

No. 675,522.

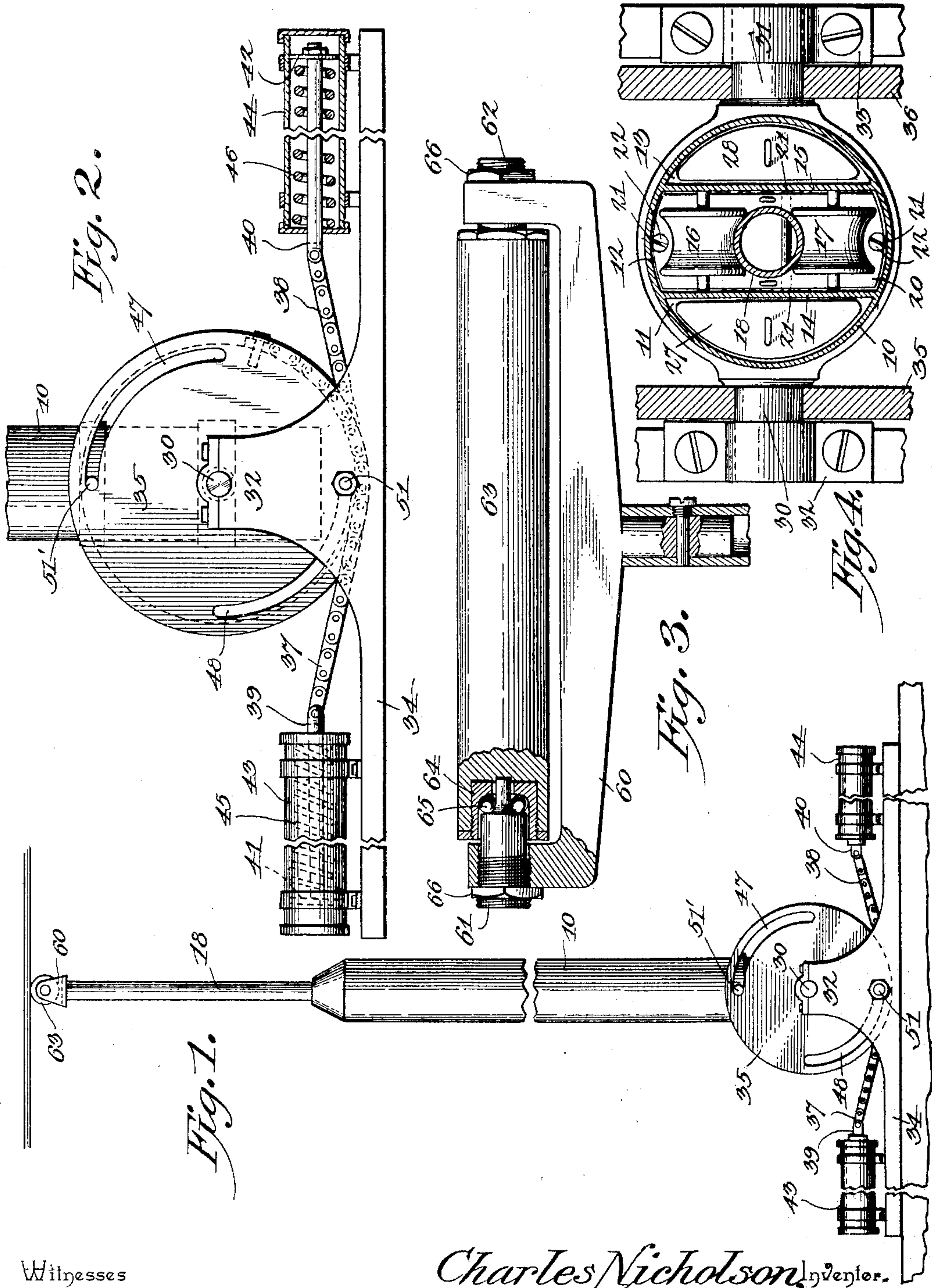
Patented June 4, 1901.

C. NICHOLSON.  
TROLLEY POLE.

(Application filed Sept. 5, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

J. Frank Culverwell,  
Geo. H. Chandler.

Charles Nicholson, Inventor.  
By C. A. Snow & Co.  
Attorneys

No. 675,522.

