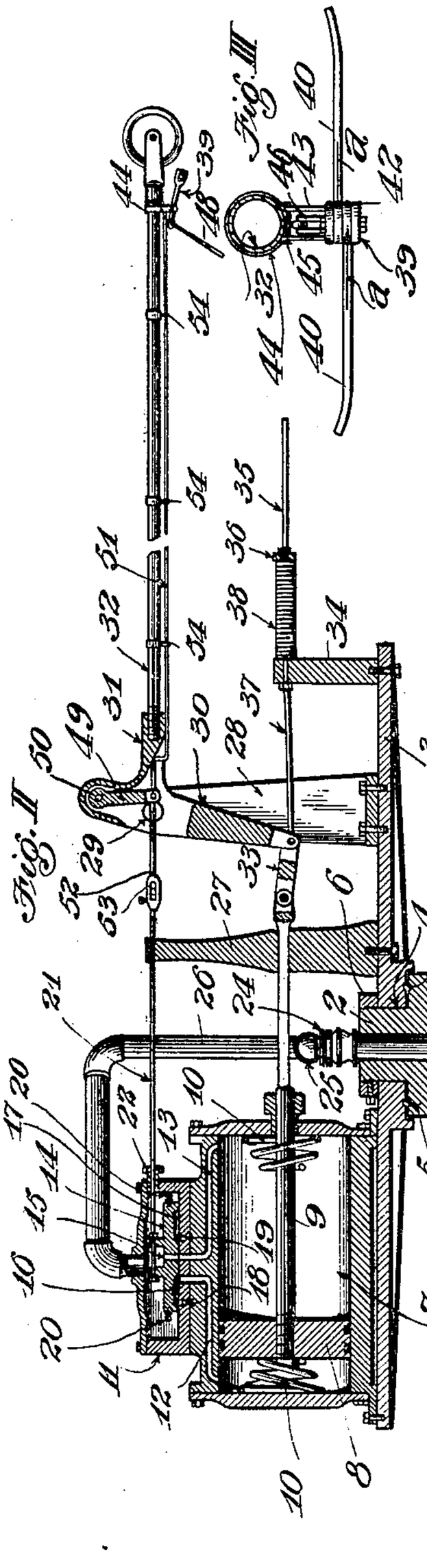
No. 768,789. PATENTED AUG. 30, 1904.

M. O. DOLSON.

TROLLEY POLE CONTROLLER.

APPLICATION FILED DEC. 23, 1903.

NO MODEL. 2 SHEETS—SHEET 1.



WITNESSES

Geo. A. Keane.

