

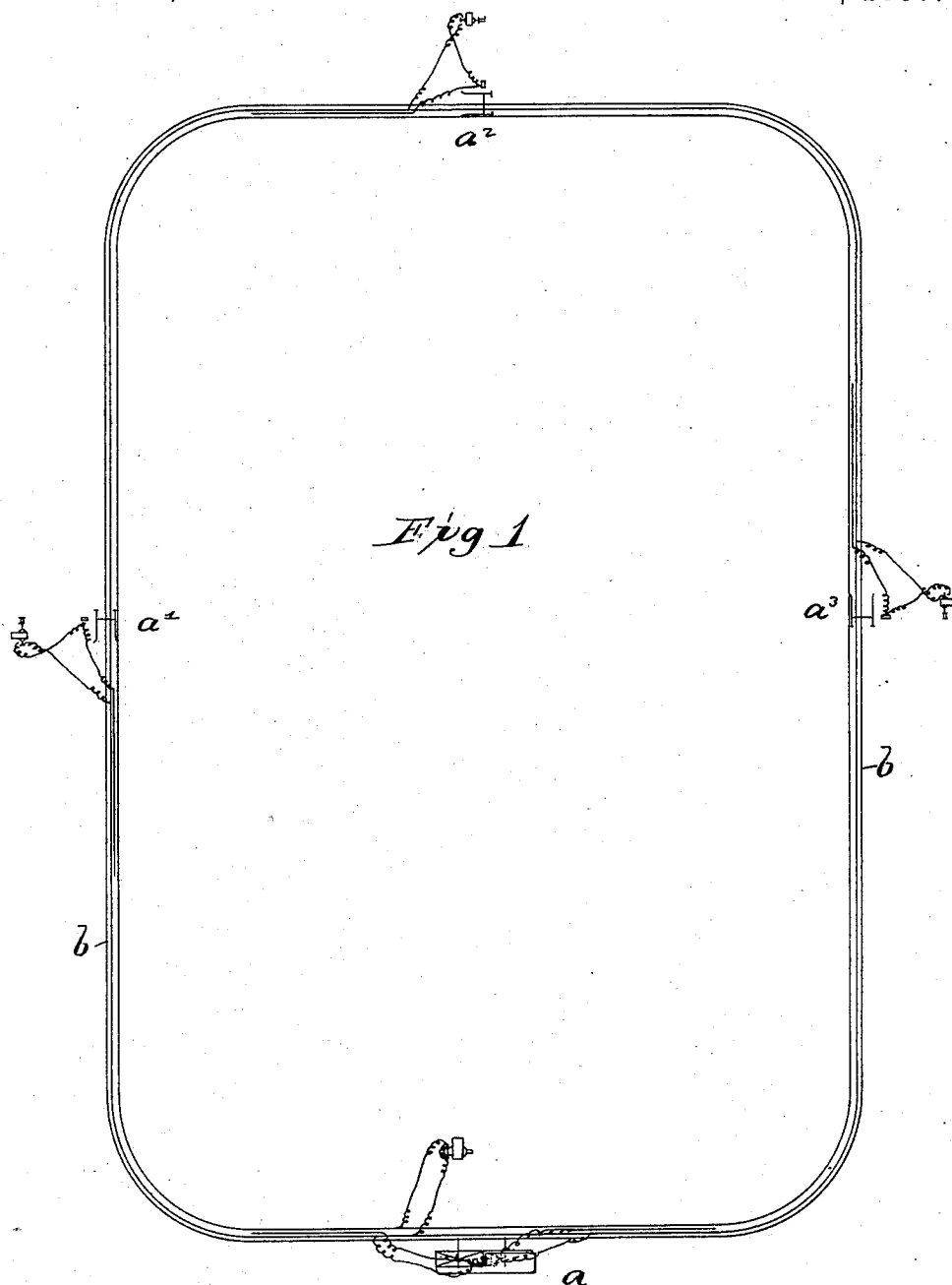
(No Model.)

6 Sheets—Sheet 1.

H. M. NEER.
ELECTRIC CARRIER APPARATUS.

No. 578,939.

Patented Mar. 16, 1897.



