(No Model.) 2 Sheets—Sheet 1.

J. CHRISTIANSEN.

ELECTRIC CAR MOTOR.

No. 452,176. Patented May 12, 1891.

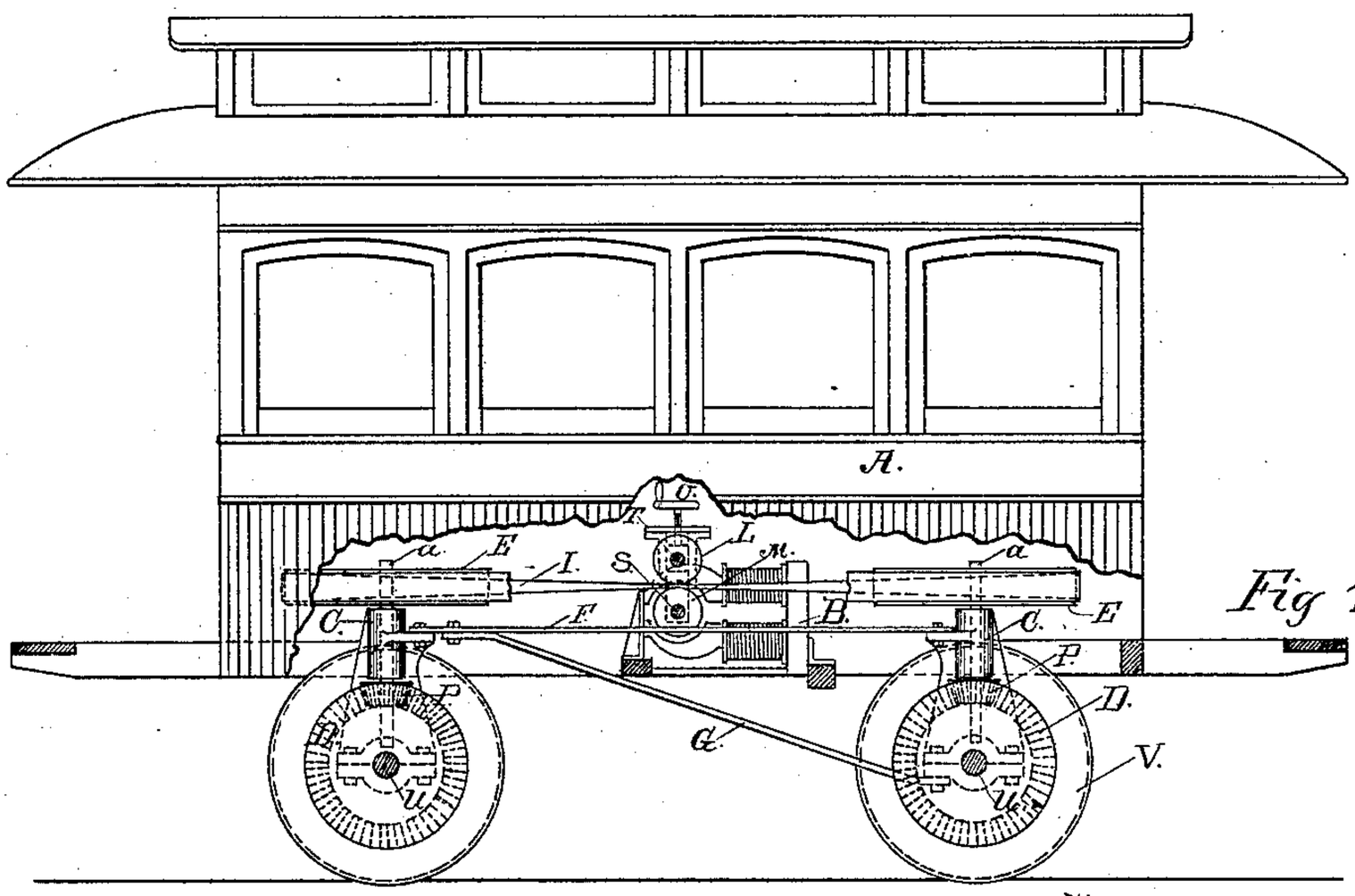

Fig 1.

