

A. A. GROSSARTH & T. E. BARKER.

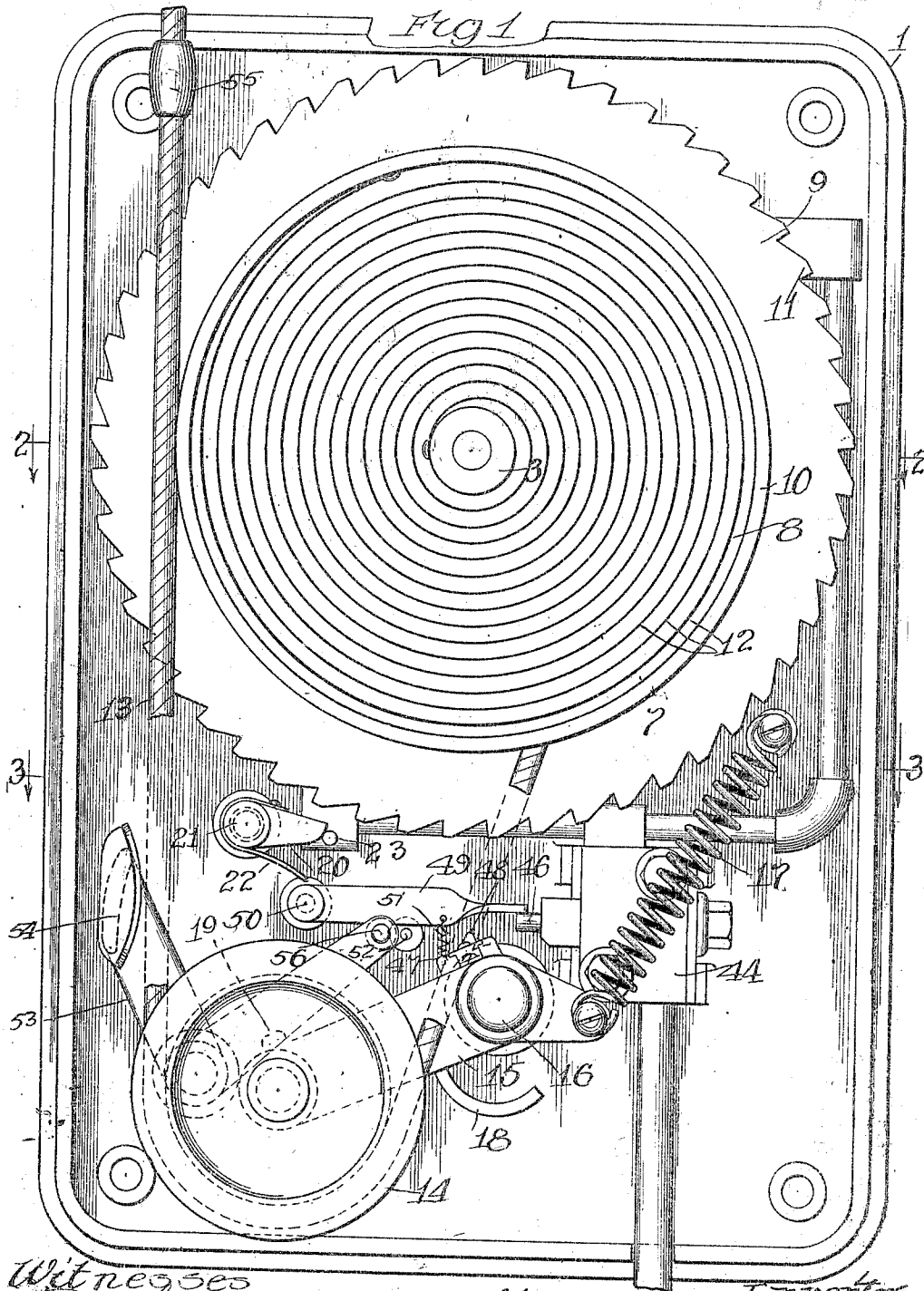
TROLLEY CONTROLLING DEVICE.

APPLICATION FILED APR. 5, 1909.

1,061,471.

Patented May 13, 1913.

4 SHEETS-SHEET 1.



Witnesses
R. A. White,
H. R. White

Inventors
Albert A. Grossarth
Theodore E. Barker
By *Rudolph A. Ford* Att'y.

