

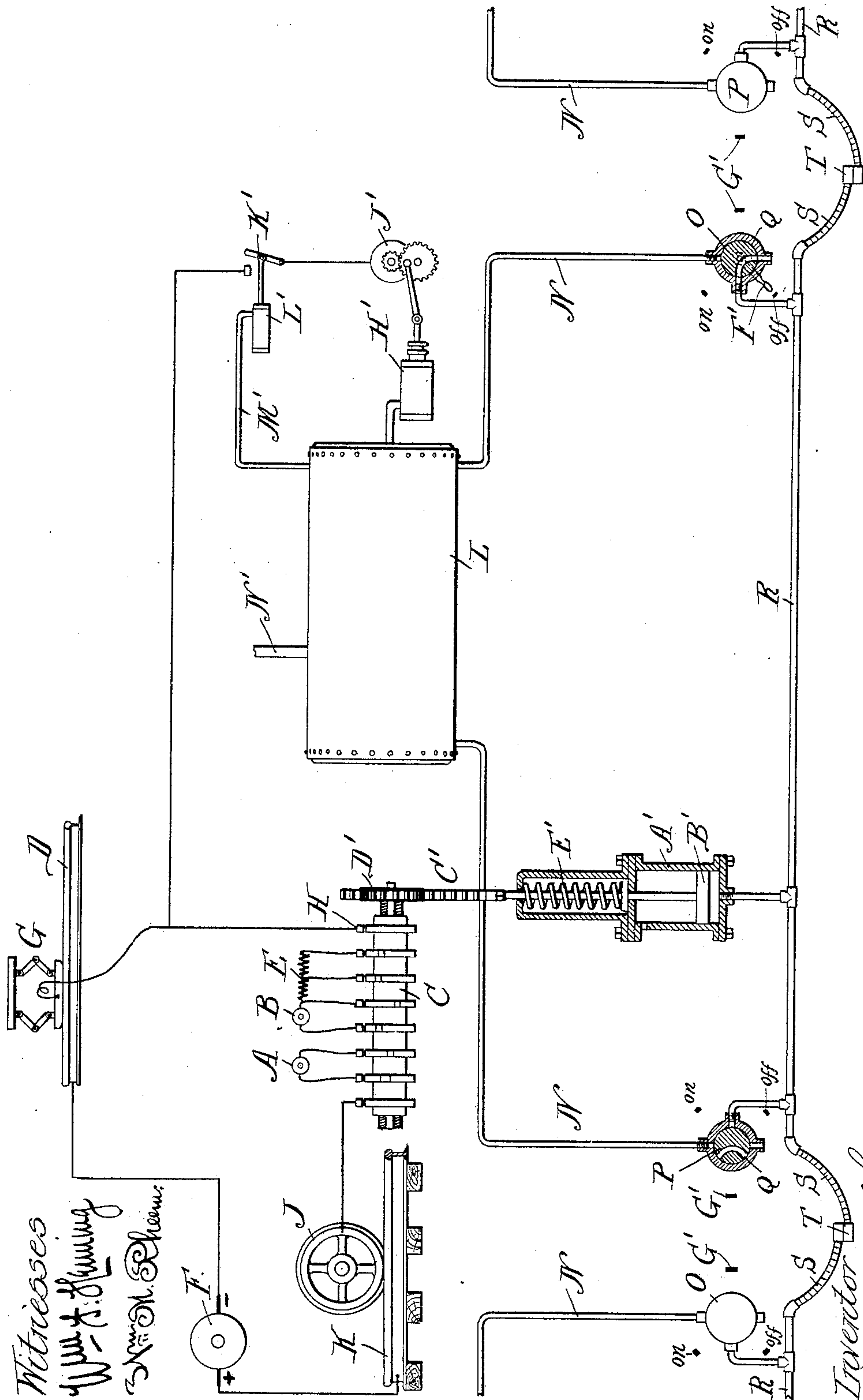
(No Model.)

S. H. SHORT.

PNEUMATIC CONTROLLING SYSTEM FOR ELECTRIC CARS.

No. 600,896.

Patented Mar. 22, 1898.



Witnesses
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UNITED STATES PATENT OFFICE.

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PNEUMATIC CONTROLLING SYSTEM FOR ELECTRIC CARS.

SPECIFICATION forming part of Letters Patent No. 600,896, dated March 22, 1898.

Application filed September 20, 1897. Serial No. 652,337. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY H. SHORT, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Pneumatic Controlling System for Electric Cars, of which the following is a specification.

This invention relates to a pneumatic controlling system for electric railways.

The object of the invention is to provide a simple and efficient pneumatic controlling system for electric railways wherein each car carries its own controlling devices and propelling-motors and wherein all the translating devices throughout the train of several cars may be suitably and conveniently controlled pneumatically from any desired point in the train.

The invention consists, substantially, in the construction, combination, location, and relative arrangement of parts, all as will be more fully hereinafter described, as shown in the accompanying drawing, and finally specifically pointed out in the appended claims.

