

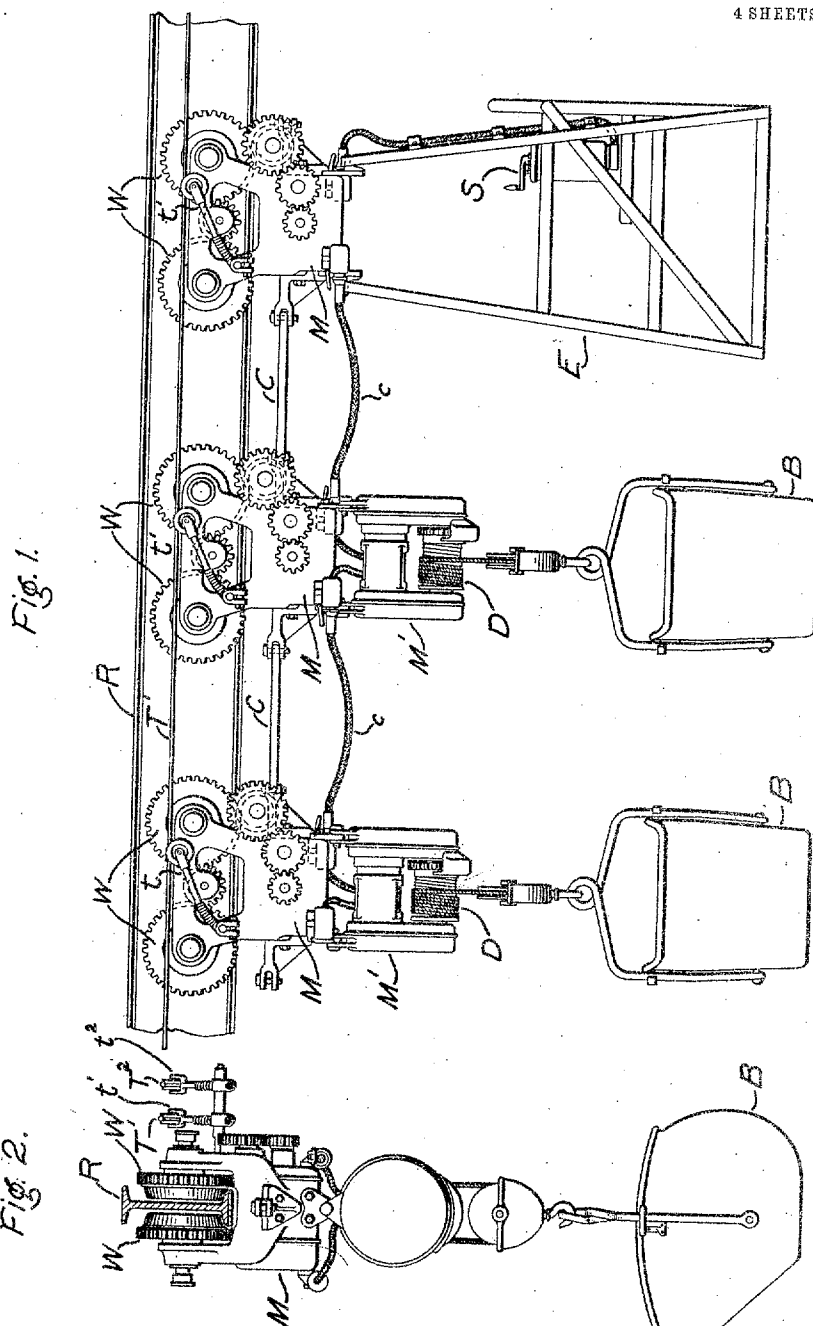
No. 884,595.

PATENTED APR. 14, 1908.

S. H. LIBBY.
CARRIER SYSTEM.

APPLICATION FILED JUNE 17, 1906.

4 SHEETS--SHEET 1.



Witnesses:
Burchard V. Kelly
Allen Oxford

Inventor.
Sam H. Libby
By Albert S. Davis
Atty.