A. A. GROSSARTH & T. E. BARKER.

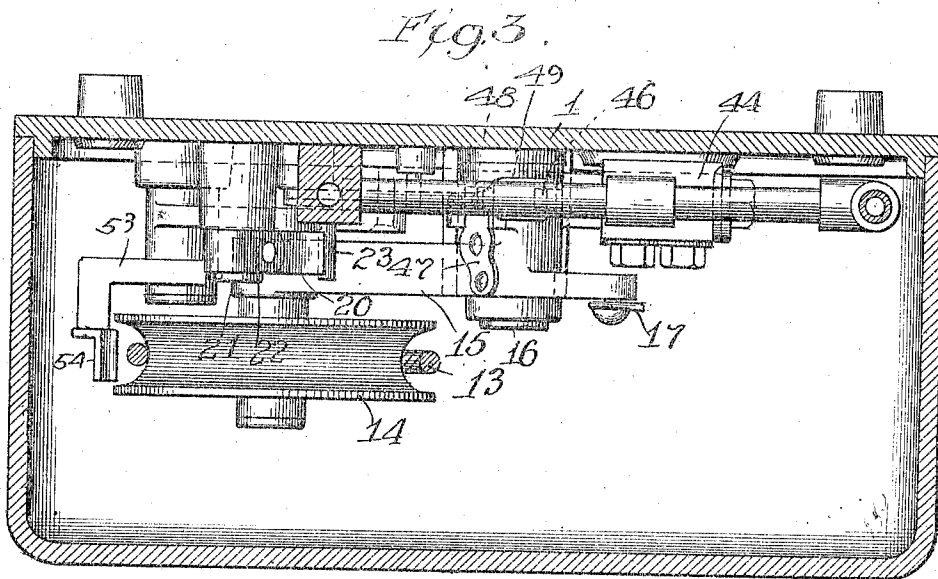
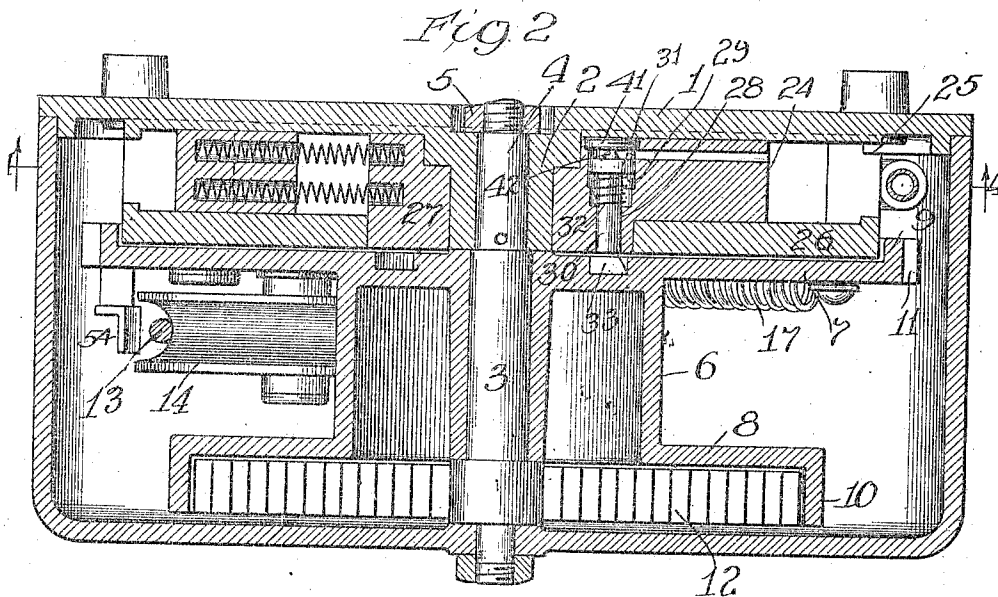
TROLLEY CONTROLLING DEVICE.

APPLICATION FILED APR. 5, 1909.

Patented May 13, 1913.

4 SHEETS—SHEET 2.

1,061,471.



Witnesses:

R. A. White.

H. P. White.

Inventors:

Albert A. Grossarth
Theodore E. Barker
By *Nicholas J. [Signature]* Att'y.

