

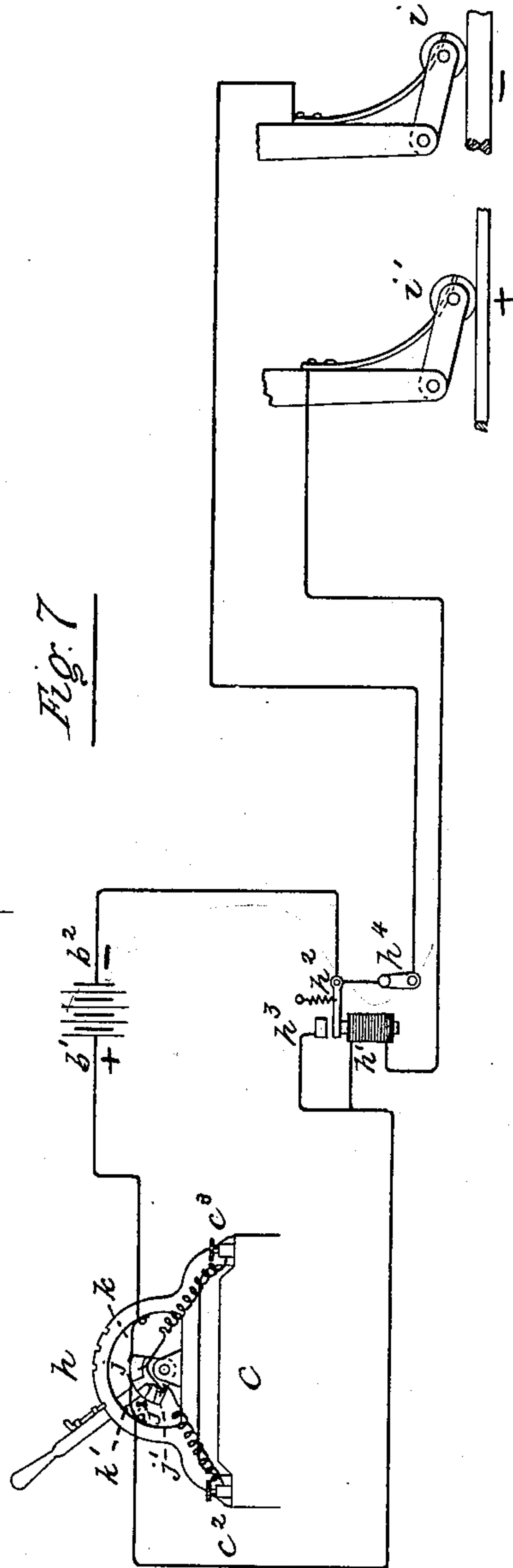