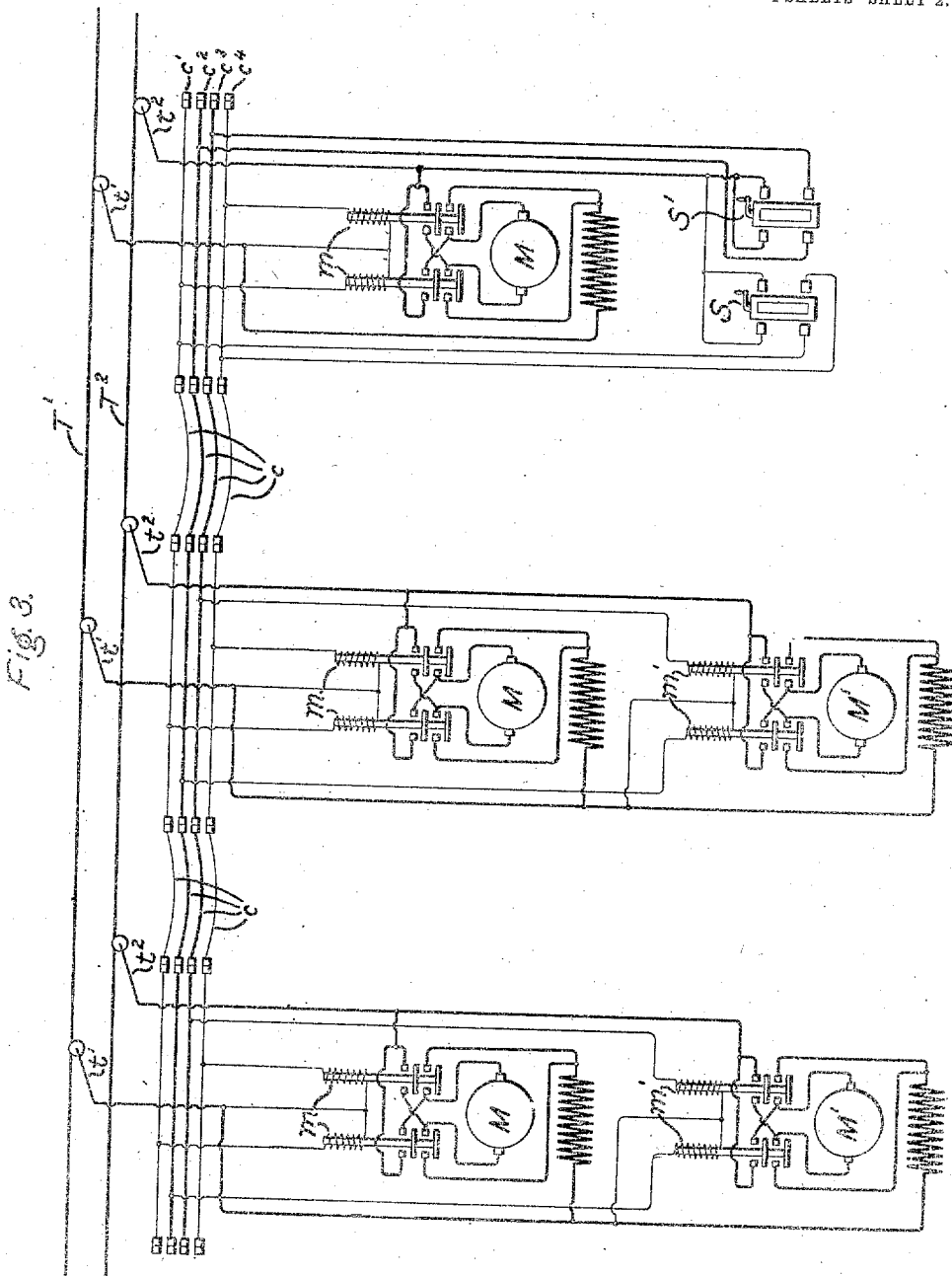
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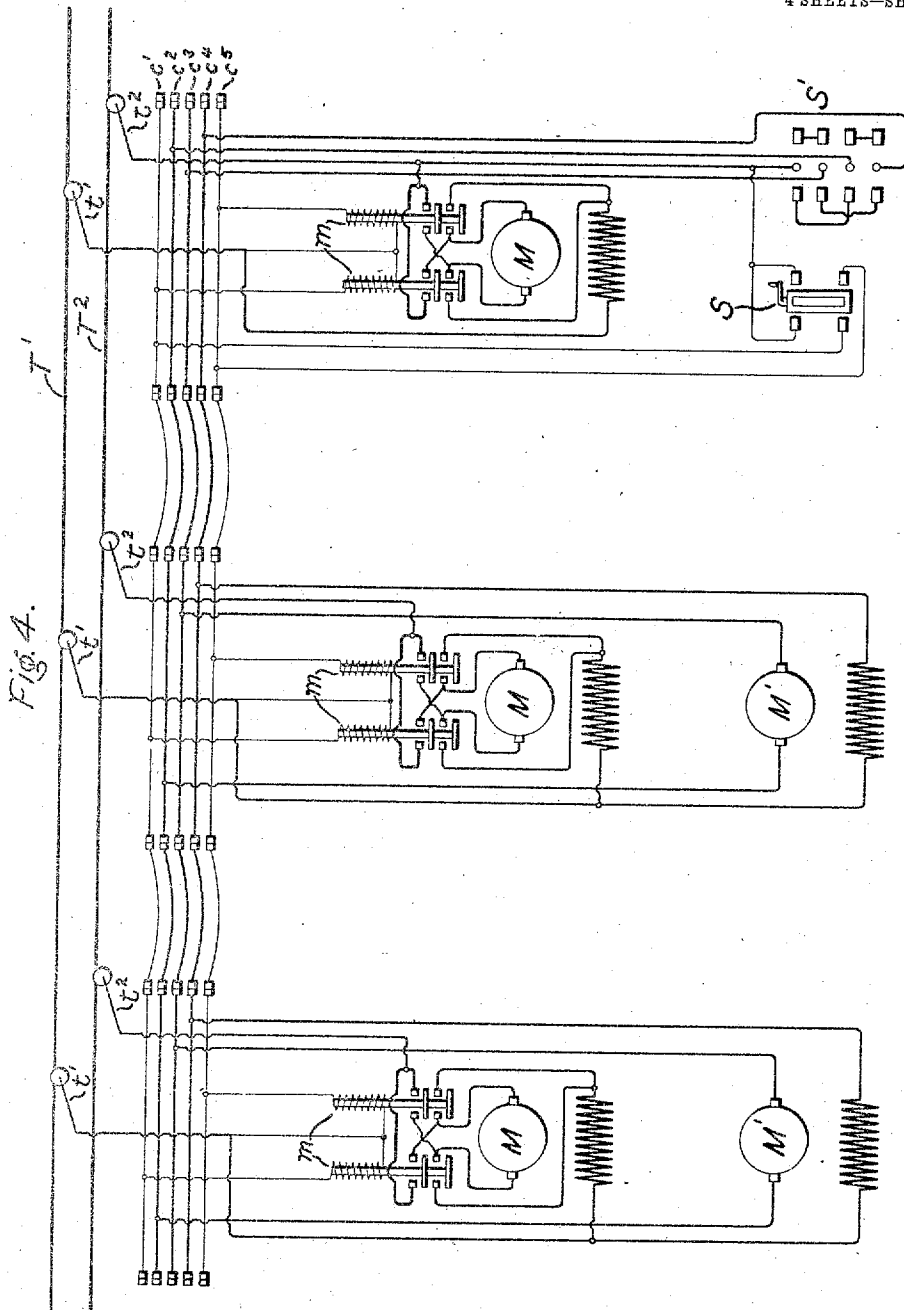
