No. 816,484. PATENTED MAR. 27, 1906.

S. H. LIBBY.

AUTOMATIC CARRIER.

APPLICATION FILED SEPT. 1, 1904.

Fig. 1.

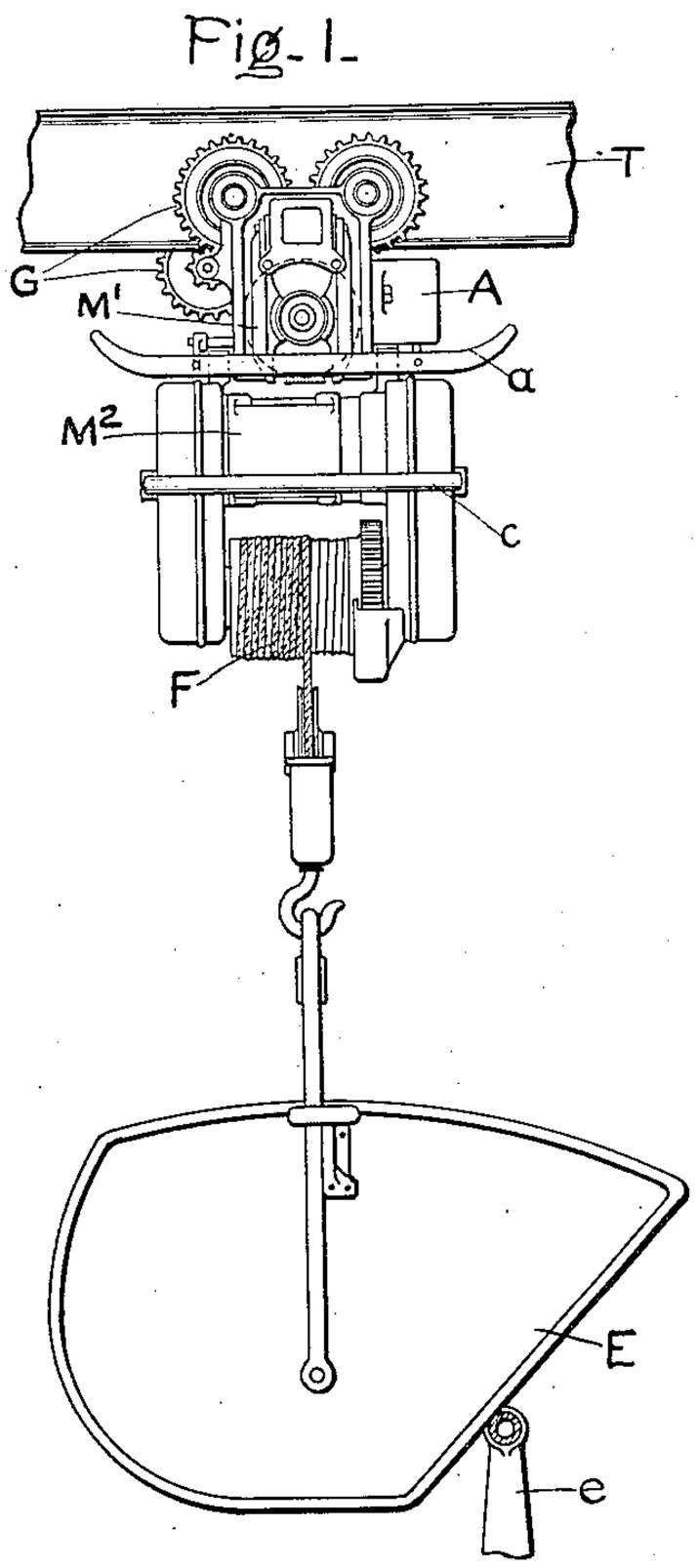


Fig. 2.