A. A. GROSSARTH & T. E. BARKER.

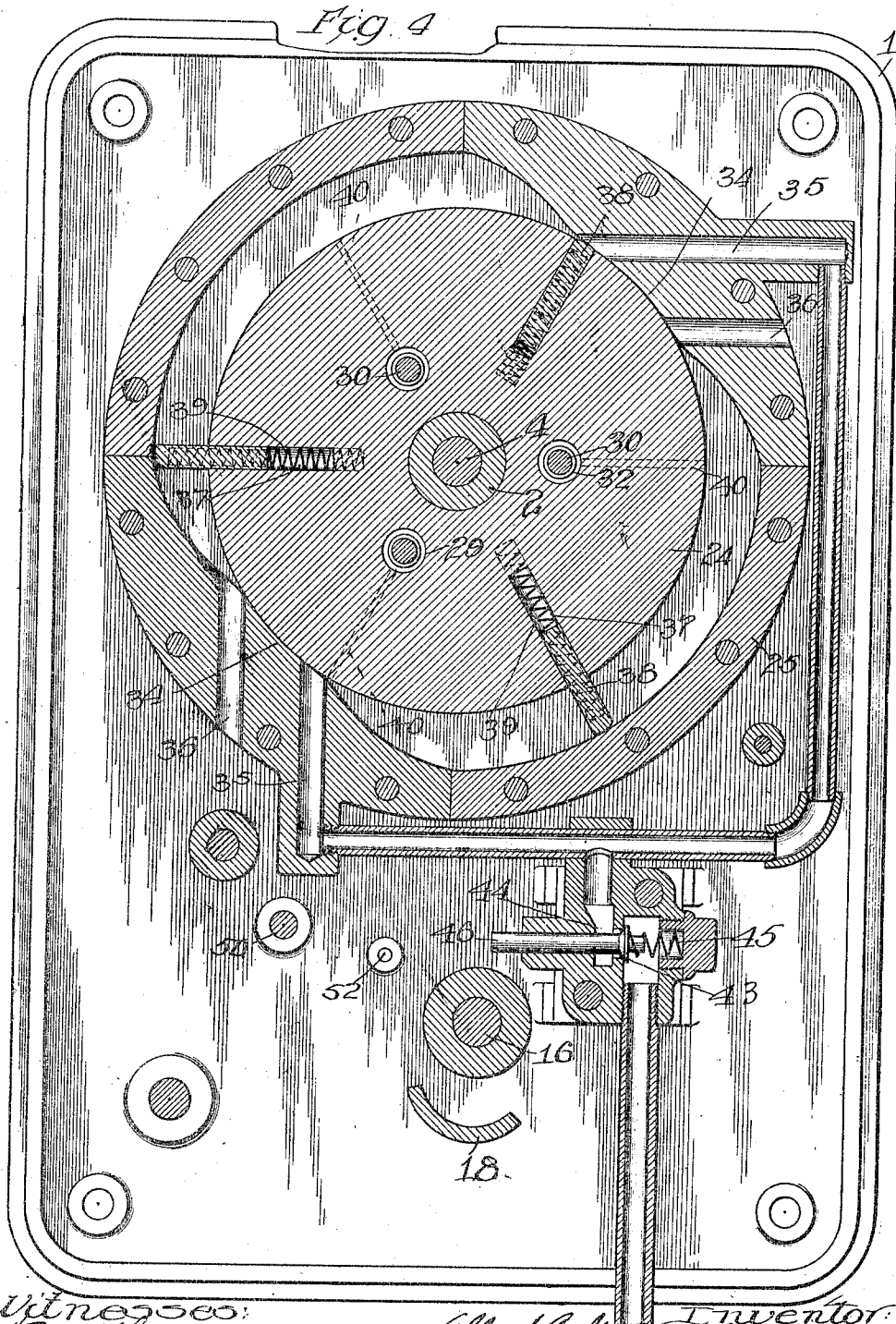
TROLLEY CONTROLLING DEVICE.

APPLICATION FILED APR. 5, 1909.

1,061,471.

Patented May 13, 1913.

4 SHEETS-SHEET 3.



Witnesses:
P. A. White.
H. P. L. White

Inventor:
Albert A. Grossarth
Theodore E. Barker
By *Adolph H. [Signature]* Att'y.

A. A. GROSSARTH & T. E. BARKER.

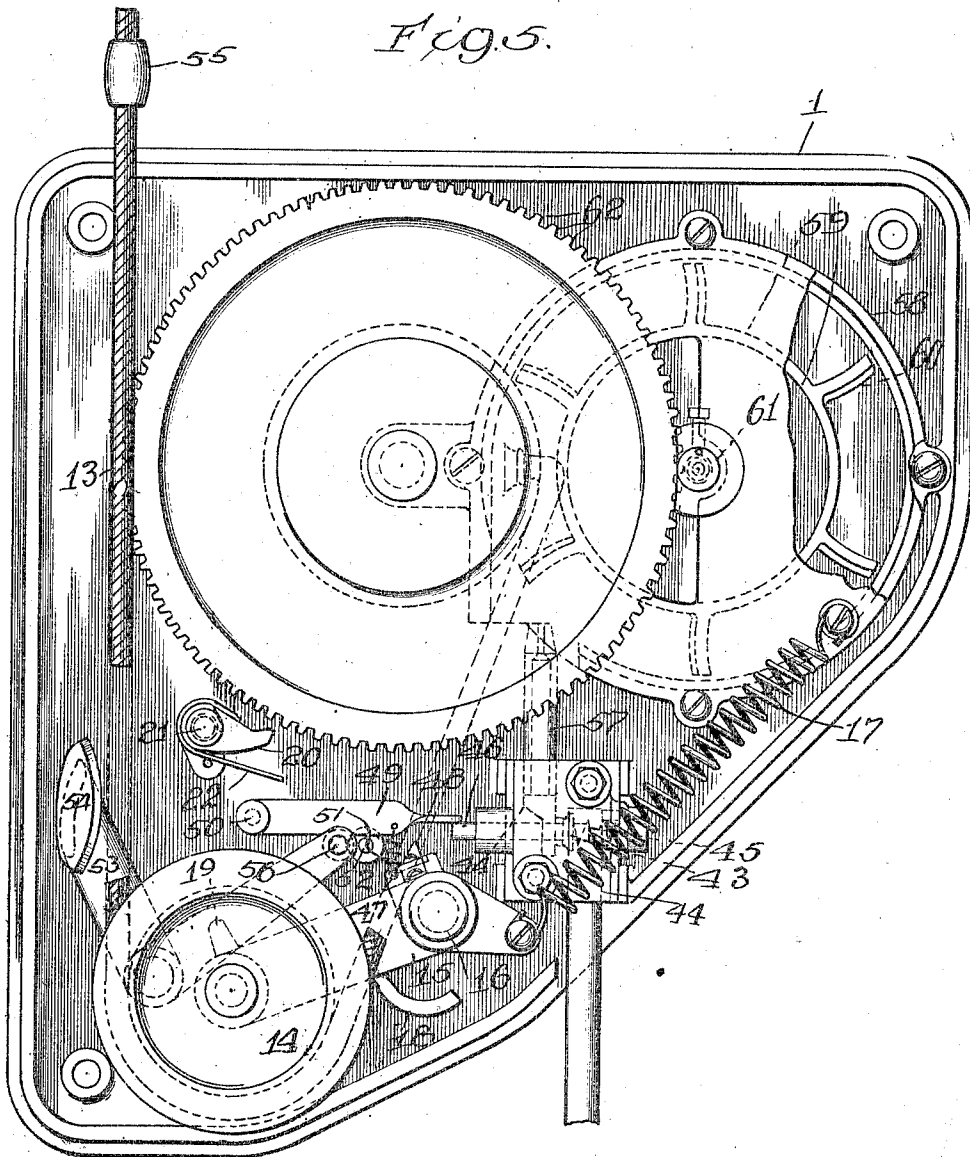
TROLLEY CONTROLLING DEVICE.

