

(No Model.)

3 Sheets—Sheet 1.

C. BROWN.
RAILWAY CAR.

No. 494,319.

Patented Mar. 28, 1893.

Fig. 1.

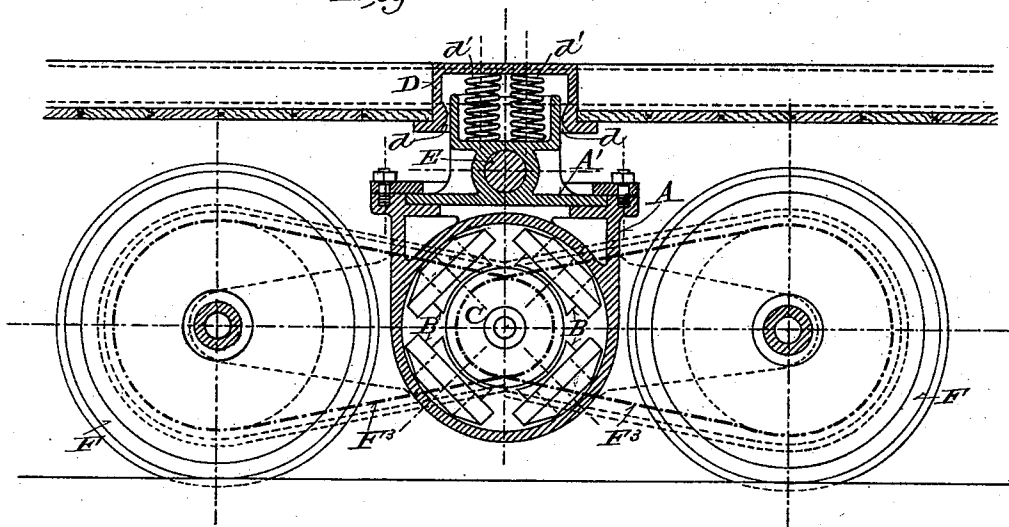
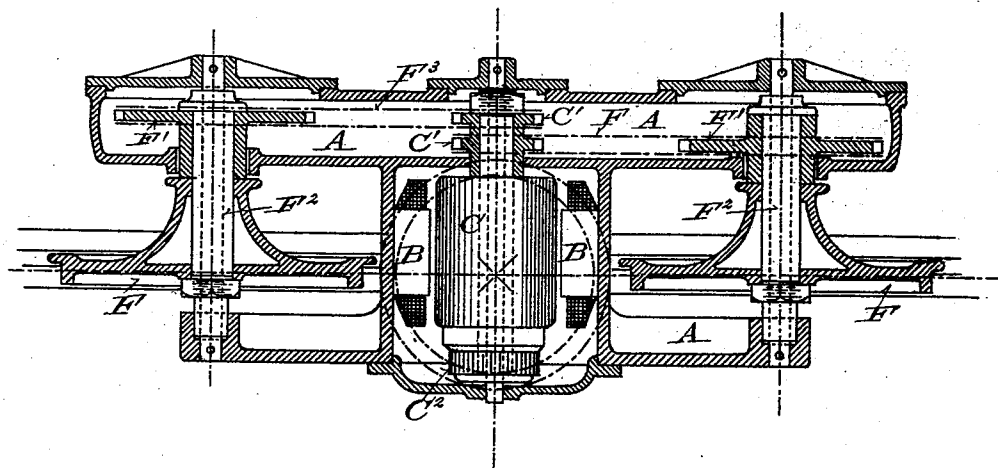


Fig. 2.



Witnesses.