Witnesses
G. M. Ridley
Chas. J. Nelson

Inventor
H. M. Neer
By his Attorney
C. M. Stetson

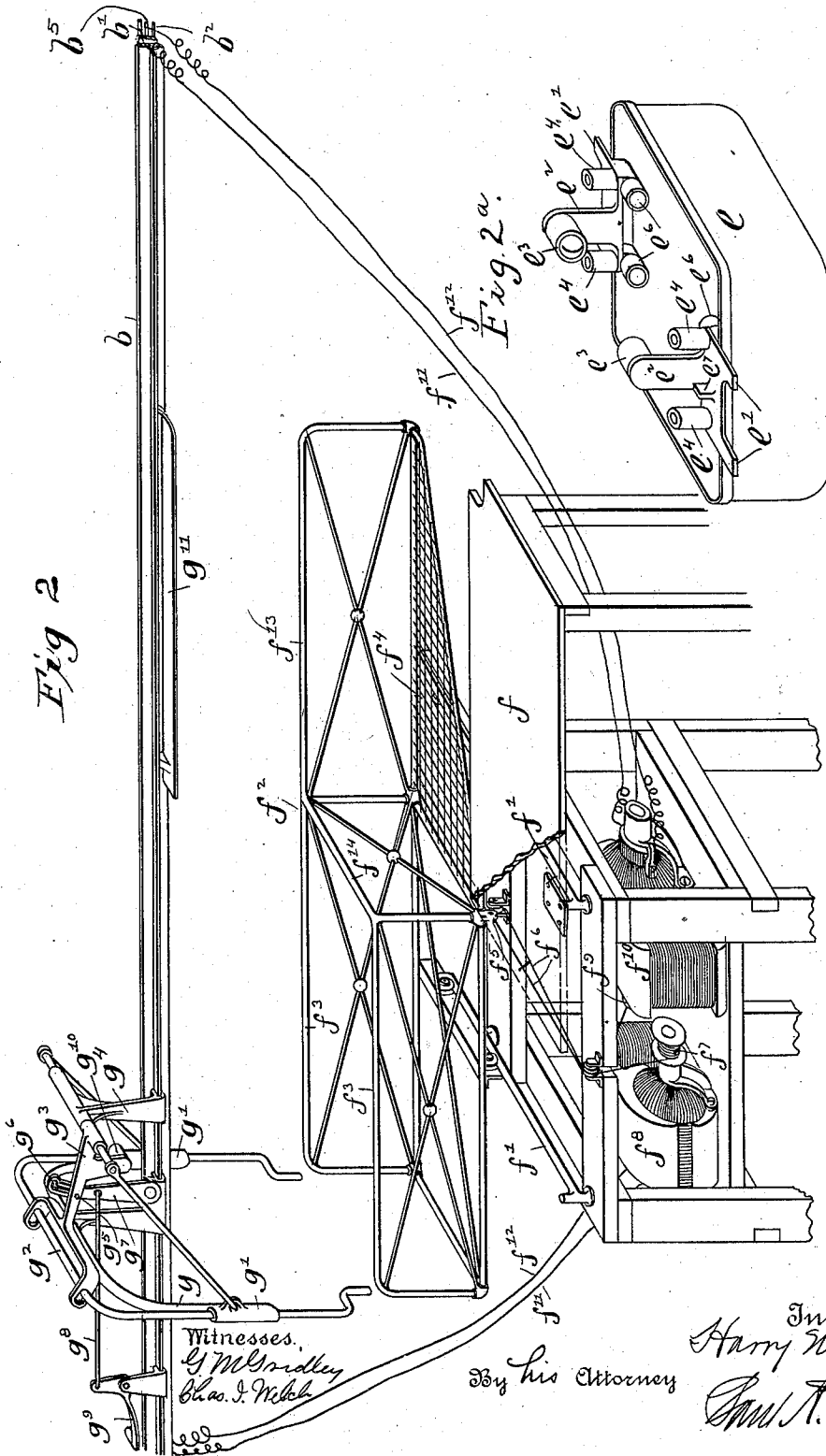
(No Model.)

6 Sheets—Sheet 2

H. M. NEER.
ELECTRIC CARRIER APPARATUS.

No. 578,939.

Patented Mar. 16, 1897.



Witnesses,
E. M. Bradley
Chas. J. Welch

By his Attorney

Inventor
Harry M. Neer
J. A. [Signature]

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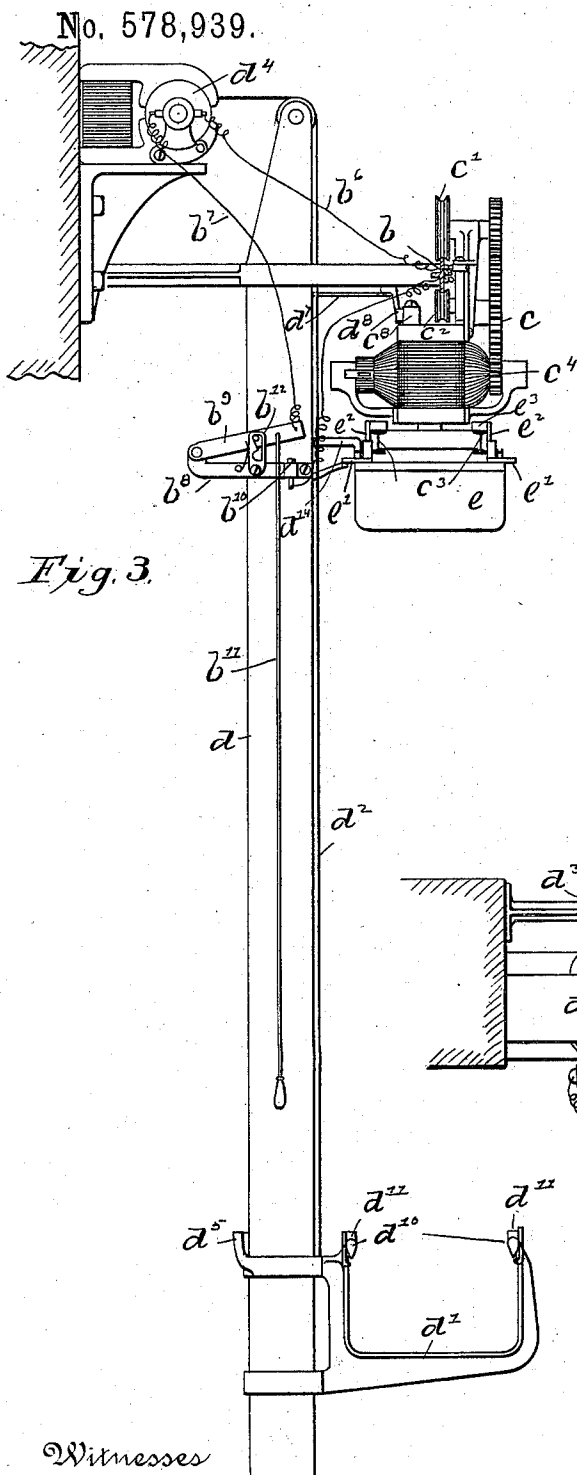


Fig. 3.

