No. 826,799. PATENTED JULY 24, 1906.

A. L. PRENTISS.

TROLLEY POLE CONTROLLER.

APPLICATION FILED MAY 10, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

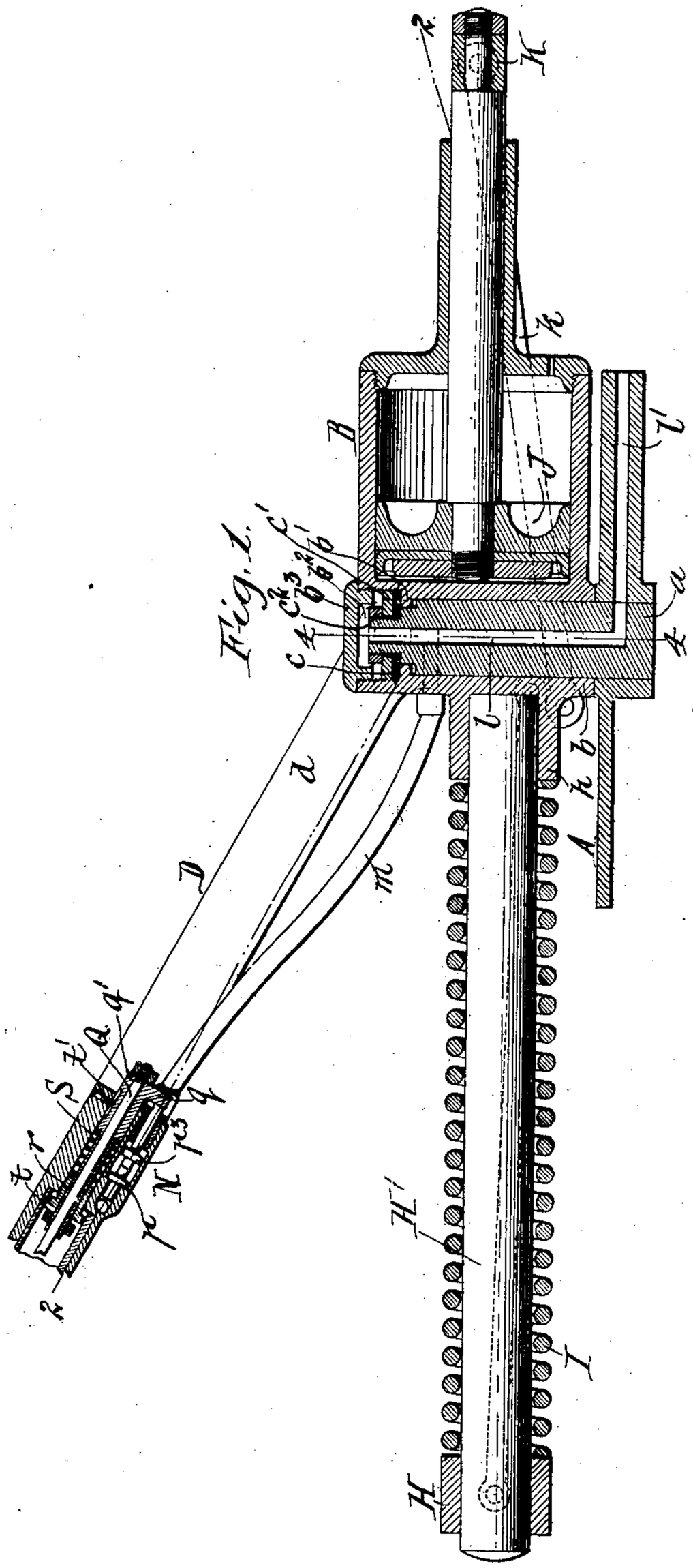
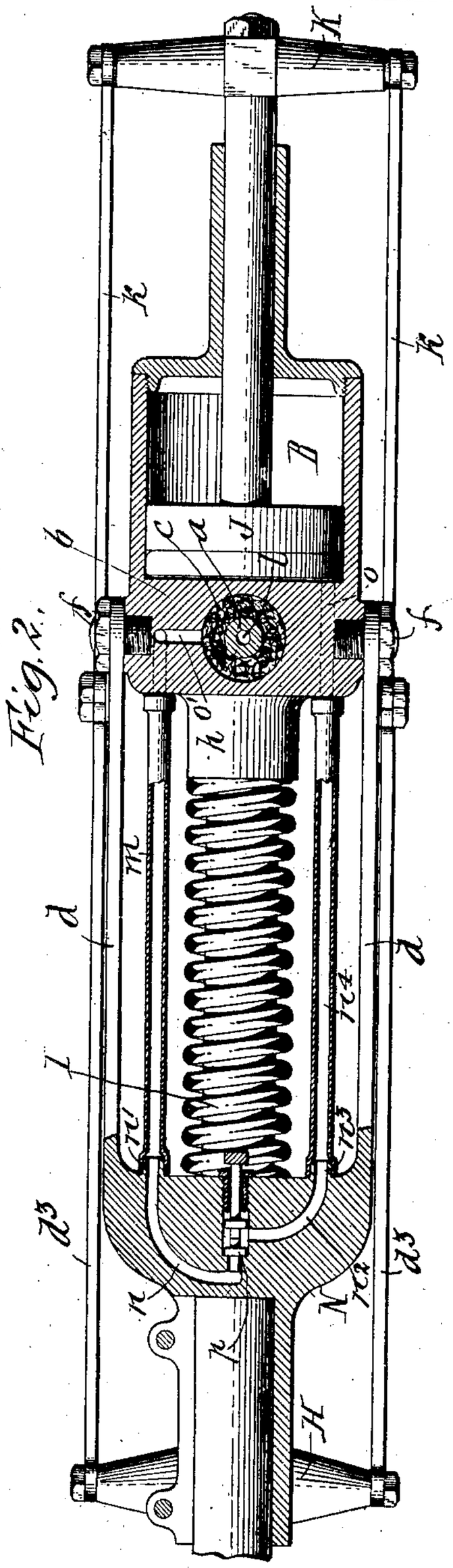