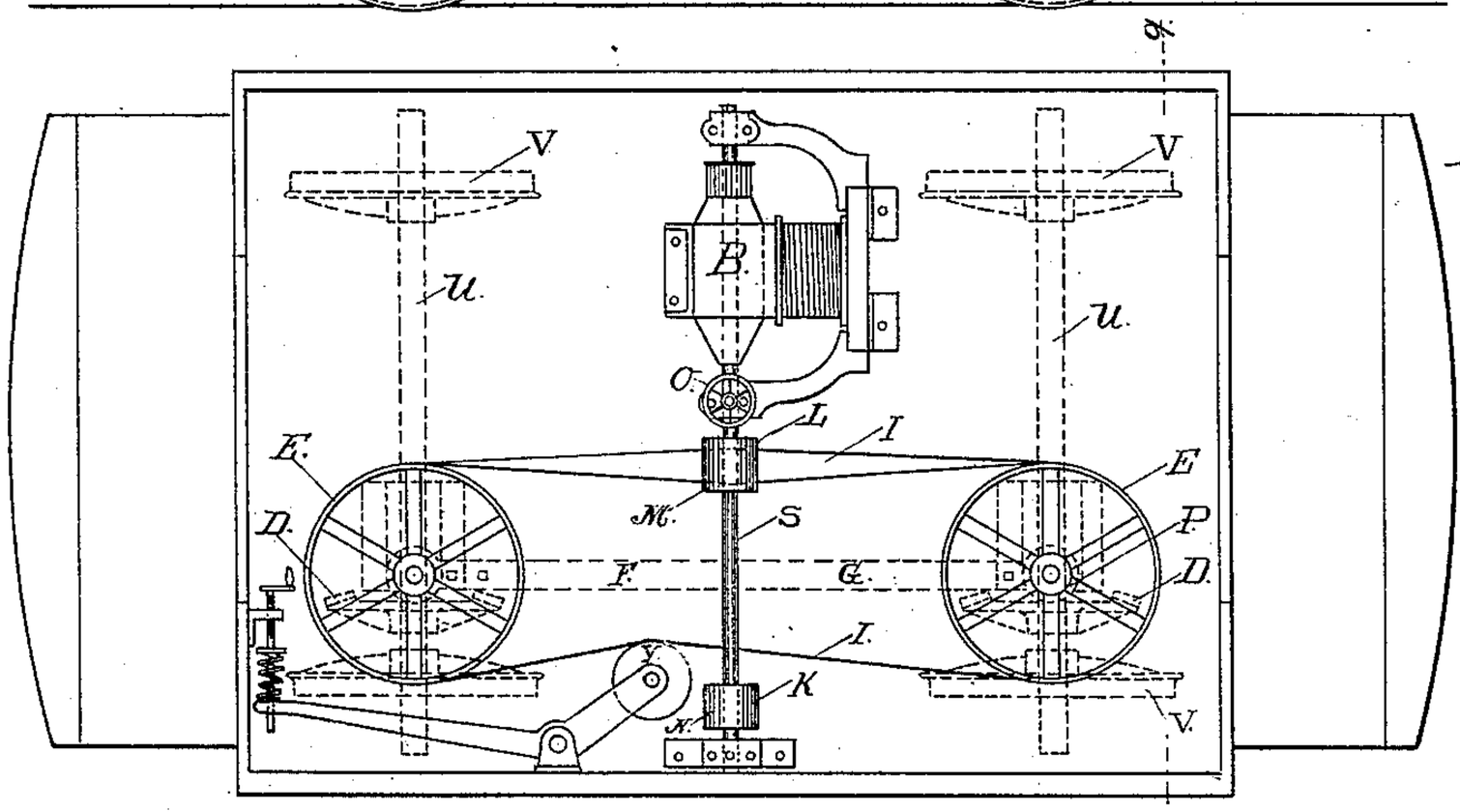

Fig 2.

