

No. 635,496.

Patented Oct. 24, 1899.

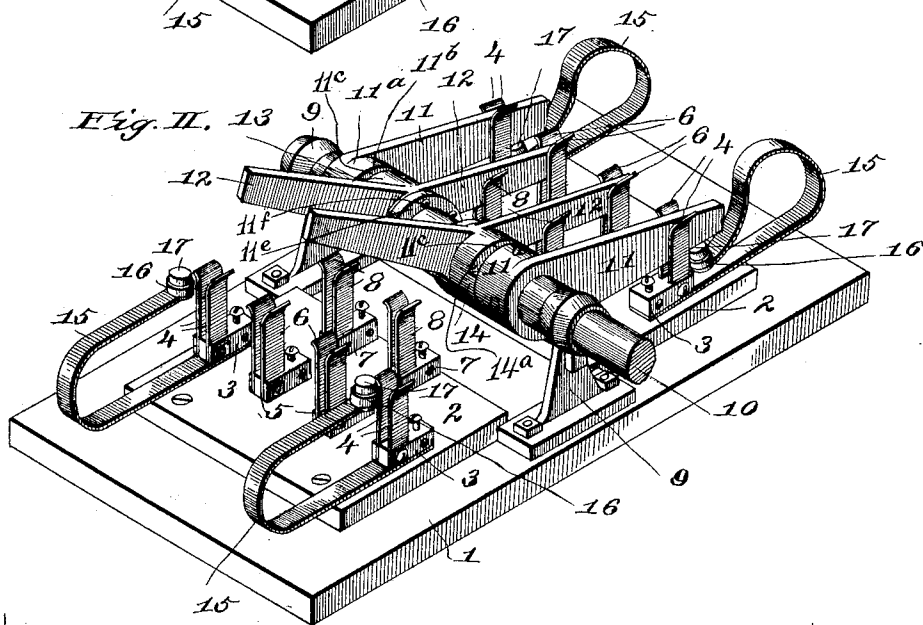
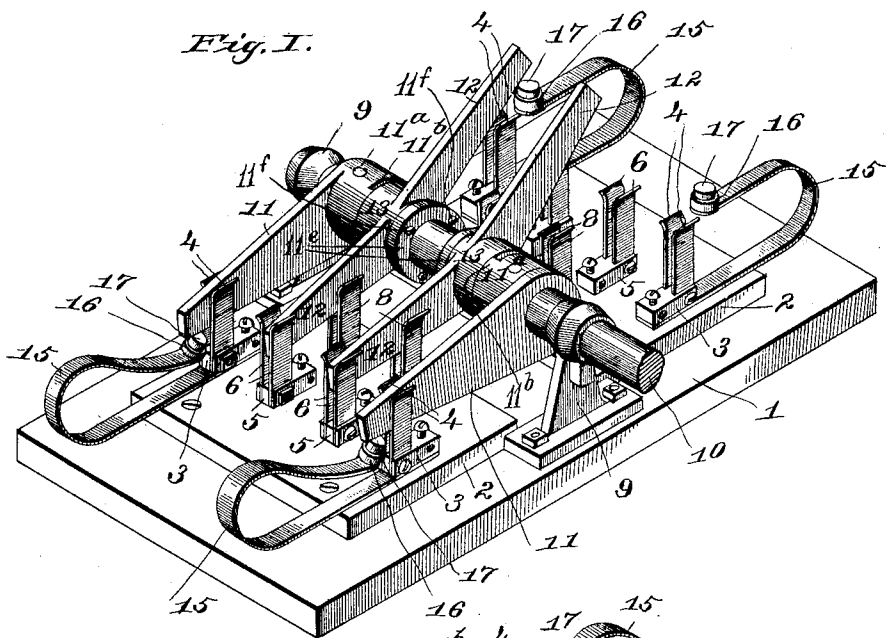
E. V. MATLACK.

REVERSING SWITCH FOR ELECTRIC MOTORS.

