

(No Model.)

2 Sheets—Sheet 1.

C. C. BURTON.

ELECTRIC TRANSMISSION WHEEL OR TROLLEY.

No. 538,408.

Patented Apr. 30, 1895.

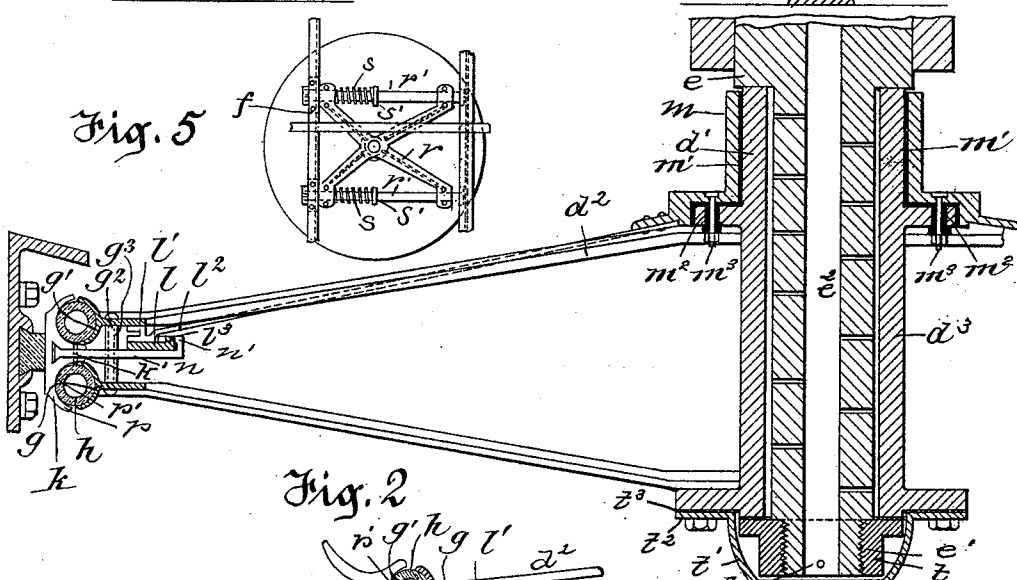
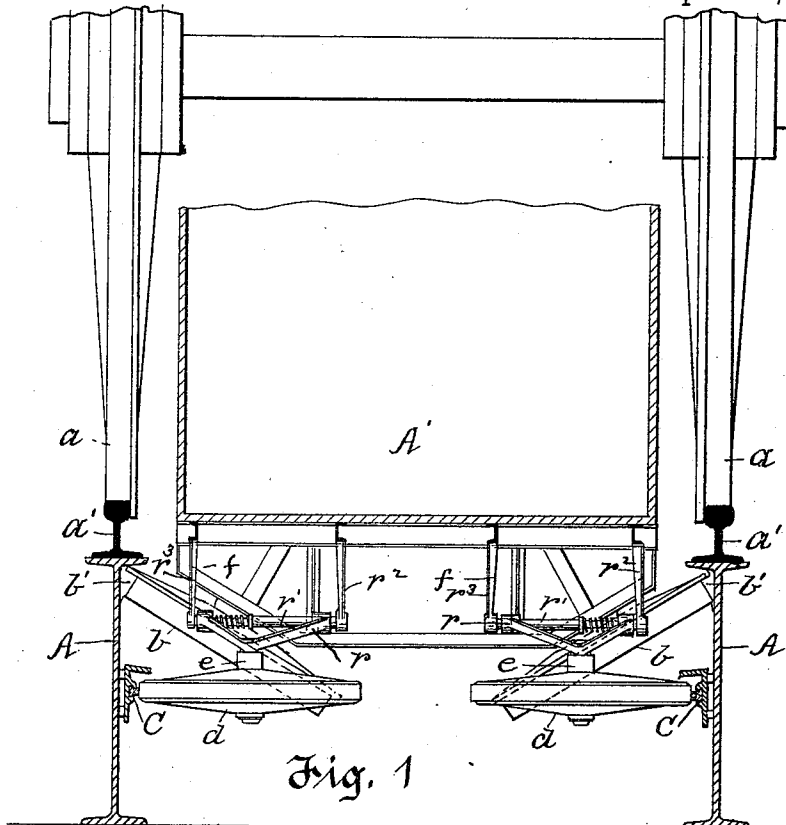