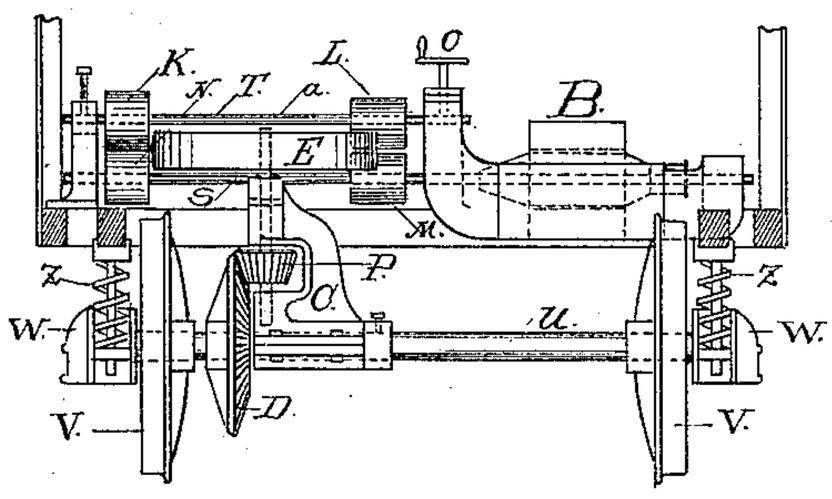

Fig 3.

WITNESSES
Geo. G. Saville
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INVENTOR
John Christiansen.

(No Model.) 2 Sheets—Sheet 2.

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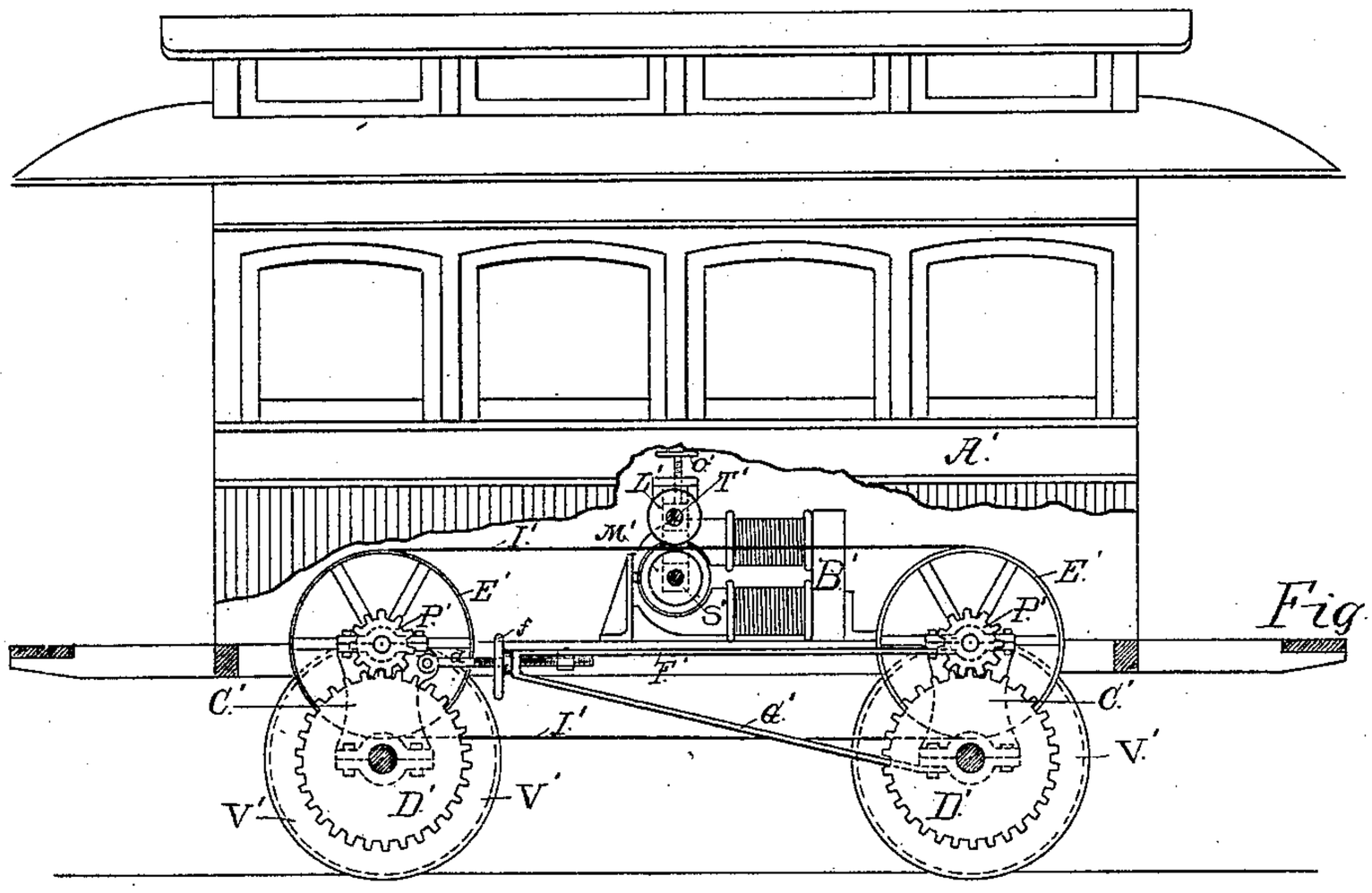

