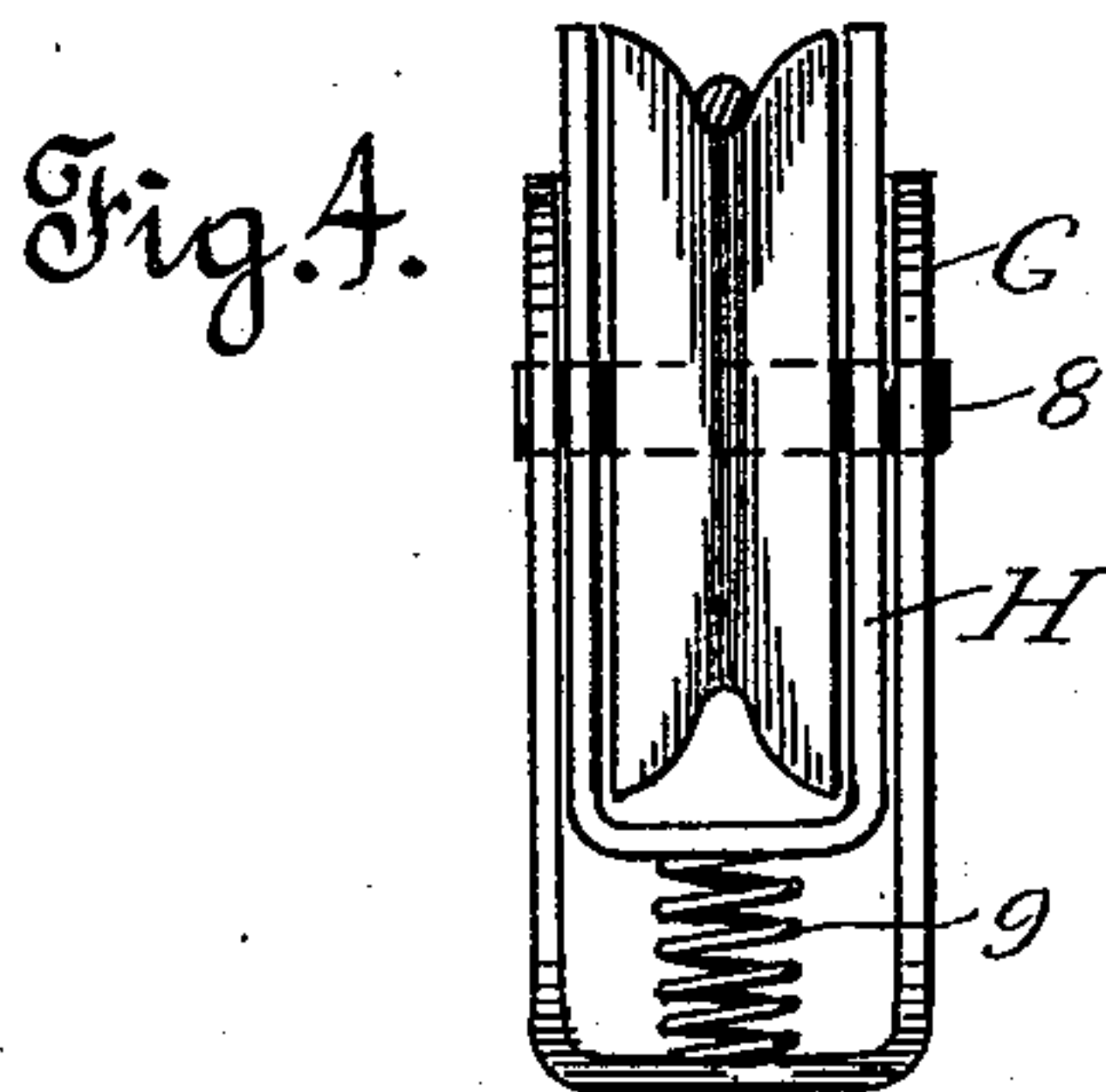
