No. 828,489. PATENTED AUG. 14, 1906.

M. LIDSTER & J. HOELLIG.

TROLLEY POLE CONTROLLER.

APPLICATION FILED DEC. 4, 1905.

2 SHEETS—SHEET 1.

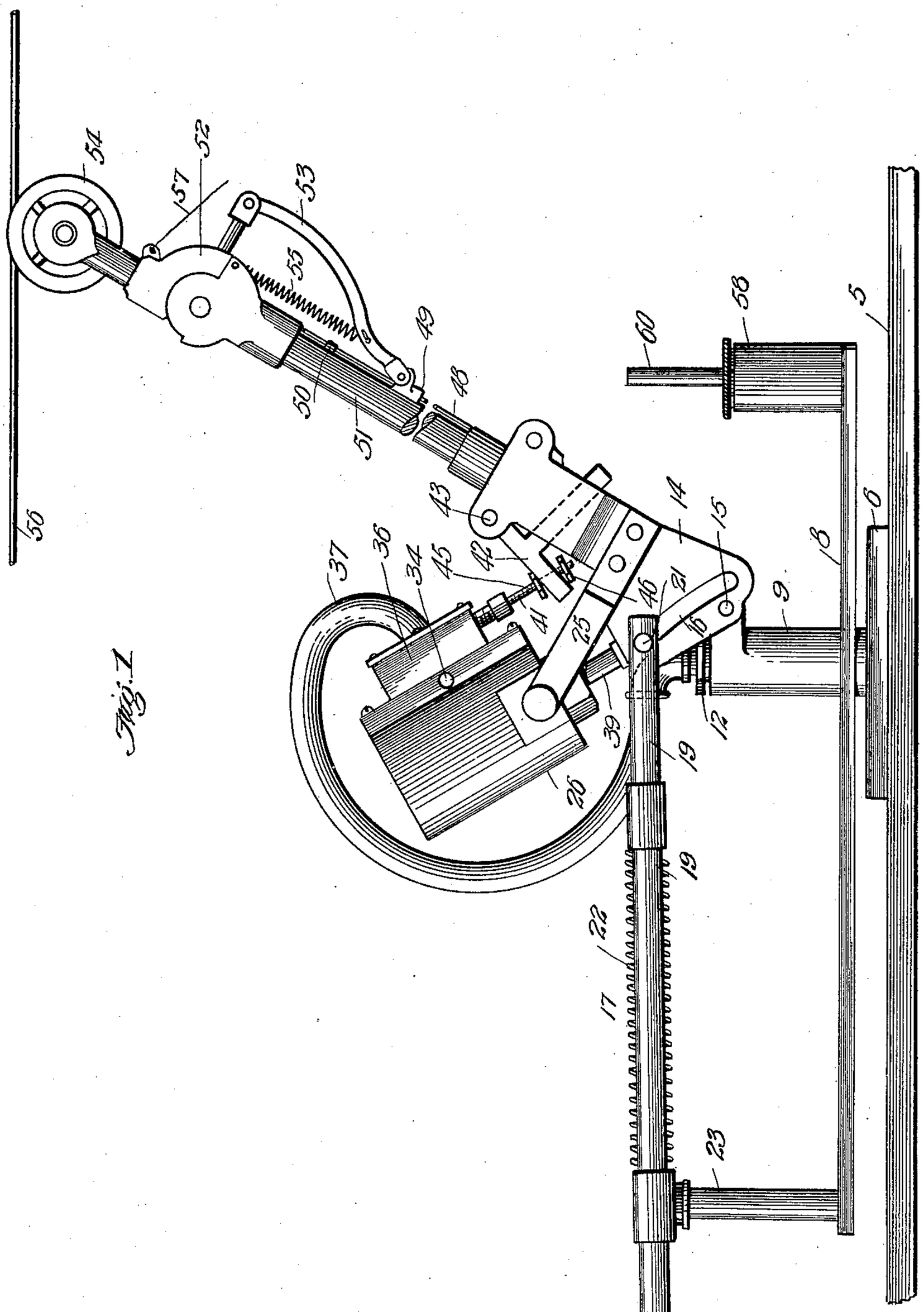

Fig. 1.

Witnesses
Edmund A. Strauss.
Margarete L. Nickelson.

Inventors
Mitner Lidster
Joseph Hoellig
By Hazard & Harpham
Attorneys.

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2 SHEETS—SHEET 2.

