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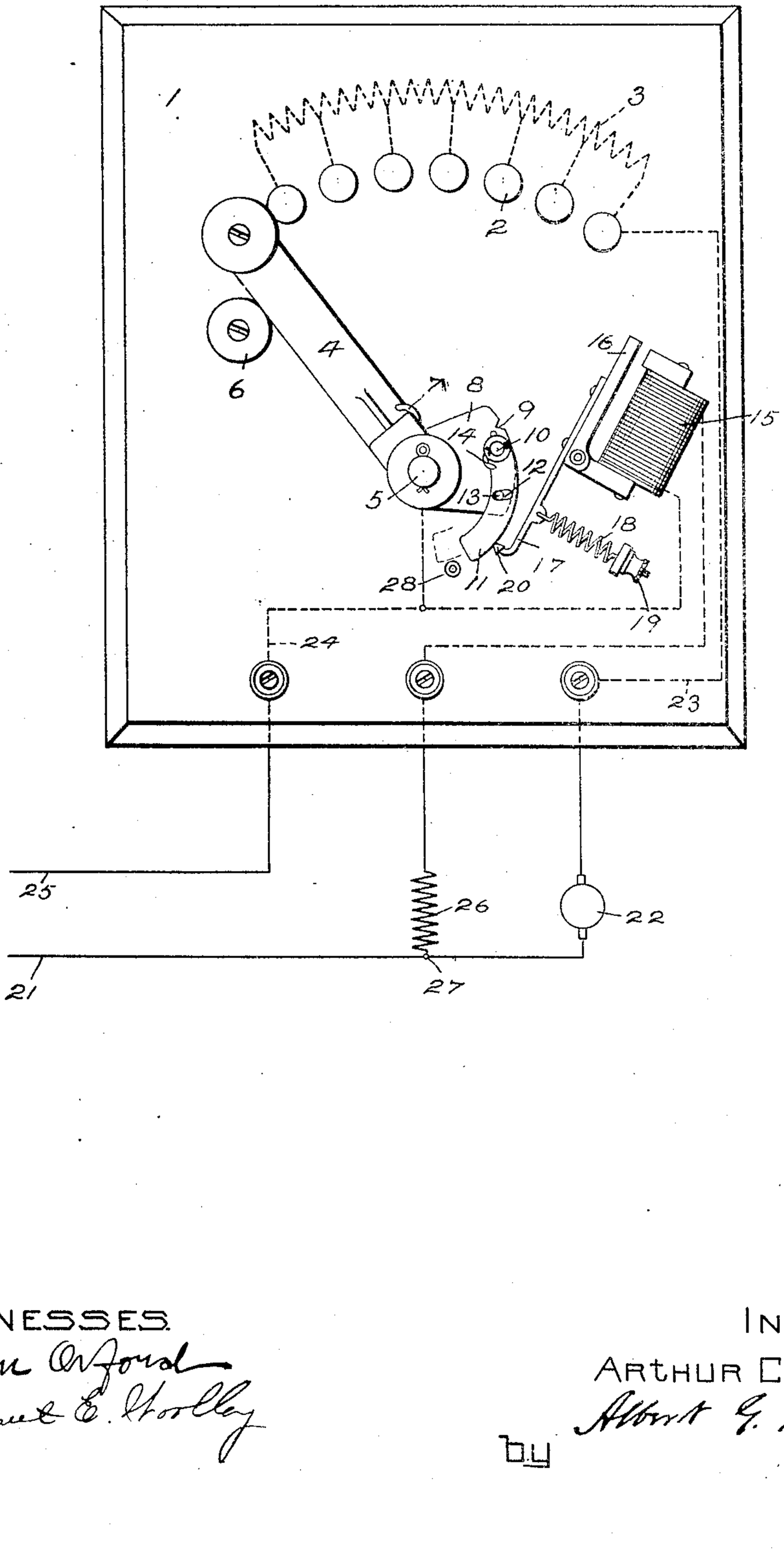
A. C. KING.

STARTING DEVICE FOR ELECTRIC MOTORS.

APPLICATION FILED JUNE 9, 1906.



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UNITED STATES PATENT OFFICE.

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STARTING DEVICE FOR ELECTRIC MOTORS.

No. 843,753. Specification of Letters Patent. Patented Feb. 12, 1907.

Application filed June 9, 1906. Serial No. 320,973.

To all whom it may concern:

Be it known that I, ARTHUR C. KING, a citizen of the United States, residing at Madison, county of Dane, State of Wisconsin, have invented certain new and useful Improvements in Starting Devices for Electric Motors, of which the following is a specification.

This invention relates to devices for controlling electric-motor circuits, and has for its object the provision of a device of this character which will protect the motor against accident due to careless handling and other causes in a reliable, safe, and efficient manner.