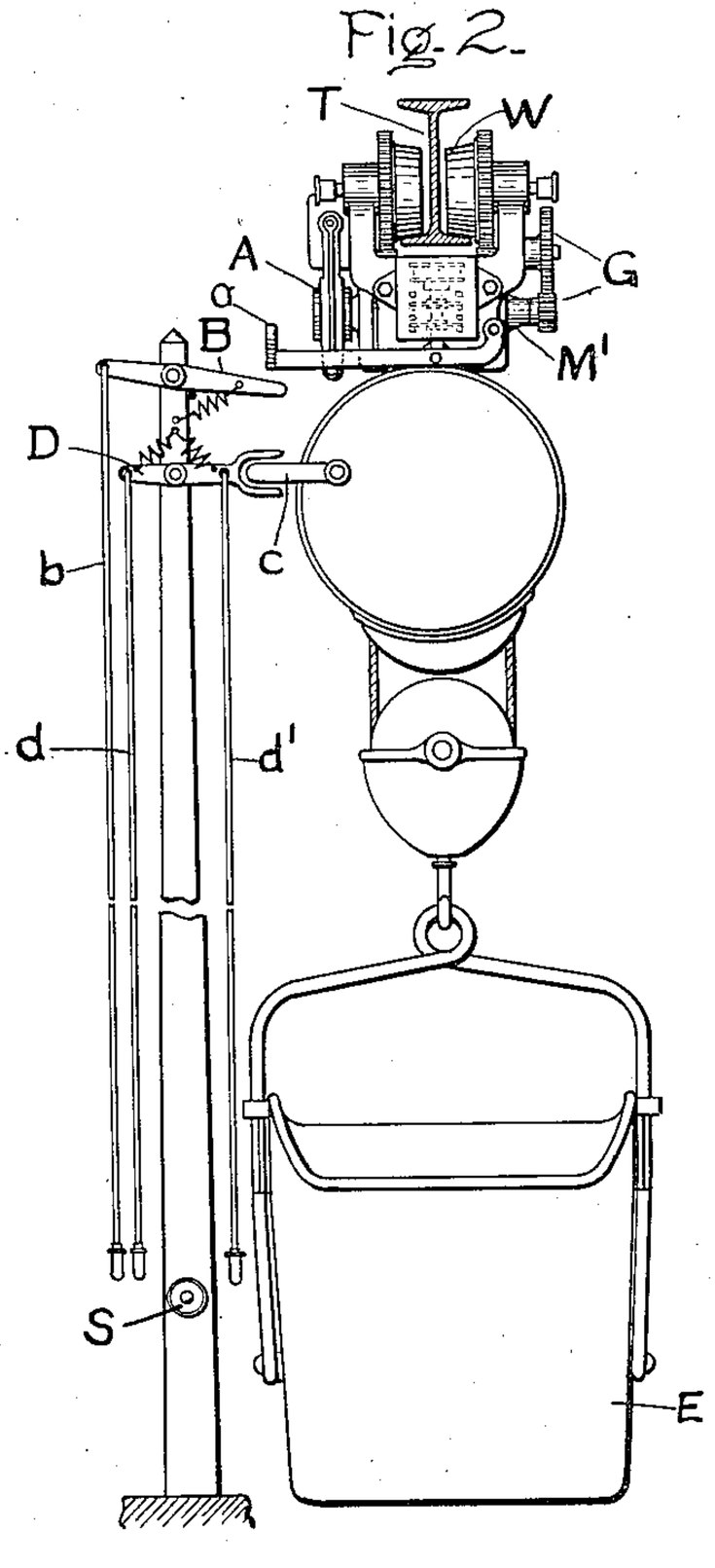