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Witnesses
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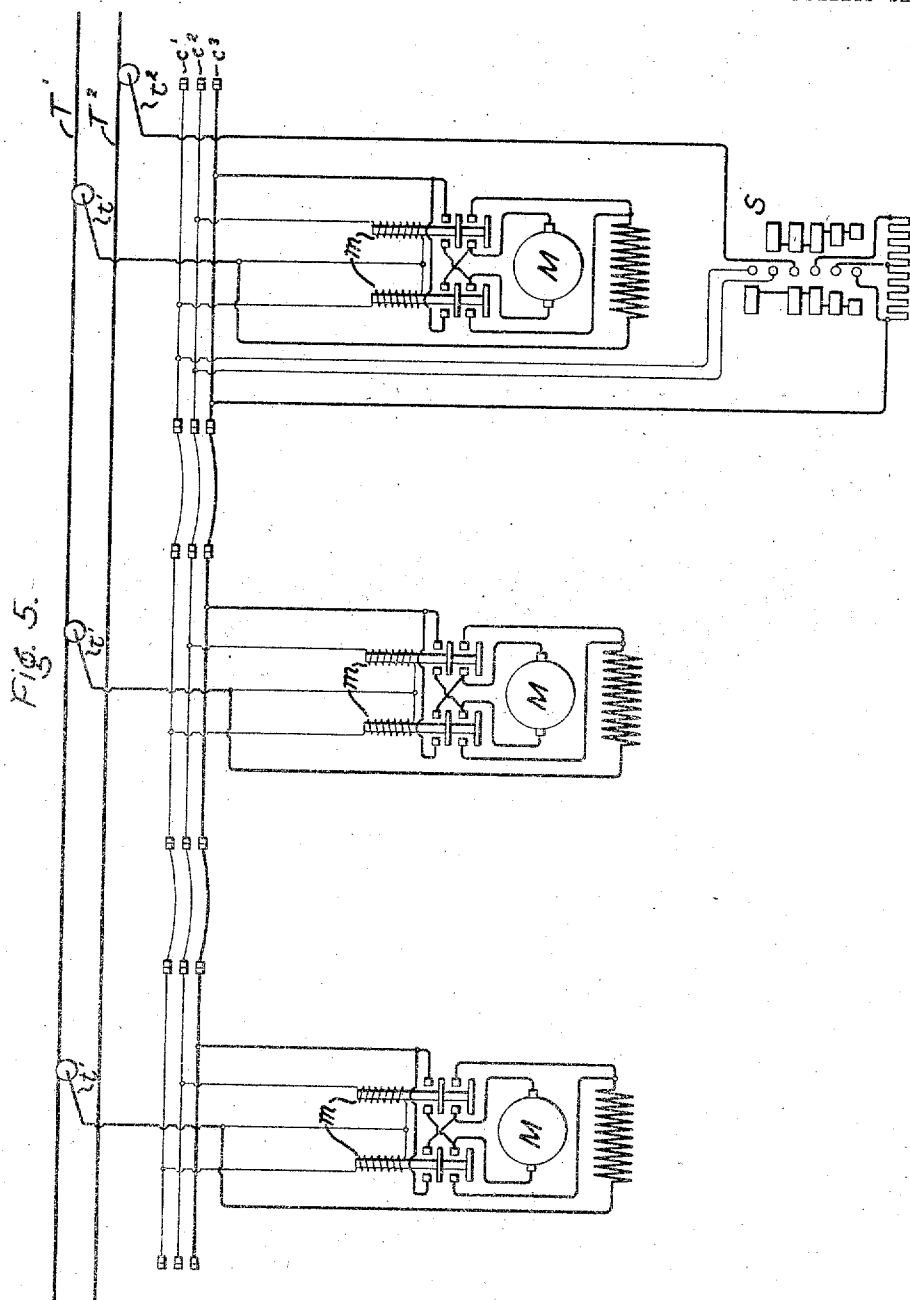
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4 SHEETS—SHEET 4.