Fig. 4.

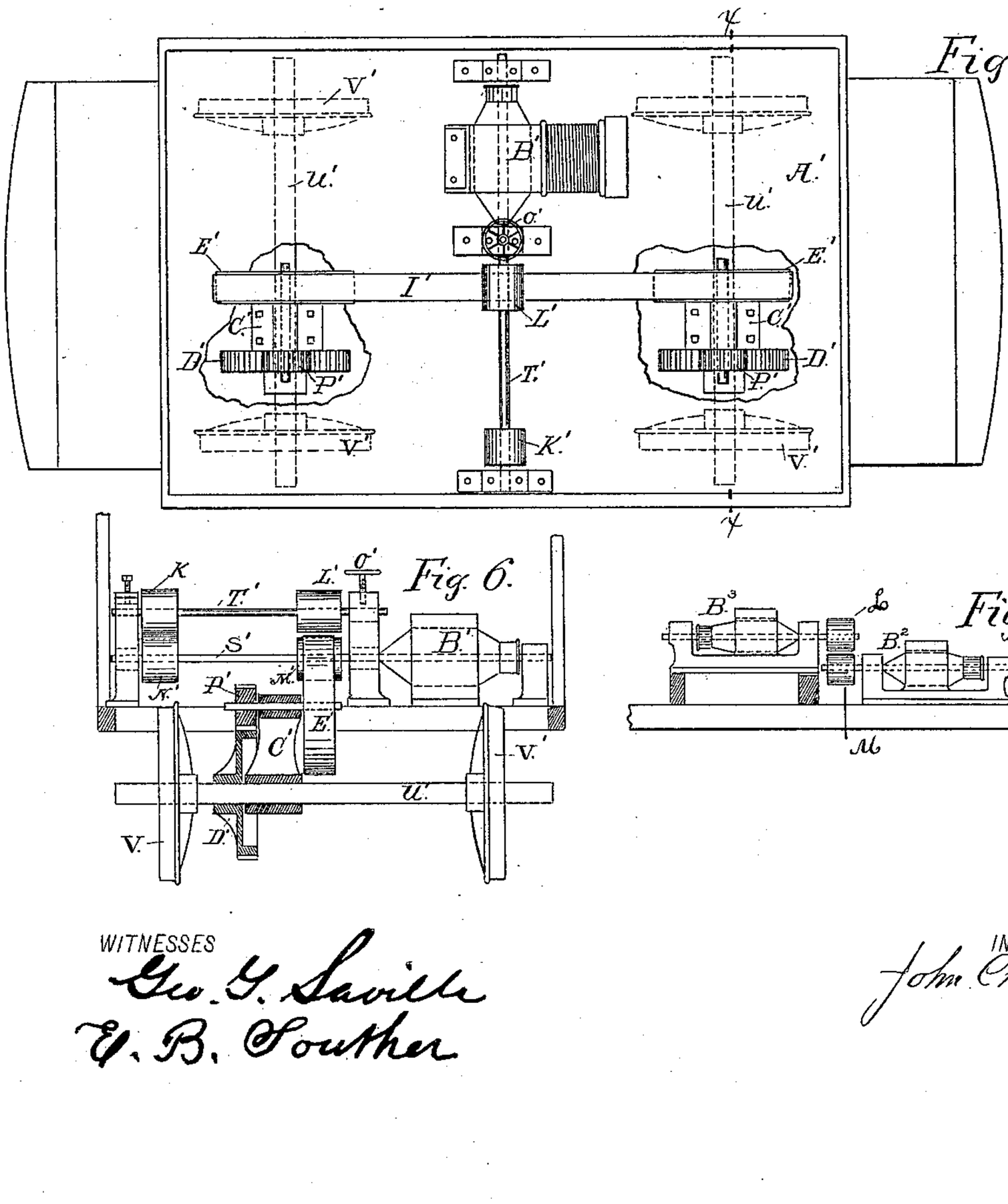

Fig. 5.

Fig. 6.

Fig. 7.

WITNESSES

Geo. G. Saville

E. B. Souther

INVENTOR

John Christiansen.

UNITED STATES PATENT OFFICE.

JOHN CHRISTIANSEN, OF QUINCY, MASSACHUSETTS.

ELECTRIC-CAR MOTOR.

SPECIFICATION forming part of Letters Patent No. 452,176, dated May 12, 1891.

Application filed May 21, 1890. Serial No. 352,676. (No model.)

To all whom it may concern:

Be it known that I, JOHN CHRISTIANSEN, a citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented Improvements in Electric-Car Motors, of which the following is a specification.

My invention relates to improvements in the application of electric motors to the propulsion of cars, especially where separate motor-cars or electric locomotives are employed, said motor-cars or locomotives carrying no passengers; and the objects of my improvement are, first, to place the electric motor inside of the car, where it is readily accessible and protected from grit and dust; second, to arrange for a continuous-running armature, the motion of which can at will be quickly communicated to the axles of the car and as quickly again released; third, to avoid the employment of special and expensive motor-trucks for the attachment of the electric motor, as is now the general custom, I attach my electric motor to any ordinary horse street-car without making any change in its running-gear; fourth, to reduce first cost, and wear and tear and consequent expense of repairs to the driving mechanism. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents an elevation of an electric-motor car. Fig. 2 is a plan view with roof removed, showing the floor plan of the car. Fig. 3 is a section transversely through the car on the line *p q*, showing the running and driving gear. On Sheet No. 2, Fig. 4 shows again an elevation of a motor car with part of the siding broken away to show the interior, and Fig. 5 a floor plan of the car. Fig. 6 is a sectional elevation on line *x x*, Fig. 5, and Fig. 7 is a longitudinal elevation of two motors B^2 and B^3, each having a grip-pulley L and M on the armature-shaft, as hereinafter explained.