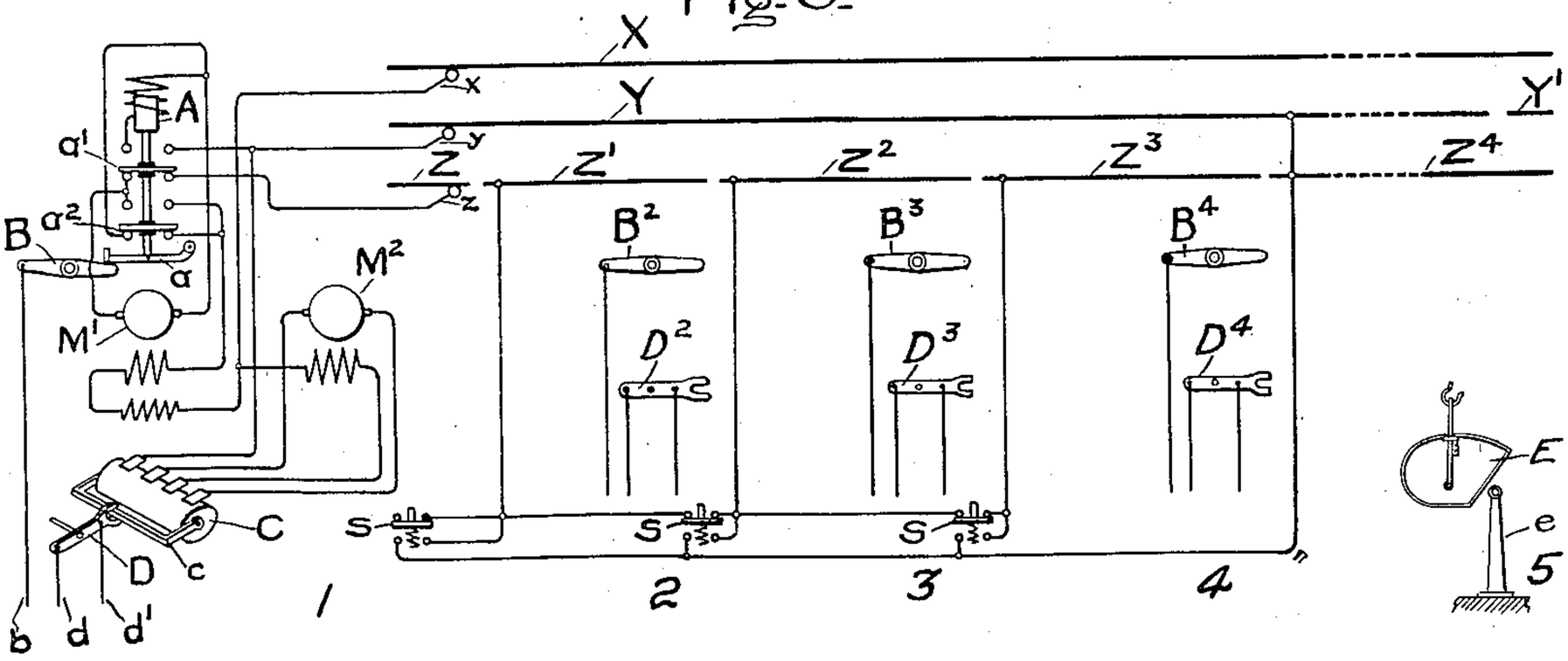