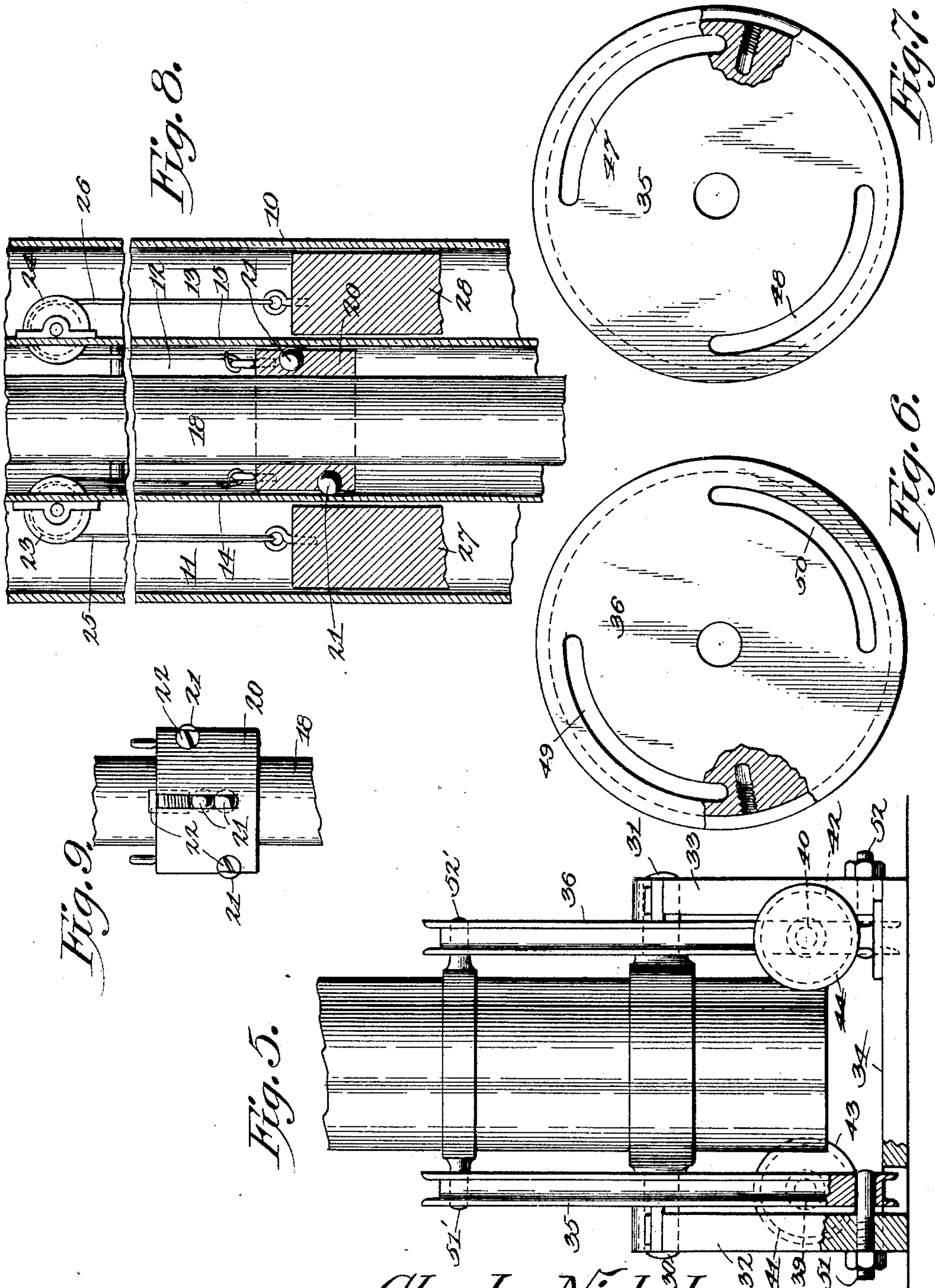
Patented June 4, 1901.

C. NICHOLSON.  
TROLLEY POLE.

(Application filed Sept. 5, 1900.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses

J. Frank Leiberwell.  
Geo. H. Chandler.

Charles Nicholson, Inventor.

By C. A. Snow & Co.  
Attorneys



# UNITED STATES PATENT OFFICE.

CHARLES NICHOLSON, OF SPRINGFIELD, MASSACHUSETTS.

