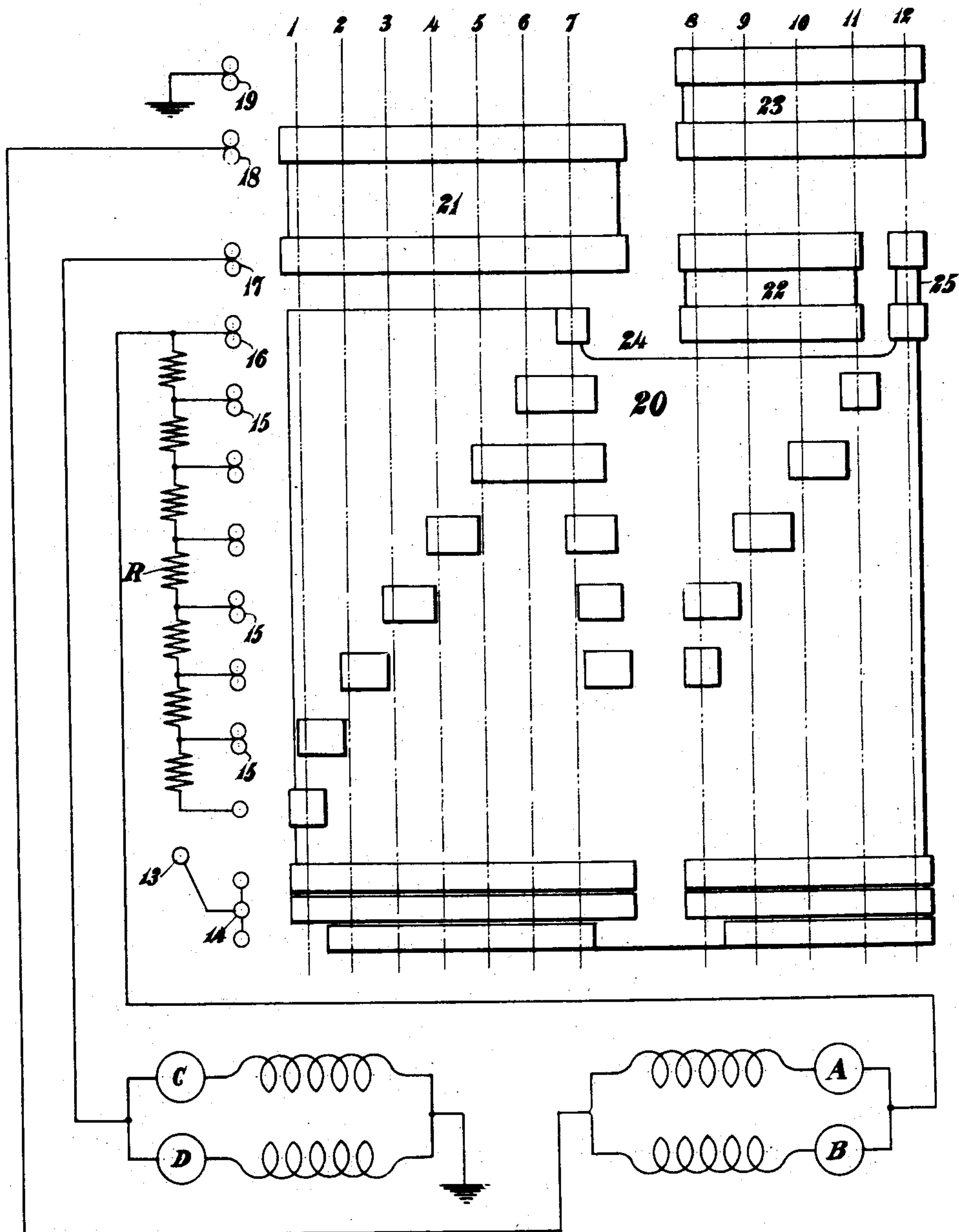


No. 871,220.

PATENTED NOV. 19, 1907.

T. GILMORE, JR.
CONTROLLER.

APPLICATION FILED OCT. 31, 1906.



Witnesses

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CONTROLLER.

No. 871,220.

Specification of Letters Patent.

Patented Nov. 19, 1907.

Application filed October 31, 1906. Serial No. 341,399.

To all whom it may concern:

Be it known that I, THOMAS GILMORE, Jr., a citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Controllers, of which the following is a full, clear, and exact specification.

My invention relates to controllers for electric motors and particularly to series-parallel controllers of the drum type.

In the operation of modern electric railway cars, especially those employed in inter-urban traffic, a number of motors, usually four, are required. These motors are of large capacity and draw heavy currents from the line and the difficulty of handling and properly controlling the current supplied to them becomes very great. At the present time it is customary in the construction of railway controllers to increase the number of parts, connecting several contact fingers in multiple and several contact segments on the controller drum in multiple in order to increase the current carrying capacity of the controller. Such an arrangement materially increases the size, weight and cost of the controller and lengthens out the drum to such an extent as to make same very bulky and unwieldy.

One of the objects of my invention is to reduce the length of the drum and consequently the height of a series-parallel controller adapted to carry these heavy currents, and to do this without impairing the efficiency of the controller and without reducing the number of its resistance steps.