G. T. Hackley

INVENTOR

MARTIN O. DOLSON

by Tennent Bros

attys.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. II

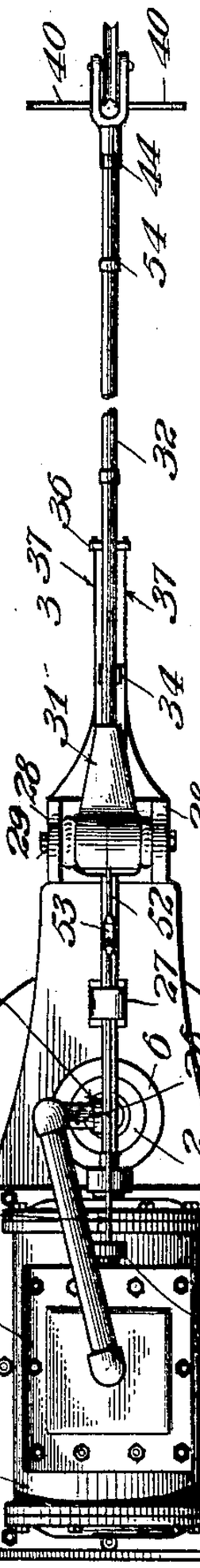


Fig. III

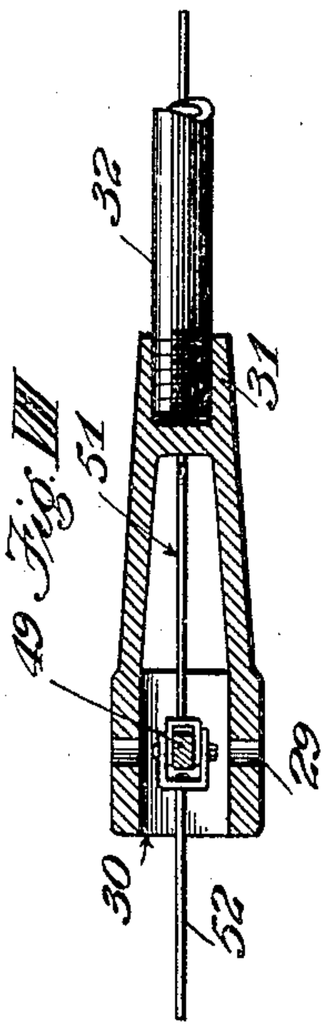


Fig. IV

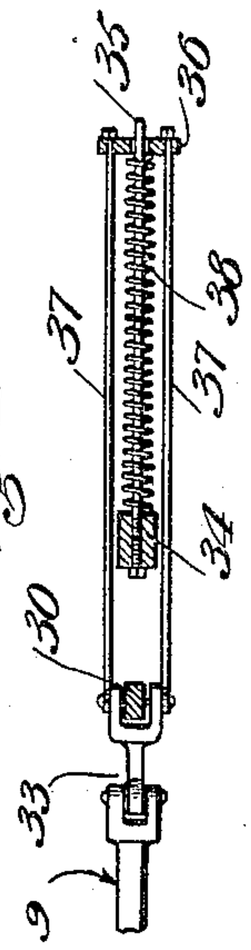


Fig. III

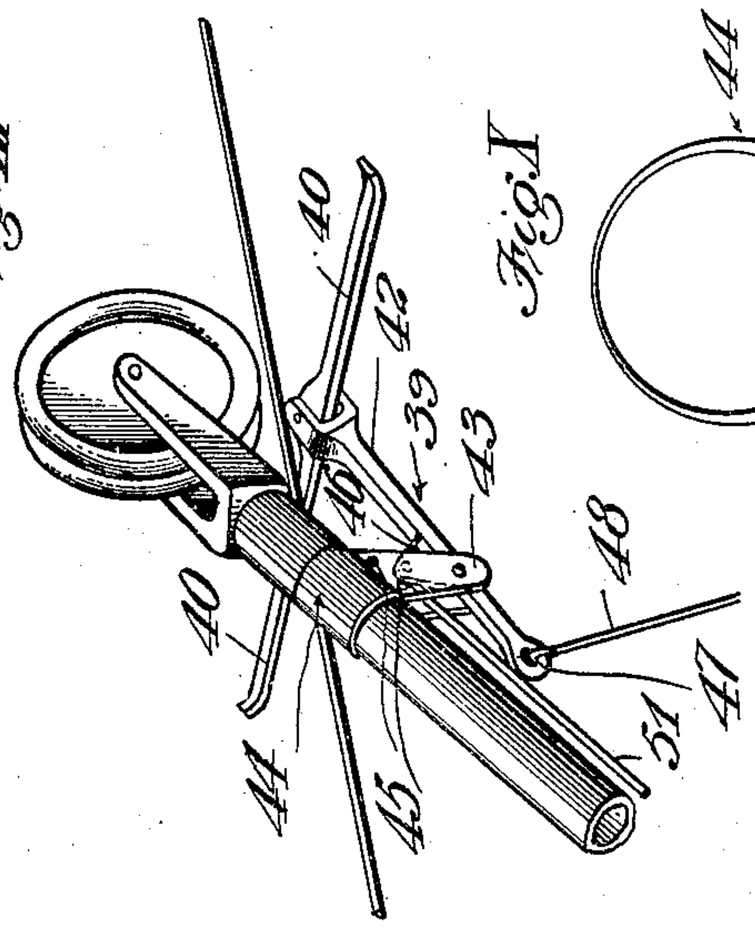
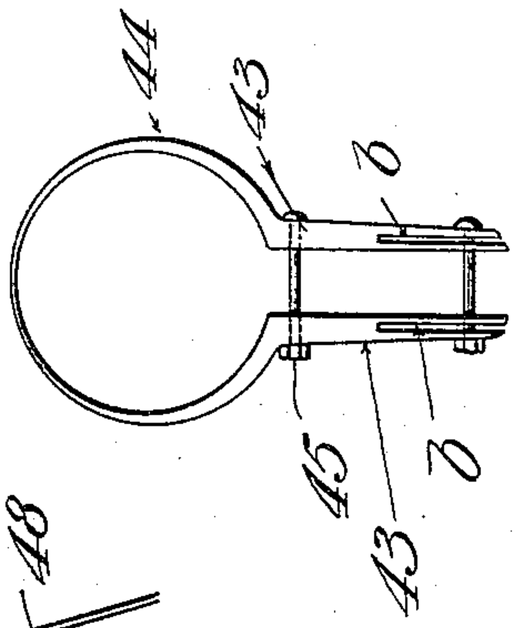