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

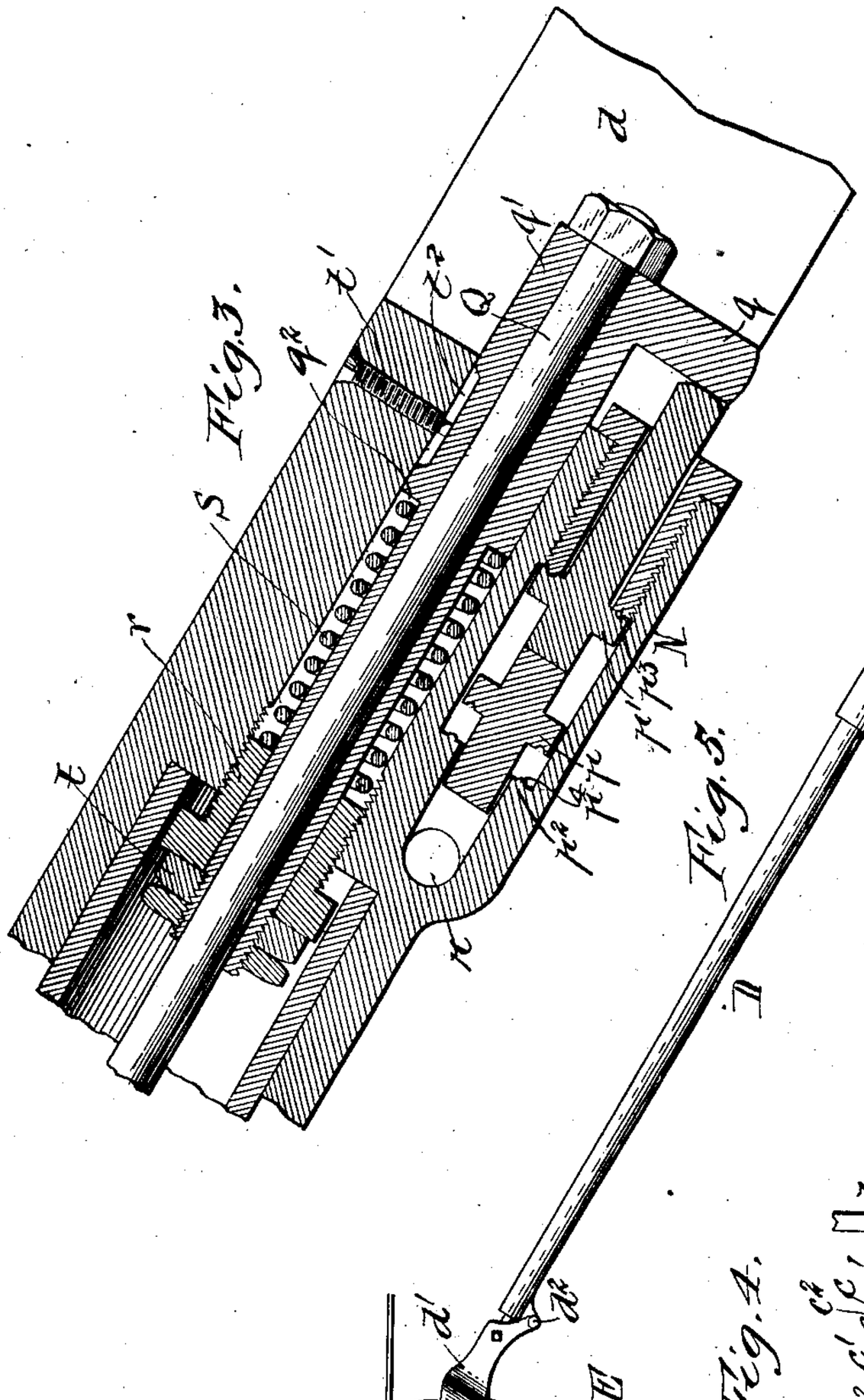


Fig. 5.