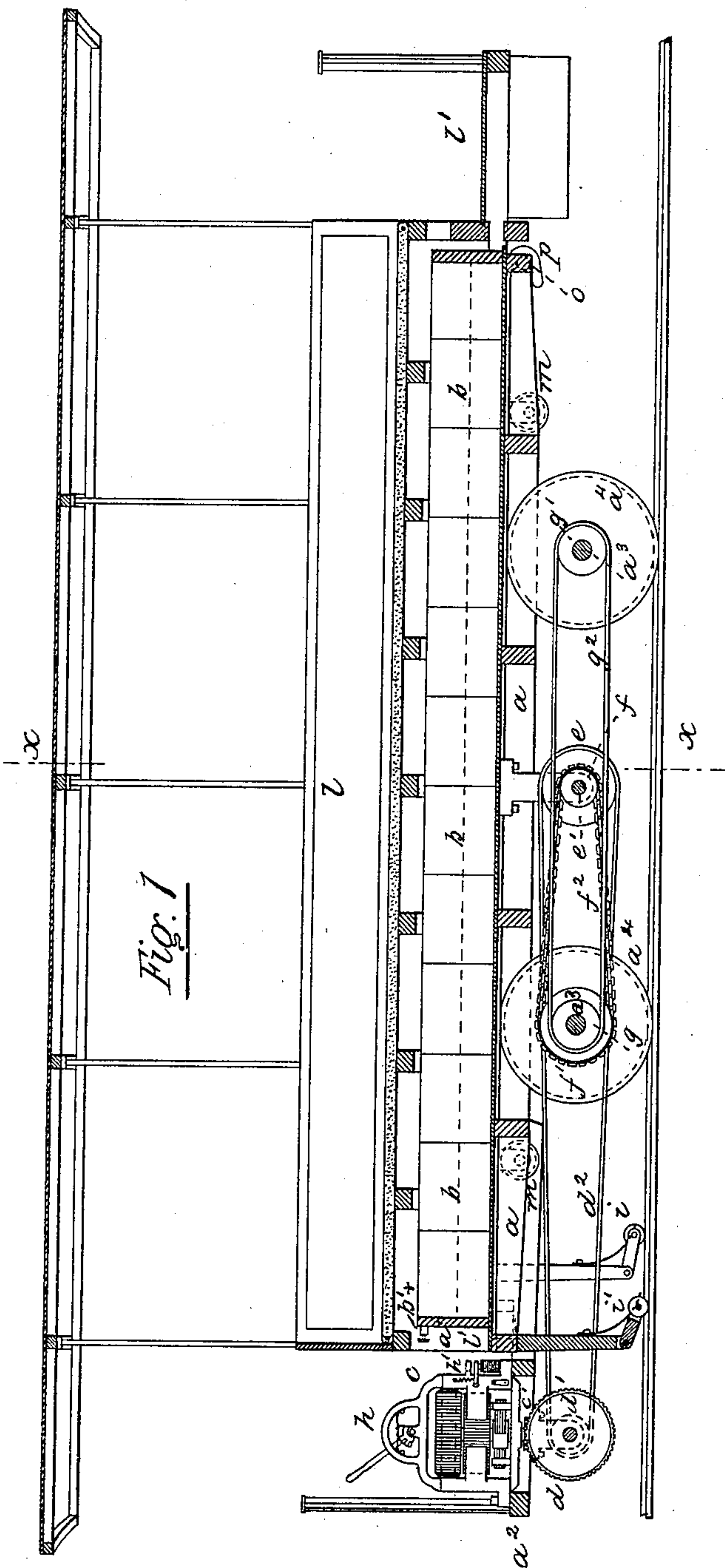
(No Model.)