Fig. I



WITNESSES
Edmund A. Strauss.
G. T. Hackley

INVENTOR
MARTIN O. DOLSON
by Townsend Bros.
Attys.

No. 768,789. Patented August 30, 1904.

UNITED STATES PATENT OFFICE.

MARTIN O. DOLSON, OF LOS ANGELES, CALIFORNIA.

TROLLEY-POLE CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 768,789, dated August 30, 1904.

Application filed December 23, 1903. Serial No. 186,371. (No model.)

To all whom it may concern:

Be it known that I, MARTIN O. DOLSON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Trolley-Pole Controller, of which the following is a specification.

This invention relates to that class of controllers which are pneumatically operated.

One object of the invention is to provide a positive mechanical means for controlling the pneumatic means which raises or lowers the pole.

Another object is to provide a device of the character described which when the trolley has been lowered is positively controlled by the trolley-rope alone to operate and lift the trolley-pole into position and bring the trolley against the wire.

Other objects of the invention are to produce a device of the character described which is simple in construction, effective in operation, and durable in use.

Other objects and advantages will appear from the following description.

The accompanying drawings illustrate the invention, and, referring to the same, Figure I is a vertical longitudinal sectional view through the device, the trolley-pole being shown in its elevated position with the trolley resting against the wire. Fig. II is a view similar to Fig. I, showing the trolley-pole depressed. Fig III is a detail view looking toward the end of the tripping device. Fig. IV is a side elevation of the upper portion of the trolley-pole, showing the tripping device attached thereto. Fig. V is a section through the knuckle-joint of the tripping device. Fig. VI is a plan view of what is shown in Fig. II. Fig. VII is a perspective of the upper end of the trolley-pole, showing the trolley off the wire. Fig. VIII is a section through the socket, which receives the trolley-pole. Fig. IX is a detail in plan, showing the spring and adjacent parts. Fig. X is a side elevation of the split sleeve.

1 designates a base which is bolted to the top of the car. (Not shown.) The base 1 has a central upwardly-projecting boss 2 and is drilled centrally.

3 designates a revoluble table which has a cupped portion 4, which rests upon the upper part of the base 1, the boss 2 passing therethrough, there being a ball-bearing 5 provided between the base 1 and the lower part of the cupped portion 4. The table 3 is held in position on the base 1 by an annular nut 6, screwed to the upper part of the boss 2, there being a set-screw provided, as shown, to prevent displacement of the nut. An air-cylinder 7 is mounted on one end of the table 3 and is provided with a piston 8 and piston-rod 9, there being buffers 10 in each end of the cylinder, which consist of coil-springs, as shown. A valve-chest 11 is provided, and passages 12 and 13 lead from the respective ends of the cylinder to the valve-chamber. A valve 14 is provided within the valve-chamber, which has a central passage 15, which is adapted to be moved into communication with either the passage 12 or the passage 13, according as the valve is shifted. The valve is also provided with recesses 16 and 17, and the valve-chest is provided with outlet-passages 18 and 19, respectively. The passage 12 is adapted to be placed in communication with the outlet 18 by the recess 16 when the valve is shifted to one position, while the passage 13 is adapted to be brought into communication with the outlet-passage 19 by means of the recess 17 when the valve is shifted to the other position. In order to limit the throw of the valve, it is provided with adjustable screw-stops 20, which are held from displacement by means of set-nuts, as shown. The valve-stem 21 extends through the wall of the valve-chest, there being a suitable gland 22 provided.

Extending up through the center of the base 1 is an air-pipe 23, which is in communication with the compressed-air supply on the car, and immediately above the boss 2 it is connected by a swivel-coupling 24 with an elbow 25, and leading from the elbow is a pipe 26, which communicates with the valve-chest, as shown. The pipe 23 is stationary, but the swivel-coupling 24 allows the table 3 to be turned about the base 1.

