J. P. HENDERSON.

TROLLEY ATTACHMENT.

APPLICATION FILED NOV. 29, 1909.

1,004,785.

Patented Oct. 3, 1911.

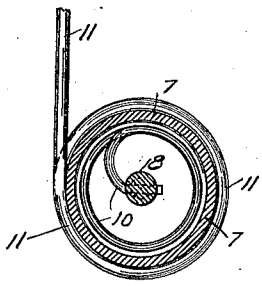

Fig. 3.

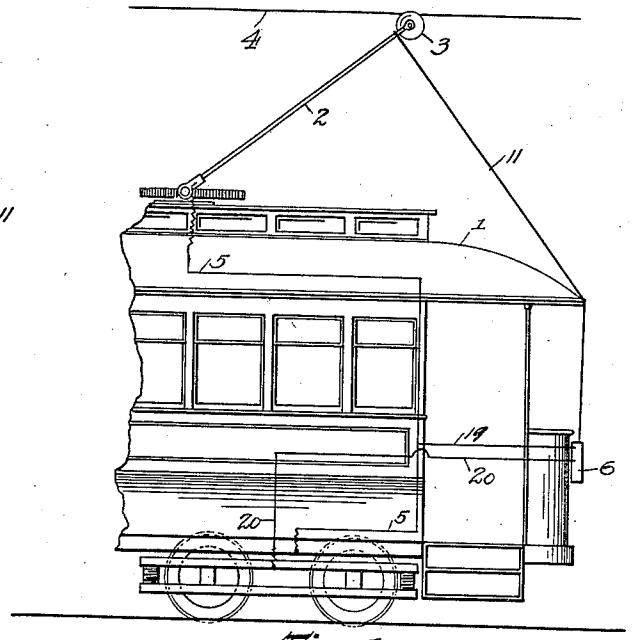

Fig. 1.

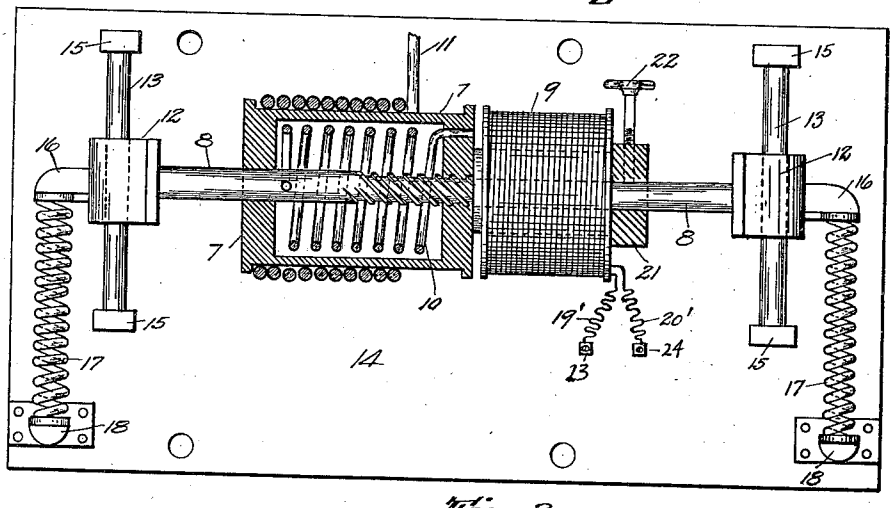

Fig. 2

Witnesses:—

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TROLLEY ATTACHMENT.

1,004,785. Specification of Letters Patent. Patented Oct. 3, 1911.

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To all whom it may concern:

Be it known that I, JOHN PHILLIPS HENDERSON, citizen of the United States, residing at Sharon, in the county of Mercer and State of Pennsylvania, have invented certain new and useful Improvements in Trolley Attachments, of which the following is a specification.

This invention relates to an attachment for trolley cars and is directed to means whereby the trolley on accidentally leaving the wire, is prevented from shooting upward any distance whatever whereby the guy wires might be broken upon the trolley coming in contact with them; and directed more especially to an improvement in the construction and certainty of operation of the present so called trolley catchers.

One of the objects of my invention is to provide means whereby a spring connected by means of a drum to a trolley rope, is held under tension while the trolley is in contact with the trolley wire, and whereby upon breaking the circuit caused by the trolley leaving the wire, the holding means will be withdrawn from the spring, and the full power of the spring directed to the winding of the trolley rope and the concurrent pulling downward of the trolley in opposition to the main trolley springs.

A further object is to provide such a construction as will permit of the use of a spring in my invention which will be sufficiently powerful to overcome the opposition of the trolley spring and which at the same time can be held under tension by the unique arrangement of my magnet and cooperating parts without impairing the certainty of operation of my device.

Other objects and purposes of my invention will appear from the description in the appended claims.