Fig. 2

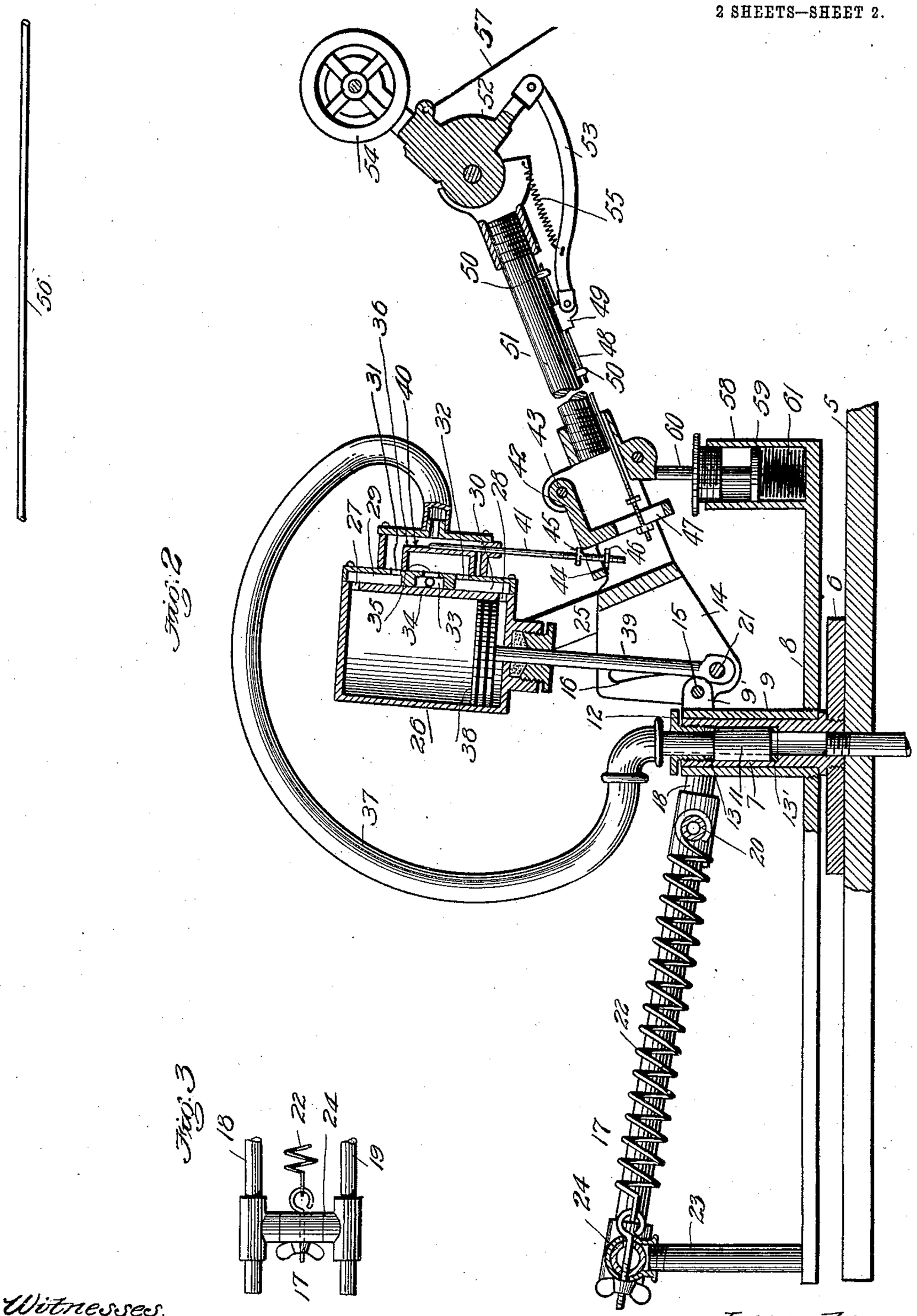

Fig. 3

Witnesses.
Edmund A. Strauss.
Margarete B. Nickelson.

Inventors
Milner Lidster and Joseph Hoellig
By Hazard & Harpham
Attorneys.

UNITED STATES PATENT OFFICE.

MILNER LIDSTER AND JOSEPH HOELLIG, OF LOS ANGELES, CALIFORNIA

TROLLEY-POLE CONTROLLER.

No. 828,489. Specification of Letters Patent. Patented Aug. 14, 1906.

Application filed December 4, 1905. Serial No. 290,280.

To all whom it may concern:

Be it known that we, MILNER LIDSTER and JOSEPH HOELLIG, citizens of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Trolley-Pole Controllers, of which the following is a specification.