The accompanying drawing is a view somewhat in diagram, parts being broken off and parts in section, of an apparatus embodying the principles of my invention.

In the operation of electric railways it is desirable in some cases to mount propelling-motors on two or more cars throughout a train of cars, whereby when such cars are detached from the train to proceed alone or to be shifted from one track to another it may be accomplished without the necessity of a shifting-locomotive. It is also desirable in some cases to use two propelling-motors upon each motor-car of a train. In such cases it is desirable to be able to control all the motors upon the train from any desirable point upon any car in the train, and to this end it is necessary to provide a controller on each car for controlling the motors on that car.

It is the purpose of the present invention to provide a pneumatic apparatus for effecting the proper actuation of the motor-controllers on each car as well as throughout the entire train.

Referring to the accompanying drawing, reference signs A B designate two motors for propelling an electric car, and C the controller therefor, carrying the usual contact-segments

for completing the circuit from the supply-conductor D to and through the motors and for changing the relative connections of the motors and for cutting in and out resistances E from the motor-circuits, whereby when the controller C is suitably and properly actuated the motors A and B are connected up in series, in parallel series, or in parallel, with resistances E, cut into or out of circuit in the usual or well-known manner. I have shown a generator F for supplying current to the conductor B, which, as is evident, may be a third rail on the surface or an overhead conductor, such as is usually employed and from which current is taken by any suitable contact G and conducted to the controller-contact H. Thence when the controller is actuated the current flows through the various controller-segments to the resistance E, motors A B, and finally is completed in any suitable or convenient manner, as through the truck-wheel J to the rail K back to generator F or in any other convenient manner.

The parts so far described may be of the usual or any well-known form of construction and arrangement and in the specific details form no part of the present invention.

I will now describe the pneumatic arrangement for effecting the operation of controller C, it being understood that the construction and arrangement shown are those designed to be placed upon each motor-carrying car.

Reference sign L designates a compressed-air reservoir. At suitable points this reservoir is tapped by means of pipes or connections M N, leading to conveniently-arranged control-valves O P, having suitable passages Q. These controlling-valves O P may be arranged at any suitable or convenient point on the car. For instance and perhaps the most convenient location will be to place one of such controlling-valves on each platform of the car.

R is a controller train-pipe arranged to extend throughout the length of the car and carrying flexible ends S, whereby all the pipes R throughout the train may be connected together by means of a hose-coupling T of the form usually employed in the construction of the ordinary Westinghouse air-brake system.

Any suitable device for actuating the controller C by variations in the air-pressure in

reservoir L may be employed. In the particular form shown I provide in suitable connection with the train-pipe R an air-cylinder A', the piston B' of which is adapted to be actuated by variations in the pressure of air admitted to said cylinder. The piston-rod of piston B' actuates the controller C through suitable connections. In the form shown this rod is formed with or carries rack-teeth C', arranged to mesh with the gear-teeth of pinion or gear-wheel D', mounted on the shaft of the controller.

From the foregoing description it will be seen that when the piston-rod B' is actuated in one direction or the other the pinion D' will be correspondingly rotated in one direction or the other, thereby actuating the controller and correspondingly controlling the circuit and relative connections of motors A B.

The particular arrangement of the cylinder A' whereby the piston B' therein is actuated upon variations in the pressure admitted thereto is unimportant so far as the scope of the present invention is concerned—that is to say, the arrangement may be such that the piston B' will be actuated in either direction by the air-pressure admitted to said cylinder. In the particular form shown, however, to which I do not desire to be limited or restricted, I arrange the piston B' to move to one end of cylinder A' by the air-pressure admitted to said cylinder, and I show a spring E' for returning the piston to the opposite limit of its travel when such pressure is exhausted; but it is evident that any other suitable or convenient arrangement for securing the return of piston B' may be employed.

The construction and arrangement of the controlling-valves O P are such that when the lever F' is moved to the position marked "Off" the passage Q thereof opens the train-pipe R to the atmosphere, thereby releasing piston B' and causing rack C' to move controller C to a position such as to break or open the motor-circuits, and when said lever F' is moved to the position marked "On" such passage Q opens communication between the controller train-pipe R and pipe N, leading from reservoir L, and when said lever F' is moved to the point G' said operating-lever F' may be removed from the stem of the valve—as for instance, when the motorman leaves his station and carries said lever with him in order to prevent unauthorized persons from tampering with the controlling-valve. In such position of the controlling-valve communication is cut off not only between the pipes N and R, but also between the pipe R and the atmosphere, as clearly shown to the left of the view in the drawing.