Witnesses:

Burchard V. Kelley
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UNITED STATES PATENT OFFICE.

SAM H. LIBBY, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO SPRAGUE ELECTRIC COMPANY,
A CORPORATION OF NEW JERSEY.

CARRIER SYSTEM.

No. 884,595.

Specification of Letters Patent.

Patented April 14, 1908.

Application filed June 17, 1905. Serial No. 265,702.

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, State of New Jersey, have
5 invented certain new and useful Improvements in Carrier Systems, of which the following is a specification.

My invention relates to the control of trains of carriers, and is particularly adapted
10 for use in places where there is a source of electric current conveniently near.

Heretofore it has been customary to employ mechanically-connected trains of carriers suspended from and traveling on a supporting rail, and drawn on the rail by ropes,
15 cables, or other mechanical connections to a small steam engine which is placed with its boiler near the carrier system. Such systems are frequently used for excavating streets,
20 digging sewers, etc.

The object of my invention is to eliminate the necessity of employing a steam plant at the point where the carriers are working, and also to dispense with the services of a fire-
25 man and signal man.

My invention broadly considered consists in the combination with a train of carriers suspended from and traveling on a supporting rail, of an operator's carrier, electric driving
30 motors on the several carriers, a source of current for the motors, and means on the operator's carrier for controlling the motors on all the carriers.

My invention further comprises a carrier
35 system in which each carrier is provided not only with a driving motor propelling it along the rail, but also with a hoisting motor for hoisting and lowering the bucket carried thereby, and with a control system adapted
40 for control of both driving and hoisting motors.

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

45 Figure 1 shows a side elevation of a portion of a train of carriers arranged in accordance with my invention; Fig. 2 shows an end elevation of the same; Fig. 3 shows a diagram of connections of the control system; Fig. 4
50 shows a modified arrangement of the control system; and Fig. 5 shows another modification.

In Fig. 1, R represents the supporting rail from which the carriers are suspended, and
55 on which they travel. Each carrier is pro-

vided with a driving motor M, which is connected through suitable speed-reducing gears to the driving wheels W, which rest on the rail R. The several carriers are mechanically connected by couplings C, and are also
60 electrically connected by conductors c. All of the carriers but one are also provided with hoisting motors M', which are connected through suitable speed-reducing gears, (not shown) to the hoisting drums D, from which
65 are suspended the buckets B. On one of the carriers or buckets the hoisting motor is omitted, and instead a support E, suitable for an operator, is suspended from the carrier. Upon this support is mounted a
70 switch or switches S, by means of which the driving and hoisting motors on the several carriers may be controlled. The carriers are provided with suitable current-collectors, such as trolleys t' t'', engaging the supply
75 conductors T' T'', suspended near the supporting rail, as shown in Fig. 2.

Now, referring to Fig. 3, one suitable arrangement of the control circuits is as follows: The several motors on the carriers
80 are provided with magnetically-actuated reversing switches, the magnetic windings being connected to the control wires c', c'', c''', and c', which extend through the train. Two master switches S and S' are mounted
85 on the operator's carrier, and control the driving and hoisting motors, respectively, by controlling the connections from the control wires to the supply conductors. Thus, if the switch S' is moved toward the right a circuit
90 will be closed as follows: from wire T'' through the trolley t'' on the operator's carrier, through switch S', to train-wire c'', through the right-hand magnets m' on the
95 several carriers, and through the trolley t' on the several carriers to conductor T'. One of the magnetically-actuated switches on each of the carriers will thus be closed on each carrier and circuit will be closed from
100 trolley t'' on each carrier through the contacts of right-hand switch m', through the armature of motor M', and through the field of motor M' to trolley t'. The hoisting motor is thus energized for hoisting or lowering, as the case may be. When the switch S' on
105 the operator's carrier is returned to off position, the magnetically-actuated switches m' are opened and the hoisting motors are brought to rest. If the switch S' is moved to its other position, the train-wire c' will be
110

connected to the conductor T^2 and the left-hand switches m' on all the carriers will be operated, thereby connecting the hoisting motors for operating in the opposite direction. The control of the driving motors by the switch S on the operator's carrier and by the magnetically-actuated switches m on the other carriers is precisely the same as has been already explained for the hoisting motors. A driving motor with its magnetically-actuated controlling devices is provided on the operator's carrier, as well as on the other carriers of the train.

The magnetically-actuated controlling switches for either or both sets of motors may be omitted, and the control obtained directly through switches on the operator's carrier. Thus, in Fig. 4 the controlling devices for the hoisting motors on the carriers are omitted and the hoisting motors themselves are connected directly to the train-wires. With this arrangement, the control of the hoisting motors is as follows: When the switch S' is moved to bring the right-hand movable contacts in engagement with the stationary contacts a circuit is closed from trolley t^2 on the operator's carrier through the switch S' , to line-wire c^3 , through the motor armatures M' , to the train-wire c^2 , through switch S' , to train-wire c' , through the fields of motors M' to the trolleys t' . If the switch S' is moved to its other operative position, the motors M' will be connected for rotation in the opposite direction. In Fig. 4 the arrangement of control for the driving motors is the same as that shown in Fig. 3, but obviously the controlling devices for these motors may also be omitted and these motors may be controlled in the same manner as has just been described in connection with the hoisting motors.