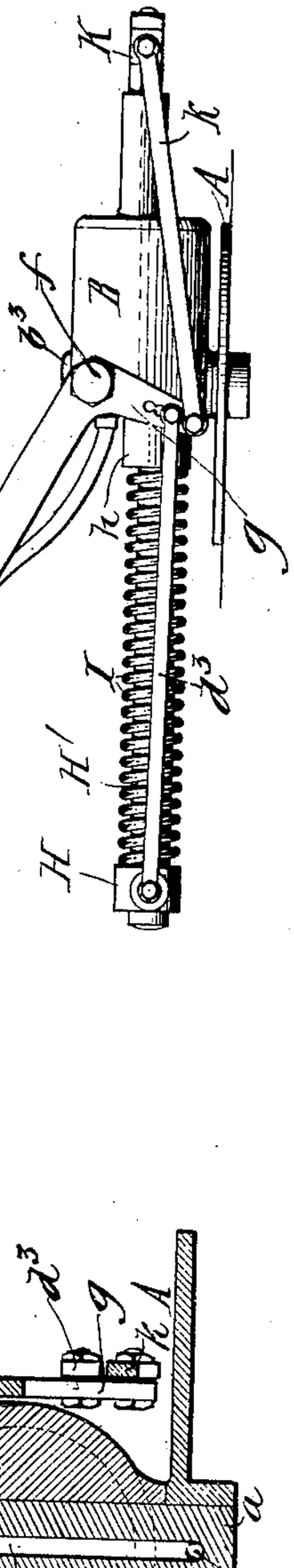


Fig. 2.

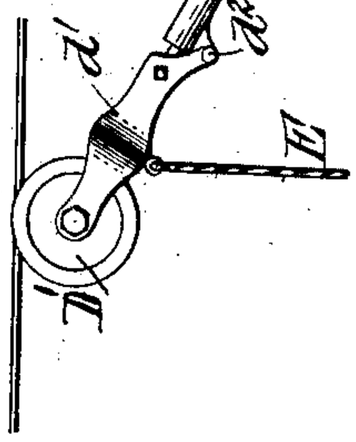
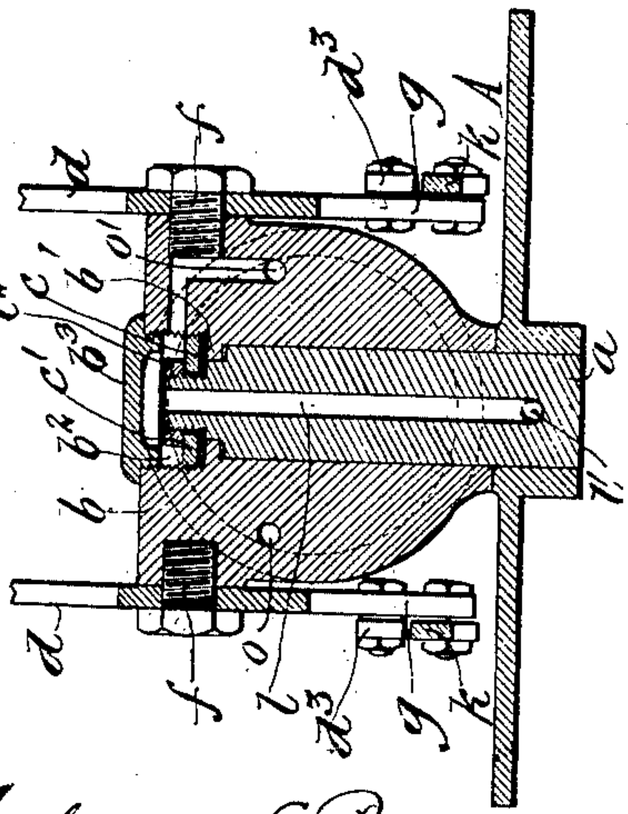