Fig. 3.



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AUTOMATIC CARRIER.

No. 816,484. Specification of Letters Patent. Patented March 27, 1906.

Application filed September 1, 1904. Serial No. 222,944.

To all whom it may concern:

Be it known that I, SAM H. LIBBY, a citizen of the United States, residing at East Orange, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Automatic Carriers, of which the following is a specification.

My invention relates to automatic carriers, telphers, or traveling hoists, and is particularly applicable to systems in which the carrier is to be controlled from a plurality of points in such manner that it may be brought to any one of these points by an operator stationed there and may then be returned by the operator to a predetermined point.

My invention is thus particularly applicable to such a case as that of an automatic carrier tending a plurality of boilers when it is desired to arrange the carrier so that it may be brought automatically to any boiler and after the bucket is loaded with ashes returned automatically to the place at which the ashes are to be dumped.

The object of my invention is to provide a novel system for electrically-driven automatic carriers which shall meet the requirements of such a case as above described.

One feature of my invention consists in providing two working conductors of the same polarity with two collectors carried by the carrier and arranged to engage the two conductors respectively. One of the conductors is continuous from all the stations to the point to which the carrier is to be returned, while the other conductor is in sections insulated from each other. The operating-motor of the carrier is normally connected only to the sectional conductor, and that conductor is normally dead. Means are provided at each station for closing the circuit of the carrier through the continuous conductor, so as to return it to the predetermined point, and also for energizing all the sections of the sectional conductor between said point and the station, so as to bring the carrier back to the station.

My invention further consists in means for preventing the stoppage of the carrier after it has been started from a station and before it reaches the return-point and to allow the carrier to be started on its journey back to one of the stations only after the return-point has been reached. The specific means which I employ for accomplishing this end consists of a switch controlled by an electromagnet which is connected in series with the continuous conductor. When the motor-circuit is connected to the continuous conductor, the magnet retains the switch in this position until the return-point is reached, when the current ceases and the switch is allowed to fall, connecting the motor to the sectional conductor, so that when the sectional conductor is properly energized the carrier will be returned to the proper station. The means for causing the switch to fall consists merely in allowing the carrier to run beyond the end of the continuous conductor. The sectional conductor extends beyond the continuous conductor, so as to supply current to the carrier after it has run beyond the continuous conductor and stopped. At the other end the continuous conductor extends beyond the sectional conductor for the same reason.

Another feature of my invention consists in providing means for operating the controlling-switches for the traversing and hoisting motors, so that it is unnecessary to provide the carrier with operating-ropes. Carriers are usually provided with operating-ropes, which must hang down within reach of the operator and which when the carrier is in motion frequently become a source of inconvenience and sometimes of danger. By my invention such ropes are entirely dispensed with and instead stationary means are provided at each station for engaging the controlling-switches.

My invention also comprises other features of invention, as will more clearly appear by reference to the following description and the claims thereto appended.

My invention will best be understood by reference to the accompanying drawings, in which—

Figure 1 shows a side view of an automatic carrier adapted for use in my system. Fig. 2 shows a front view of the same and also shows the stationary operating means for the controlling-switches, and Fig. 3 is a diagram showing the arrangement of the working conductors and also sections of the controlling-switches for the motors.

In Fig. 1, E represents a bucket suspended from the drum F, which is driven by the hoisting-motor M^2. M′ is the traversing-motor

which drives the wheels W through a train of gears G, and thereby moves the carrier along the track T. A represents the magnetically-operated switch which has been referred to above and which acts to prevent the stoppage of the carrier while it is being returned to the return-point. *c* represents the handle of the controller for the hoisting-motor. This handle *c* and the lever or shoe *a*, operatively connected to the switch A, are adapted to be engaged, respectively, by the stationary arms D and B, which are placed beside the track at a stopping point or station. The arms B and D are normally held in the position shown in Fig. 2 by springs or other suitable means. The arm B is provided with an operating-rope *b*, by means of which the lever *a* may be raised for the purpose hereinafter described. Arm D is provided with two operating-ropes *d d'*, by means of which the controller-handle *c* may be moved to connect the hoisting-motor M^2 for raising or lowering.

The magnetically-controlled switch A is arranged as shown in Fig. 3. The core of the actuating-coil carries two bridging members *a' a²*, each of which is adapted to engage one of two sets of stationary contacts, according as the magnet is energized or not. When the magnet is not energized, the bridging members are held in the position shown by gravity or a spring. In Fig. 3 are shown three working conductors, one of which, X, which is continuous, may represent the negative wire. One of the positive leads Y is continuous past the four stations 1, 2, 3, and 4 and as far as the return-point 5, at which point it is broken, and dead-section Y' is arranged to receive the trolley or collector carried by the hoist when it leaves conductor Y. The second positive conductor is shown as sectional, five sections, Z to Z^4, being shown. Three trolleys *x*, *y*, and *z* are carried by the carrier and adapted to engage the three working conductors.

