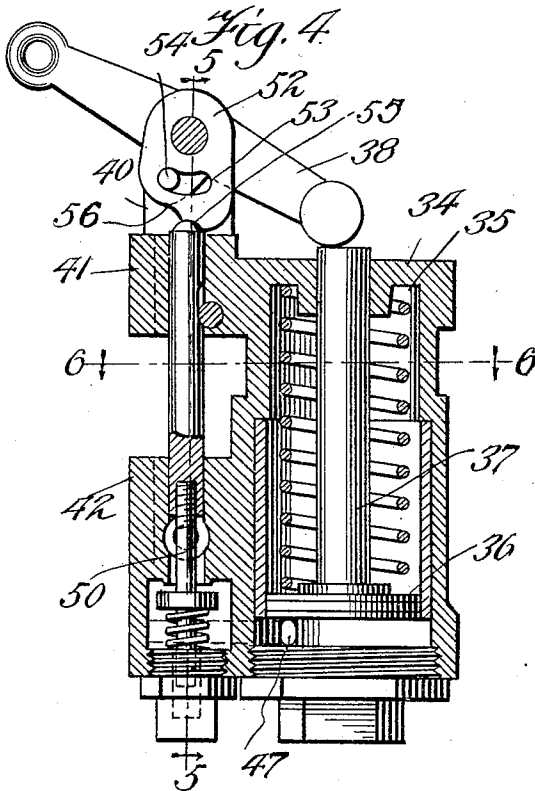
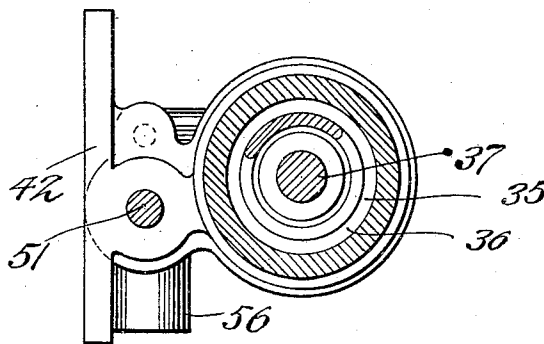


Fig. 6.



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UNITED STATES PATENT OFFICE.

WALTER M. AUSTIN, OF SWISSVALE, PENNSYLVANIA, AND SAMUEL C. COOPER, OF JOHNSTOWN, NEW YORK, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-THIRD TO SAID COOPER, ONE-THIRD TO PHILIP KECK, AND ONE-THIRD TO SIDNEY E. TRUMBULL, OF JOHNSTOWN, NEW YORK.

TROLLEY-REPLACER.

932,426.

Specification of Letters Patent.

Patented Aug. 31, 1909.

Application filed May 3, 1907, Serial No. 371,717. Renewed September 3, 1908. Serial No. 451,572.

To all whom it may concern:

Be it known that we, WALTER M. AUSTIN and SAMUEL C. COOPER, citizens of the United States, residing, respectively, at Swissvale and Johnstown, in the counties of Allegheny and Fulton and States of Pennsylvania and New York, have invented new and useful Improvements in Trolley-Replacers, of which the following is a specification.

The invention relates to an improvement in trolley replacers of the type wherein the replacing element is automatically projected into operative position by the trolley wire immediately succeeding its escape from the trolley wheel.

The main object of the present invention is the provision of means for automatically returning the trolley replacer to normal position after its effective service in guiding the wire back to the trolley wheel, whereby the replacer is returned to normal position immediately succeeding its operative function and the probability of interference by said replacer with switch or cross wires is avoided.

The invention will be described in the following specification, reference being had particularly to the accompanying drawings, in which:—

Figure 1 is a view in longitudinal section, partly in elevation illustrating a trolley pole provided with our improvements, Fig. 2 is an enlarged vertical section through the harp and connecting parts, Fig. 3 is a front elevation of the same, Fig. 4 is a vertical central section, partly in elevation through the restoring valve mechanism, Fig. 5 is a section on line 5—5 of Fig. 4, Fig. 6 is a transverse section on line 6—6 of Fig. 4, Fig. 7 is a view in elevation of the connecting link joining the operating rod and trolley replacer.

