No. 646,460. Patented Apr. 3, 1900.

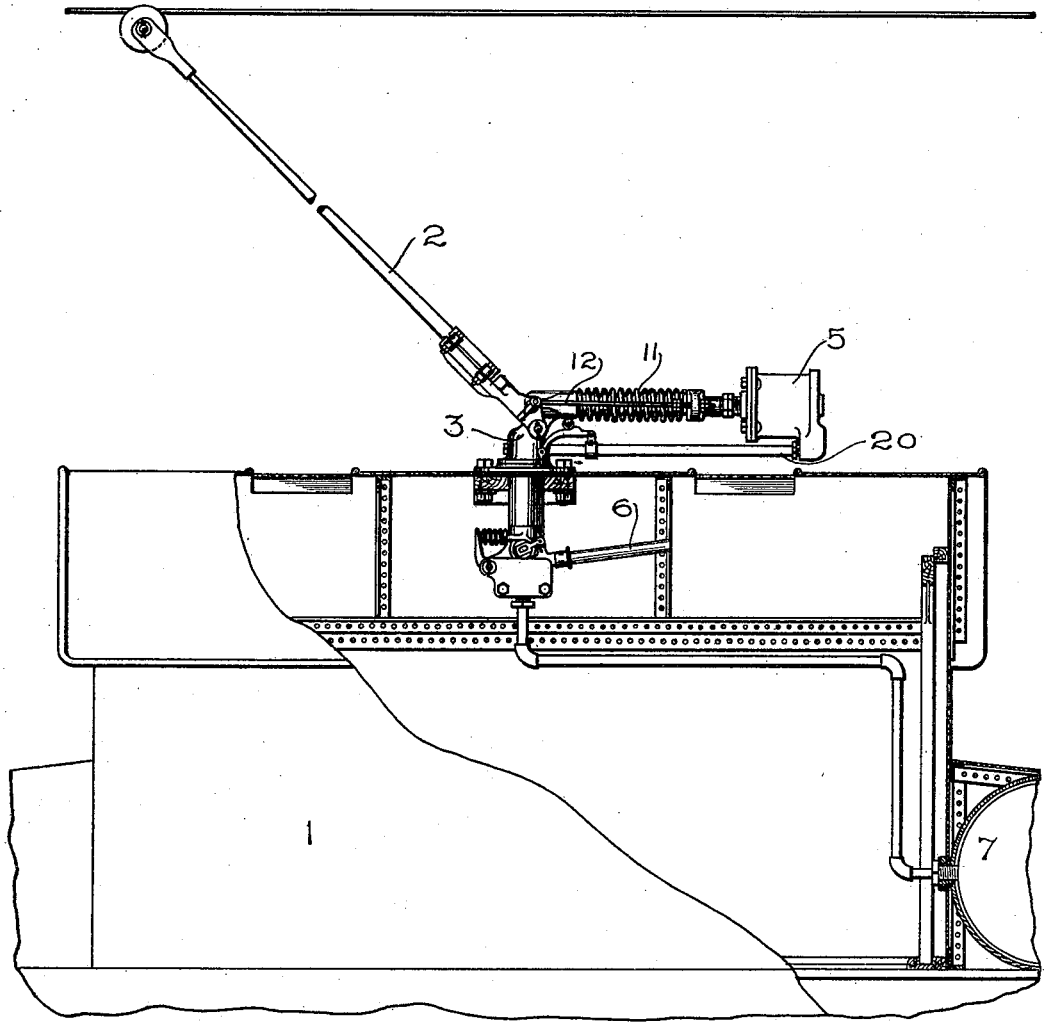
W. B. POTTER.

TROLLEY.

(Application filed Dec. 14, 1898.)

(No Model.) 3 Sheets—Sheet 1.

FIG. 1.



WITNESSES.