My invention relates more specifically to protective devices for electric-motor circuits.

As is well known, many motors are seriously injured by closing the armature-circuit with an open or very weak field. This mistake is often made even by experienced operators; and it is the object of my invention to positively prevent the occurrence of such an accident.

In carrying out my invention I provide, in connection with the controlling-arm, which is biased to the off position, a latch or dog which normally abuts against a stud on the base, so as to prevent the movement of the arm toward running position. This dog is moved out of engagement with the stud by an armature controlled by a no-voltage magnet. When the field-circuit is closed and the no-voltage magnet is energized, the arm is free to be moved to the running position, and when it reaches this position the same armature which releases the restraining-dog locks the arm in running position.

In the accompanying drawing I have shown one embodiment of my invention; but it should be understood that this arrangement is merely typical and that many modifications may be made therein without departing from the spirit of my invention.

Referring to the drawing, 1 is an insulating-base of slate or soapstone provided with a series of studs 2, forming terminals for a starting resistance 3. The controlling-arm 4 is pivoted at 5 to coöperate with the studs 2 and is biased to off position in contact with the stop 6 by means of a spring 7. Secured to the arm 4 and adapted to move therewith is a segmental piece 8, provided with a notch 9 and having pivoted thereto at 10 another segmental piece 11, acting as a pawl or dog. The movement of the dog 11 with reference to the part 8 is governed by a slot 12 in the dog, into which fits a pin 13 in the part 8. A spring 14 around the pivot 10 forces the segmental dog 11 outward from the pivot 5 into the position shown in full lines in the drawing. Suitably situated to coöperate with the starting-arm 4 is a no-voltage magnet 15, having a pivoted armature 16, provided with a spring-arm 17. This armature is normally pressed away from the pole of the magnet by means of a spring 18, made adjustable by means of the nut 19. The free end of the arm 17 is bent at right angles and provided with a V-shaped head 20, adapted to fit into the slot 9. This head is normally in engagement with the dog 11. The magnet 15 is preferably connected in the field-circuit, so that the direction of current will be from the positive main at 21, through the armature 22, thence through wire 23, resistance 3, arm 4, and wire 24, back to the line at 25. The field 26 is connected from the main 21 at 27, through the release-magnet 15, and back to line at 25.

The operation of my device will be readily understood from the foregoing description. When it is desired to start the motor, the controlling-arm will be moved on to the first stud 2. In this position the dog 11 abuts against the stop 28 and further movement of the arm cannot be made unless the magnet 15 is energized. When the magnet is so energized, the armature 16, being attracted, moves the dog inward, so that when the arm is moved the dog will assume the position shown in dotted lines. The arm may then be moved to the running position, the dog riding over the stop 28. When the arm reaches the running position, the head 20 engages the slot 9 and locks the arm. Upon the weakening or breaking of the field from any cause the armature is released, thereby releasing the arm, which returns to the off position.

It will thus be seen that I have provided an arrangement whereby it is impossible to start the motor without the proper field strength, since the arm is positively locked against such movement, and a single magnet acts to both release the restraining means and hold the arm in running position.

It should of course be understood that

many modifications will suggest themselves to those skilled in the art. For instance, the arrangement will be such that the locking means will not be accessible to the operator, and many other changes may be made without departing from the spirit of my invention, the scope of which is set forth in the annexed claims.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A starting-rheostat, comprising a controlling-arm, a magnet responsive to predetermined decrease of excitation, and means controlled by said magnet for normally preventing the movement of the arm to running position.

2. A starting-rheostat, comprising a controlling-arm, a no-voltage magnet in the field-circuit, and means controlled by said magnet for preventing the movement of said arm beyond the starting position.

3. A starting-rheostat, comprising a controlling-arm, a no-voltage magnet, and means in connection with said arm and controlled by the magnet for preventing the movement of the arm to running position.

4. A starting-rheostat, comprising a controlling-arm biased to off position and normally restrained from movement to running position, a no-voltage magnet in the field-circuit, and means controlled by said magnet for releasing the restraining means and retaining the arm in running position.

5. A starting-rheostat, comprising a controlling-arm biased to off position and normally restrained against movement to running position, a no-voltage magnet, and a single armature controlled thereby for releasing the restraining means and locking the arm in running position.

6. A starting-rheostat, comprising a controlling-arm biased to off position and normally restrained against movement to the running position, a no-voltage magnet, and a single armature controlled thereby and arranged to first release the restraining means when said magnet is energized and then lock the arm in running position.

In witness whereof I have hereunto set my hand this 6th day of June, 1906.

ARTHUR C. KING.

Witnesses:

E. A. LAMBRECHT,

F. M. SHEPARD.