APPLICATION FILED APR. 5, 1909.

1,061,471.

Patented May 13, 1913.

4 SHEETS-SHEET 4.



Witnesses

K. A. White.

H. R. L. White

Inventors.

Albert A. Grossarth

Theodore E. Barker

By *Rudolph W. F. F. F.* Att'y.

UNITED STATES PATENT OFFICE.

ALBERT A. GROSSARTH AND THEODORE E. BARKER, OF CHICAGO, ILLINOIS.

TROLLEY-CONTROLLING DEVICE.

1,061,471.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed April 5, 1909. Serial No. 488,045.

To all whom it may concern:

Be it known that we, ALBERT A. GROSSARTH and THEODORE E. BARKER, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Trolley-Controlling Devices; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a novel construction in an apparatus for automatically drawing down below the elevation of trolley wires the trolley poles of cars which have accidentally left the wire, the object being to provide simple and efficient means for preventing the striking of the cross-wires or other trolley wire supporting devices by a disengaged trolley-pole, and consists in the features of construction and combinations of parts hereinafter fully described and claimed.

In the accompanying drawings illustrating this invention: Figure 1 is a view in front elevation of an apparatus constructed in accordance with our invention the cover being removed. Fig. 2 is a plan section of the same on the line 2—2 of Fig. 1. Fig. 3 is a plan section of the same on the line 3—3 of Fig. 1. Fig. 4 is a vertical section of the same on the line 4—4 of Fig. 2. Fig. 5 is a view similar to Fig. 1 showing a modified form of construction.

Our present invention relates more particularly to certain improvements in the construction of apparatus described and claimed in our application for Letters Patent filed November 14, 1908, Serial No. 462591 and is designed to overcome certain defects found to exist in our device in order to render the apparatus more efficient and positive in action.

One particular object of our present invention is to provide means, such as a spring actuated drum, which serves to maintain the trolley rope taut, and means actuated by sudden accidental release of the trolley engaging said drum to hold the same against movement particularly in a direction to unwind the rope.

A further particular object of the invention is to provide a normally free and inactive motor which is thrown into actuat-

ing relation to the drum and at the same time into operation by the sudden release of the trolley from the trolley wire through the intermediacy of the means referred to in the latter part of the preceding paragraph.

A further object of the invention consists in providing compensating means for taking up sudden slight elevations of the trolley against the inertia of the said drum, such as occur in passing over bridges, switches, etc.

In the prior apparatus referred to the motive power is applied in a manner which renders necessary the application of relatively great force to insure an excess of power over that exerted by the springs employed to maintain the free end of the trolley pole of a car normally elevated. Compressed air supplied from the air brake system of the car is mainly relied upon by us to supply the requisite power and as the pressure in said system is subject to great variations it is essential that means be provided which will assure positive operation at the minimum as well as the maximum pressure.

Other motive power than compressed air may, of course, be employed but compressed air is deemed by us to afford the most easily accessible power for the reason that the supply thereof is not, as in the case of electric power, dependent upon the contact of the trolley with the wire and the consequent necessity of the provision of storage batteries on the car to assure the necessary current to operate the device. It appears too that these two are the most available sources of power for our purpose and we prefer, therefore, to employ the one which involves greatest simplicity in its employment and which also is the more reliable.

The improvements in our present construction over the prior one referred to will become apparent in the perusal of the following pages without particularly pointing out the same.

Our present apparatus comprises the plate 1 adapted to be mounted upon a car in any suitable manner and in a place best suited therefor, the latter being considered by us to be on the end wall or dash-board substantially midway between the sides of the car. The said plate is provided with an opening adjacent the middle portion there-

of which is surrounded by an annular flange 2 cast integral with the said plate. A stud 3 having an annularly reduced end portion 4 is secured to the said plate by inserting said end portion 4 through the opening in the annular flange 2 which it snugly fits, a nut 5 being disposed on the threaded free end portion of said portion 4. Revolvably mounted on the said stud 3 is a drum 6 equipped with annular flanges 7 and 8 respectively, each of which is provided with a peripheral flange 9 and 10 respectively. The flange 9 is equipped on its outer face with ratchet teeth 11. To the inner face of the flange 10 one end of a spiral spring 12 is secured, the other end thereof being secured to the stud 3.

