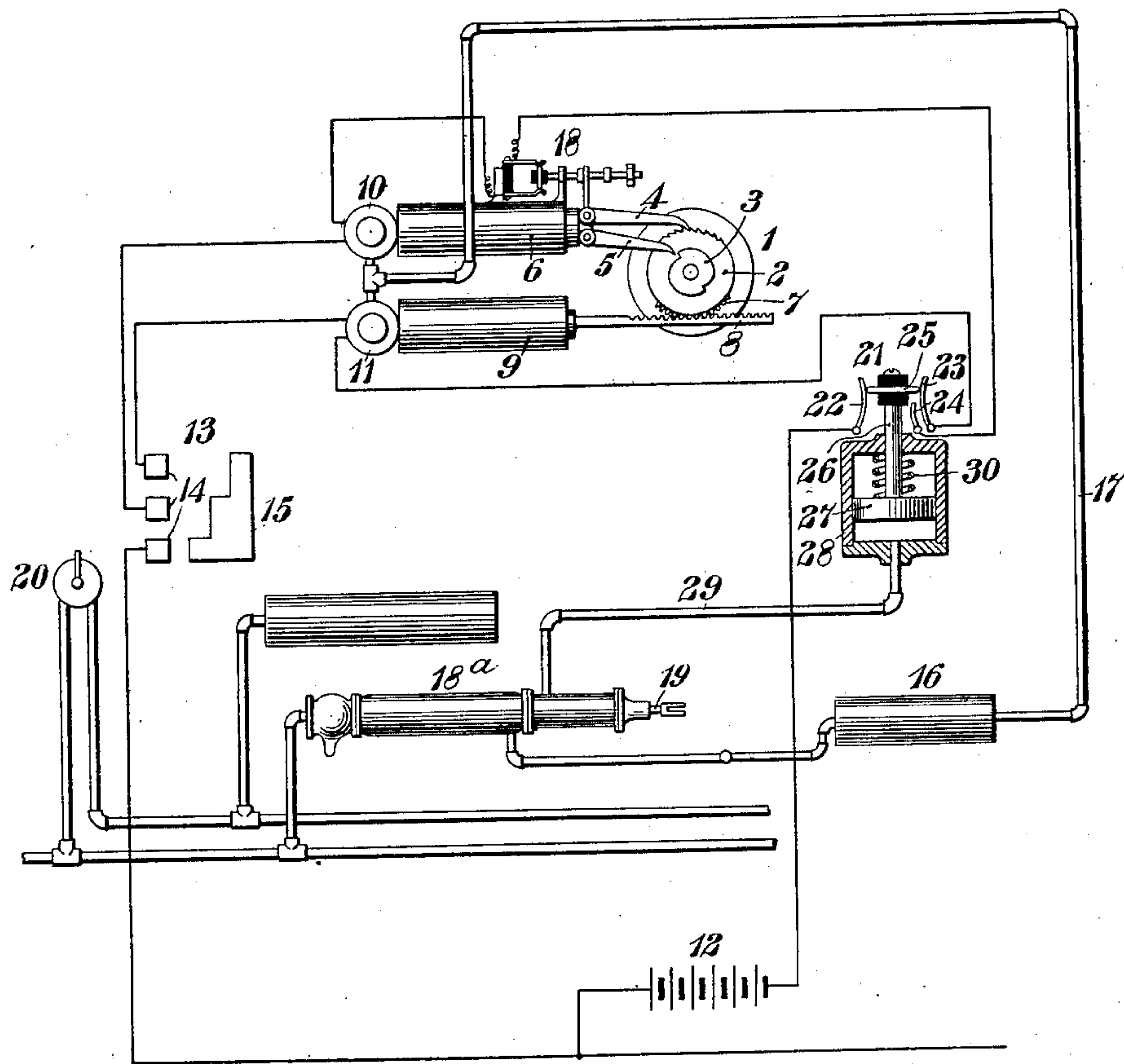


J. L. CROUSE.

## CONTROLLING SYSTEM FOR RAILWAY VEHICLES OR TRAINS.

APPLICATION FILED FEB. 20, 1903.

NO MODEL



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## CONTROLLING SYSTEM FOR RAILWAY VEHICLES OR TRAINS.

SPECIFICATION forming part of Letters Patent No. 735,714, dated August 11, 1903.

Application filed February 20, 1903. Serial No. 144,356. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN L. CROUSE, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Improvement in Controlling Systems for Railway Vehicles or Trains, of which the following is a specification.

My invention relates to apparatus employed for controlling the operation of electrically-propelled vehicles or trains in which all of the motor-controllers are actuated synchronously by means of power the application of which is governed by a manually-operated governing-switch and an electric circuit in which such switch is located.

The object of my invention is to provide an improved means for interrupting the power-circuit and effecting the return of the motor controller-drum to its initial position when the brakes are applied to the vehicle or train.

