

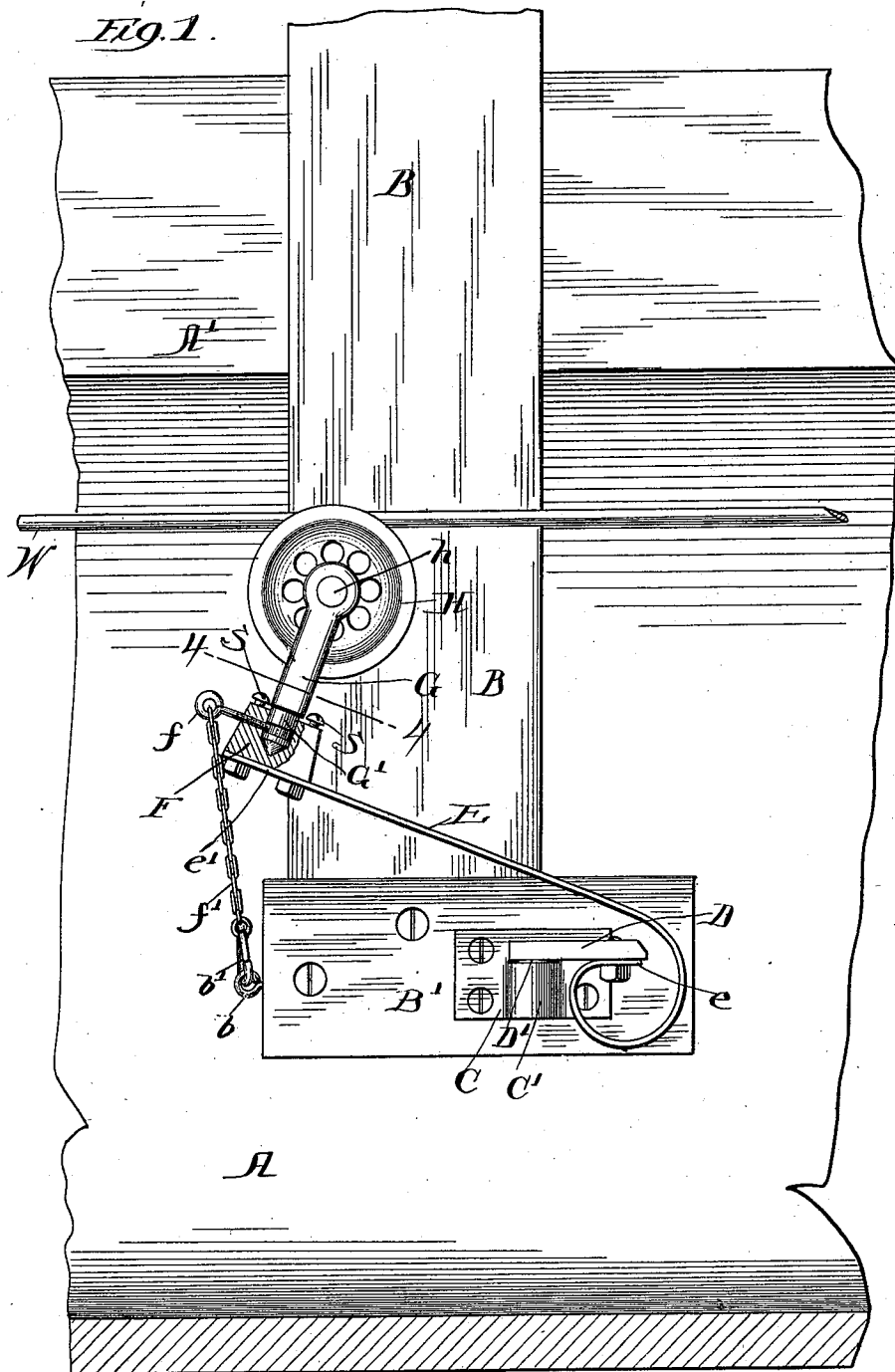
(No Model.)

2 Sheets—Sheet 1.

P. C. JUST.
CONDUIT RAILWAY TROLLEY.

No. 510,142.

Patented Dec. 5, 1893.



Witnesses

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Inventor:

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

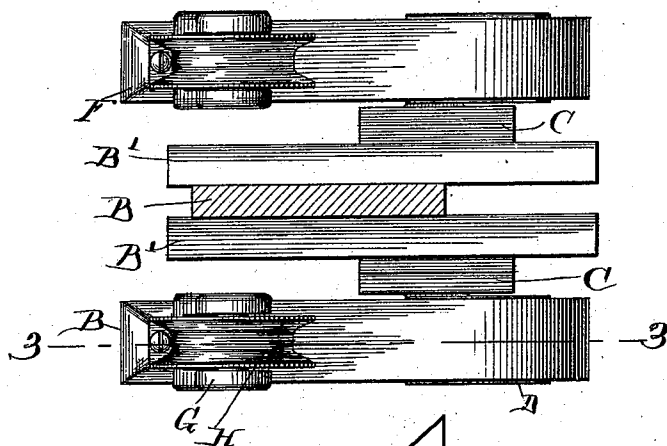


Fig. 3.