The trolley rope 13 is secured at one end to the drum 6 and part of its length is wound upon the same, the other end thereof being obviously secured to the free end portion of the trolley pole. Between its ends said rope 13 is trained over an idle sheave 14 revolvably disposed upon one end of a lever 15 which is pivotally supported between its ends upon a stud 16 of the plate 1. The other end of the said lever 15 is connected with one end of a tension spring 17 which is secured at its other end to a suitable projection on the plate 1. The said spring 17 serves to maintain the sheave carrying end of said lever normally at the lower limit of its movement which is determined by the stop 18 on said plate 1. On the last-named end portion of said lever 15 is a projection 19 and in the path of the latter is a pawl 20 pivotally disposed on a stud 21 and which is adapted to be thrown by said lever 15 into engagement with the ratchet 11, said pawl being maintained normally at the lower limit of its movement by gravity and a spring 22 being provided which is engaged by said projection 19 to maintain said pawl in yielding engagement with said ratchet. A stop pin 23 is disposed in the path of said pawl and determines the lower limit of its movement. The stop 18 is disposed also in the path of the spring engaged end of the lever 15 to determine its limit of movement in the other direction.

Revolvably mounted on the flange 2 of the plate 1 is the movable member 24 of a rotary motor the peripheral wall 25 of which is bolted or otherwise secured to the plate 1 and confined between the latter and a plate 26, the latter being provided with a central opening in which the central projection or hub portion 27 of the member 24 fits snugly. In the said hub portion 27 are a plurality of longitudinal openings 28 which are annularly enlarged at one end as at 29. Plungers 30 are longitudinally movable in said openings 28, each thereof being equipped at one end with an annu-

larly enlarged piston head 31 which snugly fits the enlarged portions 29 of said openings 28 said plungers being normally maintained at one limit of their movement by means of light compression springs 32 in an obvious manner. At their other ends said plungers are adapted when moved against the action of the springs 32 to engage the sunken ratchet teeth 33 on one face of the drum 6, said sunken ratchet teeth pointing in the same direction as the ratchet teeth 11.

The peripheral wall 25 of the motor is provided at diametrically opposite points with inwardly extending projections 34 having beveled side faces and dividing the annular space between said wall 25 and the circumferential face of the member 24 into two compartments each of which is provided with an inlet port 35 and an exhaust port 36 disposed respectively at opposite ends of each compartment. In said member 24 is a plurality of radial slots 37 in each of which a piston plate 38 is longitudinally movable, each of said plates being maintained normally at the outer limit of its movement by means of the compression springs 39 in an obvious manner, the free ends of said piston plates being adapted to ride over the said projections 34 against the action of the said springs. This type of motor and its operation is too well known to render detailed description thereof necessary. Alternating with the said slots 37 are radial openings 40 in said member 24 through which compressed air enters the small cylinders formed by the enlarged portions 29 of the openings 28, said enlarged portions being closed by means of plugs 41 and the piston heads 31 of the plungers 30 being equipped with central projections 42 which engage the plugs 41 and maintain a free space between the latter and said piston heads into which the compressed air is admitted, the latter serving to throw said plungers 30 into engagement with the sunken ratchet teeth 33 against the action of the springs 32. The latter are preferably so light as to offer very slight resistance to the movement of the said plungers 30 so that the said plungers will be thrown into engagement with the ratchet 33 before the pressure in the pressure chambers of the motor shall be sufficient to impart movement to the member 24.

The admission of compressed air to the pressure chambers of the motor is controlled by a valve 43 the casing 44 of which is interposed in the pipes connecting the motor with the air-brake system of the car, said valve casing being rigidly mounted on the plate 1. The said valve 43 may be of any suitable type and is maintained normally closed by a spring 45 and by the air pressure thereon. The stem 46 of said valve

projects at one end from said casing and into the path of a member 47 mounted upon the hub-portion of the lever 15, said member consisting of a flat spring which at its free end portion is provided with a tongue 48. The latter engages the said valve-stem when said lever is turned in one direction and by reason of the movement of said member 47 in the arc of a circle said tongue will, after forcing said valve-stem inwardly a given distance move out of its path in an obvious manner. A lever 49 pivotally mounted at one end on a stud 50 of the plate 1 normally rests at its free end portion upon the projecting end portion of the valve-stem 46 when said valve is closed and when the latter is opened by the action of the member 47 the free end of said lever drops into the path of said valve-stem, a spring 51 being provided to insure this movement and a stop 52 limiting the same. Thus, after the valve has been opened it is maintained open by the said lever 49.

A bell-crank lever 53 is pivotally mounted at its elbow portion on a stud of the plate 1 and is equipped at the free end of one of its arms with a cam projection 54 which is maintained normally adjacent the trolley rope 13 and is adapted to be thrown outwardly therefrom by the collar 55 on said drum 6 by the action of the motor. When this occurs the idler is disposed at the upper limit of its movement so that said collar 55 will act as a wedge in passing between the periphery of said idler and said cam end of said lever 53. At the free end of the other arm of said bell-crank lever 53 is a projection 56 which is adapted when said lever is turned by the engagement of the collar 55 with the projection 54 to strike the lever 49 and throw the same out of the path of the valve-stem 46, said spring 51 serving to maintain said lever 53 in the position first mentioned by the engagement of the lever 49 with the said projection 56.