(Application filed Jan. 3, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses—

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2 Sheets—Sheet 2.

Fig. III.

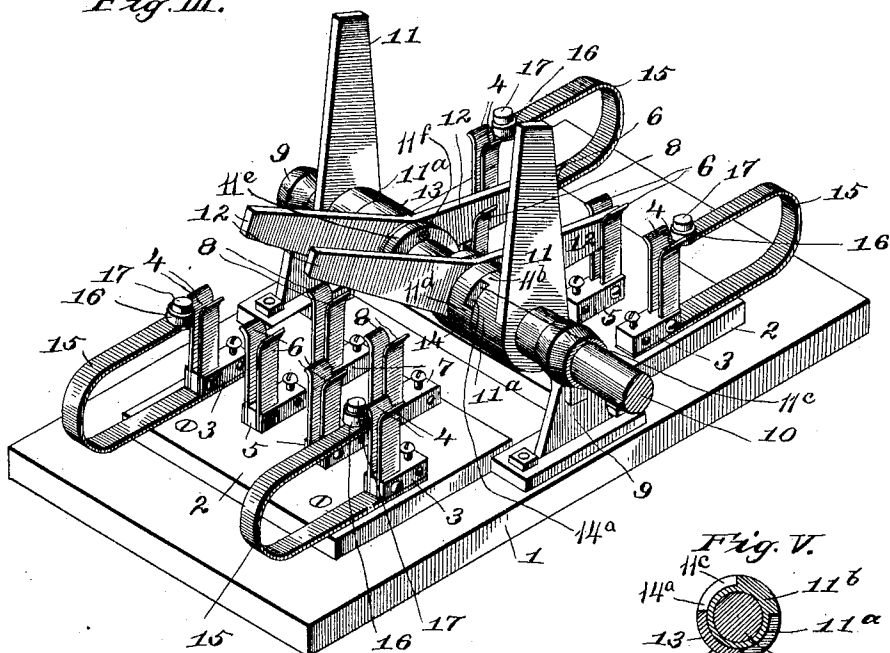


Fig. IV.

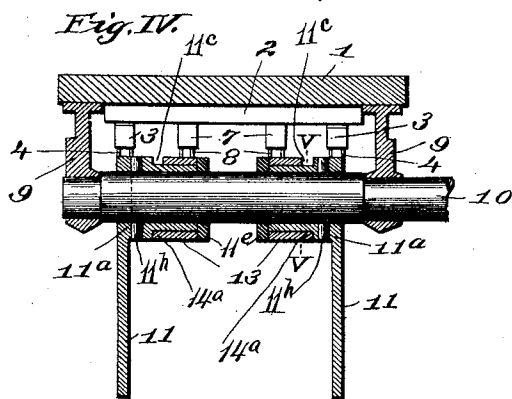


Fig. V.

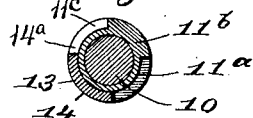
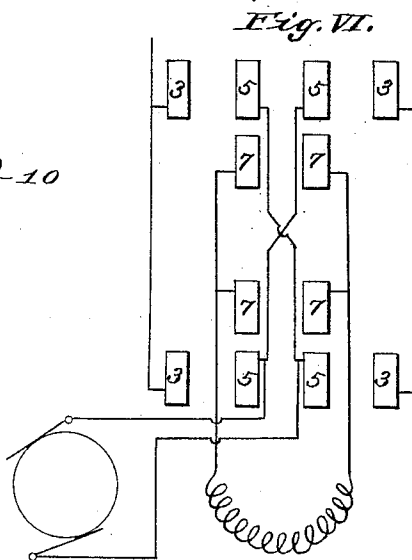


Fig. VI.



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UNITED STATES PATENT OFFICE.

ELLWOOD V. MATLACK, OF ST. LOUIS, MISSOURI.

