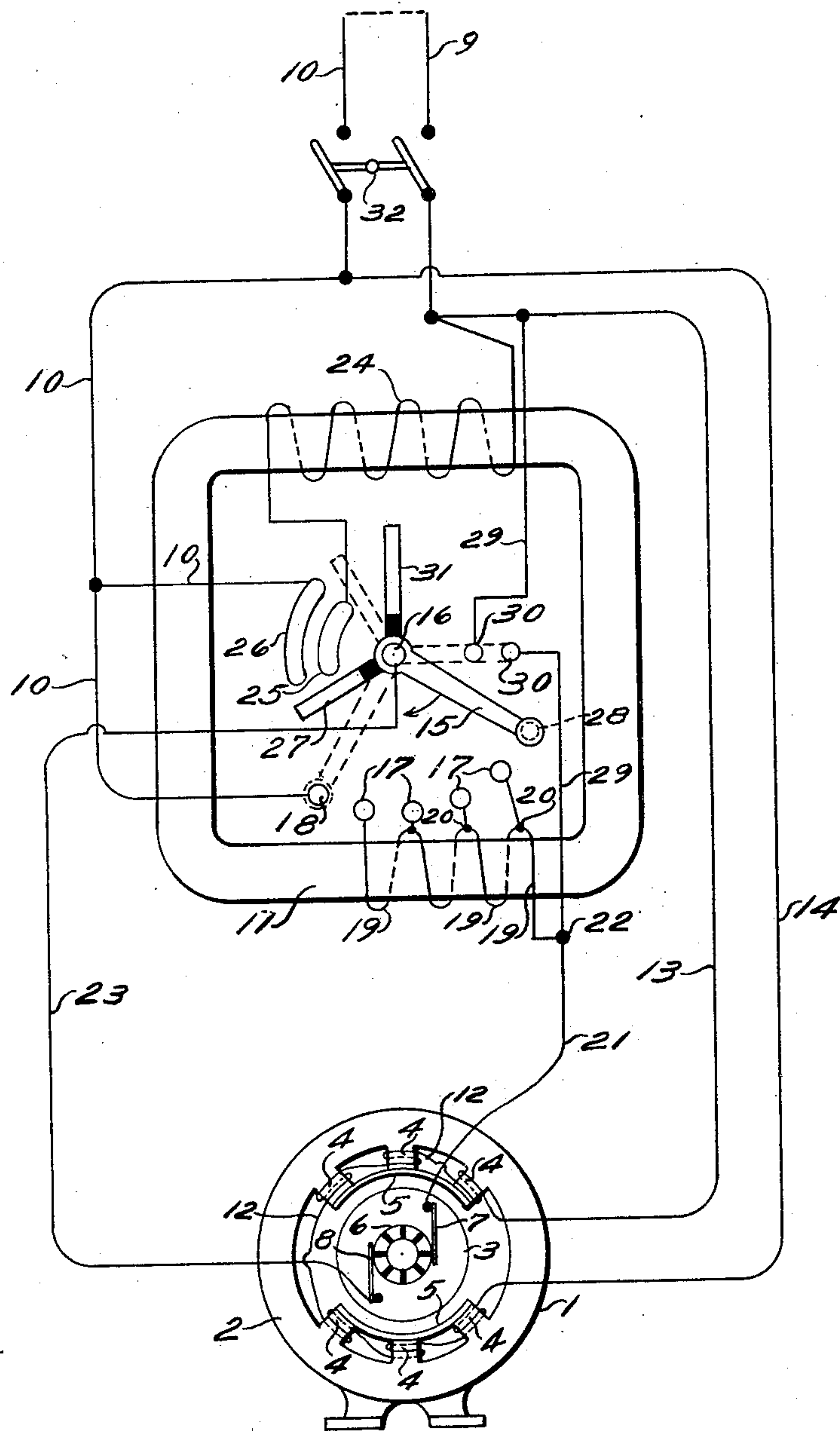


No. 733,401.

PATENTED JULY 14, 1903.

A. KIMBLE.  
ALTERNATING CURRENT MOTOR CONTROLLER.  
APPLICATION FILED JAN. 26, 1903.

NO MODEL.



Witnesses:

Rudow Sumner

Blanche Michael

Inventor,

Austin Kimble,

by Sumner Sumner,  
his Attorneys.

# UNITED STATES PATENT OFFICE.

AUSTIN KIMBLE, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO FRANK S. BETZ, OF CHICAGO, ILLINOIS.

## ALTERNATING-CURRENT-MOTOR CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 733,401, dated July 14, 1903.

Application filed January 26, 1903. Serial No. 140,630. (No model.)

*To all whom it may concern:*

Be it known that I, AUSTIN KIMBLE, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Alternating-Current-Motor Controllers, of which the following is a specification.

My invention relates to controllers for regulating the speed of alternating-current motors.

The main object of my invention is to provide an improved form of transformer-controller which is particularly adapted for regulating an alternating-current motor in which the fields are excited by a shunt-current from the main circuit supplying power for such motor. I accomplish this object by the device shown diagrammatically in the accompanying drawing.

In the construction shown the motor 1 consists of a supporting-frame 2, having an armature 3 journaled therein and having rigidly secured thereto and surrounding said armature an annular series of radially-disposed cores 4. The cores 4 are divided into two equal groups, the members of each group being connected by a pole-piece 5. The armature-circuits of the motor 1 are represented by the commutator 6 and the brushes 7 and 8. Power is supplied to the motor from a main circuit carrying an alternating current and represented by the conductors 9 and 10. The transformer 11 serves the purpose of varying the voltage of the current supplied to the armature-circuit of the motor 1. The field-circuit 12 of the motor 1 is connected by means of the conductors 13 and 14 as a shunt of the main circuit and is therefore unchanged by the action of the transformer.

