

(No Model.)

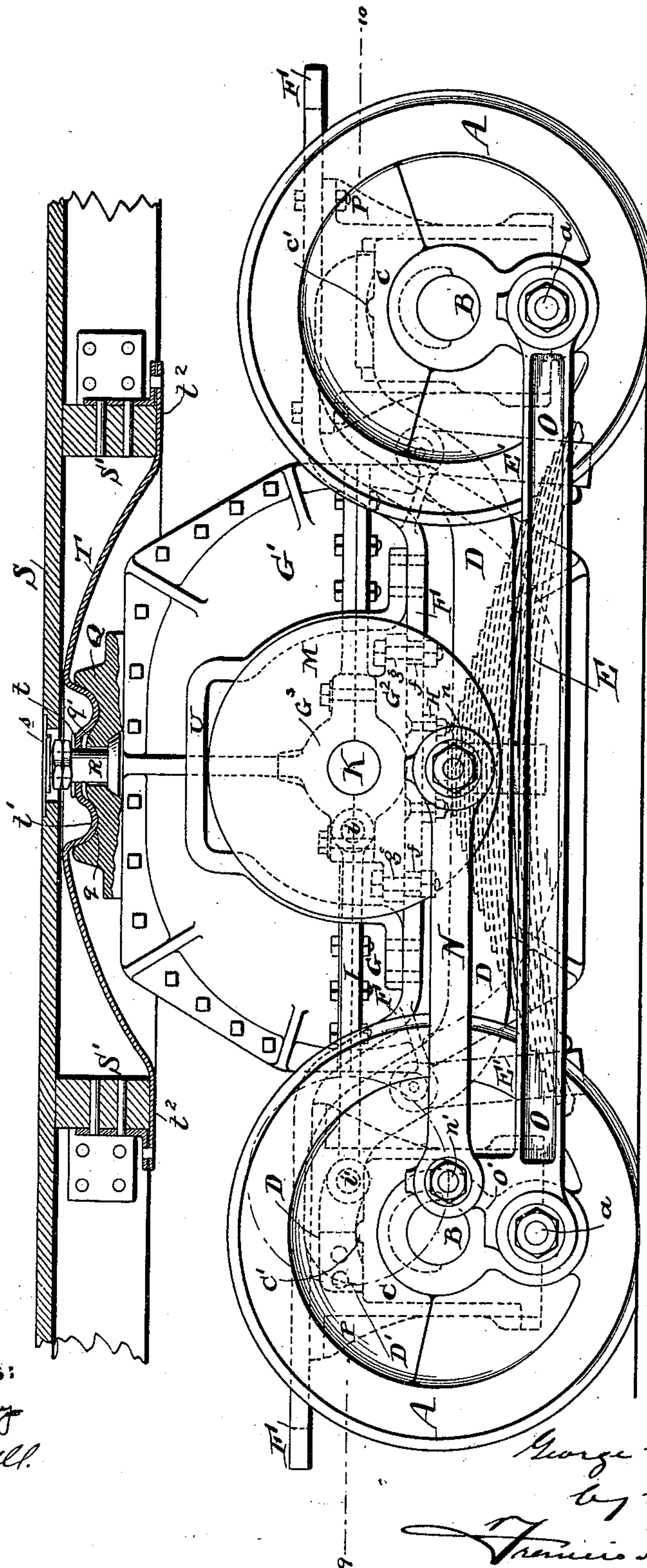
5 Sheets—Sheet 1.

G. S. STRONG.  
ELECTRIC CAR TRUCK.

No. 497,356.

Patented May 16, 1893.