Fig. 4.



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UNITED STATES PATENT OFFICE.

ANDREW L. PRENTISS, OF BUFFALO, NEW YORK.

TROLLEY-POLE CONTROLLER.

No. 826,799. Specification of Letters Patent. Patented July 24, 1906.

Application filed May 10, 1905. Serial No. 259,702.

To all whom it may concern:

Be it known that I, ANDREW L. PRENTISS, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Trolley-Pole Controllers, of which the following is a specification.

This invention relates to that class of trolley-poles which are automatically lowered or permitted to drop when the trolley-wheel leaves the wire, so as to avoid damage to the pole, the wire, and its cross-wires or supports.

The object of my invention is to provide the pole with simple means for quickly and positively lowering the same in the event of the trolley-wheel jumping the wire and at the same time to so combine the lowering mechanism with the customary elevating or tension spring that in case the depressing means becomes unserviceable from any cause the pole can be used in the ordinary manner.

In the accompanying drawings, consisting of two sheets, Figure 1 is a fragmentary longitudinal section of a trolley-pole and base embodying the invention, showing the position of the parts when the pole is in its operative position. Fig. 2 is a longitudinal section in line 2 2, Fig. 1. Fig. 3 is an enlarged longitudinal section of the valve mechanism mounted on the pole. Fig. 4 is a transverse section in line 4 4, Fig. 1. Fig. 5 is a side elevation of the pole, showing the same in its operative position.

Similar letters of reference indicate corresponding parts throughout the several views.

A is a stationary base-plate adapted to be secured to the car-roof and having a fixed post or stud *a*. Upon this post is swiveled a horizontally-swinging pressure-cylinder B, having an upright hub *b*, which surrounds the post. The reduced upper end of the post passes centrally through a diaphragm *b'*, arranged in the upper portion of the hub, the portion of the hub above this diaphragm forming an air-chamber b^2, which is closed by a screw-plug b^3. An air-tight joint is formed between the hub and the post by suitable packing *c*, interposed between the upper side of the diaphragm and a clamping-nut *c'*, which engages with an internal screw-thread of the air-chamber. The upper end of the post *a* passes loosely through this clamping-nut and carries a lock-nut c^2.

D is the trolley-pole, preferably consisting of a main or body section, provided at its lower end with a yoke or bifurcated portion *d*, rigidly connected therewith, and at its upper end with a hinged section *d'*, carrying the trolley-wheel D' and pivoted to the body-section by a transverse pivot d^2, so as to permit the upper section to swing vertically on the lower or body section.

E is the customary depressing-cord, which is connected to the upper section *d'*.

The branches of the yoke *d* straddle the cylinder B and are pivoted at their lower ends to opposite sides thereof by horizontal pins or bolts *f*, thus permitting the pole to swing vertically on the swiveling cylinder. The branches of the yoke *d* are provided with depending arms *g*, connected by links d^3 with a collar or slide H, which is mounted upon a horizontal rod or guide H', extending rearwardly from the cylinder B, this rod being preferably secured in a socket *h* at the rear end of the cylinder, as shown.

I is a tension or pressure spring surrounding said guide-rod and abutting at its ends against the collar H and the rear end of the socket *h*. This spring by its tendency to urge the collar H rearwardly elevates the pole and presses the trolley-wheel against the conductor.

