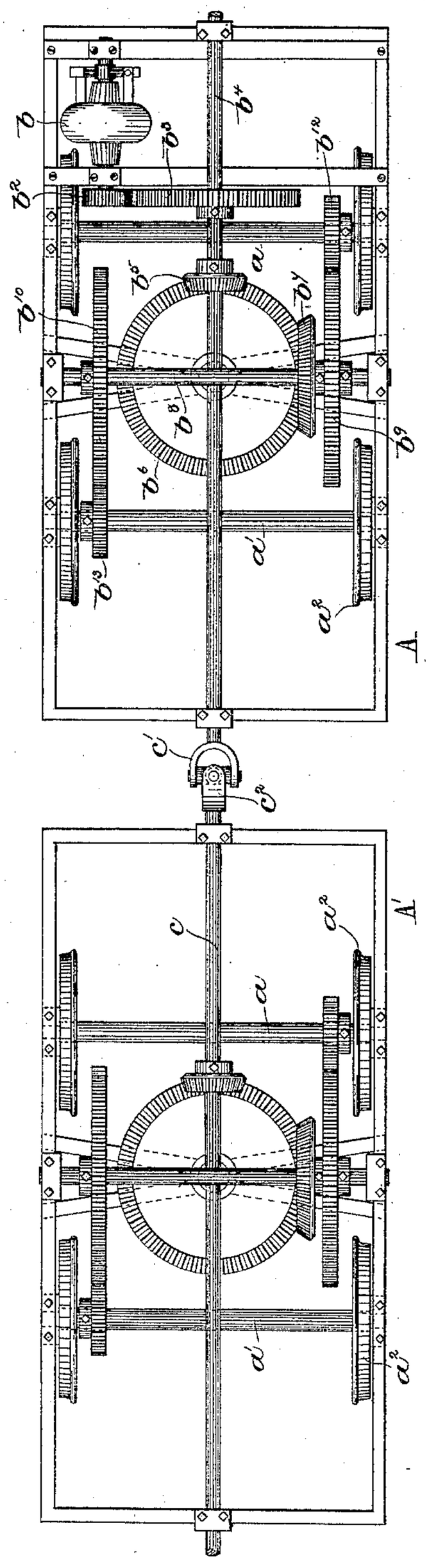
(No Model.)

F. E. SMALL.

DRIVING MECHANISM FOR RAILWAY CARS.

No. 453,025. Patented May 26, 1891.



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UNITED STATES PATENT OFFICE.

FREDERICK E. SMALL, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF TWO-THIRDS TO FREDERICK A. SWAN AND FREDERICK LANE, BOTH OF SAME PLACE.

DRIVING MECHANISM FOR RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 453,025, dated May 26, 1891.

Application filed July 1, 1890. Serial No. 357,459. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK E. SMALL, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Driving Mechanism for Railway-Cars, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention relates to a novel construction or arrangement of mechanism for propelling railway-cars, especially adapted to be used on electric-railway cars.

My invention has for its object to provide mechanism, as will be described, whereby each car may be propelled directly by power derived from the main driving-shaft, whereby increased traction is obtained for each car, and as a result any desired number of cars may be coupled together on an electric railway.

In accordance with my invention each car has extended longitudinally beneath it a main driving-shaft, which is coupled by suitable gearing to the axles of the car, and the driving-shafts of adjacent cars are connected together by a universal-joint or flexible-shaft connection.

My invention therefore consists in the combination, with a series of independent cars mounted upon axles having wheels, a gear upon said axles, and a counter-shaft having a gear in mesh with the axle-gears, of independent driving-shafts extended longitudinally the length of the said cars gearing to connect each driving-shaft with the counter-shaft of its car, and a positive flexible connection between the ends of said longitudinal shafts, substantially as will be described.

Other features of my invention will be pointed out in the claims at the end of this specification.

The drawing represents in plan view two car-trucks provided with my improved driving mechanism and coupled together by a universal joint.

A A′ represent the frames of two car-trucks, which may be of any usual or well-known construction, they being provided with the usual car-axles a a' and wheels a^2.

As represented in the drawing, the truck A supports an electric motor b, which may be of any usual or well-known construction, it having its armature-shaft provided with a pinion b^2 in mesh with a gear b^3, fast on a shaft b^4, extended longitudinally the length of the car, and, as herein shown, extended beyond the car. The shaft b^4 is herein shown as connected by gearing to both car-axles a a', it having fast on it a bevel-gear b^5 in mesh with a bevel-gear b^6, which in turn meshes with a bevel-gear b^7 on a shaft b^8, supported by the truck A. The shaft b^8, as herein represented, is provided at its opposite ends with gears b^9 b^{10} in mesh with pinions b^{12} b^{13} on the car-axles a a'.

The truck A′ is provided with a longitudinal driving-shaft c, and the said shaft is connected to the car-axles a a' of the truck A′ by similar gearing to that used on the truck A.

The driving-shafts b^4 and c of the trucks A A′ are positively connected together, preferably, by a universal joint, consisting of the parts c' c^2 of any usual or well-known construction; but instead of a universal-joint connection I may use any other equivalent flexible-shaft connection, whereby the longitudinal shaft b^4 is positively connected to the longitudinal shaft c, and yet permit of movement of one shaft, as b^4, with relation to the other shaft, as c, so that the cars may easily run around curves and on irregular tracks.

In operation the electric motor b is supplied with the electric current in any usual manner, and the rotation of the armature-shaft produces rotation of the longitudinal shaft b^4, and the said shaft through the intermediate gearing rotates the car-axles a a' of the truck A. The rotation of the shaft b^4 through the universal connection c' c^2 positively rotates the longitudinal shaft c, and thereby produces rotation of the car-axles a a' of the truck A′. It will thus be seen that the axles of each car are positively driven, thereby obtaining increased traction between the car-wheels and the rails upon which they run.

My improved construction is especially applicable to electric-railway cars, as each car by means of its longitudinal driving-shaft is propelled independently of adjacent cars, so

that any desired number of cars may be connected together to form a train and the latter propelled by a single motor on one car.

I have herein shown the longitudinal shaft b^4 of the truck A as rotated by an electric motor; but I do not desire to limit myself in this respect, as any other suitable form of motive power may be employed to produce rotation of the said longitudinal shaft.

I have herein shown both axles a a' of the car as connected by gearing to the longitudinal driving-shaft, and while I prefer this construction I do not desire to limit myself in this respect, as only one of the said axles may be connected to the said shaft to be driven thereby.

By means of my improved mechanism I may employ a single large electric motor to propel a number of cars, thereby reducing the cost of construction and maintenance and obtaining increased efficiency, inasmuch as a greater amount of power is developed in one large motor per unit of coal consumed than in a number of small ones. Furthermore, the weight of the motor-car may be reduced as the traction is distributed throughout the whole train.

I claim—

1. The combination, with a series of independent cars mounted upon axles having wheels, a gear upon said axles, and a counter-shaft b^8, having a gear in mesh with the axle-gears, of a longitudinal shaft extended the length of each car, gearing connecting the respective counter and longitudinal shafts, and a positive flexible connection between the ends of said longitudinal shafts, substantially as described.

2. In a series of independent cars, the combination, with car-axles mounted upon wheels, a gear on said axles, and a counter-shaft b^8, having a gear in mesh with said axle-gears, of independent driving-shafts extended longitudinally along each car, gearing connecting the respective counter and longitudinal shafts, and a motor on one of said cars having its driving-shaft geared directly to the longitudinal shaft, and flexible connections between the longitudinal shafts, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERICK E. SMALL.

Witnesses:
JAS. H. CHURCHILL,
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