3 Sheets—Sheet 1.

J. M. PENDLETON.
ELECTRIC LOCOMOTION.

No. 323,199.

Patented July 28, 1885.



Witnesses.

H. D. Williams
Chas L Watson

John M. Pendleton.
Inventor.

per Alfred the Lock
Att'y.

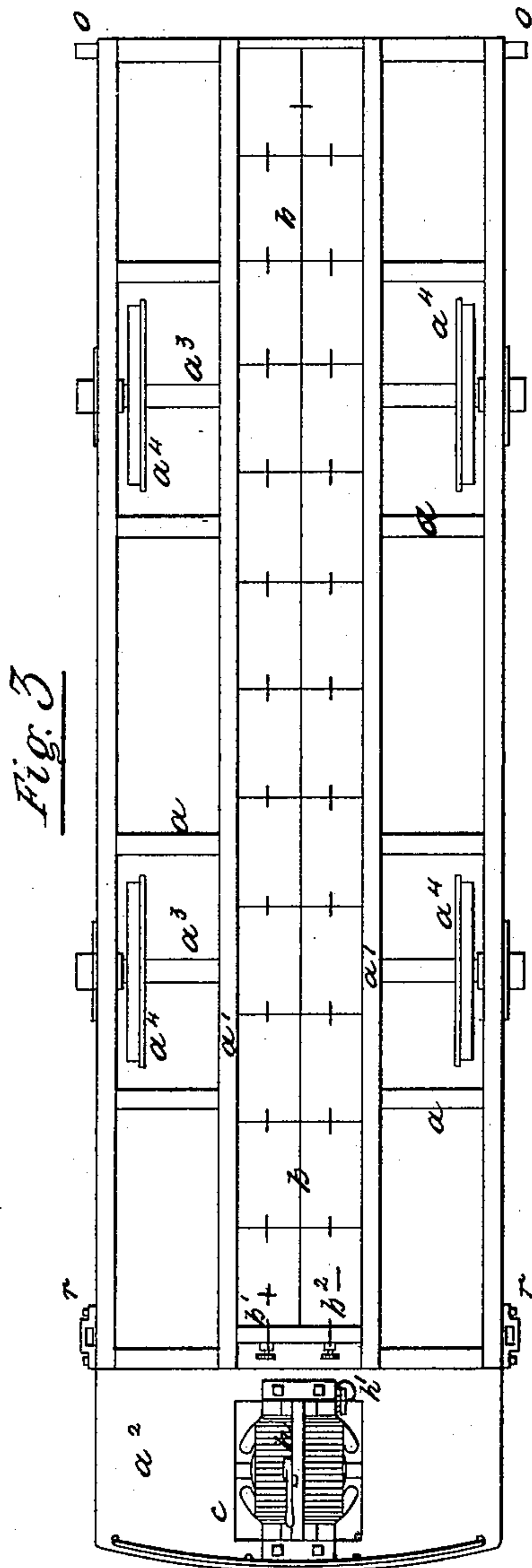
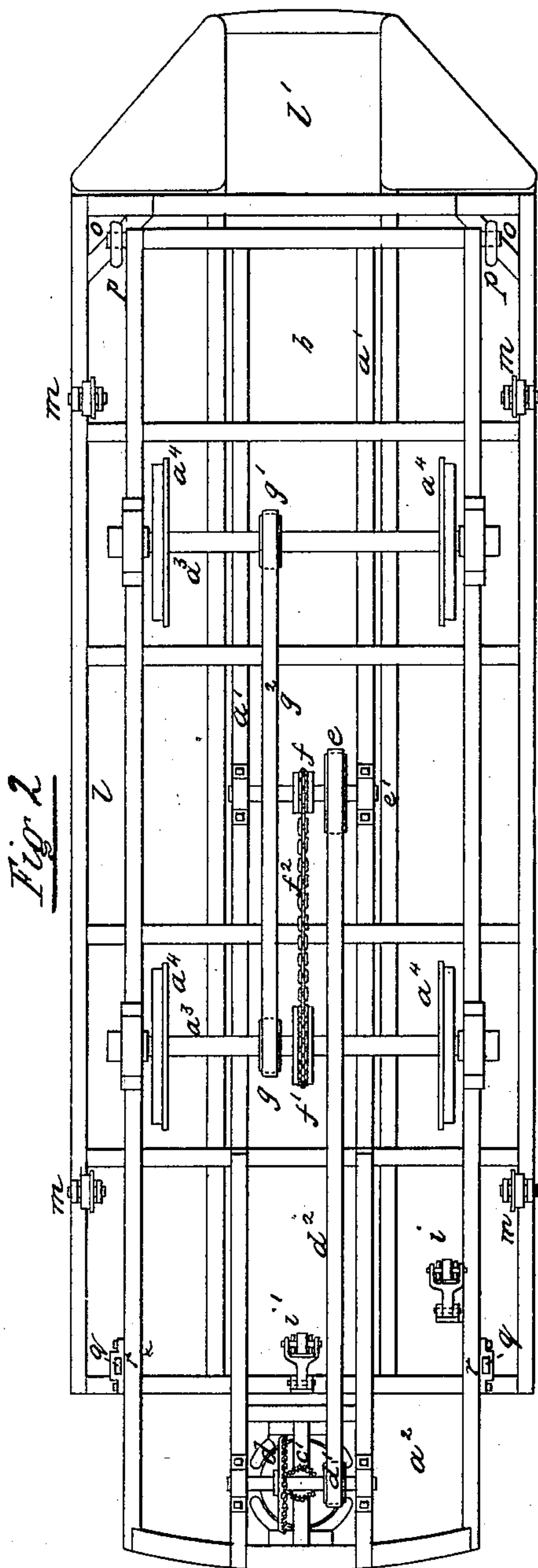
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3 Sheets—Sheet 2.