27 is a standard mounted upon the table 3 and supports the piston-rod 9 and valve-stem

21. 28 is another standard mounted upon the table 3, to which is pivoted, as at 29, a lever 30. The lever 30 is provided with a socket 31, which receives the lower end of the trolley-pole 32, and the lower end of the lever 30 is connected with thé end of the piston-rod 9 by a link 33.

The block 34, which extends up from the table 3, supports a guide-rod 35, there being a cross-bar 36 slidably mounted on the guide-rod 35, which is connected by rods 37 with the lower end of the lever 30, there being a compression-spring 38 interposed between the cross-bar 36 and the block 34.

39 is a tripping device carried at the upper end of the trolley-pole adjacent the trolley-harp and comprises a pair of arms 40, which have enlarged knuckles 41, which are lapped and pivoted to a trip-lever 42. (See Figs. III and IV.) The trip-lever 42 is pivoted to wings 43, which project from a split sleeve 44, securely held in place on the trolley-pole 32 by a bolt 45. The trip-lever 42 has a short arm 46. (See Figs. III and VII.) The lower part of the trip-lever 42 has an eye 47 for the attachment of the trolley-rope 48. The knuckles 41 are recessed to receive a spring *a*, which yieldingly holds the arms outstretched, as shown. Each wing 43 is provided with a slit *b*, which gives a spring to the wings and causes them to tightly squeeze the trip-lever.

49 is a rock-arm pivoted at 50 to the upper end of the lever 30. The lower end of the rock-arm 49 is connected by a rod or wire 51 with the arm 46 and also is connected with the valve-stem 21 by a short rod 52 and a turnbuckle 53, the end of the valve-stem 21 and rod 25 having right and left threads, respectively, so that the turnbuckle 53 may be adjusted to give the requisite length of connection between the rock-arm 49 and the valve 14. Suitable eyelets 54 are provided along the trolley-pole for supporting and guiding the wire 51.

In operation air is supplied through the connecting-pipes 23 and 26 to the valve-chest 11, and when the valve 14 is shifted to the left the compressed air enters through the passages 15 and 12 into the cylinder 7 at the left of the piston 8, which holds the piston 8 toward the right, as shown in Fig. 1, thus holding the trolley-pole elevated with the trolley against the wire, as shown. The valve is limited in its throw by the stops 20, and when it is the position shown in Fig. I the lower pivot of the rock-arm 49 is exactly concentric with the pivot 29, so that the oscillating movement of the trolley-pole caused by the travel of the trolley over the varying elevation of the trolley-wire does not act to shift the valve 14. Thus the trolley is held against the wire by the pressure of the air behind the piston, which, however, is supplemented by the power of the spring 38.

When the trolley jumps from the wire accidentally, it flies upward somewhat owing to the pressure of the air behind the piston and spring 38, and one or the other of the arms 40 is suddenly brought into contact with the trolley-wire, which results in tilting the trip-lever 42 and drawing upon the rod 51, which throws the rock-arm 49 into the position shown in Fig. II and through the medium of the before-described connections shifting the valve 14 to the right, as shown in Fig. II, which immediately places the space at the left of the piston into communication with the outlet 18 through the medium of the passage 12 and recess 16, and simultaneously compressed air is admitted to the right of the piston through the passages 15 and 13, whereupon the piston 8 is moved toward the left of the cylinder and the trolley-pole is depressed and brought into substantially a horizontal position through the medium of the connections before described. Thus the trolley-pole is instantly depressed as soon as it flies off from the wire, which prevents accidents caused by violent banging of the trolley-pole or trolley-wheel or hitting against span-wires, bridges, or other overhead structures.

The length of the arms 40 is sufficient to enable them to catch against the trolley-wire when the trolley flies up, and as the trolley moves but a slight distance sidewise from the wire one or the other of the arms 40 will always catch against the wire and trip the valve. The spring *a* is sufficiently stiff to hold the arms 40 outstretched normally, but will yield to allow the arms to fall back should one or the other of the arms strike a switch, frog, or other obstruction in the overhead structure contiguous the trolley-wire, so that although the arms 40 are normally spread apart and outstretched so as to catch the trolley-wire when the pole flies up they will readily spring back to pass any obstruction, thus preventing any damage to the tripping device or permanent overhead structure.