Fig. 5

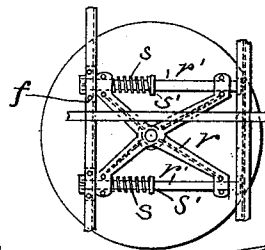
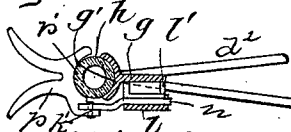


Fig. 6



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Fig. 4.

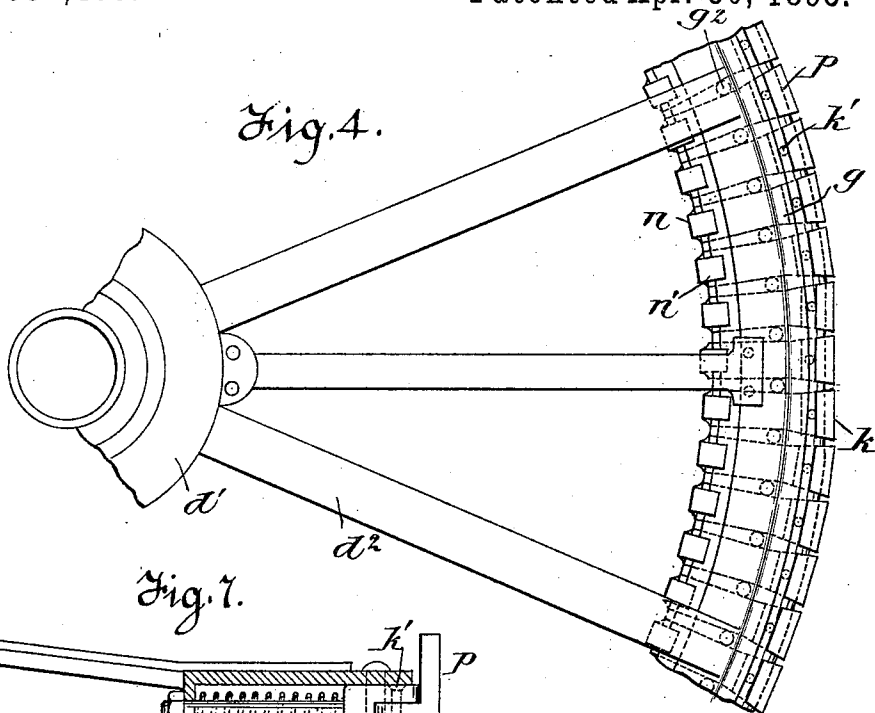


Fig. 7.