**FIG. 1.**



Witnesses:  
Henry Dwyer  
J. B. Russell.

inventor:

George S. Strong  
by his atty  
Francis T. Chambers

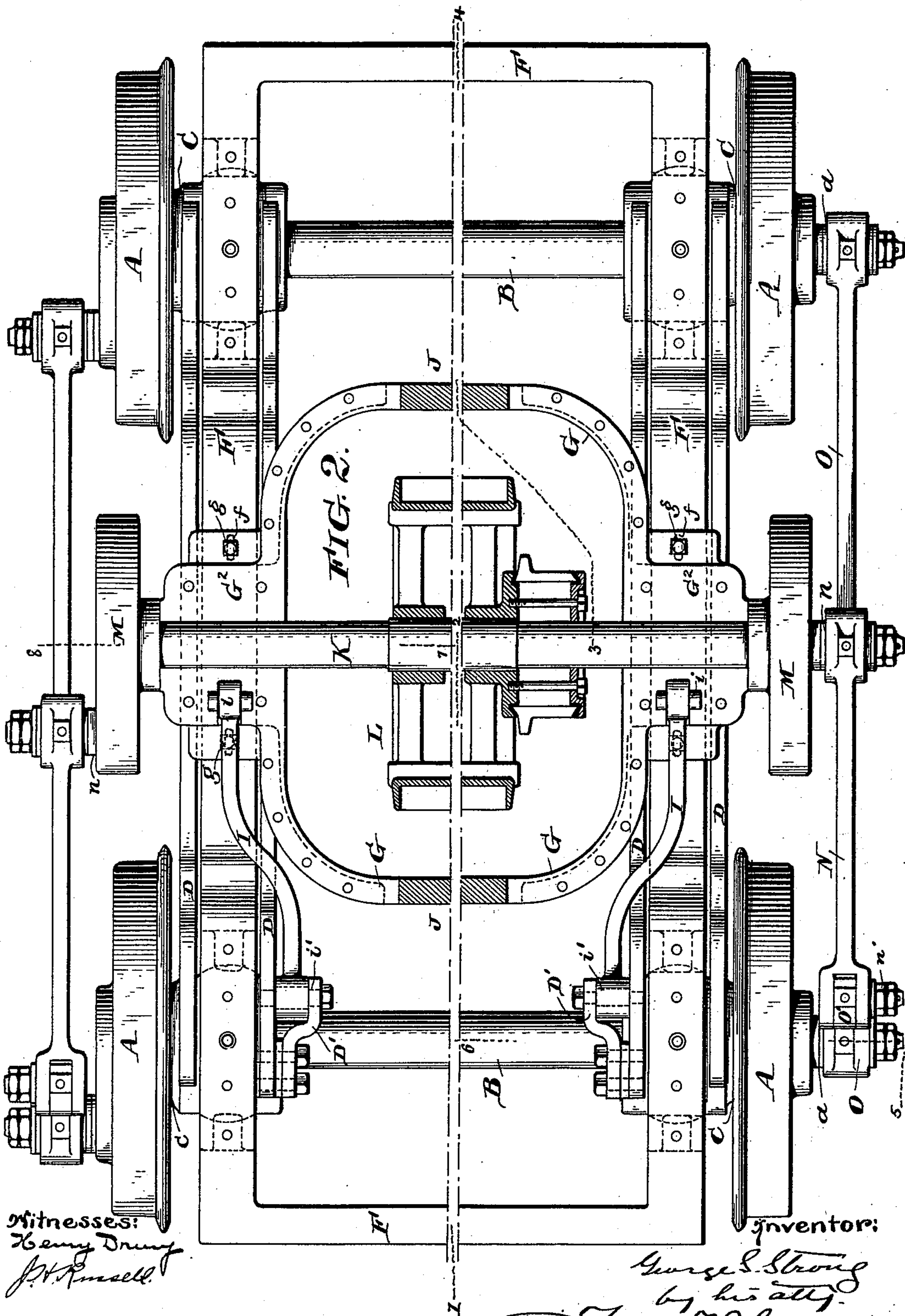
(No Model.)

