F. E. CASE.

PANTOGRAPH TROLLEY.

APPLICATION FILED DEC. 11, 1907.

1,075,331.

Patented Oct. 14, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

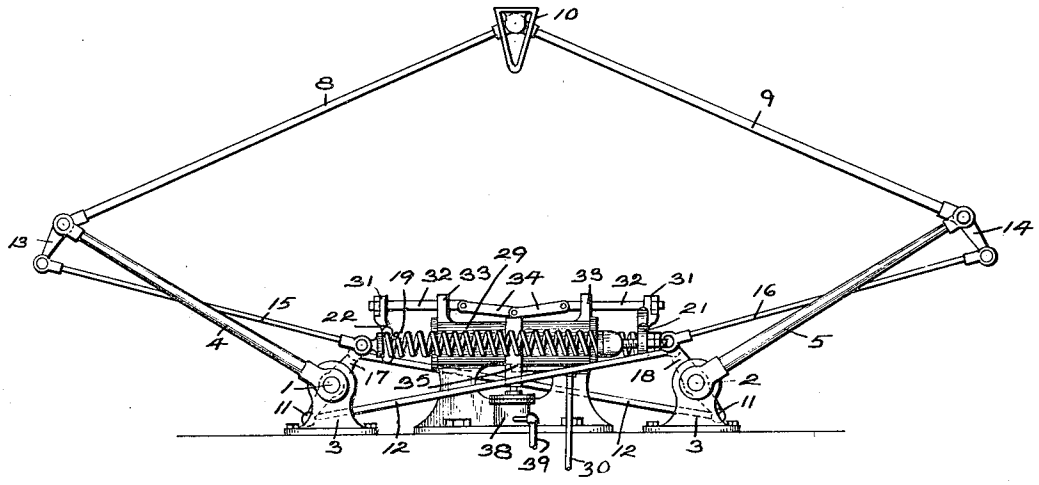
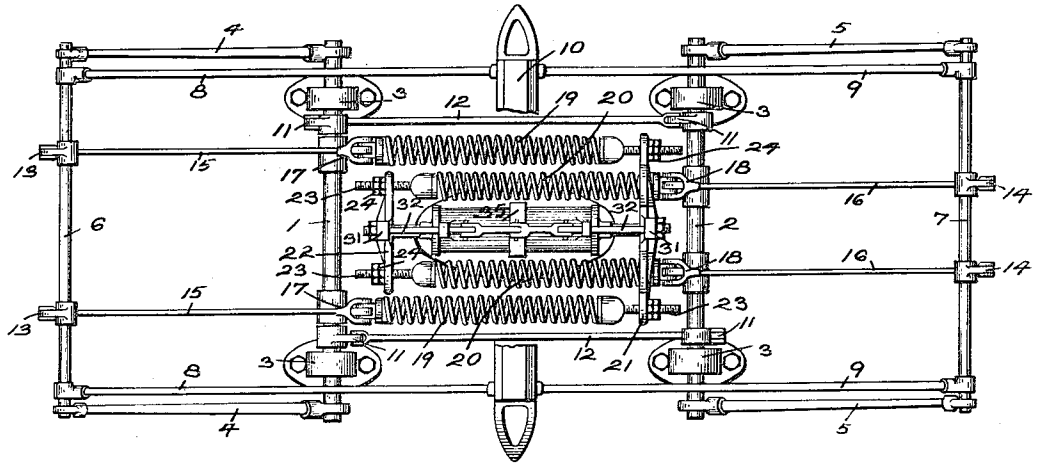


Fig. 2.



WITNESSES

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Fig. 3.