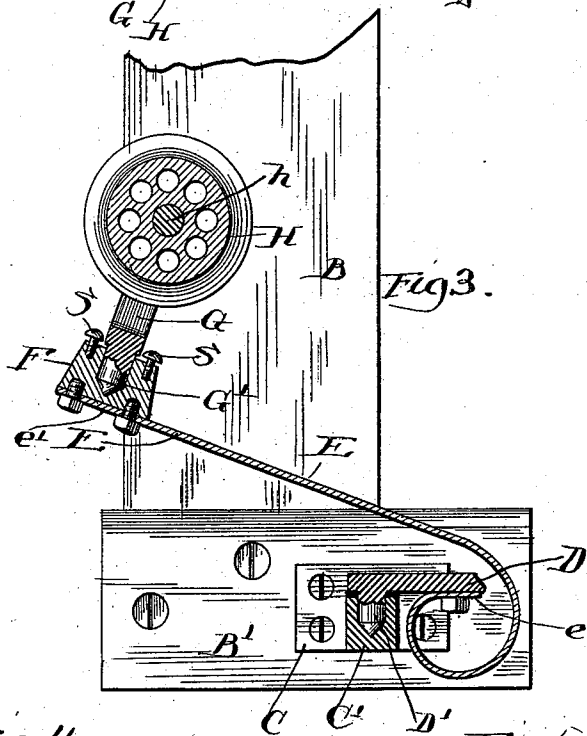


Fig. 4.

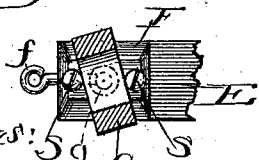
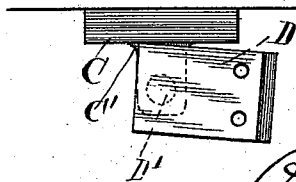


Fig. 5.



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UNITED STATES PATENT OFFICE.

PAUL C. JUST, OF CHICAGO, ILLINOIS.

CONDUIT RAILWAY-TROLLEY.

SPECIFICATION forming part of Letters Patent No. 510,142, dated December 5, 1893.

Application filed January 31, 1893. Serial No. 460,227. (No model.)

To all whom it may concern:

Be it known that I, PAUL C. JUST, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Trolleys for Electric Railways, of which the following is a specification.

My invention relates to improvements in trolleys for electric railways, and more especially to trolleys adapted for use in underground work, the object being to provide a simple and durable trolley, which shall practically overcome the difficulties experienced in following underground conductors at high rates of speed, especially in passing around curves.

The invention is fully described and explained in the specification and shown in the accompanying drawings, in which—

Figure 1 is a side elevation of a trolley embodying my improvements, the trolley being in operative position in the conduit, in which it operates. Fig. 2 is a top plan of the trolley, the supporting arm being cut by a horizontal plane. Fig. 3 is a vertical section of the trolley through the line 3—3, Fig. 2. Fig. 4 is a plan of the lower portion of the housing, which carries the trolley wheel, together with the block in which it is pivoted, the upper portion of the housing being removed on a plane passing through the line 4—4, Fig. 1; and Fig. 5 is a top plan of the pivoted plate, which carries the spring arm of the trolley.

In the views, A is an underground conduit of ordinary construction provided with the usual longitudinal slot in its upper surface, and A' is one of the slot rails which lie on opposite sides of the slot and form its walls.

B is a vertical arm passing through the slot and extending above and below it, its upper end in use being attached to a car or other motor support moving on the track beneath which the conduit is situated.

On the lower end of the arm, B, and on its opposite faces are fastened two plates, B', B', of suitable non-conducting material, and to each of them is fastened a plate, C, forming the immediate support of one of the two similar members of the trolley. Each of the plates, C, is provided with a lateral bracket, C', and in this bracket is pivoted a down-

wardly extending pin, D', formed on the lower face of a plate, D, of such form and so placed as to have a limited oscillation about the pivot. The lower end of the pin, D', is coned and rests in the conical bottom of the socket, this conical point and socket being adapted and intended to support the entire weight of the plate, D, and the parts carried thereby. The pin, D', is placed at one end of the plate, D, and the free end of the plate lies at a considerable distance from the pivot in a line approximately parallel to the plates, B', C. To the lower face of the free end of the plate, D, is fastened the end, e, of a flat spring, E, the part of the spring near the end, e, being curved in an approximately spiral form and carried upward around the free end of the plate, so that the spring extends across the plate and to a considerable distance beyond the pivot, D', in the manner clearly shown in the drawings.

