

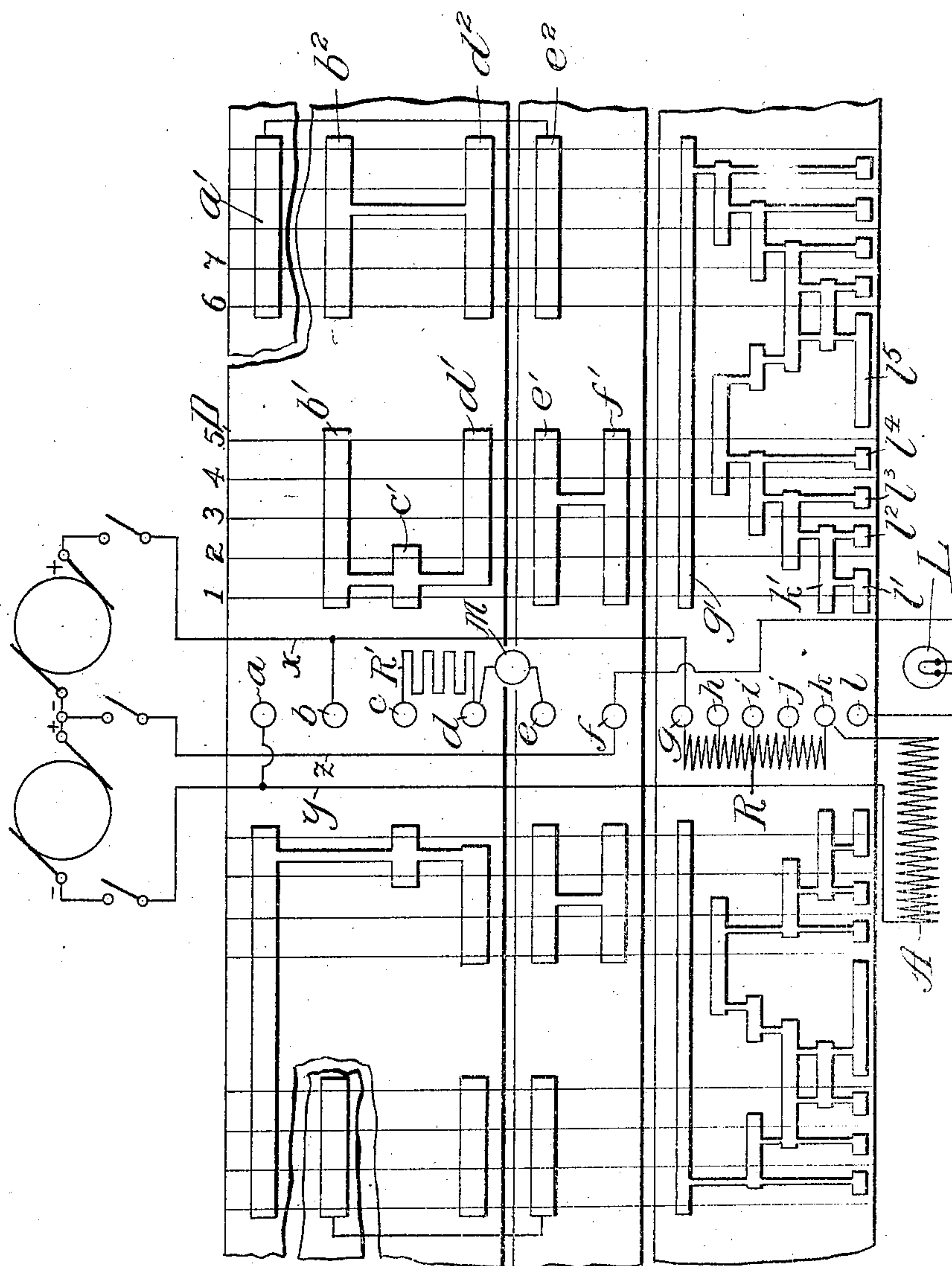
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W. H. WARREN.

WARNING SIGNAL FOR ELECTRIC MOTOR CONTROLLERS.

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UNITED STATES PATENT OFFICE.

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WARNING-SIGNAL FOR ELECTRIC-MOTOR CONTROLLERS.

No. 824,223.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM H. WARREN, a subject of the King of Great Britain, residing at Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Warning-Signals for Electric-Motor Controllers, of which the following is a full, clear, concise, and exact description.

My invention relates to a motor-controller, and has for its object the provision of a signal for indicating safe and unsafe position of the controller-drum during its operation.

In some systems for operating motors the insertion of resistance is required in the armature-circuit when the controller is moved to starting position. It is undesirable that the controller long remain at such position, for the reason that the resistance may interfere with the speed regulation or may be damaged by overheating. Also if the drum be held in a position intermediate two notches while cutting resistance in or out of the field-circuit the contact-fingers will rest in between instead of on the circuit contact-blocks of the drum.

For the purpose of notifying the operator when the controller is in any of the positions in which it should not be allowed to remain I have devised a signal, placed in a conspicuous position near the operator, and a series of contacts on the main drum arranged to close the circuit of the signal and cause it to be operated at each intermediate position of the controller and also when the armature resistance is in use. Thus whenever the controller is in improper position the attention of the operator will be called to that fact.