Our invention relates specifically to means for automatically resetting or restoring the trolley replacer after its automatic projection by the operation of the trolley wire, and for the purpose of illustrating the invention more completely we have shown an accepted type of automatic projecting mechanism, primarily adapted for use with our resetting mechanism. It is to be understood, however, that the present invention is directed broadly to the resetting mechanism and that we contemplate the use of any desired form of pro-

jecting mechanism. For the purposes of the present invention, however, the trolley replacer projecting mechanism may be described as including a trolley pole 1, preferably of hollow construction and pivotally supported upon a turn-table 2 mounted on a base 3 secured to the car top, the usual spring supports 4 being arranged to maintain the trolley pole under pressure in use. The upper end of the pole proper is engaged by a sleeve 5 depending from the harp 6, the arms 7 of which harp are arranged in spaced parallel relation, as is usual. A shaft 8 is supported in the harp arms on which is revolutely mounted a trolley wheel 9, said wheel being of any desired type and preferably formed with a circumferentially arranged wire receiving groove 10.

The replacer comprises independent members mounted on opposite sides of the trolley wheel, each of said members including a bar 11 terminally connected at one end to a sleeve member 12 formed to receive the shaft 8 and to itself fit within a bearing opening formed in the harp arm. From the sleeve a second arm 13 projects at an angle to the arm 11, the upper end of the arm 13 being provided with a laterally projecting upwardly inclined lip 14 of comparatively broad surface. The lip, or more properly the upper surface thereof, extends slightly beyond the relatively inner surface of the arm 13, as at 15, the projecting portion 15 being designed to overlies the proximate edge of the trolley wheel groove with the effect to direct the wire engaging either of the lips 14 with certainty into the groove. The relatively lower ends of the arms 11 are formed with inwardly projecting studs 16 designed to engage an elongated opening 17 in the upper end of a link 18, the lower end of which is pivotally connected to a coupling 19 with the upper end of an operating rod 20. The rod 20 extends longitudinally of the trolley pole to a point immediately adjacent the lower end thereof, being provided at a point above the lower end with an adjustable collar 21, and being guided in movement at the lower end through a guide block 22 fixed in the trolley pole. An operating spring 23 is coiled about the rod 20, bearing at its respective ends against the collar 21 and block 22. The link 18 is provided adjacent its connection with the operating rod with a

laterally projecting stud 24, designed to reciprocate in the movements of the link in a guideway 25 formed in the wall of the harp sleeve 5.

5 A trip is provided for automatically releasing the replacer to the influence of the spring 23 upon engagement of the trolley wire with the trip. This trip, as best seen in Fig. 3, comprises a trip bar 26 pivotally
10 supported between ears 27 formed on the harp sleeve 5, said bar above its pivotal connection being formed with an inwardly projecting trip finger 28. Immediately above the finger the trip is branched to provide
15 spaced arms 29 disposed beyond and on opposite sides of the trolley wheel, said arms terminating in their relatively upper portions in plates 30 curving concentrically with the curvature of the trolley wheel and
20 formed on their respective side edges with projecting flanges 31 extending at a right angle to the plane of the plate 30. Each of the trip plates is thus of approximately U-form in transverse section, being normally
25 so arranged as to dispose the free edges of the flanges 31 in a plane with the edges of the trolley wheel, so that a wire jumping from the wheel will with certainty be engaged by either one or the other of the trip
30 plates. Below the pivot the trip bar 26 is formed with a projection 32 to engage the surface of the harp sleeve 5, and above the pivot a coil spring 33 is arranged between the trip bar and surface of the harp sleeve,
35 with the effect to normally maintain the trip in one certain position relative to the trolley wheel.