Our invention relates to means for controlling the movement of a trolley-pole used with an overhead feed-wire; and the object thereof is to provide automatic means to shift the power that holds the trolley-wheel in contact with the feed-wire to bring the pole below the feed-wire when the trolley-wheel accidentally leaves the wire. We accomplish this object by the mechanism described herein and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a trolley-pole equipped with our device in its operative position on the feed-wire. Fig. 2 is a longitudinal central section. Fig. 3 is a plan of the rear end of the spring-frame.

In the drawings, 5 is the roof of the car, to which is secured a roof-plate 6. A hollow stud 7 is secured to the roof-plate and projects upwardly therefrom. On stud 7 is revolubly mounted the trolley base-plate 8, which is provided with a hollow upright 9, which surrounds studs 7 and terminates at the top on the same plane. In the bottom of stud 7 is screwed the air-pipe 10, which is connected to the compressed-air reservoir beneath the car. (Not shown.) The upper part of stud 7 is of a slightly-larger bore than the lower part, as shown in Fig. 2, and in this portion of stud 7 is mounted pipe 11, which projects above the top of the stud. The upper portion of this pipe is reduced in size, as shown in Fig. 2, and is held against separation from stud 7 by the lock-nut 12, which is screwed into the stud and bears on a packing-ring 13, which forms an air-tight connection between the stud and this pipe. A second packing-ring 13′ at the lower end of pipe 11 also makes the connection air-tight. The packing-ring contacts with the lower and larger portion of the pipe. Lock-nut 12 also projects over the upright of the trolley base-plate to prevent the same from separating therefrom. At the top of upright 9 is a lug 9′, which provides a bearing for the base 14 of the trolley-pole, which base is bifurcated and straddles lug 9′ and is pivotally secured thereto by bolt 15. The trolley-pole base is provided with a curved slot 16, which commences a short distance below and back of its pivotal connection with upright 9 and extends a considerable distance above said pivotal connection. A spring-frame 17, composed of the side bars 18 and 19 and cross-bar 20, is secured to the trolley-pole base by a bolt 21, which passes through the forward end of the side bars of the spring-frame and through slot 16 of the trolley-pole base. The forward end of the pressure-spring 22 is secured to cross-bar 20, and the rear end thereof is secured to the top of a stud 23, which is secured to the trolley base-plate. To the top of stud 23 is secured a cross-bar 24, through the ends of which the ends of side bars 18 and 19 are longitudinally movable. Secured to the trolley-pole base by the supporting-bars 25 and mounted above the same is a piston-chamber 26, which is provided with a port 27 at the top thereof and port 28 at the bottom of the chamber. These ports open into the top control-chamber 29 and the bottom control-chamber 30, respectively. The top control-chamber has a port 31 in the bottom thereof, and the bottom control-chamber has a port 32 in the top thereof. Intermediate these control-chambers is an exhaust-chamber 33, which has ports 34 in the side thereof that lead to the open air and a port 35, that connects the exhaust-chamber with the slide-valve chamber 36. The slide-valve chamber is connected by the flexible pipe 37 to pipe 11, thereby connecting the slide-valve chamber to the compressed-air supply. In piston-chamber 26 is piston 38, having a piston-stem 39, which is connected to bolt 21 between the arms of the trolley-pole base. In the slide-valve chamber is a slide-valve 40, which is connected by valve-stem 41 to a T-shaped lever 42, which is pivotally mounted at 43 by one of its arms to the trolley-pole base. The other arm of the T-lever is provided with a slot 44, through which the slide-valve stem 41 passes. The lower end of this stem is preferably threaded and provided with nuts 45 and 46, so as to adjust its connection with the T-lever. The stem of the T-lever is provided with a slot 47, through which passes lever-operating rod 48, which rod is connected to a lug 49, secured to the rod. Bearings 50 are secured to the trolley-pole 51 to support and guide rod 48. In the outer end of the trolley-pole is pivotally mounted a bell-crank lever 52, one arm of which is connected by link 53 with lug 49, and in the