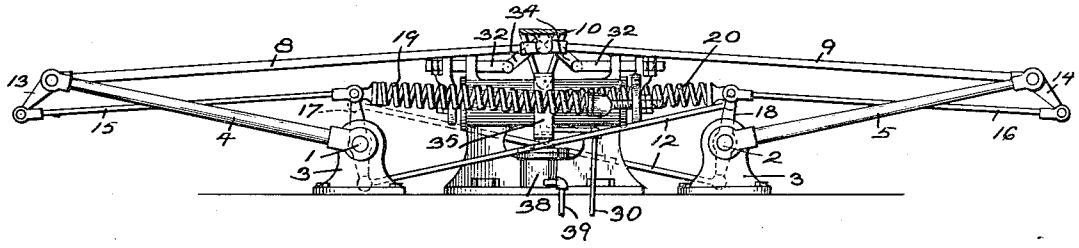
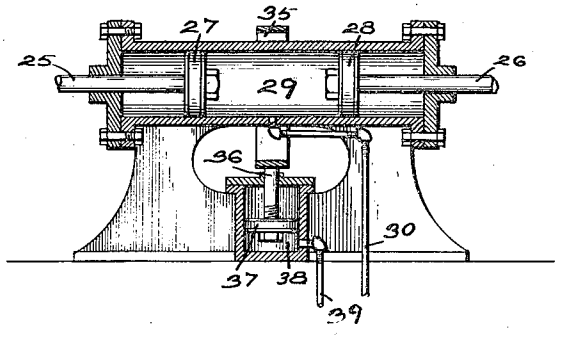


Fig 4



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UNITED STATES PATENT OFFICE.

FRANK E. CASE, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

PANTOGRAPH-TROLLEY.

1,075,331. Specification of Letters Patent. Patented Oct. 14, 1913.

Application filed December 11, 1907. Serial No. 406,058.

To all whom it may concern:

Be it known that I, FRANK E. CASE, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Pantograph-Trolleys, of which the following is a specification.

This invention relates to trolleys of the pantograph type for use in connection with electric railway motor cars.

One object of the invention is to so arrange the springs which hold the traveling contact yieldingly in its elevated position that their inertia will not affect the movement of trolley, as is necessarily the case when said springs are carried on the lower ends of the upper arms or members of the trolley.

Another object of the invention is to utilize air pressure to raise the trolley, and also to unlock and release it when it is to be lowered.

In carrying out the invention, I arrange the springs in a horizontal position so that in the operation of raising and operating the trolley their mass cannot affect the latter. They are connected with the lower ends of the upper members of the trolley by connecting rods. The springs are also attached to cross-heads which are connected to piston rods, whose pistons are located in opposite ends of a horizontal cylinder substantially in the plane of the springs. When fluid pressure is admitted to this cylinder between the two pistons, the latter are forced apart and the springs are put under tension. The pull of the springs is communicated to the members of the trolley by the connecting rods, so that the trolley is raised. When the contact arrives at the proper height, a toggle locks the pistons in this position and the fluid pressure can be released from the cylinder. In order to trip the toggle and allow the trolley to drop, fluid pressure is admitted to a device responsive to fluid pressure, such as a small cylinder whose piston rod is arranged to kick open the toggle.

In the accompanying drawings, Figure 1 is a side elevation of a pantograph trolley embodying my invention and shown in its raised position; Fig. 2 is a top plan view of the same, partly broken away; Fig. 3 is a side elevation showing the trolley lowered; and Fig. 4 is a section, on a larger scale, of the two cylinders.

Two parallel shafts 1 2 are journaled in suitable bearings 3, and at the extremities of said shafts are secured the diverging lower arms or members 4 5 of the trolley structure. Each pair of arms is connected by a shaft 6 7, to which are secured, respectively, the upper arms or members 8 9, which are pivotally connected to the transverse contact device or shoe 10. The shafts 1 2 carry rock arms 11 which are connected by equalizing rods 12, whereby the two shafts are obliged to rock in unison through equal angles in opposite directions, as the trolley is raised or lowered.

Secured on the shafts 6 7 are the rock arms 13 14 which are connected respectively by the rods 15 16 with rock arms 17 18 loosely mounted on the shafts 1 2. To these latter rock arms are attached one end of the springs 19 20, which are located preferably in substantially the same horizontal plane between the two shafts 1 2. The other ends of the springs 19 are attached to a cross-head 21 located near the shaft 2, while the ends of the spring 20 are connected with a cross-head 22 lying near the shaft 1. Provision is made for adjusting the tension of each of the springs by means of a screw-threaded rod 23 to which the spring is secured, said rod passing through the end of the cross-head and being provided with nuts 24.