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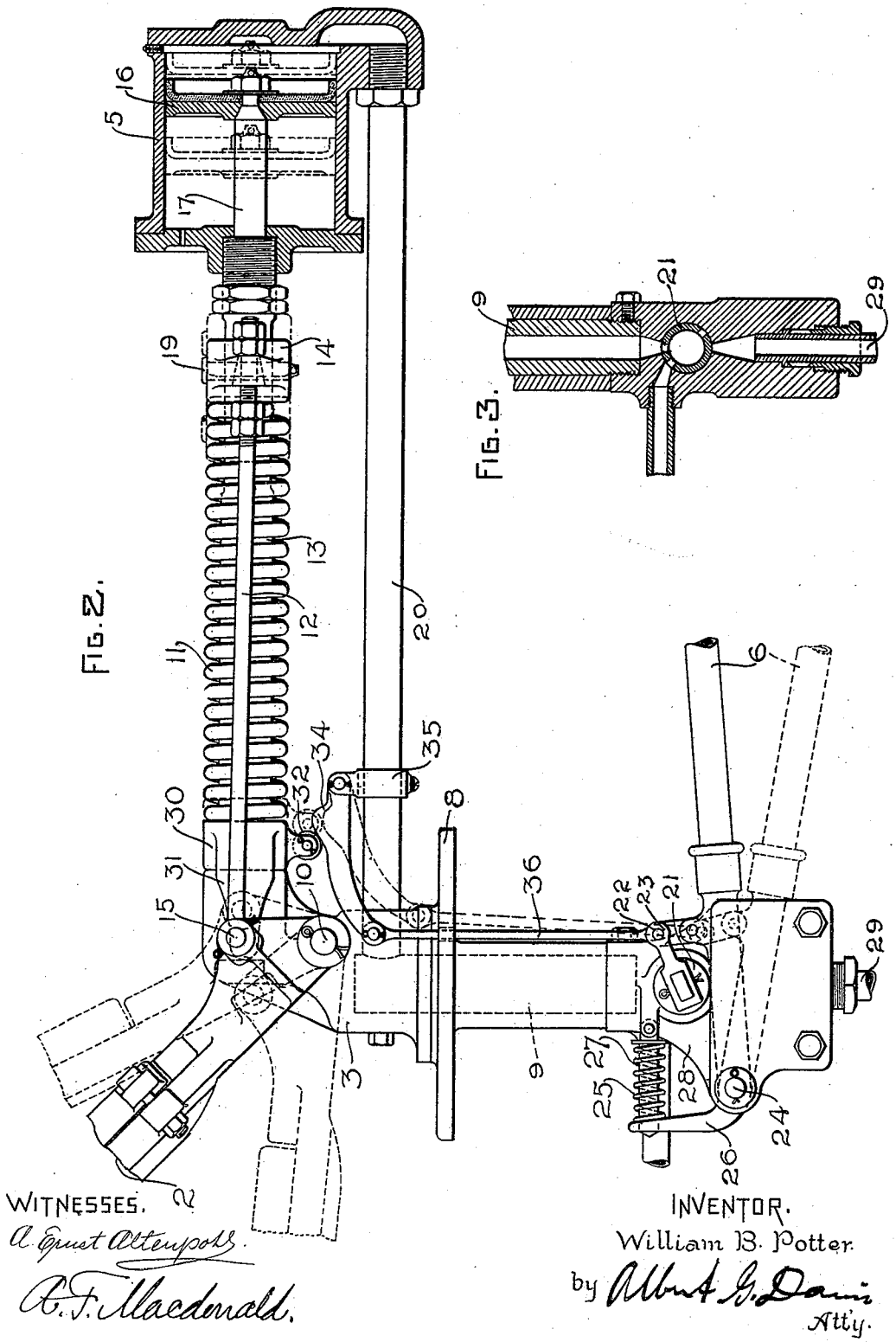

FIG. 2.

FIG. 3.