J is a piston arranged in the pressure-cylinder B. The piston-rod passes through the front head of the cylinder and carries a cross-head K, the ends of which are connected with the depending arms *g* of the pole by links *k*, by which connection the pole is depressed when the piston is moved forwardly in the cylinder.

The post *a* is provided with a longitudinal air-inlet passage *l*, leading to the air-chamber b^2 and connected with a passage *l'* in the base, which in turn is connected with a source of fluid-pressure, (not shown,) such as a compressed-air tank. The air-chamber b^2 is connected by a flexible tube or conduit *m* with a valve-chamber N, preferably arranged in the head of the yoke *d*, as shown in Figs. 2 and 3. This valve-chamber has an inlet *n* leading to one end thereof and terminating in a nipple *n'*, to which the adjacent end of the tube *m* is connected, and a lateral discharge-port n^2, terminating in a nipple n^3, to which a flexible return tube or conduit n^4 is connected. As shown in Figs. 2 and 4, the lower end of this return-tube is connected with a port *o*, extending through the rear wall of the pressure-cylinder into the interior thereof, while the other flexible tube is connected at its lower

end with a port o', communicating with the air-chamber b^2. The valve-chamber N extends through the bottom of the yoke-head, so as to open into the atmosphere and form an exhaust-port. This chamber contains a suitable valve mechanism, which in one position closes the exhaust-post and connects the pressure-cylinder with the air-chamber b^2 and in its other position opens the exhaust-port and cuts off communication between the cylinder and said air-chamber.

The preferred construction shown in the drawings comprises separate inlet and exhaust valves p p', adapted to close against seats p^2 p^3, arranged on opposite sides of the discharge-port n^2, the seat p^3 being formed by the inner end of a bushing, which is screwed into the lower end of the valve-chamber and through which the stem of the exhaust-valve passes. The stem of the inlet-valve p preferably bears loosely against that of the exhaust-valve; but, if desired, both valves may be mounted on a single stem. To form a reliable joint between each valve and its seat, one of these parts may be provided with an annular rib p^4, which enters a corresponding groove formed in the other part, as shown in Fig. 3.

The valves p p' are actuated by the pivoted upper section d' of the trolley-pole through the medium of a sliding rod Q, preferably passing through the hollow body-section D of the pole and provided at its lower end with a toe q, which bears against the projecting end of the stem of the exhaust-valve p', as shown in Figs. 2 and 3. This toe is formed on a sleeve q', suitably secured to the lower end of the sliding rod and passing through an opening formed in the yoke-head d in line with the tube D of the pole, said opening being provided in its upper end with a screw plug or bushing r. S is a spring surrounding the sleeve q' between a shoulder q^2 thereof and said screw-plug and tending to move the sleeve and the sliding rod downwardly in the pole, so as to withdraw the toe q from the exhaust-valve and permit the latter to close and the inlet-valve to open. The downward movement of the sleeve is limited by a stop or nut t, secured to its upper end and adapted to strike the screw-plug r. Rotary displacement of the sleeve is prevented by a screw or pin t', arranged in the yoke-head and engaging a longitudinal groove t^2, formed in the sleeve or by other suitable means.

In the ordinary operation of the pole the trolley-wheel is pressed against the wire by the tension-spring I, acting through the slide H, links d^3, and arms g, and the piston J is at the rear end of its stroke. The pressure of the trolley-wheel against the wire tends to straighten or swing the hinged upper section of the pole downwardly on the lower section, drawing the rod Q upward and compressing the spring S. This movement causes the toe q to open the exhaust-valve p' and close the inlet-valve p, as shown in Fig. 2, these valves being held in that position so long as the wheel remains against the wire. The compressed air or other pressure fluid is therefore prevented from entering the cylinder B, and the pole is acted on only by the tension-spring I. When the trolley-wheel accidentally leaves the wire, the upper pole-section d' swings upward on the lower section under the reaction of the spring S and causes the toe q to recede from the exhaust-valve p', allowing the latter to be closed and the inlet-valve opened by the air-pressure against the face of the inlet-valve, as shown in Fig. 3. When the valves are thus reversed, the compressed air is allowed to pass from the air-chamber b^2, through the port o', flexible tube m, inlet-port n, valve-chamber N, discharge-port n^2, and flexible tube n^4, through the port o into the pressure-cylinder B behind the piston, while the escape of the air from the cylinder through the exhaust end of the valve-chamber is cut off. The piston is therefore forced toward the front end of the cylinder, overpowering the tension-spring I and depressing the pole below the plane of the trolley-wire and its supports through the medium of the cross-head K, links k, and depending arms g, thus preventing injury to the pole and said supports.