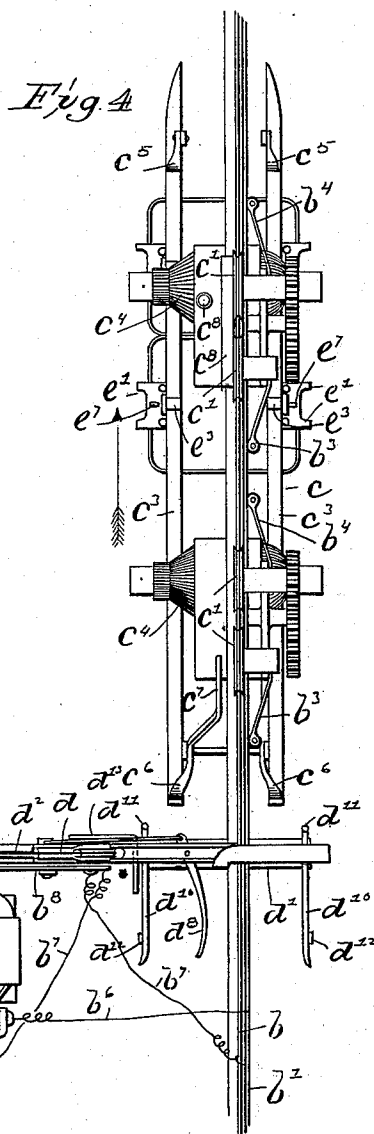


Fig. 4.

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(No Model.)

6 Sheets—Sheet 4.

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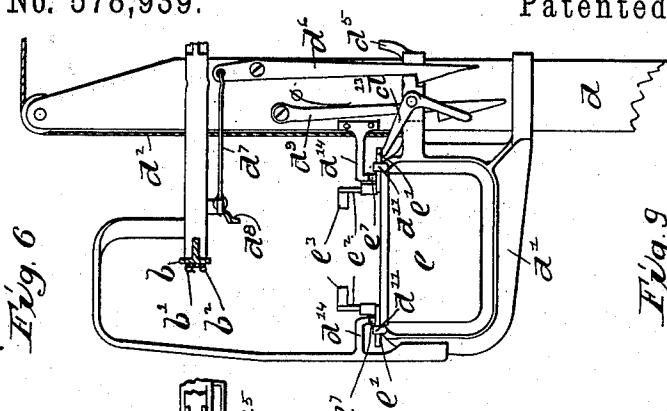


Fig. 6

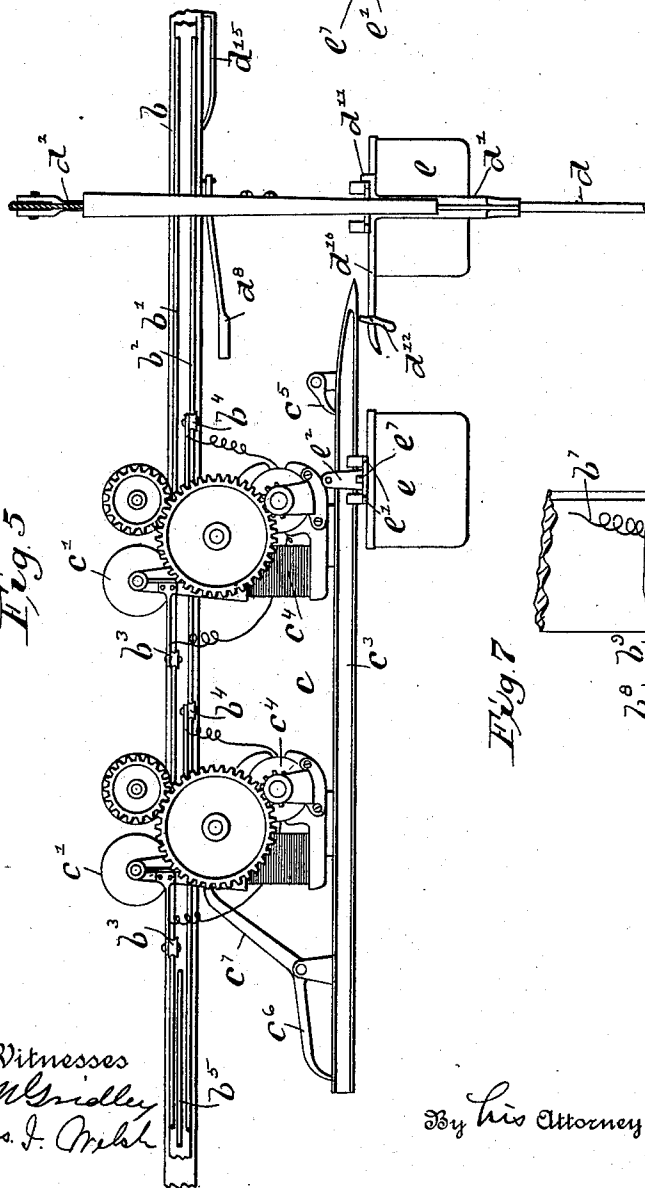


Fig. 5

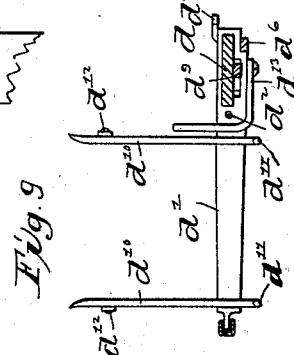


Fig. 9

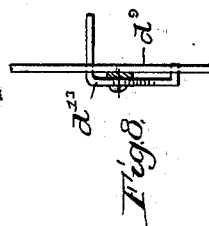


Fig. 8

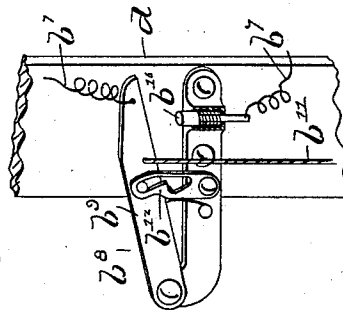


Fig. 7

Witnesses
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Inventor
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Paul A. Mink

(No Model.)