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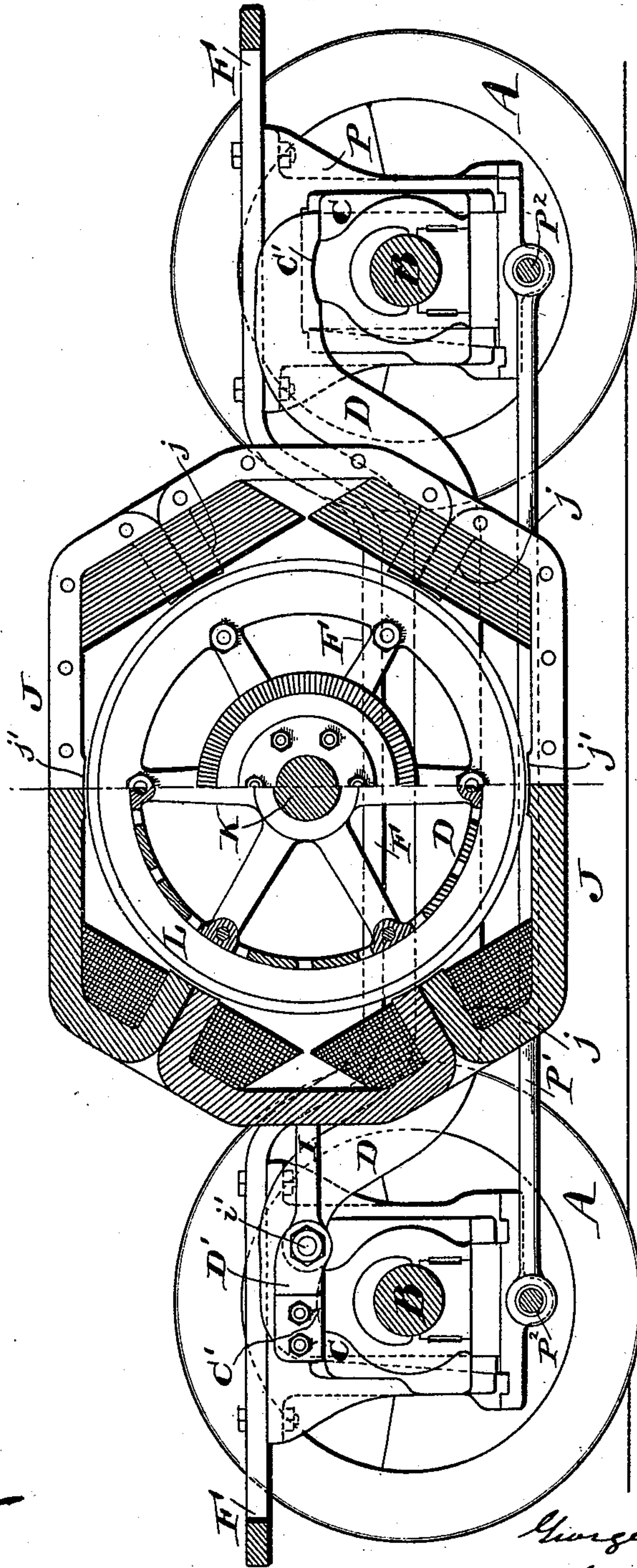
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G. S. STRONG.  
ELECTRIC CAR TRUCK.

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Patented May 16, 1893.

FIG. 3.



Witnesses:  
Henry Dwyer  
J. H. Russell.

Inventor:  
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Francis T. Chambers

(No Model.)