The operation of the projecting mechanism may be briefly described as follows.
40 With the lips 14 of the replacers arranged below the plane of the relatively upper portion of the trolley wheel, as shown in full lines in Fig. 1, the arms 11 of said replacers and the link 18 are alined with the operating
45 rod 20, thereby maintaining these parts in this position against the tension of the spring 23. In the normal position of the parts the trip finger 28 rests against the link 18 at its point of connection with the
50 stud 16 of the replacers, so that upon escape of the trolley wire from the groove 10 it will engage one of the trip plates 30, causing the trip finger to move inward, breaking the joint between the link 18 and the arms 11
55 of the replacer, to release the replacer members through the influence of the spring 23. The spring thereupon automatically acts to project the rod upward with the effect to move the lips 14 of the replacers on opposite
60 sides of the trolley wire and redirect said wire and trolley wheel grooves into cooperative relation.

In connection with the above described projector we provide means for returning
65 the operating rod 20 to the normal position,

and thereby resetting the trolley replacer. The means described comprises a valve casing 34 securely bolted or otherwise secured to the trolley pole below the relatively lower end of the operating rod. Within the casing
70 is formed a chamber 35 in which is mounted a piston 36, the stem 37 of which projects through the upper end of the casing and bears beneath one end of a resetting lever
75 38, the opposite end of which extends through a slot in the trolley pole, as at 39, and is connected to the relatively lower end of the operating rod 20, as clearly shown in Fig. 1. The lever 38 is pivotally supported
80 in ears 40 rising in spaced relation from an offset 41 projecting from the casing 34. Below and in alinement with the offset 41 is provided a second enlargement 42, interiorly provided with a valve chamber 43 communi-
85 cating with an upwardly extending port 44, the juncture of the chamber with the valve port forming a valve seat 45. The port 44 communicates with a channel 45' extending transversely of the offset 42 and communi-
90 cating with a vertically extending port 46 arranged in rear of the valve chamber 43. The lower end of the port 46 communicates with a transversely extending port 47 opening directly into the chamber 35 below the
95 piston 36. In the wall of the offset 42 is arranged a minute escape port 48, which is in open communication with the port 46. A valve 49 is arranged in the chamber 43 for cooperation with the valve seat 45, said
100 valve being spring pressed in a direction to close the seat and having its stem 50 connected to the lower end of a controlling rod 51 slidably mounted in the offsets 42 and 41, the upper end of the rod being rounded for
105 cooperation with a cam 52 secured upon the pivot pin of the lever 38. The cam is loosely mounted upon the pivot pin and is formed with an arcuate slot 53 to receive a pin 54 projecting from an extension of the lever,
110 so that said lever will, at determinate points in its movement in either direction, engage and affect the cam. The relatively lower edge of the cam 52 is formed with two distinct cam recesses 55 and 56, the former being
115 on a relatively lower plane than the latter longitudinally of the cam, and being respectively so disposed that when the cam recess 55 engages the upper end of the rod 51 the valve 49 will be held from engagement with its seat, while when the cam surface 56
120 is arranged to engage the rod 51, the valve 49 is permitted to engage the seat 46 and thereby close the valve chamber 43 against the port 44. The offset 42 is formed with a nipple 57 designed to receive a flexible hose
125 connection leading from the air brake cylinder on the car, the admittance of the air to the valve chamber 43 being manually controlled by any desired form of valve, not shown.

In operation of the resetting mechanism, and assuming the projecting mechanism as in operative position, the motorman or conductor will admit air to the valve forming the present invention. In the operative position of the rod 20, it will be noted that the stem engaging end of the lever 38 is depressed, so that the piston 36 is at the lowest plane of movement. As the cam 52 has been operated by the lever in this movement to dispose the cam recess 55 to engage the upper end of the rod 51, it will be noted that the valve 49 is held off its seat. The air admitted from the cylinder will then find its way directly to the chamber 35 and elevate the piston, with the effect to draw down the operating rod 20 and reset the replacing members. This movement of the lever 38 also moves the cam to dispose the cam surface 56 immediately above the rod 51, whereupon the spring acts to close the valve 49, thus automatically cutting off the pressure supply to the chamber 35. The excess pressure within said chamber and the ports communicating therewith will equalize with the atmospheric pressure through the vent 48, thereby permitting the reverse operation of the piston 36 in the next automatic operation of the rod 20 to set the replacer.