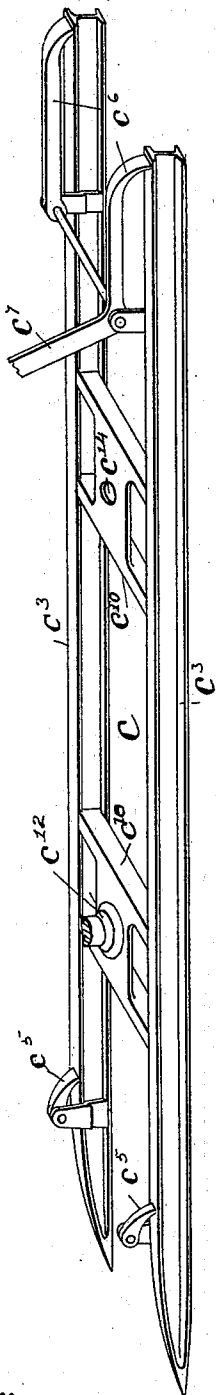
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H. M. NEER.
ELECTRIC CARRIER APPARATUS.

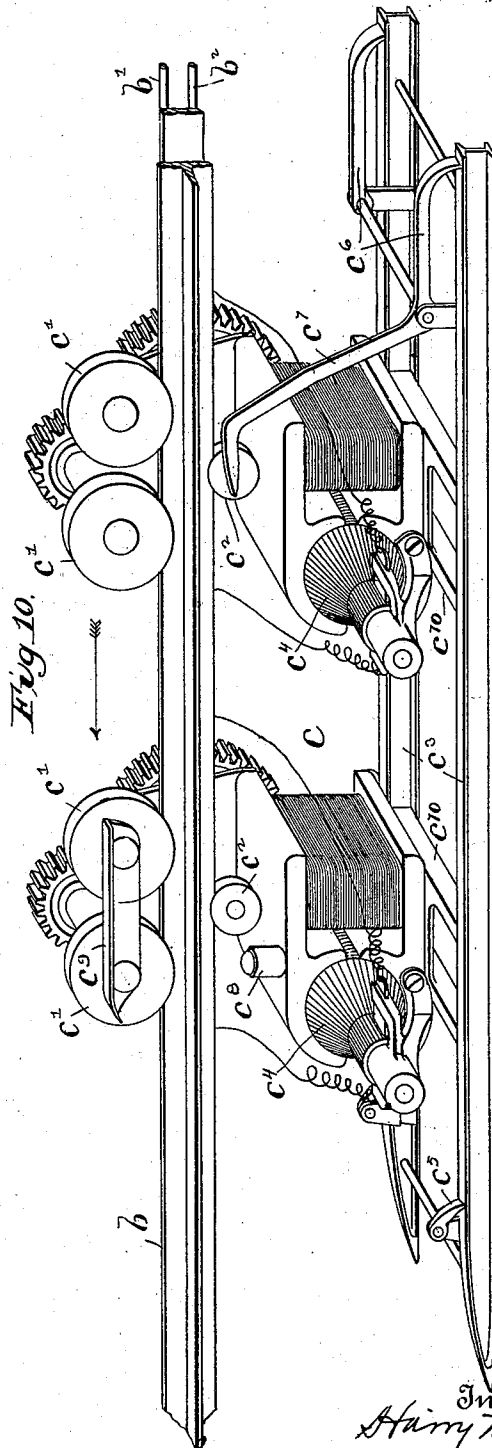
No. 578,939.

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Fig. 11



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(No Model.)