When the pole is to be elevated again to the wire, it is done by pulling on the rope 48, which will positively tilt the trip-lever 42 from the position shown in Fig. II into the position shown in Fig. I, which will shift the valve 14 to the left of the valve-chest and admit air to the left of the piston and exhaust the air from the right of the piston, so that the piston will be moved to the right of the cylinder and will elevate the trolley-pole, the trolley being guided onto the wire by manipulation of the rope, as is usual in placing the ordinary style of trolley-pole and trolley in position.

The trolley may be withdrawn from the wire and the pole depressed at any time when desired by simply pulling on the rope 48 and then easing up on the rope and guiding the trolley by the wire so that one or the other of the arms 40 will hit the wire and tilt the trip-

lever, which will, as before described, depress the pole. Obviously in finding the wire the rope is held taut and the trip-lever held tilted, so that even though one of the arms 40 should hit the wire the valve will not be shifted, but the power will be maintained to push the pole upwardly.

The springs 10 act as buffers to cushion the stroke of the piston at its termination of throw, so that violent shock to the parts of the device is avoided. The ball-bearings 5 permit of an easy movement of the table 3 and the parts which it carries around the base 1, and thus the trolley is prevented from flying from the wire as frequently as would be the case if the action of the table 3 was performed more stiffly. The wings 43 squeeze the trip-lever between them, so that the trip-lever is frictionally held in either of its positions. It is thus prevented from jarring or creeping out of position and moves only when the rope is pulled upon or when one of the arms 40 strikes the wire.

What I claim is—

1. A trolley-pole, means for moving the pole, a trip-lever on the pole and connected with the moving means, and means projecting from the trip-lever for engaging the trolley-wire and tilting the trip-lever.

2. A trolley-pole, means for moving the pole, a trip-lever on the pole and connected with the moving means, and an arm on the trip-lever for engaging the trolley-wire and tilting the trip-lever.

3. A trolley-pole, means for moving the pole, a trip-lever on the pole and connected with the moving means, and arms projecting laterally from the trip-lever for engaging the trolley-wire and tilting the trip-lever.

4. A trolley-pole, means for moving the pole, a trip-lever on the pole and connected with the moving means, a pair of arms pivoted to the trip-lever, and means for yieldingly holding the arms extended from opposite sides of the trip-lever.

5. A trolley-pole, means for moving the pole, a trip-lever on the pole and connected with the moving means, a pair of arms having lapped knuckles pivoted to the trip-lever, the knuckles being recessed, and a spring lying within the recessses and engaging said arms for holding the arms extended.

6. A trolley-pole, pneumatic means for moving the pole, a trip-lever on the pole and connected with the moving means, and means projecting from the trip-lever for engaging the trolley-wire and tilting the trip-lever.

7. A trolley-pole, pneumatic means for moving the pole, a trip-lever on the pole and connected with the moving means, and an arm on the trip-lever for engaging the trolley-wire and tilting the trip-lever.

8. A trolley-pole, pneumatic means for moving the pole, a trip-lever on the pole and connected with the moving means, and arms projecting laterally from the trip-lever for engaging the trolley-wire and tilting the trip-lever.

9. A trolley-pole, pneumatic means for moving the pole, a trip-lever on the pole and connected with the moving means, a pair of arms pivoted to the trip-lever, and means for yieldingly holding the arms extended from opposite sides of the trip-lever.

10. A trolley-pole, pneumatic means for moving the pole, a trip-lever on the pole and connected with the moving means, a pair of arms having lapped knuckles pivoted to the trip-lever, the knuckles being recessed, and a spring lying within the recesses and engaging said arms for holding the arms extended.

11. A trolley-pole, pneumatic means for raising and lowering the pole, a trip-lever on the pole and connected with the moving means, and means projecting from the trip-lever for engaging the trolley-wire and tilting the trip-lever.

12. A trolley-pole, pneumatic means for raising and lowering the pole, a trip-lever on the pole and connected with the moving means, and an arm on the trip-lever for engaging the trolley-wire and tilting the trip-lever.

13. A trolley-pole, pneumatic means for raising and lowering the pole, a trip-lever on the pole and connected with the moving means, and arms projecting laterally from the trip-lever for engaging the trolley-wire and tilting the trip-lever.

14. A trolley-pole, pneumatic means for raising and lowering the pole, a trip-lever on the pole and connected with the moving means, a pair of arms pivoted to the trip-lever, and means for yieldingly holding the arms extended from opposite sides of the trip-lever.