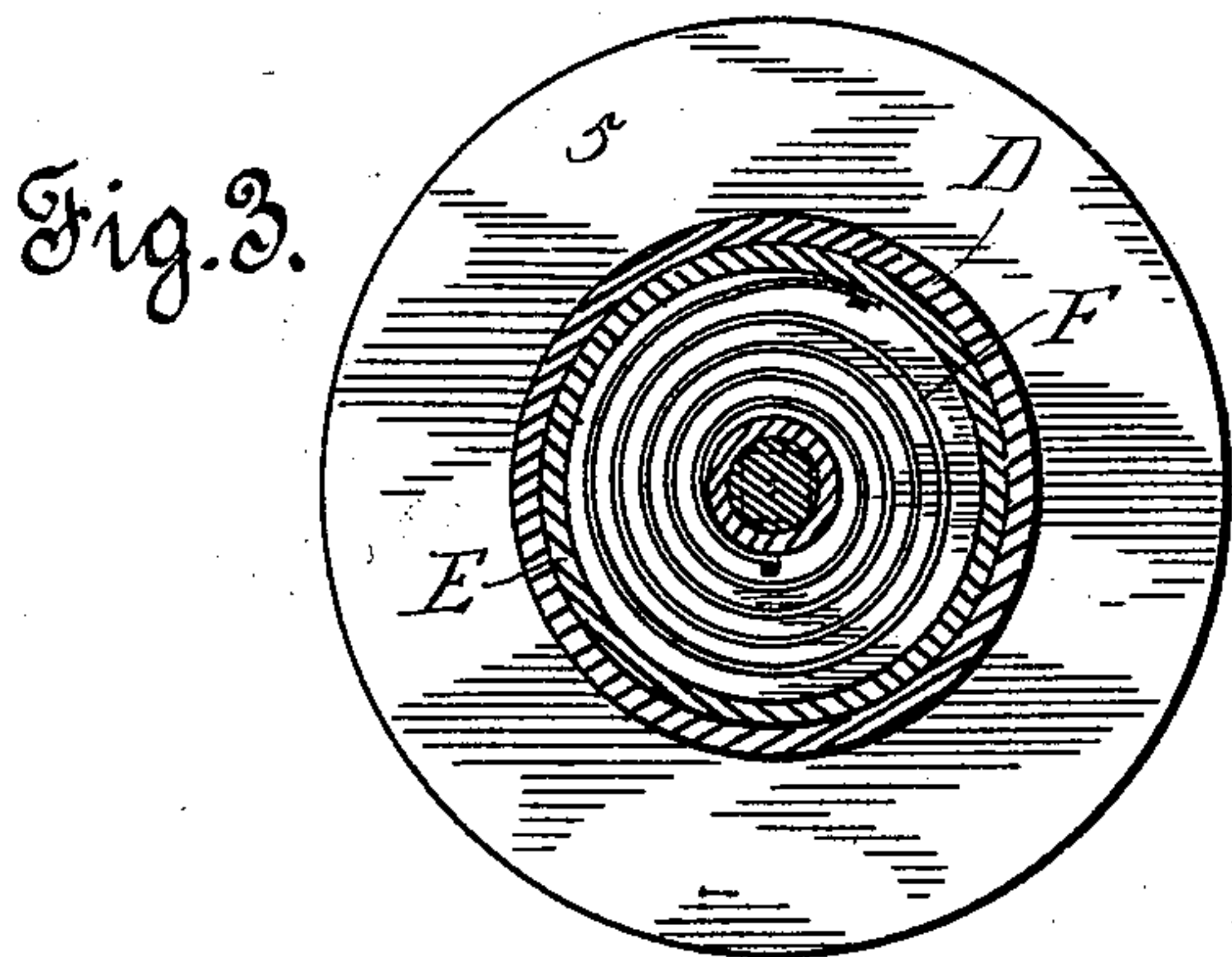
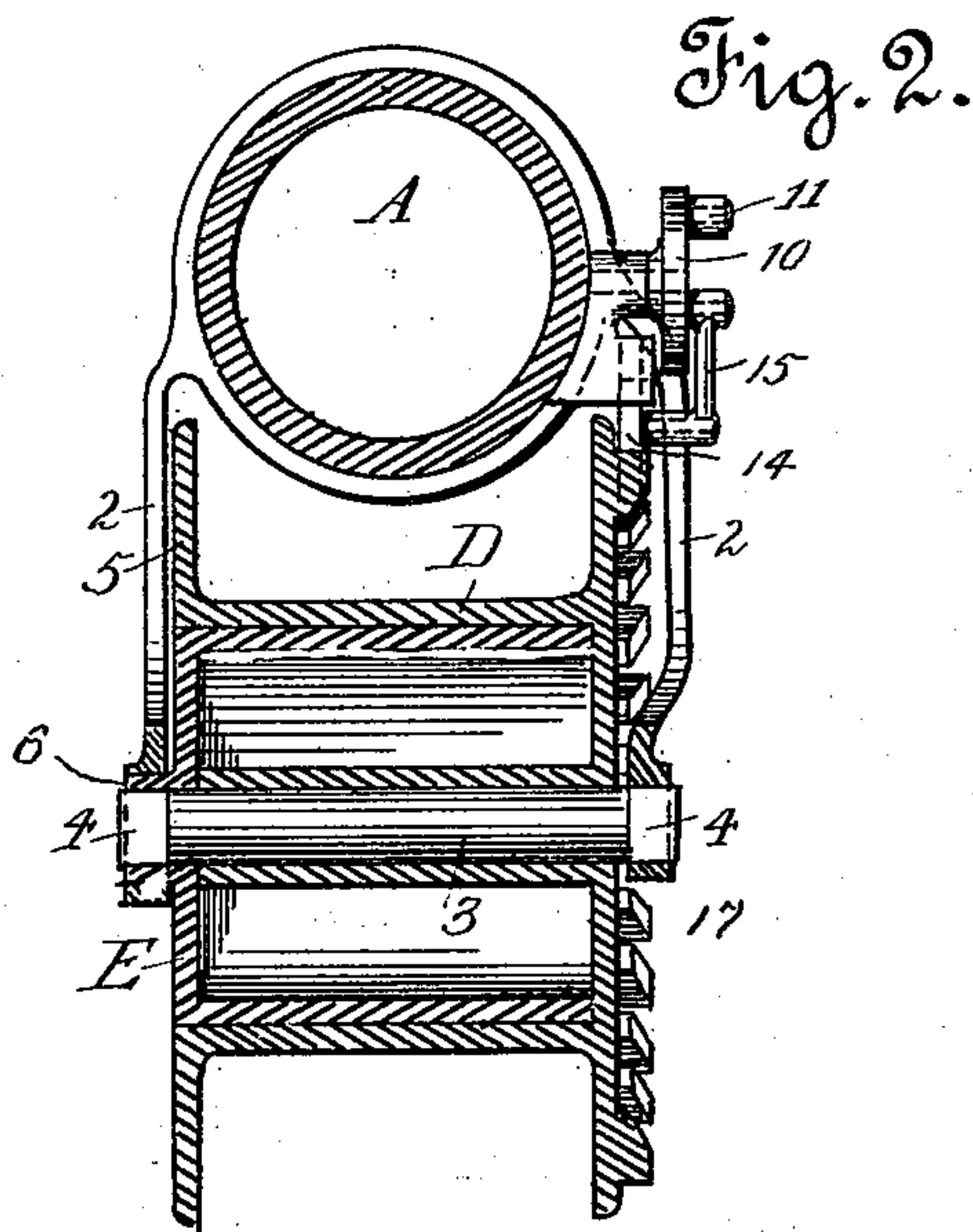