6 Sheets—Sheet 6.

H. M. NEER.
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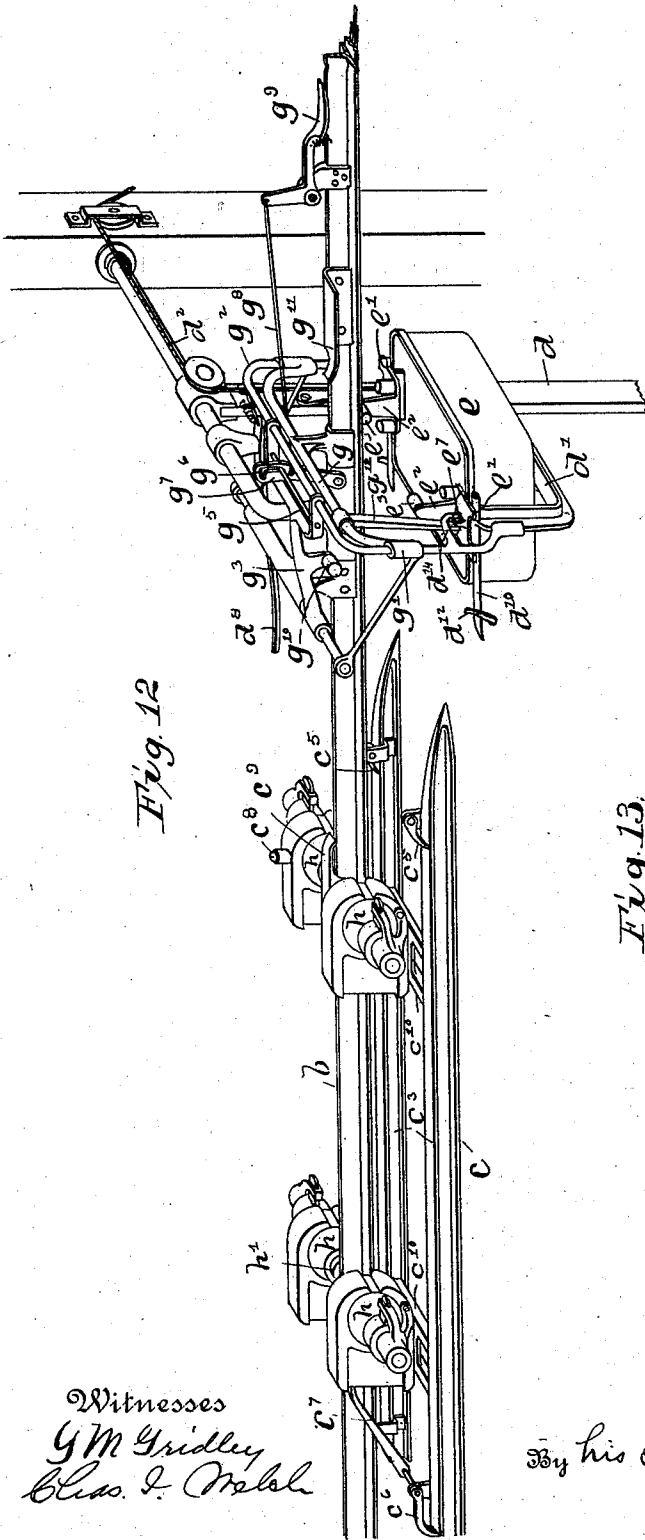


Fig. 12

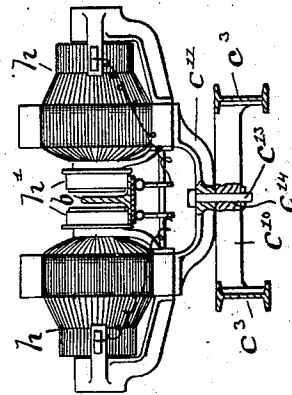


Fig. 13

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Inventor
Harry M. Neer
By his Attorney
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UNITED STATES PATENT OFFICE.

HARRY M. NEER, OF SPRINGFIELD, OHIO, ASSIGNOR TO O. S. KELLY, OF
SAME PLACE.

ELECTRIC CARRIER APPARATUS.

SPECIFICATION forming part of Letters Patent No. 578,939, dated March 16, 1897.

Application filed July 25, 1896. Serial No. 600,560. (No model.)

To all whom it may concern:

Be it known that I, HARRY M. NEER, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Electric Carrier Apparatus, of which the following is a specification.

My invention relates to improvements in electric carrier apparatus; and it especially relates to improvements on the devices shown and described in my prior patent, No. 544,002, dated August 6, 1895.

My invention consists in the constructions and combinations of parts hereinafter described, and set forth in the claims.

In the accompanying drawings, Figure 1 is a diagrammatic view illustrating the circuits and track of my improved carrier. Fig. 2 is a perspective view showing the arrangement of the receiving or terminal station. Fig. 2^a is a perspective view of one of the carrier-receptacles. Figs. 3 and 4 are respectively an elevation and plan showing a sending or way station. Figs. 5 to 9, inclusive, are detail views of some of the parts of the same. Figs. 10 and 11 are perspective views of a portion of the motor car or carrier. Fig. 12 is a perspective showing portions of the same with modifications. Fig. 13 is a sectional view of the motor shown in Fig. 12.

Like parts are represented by similar letters of reference in the several views.

In the drawings, and with particular reference to Fig. 1, *a* represents a receiving or what may be termed a "terminal" station. *a'*, *a*², and *a*³ are sending or way stations. If the device is to be used as a store-service apparatus, then the station *a* will be the wrapper's or cashier's station, and *a'*, *a*², *a*³ substations for the clerks or departments.

In my carrier system a circular track is preferably employed, and one or more carriers are adapted to run thereon and travel entirely around said track, so as to pass each station. Means are provided by which baskets or receptacles placed at one station are received or deposited, as the case may be, by or from the carrier; and this invention relates more particularly to the means for automatically supplying the receptacles to the moving carriers or discharging them therefrom without stopping the said carriers.

The track *b*, which may be of any suitable construction, is adapted to receive and support the motor-car *c*, which is provided with suitable track-wheels *c'*, which are preferably grooved to fit the track-rails, and oppositely-arranged auxiliary wheels *c*², which run under the rails and hold the car firmly in position. The car is substantially nothing more than a skeleton frame, which is provided at the bottom with two longitudinal supporting-rails *c*³, to which are secured the motors *c*⁴, which are connected by suitable gearing to the track-wheels *c'*. The rails *c*³ are preferably beveled or pointed at one end, as shown in Figs. 11 and 12, and are provided with pivoted pawls *c*⁵ at one end, which operate by gravity, and at the other end with pivoted latches *c*⁶, which are operated by a cam-lever *c*⁷.

At each substation there is a vertical support or guide *d*, on which is adapted to travel a U-shaped frame *d'*, to which is attached one end of a flexible cord or cable *d*², the other end being connected to a drum *d*³ on the end of an armature-shaft of an electric motor *d*⁴.

The track *b* is supplied with conductors *b'* and *b*², with which suitable collectors *b*³ and *b*⁴ (see Fig. 5) on the carrier contact to furnish current for the motors.

At suitable intervals in the track and adjacent to the stations I employ a third conductor *b*⁵, normally inactive, but adapted, as the carrier passes the same, to be electrically connected with the positive wire *b'* by the collector *b*³, which travels on said positive wire. From this auxiliary conductor *b*⁵ a wire or other connection *b*⁶ extends to the motor *d*⁴, and from said motor a suitable connection *b*⁷ extends through a switch *b*⁸ to the negative conductor *b*². The switch *b*⁸ is preferably provided with a movable lever *b*⁹, adapted to move against a contact-point *b*¹⁰ by the operation of a hand connection *b*¹¹, which leads to the counter or other convenient point for the operator. The switch-lever *b*⁹ is provided with a spring-latch *b*¹², adapted, as the lever *b*⁹ is drawn downwardly, to retain said lever and hold it in contact with the point *b*¹⁰ and thus establish an electric circuit from the auxiliary conductor *b*⁵ through the motor to the negative conductor *b*². If a car should pass now under these circumstances, a connection

will be established by the collector b^3 between the conductor b' and the auxiliary conductor b^5 , thus bringing the motor d^4 in circuit with the main conductors, causing the same to operate so as to wind up the cord or cable d^2 and thus elevate the U-shaped frame d' . This frame d' is provided with a projecting finger d^5 , adapted, as the frame is elevated, to contact with the switch-lever b^9 and force the same out of contact with the point b^{10} , the spring-latch b^{12} being of such construction as to yield under pressure and permit the operation of the switch-lever. The frame d' is thus elevated, and means are provided for retaining it in an elevated position, which may be described as follows:

Pivoted to the guide or support d is a latch d^6 , the upper end of which is connected by a link d^7 to a swinging lever d^8 , pivoted in the line of travel of the motor-car. As the supporting-frame d' is elevated the latch d^6 is adapted to engage and retain the same. Adjacent to the pivoted latch d^6 is an auxiliary latch d^9 , also adapted to engage the frame d' , but at a different point and after the same has been released by the latch d^5 in the manner hereinafter more fully described.