In carrying out my invention I so construct and arrange the drum contacts and the contact fingers which cooperate therewith, that in the final parallel positions of the controller the current flows from the customary resistance regulating section of drum contacts to contact fingers directly connected with the motors, without passing through certain of the customary parallel connecting contacts on the controller drum. With such a construction, which may be modified materially from that shown without departing from the spirit and scope of the invention, it will be seen that but a single contact finger of sufficient capacity to carry the full current passing through the controller is required.

Other features of the invention are described hereinafter and set forth specifically in the appended claims.

The single figure of the drawing is a diagram showing the connections and arrangement of my controller, the controller drum being shown developed.

The trolley or other current collecting device 13 is connected to the lower contact finger 14 of the controller. The contact fingers 15 are connected to various intermediate points of the resistance R, the finger 16 being connected to the end of the resistance and to one common terminal of the pair of parallel connected series motors A and B. The other common terminal of these motors is connected to finger 18. Finger 17 is connected to one common terminal of the parallel connected series motors C and D, the other common terminal of these motors and contact finger 19 being grounded.

The controller drum is composed of a resistance regulating section 20, a section 21 for connecting the two pairs of motors in series and sections 22 and 23 for connecting the two pairs of motors in parallel. The sections are insulated from each other and each carry the customary contact segments adapted to cooperate with the contact fingers. The section 22 projects into a recess 24 in the upper end of the resistance regulating section 20, thereby permitting a material shortening of the controller drum. The various operating positions of the controller are indicated by the vertical broken lines. The resistance regulating section extends all around the drum, the series connecting section 21 from positions 1 to 7 inclusive, and the section 23, one of the parallel connecting sections, from position 8 to 12 inclusive. The section 22, the other parallel connecting section, extends from positions 8 to 11 inclusive, and in its stead in position 12, the final parallel position of the controller, is an extension 25 from the resistance regulating section 20. Each section has its proper contacts to cooperate with the contact fingers 14 to 19 inclusive.

When the controller is in any of its series positions, 1 to 7 inclusive, the circuit is complete from trolley 13, finger 14, resistance regulating section 20, fingers 15 or 16, that part of resistance R which may not be cut

out, motors A and B, finger 18, drum section 21, finger 17 and motors C and D, to earth. In parallel positions 8 to 11 inclusive, the current flows from the trolley 13, finger 14, resistance regulating section 20, one of the contact fingers 15, and part of resistance R to finger 16, where it divides, one part flowing through motors A and B, finger 18, drum section 23 and finger 19 to earth, and the other part flowing through finger 16, drum section 22, finger 17, motors C and D to earth. So far there is nothing essentially new in the action of the controller. When, however, the controller is in the final parallel position 12, the current flow is from the trolley 13, finger 14, drum section 20, the extension 25 where it divides, one part going to contact finger 16, and through motors A and B, fingers 18 and 19, and section 23 to ground, the other part going to contact finger 17, and through motors C and D to ground. When the controller is in this running position, which it is more than in any other operative position, the greatest current is flowing, but the full current flows through only one contact finger 14, and does not flow as is usual in other controllers, through the contact finger at the upper end of the resistance regulating section, here finger 16. Therefore only finger 14 need be made of great current carrying capacity, as indicated by its three circles, and the other fingers may be made smaller, as indicated by the lesser number of circles. Moreover, by recessing the upper end of section 20 at 24, and permitting the section 22 to project into the recess, the height of the controller is lessened by the width of a contact finger and the space between two contact fingers.

I have described my invention in what I now consider to be its preferred form, but I do not wish to be limited to the precise arrangement and connections set forth for obviously many changes can be made without departing from the spirit of my invention, and all of these obvious modifications I claim as falling thereunder.

What I claim as new and desire to secure by Letters Patent is:—

1. A controller of the series-parallel type, having a resistance regulating section and

series-parallel sections, and connections whereby in the final parallel position of the controller the motors to be controlled are connected to the current collecting device through only the resistance regulating section of the controller.

2. A series-parallel controller of the drum type, comprising a resistance regulating section, and sections for connecting the controlled motors in series and in parallel, one of the parallel connecting sections projecting into a recess in one end of the resistance regulating section, contact fingers cooperating with said various sections, and connections whereby in the final parallel positions of the controller only one contact finger carries the full current.

3. In combination, a plurality of motors, and a series-parallel controller of the drum type, comprising contact fingers, a resistance regulating section, sections for connecting the motors in series and in parallel, and an extension from one end of the resistance regulating section which in the final parallel position of the controller engages with a plurality of contact fingers to connect the different motors in parallel independently of said parallel connecting sections.

4. In combination, a plurality of electric motors, and a series-parallel controller of the drum type, comprising contact fingers, a resistance regulating section, and series and parallel connecting sections, the resistance regulating section having an extension adjacent to said parallel connecting section and carrying contacts, the whole being so connected and arranged that in certain of the parallel positions of the controller the parallel connecting section cooperates with certain contact fingers to connect the motors in parallel, while in the final parallel position of the controller the contacts on said extension cooperate with the same contact fingers to connect the motors in parallel.

In testimony whereof I affix my signature, in the presence of two witnesses.

THOMAS GILMORE, JR.

Witnesses:

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ARTHUR F. KWIS.