## TROLLEY-POLE.

SPECIFICATION forming part of Letters Patent No. 675,522, dated June 4, 1901.

Application filed September 5, 1900. Serial No. 29,080. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES NICHOLSON, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Trolley-Pole, of which the following is a specification.

This invention relates to trolley-poles for electric railways; and it has for one object to provide a pole which will be held operatively in a vertical position and yet may incline under proper conditions, a further object of the invention being to provide a simple and efficient means for holding the pole in its upright position yieldably.

Further objects of the invention are to provide a pole which will compensate for variations in the height of the trolley-wire and which will not be liable to leave the trolley-wire on curves, further objects and advantages of the invention being evident from the following description.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a side elevation showing the complete trolley-arm upon a car top and with its wheel engaged with a trolley-wire, parts being broken away to permit showing on a larger scale. Fig. 2 is an enlarged view, partly in section and partly in elevation, showing the lower portion of the pole with the spring retaining devices. Fig. 3 is a detail elevation, partly in section, of the upper end of the trolley-pole with the trolley-roller thereon. Fig. 4 is a tranverse section taken through the pole, the disks upon the trunnions being shown in section, while the trunnions and their pillow-blocks are in elevation. Fig. 5 is an elevation taken at right angles to Fig. 2, a portion of a disk and a pillow-block being in section. Fig. 6 is an elevation, partly broken away, showing one of the drum-disks of the pole. Fig. 7 is a view similar to Fig. 6 and showing the second disk, the positions of the slots of the two disks being shown by comparison. Fig. 8 is an enlarged vertical section of a portion of the trolley-arm. Fig. 9 is an elevation showing a portion of the upper section of the trolley-pole with the guide and lifting-block thereon.

Referring now to the drawings, the trolley-pole comprises a lower cylindrical and tubular section 10, which is divided into three compartments 11, 12, and 13 by means of two parallel and vertical partitions 14 and 15, spaced equidistant from the axis of the tube. In the upper portion of the compartment 12 are rotatably mounted two grooved friction-pulleys 16 and 17, and in engagement therewith is disposed the upper tubular and cylindrical section 18 of the pole, which is adapted for telescopic movement with respect to the lower member or section 10.

Fixed to the upper section 18 of the pole is a guide and lifting block 20, the shape of which corresponds to the cross-section of the compartment 12 and which has a central opening through which is passed the section 18. In the sides of the block 20 are formed grooves which are contracted at the surface of the block, and in these grooves are disposed bearing-balls 21, which rest against the partitions 14 and 15, and additional and vertical grooves are formed in the ends of the block and of similar shape, these grooves having also balls 21, which project through the opening of the groove to engage the inner surface of the section 10 of the trolley-pole. The friction between the block and the section 10 is thus reduced to a minimum, and to hold the balls from displacement screws 22 are engaged with the interiorly-threaded ends of the grooves.

Pulley-wheels 23 and 24 are mounted in the upper portions of the partitions 14 and 15 above the pulleys 16 and 17, and passed over these pulleys 23 and 24 are cords 25 and 26, which are connected at one end to the guide and lifting block 20, their opposite ends being attached to weights 27 and 28 of segmental shape and located between the partitions 11 and 13 and the outer wall of section 10 of the pole. The weights are adapted to hold the pole normally and yieldably raised.

In order to hold the pole normally vertical and yet to permit it to incline at proper times, the lower section 10 is provided with oppositely-disposed trunnions 30 and 31, journaled in pillow-blocks 32 and 33 upon a base-plate 34, adapted to be secured upon the top of a car. Disposed loosely upon the trunnions 30 and 31 are grooved disk-shaped drums 35 and 36, and connected with the periphery of these



drums are chains or other flexible connections 37 and 38, respectively, which cross at the lowermost point of the drums, the free or outer ends thereof being connected with the rods 39 and 40 of pistons 41 and 42, which are disposed in cylinders 43 and 44 and are held normally retracted by helical springs 45 and 46, which encircle the rods and bear at their ends against the ends of the cylinder and the faces of the pistons. The tendency of these springs is to hold the drums yieldably in a predetermined position, so that the points of attachment of the chains to the drums will lie in a common horizontal plane.

In the drum 35 are formed two arc-shaped slots 47 and 48, each of ninety degrees and located at opposite sides of the center of the drum, while drum 36 has two arc-shaped slots 49 and 50 formed therein, each of ninety degrees and at opposite sides of the center of the drum, the slots of one drum being rotated ninety degrees from the slots of the other.