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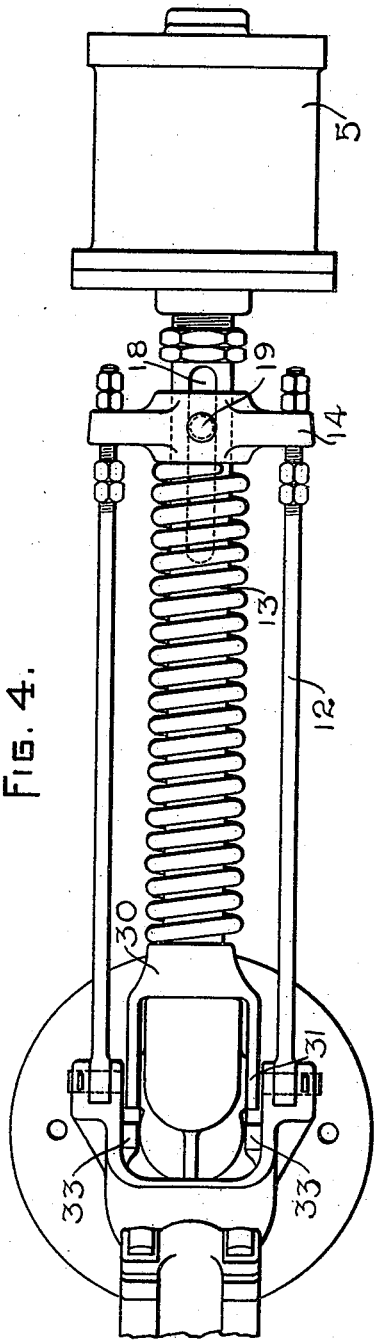

FIG. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM B. POTTER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF NEW YORK.

TROLLEY.

SPECIFICATION forming part of Letters Patent No. 646,460, dated April 3, 1900.

Application filed December 14, 1898. Serial No. 699,222. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. POTTER, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Trolleys for Electric Railways, (Case No. 832,) of which the following is a specification.

My present invention relates to an apparatus for controlling the movements of trolley-poles for electric railways, and has particular reference to an arrangement of devices whereby fluid-pressure is applied for raising and lowering the trolley-pole, the rotation of the trolley-pole about its vertical axis being effected by force otherwise applied. In the apparatus hereinafter described a single controlling-handle is employed, which by motion about one axis indirectly causes the trolley-pole to be raised or lowered through the agency of a device actuated by fluid-pressure and which by motion about another axis applies force directly to rotate the trolley about its vertical axis.

Other features and details of my invention will be more clearly understood by reference to the following description and accompanying drawings, while the scope of my invention will be clearly and particularly pointed out in the appended claims.

Figure 1 shows the application of my invention to a trolley mounted on the roof of an electric locomotive. Fig. 2 is a view, on a larger scale, of the trolley-controlling apparatus. Fig. 3 is a view of a detail, and Fig. 4 is a plan view corresponding to the view in side elevation shown in Fig. 2.

In Fig. 1, 1 represents an electrically-propelled vehicle, mounted on the roof of which is an underrunning trolley consisting in its essential parts of a trolley-pole 2, pivoted about a horizontal axis to the trolley-base 3, the latter being mounted on the roof of the vehicle so as to rotate about a vertical axis. The trolley-actuating spring for raising the trolley is indicated at 11, and at 5 is shown a cylinder having a piston which by the application of fluid-pressure thereto operates through intermediate connections to depress the trolley-pole. The controlling-lever is shown at 6 and serves by its vertical motion to admit fluid-pressure from the reservoir 7 to the cylinder 5 and by its horizontal motion to rotate the trolley about its vertical axis.

The details of my invention will be more clearly understood by reference to Fig. 2, which is drawn on a larger scale than Fig. 1.

In Fig. 2, 8 represents a flange secured to the roof of the vehicle and having depending therefrom a hollow bearing or sleeve. The trolley-base 3 has secured thereto the tube 9, indicated in outline by the dotted lines in Fig. 2 and extending down through and making a working fit with the flanged sleeve 8. The trolley-pole 2 is pivoted at 10 to the base 3 and is connected with the spring 11 by means of the connecting-rods 12. The actuating-spring 11 is of the compression type and is carried by a rod 13, one end of which is secured to the base 3. A cross-head 14 slides on this rod. One end of each connecting-rod 12 makes a lost-motion connection with the cross-head 14, while its other end is pivoted to the trolley-pole above its fulcrum, as shown at 15.

