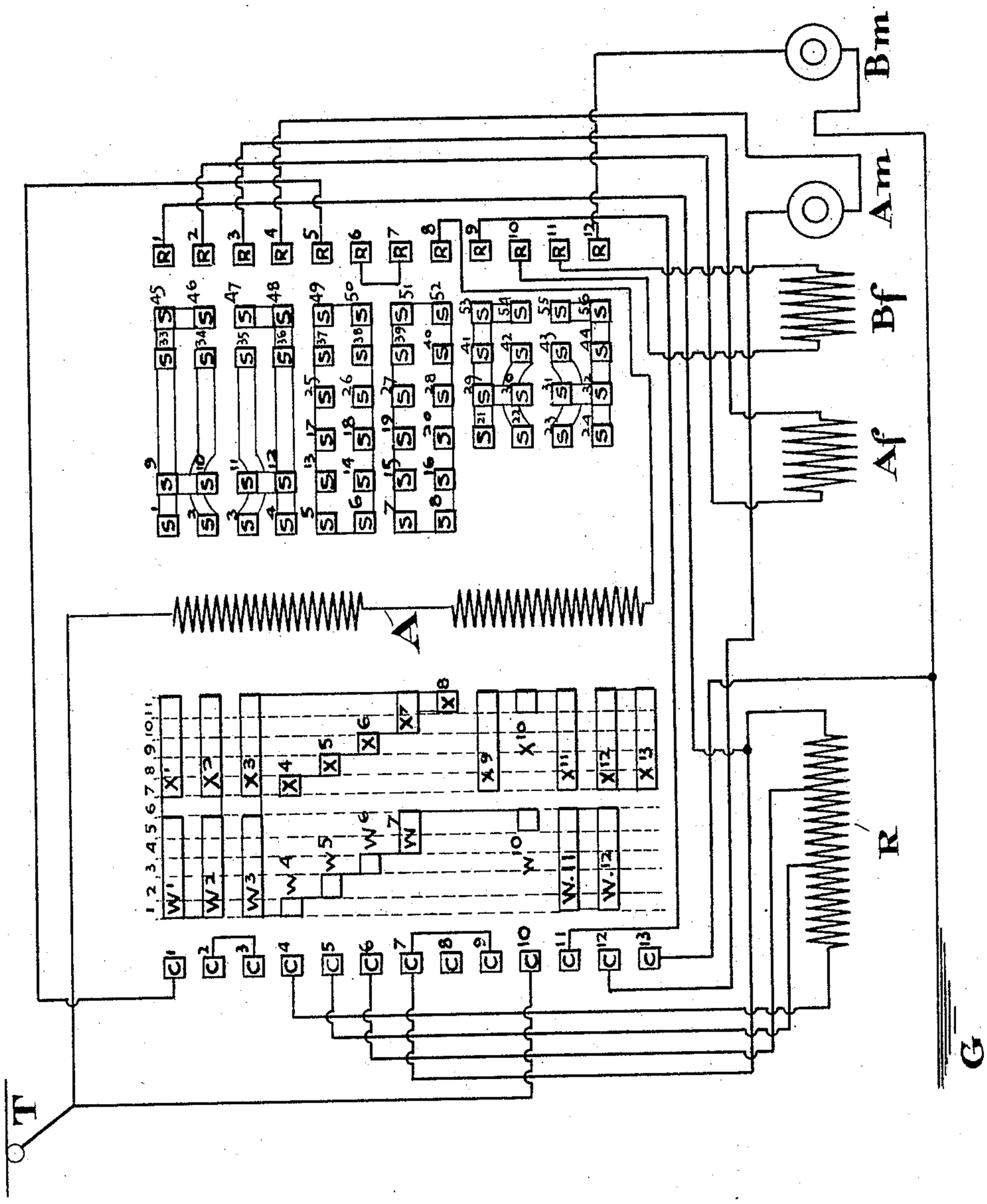
(No Model.)

F. A. MERRICK.

ELECTRIC CONTROLLER.

No. 599,186. Patented Feb. 15, 1898.



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ELECTRIC CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 599,186, dated February 15, 1898.

Application filed May 27, 1897. Serial No. 638,373. (No model.)

To all whom it may concern:

Be it known that I, FRANK A. MERRICK, of Auburndale, Middlesex county, Massachusetts, have invented certain new and useful Improvements in Electric Controllers, of which the following is a specification.