The operation of our apparatus is as follows: The spiral spring 12 serves to maintain the trolley rope 13 taut but the tension exerted thereby is insufficient to overcome the tension of the spring 17 so that the ordinary movements of the trolley pole caused by variations in elevation of the trolley wires will cause the drum 6 to oscillate slightly the said springs 12 and 17 being of such relative strength as to cause slight movement to be imparted to the lever 14 when a slight sudden jerk such as might be imparted by the bouncing and bounding of the car body or in passing over frogs, switches or other connections or impediments in the trolley line and rails is transmitted to the rope. As soon however, as the trolley leaves the trolley wire, the sudden unlimited jerk upon the rope due thereto

will cause the lever 15 to be turned against the action of the spring 17 and throw the projection 19 into engagement with the spring 22 of the pawl 20 thereby throwing the latter in yielding engagement with the ratchet 11. Said pawl thus locks the drum against movement in a direction to unwind the rope 13 therefrom. The inertia of the drum 6 together with the resistance of the spring 12 prevents the sudden jerk imparted to the rope from setting the said drum in motion sufficiently early to prevent the movement of the lever 15 as above described it being essential of course to so regulate the relative tensions of the springs 12 and 17 to each other and to the springs supporting the trolley pole as to accomplish the desired results. The movement of the lever 15 obviously causes the valve 43 to be opened and the lever 49 to be thrown into the path of the valve-stem 46 to maintain said valve open. The opening of the valve 43 admits compressed air to the motor. The latter primarily throws the plungers 30 into engagement with the ratchet 33 so that the drum 6 will be rotated with the member 24 in a direction to wind the trolley rope upon the said drum against the action of the springs supporting the trolley pole. The high tension of the rope during this operation maintains the lever 15 in the last described position until the collar 55 on the rope engages and moves the projection 54 of the bell-crank lever 53 out of its path thereby turning said lever 53 and causing the projection 56 to throw the lever 49 out of the path of the valve-stem 46. The valve 43 closes instantly and the drum 6 now remains stationary until a member of the crew pulls the trolley rope in the same direction as it has been moved by the drum 6. Such further movement of the rope should be sufficient to cause the lever 15 to return to its normal position, and to allow the drum to be rotated slightly by the spring 12 whereby the pawl 20 is allowed to drop out of engagement with the ratchet 11, and the angular sides of sunken ratchet teeth 33 to push plungers 30 back into their normal position, the springs 32 being intended only to prevent plungers from working out into the path of the ratchet teeth 33 by vibration of the mechanism under normal conditions. The operator then gradually feeds out rope in the opposite direction until the trolley again engages the wire. In returning to its normal position the lever 15 causes the yielding member 47 carried thereby to spring past the valve-stem 46 as will be obvious. The mechanism is now again in normal position and the foregoing operations will be repeated as soon as the trolley again leaves the trolley wire. It is essential, of course, that the drum 6 when actuated by the motor shall draw the trolley end of the

trolley pole a considerable distance below the elevation of the trolley wire and thus out of the path of the trolley wire supporting means.

The distance to which the trolley pole is lowered is determined by the position of the collar 55. The latter may be so located as to cause the pole to be lowered to its usual position close to the roof of the car when out of action and if this is done our said device may be used to hold the pole down when the direction of travel of the car is reversed. Thus the device may be the means of saving considerable time at terminals as the conductor need only give the rope a sudden upward jerk to set the apparatus in motion and immediately proceed to the other end of the car to release the other trolley pole.

In Fig. 5 we have illustrated a modified form of construction in which another style of motor is employed, the remaining mechanism being identical with that shown in Fig. 1.

The motor illustrated in Figs. 2 and 4 is actuated by direct pressure. Instead of this a motor actuated by the impingement of a jet of compressed fluid delivered from a nozzle 57 may be employed as shown in the said Fig. 5. The said motor consists of a casing 58 in which a wheel 59 provided with peripheral vanes 60 is revolutely mounted, said wheel being rotated by the impingement of the jet of compressed fluid from the nozzle 57 upon the said vanes 60. A spur pinion 61 rigid with the wheel 59 meshes with a spur gear 62 substituted for the ratchet 11 on the drum 6 (shown in Fig. 1) and which said gear 62 is engaged by the pawl 20 so that it performs two functions. The operation of this modified form of construction is identical with the preferred form hereinbefore described.

We claim as our invention:

1. In a device of the kind specified, a spring-actuated rotatable drum, a trolley rope secured at one end thereto and maintained taut thereby, a normally free and inactive motor, a member over which the trolley rope is trained controlling said motor, said member being actuated by a sudden jerk imparted to said rope, and a clutch member carried by said motor and adapted to couple said drum therewith, said clutch being actuated to engage said drum by the power actuating said motor.

2. In a device of the kind specified, a spring-actuated rotatable drum, a trolley rope secured at one end thereto and maintained taut thereby, a normally free and inactive fluid pressure motor, a member over which the trolley rope is trained controlling said motor, said member being actuated by a sudden jerk imparted to said rope, and a fluid pressure actuated clutch member car-

ried by said motor and adapted to couple said drum therewith.