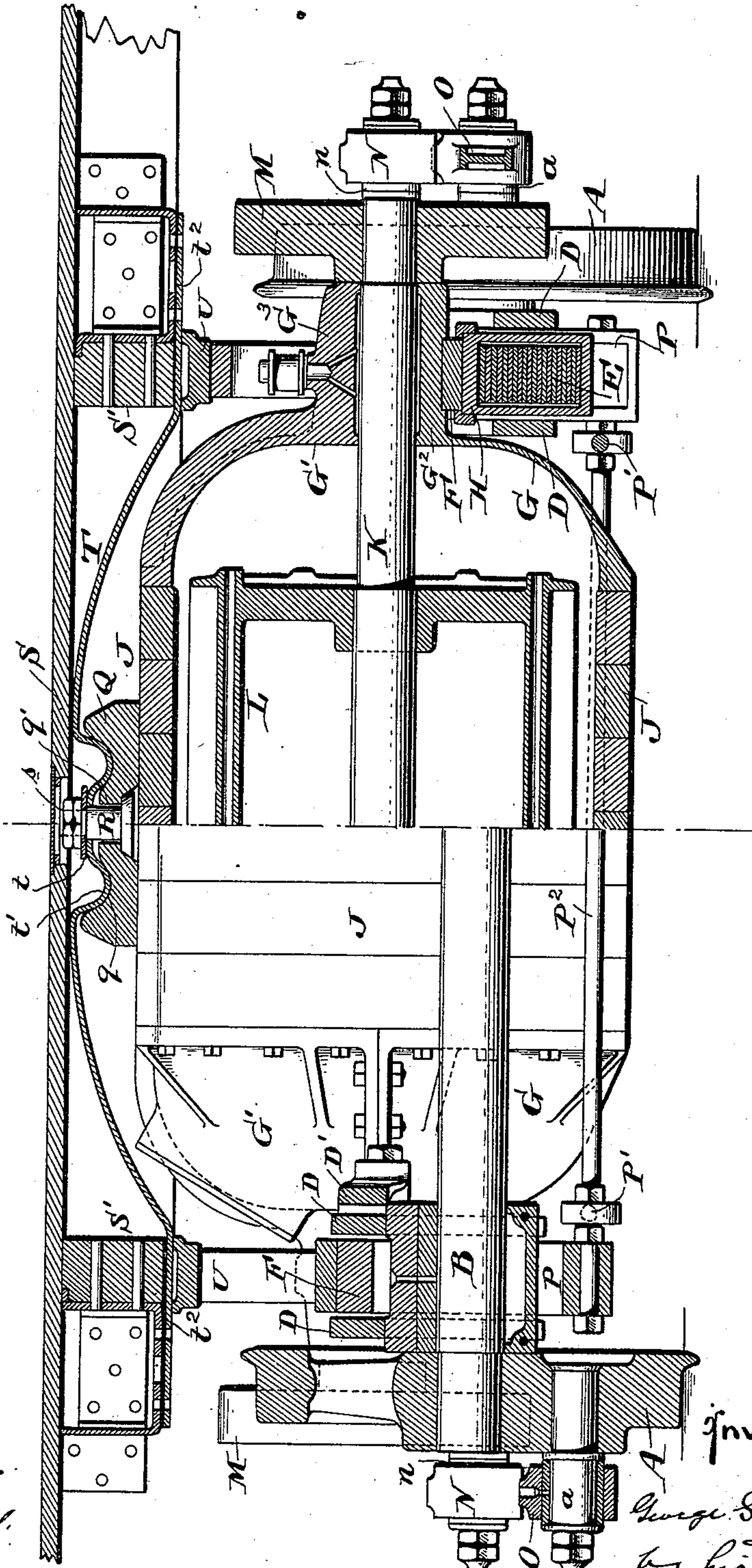
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G. S. STRONG.  
ELECTRIC CAR TRUCK.

No. 497,356.

Patented May 16, 1893.

FIG. 4.



Witnesses:  
Henry D. ...  
J. H. Russell.

Inventor:

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by his atty.

James T. Chambers



(No Model.)