The object of my invention is to provide an electric controller of the class commonly used upon electric railways which is adapted to make the usual series-multiple changes of the motors carried upon the vehicle with the usual insertion of more or less resistance into the circuit when desired, which is provided with an electromagnetic arc-interrupter, for a purpose well known to those skilled in the art, but which has its contacts so arranged that at certain positions of the controller the energizing-coils of the said arc-interrupter will be short-circuited. By short-circuiting the said coils when the controller is at one or both of its "running" positions I am enabled to save much electric energy and thereby can afford to put in an unusually strong arc-interrupter, because the energizing-coil, being only used in the temporary positions of the controller, in reality wastes no power, because in these positions a resistance has to be provided in series with the motors whether the arc-interrupter is present or not. The energizing-coil, therefore, being placed in series with the motors serves as a part of this required resistance.

With this end in view my invention consists in so arranging the contacts of a controller that at the desired position or positions I may short-circuit the energizing-coil of the arc-interrupter.

The drawing forming a part of this specification represents a diagrammatic view of a controller embodying the present invention.

T is the trolley, and G the ground side of the circuit.

A^f and A^m represent, respectively, the field and armature of one of the motors. B^f and B^m are corresponding parts of the other motor.

R is a resistance adapted to be placed in series with the motor.

C′ to C^{13} are contact-fingers of the operating-drum of the controller.

W′ to W^{12} and X′ to X^{13} are contacts secured upon the operating-drum. The W group represent the series positions of the drum, while the X group cover the multiple positions of the drum. The R group represent the fingers of a reversing and cut-out switch, while the S group are contacts upon the drum of the same.

A is the energizing-coil of the electromagnetic arc-interrupter.

The W and X groups are each shown as divided into five operative positions. I have shown these operative positions by ten dotted lines, which are marked numbers 1 to 10.

I will illustrate the operation of my invention by showing the passage of the current at the fourth and fifth points of the drum. For the purpose of the present description I will suppose the R fingers of the reversing and cut-out switch to be in contact with the contacts numbered S^{45} to S^{56}, inclusive. This position of the switch controls the circuit so as to cause both motors to coact to propel the car in a forward direction. Other positions of this switch would while effecting various changes in the motor-circuits act in a precisely similar manner so far as the energizing-coils of the arc-interrupter are concerned. At the fourth point the current passes as follows: T A R^8 R^5 C′ W′ W^7 C^7 R′ R^2 A^f R^3 R^4 A^m C^{12} W^{12} W^{11} C^{11} R^9 R^{10} B^f R^{11} R^{12} B^m G, thus going through both motors with the coil A in series therewith. In the positions 1, 2, and 3 the circuit is substantially the same except that more or less of the resistance R is passed through before the current reaches the motors. This can easily be traced out by any one skilled in the art. The fifth point would be as follows: T C^{10} W^{10} W^7, &c., exactly as before. The energizing-coil A has thus been short-circuited from T to W^{10}, which is not present until the fifth position is reached. The same change is again repeated between the ninth and tenth positions, the only difference being in the arrangement of the contacts to pass the current through the motors in multiple instead of series.

It is clear that I am not limited in the use of my invention to any particular type of controller; nor am I even limited to the particular arrangement of contacts shown, for any one skilled in the art could readily modify the details which I have described.

Having thus described my invention, what I claim, and desire to protect by Letters Patent, is—

1. In an electric controller having stationary contacts connected to various parts of the circuit and movable contacts coöperating therewith, the combination with one of the stationary contacts connected to one side of the circuit through the energizing-coil of an arc-interrupter, coöperating movable contacts engaging therewith at all operating positions of the controller, another of the stationary contacts connected directly to the same side of the circuit, and coöperating movable contacts engaging therewith at certain positions of the controller only.

2. The combination in an electric controller of the contact-finger C′ connected to one side of the circuit, as T, through energizing-coils A, the contact-finger C^{10} connected to the same side of the circuit and shunting around the said energizing-coils, and the movable contacts W′, X′, W^7, X^7, W^{10}, and X^{10}, arranged substantially as, and for the purpose, specified.

3. A rotatable contact-carrying drum and a series of fixed fingers engaging therewith, in combination with an energizing-coil for a magnetic arc-interrupter, connections from one side of the circuit through said energizing-coil to one of the fixed fingers, said finger contacting with the drum at all of its operative positions; a direct connection from the same side of the main circuit to another of the fixed fingers, said last-mentioned finger contacting with the drum at only a part of its operative positions.

In testimony whereof I have affixed my signature in presence of two witnesses.

FRANK A. MERRICK.

Witnesses:
RICHARD EYRE,
H. W. SMITH.