(No Model.) 2 Sheets—Sheet 1.

L. A. McCARTHY.

ELECTRIC RAILWAY CAR.

No. 444,539. Patented Jan. 13, 1891.

Fig. 1.

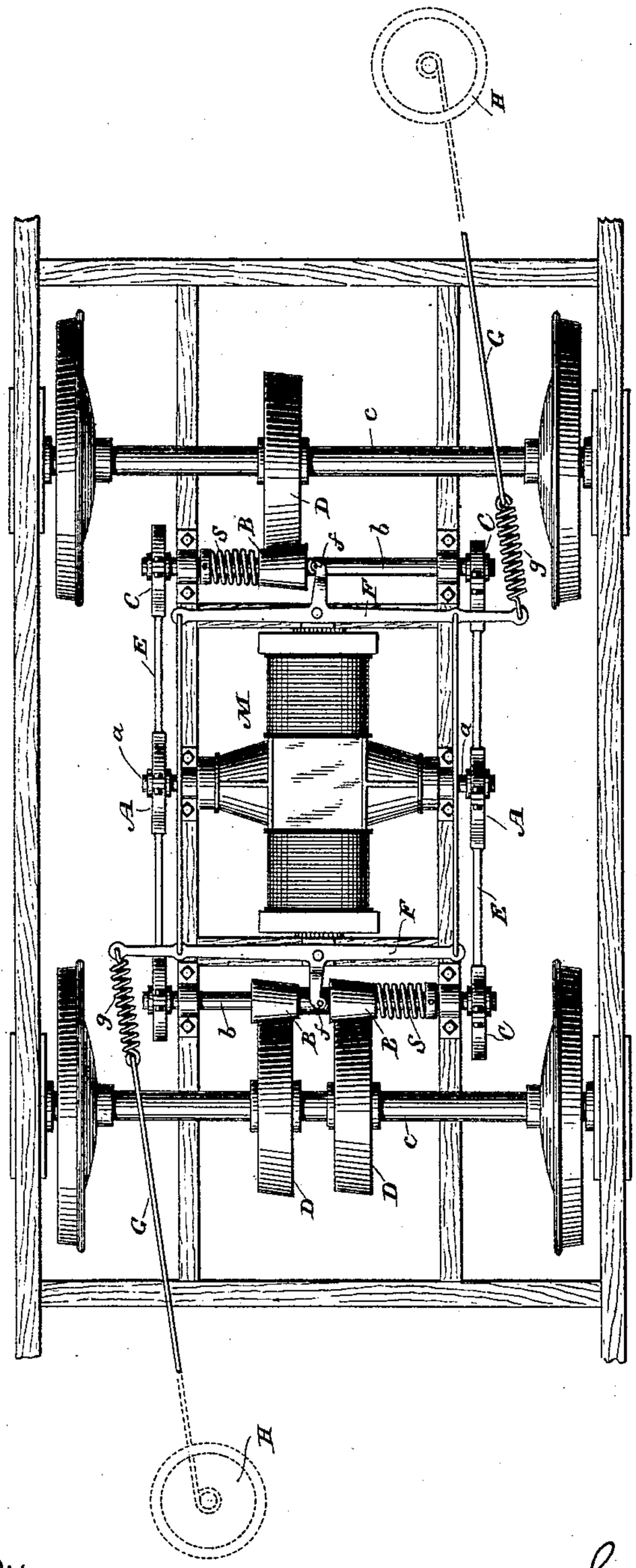
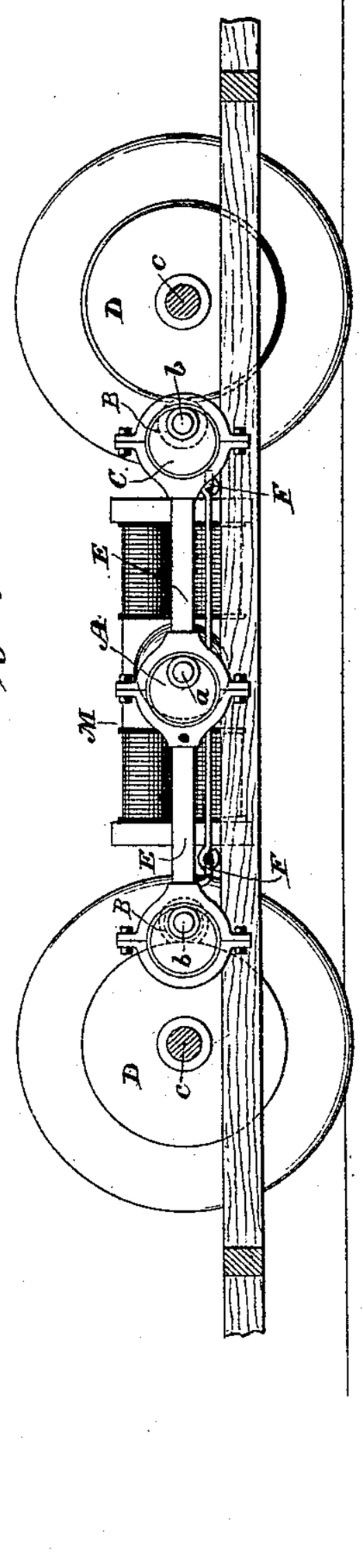