Similar letters refer to similar parts throughout the several views.

On Sheet No. 1, A is the body of a motor-car, resting on wheels V V and axles U U by means of journal-boxes W W and springs Z Z, as indicated in Fig. 3, and in a manner now customary on street horse-railroads.

D D are bevel-gears keyed onto the car-axles U U, and C C are brackets mounted upon the car-axles in such a manner as to allow of a free revolving of the axle in the bracket. Said brackets contain each a bevel-pinion P and a pulley E, both keyed upon a shaft *a*, the pinion meshing into the gear D on the car-axle, and the pulleys being connected by an endless belt I, made of leather, rubber, or other suitable material. The brackets C C are supported in their position by a brace F G, consisting of two members and having two points of attachment—namely, at the top and bottom—of one of the brackets and only one point of attachment, namely, at the top—of the other bracket. This arrangement holds the brackets always in the same relative position to the car-axle upon which they are mounted, and still allows of a perfectly free movement of the axle, and even admits of a lateral or horizontal movement of the axle-boxes in their guides without in any way disturbing the efficiency of the driving-gear. The top member of said brace also serves to take the thrust caused by the tension of the belt I, which is provided with a tightener-pulley Y. (Shown in Fig. 2.) Thus, then, the driving mechanism is complete and is entirely independent of the car-body or of the truck of the car and in no wise connected with either. It is evident then that if power be applied to the endless belt, the car-axles and wheels must revolve and cause the car to move.