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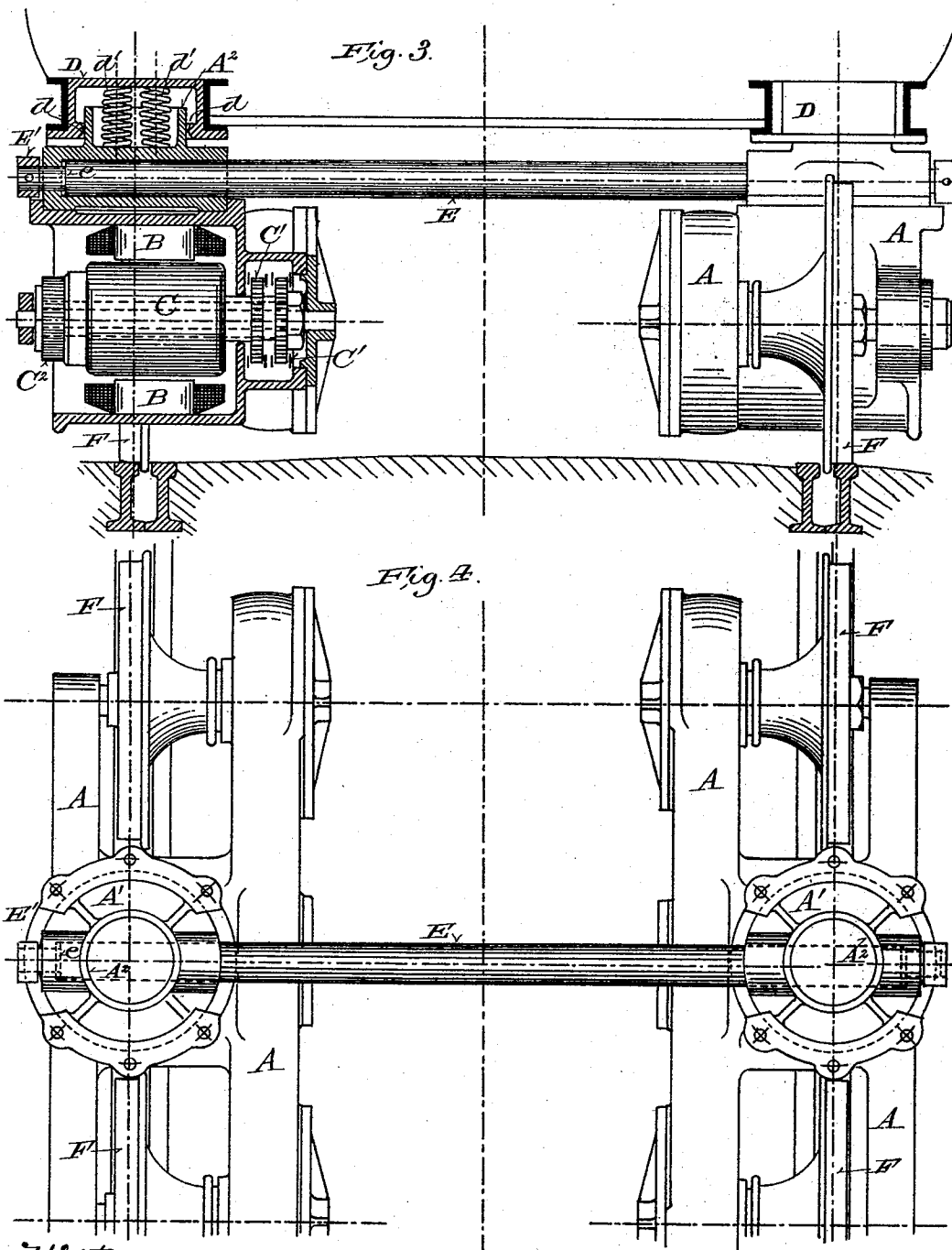
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3 Sheets—Sheet 2.

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(No Model.)

3 Sheets—Sheet 3.

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Fig. 5.

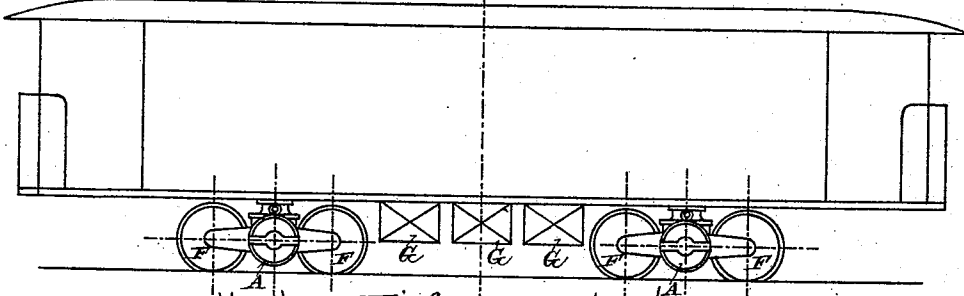


Fig. 6.