The supporting-frame d' is adapted to receive the receptacles e , which are to be supplied to the moving car. These receptacles each have laterally-extending projections e' , adapted to rest on the sides of the frame d' , and upwardly-extending fingers e^2 , having thereon horizontally-arranged rollers e^3 , adapted to be engaged by the rails c^3 of the moving car, so as to be supported thereon.

It should be stated that the frame d' has at the top supporting-rails d^{10} , on which the baskets or receptacles are adapted to rest, these rails each having near one end a stop-lug d^{11} and at the opposite end a pivoted latch d^{12} .

Pivoted to the yoke or frame d' , on one side thereof, is a bell-crank lever d^{13} , one end of which is adapted, when the yoke or frame is raised, to contact with the end of the latch d^9 and the other end to contact with the projection e' on the receptacle when said receptacle is placed on the rails d^{10} of said yoke or frame, the construction being such that when a receptacle is placed on said yoke or frame and the frame elevated to its position in proximity to the track-rails the latch d^9 will be moved and held out of contact with said yoke or frame by the bell-crank lever d^{13} . Each car is provided with a projection c^8 , adapted, as the car passes a station, to contact with the lever d^8 , so as to move said lever laterally and thus move the pivoted latch d^9 until it disengages the supporting yoke or frame d' . Prior to the time that the lug c^8 on the car strikes the lever d^8 at the station the beveled ends of the rails c^3 have entered under the rollers e^3 on the receptacle which is supported on said yoke or frame. The latch d^6 , being operated when in this position, causes the frame d' to drop, thus withdrawing said frame

from the receptacle e , so that said receptacle becomes supported on the rails of the car, and the stop-lug d^{11} is withdrawn therefrom, permitting the receptacle to pass onward with the car. As the receptacle e is released from the frame d' the bell-crank lever d^{13} releases the latch d^9 and the frame d' is caught by said latch and retained in this position a short distance below the position which it previously occupied. The basket or receptacle is thus transferred from the supporting-frame at the station to the traveling car and travels with it until it reaches the terminal or receiving station, which will now be described, particular reference being had to Fig. 2.

At the terminal station there is preferably provided a counter or table f , which is supported on a suitable framework, in which are tracks or ways f' . These tracks or ways are adapted to support a traveling frame f^2 , having at one end supporting-rails f^3 and at the other end a platform f^4 , which is adapted, as the frame is moved laterally, to slide under the counter or table f . There is connected to a lug or projection f^5 on the frame or table f^2 a flexible cord or cable f^6 , one end of which passes around a drum f^7 on the armature-shaft of a motor f^8 , the opposite end passing in a similar manner, but in the opposite direction, around a drum f^9 on a motor f^{10} . These respective motors are connected by suitable connections f^{11} and f^{12} to the main and auxiliary conductors b' and b^5 in the same manner as described for the substation, the respective motors being connected to the main and auxiliary conductors on opposite sides of the receiving-station, so that each time a car passes by the receiving-station the motors are alternately charged, and by their rotation cause the frame f^2 to travel laterally on the tracks or ways f' . When moved outwardly from the counter f , the frame f^2 stands substantially under the track b , with the rails f^3 in line with the projections e' of the receptacle e , which is carried by said car.

There is supported near one end of the rails f^3 and on the track b a U-shaped frame g , the extremities of which are formed with sleeves g' , through which are extended the extremities of a movable yoke g^2 . This yoke g^2 passes at its upper end through the perforated extremity of a bifurcated lever g^3 , pivoted at one end to a suitable supporting-standard g^4 , also supported on the track b , and is provided with a laterally-projecting pin g^5 , which operates in a slotted opening g^6 in the end of a pivoted lever g^7 on the frame g , which lever is connected by a link g^8 to a bell-crank cam-lever g^9 , pivoted to said track in proximity to said yoke. The pivoted lever g^3 is provided with a projection g^{10} , which stands slightly above the track b and in line with the projection on the cam-lever g^9 . The car is provided with a camway c^9 , adapted, as the car passes under the frame g , to contact successively with the levers g^3 and g^9 . The first operation rotates the lever

g^3 , so as to raise the yoke g^2 through the sleeves g' until the pin g^5 has engaged in the top of the slotted opening g^6 , which is recessed to engage and hold said pin. The lower ends of the yoke g^2 are thus elevated above the rails f^3 of the traveling frame f^2 and held in this position until the motor passes the cam-lever g^9 , which is tripped by the cam-track c^9 , moving the lever g^7 , so as to disengage the pin g^5 on the swinging lever g^8 , thus lowering the ends of the yoke g^2 to their normal positions.

Secured to the track b at a point above the platform f^4 of the traveling frame, when said frame is in its operative position, is a cam-track g^{11} , adapted, as the car passes, to engage the end of the lever c^7 on the car, and thus elevate the pivoted latches c^6 on the rear end of the rails c^3 of said car.

It should be stated that the platform f^4 is depressed below the rails f^3 of the traveling frame f^2 to a distance slightly more than the depth of the traveling receptacle, said platform having at one end and one side guard-rails f^{13} f^{14} .