15. A trolley-pole, pneumatic means for raising and lowering the pole, a trip-lever on the pole and connected with the moving means, a pair of arms having lapped knuckles pivoted to the trip-lever, the knuckles being recessed, and a spring lying within the recesses and engaging said arms for holding the arms extended.

16. A trolley-pole, a split sleeve thereon, wings projecting from the split sleeve, a trip-lever pivoted to the wings, an eye on the lower end of the trip-lever, and means projecting from the other end of the trip-lever for engaging with the trolley-wire.

17. A trolley-pole, means for moving the pole, a trip-lever pivoted to the pole, means projecting from the trip-lever for engaging the trolley-wire, an arm projecting from the trip-lever, and a connection from the arm to the moving means.

18. In combination, a trolley-pole, a cylinder, a piston therein connected to the trolley-pole, a valve for controlling the admission of compressed air to either side of the piston, a

trip-lever on the pole, an arm projecting from the trip-lever, and a rod connecting the arm and valve.

19. In combination, a cylinder, a piston therein connected to the trolley-pole, a valve for controlling the admission of compressed air to either side of the piston, a standard, a trolley-pole, a lever carrying the same and pivoted to the standard, a connection from the trolley-pole to the piston, a rock-arm pivoted to the lever eccentric of the pivot of the trolley-pole, a trip-lever pivoted to the trolley-pole, a rod connecting the trip-lever and rock-lever being attached to the latter at a point the arc of movement of which intersects the pivotal axis of the trolley-pole.

20. In combination, a base, a table revolubly mounted on the base, a standard on the table, a trolley-pole pivoted to the standard, a cylinder, a piston therein connected with the piston-rod, a valve for controlling the admission of compressed air to either side of the piston, a trip-lever on the trolley-pole, a connection from the trip-lever to the valve, and means projecting from the trip-lever for engaging the trolley-wire.

21. In combination, a cylinder, a piston therein, a pivoted trolley-pole, a connection from the trolley-pole to the piston, a valve-chest, a valve therein, adjustable stops for limiting the throw of the valve, a trip-lever on the pole, and a connection from the trip-lever to the valve.

22. In combination, a cylinder, a piston therein, a pivoted trolley-pole, a connection from the piston to the trolley-pole, a valve for controlling the admission of compressed air to the cylinder, a pivoted rock-arm, a valve-stem on the valve, a rod connected to the rock-arm, said stem and rod having right and left threads, a turnbuckle engaging the threaded portions, a trip-lever on the pole, a rod connecting the trip-lever and rock-arm, and means projecting from the trip-lever for engaging the trolley-wire.

23. In combination, a base having a boss, a table revolubly mounted on the boss, an annular nut screwed to the boss above the table, a set-screw for the nut, a cylinder on the table, a piston therein, a valve-chest for the cylinder, an air-pipe extending up through the base, another pipe connected to the first pipe with a swivel-joint and leading to the valve-chest, a valve in the chest, a standard on the table, a trolley-pole pivoted to the standard, a piston-rod, a valve-stem, a guide for the piston-rod and valve-stem, a link connecting the piston-rod and trolley-pole, a rock-arm pivoted to the standard, an adjustable connection from the rock-arm to the valve-stem, a trip-lever on the trolley-pole, an arm projecting from the trip-lever, a rod connecting the latter arm and said rock-arm, and means projecting from the trip-lever for engaging the trolley-wire.

24. A trip-lever, a pair of arms pivoted thereto, means for yieldingly holding the arms outstretched, the outer ends of the arms being bent.

25. In combination, a table, a standard thereon, a trolley-pole pivoted to the standard, pneumatic means for raising and lowering the pole, a block on the table, a guide-rod on the block, a cross-bar slidable on the block, a spring between the cross-bar and the block, rods connecting the cross-bar and trolley-pole, a trip-lever on the pole, means projecting from the trip-lever for engaging the trolley-wire, and means connecting the trip-lever and pneumatic means for controlling the latter.

In testimony whereof I have hereunto signed my name, in the presence of two subscribing witnesses, at Los Angeles, in the county of Los Angeles and State of California, this 11th day of December, 1903.

MARTIN O. DOLSON.

Witnesses:

GEORGE T. HACKLEY,

JULIA TOWNSEND.