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ELECTRIC LOCOMOTION.

No. 323,199.

Patented July 28, 1885.



Witnesses.

H. D. Williams

Chas. L. Watson

John M. Pendleton
Inventor.

per Alfred Hedrick
Atty.

UNITED STATES PATENT OFFICE.

JOHN M. PENDLETON, OF NEW YORK, N. Y., ASSIGNOR TO THE EQUITABLE ELECTRIC COMPANY, OF SAME PLACE.

ELECTRIC LOCOMOTION.

SPECIFICATION forming part of Letters Patent No. 323,199, dated July 28, 1885.

Application filed March 5, 1885. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. PENDLETON, a citizen of the United States, residing at New York, county and State of New York, have invented certain new and useful Improvements in Electric Locomotion, of which the following is a specification.

This invention relates to electric locomotion, and embraces novel and useful features in a system operated by self-propelling cars, whereby such cars are adapted to be used on lines provided with means for supplying the electric current to the cars while in motion; and it also embraces improvements in self-propelling cars, which consist in making the car-body detachable from the motor or truck, said motor-car comprising the wheels, axles, and suitable frame-work, and containing accumulators or storage-batteries and the electromotor permanently attached thereto, and constituting the running-gear of the detachable car-body when applied thereunder. The motor-car is constructed to be moved from under the car-body at the termini or charging-stations of the road, the car-body being there supported on suitable frame-work. This admits of the motor-car being replaced by another motor-car whose store of electrical energy in the accumulators or storage-batteries has been renewed, said change of motor-cars taking place while the car-body is being unloaded and reloaded, thus saving considerable time in the operation of electrical railways working under this system of self-propelling cars.

To fully describe the construction and operation of my improvements, I will now refer to the accompanying drawings, in which—

Figure 1, Sheet 1, is a longitudinal central sectional elevation of my improved electric locomotive or motor-car and car-body. Fig. 2, Sheet 2, is an under side view of the same. Fig. 3, Sheet 2, is a plan view of the motor-car. Fig. 4, Sheet 3, is a transverse section of Fig. 1, taken on line $x x$. Fig. 5, Sheet 3, represents the motor-car about to leave the car-body. Fig. 6, Sheet 3, represents the motor-car entirely detached from the car-body; and Fig. 7, Sheet 1, is a diagram view showing the electrical connections of the motor, battery, &c.

The body or truck a of the motor-car con-

sists of suitable frame-work having the bearing boxes of the wheels attached thereto in the ordinary manner. The two main longitudinal timbers $a' a'$ project up above the top of the car, and constitute the side of the receptacle for the accumulators or storage-batteries $b b$, said batteries being so made as to be permanently fixed on or in the car. One end only of the car is provided with a platform, a^2 , on which is secured the electric motor c , arranged with its armature-shaft vertical, the lower end of which shaft projects below the platform, and is provided with a bevel-pinion, c' , which meshes into the bevel-wheel d , rotating in bearing-brackets depending from the platform a^2 . A pulley, d' , on the shaft of this bevel-wheel d is connected by the belt d^2 to the pulley e , secured to a transverse shaft, e' , located at the center of the car, and this shaft e' is connected to one of the axles a^3 of the wheels a^4 by means of the chain-wheels $f f'$ and chain belt f^2 , the two axles $a^3 a^3$ being connected together by the pulleys $g g'$ and belt g^2 . The object of connecting the shaft e' to the axle a^3 by means of a chain belt is to compensate for the vertical movement of the car and shaft e' relatively to the axles $a^3 a^3$, as said chain belt does not require to be perfectly tight to insure positive motion from the driving to the driven chain-wheel. The sizes of driving-pulleys and gears and driven pulleys and gears are so proportioned as to reduce the number of revolutions at which it is necessary to run the motor to obtain effective results therefrom to the speed which it is desired to impart to the axles $a^3 a^3$.