From the above description it will be noted that the motorman or conductor may automatically reset the replacer immediately succeeding its projection, the use of the mechanism described for this purpose resulting in such speedy and effective resetting as to avoid any possibility of the resetting arms engaging the switch or cross wires of the trolley connections.

It is, of course, obvious that the valve for controlling the admission of pressure to the valve chamber 43 may be automatically controlled by the initial upward movement of the rod 20, so that said rod will, in its upward movement open the valve and admit pressure to the valve which will tend to reset the rod. The entire operation may thus be automatically effected, if desired, by a well understood arrangement of the valve.

Having thus described the invention what we claim as new, is:—

1. A trolley replacer, spring operated means for projecting the replacer into operative position, and means operative independent of the trolley wheel for automatically resetting the replacer.

2. A trolley replacer, means for automatically projecting the replacer into operative position, and fluid pressure means for resetting the replacer.

3. A trolley replacer, means for projecting the replacer into operative position, means for resetting the replacer and a mechanically controlled valve for admitting pressure to operate the resetting means.

4. A trolley replacer, and pressure con-

trolled means for moving said replacer in the resetting direction, and means for relieving said pressure controlled means from the operating pressure.

5. A trolley replacer, a pressure controlled member operating to move the replacer in the resetting direction, and a valve to automatically relieve the member from the operating pressure after operative actuation of said member.

6. A trolley replacer, a rod connected therewith, spring means for operating the rod in one direction, and fluid pressure controlled means for operating the rod in the opposite direction.

7. A trolley replacer, a rod connected therewith, a spring for operating the rod in one direction, and a member controlled by fluid pressure to operate the rod in the opposite direction.

8. A trolley replacer, a rod connected therewith, a spring for operating the rod in one direction, a lever connected with the rod, a piston arranged to be actuated by fluid pressure for operating the lever to move the rod in the opposite direction, and means controlled by the lever for relieving the piston of the operating pressure in one position of the lever.

9. A trolley replacer, a rod connected therewith, a spring for operating the rod in one direction, a lever connected with the rod, a piston arranged to be actuated by fluid pressure for operating the lever to move the rod in the opposite direction, and a valve controlled by the lever for relieving the piston of the operating pressure in one position of the lever.

10. A trolley replacer, a rod connected therewith, a spring for operating the rod in one direction, a lever connected with the rod, a piston arranged to be actuated by fluid pressure for operating the lever to move the rod in the opposite direction, a valve for relieving the piston of the operating pressure, and means carried by the lever for controlling the position of the valve.

11. A trolley replacer, a rod connected therewith, a spring for operating the rod in one direction, a lever connected with the rod, a piston arranged to be actuated by fluid pressure for operating the lever to move the rod in the opposite direction, a valve for relieving the piston of the operating pressure, and a cam carried by the lever for controlling the position of the valve.

12. A trolley replacer, means for normally tensioning said replacer for operation, and fluid pressure means for operating the replacer against the influence of its normal tensioning means.

13. A trolley replacer, means for normally tensioning said replacer for projection to operative position, and means automatically operative by fluid pressure for forcing the

replacer into normal position after its projection.

14. A trolley replacer, means for normally tensioning said replacer for operation in one direction, and fluid pressure means for automatically actuating the replacer in the opposite direction.

15. A trolley replacer, a spring for automatically projecting the replacer into operative position, and fluid pressure means for moving the replacer in the opposite direction against the tension of the spring.

16. A trolley replacer, a spring for automatically projecting the replacer into op-

erative position, fluid pressure means for moving the replacer in the opposite direction against the tension of the spring, and means to automatically control the fluid pressure means in the movement of the replacer.

In testimony whereof, we affix our signatures in presence of two witnesses.

WALTER M. AUSTIN.
SAMUEL C. COOPER.

Witnesses:

JAMES V. SHAFFER,
WILLIAM K. WEAVER.