The operation of this mechanism is as follows: As the car approaches the receiving-station the motor f^{10} is caused to operate, thus moving the traveling frame f^2 to a position under the track. As the car reaches the cam-track g^{11} the latches c^6 are raised, the receptacle comes in contact with the rail f^{14} , and is dropped onto the platform f^4 with one end resting on the table or counter f . If there are any receptacles to be returned by the car, they are placed on the rails f^3 , being retained thereon by the downwardly-projecting ends of the yoke g^2 until the ends of the rails c^3 pass under the projections e^3 , at which

time the yoke g^2 is withdrawn by the cam-track c^9 on the car coming in contact with the lever g^8 , as before described, the yoke being returned to its normal position as the car passes on by the contact of said cam-track c^9 with the cam-lever g^9 . At the same or about the same time an electrical connection is established by the moving car between the main conductors and the motor f^8 , which causes the traveling frame f^2 to move laterally, so as to deposit any receptacles which have been discharged from the car onto the counter f . It will thus be seen that the operation of supplying and discharging the receptacles to and from the moving car is thoroughly automatic, the operator simply placing them on the respective frames at the stations and making the necessary connections. The receptacles are returned to the substations in a similar manner. Each substation has projections d^{14} , which stand in line with the traveling receptacles. These projections and corresponding projections e^7 on the receptacles are varied laterally or vertically, as the case may be, so that said projections will contact with only such receptacles as belong to that station. The moving car passing a substation will have the latches c^6 thereof ele-

vated by a cam-track d^{15} , secured to the track b , and the projections d^{14} , engaging with the projections on the receptacle, will discharge the receptacle from the rails c^3 onto the frame-rails d^{10} . As the receptacle is dropped from the car the projection e^7 engages the bell-crank lever d^{13} , which releases the latch d^9 and allows the frame d' to descend, thus bringing the receptacle to the counter from which it started.

As before stated, the projections e^2 on the receptacles e are preferably provided with antifriction-rollers e^3 . Similar rollers are also preferably arranged vertically on each side of the projections e^2 to engage the sides of the rails c^3 on the car and thus prevent lateral movement of the receptacle. If desired, similar rollers e^6 may be provided below the rollers e^3 to contact with the bottom of said rails, thus holding the receptacles against unnecessary movement on the rails and causing them to move from end to end of said rails in a steady and uniform manner.

It is understood that the receptacles which are discharged at the receiving-station will be returned therefrom in the order in which they are received, so that no matter how many receptacles may be on a car at one time they will always be discharged at the proper station and in the order in which they are received from said stations.

In Fig. 12 I have shown a modification of the parts in use at the substations for delivering the receptacles to and from the carriers. In this modification I employ constructions similar to those at the receiving-station for retaining the receptacles on the supporting-stand until the carrier has engaged the same. The reciprocating U-shaped frame g^2 has projections d^{14} , which normally engage with the projections e^7 on the baskets or receptacles, the stop projections d^{11} on the supporting-rails of the frame d' being dispensed with. The receptacle is thus held on the rail d^{10} until the projection c^9 engages with the roller g^{10} , as before described, when the said receptacle is released and passes on with the carrier. The receptacle is discharged from the carrier and returned to its normal position by stop projections g^{13} and the other mechanism heretofore described in connection with said substation.

It will be seen from the construction above described that I provide a carrier apparatus in which the baskets or receptacles are automatically conveyed to and placed onto the carrier, discharged at the proper receiving station, and returned and automatically delivered to the operator at the substation.

In Figs. 11, 12, and 13 the preferable form of motor is illustrated. In this construction the rails c^3 , together with the cross-bars c^{10} , constitute the lower frame of the motor. To this frame there is connected two independent trucks, each formed by a frame-support c^{11} , carrying at each end an independent motor, the armature h of which is connected di-

rectly to a track-wheel h' , which runs on the track b . The front trucks are pivoted to the cross-bar c^{10} by a ball-and-socket connection c^{12} , as shown in Fig. 11, the rear trucks being
 5 connected to said frame by a pin c^{13} , which passes through a suitable opening c^{14} in the other bar c^{10} . By this construction each of the track-wheels is independent from each of the other track-wheels and is operated inde-
 10 pendently by an independent motor, which motor is connected directly to the track-wheel and stands in line therewith, so that the center of gravity of the motor is supported above the track-rails, while the center of gravity of the frame and the receptacles carried thereby
 15 is supported below the track-rails, thus equalizing the weight of the motor-car and preventing oscillation thereof in turning curves.

Having thus described my invention, I
 20 claim—

1. In a carrier apparatus, a carrier-track and working conductors and substations along the line of said track, stationary auxiliary conductors adjacent to and parallel
 25 with said working conductors, and motors at said substations adapted to be thrown in circuit with said auxiliary conductors, a traveling car on said track, and means on said car for connecting said auxiliary conductors
 30 with the working conductors, substantially as specified.

2. The combination with a track and a car operating thereon, main conductors adjacent to said track, electric motors on said car supplied from said main conductors, substations
 35 along said track and receptacle-supporting devices at said substations, motors at said substations for operating said supporting devices, and means, as described, for throwing
 40 said station-motors into circuit with the main conductors by the operation of said car, substantially as specified.

3. The combination with a track and a car thereon, main conductors adjacent to said
 45 track, an electric motor or motors on said car supplied from said conductors, substations having supporting devices for carrying receptacles adapted to be engaged by said car, and traveling means at said substations for moving
 50 said receptacles into and out of position to be engaged by said car, and motors at said substations to operate said traveling devices, and branch circuits including said station-motors adapted to be connected to the main
 55 conductors by the operation of the traveling car, substantially as specified.

4. A track, a car traveling on said track, electric motors on said car, and conductors adjacent to said track to supply said car-motors
 60 a traveling frame adapted to support one or more receptacles thereon, and an electric motor for operating said traveling frame, a normally open branch circuit from the main conductors through said station-motor, and
 65 means for closing said branch circuit to cause the current to pass through said station-motor when the traveling car has reached a pre-

determined position, substantially as specified.

5. The combination with a track and an
 70 electric carrier thereon, a traveling frame adapted to support receptacles to be engaged by said carrier, a motor for operating said traveling frame, and means, substantially as described, for operating said motor whenever
 75 the car has reached a predetermined position, substantially as specified.