other arm of the bell-crank lever is rotatively mounted the trolley-wheel 54. The bell-crank lever is so mounted in the end of the trolley-pole that it has a limited movement only. To the end of the trolley-pole, on the lower side thereof, is secured a spring 55, which spring is secured at its other end to the link 53, so that when the trolley-wheel accidentally leaves the feed-wire 56 it will cause the arms of the bell-crank lever which carries the trolley-wheel to be turned at an angle to the trolley-pole, as shown in Fig. 2, and through the connecting mechanism to cause the slide-valve to move downwardly to connect the interior of the piston-chamber below the piston to exhaust and to open communication to the interior of the piston-chamber above the piston to air, whereby the piston is forced to its lowermost position, as shown in Fig. 2, thereby causing the end of the spring-frame connected to bolt 21 to be thrown below the pivotal connection between the trolley-pole base and the upright to which it is connected, thereby causing the spring 22 to bring the trolley-pole below the feed-wire. To return the trolley-wheel to the feed-wire, the operator seizes the usual guide or trolley rope 57, which is connected to the arm of the bell-crank lever carrying the trolley-wheel and pulls upon the same until said arm lies in the same plane as the trolley-pole, as shown in Fig. 1. This movement of the bell-crank lever through connecting mechanism shifts the slide-valve to throw the upper part of the piston-chamber to exhaust and the lower part below the piston to air, and thereby through connecting mechanism brings bolt 21 to the upper end of slot 16, which brings the power of spring 22 to carry the trolley-pole upwardly. As soon as the wheel is guided to the feed-wire the power of spring 22 retains it in that position and keeps it spring-pressed against the feed-wire, as shown in Fig. 1.

By this construction we utilize the ordinary pressure-spring both for holding the trolley-wheel in contact with the feed-wire when operating normally and also to bring the trolley-wheel below the feed-wire whenever the same accidentally leaves the wire. It will be seen that as long as the trolley-wheel is on the feed-wire, no matter whether the wire is low or high, the power of spring 22 will hold it in contact therewith and that as soon as the wheel accidentally leaves the wire, no matter whether it is a high wire or a low wire, the power of spring 22 will be instantly shifted, so that it will draw the trolley-wheel below the feed-wire. To prevent injury to the trolley-pole and to prevent it falling too far, I have provided a dash-pot, which consists of a piston-chamber 58, in which is loosely mounted a piston 59, provided with a stem 60, which projects above the chamber when in its normal position and is engaged by the trolley-pole as it comes down. Piston 59 is held in its elevated position by spring 61, and it also has such a fit in the piston-chamber that the air will slowly escape around the piston as the trolley-pole engages stem 60, thereby preventing the too sudden stopping of the trolley-pole in its downward movement.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an overhead electric railway system a trolley-pole pivotally connected to a support and carrying on the outer end thereof a trolley-wheel; a pressure-spring connected to said trolley-pole base by a shiftable connection; and means to shift the connection between the pressure-spring and the base of the trolley-pole to above or below the pivotal connection between the trolley-pole base and its support.

2. In an overhead electric railway system a trolley-pole pivotally connected to a support and carrying on the outer end thereof a trolley-wheel; a pressure-spring connected to said trolley-pole base by a shiftable connection; and pneumatic means connected to said connection between the trolley-pole base and the pressure-spring for shifting said connection above or below the pivotal connection between the trolley-pole base and its support as desired.

3. In an overhead electric railway system, a rotating support; a trolley-pole pivotally connected to said rotating support; said pole consisting of connected parts, the trolley-pole base having a slot therein extending above and below the plane of the connection between said pole and its support; a pressure-spring frame having the front end of its side bars connected together by a bolt passing through said slot and the rear end passing through guides secured to the base-plate of the trolley-pole support; a pressure-spring secured to the front end of said frame and to the base-plate of the trolley-pole support; a piston-chamber secured to the base of the trolley-pole; a piston in said chamber, said chamber having ports at the top and bottom thereof; a piston-stem secured to said piston and to the bolt passing through the slot in the trolley-pole base; control-chambers on the side of said piston-chamber into which the ports of the piston-chamber open, one chamber being at the top and the other at the bottom of said piston-chamber, the top control-chamber having a port in the bottom thereof and the bottom control-chamber having a port in the top thereof; a slide-valve chamber surrounding said ports; an exhaust-chamber intermediate said controlled chambers and having ports opening to the outer air and a port opening into the slide-valve chamber; a slide-valve in said chamber adapted to connect said control-cham-

bers, one with the exhaust and the other with the slide-valve chamber and to reverse said connection when desired; a connection from said slide-valve chamber to an air-pipe; a hinged connection between the parts of the trolley-pole near the upper end thereof; a trolley-wheel in the outer end of said pole; an arm secured to the inner end of the outer section of said trolley-pole; a lever-operating rod slidably mounted in bearings secured to said trolley-pole; a link connecting said rod to the lower arm of the upper section of the trolley-pole; a T-lever pivotally connected to said trolley-pole base and adjustably connected to said lever-operating rod; a stem secured to said slide-valve and adjustably connected to said T-lever.

In witness that we claim the foregoing we have hereunto subscribed our names this 25th day of November, 1905.

MILNER LIDSTER.
JOE HOELLIG.

Witnesses:
G. E. HARPHAM,
EDMUND A. STRAUSE.