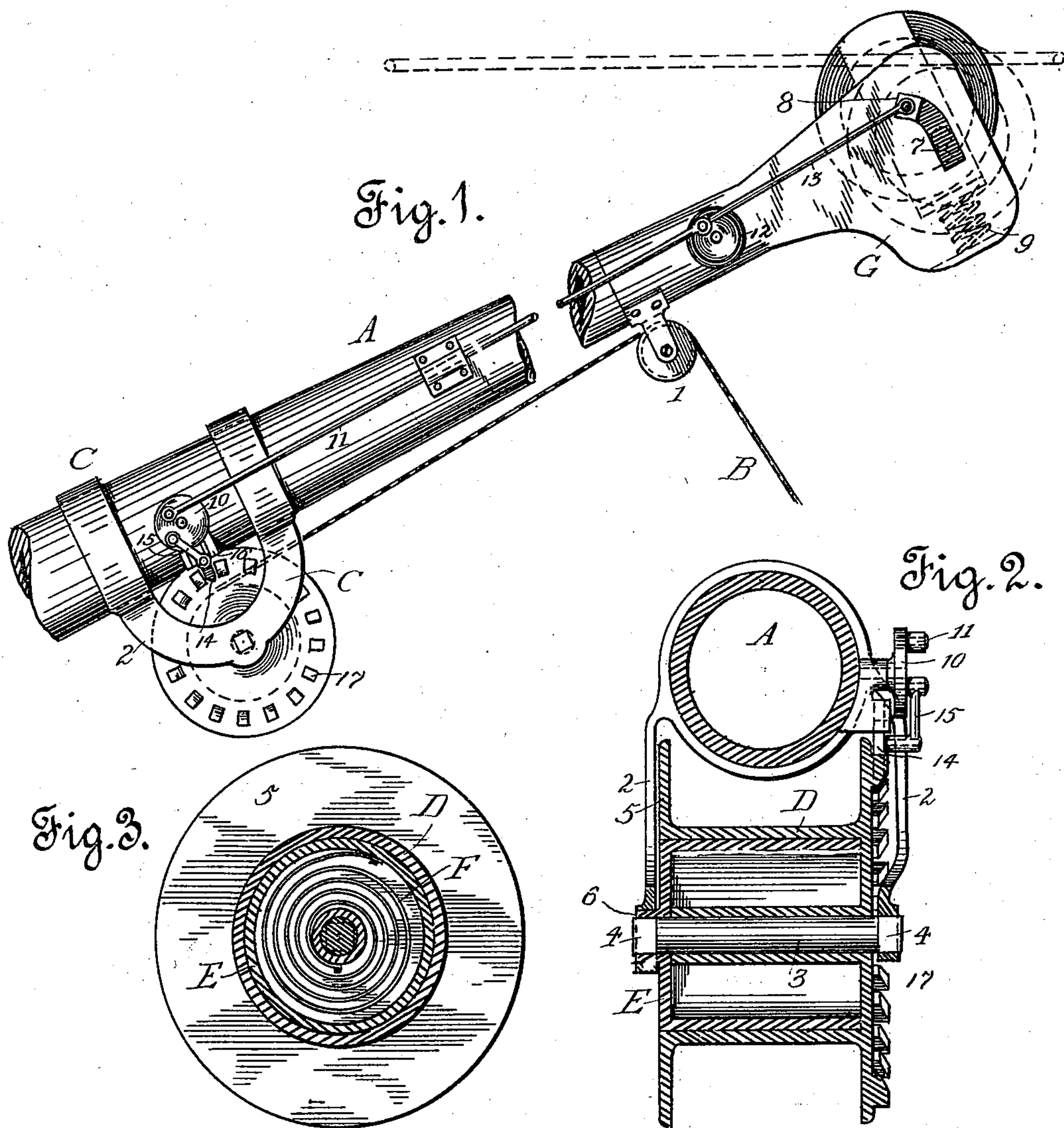