The cross-heads are connected respectively with two piston rods 25 26 whose pistons 27 28 occupy opposite ends of a main cylinder 29 arranged horizontally between the two shafts 1 2, and substantially in the plane of the springs. A pipe 30 is connected with the middle of the cylinder and serves to convey thereto a charge of fluid pressure, preferably compressed air coming from suitable source of supply, such as the reservoir of the air brake system. Steam or other motive fluid may be substituted for air, if desired.

A lug 31 projects up from each cross-head to a point above the cylinder 29. A bar 32 is attached to each lug and slides to and fro in a guide 33 erected on the cylinder. The neighboring ends of these bars are connected by pivoted links 34, of such length that when the pistons are at the ends of the cylinder, the joint of the links drops down

toward the cylinder, as shown in Fig. 1. In this position, the links form a toggle which has straightened and passed the center, so that it resists any effort of the pistons to move back into the cylinder. To break the toggle, there is placed under its joint a lifter 35, preferably a loop encircling the cylinder. The lifter is connected to the piston rod 36 of a movable abutment, such as the piston 37 located in a small upright cylinder 38 underneath the main cylinder. The space below this piston is in communication with a source of fluid pressure, preferably by means of a pipe 39.

The operation of the device is as follows: Assume the trolley to be lowered, as shown in Fig. 3, with the pistons 27 28 at or near the middle of the main cylinder and the springs not under tension. To raise the trolley, air is admitted through the pipe 30, forcing the main pistons apart and causing the cross-heads to exert a pull on the springs. This in turn is communicated through the loose rock arms 17 18 to the connecting rods 15 16 and by them transmitted to the rock arms 13 14 on the shafts 6 7. The rocking of these shafts lifts the arms or upper members 8 9 carrying the trolley shoe, so that the parts quickly assume the position shown in Fig. 1. After the air has exhausted from the main cylinder, the tension of the springs is borne by the bars 32 and links 34, which keep the cross-heads separated. Any downward pressure on the trolley shoe is resisted yieldingly by the springs, through the connecting rods and the loose rock arms. When it is desired to lower the trolley, air is admitted through the pipe 39 into the small lifter cylinder and the piston 37 is forced upward, causing the lifter to kick off the toggle and let the tension of the springs move the main pistons back into the cylinder 29. It will be seen that this construction relieves the trolley arms 4 and 5 of the weight of the springs; relaxes the springs when they are not in service and the trolley is lowered; and uses the air pressure only when the trolley is to be raised or lowered, but without requiring the expenditure of any energy while the trolley is in service or out of service.

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

1. A pantograph trolley comprising movable upper and lower members and horizontally disposed springs, means for supporting said springs independent of the movable trolley members, and rods connecting said springs with the upper members of said trolley.

2. A pantograph trolley comprising parallel shafts on which the movable members of said trolley are mounted, loose rock arms on said shafts, rods connecting said arms with the upper members of said trolley, and horizontal springs connected at one end with said arms.

3. A pantograph trolley comprising movable members and springs, a cylinder, pistons therein connected with said springs, means for locking said pistons when said springs have been put under tension, and means for simultaneously releasing said pistons.

4. A pantograph trolley comprising movable members and lifting springs, a cylinder, pistons therein connected with said lifting springs, and links pivotally connected to said pistons and adapted to hold them apart when said springs have been put under tension.

5. A pantogroph trolley comprising mov able members and lifting springs, a cylinder, pistons therein connected with said lifting springs, means for locking both of said pistons when said springs have been put under tension, and means for simultaneously releasing said pistons in order to lower said trolley.

6. A pantograph trolley comprising movable members and lifting springs, a cylinder, pistons therein connected with said springs, a toggle for locking said pistons when the springs have been put under tension, and means responsive to fluid pressure for breaking said toggle in order to lower said trolley.

7. A pantograph trolley comprising movable members and lifting springs, a cylinder, pistons therein carrying cross-heads connected with said springs, pivoted links connected with said cross-heads, a lifter for raising said links, and a movable abutment exposed to fluid pressure for actuating said lifter.

In witness whereof, I have hereunto set my hand this 10th day of December, 1907.

FRANK E. CASE.

Witnesses:
BENJAMIN B. HULL,
HELEN ORFORD.