5. Sheets—Sheet 5.

G. S. STRONG.  
ELECTRIC CAR TRUCK.

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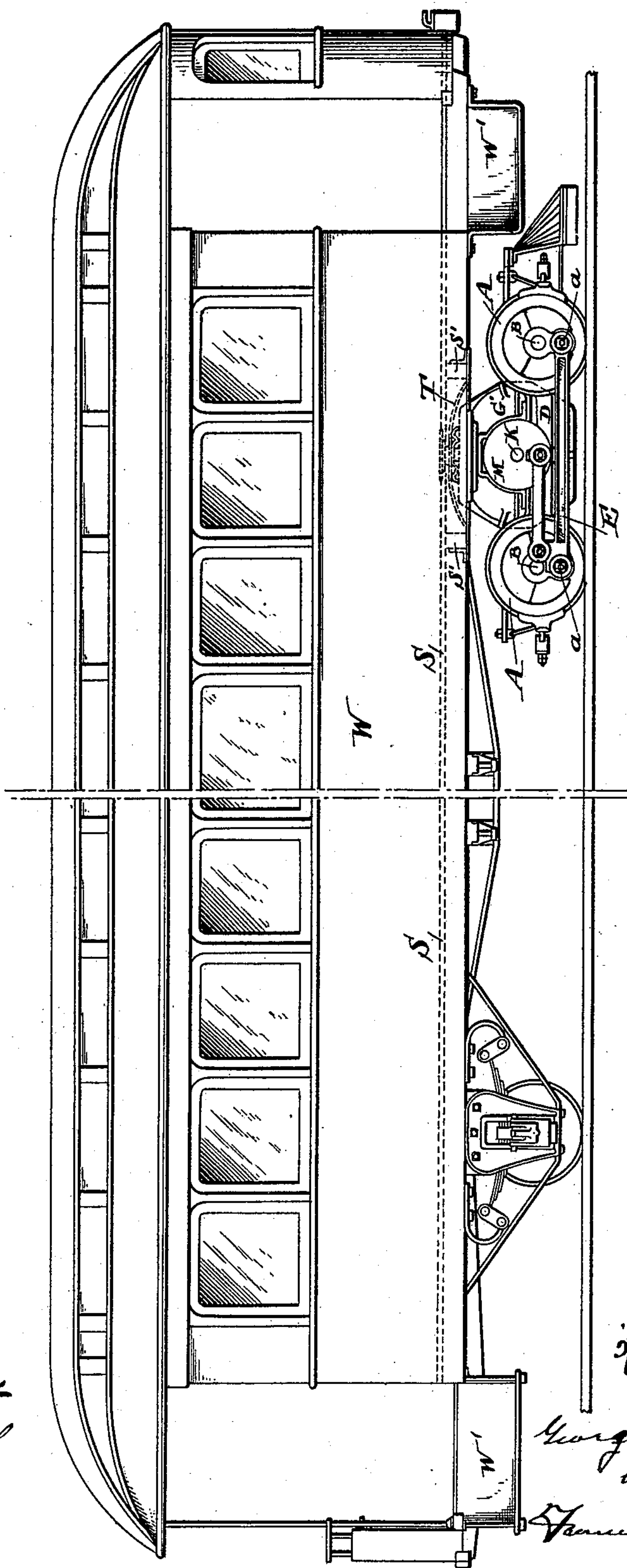


FIG. 5.

Witnesses:  
Henry Dwyer  
J. H. Russell

Inventor:

George S. Strong  
by his atty.  
Francis T. Chambers



# UNITED STATES PATENT OFFICE.

GEORGE S. STRONG, OF NEW YORK, N. Y., ASSIGNOR TO JAMES N. GAMBLE,  
OF CINCINNATI, OHIO.

## ELECTRIC-CAR TRUCK.

SPECIFICATION forming part of Letters Patent No. 497,356, dated May 16, 1893.

Application filed January 25, 1892. Serial No. 419,168. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE S. STRONG, of the city and county of New York, State of New York, have invented a certain new and  
5 useful Improved Motor-Truck, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to the construction of  
10 car or motor trucks and their combination with the motor and car—the object of my invention being, generally speaking, to provide improved means for coupling an electric motor with the driving wheels of the truck and  
15 also improvements in construction by which the car body can be carried as low down as possible.