The rod 13 is formed of heavy metallic tubing, and the cylinder 5 is mounted on its outer end. The piston and piston-rod operating in conjunction with the cylinder are shown, respectively, at 16 and 17. The piston-rod 17 is arranged to project into the rod 13, in which is formed the elongated slot 18. (Shown best in Fig. 4.) The pin 19 projects through the cross-head 14 and engages the end of the piston-rod. The slot 18 allows a reciprocating movement of the cross-head.

Fluid-pressure is admitted to the cylinder 5 through a pipe 20, connected at one end to one end of the cylinder and at its other end to the trolley-base 3 and communicating with the opening in the pipe 9, which forms the downwardly-projecting bearing of the base. The admission of fluid-pressure to the cylinder is performed either at will by movement of the controlling-lever 6 or automatically by motion transmitted to the pressure-controlling valve when the trolley leaves the trolley-wire and is thrown upward by its actuating-spring.

The valve-controlling mechanism is shown best in Fig. 2 and consists of a lever 22, secured to the valve 21 and connected by a link

23 with the controlling-lever 6, which is fulcrumed, as shown at 24. A spring 25 is arranged to act in any suitable manner upon the controlling-lever 6, so as to normally retain it in one of its extreme positions. As shown, the lever 6 is provided with an upwardly-turned end 26, through an opening in which is passed one end of the rod 27, the other end of which is pivoted to the valve-casing 28. The spring 25 is coiled around the rod 27. This valve-casing is secured to the lower end of the tube 9, as shown in Fig. 3, and makes a rotatable and fluid-tight joint with the supply-pipe 29, as shown in detail. The three-way valve 21, which is shown in section in Fig. 3, is arranged in any suitable manner, so that when the controlling-lever 6 is in its upper extreme position the fluid-pressure is shut off, while when in its lower position communication is opened between the source of pressure and the cylinder 5. Upon the controlling-lever being returned to its upper position communication with the source of supply is interrupted and the interior of the cylinder is put in connection with the open air, thereby releasing the pressure therein and allowing the spring 11 to act. It will thus be seen that the downward motion of the controlling-lever 6 causes the trolley to be lowered, while the upward movement of the lever allows the actuating-spring to operate, thus raising the trolley.

If it be desired to rotate the trolley about its vertical axis, it is only necessary to apply pressure laterally to the controlling-lever 6, thereby positively moving the trolley in the manner desired. In order to prevent the pivot of the controlling-lever 6 from bearing all the strain incident to the lateral application of force to the lever, I secure a guide-plate 29 to the valve-casing 28, between which guide-plate and casing the controlling-lever 6 is adapted to move and against the adjacent sides of which the lever is adapted to bear when in the operation of rotating the trolley.

When it is desired that the trolley should be automatically lowered in case it leaves the trolley-wire, I provide the apparatus already described with certain adjunctive devices which serve automatically to control the valve 21. A normally-stationary cross-head 30, provided with rearwardly-extending fingers 31, is sleeved upon the rod 12 and bears against the trolley-base 3 at the point where the rod 12 enters the same. The under side of the cross-head is provided with an antifrictional roller 32. The lower end of the trolley-pole is forked and pivoted to the trolley-base at 10, as already described, and the inner side of each arm of the fork is provided with a lug 33, each of which lugs is adapted to engage with one of the rearwardly-extending fingers 31, the parts being so arranged that this engagement takes place when the trolley-pole attains an abnormal elevation, such as would happen if the trolley left the wire. A cam 34 is pivoted at one end to the support 35, carried by the pipe 20, and at the other end is connected by the link 36 with the valve-controlling lever 22, as shown. The cross-head 30 is arranged so as to operate upon and depress the cam 34 when moved along the rod 12.