The accumulators or storage-batteries $b b$, permanently attached to the car in the box formed by the two longitudinal timbers $a' a'$, have their terminals at b' and b^2 , (marked + and —,) which are connected to a commutator on the motor adapted to pass the electric current thereto, according to the direction it is desired to run the motor.

The electromotor used is of that class in which the conducting-wires of the armature and field-magnet system are joined in multiple arc, so that the current is divided between them, and is caused always to flow through the armature in one direction, and its direction through the field-magnet wire, the ends

of which are joined to the contact-blocks of the commutator or pole changer, is changed, according to the direction in which it is desired to run the motor.

Between one of the terminals, b^2 , and the commutator h is placed the automatic switch h' , to which are joined the contact rollers or brushes i i^2 , carried by brackets from the bottom of the car, so as to pass the current to the motor or accumulators, or to both, from conductors along the track, one of which may be one of the rails. The object of this provision in the construction is to enable electric cars, which carry their own source of electricity, to be run on lines of greater length than the storage-battery carried thereby is capable of supplying current for. In such case part of the line can be provided with fixed conductors connected to a source of electricity, the motor receiving current therefrom, which current can also be passed through the storage-batteries to charge them while the car is traveling over the part of the line so provided with conductors, so that when the car reaches the part of the line or a siding or branch track unprovided with conductors the stored energy in the accumulators is utilized to drive the motor.

The diagram view, Fig. 7, clearly indicates the connections and devices. In this view c represents the motor, on which is placed the commutator h , consisting of a pivoted plate of insulating material provided with two outside metal blocks, j and j' , connected to one terminal, c^3 , of the motor, and a central block, j^2 , connected to the other terminal, c^2 , of the motor. One of the terminals of the battery b is connected to the fixed contact-spring k , and the other terminal to the armature h^2 of the automatic switch, which armature h^2 also joins the contact roller or brush i , and is upheld by a spring against the stop h^3 . This stop h^3 is connected to the fixed spring k' , and also to the other contact roller or brush, i' , the conductor which joins it to the brush i' first passing around the iron core of the automatic switch to form the coil thereof.

The blocks j j' j^2 on the plate of the commutator are so shaped and arranged that when the plate is placed in one position the + terminal of the battery b , by the spring k , is joined to the block j , and the other terminal of the battery, by the armature h^2 and the contact-spring k' , is connected to the central block, j^2 , thus causing the battery-current to flow through the motor in one direction. When the plate is placed in another position, the positive spring of the battery is on the block j^2 and the negative spring on the block j' , thus causing the current to flow through the motor in the opposite direction; or the plate may be placed so that both contact-springs k k' bear on the block j , as shown, and in this position the motor is cut out of the circuit, which is required to be done when the battery is being charged through the contact rollers or brushes i i' , the car being stationary at the charging-station, or at any part of the line provided

with the conductors from the fixed source of electricity. In this case, the brush i' being in contact with the positive rail or conductor, and the brush i on the negative rail or conductor, the charging-current passes through the coil of the automatic switch h' to the stop h^3 , through the armature h^2 , and to the negative rail or conductor. The magnet immediately attracts the armature away from the stop h^3 , causing the current to flow through and charge the secondary battery b . Now, assuming that the commutator is set so that the charging-current also passes through the motor, and assuming that the car is thereby moving along the rails, the motor will be actuated and the accumulators charged by current from the fixed source of electricity until the car passes onto a part of the rail unprovided with the supply-conductors. As soon as this occurs, the current ceases to flow through the coil of the automatic switch h' , and its armature is immediately brought in contact with the stop h^3 , thus closing the circuit of the accumulator and motor. Said motor can then be actuated by the accumulator in either direction, according to which two of the three blocks j j' j^2 of the commutator h the springs k k' are caused to bear against. The motor is stopped by setting the commutator so that both the springs k k' bear on the insulated plate of the commutator.

The switch h^4 is for the purpose of breaking the charging-conductor circuit on the motor when necessary.