The controller-lever 15 is pivoted at 16 and is movable so as to come into electrical contact with a series of contact-pieces 17 and 18. The secondary winding of the transformer 11 consists of a plurality of coils 19, connected in series and having their junctions 20 each respectively in electrical connection with one of the contact-pieces 17. The conductor 21 connects the end 22 of the secondary winding of the transformer with the brush 7 of the motor. The brush 8 of the motor is connected

by means of the conductor 23 with the controller-lever 15. The contact-piece 18 is connected directly with the conductor 10 of the main circuit. The primary coil 24 of the transformer 11 is connected at one end with the conductor 9, and its other end terminates in a contact-piece 25. A second contact-piece 26, adjacent to but insulated from the contact-piece 25, is connected with the conductor 10. The controller-lever 15 has rigidly secured thereto and insulated therefrom an arm 27, which is suitably arranged to make an electrical connection between the contact-pieces 25 and 26 when the lever 15 is in contact with any of the contact-pieces 17 and to break such connection when said lever is in contact with either the "off" button 28 or the contact-piece 18. The arm 27 and the contact-pieces 25 and 26 thus form a switch controlling the primary circuit 24. A conductor 29 connects the conductor 9 with the brush 7 of the motor, but the circuit therein is normally broken at the contact-pieces 30, which are insulated from each other. The lever 15 has also secured thereto and insulated therefrom an arm 31, which is suitably located and is adapted to make an electrical connection between the contact-pieces 30 when the lever 15 is in connection with the contact-piece 18. The switch 32 controls the passage of current through the entire system.

To operate the device shown, the switch 32 is thrown in, and a current is thereby caused to pass through the field-circuit 12 of the motor 1. The lever 15 is then moved in the direction of the small arrow to one of the contact-pieces 17, depending upon the desired voltage of the secondary current. As soon as the lever 15 arrives at one of the contact-pieces 17 the arm 27 connects the contact-pieces 25 and 26, completing a circuit and causing current to pass through the primary coils 24. The lever 15 having completed the secondary circuit a current is induced therein and passes through the armature-circuit of the motor, the voltage of the armature-circuit depending upon the number of coils 19 of the secondary circuit which are being used. When it is desired to throw the current of the main circuit directly into the armature-circuit without the intervention of the trans-



former, the lever 15 is moved into contact with the contact-piece 18, thus directly connecting the brush 8 with the conductor 10. As the lever 15 arrives at the contact-piece 18, the arm 27 leaves the contact-pieces 25 and 26, breaking the primary circuit, and the arm 31 connects the contact-piece 30, and thereby directly connects the brush 7 of the motor with the conductor 9. The armature-circuit of the motor thus receives its current directly from the main circuit.

It will be noticed that the form of controller which is herein described is particularly useful in connection with the type of motor shown, wherein the speed of the armature-shaft is independent of the frequency of the current supplied and dependent only upon the voltage in the armature-circuit and the load on the motor.

It will be seen that numerous details of the construction shown may be altered without departing from the spirit of my invention. I therefore do not confine myself to such details except as hereinafter limited in the claims.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a motor; a transformer having primary and secondary coils of wire on same; a main circuit connected with said primary coil; a field-exciting circuit on said motor connected as a shunt from said main circuit; an armature-circuit in said motor; a switch adapted to connect said armature-circuit with the secondary coil of said transformer; and means for cutting out said transformer and simultaneously connecting said armature-circuit directly with said main circuit, substantially as described.

2. The combination of a motor; a main circuit for supplying power to said motor; a transformer; a primary coil on said transformer connected with said main circuit; a switch for controlling said primary coil; a shunt from said main circuit for exciting the field of said motor; an armature-circuit in said motor; a secondary circuit in said transformer comprising a plurality of coils connected in series, one end of said secondary circuit being connected with a terminal of said armature-circuit; a series of contact-

pieces each connected with the end of one of said secondary coils; a member connected with the remaining terminal of said armature-circuit and movable along said series of contact-pieces; an additional contact-piece, not connected with said secondary coils, and means operated by said member whereby, when said member is in electrical connection with said additional contact-piece, said primary circuit will be broken and said armature-circuit will be excited directly by said main circuit, substantially as described.

3. The combination of a motor; a transformer having primary and secondary coils of wire on same; a main circuit connected with said primary coil; a field-exciting circuit on said motor, connected as a shunt from said main circuit; an armature-circuit in said motor having the brushes 7 and 8; a lever 15 movably mounted near said transformer and having rigidly secured thereto and insulated therefrom the arms 27 and 31; a plurality of contact-pieces 17 adapted to be engaged by the lever 15 for completing and regulating the length of the secondary circuit in said transformer; an additional contact-piece 18 connected with the conductor 10 of said main circuit; the contact-pieces 25 and 26, insulated from each other and adapted to coact with said arm 27 to form a switch for controlling the primary circuit of said transformer, said contact-pieces and arm being arranged to complete the primary circuit when the lever 15 is on any of the contact-pieces 17 and to break said primary circuit when said lever is moved out of contact with said contact-pieces; contact-pieces 30 insulated from each other and adapted to be engaged by the arm 31 when the lever 15 is in contact with the contact-piece 18, said contact-pieces 30 being respectively connected with the conductor 9 and the brush 7; and a conductor connecting the brush 8 with the lever 15, substantially as and for the purpose specified.

Signed at Chicago this 23d day of January, 1903.

AUSTIN KIMBLE.

Witnesses:

RUDOW RUMMLER,  
EUGENE A. RUMMLER.