My invention is particularly adapted for use in connection with a motor-controller such as is shown, for example, in patent to Walter J. Warder, Jr., No. 790,541, dated May 23, 1905.

I will describe my invention more particularly by reference to the accompanying drawing, which is a diagrammatic view showing the drum developed in order to clearly illustrate the arrangement of circuits.

The iron drum, as shown, consists of insulated sections and is of course mounted, as usual, on a shaft carrying the controller-handle. The operation of the drum is well known and need not be described in detail.

On the drum are the contact-blocks $a' b' c' d' e'$, adapted to contact with the fingers $a b c d e$, respectively, upon the rotation of the drum.

When the switch is closed to connect the motor with the mains, the circuit from the terminals will be closed through the conductor x , the shunt resistance R , the shunt field-magnet coils A , and conductor y . When the controller is moved forward into position 1, the drum is rotated, so that fingers $b c e f g k l$ contact with the blocks $b' c' e' f' g' k' l'$, respectively. A circuit is then closed through the line x , contacts b and c , armature resistance R' , armature-motor M , contacts e and f , and line z . The resistance R is short-circuited through the finger g , contact-blocks g' and k' , and finger k . In this position the current flows through the armature resistance, and it is undesirable, for reasons already stated, that the controller long remain in such position. I therefore provide a signal, here shown as a lamp L , to warn the operator. The lamp has one terminal secured to the finger l and the other to finger f , connected to line z . When the controller is in position 1, the finger l rests on the block l' and the circuit is closed through the lamp, thereby lighting it to attract the operator's attention.

When the controller is moved to the point 2, the resistance R' is cut out by the finger d contacting with the block d' , the controller is then in a safe position, the circuit containing the lamp is open, and the lamp extinguished. By moving the controller-lever to point 3 a portion of the shunt resistance R is included in the shunt-circuit, and by moving it to points 4 and 5 additional resistance is cut in. When in any of the positions 2 3 4 5, the contact-fingers rest on the blocks and the motor-controller is in proper running position. Should the controller be placed in a position intermediate any of the two points, thereby causing the contact-fingers to rest between the contact-blocks, the operator's attention is called to this unsafe position of the controller by the lamp being lighted. This is due to the fact that the finger l in any one of said improper positions of the controller contacts with one of a series of blocks $l' l^2 l^3 l^4$, situated on the drum between the points 1, 2, 3, 4, and 5, and the circuit containing the signal is thereby closed. In moving the controller-lever from point 5 to point 6 the con-

tact-fingers *a b c d e f* do not rest on contact-points on the drum, thereby opening the circuit through the motor-armature, and the motor will tend to stop. In this intermediate position, however, the contact-point *l* rests on block *b*⁵ and the warning-signal is operated. When the controller-lever reaches the point 6, the fingers *a b d e* contact with the blocks *a'* *b*² *d*² *e*², respectively. The block *a'* is mounted on a separately-insulated section of the drum and is electrically connected with block *e*². In this position a circuit is closed from the mains through blocks *b*² and *d*², motor-armature M, blocks *e*² and *a'* to the conductor *y*. The controller is in a safe position, and the warning-signal is not operated. If, however, the controller is moved forward to regulate the resistance R in the shunt-field at every position intermediate the main contact-blocks, the finger *l* will rest on a corresponding auxiliary contact-block and the warning-signal operated.

While I have described the operation of the device only while the controller-lever is moved forward, it is obvious that in the reverse position of the lever the signal will be operated in a similar manner.

Though I have shown a lamp in the drawing, I do not limit myself to the use of any particular signal device. Any other suitable signal may be used instead of a lamp.

What I claim is—

1. The combination with the switching mechanism of a motor-controller, of a circuit including a signal for indicating safe and unsafe positions of the controller mechanism, and additional switching mechanism, which moves with each movement of the controller, to control the signal-circuit.

2. In a controller for electric motors, the combination with a motor-circuit, of a normally open circuit including a signal, a contact-finger to which one terminal of the signal is connected, and a series of contact-blocks on the controller-drum, adapted to engage with said finger when the controller is in improper running positions, and thereby to close the signal-circuit.

3. In a controller for electric motors, the combination with the motor-circuit, of a normally open shunt-circuit including a signal, a series of contact-blocks on the controller-drum located in positions intermediate the proper running positions of the controller, a finger connected to one terminal of the signal and adapted to engage said contact-blocks to close the signal-circuit when the controller mechanism is in an unsafe position.

4. In a controller for electric motors, the combination with a controller-drum having a series of main contact-blocks thereon, of a series of fingers adapted to engage said blocks for controlling the motor-circuit, a normally open shunt-circuit including a signal, an auxiliary contact-finger to which one terminal of the signal is connected, and a series of auxiliary contact-blocks on the controller-drum so located as to engage the auxiliary finger when the controller mechanism is in unsafe position and thereby to close the signal-circuit.

In witness whereof I hereunto subscribe my name this 4th day of October, A. D. 1905.

WILLIAM H. WARREN.

Witnesses:

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