In addition to the operating-arms B and D, as shown, at each station is a switch S, normally held open by a spring and arranged when closed to energize the several sections of the sectional conductor between that station and the return-point 5.

The operation is then as follows: Assume the carrier to be at station 1, as shown. The circuit of the traversing motor is open, since the connection from conductor Y is not closed until bridging member *a'* is in its raised position, and since the section Z of the sectional conductor is dead. If it is desired to return the carrier to the return-point 5, arm B is moved by means of the operating-rope *b*. The core of the magnet A is raised, carrying with it the bridging members *a'* and *a²*. When the bridging members have reached their upper position and have engaged the upper sets of contacts, the circuit of the traversing motor is closed as follows: From collector *y*, bridging member *a'*, actuating-coil A, armature of motor M', bridging member *a²*, field of motor M' to collector *x*. The traversing motor consequently starts up, moving the carrier toward the return-point 5, and since the actuating-coil A is included in the motor-circuit when the bridging members are in their upper position the circuit is held closed after the lever *a* has left the operating-arm B. The motor consequently runs until the collector *y* runs off on the dead section Y' at the stopping-point 5. When this point is reached, the bucket E is tripped by the stop *e*, so that the ashes or other material is dumped at this point. As soon as the motor-circuit is broken by running onto the dead-section not only is the motor stopped, but also the actuating-coil A is deënergized, allowing the bridging-contact to fall. A circuit is then closed from section Z^4 through collector *z*, bridging member *a'*, armature of motor M', bridging member *a²*, field of motor M' to collector *x*. The motor-cicuit is consequently again closed, but with the armature connections reversed. The motor therefore starts up in the opposite direction and runs the carrier back as far as station 4. At this point collector *z* runs onto section Z^3, which is dead, unless a switch at one or the other stations is closed. If it is desired to bring the carrier back to station 1, switch S is pressed down to its lower position by the operator and held there. This energizes sections Z^3, Z^2, and Z', so that the carrier is again started up and runs until collector *z* runs onto the dead section Z at station 1. At each station there is an operating-arm D for controlling the hoisting-motor and also an arm B for controlling the magnetically-actuated switch A. The controller C for the hoisting-motor M^2 is shown in Fig. 3 with its handle *c* engaged by the operating-arm D.

In the drawings hereto annexed I have illustrated a system in which the motor-driven carrier is returned to the starting-point only in case a switch is closed to energize the several sections of the sectional conductor; but it will be understood that my invention is not limited to this particular arrangement, since many modifications may be made by one skilled in the art which do not involve a departure from my invention. Moreover, my invention comprises features which are applicable to telpher systems generally, and I aim in the appended claims to cover all modifications of my system and the various features thereof which do not involve a departure from the spirit and scope of my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an automatic carrier system, a motor-driven carrier, a normally energized continuous conductor, a normally dead sectional conductor, collecting devices carried by the

carrier and engaging said conductors, the device engaging said sectional conductor being normally connected to the driving-motor, means at each station for energizing the sectional conductor as far as that station to bring said carrier to said station, and means for connecting the driving-motor to the continuous conductor to return the carrier.

2. In an automatic carrier system, a motor-driven carrier, a normally energized continuous conductor, a normally dead sectional conductor, collecting devices carried by the carrier and engaging said conductors, a switch carried by said carrier adapted to connect the driving-motor to either of said conductors and arranged normally to connect the motor to said sectional conductor, means at each station for energizing said sectional conductor as far as that station to bring said carrier to said station, and means for shifting said switch to connect the driving-motor to the continuous conductor to return said carrier.

3. In an automatic carrier system, a motor-driven carrier, a plurality of stations, a point to which the carrier is to be returned, a normally energized continuous conductor and a normally dead sectional conductor extending from said stations to said point, collecting devices carried by the carrier and adapted to engage said conductors respectively, a switch carried by said carrier adapted to connect the driving-motor to either of said conductors and arranged normally to connect it to said sectional conductor, a magnet-winding controlled by said switch and arranged to be energized when said switch is moved to connect the motor to the continuous conductor and adapted when energized to hold said switch in that position, means at each station for energizing the sectional conductor between the return-point and that station, to bring the carrier to that station, and means for shifting said switch to connect the motor to the continuous conductor to return the carrier.