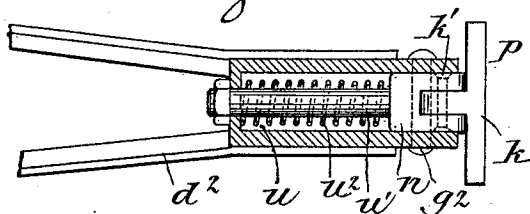
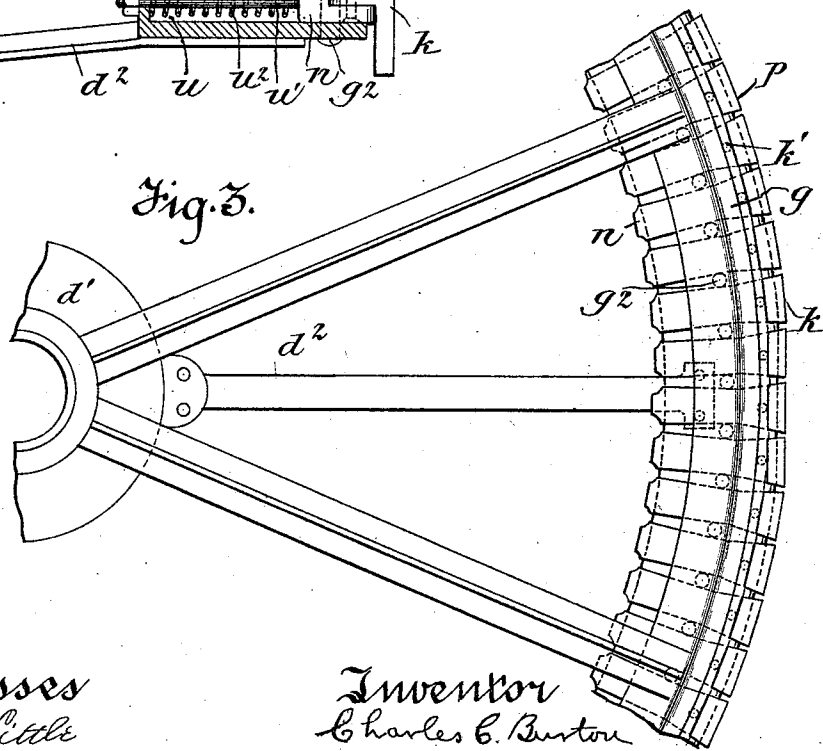


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES C. BURTON, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF FOUR-FIFTHS TO CURTIS G. HUSSEY AND JOHN C. DES GRANGES, OF SAME PLACE, LEWIS E. HOLDEN, OF BELOIT, WISCONSIN, AND GEORGE M. LUDLOW, OF CHICAGO, ILLINOIS.

ELECTRIC TRANSMISSION WHEEL OR TROLLEY.

SPECIFICATION forming part of Letters Patent No. 538,408, dated April 30, 1895.

Application filed August 11, 1894. Serial No. 520,075. (No model.)

To all whom it may concern:

Be it known that I, CHARLES C. BURTON, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Electric Transmission Wheels or Trolleys; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to electric current transmitting wheels, or, as they are sometimes termed, trolleys, its principal object being to form a trolley which insures considerable contact surface between the wheel and the conductor and so overcomes the difficulty of sparking or other like difficulties arising from imperfect or insufficient contact between the traveling trolley and the conductor along which it travels. This is a well-known difficulty encountered in all trolley or electric roads obtaining their current through the medium of traveling contact wheels; and it prevents a continuous current to the motor, and also leads to waste of the current, as well as having other objectionable features. In my improved contact wheel in which these objections are overcome I provide a wheel with a series of yielding contact blocks around its rim which are properly cushioned and are pressed back by the conductor so that two or more of these blocks are brought into contact therewith, the contact of a considerable surface of the wheel upon the conductor being thus obtained. These contact blocks are also preferably provided with hinged contact pieces or shoes which can swing so as to bring their outer faces into line and contact with the conductor so that the faces of such contact blocks for their full width are in contact with the conductor, and a broad surface contact for the taking up, or the discharge of the current is in this way insured.

My invention also relates to the method of mounting such trolley or contact wheel, especially where it forms a contact under the car and by a horizontal movement toward the conductor.

The particular points of the invention desired to be covered will be hereinafter more fully set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more, fully referring to the accompanying drawings, in which—

Figure 1 is a cross-section of a line of track, showing the car and the trolley-wheels in operative position. Fig. 2 is an enlarged sectional view of one side of the trolley-wheel and its axle. Fig. 3 is a plan view of a part of the trolley-wheel on one side. Fig. 4 is a like view of the other side. Fig. 5 is a detail view of the supporting-frame for the trolley-wheel, and Figs. 6 and 7 are detail views of other forms embodying my invention.

Like letters of reference indicate like parts in each figure.