6. The combination with a traveling frame and a receptacle thereon, a track having a
 80 traveling car thereon adapted to engage the receptacle on said frame, an electric motor for operating said traveling frame, said motor being in a normally open circuit including a switch as described, and means in said circuit
 85 for establishing an electrical connection through said motor by the operation of the traveling car when said switch has been closed, substantially as specified.

7. The combination with the traveling car and its supporting-track, of a substation hav-
 90 ing a traveling frame, supporting-rails on said frame for supporting receptacles to be engaged by said car, detachable supports for supporting said frame in proximity to the line
 95 of travel of said car, and means on said car for detaching said supports when the car has engaged the receptacle, substantially as specified.

8. The combination with a track and a car adapted to travel thereon, and a receptacle
 100 carried by said car, a substation having a traveling frame and detachable supports for said frame, one of said supports being adapted to be operated by the moving car to release said frame to cause it to move a limited
 105 distance, and the other support being adapted to be operated by a receptacle on said frame to completely release said frame and cause it to move with said receptacle, substantially as specified.

9. The combination with the track, a car thereon, and a receptacle adapted to be carried by said car, a substation adjacent to said
 110 track, a traveling frame at said substation, an electric motor arranged in a circuit adapted to be closed by said car to move said traveling frame, and two independent supports for said frame adapted to support the same
 115 when moved by said motor, means on said car for detaching one of said supports to produce a limited movement of said frame, and an intermediate device adapted to be operated by said receptacle to detach the second support
 120 from said frame and permit the same to move with said receptacle, substantially as specified.

10. The combination with the track, a car thereon, a receptacle adapted to be carried
 130 by said car, and a traveling frame adapted to support said receptacle adjacent to the line of travel of said car, stops on said frame to prevent a movement of said receptacle, and two independent detachable supports for said frame, one of said supports having means op-

erated by said car to detach the same to permit the frame to be engaged by the second support when the receptacle is engaged by said car, and means connected with said second support for detaching the same to permit the frame to move with said receptacle when said receptacle is deposited from said car on said frame, substantially as specified.

11. The combination with the track, a car moving thereon, electric motors on said car, and a main circuit for supplying current to said motors, a station having a moving frame, and a motor for operating said frame, and auxiliary conductors connected to said station-motor adapted by the operation of said car to be brought in circuit with said main conductors, two independent detachable supports for said frame, one of said supports being adapted to be operated by said car to produce a limited movement of said frame, and the other support being adapted to be operated by the receptacle deposited from said car onto said frame, substantially as specified.

12. The combination with the track and a car thereon, a receptacle adapted to be carried by said car, an electric motor or motors on said car, and a main circuit for supplying current to said motor or motors, a traveling frame adjacent to said track, a motor adapted to operate said frame, and an auxiliary circuit including said motor, and means for connecting said auxiliary circuit to the main conductors by the operation of said car, two independent supports for said traveling frame, one of said supports being adapted to be detached by said car, and the other support being adapted to be detached by the receptacle discharged from said car, and a switch in said auxiliary circuit, substantially as and for the purpose specified.

13. The combination with a track, a motor-car thereon, and a main circuit for furnishing electric current to said motor, a series of substations along the line of said track, and receptacles at said substations adapted to be engaged by said car, and a central or receiving station having a traveling frame, and independent motors for operating said frame in opposite directions, and auxiliary circuits from said motors extending to points on said track on opposite sides of said receiving-station, and means for alternately closing said auxiliary circuits as the car approaches and leaves said station to cause said frame to move in opposite directions at said station, substantially as specified.

14. The combination with a track and a car thereon, substations arranged adjacent to said track, and a central or receiving station, a traveling frame at said receiving-station, said frame being divided into two parts, one part being adapted to receive receptacles from said traveling car, and the other part being adapted to support receptacles to be received by said car, removable stops supported adjacent to said track and adapted to retain the

receptacles on said frame, and movable devices connected with said stops to cause said stops to be alternately moved away from and toward said traveling frame as the car passes said central station, substantially as specified.

15. The combination with a track and a car moving thereon, receptacles adapted to be carried by said car, and a frame for supporting said receptacles, movable stops arranged adjacent to said track and adapted to engage said receptacles on said frame, and operating devices adjacent to said track adapted to be successively moved by said car to withdraw and return said stops as said car passes said station, and means on said car for engaging said receptacles, substantially as specified.

16. The combination with a moving car having longitudinal supporting-rails, and a receptacle adapted to be supported in proximity to the line of travel of said car and having engaging projections to engage said rails, said car being provided with friction-rollers adapted to engage on opposite sides and on top of said rails to permit said receptacle to move from end to end of said supporting-rails, substantially as specified.

17. The combination with a moving car and receptacles carried thereon, a movable frame arranged adjacent to the line of travel of said car, and a stationary table adjacent to said frame, said frame being adapted to contact with said receptacles to cause the same to fall partly on said table and partly on said frame, and means, substantially as described, for moving said frame to cause the receptacles to be deposited on said table, substantially as and for the purpose specified.

18. A motor-car consisting of independent trucks, and a frame pivoted to and depending from said trucks, independent motors at each end of said trucks, and track-wheels on the armature-shafts of each of said motors, and a track below said armature-shafts and wheels and on which said wheels run and on which the car is supported whereby the center of gravity of said motors is carried above the track-rails and the center of gravity of the motor-frame and the load below the track-rails, substantially as specified.

19. A motor-car consisting of independent trucks, and a frame pivoted to and depending from said trucks, independent motors at each end of said trucks, and a track arranged between said motors, and track-wheels on the inner ends of the armature-shafts of said motors above and adapted to rest on said track so that the center of gravity of the motors is carried above the track-rails and the center of gravity of the motor-frame below the track-rails, substantially as specified.

In testimony whereof I have hereunto set my hand this 16th day of July, A. D. 1896.

HARRY M. NEER.

Witnesses:

CHAS. I. WELCH,
G. M. GRIDLEY.