Pins 51 and 52 are engaged with the pillow-blocks 32 and 33 and lie with their inner ends in the slots 48 and 50, respectively, while pins 51' and 52', carried by the lower section 10 of the trolley-pole, engage the slots 47 and 49, the several pins lying in the same vertical plane and lying at the ends of the slots when the pole is vertical. With this construction if the pole be moved in one direction on its trunnions the pin 51' will move freely in slot 47, while the pin 52', lying at the limit of this direction of movement in the slot 49, will press against the end of the slot and will act to rotate the disk 36, at the same time winding the flexible connection 38 upon drum 36. When the pole is released, the tension of spring 46 acts to draw it to an erect position. If the pole be moved in an opposite direction, the pin 51', resting against the end of its slot, will act to rotate its drum 35 to wind the chain 37 thereon, while pin 52' will move idly in slot 47. When the pole is released, it is erected by the spring connected with the chain 37. As each drum is operated the corresponding pins 51 and 52 move freely through the slots with which they are engaged.

In order to maintain contact of the trolley-wheel with the trolley-wire with exerting lateral strain on the trolley-arm and on the wire at the hangers, owing to lack of alinement between the wire and track, a special form of wheel is used. This wheel is shown in Fig. 3 of the drawings in detail and comprises a yoke 60, which is connected to the upper section of the trolley-arm in the usual manner and the upturned ends of which are threaded for engagement of plugs 61 and 62, having spindles at their inner ends. The wheel proper is in the form of a cylindrical drum 63, in the ends of which are engaged bushings 64, forming race elements, which cooperate with the enlarged bases of the spindles of plugs 61 and 62 to receive bearing-balls 65. The plugs are held against displacement by means of set-

nuts 66, engaged therewith. Thus as the vehicle moves along the track the drum may have a longitudinal movement transversely of the trolley-wire without becoming displaced therefrom and without exerting strain upon any part.

What is claimed is—

1. A trolley-pole comprising an inner section and an outer section telescopically connected, a lifting-block upon the inner section, roller-bearings between the block and the outer section, and counterbalancing-weights disposed in the inner section and connected with the upper section through the medium of the lifting-block for holding the outer section normally and yieldably projected from the lower section.

2. A trolley-pole comprising a lower section comprising longitudinally-extending compartments, an upper section disposed slidably in one of the compartments, counterbalancing-weights in the remaining compartments, guide-pulleys, and connections attached to the weights and to the upper section and passed over the guide-pulley for holding the upper section normally projected.

3. A trolley-pole comprising a lower section comprising compartments, guide-rollers in one of the compartments, an upper section disposed in the compartment and in engagement with the rollers, a block attached to the upper section and fitted in said compartment, said block having facial grooves provided with balls in contact with the walls of the compartment, pulleys, counterbalancing-weights, and flexible connections attached to the upper section and to the counterbalancing-weights and passed over the pulleys to hold the upper section normally projected.

4. The combination with a trolley-pole having trunnions, of pillow-blocks in which the trunnions are journaled, drums disposed loosely upon the trunnions, slots through the drums and extending in opposite directions from the pole, pins upon the pole engaging certain of the slots, pins upon the pillow-blocks engaging the remaining slots, and means for holding the drums yieldably against rotation.

5. The combination with a pivoted trolley-pole, of oscillatory members mounted adjacent to the pole, and resistance devices connected with the oscillatory members for holding them yieldably against movement in opposite directions, said pole being adapted for engagement with one member and for lost motion with respect to the other member when moved in one direction, and adapted for reverse relation to said members when moved in an opposite direction.

6. The combination with a pivoted trolley-pole, of oscillatory members mounted adjacent to the pole, resistance devices connected with the oscillatory members for holding them yieldably against movement in opposite directions, said pole being adapted for engagement with one member and for lost motion



with respect to the other member when moved  
in one direction, and adapted for reverse re-  
lation to said members when moved in an op-  
posite direction, and means for holding the  
5 members with their tension devices under ten-  
sion during the times of lost motion of the  
pole with respect thereto.

In testimony that I claim the foregoing as  
my own I have hereto affixed my signature in  
the presence of two witnesses.

CHARLES NICHOLSON.

Witnesses:

F. H. NICHOLSON,  
J. F. CRANSTON.