My invention accordingly consists in the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth, and the scope of application of which will be indicated in the following claims.

Referring to the drawings in which is shown one of the embodiments of my invention, and in all of which like reference characters designate like parts; Figure 1 is a view showing the rear end of a trolley car and illustrating in a general way the application of my trolley puller to an electric car; Fig. 2 is a view of the cross section of the drum of my invention; Fig. 3 is a front plan view of my attachment with the outer casing removed showing the drum in a front longitudinal cross section.

(1) designates an electric car carrying the usual trolley pole (2), having at its upper end the wheel (3) which is normally in contact with the trolley wire (4). Leading from the trolley pole and in an electrical connection therewith, is a circuit wire (5) which conveys the current from the conducting wire (4) down through the trolley to the motor (not shown) located beneath the car.

Leading from the circuit wire (5) is a wire (19) which terminates in a suitable socket (not shown) located on the outside of the rear and front dash of the car. On each of the two dashes and in close proximity to the first socket, is a second socket (not shown) to which is connected the wire (20) which is ground on the truck frame of the car.

My attachment properly consists of a base plate (14) provided with a suitable housing (6), in the top of which housing is a longitudinal slit through which the trolley rope (11) passes. Mounted on the base plate (14) are brackets (15), and supported between the two pair of brackets, are the two vertical runners (13). Slidably mounted on the runners (13), are blocks or guide bearings (12) between which is supported a nonmagnetic spindle or shaft (8). Located on the right and left side of the right and left blocks (12) respectively and integral therewith, are projections (16) which on their under side are provided with seats for the spiral springs (17), which springs are in turn fixed to and supported at their lower end by brackets (18), said brackets being riveted to the base plate (14).

The spindle (8) is provided in its central portion with a forty-five degree thread and mounted on the spindle are the drum (7) and the electro magnet (9). The hub of the drum toward the magnet is provided with a suitable female thread to properly engage the threaded section of the spindle, while the opposite hub of the drum has a smooth bearing on the unthreaded section of the spindle. Located within the drum is a strong spiral spring (10) having one end passing through and securely fixed to the spindle, and the other end fixed to the

outer part of the drum hub. Fastened to the outer surface of the drum, is one end of the trolley rope (11) which normally has a plurality of coils around the drum, and is prevented from slipping off by means of flanges with which the drum is provided.

The magnet (9), a merely conventional form of which is shown, is provided at one end with a contact plate and at the opposite end with a block (21), in which is threaded a set screw (22). The base plate is provided with posts (23 & 24) terminating at the rear in plugs (not shown) which are so positioned as to plug into the sockets located on the car dash. Connecting the posts and the magnet are wires designated as (19′) and (20′).

From the construction above described, the operation of my attachment can readily be comprehended to be as follows: Taking the point on the line where the trolley wire reaches its greatest elevation above the track as the normal point for adjustment, the trolley rope is manually unwound from the drum. As the drum rotates in paying out the rope, its threaded contact with the spindle causes the drum to move longitudinally in the direction of the magnet. When the trolley is on the wire, at the latter's highest elevation from the track, the magnet is so adjusted as to be in direct contact with the drum and is then fixed in that position by means of the set screw. The trolley now being in contact with the wire, and the circuit being complete, the magnet (9) is energized and affects the threaded drum head which is cast from some highly conductive metal. The forces then acting upon the trolley are as follows: The spiral spring (10) which is under tension tends to draw the trolley downward, but in so doing, would, by reason of its threaded contact with the spindle, have to move longitudinally away from the magnet. The springs and several parts of my device are tensioned and so adjusted, that the main trolley spring enforced by the resistance of the magnet to the revolution of the drum, will prevent the trolley from being pulled downward from the wire; when however, the circuit is broken by the trolley leaving the wire, the magnet is deënergized, and as the spiral spring (10) is more powerful than the main trolley spring, it can then, uninfluenced by the magnet, draw the trolley downward, inasmuch as the drum, viewed from the left end tends to move, under the influence of the spring (10) in a contra-clockwise direction, thus winding the rope (11). To replace the trolley on the wire, the rope (11) is manually pulled upward, thereby causing the drum to rotate on the threaded spindle toward the magnet, and when the trolley strikes the wire, the rope is still pulled, if needed, until the drum contacts with the magnet, at which time the circuit is completed.

While the trolley is on the wire, the drum is at all times in contact with the magnet, but to provide for the upward or downward play of the trolley without any revolution of the drum, I have mounted the spindle on the sliding blocks. The spiral springs connecting the blocks with the base plate permit the spindle and its burden accordingly to move upward or downward in accordance with the variations of the trolley wire, and likewise relieves the mechanism from shocks caused by the unevenness of the road bed.