(No Model.)

C. A. LORD.
TROLLEY ROPE AND POLE CONTROLLER.

No. 548,074.

Patented Oct. 15, 1895.



Witnesses.
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UNITED STATES PATENT OFFICE.

CHARLES A. LORD, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO T. A. KIRKPATRICK, OF SAME PLACE.

TROLLEY ROPE AND POLE CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 548,074, dated October 15, 1895.

Application filed January 9, 1893. Renewed August 9, 1895. Serial No. 558,792. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. LORD, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Trolley Pole and Rope Controllers; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to improvements in devices for controlling the trolley poles and ropes used upon electric cars operated by the overhead system.

The object of my invention is to provide a trolley-rope with a tension device to which one end of it is connected, which device, while it will not permit the rope to unwind or slacken under ordinary conditions, will yield sufficiently to allow for fluctuations caused by inequalities in the conductor, oscillation of the car, or ordinary movements of the pole.

A further object of my invention is to provide an automatic locking device for stopping the tension device, should the trolley-roller leave the conductor. Under ordinary conditions, when the roller is on the conductor and exposed only to the natural or incidental fluctuations caused by the motion of the car, this lock is never in use and the tension device for the rope performs its duties entirely independently of the lock. When, however, the roller leaves the conductor, the lock is automatically operated and the reel or drum upon which the rope is wound is stopped while the rope is taut, making it impossible for any pressure of the main trolley-spring to throw the pole upward. Were such a lock not provided, the tension device, while it would work properly under ordinary conditions, would, as soon as the roller left the conductor, be overcome at once by the force of the trolley-spring, and the pole would be thrown upward, where it would be liable to become entangled with the cross-wires and either break them or be pulled with its brackets from the top of the car.

My invention therefore consists of two parts—first, a tension device for keeping the rope taut while the car is proceeding in the ordinary way, and, secondly, in a means for locking such device when the roller leaves

the conductor, and thus preventing the end of the pole from being thrown above the level of the conductor itself.