Fig. 2.



Witnesses
Geo. W. Breck.
Edward Thorpe.

Inventor
L. A. McCarthy
By his Attorney
J. B. Sabine

(No Model.) 2 Sheets—Sheet 2.

L. A. McCARTHY.

ELECTRIC RAILWAY CAR.

No. 444,539. Patented Jan. 13, 1891.

Fig. 3.

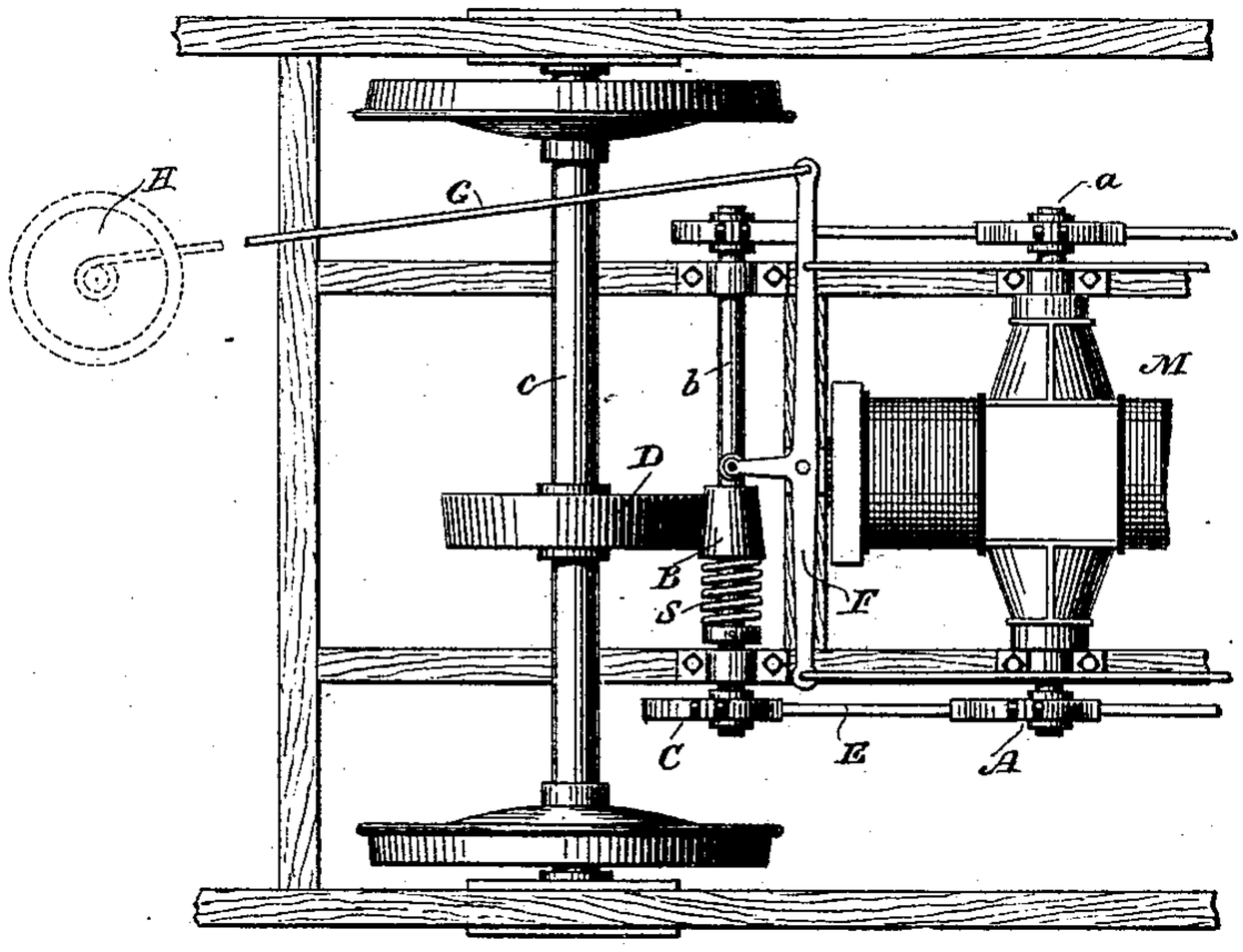
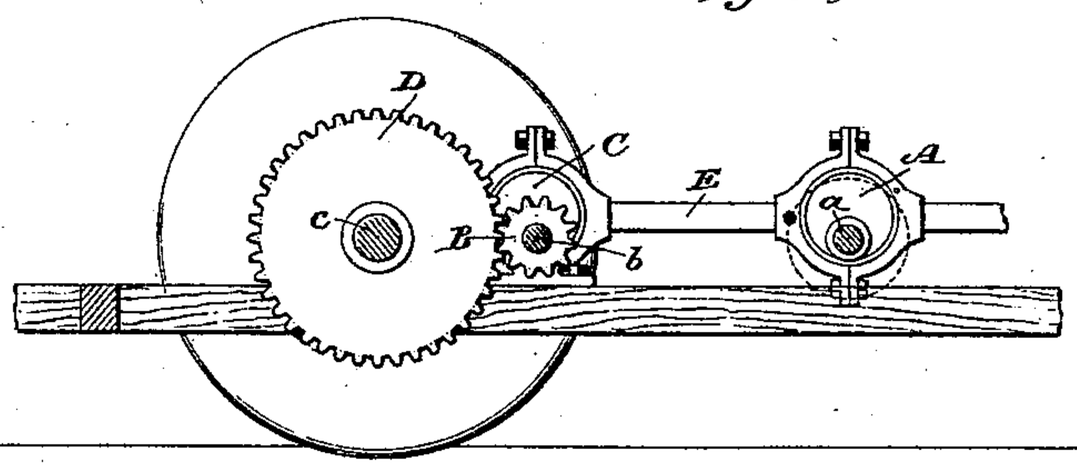


Fig. 4.



Witnesses
Geo. W. Breck.
Edward Thorpe.

Inventor
L. A. McCarthy
By his Attorney
J. P. Sabine

UNITED STATES PATENT OFFICE.

LAWRENCE A. McCARTHY, OF BROOKLYN, NEW YORK.

ELECTRIC-RAILWAY CAR.

SPECIFICATION forming part of Letters Patent No. 444,539, dated January 13, 1891.

Application filed September 3, 1890. Serial No. 363,823. (No model.)

To all whom it may concern:

Be it known that I, LAWRENCE A. McCARTHY, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Electric-Railway Cars, of which the following is a specification.

My invention relates to improvements in electric-railway cars in which driving-rods are used in conjunction with friction-pulleys to take the place of means heretofore used in connecting a motor to the axles of a car.