The power to move the belt I is supplied by means of a rotary grip operated by the electric motor in the following manner: B is the electric motor fastened upon the car-floor and free to follow the motions of the car-body. S is the armature-shaft. Upon this shaft I place two pulleys, one grip-pulley M and one friction-pulley N. Above and parallel to the armature-shaft I place another shaft T, said shaft having also a grip-pulley L and a friction-pulley K, which pulleys correspond in location to the pulleys on the armature-shaft. The shaft T is located in adjustable bearings and by means of a screw or other suitable device the friction-pulleys can be put in contact with each other with any pressure that may be required to transmit the motion of the armature-shaft to the shaft T. The grip-pulleys do not touch each other,

but are so adjusted in size and position as to leave a space between them somewhat larger than the thickness of the endless belt I, which passes between them. By means of a screw and hand-wheel O, or any other suitable device, I may cause these grip-pulleys to impinge upon the belt, and if the motor is in motion the belt will be caused to revolve, which will cause the car to move. A release of the grip-pulleys will at once release the belt and stop the car, while still the armature may be kept in motion, if so desired.

The belt, as will be noticed in Figs. 1 and 2, has to make half a twist in order to pass flatwise between the grip-pulleys, a matter which the flexibility of the belt and the considerable distance between the pulleys readily admits of.

The friction and grip pulleys are made of wood, leather, or rubber, or other suitable material having a large coefficient of friction. I may omit the two friction-pulleys if it is found that adhesion enough can be obtained on the belt without them, introducing then simply an idler-pulley with the grip-pulley M on the armature-shaft, said idler-pulley being operated in the same manner as described for the grip-pulley L; but by the arrangement as shown and described the power of the grip is materially increased. I may also substitute gears for the two friction-pulleys, if found desirable. I also may construct my rotary grip by employing two motors in place of one, each motor having a grip-pulley on the armature-shaft, the motors being placed in such a position as to have their grip-pulleys act upon the belt I, as heretofore described.

Fig. 4 on Sheet 2 shows substantially the same arrangement as Fig. 1 on Sheet 1, and, as above described, with this difference, that spur-gears and pinions are employed in place of bevel-gears and bevel-pinions; also, the brace F′ G′, connecting the brackets C′ C′, is in this case made adjustable by means of screw *d* and hand-wheel *f*, or other suitable device, enabling thus the taking up of the slack of the belt I′ and adjusting it to its proper tension. The rotary grip is the same as hereinbefore described.

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

1. In an electric-motor car, the combination of an electric motor provided with the armature-shaft S, having thereon the grip-pulley M, with the shaft having thereon the grip-pulley L, and the endless belt I, substantially as above described.

2. In an electric-motor car, the combination of an electric motor, the endless belt I, the grip-pulleys L and M, placed, respectively, on the shafts T and S, the pulley E, the bevel-pinion P, the bevel-gear D, and shaft U, substantially as above described.

3. In an electric-motor car, the combination of a motor connected with the car-body, driving mechanism, substantially as described, applied to each of two car-axles and independent to trucks or car-body, and connected by the endless belt I, substantially as described.

4. In an electric-motor car, the combination of the axles U, the bevel-gear D, the bevel-pinion P, the bracket C, and the brace F G, substantially as above described.

5. In an electric-motor car, the combination of the bracket C, the pinion P, the bevel-gear D, the pulley E, and the endless belt I, substantially as above described.

6. In an electric-motor car, the belt-tightening device consisting of the tightener-pulley G, attached to a lever and capable of adjustment by means of a screw, in combination with the pulleys E E and the endless belt I, substantially as above described.

7. In an electric-motor car, the combination of the armature-shaft S, provided with grip-pulley M, and friction-pulley N, with the parallel and adjustable shaft T, provided with grip-pulley L and with the friction-pulley N, the endless belt I, pulley T, pinion P, gear D, and shaft U, substantially as above described.

8. In an electric-motor car, the brace F G, having two points of attachment to one of the brackets C and one point of attachment at the top of the other bracket C, in combination with said brackets C C, substantially as above described.

9. In an electric-motor car, the combination of the car-axles and gears, and the brackets C, containing pinions, and pulleys mounted thereon, with the brace F′ G′, attached at two points to one of the brackets and at one point to the other bracket as near the axle as possible, substantially as described.

JOHN CHRISTIANSEN.

Witnesses:
GEO. G. SAVILLE,
E. B. SOUTHER.