Aside from this general statement there are various features of my invention which need not be here set forth, but which are fully herein described, and are shown in the accompanying drawings, in which—

Figure 1 is a side elevation of the trolley pole and roller. Fig. 2 is a cross-section through the pole and the spring-reel connected to it. Fig. 3 is a longitudinal section taken through the reel and the spring-barrel which operates it. Fig. 4 is a detail elevation of the trolley head and roller.

A represents a trolley-pole. (Shown in the drawings in two broken sections for convenience.) It is assumed that the pole is properly swiveled to a bracket on the car in the usual manner, and that it is provided with the usual or any desired form of trolley spring or springs for keeping the trolley-roller in contact with the overhead conductor. These parts, by which the pole is secured to the car and is pressed constantly upward, are not shown in the drawings, as their use and general construction are now well understood.

B represents the trolley-rope, which in ordinary practice is secured near the outer end of the pole and extends to a fastening device either on the roof of the car or to the dashboard, so as to be within reach. According to my invention, however, one end of the rope B is attached in the usual or in any desired way to either of the points last named; but the rope, instead of being secured near the end of the pole, is carried over a guide-pulley 1, secured to the pole, and thence extends down the pole to the spring-tension device. (More fully shown in Figs. 2 and 3.)

C represents a bracket, which I prefer to make in the form shown, although this is not essential. This bracket is formed with two depending hangers 2, in the lower ends of which are square openings for the reception of the stationary transverse pin 3, having squared ends 4. Mounted upon this pin by a center bearing, so as to turn freely upon its cylindrical portion, is a reel or drum D, having flanges 5 to hold the rope when wound upon it. The reel has one side entirely open,

so as to admit a close-fitting barrel E of substantially the same width as the reel. This forms an exceedingly compact construction, the reel and barrel when fitted together being only a trifle greater in width than the pole itself. The barrel is kept stationary in any desired way, such as by a set-screw connecting it to the pin or by giving it a square hollow projection 6, which incloses the squared end of the pin, as shown in Fig. 2.

F represents a coil-spring, one end of which is secured to the barrel and the other to the center bearing of the reel, the spring filling the space within the hollow barrel, and, from its tendency to uncoil, acting constantly upon the reel so as to wind up the rope. A yielding tension upon the rope is thus maintained, keeping the rope taut whatever may be the fluctuations of the pole as the car travels. Only a light spring is required in the barrel, as it acts solely upon the rope and need be only strong enough to prevent the rope from becoming slack. When the trolley-roller is running freely upon the conductor, this spring-reel forms an effective tension device, as set forth; but it is evident that should the roller leave the wire the force of the trolley-springs would be so great as to overcome the spring connected to the reel, throw the trolley-pole up into the air, and unwind all the rope. I have therefore provided a locking device operated automatically at the instant the roller leaves the conductor, by means of which the reel is instantly locked, preventing any rope from being wound off, and thus absolutely preventing the trolley-spring from raising the pole above the conductor. This device is shown in Figs. 1 and 4, in which G represents the trolley-head, secured to the pole in the usual way, having its sides provided with slots 7. The trolley-roller is journaled upon a movable pin 8, the ends of which fit within the slots. The roller itself is mounted in a casing H, through the sides of which the pin passes. Between the bottom of the trolley-head and the bottom of this casing is interposed a coil-spring 9. When the roller is on the conductor, this spring 9 will yield to the pressure from above and ordinarily will permit the transverse pin to remain approximately near the middle of the slot, as shown in dotted lines in Fig. 1, though its position changes slightly, according to variations in the conductor or movement of the pole; but if the roller leaves the conductor the resistance from above is removed, and the spring 9 forces the roller up into the top of the slot, as indicated in full line in Fig. 1. This movement of the roller actuates the locking device for the reel upon which the rope is wound and locks the reel, so that no pressure of the trolley-spring can cause the rope to unwind, the result being that the end of the pole cannot rise above the conductor. Different forms of locking devices and different means for connecting them to the trolley-roller may be employed, but I have shown in the drawings