The object of my invention is to enable one with one motor to obtain greater control over the car in starting, stopping, and running than it is possible to obtain with two motors as connected and used at present, which is to connect a separate motor to each axle of the car by means of gear-wheels and pinions, either direct or through an intermediate shaft, necessarily causing a jerk or jar as soon as the gearing is at all worn. I obtain this result by suspending or mounting a motor, preferably, underneath the center of the car and connecting said motor by means of a driving bar or bars to an intermediate shaft near either or both car-axles. On said intermediate shaft I mount one or more small cone-pulleys so arranged that they will move freely endwise on said shaft, said pulleys being under the complete control of the motorneer or person in charge of the car and so arranged as to be pressed against large friction-pulleys which are fastened on the car-axles when it is desired to transmit power from the motor to the car-wheels, thus changing the rapid rotary motion of the armature into an alternate motion in the driving-rods by means of the cams which are fastened to the armature-shaft, then back into a rotary motion in the intermediate shafts by means of the cams fastened to said intermediate shafts, and by the small and large friction-pulleys into a slower rotary motion in the car axles and wheels. By thus having the connections between the motor and car under control the motor can be allowed to attain its normal speed with a light current before connecting the motor to the car, and thus with less strain on the motor to transmit the necessary power to the car.

The different parts and their relative bearing to each other are shown in the accompanying drawings, which are made a part of this specification, and in which—

Figure 1 gives a top view of the different parts, showing the motor connected to both axles by means of driving-rods connecting the armature-shaft to the intermediate shafts, also showing pulleys connecting the intermediate shafts with the car-axles, and levers and springs by means of which the small cone-pulleys on the intermediate shafts are pressed against or away from the large pulleys on the axles of the car. Fig. 2 gives a side view of the motor and connections, showing more fully the driving-rods connected to the armature-shaft and the intermediate shafts by means of eccentric wheels or cams and their relative position to each other. By using cams I believe I gain a smoother motion than could be had with cranks and pins, which are their mechanical equivalents. Fig. 3 gives a top view similar to Fig. 1 with this difference, that it shows the spring on the intermediate shaft pressing the small pulley on the said shaft against the large friction-pulley on the axle instead of away from it, as shown in Fig. 1. Fig. 4 shows the armature-shaft, driving-rod, and intermediate shaft in combination with a pinion and gear-wheel instead of friction-pulleys.

Again referring to Fig. 1, M represents an electric motor. *a a* indicate the armature-shaft of motor M; *b b*, the intermediate shafts; *c c*, the axles of the car-wheels; *f f*, small wheels fastened to an arm on levers F F; *g g*, springs connecting the rods G G to the levers F F. Letters A A indicate the eccentric wheels or cams fastened on the armature-shaft *a a;* B B, small cone-pulleys mounted on the intermediate shafts *b b*. C C, &c., indicate eccentric wheels or cams fastened to the intermediate shafts *b b;* D D, large friction-pulleys fastened to the car-axles *c c;* E E, eccentric or driving rods connecting the armature-shaft *a a* to the intermediate shafts *b b*, whereby the power is conveyed from the motor to the car-wheels; F F, levers controlled

from the platform of the car and arranged to press the small pulleys B B, mounted on the intermediate shafts, against the large pulleys D D, mounted on the car-axles; G G, rods or chains for the purpose of connecting levers F F to the wheels or controlling devices H H, located on the platform or other desirable position on the car. S S are springs arranged to press the small pulleys B B on the intermediate shafts away from the large pulleys D D on the car-axles when the pressure is taken off of levers F F. Again referring to springs *g g*, they not only connect the levers F F to the rods G G, but by giving a flexible pressure to the pulleys B B B enable them to take up any small jar or jolt without slipping on the face of pulleys D D D. The springs *g g* are of course made stronger than the springs S S or they would be useless. On one axle in Fig. 1 are shown two large pulleys and on the corresponding intermediate shaft two small cone-pulleys. The latter are fastened together and press against the larger ones. In some cases, especially on rough or uneven tracks, this may be found desirable or even necessary in order to more fully overcome any jump or slip that might occur with one set of pulleys.