On the upper face of the free end, e', of the spring, E, is fastened a block, F, in which is pivoted a pin, G', formed on the lower face of a bifurcated housing, G, the pin being coned and the socket made to conform thereto as in the case of the pin, D', and the socket in which it rests.

Between the branches of the housing is mounted a grooved roller, H, pivoted on a spindle, h, which passes through the roller and through the two branches of the housing in the ordinary manner. The groove in the roller is adapted to embrace one of the conducting wires, W, which supply electricity to the motor above ground by means of suitably arranged conductors connecting the trolley rollers with the motor.

In the block, F, are set two screws, S, S, which limit the rotation of the housing, G. One of these screws will ordinarily be found sufficient and either of them may be dispensed with, if desired.

The operation of this trolley is the same as that of other devices for the same purpose, except that its construction is such as to make it extremely sensitive in its movements, and I have found in the severest tests that it meets every requirement of underground work and follows the conductors with absolute certainty in the most difficult situations. The pivoting of the plate, D, and housing, G, is such that

these parts swivel with great ease and offer, in fact, no appreciable resistance to such oscillation as is needed in passing around any curve of an underground system. The spring
 5 is of such length and so constructed as to yield readily and accommodate itself perfectly to the variations of level of the conductors at various points in the conduit. This elasticity and range of movement is due
 10 to the fact that the spring has great length in proportion to the space, in which it must be placed. The horizontal distance from the pivot to the roller must be very short in order that the device may work practically on short
 15 curves, but considerable length and added elasticity have been gained by extending the plate, D, in one direction from the pivot and arranging the spring, so that its free end lies on the opposite side of the pivot. This, together with the spiral form of the attached
 20 end of the spring, gives it a length sufficient to allow for all necessary movement.

I have found it advisable to provide means for limiting the upward movement of the free
 25 end of the spring, E, and the housing and roller mounted thereon, and means for this purpose are illustrated in Fig. 1, in which *f* and *b*, are eye-bolts set in the block, F, and the plate, B', respectively. A cord or chain,
 30 *f'*, is fastened at one end to the eye-bolt, *f*, and at the other end to the eye-bolt, *b*, the cord being preferably provided at one of its ends with a snap hook, *b'*, for connecting it with the corresponding eye-bolt. The eye-
 35 bolt, *f*, extends into the socket in the block, F, and enters an annular groove, *g*, in the pin, G', thus forming a lock to prevent accidental upward movement and escape of the pin, G', from the socket in the block. The groove, *g*,
 40 may, if desired, extend but partly about the pin, G, as shown in dotted lines in Fig. 4, in which case the end of the bolt, *f*, forms a stop limiting the oscillation of the pin and the screws, S, S, may then be dispensed with.

45 Having now described and explained my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with the arm, B, of the supporting bracket, C', fastened thereto, the
 50 plate, D, pivoted on the bracket and having limited horizontal oscillation, the spring, E, fastened at one end to the plate, D, the block, F, fastened to the free end of the spring and

the housing, G, pivoted on the block, F, and supported thereby and the grooved roller, H,
 55 mounted in the housing, the pivots connecting the plate, D, with the bracket, C', and the housing, G, with the block, F, being coned and being arranged to support the entire weight of the connected parts; substantially as
 60 shown and described.

2. The combination with the arm, B, and plate, B', of the bracket, C', fastened to the plate, B', the plate, D, pivoted at one end to the bracket, C', and extending in a line ap-
 65 proximately parallel to the plate, B', the spring, E, having one of its ends fastened to the free end of the plate, D, and extending from said free end to a point at the opposite side of the pivot of the plate, D, the block, F,
 70 fastened to the free end of the spring, E, and the housing and grooved roller swiveled in the block; substantially as shown and described.

3. The combination with the arm, B, and
 75 plate, B', of the plate, D, swiveled to the plate, B', a spring, E, fastened at one end to the plate, D, the block, F, supported by the free end of the spring, the housing and pulley G, H, swiveled in the block and the limiting cord,
 80 *f'*, connecting the block, F, and the plate, B', substantially as shown and described.

4. The combination with the arm, B, plate, B', swiveled spring, E, and block, F, of the housing, G, provided with the pin, G', pivoted
 85 in the block, F, and having the annular groove, *g*, and the bolt, *f*, set in the block, F, and entering the groove in the pin; substantially as shown and described.

5. The combination with the arm, B, and
 90 plate, B', of the bracket, C', supported by the plate, the plate, D, pivoted to the bracket, the spring, E, supported by the plate, the block, F, fastened to the free end of the spring, the housing and roller swiveled in the block, the
 95 eye-bolts *f*, *b*, set in the block, F, and plate, B', respectively, and the cord, *f'*, fastened at one end to one of said eye-bolts and provided at its other end with a snap hook adapted to engage the other eye-bolt; substantially as
 100 shown and described.

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Witnesses:

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