a practical construction for accomplishing the required movement, which I now proceed to describe. Pivoted upon the pole, just above the reel, is a disk 10. A rod 11 is connected eccentrically to this disk and extends along the pole to a similar disk 12, pivoted upon or near the trolley-head. From the disk 12 a rod 13 extends to the end of the transverse pin upon which the trolley-roller is journaled. Before I describe the locking device, which is operated by these rods, it should be mentioned that instead of a single rod or two rods connected together two wires may be substituted, which wires, connected to the disks substantially opposite one another, will give a pull and thus operate the locking-bolt whether the roller moves upward or downward in its slot. I mention this because a light rod when required to push the bolt might possibly bend or buckle. The two wires, however, actuated by the movement of the roller, whether upward or downward, are the exact equivalent of the rods shown in the drawings. With this explanation and still referring to the drawings, I now proceed to describe the locking device. A locking-bolt 14 is connected by a link 15 to the disk 10, its movement being guided by ribs 16. The outer face of the rope-reel is formed with a circular series of teeth 17, arranged closely enough together, so that the beveled or pointed end of the locking-bolt shall fall between two of them when the lock is operated. Thus it will be seen that the upward movement of the trolley-roller in its slots will positively operate the rods by which it is connected to the lock, and the rope-reel will instantly stop. Until the locking movement has actually taken place the rope has been under tension, so that when the reel stops there is no slack rope to permit the trolley-spring to throw the pole upward, and the end of the pole remains at about the level of the conductor, ready to be replaced upon the wire in the usual way. When the roller is replaced upon the conductor, the pressure forces it down in the slots, unlocking the reel. The latter is never locked unless the roller leaves the conducting-wire.

In practical operation I prefer to use the construction shown in the drawings, in which the trolley-roller is mounted in a sliding casing acted upon by a coil-spring; but I can accomplish the same result and still keep within the limits of my invention by attaching two springs near the trolley-head and causing them to bear directly upon the pin on which the roller rotates. When I use this construction, I dispense with the sliding casing in which the roller is mounted and attach flat springs by means of a collar or by riveting them directly to the pole, so as to bear upon the ends of the transverse pin.

While I have described the movable or yielding trolley-roller as a means for operating the lock for the tension device, the spring-roller tends to keep itself upon the conductor in case of sudden jolts, such as those caused

by inequalities in the joints of the conductor, because after the jolt has forced the roller partly down the spring bearing upon the roller acts much more quickly than the main spring at the base of the pole and returns the roller to the conductor before it can be thrown off by the upward movement of the pole.

What I claim is—

1. The combination of a trolley pole, a trolley rope connected to a car at one end and passing over the end of the pole, and a reel for said rope mounted upon the pole, substantially as set forth.

2. The combination with a trolley pole of a trolley rope having one end connected to the car, a guide pulley near the trolley head and a winding reel for the rope mounted upon the pole and near the base of the same, substantially as set forth.

3. In combination with and mounted upon a trolley pole a tension device for the trolley rope consisting of a hollow reel, a hollow barrel inclosed within said reel, a spring within the barrel having its ends connected respectively to said barrel and said reel, and a bracket for supporting said parts, secured to the pole, substantially as set forth.

4. In combination with a trolley pole and with a trolley rope, a tension device for the rope, and an automatic lock for locking the tension device when the trolley leaves the conductor.

5. In combination with a trolley pole and a trolley rope, a spring-actuated reel mounted on the pole, and an automatic lock for stopping said reel, and thus preventing the un-

winding of the rope when the trolley leaves the conductor.

6. The combination with a trolley pole and rope, of a tension device for the rope, a lock for the tension device, a sliding trolley-roller, and connections between said roller and the lock whereby said lock is engaged and released by the movement of the roller.

7. In combination with a trolley pole and rope, a slotted trolley-head, a roller movable in said slots, a spring for pressing said roller constantly upward, a spring-actuated reel for maintaining the tension upon the trolley rope, a lock for stopping the movement of said reel, and connections between said lock and the trolley-roller, for the purposes set forth.

8. In combination, a head for a trolley-pole having slotted sides, a transverse pin projecting through said slots, a casing upon said pin, a trolley-roller within said casing and loose upon the pin, and a spring between the bottom of the trolley head and said casing, substantially as set forth.

9. The combination with a trolley pole and trolley rope, of a spring reel for putting said rope under tension, a series of teeth upon the reel and an automatic lock adapted to engage with said teeth, substantially as set forth.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 30th day of December, 1892.

CHAS. A. LORD.

Witnesses:

L. W. SEELY,
JOHN COFFEE.