The detachable car-body l is shown as being of the open central-seat construction, but is provided with a platform, l' , and entrance-steps at one end only, and on its under side are secured the small bearing-wheels m m , by which it is supported on the fixed supporting-frame n , located at the charging-stations, when the motor-car is run from under the car-body, as shown at Fig. 6, the rails s at such place being slightly inclined to allow the motor to clear the car-body, and the car-body and motor-car are automatically connected together by the following means:

Transversely-projecting pins o o , secured to each side of the motor car or truck a , engage in hooks p p , secured to the bottom of the car-body near the end at which the platform l' is situated, and from the other end of the car-body depend the pins q q , which pass into sockets r r , secured to the motor car or truck near its platform.

The manner in which the motor car or truck takes up the car-body is as follows: The car-body rests on the fixed supporting-frame n , and the motor-car is run up the inclined rails, as shown at Fig. 6, so as to pass under the car-body. The projecting side pins, o o , of the motor-car engage in the hooks p on the car-body, the downwardly-projecting pins q q of the body being then directly over the sockets r r of the motor-car. As the motor-car continues to move forward up the inclined rails s , the car-body is carried along with it off from the supporting-frame n , the pins q q entering the

sockets *r r*, and by the time the body-supporting wheels *m* are clear of the supporting-frame *n* the car-body is resting firmly on the motor-car, and securely connected thereto by the hooks *p p*, pins *o o q q*, and sockets *r r*, and if desired a simple locking device may be applied to the pins *q q* and sockets *r r*. The reverse action takes place when the car arrives at the charging-station, the sockets *r r* carrying the body onto the supporting-frame *n* by bearing against the pins *q q* until the sockets *r r* clear the pins *q q*, as shown at Fig. 5. The motor-car is then free to run down the inclined rails clear of the car-body. The accumulators or storage-batteries on the motor-car pass under the centrally-placed seats of the car-body, the end of the car-body being open at this place, *l'*, as shown at Fig. 1, to admit of their passage.

If it is desired to use car-bodies having side seats with a detachable self-propelling motor, then the accumulators or storage-batteries will be arranged in two sets at the sides of the motor-car, so as to pass under the side seats.

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

1. An electromotor-car actuated by self-contained accumulators or storage-batteries and electromotor, in combination with a car-body detachably connected thereto, substantially as set forth.

2. In an electromotor-car, in combination, accumulators or storage-batteries, an electric motor provided with a commutator by which the current from the battery is used to actuate it in either direction, and by which it may be cut out of the battery-circuit, an automatic switch the armature of which is in the circuit of the battery and motor, a contact-brush constructed and arranged to bear on a conductor fixed along the line, and connected to the bat-

tery and motor through the magnet-coil of the automatic switch, and a contact-brush constructed and arranged to bear on another fixed conductor, and joined to the circuit of the battery and motor on the other side of the automatic switch, substantially as set forth.

3. An electromotor-car having a platform at one end and an electric motor secured thereon, and accumulators or storage-batteries permanently attached along the length of the top of the car-truck, in combination with a car-body having a platform at one end and an opening at the other end, through which the accumulators pass when the motor-car and car-body are being connected to or separated from one another, substantially as set forth.

4. The combination, with a car-body having downwardly-projecting hooks at one end and downwardly-projecting pins at the other end, of a motor car or truck having pins projecting from its sides at one end, adapted to engage the downwardly-projecting hooks of the car-body, and sockets at its other end, adapted to receive the downwardly-projecting pins of the car-body, substantially as and for the purpose set forth.

5. In an electromotor-car, in combination, an electric motor having its shaft arranged vertically, a bevel-pinion secured to the lower end of its armature-shaft, a bevel-wheel secured to a shaft parallel with the car-axles, and connecting pulleys and belts, whereby motion is imparted to the axles from the motors, substantially as set forth.

In testimony whereof I have hereunto set my hand, at New York, county and State of New York, this 19th day of February, 1885.

JOHN M. PENDLETON.

Witnesses:

H. D. WILLIAMS,
FLOYD CLARKSON.