My invention is more particularly illustrated in connection with a trolley wheel having a flat surface to contact with a flat faced conductor, as it has been devised more particularly for use of conductors under the track, such as illustrated in Fig. 1, in which the car or locomotive wheels *a* travel on rails *a'* supported a sufficient distance above the ground on any suitable trestle *A* to permit the employment of inclined wheels *b* supported from the car or locomotive body *A'*, and bearing on rails *b'*, so as to hold the car or locomotive from rising. Though the trolley wheels particularly illustrated in the drawings were devised for use with such form of apparatus, yet it is of course to be understood that they may be employed in any desired position to contact with any desired conductor *C*, whether the trolley wheel have flat contact faces or grooved faces such as usually employed with wire conductors or contact faces of other forms.

The trolley wheel *d* is shown as running upon a stud or axle *e* hung from a frame *f* which stud and frame will be hereinafter more particularly described.

The trolley wheel in its preferred construction has the hub *d'*, the spokes *d''* extending out and connecting with the rim *g*, the spokes *d''* being preferably formed of wrought metal bars or plates which, in the preferred construction, converge from the hub to the rim, the rim in the construction illustrated be-

ing formed of two T-shaped hoops or bars g which are connected at short intervals with each other by means of rivets g^2 passing through such T-shaped hoops or bars and through ferrules or distance sleeves g^3 holding the T-shaped bars g the proper distance apart. These rivets and their surrounding sleeves also form the guides for the sliding bars and contact blocks hereinafter referred to. It will be noticed that the T-shaped bars g have their outer faces concave so that each such bar forms a seat g' for the yielding cushion, or, as it might possibly be termed, yielding tire h , which, if desired, may be of pneumatic form so as to provide the necessary cushion for the contact blocks k .

Within the body of the wheel a short distance back from the edge thereof is an annular collecting plate l (formed of copper or other good conducting metal) extending entirely around the body of the wheel and supported in any suitable way from the rim such as by brackets l' extending inwardly from one or both of the T-shaped bars g' to which annular plate the current is carried by the contact blocks, and from which plate a conductor l^2 extends to the commutator m on the hub e . Suitable insulating material m' is interposed between the hub e and the commutator m , while an insulating sleeve m^2 surrounds the bolt m^3 which connects the commutator to the hub and wheel. The annular plate l is also provided with the guide lugs l^3 which, in connection with the rivets g^2 form the guides for the contact blocks k which will now be described. Each such contact blocks consists of the sliding bar n and the shoe or contact piece p which are pivoted together at k' so that the shoe swings on the sliding bar so as to conform itself to the conductor C supported in the main frame work A , and in contact with which the trolley is intended to be held, the shoes p being pushed against the cushion tires h and swinging on the sliding bars n so that by the pressure of the wheel upon the conductor, the full surface of the shoe is brought into contact with the conductor. The sliding bar is guided by the rivets g^2 and by the hook n' which passes over to the opposite side of the plate l and enters between the guide lugs l^3 so assisting in guiding the sliding bar and performing the other function of limiting the outward movement of the contact block.

It is of course to be understood that the shoe p has the concave inner face or faces p' to fit around the yielding tire h , the tire being in this way held between the concave seat g' of the rim and the concave inner faces of the contact pieces which are confined upon it by the hooks n' at the inner ends of the sliding bars. The shoes may be made wider than the sliding bars, the only requirement being that they shall have sufficient movement to permit the swinging of each shoe to conform itself to the face of the conductor.

The form of the shoe, and, indeed, of the

general construction of the bars above described, may be changed to suit the use, the shoe having the grooved face, as shown in Fig. 6, if desired, or, if desired a single yielding cushion between the rim and tire being employed, such construction being of course more desirable in a smaller trolley wheel. Any suitable form of yielding cushion for the contact blocks or means of mounting the blocks to obtain the peculiar movement described, may be employed; an example of a different way of mounting them being shown in Fig. 7, in which seats u are formed in the tire; and each sliding bar, u' enters one such seat, said blocks extending through a cushioning spring u^2 confined within the seat and being held by a nut resting against the inner face of the wheel rim.