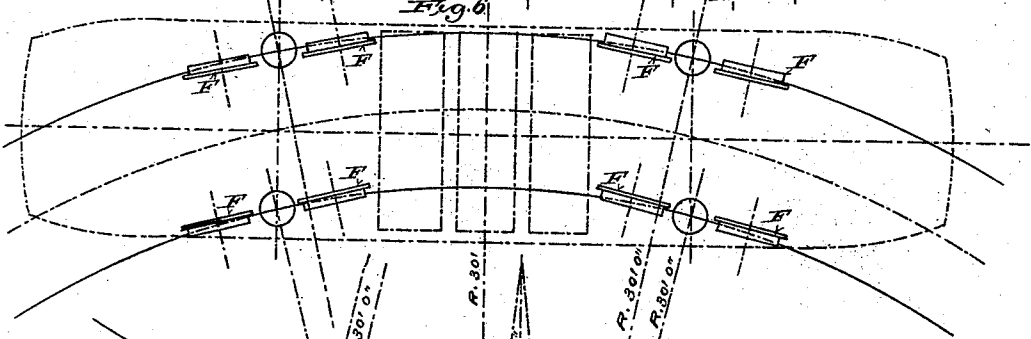


Fig. 7.

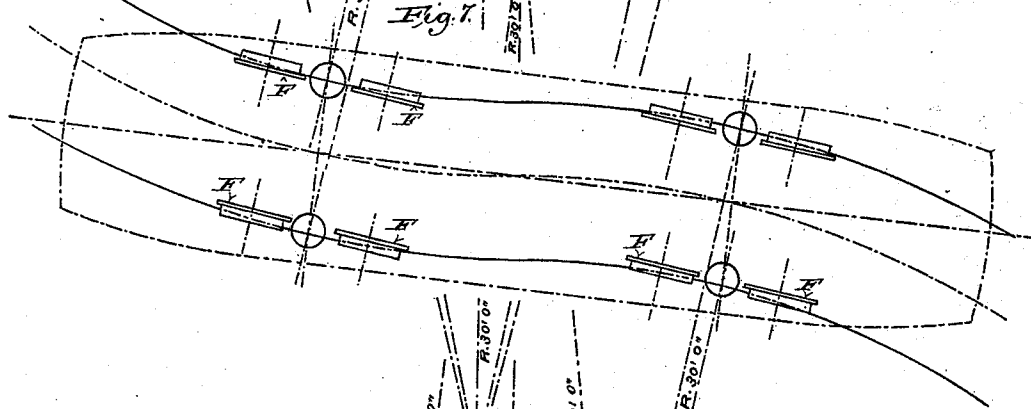
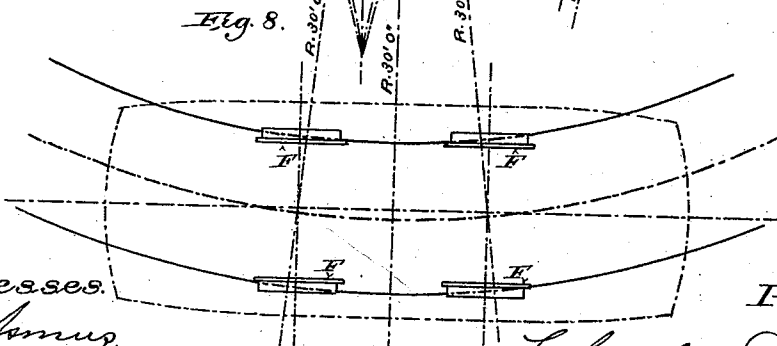


Fig. 8.



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES BROWN, OF BASLE, SWITZERLAND, ASSIGNOR TO MASCHINENBAU
GESELLSCHAFT, OF SAME PLACE.

RAILWAY-CAR.

SPECIFICATION forming part of Letters Patent No. 494,319, dated March 28, 1893.

Application filed April 11, 1892. Serial No. 428,716. (No model.) Patented in France May 20, 1891, No. 213,590, and in Belgium August 29, 1891, No. 96,207.

To all whom it may concern:

Be it known that I, CHARLES BROWN, a subject of the Queen of Great Britain, residing at Basle, in the Canton of Basle and Republic of Switzerland, have invented certain new and useful Improvements in Railway-Cars, (for which I have obtained Letters Patent in France, No. 213,590, dated May 20, 1891, and in Belgium, No. 96,207, dated August 29, 1891;) and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The main objects of my invention are to facilitate the running of street cars upon curves without unnecessary strain or wear upon the running gear, to increase the capacity and efficiency of self-propelling cars of this class, to facilitate access to and inspection of the motors, to protect the motors from mud, dust and moisture, &c.