My invention is illustrated in the single figure of the accompanying drawing, which is a diagram of so much of the electric and pneumatic portions of a controlling system as pertains directly to my invention. Other features which belong to a complete controller system and which are shown, for example, in Patent No. 624,277, granted to George Westinghouse May 2, 1899, and in Patents Nos. 682,828 and 684,609, granted to E. R. Hill September 17, 1901, and October 15, 1901, respectively, are for convenience omitted; but reference may be had to the said patents for any additional illustration and description that may be deemed necessary in order to obtain a full and clear understanding of the system as a whole.

The controller 1 is provided with two ratchet-disks 2 and 3, which are respectively operated by two pawls 4 and 5, movement of which is effected in the usual manner in one direction by means of pneumatic pressure in a cylinder 6 and in the other direction by a spring. (Not shown.) The return of the controller-drum to its initial position is also effected in the usual manner by means of a toothed wheel 7 and a rack-bar 8, the latter being moved in one direction by pneumatic pressure in the cylinder 9 and in the other direction by a spring. (Not shown.) The ap-

plication of the pneumatic pressure in the cylinder 6 is governed by an electromagnetically-actuated valve, (represented in outline at 10,) and the application of the pneumatic pressure to the cylinder 9 is governed by a similar electromagnetically-controlled valve, (represented at 11.)

The governing-circuit for the magnets of the devices 10 and 11 is supplied with energy by a battery 12 and is provided with a manually-operated governing-switch 13, here shown as comprising three stationary contact-terminals 14, one of which leads to one magnet, another to the other magnet, and the third to one terminal of the battery, the movable member 15 of the switch being so constructed as to first make the battery connection for the magnet of the device 10 and subsequently the battery connection of the magnet of the device 11.

The governing-switch 13 and the other apparatus are, as has already been indicated, of greatly-simplified construction as compared with what would be employed in a complete controlling system; but the apparatus shown is operative and discloses a sufficient number of the elements of the system to illustrate my present improvement.

The closing of the circuit of the magnet part of the device 10 serves to admit air from the reservoir 16 through the pipe 17 to the cylinder 6, and thus actuates the pawls 4 and 5 to move the controller-drum one step. So long as the governing-switch is maintained in this position there will be no further movement of the controller-drum in the absence of other means for breaking the governing-circuit. I therefore provide a repeating switch 18, the movable member of which is magnetically actuated by the forward movement of the pawls 4 and 5 to break the governing-circuit and by their rearward movement to again close the circuit, so that the pawls are reciprocated automatically.

The vehicle-brakes (not shown) are operated by a brake-cylinder 18<sup>a</sup>, its piston, (not shown,) the piston-rod 19, and suitable levers and rods connected thereto when the engineer's valve 20 is manipulated for that purpose. In order that the controller-drum may be released and returned to its initial or zero



position when the brakes are applied, I provide a switch 21, one stationary terminal, 22, of which is connected to one pole of the battery 12 and the other two stationary terminals, 23 and 24, of which are connected, respectively, to the electromagnet of the device 11 and that of the device 10. The movable contact member 25 of the switch is mounted upon the piston-rod 26 of a piston 27, which is located in a cylinder 28, the lower end of which is connected to the brake-cylinder 18<sup>a</sup> by means of a pipe 29 in such manner that when the brakes are applied air will be admitted to the cylinder 28 through pipe 29, and thus open the switch 21, it being held normally closed by means of a coiled spring 30. The contact-terminal 24 is shorter than the terminal 23 in order that the governing-circuit for the operating-pawls 4 and 5 may be first broken to insure the release of the ratchet-disk from the pawls before the mechanism for returning the controller-drum to its initial position is set in operation.

Variations from what is shown as regards details of construction may obviously be made without departing from my invention, and I therefore desire it to be understood that the invention is not to be limited except as restrictions may be imposed by the prior art.

I claim as my invention—

1. In a controlling system for railway vehicles or trains, the combination with means for imparting a forward movement to each controller and means for returning the same to its initial position, of electric governing-circuits for said controller-operating means, an air-brake system, a switch for successively breaking said governing-circuits and pneumatically-actuated means connected to the brake-cylinder for operating said switch when the brakes are applied.

2. In a controlling system for railway ve-

hicles or trains, the combination with independent means for operating each controller in its two directions and electric governing-circuits therefor, of braking apparatus, a switch for said governing-circuits and connections between the same and the braking apparatus whereby the governing-circuits are successively broken when the brakes are applied.

3. In a controlling system for railway vehicles or trains, the combination with means for imparting a step-by-step movement to each controller in one direction and means for returning the same to its initial position, of electric governing-circuits for said controller-operating means, a switch for making and breaking said circuits, braking apparatus and connections between the same and said switch which are made operative by the setting of the brakes to open said governing-circuits successively.

4. In a controlling system for railway vehicles or trains, the combination with operating means to produce forward movement of each controller and operating means to produce rearward movement of the same, of governing electric circuits for said operating means, a switch for said circuits, a cylinder and piston for operating the same, an air-brake system and a pipe connection between the brake-cylinder and the switch-cylinder whereby the switch-piston is moved to successively open the governing-circuits when the brakes are applied.

In testimony whereof I have hereunto subscribed my name this 13th day of February, 1903.

JOHN L. CROUSE.

Witnesses:

L. C. CARUANA,  
CHARLES A. TERRY.