Around the hub of the wheel and connected to the plate l by the conducting bars l^2 is the commutator m above referred to which can be made of any suitable form and from which the current taken up by the wheel can be gathered by simple brushes or to which the current can be carried by brushes to the wheel contacting with the conductor of the return circuit.

In order to properly support the trolley wheel and hold it in contact with the conductor, it is preferably supported in the following way: The stud e above referred to, extends down from a sliding frame r which frame is mounted to slide on bars r' secured in brackets r^2 r^3 , having an insulated connection with the car body A' . Surrounding the guide bars r' , of the frame and between said sliding frame and the inner bracket r^2 are the springs s which exert sufficient force to hold the trolley wheel in contact with the conductor and depress several of the contact blocks as the wheel travels along the conductor, the pressure of these springs being controlled when desired by collars s' held by set screws to the guide bars r' .

It is of course to be expected that suitable means for lubricating the trolley wheel on the stud or axle e be provided, and I will now describe the means preferably employed for this purpose. The hub d' has secured thereon in any suitable manner the axle box or lining d^3 which is turned to fit the axle e . Said axle e extends below the wheel, having the threaded boss e' , around which the nut t screws, said nut extending below the lining d^3 and the hub d' of the trolley wheel, and supporting the wheel on the axle e . The axle e is provided with a central oil chamber e^2 which extends from a point above the trolley wheel at which the oil can be properly fed thereto through the axle and its threaded boss at the base thereof; and at suitable intervals oil passages are formed extending through from the oil chamber e^2 to the outer face of the axle to carry the lubricant through to the bearing between the hub lining and the axle. Surrounding the boss e' and nut t where they extend below the hub is the oil cup t' which cup

is secured to the hub by an annular flange ² suitable packing ³ being inserted between said flange and the hub so as to form a close joint. In this way the oil can circulate 5 through the numerous oil passages from the oil chamber ^e into the bearing and descend between the hub lining ^d and the axle into the cup ^f, which cup retains the oil, the oil flowing thence back into the oil chamber ^e 10 through the boss ^{e'}. The nut may be locked upon the boss in any suitable way, such as by a pin ^{e''} extending through both nut and boss.

When the trolley wheel above described is in use where it makes a side contact with a 15 flat faced conductor, as illustrated in Figs. 1 to 4, as the car or locomotive travels along the track, the springs ^s pressing on the trolley frame ^r force the wheel carried thereby against the conductor ^C with sufficient force 20 to depress two or more of the contact blocks, the springs ^s being generally adjusted to keep three of these blocks in contact with the conductor. As the contact blocks ^k are depressed their sliding bars ⁿ slide back in the guides 25 above described and their shoes or contact pieces ^p swing on the pivots ^{k'}, so that they conform to the conductor, the faces of three or more of such shoes being in this way always held in contact with the conductor, for the 30 full length thereof, so that a flat contacting surface of a considerable area for the taking up or discharge of current is always provided. In the wheel as designed, a depression of the contact pieces of about one-tenth of an inch 35 provides for a flat contact of three contact blocks with the conductor giving a contact about four and one-half inches in length, and enabling me to carry the current to and from the car, without fear of loss through sparking 40 or insufficient contact. The cushion tires ^h yield of course when the contact blocks are depressed, serving to give the necessary movement to each block and to hold it, through the pushing action, in contact with the conductor. 45 These cushion tires may of course be formed of simple solid rubber annulus though to obtain the most desirable yielding action they are made hollow and filled with air. These cushioning tires, or other cushioning means, 50 may be depended upon entirely for the cushioning action to give the yielding movement to the blocks, but in view of the swinging of the car it is preferred to employ the sliding frame ^r for the support of the trolley wheel, 55 and the springs ^s above described. The current taken up by the trolley wheel passes back along the contact blocks to the copper collecting plate ^l and thence through the conductors ^{l'} to the commutator ^m from which it is col- 60 lected and carried to the motor on the locomotive or car; and the return current is discharged in like manner passing from the brushes to the commutator and thence along the conductor ^{l'} and collecting plate, to the 65 contact blocks and to the return conductor along which that trolley wheel travels. As the trolley wheel revolves upon the axle or

stud ^e it is properly lubricated in the manner above described, and the oil is confined by the oil cup so that it may be used over and 70 over again, and the oil for lubrication is only required at long intervals.