It consists essentially of mounting the car upon four independent trucks, each having two wheels in tandem and jointed connections with the car whereby the wheels of each truck are permitted, independently of the wheels of the other trucks, to adapt themselves in position to curves and irregularities in the track, and of providing each truck with an independent motor.

It consists also of locating the motor between the wheels of each truck with which it is connected by suitable gearing, and of inclosing the motor and the gearing connecting it with the truck wheels, in a casing constituting a portion of the truck frame; and of certain other peculiarities of construction and arrangement hereinafter particularly described and pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 represents a motor truck embodying my improvements, partially in side elevation and partially in vertical section cutting the horizontal axis of the truck transversely.

Fig. 2 is a horizontal section of said truck in a plane cutting the axes of the truck wheels. Fig. 3 represents two connected trucks, one being shown in end elevation and the other in vertical cross section cutting the horizontal axis of the truck. Fig. 4 is a plan view of a pair of trucks. Fig. 5 is a side elevation of a car mounted upon my improved trucks. Figs. 6 and 7 are diagrams illustrating the manner in which the truck wheels of a car provided with my improvements adapt themselves to curves, a simple curve being shown in Fig. 6 and a combined or reverse curve in Fig. 7; and Fig. 8 is a diagram illustrating the position of the wheels of an ordinary street car with reference to a curve of the same radius as those shown in Figs. 6 and 7.

Heretofore electric motors for street railway service have been applied to cars of a construction like or similar to that of horse cars, which are usually provided with two pairs of wheels rigidly mounted upon axles extending from one side of the car to the other, and rigidly held by their bearings at the same distance apart at both ends, so that in passing around curves, especially of the short radius usually found in street railways, the wheels on one side of the car are compelled to slip upon the rail. This difficulty of adaptation of the wheels to the curves is not serious in the use of horse cars which are made as light as possible and are guided upon the rails by the draft of the animals, but the difficulty is greatly increased and becomes serious by reason of the increased weight necessary in the adaptation of such cars to self propulsion. The additional load thus placed upon the truck wheels renders their adaptation to curves by slipping on one side of the track, much more difficult, and the strain and wear upon the running gears, motors, &c., correspondingly greater. The location of the motors as heretofore, under the floors of the cars, renders access to the motors for the purpose of inspection and proper care difficult and inconvenient in many ways, and exposes them to dust, mud, &c. The gears are thus subjected to rapid wear and the insulation of the conductors thus exposed rapidly deteriorates

and tends to the destruction of the armatures. These difficulties it is the aim of my invention to overcome.

Referring to Figs. 1 to 4 inclusive of the drawings, A represents a truck frame formed in the middle between its wheels F F with a casing for the electric motor, of which B B are the field magnets, C the armature and C² the collector or commutator. The frame A is pivoted at the middle of its upper side to a horizontal plate A' so as to turn horizontally on a vertical axis *a a* midway between the points of contact between the wheels F F and the rail upon which they run. The plate A' is formed on the upper side with a cup A² which is loosely inserted in a cap D secured in the base of the car. Sufficient play is allowed between the cup A² and the inner face *d* of the cap D, to permit the plate A' to turn a limited distance upon the shaft E, upon the end of which it is mounted. The weight of the car body is carried by springs *d' d'* interposed between the cups A² and the caps D. The corresponding trucks on opposite sides of the car are connected by the shaft E and firmly held in their proper relative positions while they are each permitted to turn independently of the other upon said shaft, so as to allow the wheels on either side of the car to follow vertical variations in the rails. The vertical axes *a a* on which the several trucks turn horizontally to permit the truck wheels to readily follow without binding, curves in the track, intersect the axes of the shafts E, on which the trucks swing vertically to permit of the wheels following variations in the level of the rails. Each plate A' is formed on the upper side between it and the cup A² with a sleeve fitted to the end of the shaft E, upon which it is held by the shoulder *e* and collar E'. This sleeve is allowed a limited amount of endwise play upon the shaft E, as shown in Fig. 3, to permit the trucks to adapt themselves to variations in the course of either rail. Upon the inner end of each armature shaft are mounted two separate sprocket wheels C' C' which are connected by and transmit their motion through chain belts to sprocket wheels F' F' connected with the truck wheels F F. The truck wheels F F and sprocket wheels F' F' are preferably mounted upon sleeves F², which turn upon shafts secured at the ends in frame A. The sprocket wheels C' C' and F' F' and the chain belts F³ F³ connecting them are inclosed in a case which constitutes a part of the frame A and protects them from mud, dust and moisture. It will be observed that the motors are located on the outer sides of the trucks, with their commutators or collectors C² outside, thus affording easy access thereto.