3. In a device of the kind specified, a movable member, a trolley rope connected at one end therewith and maintained taut thereby, a normally free and inactive motor adapted to actuate said member, a second movable member over which said rope is trained between its ends and controlling said motor, said last-named member being actuated by a sudden jerk imparted to the trolley rope, and a clutch adapted to couple said motor with said first-named member, said clutch being actuated by the power actuating said motor.

4. In a device of the kind specified, a movable member, a trolley rope connected at one end therewith and maintained taut thereby, a normally free and inactive fluid pressure actuated motor adapted to actuate said member, a fluid pressure actuated clutch engaging said motor with said drum, a valve controlling the connection of said motor and said clutch with the source of supply of fluid under pressure, and a member controlling said valve and over which the trolley rope is trained and adapted to be actuated by a sudden jerk on the latter to open said valve.

5. In a device of the kind specified, a movable member, a trolley rope connected at one end therewith and maintained taut thereby, a normally free and inactive fluid pressure actuated motor adapted to actuate said member, a fluid pressure actuated clutch engaging said motor with said movable member, means controlling the connection of said motor and said clutch with the source of supply of fluid under pressure, and devices engaged with the trolley pole and actuated by a sudden jerk on the latter to actuate said means, whereby said clutch and said motor are actuated.

6. In a device of the kind specified, a trolley pole, a member having connection therewith, normally free and inactive power actuated means adapted to actuate said member, a member controlling the same and operatively engaged with the trolley pole and actuated by sudden elevation of the latter, and a clutch actuated by the power actuating said motor to operatively engage the latter with said first-named member.

7. In a device of the kind specified, a trolley pole, means for depressing the same, a member connecting said means with said pole, a normally free and inactive fluid pressure motor for actuating said means, a fluid pressure actuated clutch for engaging said motor with said means, a normally closed valve controlling the fluid supply to said motor and said clutch, means controlling said valve operatively engaged with said member and adapted to be actuated by sudden elevation of said pole for opening said valve, and a part carried by said member

and adapted to engage and actuate said last-named means for closing said valve and stopping said motor as said first-named means draws the trolley pole down.

5 8. In a device of the kind specified, a trolley pole, a member having connection therewith, normally free and inactive fluid pressure actuated means adapted to actuate said member; a member controlling the same and
10 operatively engaged with the trolley pole and actuated by sudden elevation of the latter, and a fluid pressure actuated clutch operatively engaging said fluid pressure actuated means with said first-named member.

15 9. In a device of the kind specified, a trolley pole, a member having connection therewith, normally free and inactive fluid pressure actuated means adapted to actuate said member, a member controlling the same and
20 operatively engaged with the trolley pole and actuated by sudden elevation of the latter, and a fluid pressure actuated clutch operatively engaging said fluid pressure actuated means with said first-named member, and means actuated by said fluid pressure
25 actuated means and controlling the connection thereof with said source of power for automatically stopping said fluid pressure actuated means.

30 10. In a device of the kind specified, a trolley rope, a member connected therewith and serving to maintain the same taut, a normally free and inactive motor adapted to actuate said member, a member controlled
35 by the trolley rope and controlling said motor, said member being actuated by sudden jerks of the trolley rope to throw said motor into action, a clutch actuated by the power actuating said motor and operatively
40 engaging the latter with said first-named member, and secondary means controlling said motor and actuated thereby to automatically stop the same.

45 11. In a device of the kind specified, the combination with a normally inactive motor, and a trolley pole operatively connected therewith and adapted to be actuated thereby, of means interposed in said connection
50 and adapted to be actuated by the trolley pole to start the motor, and means interposed in said connection and actuated by the motor to automatically stop the same.

55 12. In a device of the kind specified, a trolley rope, a member connected therewith and maintaining the same taut, a normally free and inactive motor, a clutch adapted to operatively engage said motor with said member and actuated by the power actuating the former, a member controlling the connection
60 between said motor and the source of power and operatively engaged by said rope and actuated by a sudden jerk on the latter to establish said connection, secondary means controlling said connection, and means actuated by said motor and actuating said sec-

ondary means to automatically interrupt said connection.

13. In a device of the kind specified, a rotatable drum, a trolley rope secured at one end thereto, a spring operatively engaging
70 said drum to turn the same in a direction to wind the rope thereupon and maintaining the said rope normally taut, an idler over which said rope is trained, a movable member carrying the said idler, a spring main-
75 taining said member normally at one limit of its movement against the normal tension of said rope, a normally free and inactive motor, power actuated means throwing said motor into actuating relation to said drum, and a device controlling the connection of
80 said motor and said power actuated means with a source of power, said device being actuated by said idler carrying member when the latter is moved against the action of the
85 spring engaging the same.

14. In a device of the kind specified, a rotatable drum, a trolley rope secured at one end thereto, a spring operatively engaging
90 said drum to turn the same in a direction to wind the rope thereupon and maintaining the said rope normally taut, an idler over which said rope is trained, a movable member carrying the said idler, a spring main-
95 taining said member normally at one limit of its movement against the normal tension of said rope, a motor adapted to actuate said drum to turn the same in the same direction as its actuating spring, a device controlling the connection of said motor with
100 its source of power, said device being actuated by the said idler carrying member, a dog adapted to engage said device to maintain said motor connected with its source of power, an enlargement on the trolley rope,
105 and a lever actuated thereby and operatively engaging said dog to release said device.