The nature of my invention will be best understood as explained in connection with  
20 the drawings in which it is illustrated and in which—

Figure 1 is a side elevation of a truck embodying my invention showing the mode of carrying the car body in section. Fig. 2 is  
25 a plan view of my improved truck taken on the section-line 9—10 of Fig. 1, and with the center part cut away so as to permit the drawings to be made on a larger scale. Fig. 3 is a longitudinal sectional elevation taken  
30 to the left of the center line as on the line 1—7 of Fig. 2—and to the right of the center line as on the line 2—3—4 of Fig. 2, and with some of the parts removed the better to show those which are represented. Fig.  
35 4, to the left of the center line, is a cross-sectional elevation taken on the line 5—6 of Fig. 2; and to the right of the center a cross-sectional elevation taken on the line 7—8 of Fig. 2; and Fig. 5 is a side elevation of a car pro-  
40 vided with my improved motor truck.

A A, &c., indicate the wheels of the truck carried in pairs on axles B B.

C C, &c., are journal-boxes of ordinary character having, as shown, projection C' at  
45 their tops which engage the equalizing bars D D, which rest upon the journal-boxes.

E E indicate plate springs which are suspended from the equalizing bars D by means of swinging links E'.

50 F is the frame of the truck which rests at its center upon the springs E and which is

provided with pedestals P P, &c., which extend over the journal-boxes C and serve to properly align, though not to support, the frame F. 55

G and G' are castings which are bolted to the edge of the field J of the electro-magnet forming caps to inclose the armature and shaft. Extensions G<sup>2</sup> and G<sup>3</sup> from these castings form the bearings for the driving  
60 shaft K, the part G<sup>2</sup> being secured to the frame F by bolts g passing through slotted perforations f in the frame so as to give the casting and the parts secured to it freedom for a slight longitudinal motion on the frame. 65  
The casting G<sup>2</sup> rests upon the frame F directly above the springs E so that the weight of the motor is properly said to be directly supported upon the spring. It will be noticed that the frame is secured to the spring by  
70 means of the clamping plates H which hold the spring plates together.

I I are rods pivotally connected to the castings G<sup>2</sup> by means of pins i and at their other ends pivotally connected by means of pins i' 75 with the equalizing bars D, the pin i' being held between the equalizing bar and the bracket D' bolted to the bar as shown in Fig. 2. The motor field J which, as I have stated, is bolted to the castings G G', need not be  
80 specifically described further than to state that j j, &c., are the wound salient poles, and j' j' consequent poles. The form shown is, I believe, new with me but will form the subject-matter of another application for a patent. 85  
A prominent advantage is that it enables a powerful motor to occupy a very small vertical space.

L indicates the armature of the motor which is secured to the shaft K, said shaft being  
90 journaled as above described and having crank disks M M at its ends—n indicating the crank pins held on the disks M to which are connected connecting-rods N N, these rods being at their ends connected with pins n' 95 supported on an upwardly-extending projection or heel O' formed on each of the connecting-rods O which are coupled with crank-pins a a of the driving-wheels A A. The feature just described is one of prime importance enabling me to place my motor higher  
100 up while still maintaining an efficient and



satisfactory connection with the driving wheels. The height of the pin  $n'$  above the center line of the connecting-rod O is of course equal to the height of the driving shaft K above the plane of the axles B B, and the distance of the pins  $n$  and the pins  $a$  from the shafts about which they rotate equal. In this way the rod N always lies substantially parallel with the rod O beneath it. When (as I prefer should be the case and as I have shown in the drawings) the motor is carried on springs and not rigidly fastened to the truck or axles it is necessary to provide that no motion of the shaft K should destroy the proper relation between the centers of the shafts K and B and this is provided for by giving the motor a slight freedom to move on the frame and then connecting it with the equalizing bars by means of the links I, the point at which these links connect with the equalizing bars being that which is the center of rotation of the pins  $n'$  on the heel O'. It will readily be seen that by thus connecting the parts they are maintained under any circumstances in proper relation.