The pitch of the thread of the spindle, the gauge of the drum spring, and the particular form of magnet used, are of course all matters of detail which need not be discussed in setting forth the principles of my invention; but it must be understood that my invention broadly contemplates the principle of a mechanism for pulling or winding a rope which is held under spring tension by means of magnetic forces preventing its longitudinal movement, and which upon the deënergizing of the magnet, allows the winding mechanism to concurrently move longitudinally of its supporting means and rotate.

I claim:

1. In an attachment for trolley cars, the combination of a rotatable drum mounted on a spindle and having a threaded engagement therewith, means for rotating the drum relative to the spindle, whereby the drum moves longitudinally of the spindle and a magnet located on the spindle and opposing the first named means, substantially as shown and described.

2. In a trolley attachment, the combination of a trolley rope, a spindle, a rotatable drum mounted upon and having at one end a threaded engagement with the spindle, and to which drum the trolley rope is attached means for causing the rotation and longitudinal movement of the drum, whereby the trolley rope is wound upon the latter and a magnet normally acting upon the drum to prevent its rotation and longitudinal movement, substantially as shown and described.

3. In a trolley attachment, the combination of a trolley rope, a drum upon which the trolley rope is wound in drawing the trolley downward, a spindle upon which the drum is rotatably mounted said drum having at one end a threaded engagement with the spindle, means for rotating the drum to wind the trolley rope, and an electro magnet operative when the trolley is in contact with the trolley wire, to oppose the rotation of the drum, substantially as shown and described.

4. In a trolley attachment, the combination of a spindle having adjustably mounted

thereon an electro magnet, a drum mounted on the spindle and having a threaded engagement therewith, a spring located within the drum for rotating the drum and concurrently causing the drum to move along the threaded section of the spindle and away from the magnet, and electrical connection between the magnet and the trolley wire for energizing the magnet and preventing the rotation of the drum, substantially as shown and described.

5. In a trolley attachment, the combination of a spindle mounted on runners and having a limited vertical movement, means mounted on the spindle for winding a trolley rope, and secondary means mounted on the spindle and normally opposing the first named means, substantially as shown and described.

6. In a trolley attachment, the combination of a spindle, a rotatable drum mounted on and having at one end a threaded engagement with the spindle, a spring connecting the drum and spindle, and an electro magnet acting on one end of the drum to hold the spring under tension and prevent the rotation of the drum, substantially as shown and described.

7. In a trolley attachment, the combination of a base plate having a spindle mounted thereon, capable of a limited vertical movement, spring means connecting the spindle and base plate, a rotatable spring actuated drum mounted on the spindle, and a magnet normally acting upon one end of the drum to prevent its rotation, substantially as shown and described.

8. In a trolley attachment, the combination of a base plate, parallel runners fixed to the base plate, a spindle slidably mounted on the runners, springs connecting the spindle and the base plate, and an adjustable magnet mounted on the spindle and having an electric connection with the trolley circuit, a drum mounted on the spindle and having threaded connection therewith, spring means for rotating the drum, and the end of the drum toward the magnet being conductive metal upon which the magnet normally acts to prevent the rotation of the drum, substantially as shown and described.

9. In a trolley attachment, a spindle of non-conductive metal, a spring actuated drum, having threaded engagement with the spindle, an electro magnet mounted on the spindle and acting upon the drum to hold the spring under tension, and to prevent the withdrawal of the drum from the magnet, substantially as shown and described.

10. In a trolley attachment, the combination of a non-conductive spindle, a drum having a conductive metal head in threaded engagement with the spindle, means for rotating the drum, and electrical means acting on the drum head for normally opposing the rotation of the drum, substantially as shown and described.

11. In a trolley attachment, a member movably mounted on a base plate and having mounted thereon spring actuated means for winding the trolley rope, a magnet normally holding said means with its spring under tension, and a spring interposed between said member and base plate and connecting the same, substantially as shown and described.

12. In a trolley attachment, means for taking up slack in the trolley rope and secondary electrically controlled means, mounted on the first means and movable therewith, for winding the rope when the trolley leaves the wire, substantially as shown and described.

13. In a trolley attachment, the combination of a drum about which the trolley rope is wound, an electro magnet, a spring, normally held under tension by the electro magnet and adapted to be thrown into action when the magnet is deënergized, whereby the trolley rope is wound upon said drum, a base, and a spring interposed between said drum, spring and magnet and the base, and adapted to take up the slack in the trolley rope.

14. In a trolley attachment, the combination of means for winding the trolley rope when the trolley leaves the wire, magnetically operated means holding said first named means inactive during the contact of the trolley and the wire; a base, and means affording relative movement of said first means on the base for taking up the slack in the trolley rope, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN PHILLIPS HENDERSON.

Witnesses:

GERALD C. DIXON,

FRED A. SERVICE.