Figs. 6 and 7 illustrating in diagram a car with four trucks having jointed connections therewith in accordance with my invention, placed upon two curves of thirty feet radius, one simple and the other compound or reverse, show in connection with Fig. 8, which

illustrates in diagram a car of the ordinary construction on a curve of the same radius, the great advantage of my improved system of trucks in comparison with the old. It will be observed also by reference to Fig. 5, that my system permits of the employment of cars of greater capacity than those at present in use, and that the arrangement of the running gear affords ample space between the trucks for storage batteries G G, when they are employed to supply the motive power. This position of the batteries is for many obvious reasons preferable to that in which they are usually placed under the seats or upon the trucks.

Various changes in the details of my invention may be made within its intended scope, as for instance, in place of the sprocket wheels and chains shown for transmitting the motion of the armature to the truck wheels, gears may be employed.

I claim—

1. A railway car having four independent trucks, each provided with two wheels one in front of the other, and with a motor connected with and arranged to actuate said wheels, said trucks having vertical pivot connections with the body of the car whereby they are permitted to turn independently of each other so as to follow curves in the track, substantially as and for the purposes set forth.

2. A railway car having four independent trucks, each provided with two wheels one in front of the other, and with a motor connected with said wheels, said trucks having vertical and horizontal pivot connections with the body of the car whereby they are permitted to turn independently of each other so as to follow curves and variations in the level of the track, substantially as and for the purposes set forth.

3. A railway car with four trucks having jointed connections with the body, each truck having two wheels, one in front of the other, and a special motor inclosed therein, and connected by suitable gearing with the truck wheels, substantially as and for the purposes set forth.

4. In a railway car, the combination of the body mounted upon four independent trucks having universal joint connections therewith, and each provided with a casing, and separate motors inclosed in the several trucks and connected by suitable gearing with the truck wheels, substantially as and for the purposes set forth.

5. In a railway car the combination of the body mounted upon four independent trucks, each having two wheels one in front of the other, horizontal sleeves to which said trucks are pivoted vertically, and cross shafts upon which said sleeves are mounted and free to turn, substantially as and for the purposes set forth.

6. In a railway car, the combination of the body, trucks each having two wheels one in front of the other, cups pivoted vertically to

said trucks and loosely inserted in caps in the base of the car, springs interposed between said cups and caps, and cross shafts to which said cups are pivoted horizontally, substantially as and for the purposes set forth.

5 7. In a railway car, the combination of the car body, trucks each provided with two wheels one in front of the other, and with a housing between the wheels open on the outer
10 side, and a motor inclosed in said housing with its commutator or collector and brushes adjacent to the opening therein, substantially as and for the purposes set forth.

15 8. In a railway car, the combination of the car body, trucks each provided with two wheels one in front of the other, and with a housing between the wheels for a motor, sprocket wheels mounted upon the truck axles and on the motor shaft, and chain belts connecting the sprocket wheels on the truck axles
20 with the sprocket wheels on the motor shaft and inclosed by the truck frame, substantially as and for the purposes set forth.

9. In a railway car, the combination of the car body, four independent trucks each comprising a frame provided with two wheels one 25 in front of the other, and formed with an intermediate housing, and a motor inclosed in said housing and connected by suitable gearing with said wheels, circle plates pivotally 30 connected horizontally with the upper sides of the truck frames between the truck wheels and provided on their upper sides with cups which are loosely inserted in caps in the base of the car body and with horizontal sleeves, 35 springs interposed between said cups and caps, and horizontal cross shafts loosely secured at the ends in said sleeves, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as
40 my own I affix my signature in presence of two witnesses.

CHARLES BROWN.

Witnesses:

CLARENCE H. GIFFORD,
GEORGE GIFFORD.