15. In a device of the kind specified, a rotatable drum, a trolley rope secured at one end thereto, a spring operatively engaging
110 said drum to turn the same in a direction to wind the rope thereupon and maintaining the said rope normally taut, an idler over which said rope is trained, a movable member carrying the said idler, a spring main-
115 taining said member normally at one limit of its movement against the normal tension of said rope, a normally inactive motor adapted to actuate said drum to turn it in the same direction as its actuating spring, a
120 normally free dog adapted to be actuated by said idler carrying member and thrown thereby into engagement with said drum to stop the latter, a device actuated by said idler carrying member and controlling the
125 connection of said motor with its source of power, a trip lever engaging said device after actuation thereof by said idler carrying member to maintain the connection of said motor with its source of power, an en- 130

largement on the trolley rope, and a lever actuated thereby and engaging said trip lever to throw the same out of engagement with said device.

16. In a car, a trolley controlling device comprising a rotatable drum, a trolley rope secured at one end thereto, a spring operatively engaging said drum to turn the same in a direction to wind the rope thereupon and maintaining the said rope normally taut, an idler over which said rope is trained, a movable member carrying the said idler, a spring maintaining said member normally at one limit of its movement against the normal tension of said rope, a motor connected with a source of supply of compressed air and adapted to actuate said drum to turn the latter in the same direction as the spring actuating the same, a normally closed valve interposed in said connection, a member carried by said idler carrying member actuating said valve to open the same, a member operatively engaging said valve when open to maintain the same in said position, a collar on the trolley rope, and a trip lever engaging said last-named member and actuated by said collar to throw the said member out of engagement with the said valve.

17. In a device of the kind specified, a spring actuated drum, a trolley rope secured at one end thereto, an idler over which the said rope is trained, a movable member carrying the said idler, a spring normally maintaining said member at one limit of its movement against the normal tension of the trolley rope, a ratchet rigid with said drum, and a normally free dog adapted to engage said ratchet to hold said drum against rotation in a direction to unwind the trolley rope, said dog being actuated by said member when the latter is turned against the action of its spring.

18. In a device of the kind specified, a spring actuated drum, a trolley rope secured at one end thereto, an idler over which the said rope is trained, a movable member carrying the said idler, a spring normally maintaining said member at one limit of its movement against the normal tension of the trolley rope, a fluid pressure motor connected with a source of supply of fluid under pressure and adapted to actuate said drum, a normally closed valve controlling said connection, a ratchet rigid with said drum, and a normally free dog adapted to engage said ratchet to hold said drum against rotation in a direction to unwind said rope, said member when turned against the action of its spring throwing said dog into engagement with said ratchet and opening said valve.

19. In a device of the kind specified, a rotatable spring actuated drum, a trolley rope secured at one end thereto and main-

tained taut thereby, an idler over which said trolley rope is trained, a movable member carrying the said idler, a spring normally maintaining the said idler at one limit of its movement, a fluid pressure actuated motor, a fluid pressure actuated normally free clutch controlling the engagement of said motor with said drum, and a single normally closed valve controlling said motor and said clutch, said valve being operatively engaged and opened by said member when turned against the action of its spring.

20. In a device of the kind specified, a rotatable spring actuated drum, a trolley rope secured at one end thereto and maintained taut thereby, an idler over which said trolley rope is trained, a movable member carrying the said idler, a spring normally maintaining the said idler at one limit of its movement, a fluid pressure actuated motor, a fluid pressure actuated normally free clutch controlling the engagement of said motor with said drum, a single valve controlling said motor and said clutch, and a normally free member adapted to operatively engage said drum to hold the same against rotation in a direction to unwind said rope, said idler carrying member operatively engaging said last-named member and said valve to open the latter and throw the former into engagement with said drum.

21. In a device of the kind specified, a rotatable spring actuated drum, a trolley rope secured at one end thereto and maintained taut thereby, an idler over which said trolley rope is trained, a movable member carrying the said idler, a spring normally maintaining the said idler at one limit of its movement, a fluid pressure actuated motor, a fluid pressure actuated normally free clutch controlling the engagement of said motor with said drum, a single valve controlling said motor and said clutch, and a normally free member adapted to operatively engage said drum to hold the same against rotation in a direction to unwind said rope, said idler carrying member operatively engaging said last-named member and said valve to open the latter and throw the former into engagement with said drum, a member operatively engaging said valve when opened to prevent closure thereof, a collar on the trolley rope, and a lever adapted to be engaged and actuated by said collar and engaging said last-named member to release said valve.

22. In a device of the kind specified, a trolley rope, a movable member connected with the free end thereof and maintaining the latter taut, a take-up member over which the trolley rope is trained between its ends, said take-up member serving to compensate for sudden slight variations in elevation of the trolley against the inertia of said first-named member, a normally inactive motor

adapted to actuate said first-named member, and a normally released clutch actuated by the power actuating said motor and controlling the actuating relation of said motor with said first-named member, said take-up member controlling said motor and said clutch.

In testimony whereof we have signed our

names in presence of two subscribing witnesses.

ALBERT A. GROSSARTH.
THEODORE E. BARKER.

Witnesses:

RUDOLPH WM. LOTZ,
A. FRANCK-PHILIPSON.