4. In an automatic carrier system, a motor-driven carrier, two parallel conductors adapted to be engaged thereby, a switch adapted to connect the driving-motor to either of said conductors, means for holding said switch normally in one position, means for shifting said switch to its other position, and a magnet-winding arranged to be connected in circuit with the driving-motor when said switch is moved to its second position and adapted when energized to hold said switch in said position.

5. In an automatic carrier system, a motor-driven carrier, two conductors adapted to be engaged thereby, one of said conductors being normally dead and the other normally energized, collecting devices carried by said carrier and adapted to engage said conductors, the device engaging said normally dead conductor being normally connected to the driving-motor, means for energizing said normally dead conductor to move said carrier in one direction, and means for connecting the driving-motor to the normally energized conductor to move said carrier in the other direction.

6. In an automatic carrier system, a motor-driven carrier, two conductors adapted to be engaged thereby, one of said conductors being normally dead and the other normally energized, collecting devices carried by said carrier and adapted to engage said conductors, the device engaging said normally dead conductor being normally connected to the driving-motor, means for energizing said normally dead conductor to move said carrier in one direction, means for connecting the driving-motor to the normally energized conductor to move said carrier in the other direction, and electromagnetic means for maintaining said connection until the carrier reaches the end of said conductor.

7. In an automatic carrier system, a plurality of stations, a carrier, an electric motor carried thereby, a controlling-switch for said motor carried by said carrier, means at each station adapted to engage said controlling-switch, and manually-operated means controllable from the floor for operating said engaging means.

8. In combination, an overhead track, a hoist traveling thereon, an electric motor and controlling-switch carried by said hoist, means at a plurality of points adjacent to the track for engaging said controller, and manually-operated means controllable from the floor for operating said engaging means.

9. In an automatic carrier system, a motor-driven carrier, a continuous conductor, a sectional conductor, collecting devices carried by the carrier and engaging said conductors, the device engaging said sectional conductors being normally connected to the driving-motor, means at each station for controlling the supply of current to the section of the sectional conductor to bring said carrier to said station, and means for connecting the driving-motor to the continuous conductor to return the carrier.

10. In combination, a motor-driven carrier, a trolley system comprising a continuous conductor and a sectional conductor, collecting devices carried by the carrier and engaging said conductors, a motor-controlling switch for connecting the motor on the carrier in circuit with either of said collecting devices, and switches for separately controlling the supply of current to the sections of the sectional conductor.

11. In combination, a motor-driven carrier, a trolley system comprising a continuous conductor and a sectional conductor, the continuous conductor extending beyond the sectional conductor at one end of the system

and the sectional conductor extending beyond the continuous conductor at the other end, an electrical connection joining the continuous conductor and the last section of the sectional conductor, and switches for separately controlling the supply of current to the remaining sections of the sectional conductor.

12. In combination, a motor-driven carrier, a trolley system comprising two conductors of substantially equal length, the one being slightly displaced longitudinally with reference to the other, collecting devices carried by the carrier and engaging said conductors, a reversing-switch arranged to complete the connections of the motor on the carrier for one direction of rotation through one of said collecting devices and for the opposite direction of rotation through the other collecting device, and means whereby the said switch will be maintained in one position as long as the collecting device corresponding to that position is in engagement with its trolley-conductor and will be shifted into its other position when said collecting device passes from its trolley-conductor.

13. In combination, a motor-driven carrier, a trolley system comprising two conductors of substantially equal length, the one being slightly displaced longitudinally with reference to the other, collecting devices carried by the carrier and engaging said conductors, a reversing-switch arranged to complete the connections of the motor on the carrier for one direction of rotation through one of said collecting devices and for an opposite direction of rotation through the other collecting device, and an electromagnet in series with one of said collecting devices, and adapted to maintain said switch in one position as long as said collecting device is in contact with its conductor.