From the construction described it will readily be understood that in case the trolley leaves the wire the pole will be projected up to an abnormal angle, thus causing the lugs 32 to engage the rearwardly-extending fingers of the cross-head 30, and so move the cross-head itself along its supporting-rod 12 a short distance sufficient to depress the cam 34, which then operates through its connecting-link 36 to open the valve 21, thus admitting pressure to the cylinder 5, and so lowering the trolley-pole into a position where it is in no danger of engaging in the overhead-line structure.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a trolley for electric railways, the combination of a rotatable trolley-base, a trolley-pole pivoted to the base, means actuated by fluid-pressure for lowering the trolley-pole, a spring for raising the pole, and a single controlling-handle by the movement of which the trolley may be raised, lowered or rotated.

2. In a trolley for electric railways, the combination of a trolley-base, a trolley-pole pivoted to the base, a spring for urging the pole in one direction, means controlled by fluid-pressure for urging the pole in another direction, and a controlling-handle carried by the trolley-base and operative by its movement to rotate said pole and control said fluid-pressure.

3. In a trolley for electric railways, the combination of a trolley-base, a rod secured to the base, a cross-head sliding on the rod and connected to the pole, a coiled spring carried by the rod, and arranged thereon between the cross-head and the base, a cylinder carried by the outer end of the rod, and a piston-rod secured to the cross-head.

4. In a trolley for electric railways, the combination of a trolley-base, a rod secured to the base, a cross-head sliding on the rod, a coiled spring carried by the rod and arranged thereon between the cross-head and the base, a cylinder carried by the outer end of the rod, a piston-rod secured at one end to the cross-head and at the other to a piston in the cylinder, and a supply-pipe connected to the cylinder and in communication with a passage in the base.

5. In a trolley for electric railways, the combination of a trolley-base, a trolley-pole pivoted to the base, a spring for urging the pole in one direction, means actuated by fluid-pressure for causing the pole to move in the opposite direction, a passage in the base through which the fluid-pressure is supplied, and a three-way valve for controlling said fluid-pressure.

6. In a trolley for electric railways, the com-

bination of a trolley-base, a trolley-pole pivoted to the base, a spring for urging the pole in one direction, means actuated by fluid-pressure for causing the pole to move in the opposite direction, a passage in the base through which the fluid-pressure is admitted, a three-way valve controlling the fluid-pressure, a lever for moving the valve, and a spring for resisting such motion.

7. In a trolley for electric railways, the combination of a socket-piece, a trolley-base having a tubular bearing projecting through the socket, a valve-casing secured to the projecting end of the tubular bearing, a valve in said casing, an operating-lever for moving said valve, and a spring for resisting the motion of the operating-lever.

8. In a trolley for electric railways, the combination of a trolley-base, a trolley-pole pivoted to the base, a spring for urging the trolley-pole toward the trolley-wire, means actuated by fluid-pressure for counteracting the effect of the spring, and a controlling-handle for rotating the trolley-base and for governing said fluid-pressure.

9. In a trolley for electric railways, the combination of a trolley-base, a spring for urging the trolley-pole toward the trolley-wire, means actuated by fluid-pressure for counteracting the effect of the spring, a passage in the base through which the fluid-pressure is supplied, a valve controlling the fluid-pressure, a cam fulcrumed at one end and at the other end connected by a link to an arm carried by the valve, and means for moving the cam about its fulcrum when the trolley leaves the trolley-wire.

10. In a trolley for electric railways, the combination of pneumatic means for lowering the trolley and manually-operated means connected to the trolley-base for rotating it.

11. In a trolley for electric railways, the combination of pneumatic means for controlling the vertical movement of the trolley, and manually-operated means acting through the trolley-base for moving the trolley horizontally.

In witness whereof I have hereunto set my hand this 12th day of December, 1898.

WILLIAM B. POTTER.

Witnesses:
B. B. HULL,
A. D. JUNT.