It will be seen that the hoisting motors in Fig. 4 are connected directly to a train-wire and are connected to the conductor T^2 only through the trolley t^2 on the operator's carrier. Consequently, if the driving motors are arranged similarly to the hoisting motors, as shown in Fig. 4, the trolley t^2 could be omitted on all the carriers except the operator's carrier. Such an arrangement is shown in Fig. 5, in which only the operator's carrier is provided with the second trolley t^2 . In Fig. 5 only the driving motors are shown, the hoisting motors being omitted for the sake of simplicity. In this arrangement of Fig. 5, the reversing of the motors is accomplished by magnetically-actuated devices, as before, but the motors, instead of being connected directly to the working conductors through their own trolleys are connected to the train-wire c^3 , which is connected to the working conductor T^2 through the switch S on the operator's carrier. This switch in this figure is arranged to vary the resistance in the motor circuit, as well as to control the

direction of rotation by selectively operating the magnetically-actuated reversing switches.

Obviously, many other modifications of the control system may be employed, and consequently I do not desire to limit myself to the particular construction and arrangement of parts here shown, but aim in the appended claims to cover all modifications which are within the scope of my invention.

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

1. In a carrier system, a supporting rail, a train of carriers suspended from said rail and adapted to travel thereon, load carrying devices suspended from said carriers, independent motors on the several carriers for driving them along said rail and for hoisting said devices, a source of current for said motors, an operator's carrier, and means on the operator's carrier controlling all of said motors.

2. In a carrier system, a supporting rail, a train of carriers suspended from said rail and adapted to travel thereon, load carrying devices suspended from said carriers, independent motors for the several carriers for driving them along said rail and for hoisting said devices, a source of current for said motors, controlling devices for said motors carried by the several carriers, an operator's carrier, control wires extending through the train and connected to said controlling devices, and means on the operator's carrier controlling the connections from said control wires to the source of current.

3. In a carrier system, a supporting rail, a train of carriers suspended from said rail and adapted to travel thereon, load carrying devices suspended from said carriers independent motors for the several carriers for driving them along said rail and for hoisting said devices, a source of current for said motors, magnetically-actuated reversing switches for said motors on the several carriers, an operator's carrier, control wires extending through the train and connected to the actuating magnets of said switches, and means on the operator's carrier controlling the connections from said control wires to the source of current.

4. In a carrier system, a supporting rail, a train of carriers suspended from said rail and adapted to travel thereon, receptacles suspended from said carriers, motors on the several carriers for driving them along said rail, a second set of motors on the several carriers for hoisting said receptacles, a source of current for the motors, an operator's carrier, and means on the operator's carrier for controlling all of said motors.

5. In a carrier system, a supporting rail, a train of carriers suspended from said rail and adapted to travel thereon, receptacles suspended from said carriers, motors on the several carriers for driving them along said rail, a second set of motors on the several carriers

for hoisting said receptacles, a source of current for the motors, an operator's carrier, control wires for both sets of motors extending through the train, and means on the operator's carrier for controlling the connections from said control wires to the source of current.

6. In a carrier system, a supporting rail, a train of carriers suspended from said rail and adapted to travel thereon, receptacles suspended from said carriers, motors on the several carriers for driving them along said rail, a second set of motors on the several carriers for hoisting said receptacles, a source of current for the motors, magnetically-actuated reversing switches for the motors on the several carriers, control wires extending through the train and connected to the actuating magnets of said switches, an operator's carrier, and means on the operator's carrier for controlling the connections from said control wires to the source of current.

7. In a carrier system, a supporting rail, a train of carriers suspended from said rail and adapted to travel thereon, receptacles suspended from said carrier, motors on the several carriers for driving them along said rail, a second set of motors on the carriers for raising and lowering said receptacles, an operator's carrier, control wires extending throughout the train, and control apparatus arranged on the operator's carrier and associated with said control wires for causing either set of motors to be energized simultaneously for corresponding directions of rotation.

In witness whereof, I have hereunto set my hand this fourteenth day of June, 1905.

SAM H. LIBBY.

Witnesses:

ROGER H. BUTTERWORTH,
ANNA M. GILLIN.