Air-pressure may be supplied to reservoir L in any suitable or convenient manner. In practice, however, I propose to utilize the air-pressure contained in the brake-cylinder reservoir of the air-pressure brake mechanism usually employed on electric-railway cars. In such case any suitable pump H', suitably ac-

tuated in any convenient manner, as from a small motor J', may be employed for delivering the air to the reservoir L, the switch K' being employed to control the circuit of the motor J', said switch K' being automatically actuated through a small air-cylinder L', in connection through pipe M' with the reservoir, whereby when the desired degree of pressure is attained in the reservoir the piston of cylinder L' is automatically actuated to open switch K', thereby arresting the action of motor J'.

Reference sign N designates a pipe leading from the reservoir L to the brake mechanism. (Not shown.)

The particular construction of reservoir L, pump H', motor J', or cylinder L' and switch K' is unimportant, and the particular construction and arrangement thereof form no part of the present invention, as such apparatus may be of the usual or any well-known form usually employed in air-brake mechanisms, and may be changed or varied without departing from the spirit or scope of my invention.

By supplying each car of the train of cars with a pneumatic controlling equipment such as above described it will be readily seen that when the several controller-pipes R are coupled up by the hose-couplings T all the motor-controllers C throughout the train may be actuated simultaneously and may be controlled from any point on the train. It will also be seen that when a motor-carrying car is detached from the train it carries with it its own controlling system and is therefore to this extent wholly independent of the other cars of the train. The hose-couplings T, being of the usual form employed in air-brake mechanisms, it will be understood that when a car is detached the sections or half-blocks of the coupling are automatically closed by valves in the usual manner, thereby preventing the escape of air from the controller train-pipe R of the detached car or from the car from which it was detached.

In case all the controllers throughout the train are operated from one car of course the supply of pressure for effecting the actuation of all the controllers is drawn from the same reservoir L on the particular car from which such actuation is effected. In such case the levers F' of the controlling-valves of the other cars are maintained in a position such as to close or cut off the communication between the pipes of the reservoir on that car and the controller train-pipe R, as will be evident.

It will be seen that in case the train should break and the connections or controller train-pipe R should break or part the pressure from all the air-cylinders A' throughout the train would instantly exhaust, thereby automatically returning the controllers to off position.

Many variations and changes in the details of construction and arrangement of apparatus would readily suggest themselves to persons

skilled in the art and still fall within the spirit and scope of the invention. I do not desire, therefore, to be limited or restricted to the exact details shown and described; but,

5 Having now set forth the object and nature of my invention and a form of apparatus embodying the same and having explained the construction, function, and mode of operation thereof, what is claimed as new and useful and
10 of my own invention, and what I desire to secure by Letters Patent of the United States, is—

1. In a pneumatic controlling system for a train of two or more electric cars, propelling-
15 motors mounted on two or more of said cars, a controller for each motor, an air-cylinder arranged in operative relation with respect to each controller, a piston mounted in each cylinder, a compressed-air reservoir, a pipe
20 connection between said reservoir and one end of each air-cylinder throughout the train, whereby all of said pistons may be simultaneously actuated in one direction pneumatically, a spring for returning each piston
25 when the air-pressure is exhausted from its cylinder, gearing actuated by each piston for actuating a controller, and a valve located at each end of each car throughout the train for controlling said pipe connection, as and for
30 the purpose set forth.

2. In a pneumatic controlling system for electric cars, a train of several cars, propelling-motors mounted on two or more of such cars, a motor-controller mounted on each motor-car, and pneumatically-actuated means
35 for simultaneously operating all the controllers throughout the train, and means mounted on each car for controlling said pneumatic actuating means, as and for the purpose set
40 forth.

3. In a pneumatic controlling system for electric cars, a train of cars, propelling-mo-

tors mounted on two or more of said cars, a controller for each of said sets of motors, an air-cylinder mounted on each motor-carrying
45 car, a piston mounted in each air-cylinder, gearing actuated by each of said pistons for operating the controller on the same car, a controller train-pipe connecting the cylinders on all of the motor-carrying cars, a com-
50 pressed-air reservoir and means located on each car for controlling the supply of compressed air from said reservoir to said controller train-pipe, whereby all the controllers
55 may be pneumatically actuated from any desired point on any of the cars throughout the train, as and for the purpose set forth.

4. In a pneumatic controlling system for electric cars, propelling-motors mounted on each car, a controller mounted on each car
60 for controlling the propelling-motors on that car, an air-cylinder mounted on each car, a piston arranged therein, gearing actuated by said piston for operating the controller on the same car therewith, a section of controller
65 train-pipe carried by each car, means for detachably connecting all the controller train-pipes throughout the train and air-reservoir, connections between said reservoir and train-pipe and a valve arranged in said connection,
70 said valve when actuated adapted to admit air-pressure from said reservoir to all of said cylinders, or to exhaust the air from all of said cylinders, whereby all of the controllers
75 throughout the train may be simultaneously actuated from any desired point on any car of the train, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, in the presence of the subscribing witnesses, this 16th day of September, 1897.

SIDNEY H. SHORT.

Witnesses:

FRANK T. BROWN,
S. E. DARBY.