In Fig. 2 is given a side view of the motor M, the eccentric wheel or cam A, fastened on the armature-shaft *a*, the eccentric wheels or cams C C, fastened on the intermediate shafts *b b*, and the eccentric or driving rods E E, and this figure more fully shows the connections between cams A, rods E E, and cams C C and their relation to and resultant action on each other.

In Fig. 3 is shown spring S, arranged to press the small pulley B against the large pulley D, instead of away from it, as shown in Fig. 1.

Fig. 4 gives a side view, in which is shown the eccentric wheel or cam A on armature-shaft *a*, the driving-rod E, the eccentric wheel or cam C, and the pinion B, mounted on the intermediate shaft *b* with said cam C, said pinion B meshing with the gear-wheel D, mounted on the car-axle *c*.

Now, having described the different parts, with their relation to and their action on each other, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In an electric-railway car, the combination, with a motor, of driving-bars connecting the armature of the motor with the intermediate shaft or shafts, and small pulleys arranged to move endwise on said shafts and controlled by levers and springs, said pulleys arranged to press against large friction-pulleys which are fastened on the car-axles, said driving-bars arranged to span cams fastened to the armature-shaft of the motor and the intermediate shaft or shafts, all substantially as set forth and shown.

2. In an electric car, the combination, with a motor, intermediate and axle shafts having friction-pulleys arranged to act on each other, and said friction-pulleys, of driving-rods arranged to connect said motor to said intermediate shafts, all substantially as set forth.

3. In an electric car, the combination, with an electric motor, one or more intermediate shafts, and one or more car-axles, of two or more driving-rods arranged to connect said motor with said intermediate shafts, the said intermediate shafts being arranged to be connected with the car-axles by means of friction-pulleys or pinions and gear-wheels, all substantially as set forth.

4. In an electric car, the combination, with an electric motor, driving-rods arranged to connect said motor with intermediate shafts, and said intermediate shafts, of movable pulleys mounted on said intermediate shafts and arranged to be pressed against friction-pulleys fastened on the axle-shafts, substantially as set forth, for the purpose of moving the car.

5. In an electric car, the driving-rods E, intermediate shafts *b*, friction-pulleys B and D, controlling-levers F, and springs S and *g*, in combination with an electric motor and car-axles, all substantially as set forth.

6. In an electric car, the combination of the cone-pulleys B, mounted on intermediate shafts and arranged to be pressed against pulleys D on the axle-shafts, with levers F and springs S and *g*, arranged to press the cone-pulleys B against or away from pulleys D, substantially as described and shown.

7. In an electric car, the combination, with an electric motor, driving-rods arranged to connect said motor with intermediate shafts, said intermediate shafts, and car-axles, of movable pulleys mounted on said intermediate shafts and controlled by levers and springs, substantially as shown.

8. In an electric car, the combination of springs *g* and S with controlling device H, rods G, and levers F, arranged to flexibly press cone-pulleys B, that are mounted on the intermediate shafts against or away from pulleys D, which are mounted on the axle-shafts, all substantially as set forth.

9. In an electric car, the combination of the electric motor M, driving-rods E, intermediate shafts *b*, and movable pulleys B with fixed pulleys D on car-axles *c*, all substantially as set forth.

10. In an electric car, the combination, with an electric motor mounted under the center of the car, intermediate and axle shafts having pinions and gear-wheels arranged to mesh with each other, and said pinions and gear-wheels, of driving-rods arranged to connect said motor with said intermediate shafts, all substantially as set forth.

11. In an electric car, the combination of an electric motor, intermediate shafts, driving-rods arranged to connect said motor to said

intermediate shafts, and car-axles with the pinions mounted on the intermediate shafts and the gear-wheels on the axle-shafts, said gear-wheels and pinions arranged to mesh with each other, substantially as and for the purpose specified.

Signed at New York, in the county of New York and State of New York, this 15th day of August, A. D. 1890.

LAWRENCE A. McCARTHY.

Witnesses:
MIRON WINSLOW,
D. STELL. MOULTON.