14. In combination, a motor-driven carrier, a trolley system therefor passing through a number of stations, means for starting the carrier at any of said stations, means for automatically stopping the carrier at a predetermined point, and controlling means at each station for starting said carrier from said point in the opposite direction to bring it back to that station.

15. In combination, a motor-driven carrier, a trolley system comprising two conductors, collecting devices carried by said carrier and engaging said conductors, and means whereby the disengagement of one collecting device from its corresponding conductor will change the motor connections so that current will be supplied thereto through the other collecting device.

16. In combination, a motor-driven carrier, a trolley system comprising two conductors, means for closing the motor-circuit through the collecting device engaging one of said conductors, and means whereby the disengagement of the said collecting device from its corresponding conductor will cause the motor to be supplied with current through the other collecting device.

17. In combination, a motor-driven carrier, a trolley system comprising two conductors, collecting devices carried by said carrier and engaging said conductors, means for closing the motor-circuit through one of said collecting devices, and means whereby the disengagement of said collecting device from its corresponding conductor will cause the motor to be connected to the other collecting device with its circuit arranged for rotation in the reverse direction.

18. In combination, a motor-driven carrier, a trolley system comprising a continuous conductor and a sectional conductor, collecting devices carried by the carrier and engaging said conductors, means for connecting the motor in circuit with one of said collecting devices, and means whereby a stoppage of current-flow through said collecting device will cause the motor-circuit to be connected to the other collecting device.

19. In combination, a motor-driven carrier, a trolley system comprising two conductors, collecting devices carried by the carrier and engaging said conductors, means for closing the motor-circuit through one of said collecting devices, and means whereby a cessation of current through said collecting devices will cause the motor-circuit to be connected to the other collecting device.

20. In combination, a motor-driven carrier, a trolley system comprising a continuous conductor and a sectional conductor, collecting devices carried by said carrier and engaging said conductors, means for closing the motor-circuit through the collecting device engaging the continuous conductor, and means whereby a cessation of current-flow will connect the motor-circuit to the collecting device engaging the sectional conductor.

21. In combination, a motor-driven carrier, a trolley system comprising two conductors, collecting devices carried by the carrier and engaging said conductors, means for closing the motor-circuit through one of said collecting devices, and means for shifting the motor-circuit connections to the other collecting device.

22. In combination, a motor-driven carrier, a trolley system comprising two conductors, collecting devices carried by the carrier and engaging said conductors, means for closing the motor-circuit through one of said collecting devices, and means whereby the motor-circuit will be automatically connected to the other collecting device when the motor-driven carrier reaches a certain point in its travel.

23. In combination, a motor-driven carrier, a trolley system comprising a continuous conductor and a sectional conductor, collecting devices carried by the said carrier and

engaging said conductors, means for connecting the motor in circuit with the collecting device engaging the continuous conductor, means whereby the motor-circuit will be connected to the other collecting device when the motor-driven carrier reaches a certain point along the way, and means for controlling the supply of current to the several sections of said sectional conductor.

24. In combination, a motor-driven carrier, a trolley-conductor passing through a number of stations, a collecting device carried by said carrier and engaging said conductor, a switch for closing the motor-circuit through said collecting device, and manually-operated means at each of said stations for operating said switch.

25. In combination, a motor-driven carrier, a trolley system comprising a continuous conductor and a sectional conductor, the said trolley system passing through a plurality of stations, collecting devices carried by the carrier and engaging said conductors, a circuit-closing switch for closing the motor circuit through one or the other of said collecting devices, and manually-operated means at each station for operating said switch.

In witness whereof I have hereunto set my hand this 29th day of August, 1904.

SAM H. LIBBY.

Witnesses:

ROGER H. BUTTERWORTH,

ANNA GILLIN.