The invention may be employed in connection with the ordinary trolley wheel traveling in contact with a wire conductor as illustrated 75 in Fig. 6, and in that case, the trolley wheel is supported on a suitable arm and is mounted in suitable way, the construction of the parts being practically the same except that grooved contact pieces or shoes are employed, as shown 80 in said Fig. 6. In a smaller and lighter wheel, the single T-shaped rim, with the concave seat and a single cushioning tire, may be employed as illustrated in said figure. In this way I am enabled to obtain the full contact 85 of a series of flat faces upon the conductor and to provide a contact between the conductor and trolley wheel which insures perfect contact at all times and so overcomes the sparking and other difficulties usually found in 90 trolleys traveling along conductors.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. An electric current transmitting or trolley wheel having a rigid rim with a seat in the 95 outer face thereof, a rubber tube around said rim, fitting in said seat, and a series of contact blocks mounted in the rim and extending over such rubber tube, substantially as set forth. 100

2. An electric current transmitting or trolley wheel having a rigid rim with a seat in the face thereof; a rubber tube around the said rim and a series of contact blocks mounted to slide in the rim and extending over the rub- 105 ber tube, substantially as set forth.

3. An electric current transmitting or trolley wheel having a series of yielding contact blocks at the rim thereof formed of bars mounted to slide in the rim and of shoes piv- 110 oted on the bars, substantially as set forth.

4. An electric current transmitting or trolley wheel having a rigid rim with a seat in the face thereof, a cushioning tire mounted in said seat and a series of contact blocks formed of 115 sliding bars mounted in the rim and shoes pivoted on the bars and extending over the cushioning tire, substantially as set forth.

5. An electric current transmitting or trolley wheel having a rigid rim provided with two 120 concave seats, cushioning tires fitting therein and a series of contact blocks having sliding bars between said cushioning tires and shoes pivoted to said blocks and extending over each cushioning tire, substantially as set 125 forth.

6. The combination of a wheel body having the rigid rim formed of T-shaped bars ^g connected by a series of rivets, the annular plate 130 ^l having guide pieces thereon, and the contact blocks having bars extending between the rivets and the guide pieces on the annular plate, substantially as set forth.

7. The combination with a wheel body hav-

ing the rigid rim formed of T-shaped bars g' connected by a series of rivets, of the annular plate l having guide pieces l^3 thereon and the contact blocks having bars extending between said rivets and engaging with the guide pieces of the annular plate and extending back of the said plate, substantially as set forth.

8. The combination with a wheel body having the rigid rim formed of T-shaped bars g' , of the annular plate l having guide pieces l^3 on one face thereof, and the contact blocks having bars provided with hooks at their inner ends extending back of said annular plate, the ends of the hooks extending between the guide pieces of the annular plate substantially as set forth.

9. The combination with a wheel having the

rigid rim provided with a concave face, a cushioning tire fitting in said face and the contact blocks having concave inner faces fitting around such cushioning tire, substantially as set forth.

10. An electric current transmitting or trolley wheel having a rigid rim, a series of yielding contact blocks mounted in said rim, a separate current collecting plate within the rim with which said blocks contact, and a conductor extending from the annular plate to the wheel hub, substantially as set forth.

In testimony whereof I, the said CHARLES C. BURTON, have hereunto set my hand.

CHARLES C. BURTON.

Witnesses:

ROBT. D. TOTTEN,
ROBERT C. TOTTEN.