Q is a casting secured to the top of the field bars J and preferably made with the annular groove  $q$  surrounding the pin-hole  $q'$  in which the swivel-bolt R is secured.

T is a dished plate having a central perforation  $t$  through which the pin R passes and, as shown, an annular depression  $t'$  which fits and rests in the groove  $q$ . The ends of the plate T are secured to the timbers S' which support the platform S of the car; the bolt R is shown as passing into the platform or floor S in the usual way, fitting into a metallic plate  $s$  secured therein. The weight of the car is thus supported directly upon the motor through the dished plate T which is large enough to practically inclose or envelop the upper plate of the motor thus permitting the timbers S' to come as low or lower down than the top of the motor. At each side of the motor the edges of the dished plate T rest upon supports U U which in turn are secured upon the frame F as shown in Fig. 1. These supports prevent any lateral tipping of the car body while permitting the truck to swivel freely under it. The advantage of this feature of my construction is apparent on Fig. 5 of the drawings where the car body is shown and in which it will be noted how low the platform is carried notwithstanding the fact that the motor is centered in a higher plane than that of the axles of the driving wheels.

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

1. In a car-truck, a motor having a rotating driving shaft supported on the truck above the level of the wheel axles and carrying a crank-pin, in combination with a connecting-rod or rods coupling the wheels and having an upwardly-extending heel O', a pin  $n'$  sup-

ported on heel O', and arranged to revolve around a center lying substantially in the same horizontal plane as the motor shaft and a connecting-rod coupling the motor crank-pin with pin  $n'$ , all substantially as and for the purpose specified.

2. In a car-truck, equalizing bars as D D, &c., resting on the axles in combination with springs E suspended from said bars, a frame F resting on the springs and having pedestals engaging the axle-boxes; an electric motor secured to the frame immediately above the springs E and resting on said springs, said motor having a driving shaft K lying in a plane above that of the axles; connecting-rods O coupling the truck-wheels and having upwardly-extending heels O', pins  $n'$  secured in heels O' in position as described so that their centers of rotation will lie substantially in the same plane as shaft K; crank-pins  $n$  on shaft K and connecting-rods N coupling pins  $n n'$  and lying parallel to rods O.

3. In a car-truck, a spring-supported frame, a motor supported upon and longitudinally-movable on said frame; a connecting-rod or rods O coupling the wheels of the truck and having an upwardly-projecting heel O', said heel O' carrying a pin  $n'$  which revolves around a center lying in the same plane with the motor's driving-shaft; a connecting-rod or rods N coupling pin  $n'$  with a crank pin  $n$  of the driving-shaft; and a rod or rods I connecting the motor with the center of rotation of pin  $n'$ .

4. In a car-truck, springs extending between the axles a frame supported thereon and having pedestals engaging the axle-boxes, in combination with an electric motor field supported on the frame and resting directly over the springs; and a car body supported pivotally directly upon the field and through it upon the spring-support of the frame and field.

5. The combination of an electric motor field supported on a car truck, a dished plate T pivotally supported on the top of the field and extending down around the same; and a car body S supported on the lower outer edges of said plate substantially as described and so that the frame of the car body is depressed to or below the top of the field.

6. The combination of an electric motor field supported on a car truck, a dished plate T pivotally supported on the top of the field and extending down around the same; supports U U for said plate extending up on each end of the motor field; and a car body S supported on the outer edges of said plate substantially as described and so that the frame of the car body is depressed to or below the top of the field.

GEORGE S. STRONG.

Witnesses:

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FRANCIS T. CHAMBERS.