To restore the depressed pole to its operative position, it is only necessary to pull down on the cord E, so as to again straighten the upper pole-section d' and shift the sliding rod upwardly in the pole. This causes the toe q to reverse the inlet and exhaust valves to their former position, as shown in Fig. 2, cutting off the further supply of pressure to the cylinder and allowing the tension-spring I to elevate the pole and hold it in contact with the wire, the air behind the piston meanwhile exhausting through the return-tube n^4, discharge-port n^2, and the open lower end of the valve-chamber N.

In my improved construction the valve mechanism and its actuating device are both mounted on the pole, and the connection between the same is simple and direct and transmits the movement of the pivoted upper pole-section to the valves without lost motion. A prompt and positive action of the lowering devices of the pole is thus secured irrespective of the height of the wire. At the same time the elevating and pressure spring of the pole is so combined with the pneumatic depressing device that in case the latter should be temporarily disabled the pole can be used in the ordinary manner.

I claim as my invention—

1. The combination of a trolley-pole, a spring connected therewith for normally pressing the trolley-wheel against the conductor, means for depressing the pole includ-

ing a pressure-cylinder containing a piston, means for connecting the pole with the piston, and valve mechanism mounted on the pole and controlled by the movements thereof and operating to admit the pressure fluid to the cylinder when the pole rises above its operative position, substantially as set forth.

2. The combination of a trolley-pole, a pressure-cylinder containing a piston, a connection between the pole and the piston constructed and arranged to lower the pole when the motive fluid is admitted behind the piston, and valve mechanism mounted on the pole and controlling the admission of the fluid to the cylinder and operated by the movements of the pole, substantially as set forth.

3. The combination of a trolley-pole having upper and lower sections movable relatively to each other, a pressure-cylinder containing a piston, a connection between the lower section of the pole and the piston constructed and arranged to lower the pole when the motive fluid is admitted behind the piston, valve mechanism mounted on the pole for controlling the admission of the motive fluid to the cylinder and its escape therefrom, and operating means for said valve mechanism controlled by the movements of said upper pole-section relative to the lower section, substantially as set forth.

4. The combination of a base having a stud or post, a cylinder swiveled on said post and arranged on the front side thereof, a piston in the cylinder, a connection between the piston and the pole operating to lower the pole when the motive fluid is admitted behind the piston, valve mechanism mounted on the pole and controlling the passage of the fluid to and from the cylinder, said mechanism being controlled by the movements of the pole, and an elevating-spring connected with the pole and arranged on the rear side of said post, substantially as set forth.

5. The combination of a trolley-pole having a pivoted upper section, a pressure-cylinder containing a piston, a connection between the body of the pole and the piston, a valve-case arranged on the under side of the pole and having inlet and exhaust valves which control the passage of the motive fluid to and from the cylinder, and a shifting rod for said valves arranged in the pole and connected with its pivoted section, substantially as set forth.

6. The combination of a trolley-pole having a pivoted upper section and a lower section having a yoke, a pressure-cylinder containing a piston, a connection between the piston and the lower pole-section, valve mechanism mounted on the pole and controlling the passage of the motive fluid to and from the cylinder, a shifting rod for said valve mechanism passing through the pole and the head of said yoke and connected with the pivoted upper section of the pole, and a spring acting to lower said rod in the pole and applied to the portion of the rod arranged in the yoke-head, substantially as set forth.

7. The combination of a trolley-pole having a pivoted upper section and a lower section having a yoke, a pressure-cylinder containing a piston, a connection between the piston and the lower pole-section, valve mechanism mounted on the pole and controlling the passage of the motive fluid to and from the cylinder, a sleeve sliding in the yoke-head and carrying a toe which acts upon said valve mechanism, means for preventing rotation of the sleeve, a spring surrounding the sleeve between shoulders in the same and the yoke-head, and a shifting rod passing through said sleeve and connected with the pivoted upper section of the pole, substantially as set forth.

Witness my hand this 8th day of May, 1905.

ANDREW L. PRENTISS.

Witnesses:

C. F. GEYER,

MAY E. MCARTHUR.