REVERSING-SWITCH FOR ELECTRIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 635,496, dated October 24, 1899.

Application filed January 3, 1899. Serial No. 700,882. (No model.)

To all whom it may concern:

Be it known that I, ELLWOOD V. MATLACK, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Reversing-Switches for Electric Motors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming
10 part of this specification.

My invention relates to improvements in switches for reversing the relation of the "armature" and "field" currents in their connection to an electric motor; and my invention consists in features of novel construction, as hereinafter fully described and claimed.

Figure I is a perspective view of my improved switch. Fig. II is a perspective view showing the contact-arms in reversed position from that shown in Fig. I. Fig. III is a perspective view showing the armature and field contact-arms against their contacts and "main-line" contact-arms away from their contacts. Fig. IV is a view showing
25 the contact-arms and their bearings in section. Fig. V is a cross-sectional view taken on the line V V, Fig. IV. Fig. VI is a diagrammatical view illustrating the wiring throughout the switch.

1 designates the switch base-board.

2 are insulator-plates on the base-board, on which the binding-posts are mounted. The binding-posts are surmounted by spring-contacts arranged in pairs and designed to receive contact-arms on a rock-shaft supported from the base-board.

3 designates the binding-posts, to which the main-line wires are connected, these posts being surmounted by contacts 4.

5 and 7 are binding-posts arranged in outer and inner pairs or multiple and surmounted, respectively, by pairs of contacts 6 and 8. Either pair of binding-posts 5 or 7 may receive the connection of the armature-wires and the other the field-wires; but for the purpose of facilitating the description I will refer to the posts 5 as the armature binding-posts and the posts 7 as the field binding-posts, which arrangement corresponds with the wiring illustrated in the diagram Fig. VI.

It will be seen that there are two complete sets of binding-posts and surmounting con-

tacts arranged at opposing ends of the switch base-board. It will be readily understood that the two sets of posts and contacts are employed for the purpose of attaining the reversal of the relation of polarity of current from the wires connected to one set to those of the other set to reverse the relation of the armature and field.

9 designates bearing-brackets mounted on the base-board 1, and 10 is a rock-shaft journaled in said brackets transversely of the base-board 1.

11 designates single contact-arms keyed by cross-pins 11^a to the rock-shaft 10, said arms being so disposed on the shaft as to swing into position between the pairs of main-line contacts 4 at either end of the switch base-board.

12 are double contact-arms that are formed in pairs extending in diverse directions from collars 13, loosely mounted on the sleeve extensions 11^a of the collars 11^a of the contact-arms 11. The collars 13 are arranged to rotate on the sleeve extensions 11^a, and the collars 11^a are provided with segmental facing projections 11^b and segmental recesses 11^c, and the collars 13 have corresponding segmental facing projections 14 and segmental recesses 14^a. 11^e are retaining-rings surrounding the shaft and fastened to the sleeve extensions by screws 11^f for holding the double arms in place. By this construction the contact-arms 12 are permitted to rock on the collars of the arms 11 to a limited extent, but are moved thereon only by the projections of the arms 11 coming into contact with the projections 14. The contact-arms 12 are adapted to be moved into engagement with the sets of contacts 6 and 8 at either end of the switch and receive the electrical current passing thereto from the main-line contacts 4 through the contact-arms 11.

15 designates bow-springs located at each of the main-line contacts 4, one end of each spring being secured beneath the binding-post 3 at its location. The free end of each spring 15 lies in proximity to the contacts 4, and such free ends are formed with sockets 16. These sockets hold blocks 17, that are designed to receive the contact of the contact-arms 11 when such arms are in engagement with the contacts 4, in which instance the springs 15 are depressed and the arms 11 re-

main in contact with the blocks 17 as long as the arms are engaged with the contacts 4. The blocks 17 serve as arc-receivers when the contact is broken between the arms 11 and the main-line contacts 4. The blocks may be of any desirable material, on which the arcs may be received, (but I prefer to use blocks of carbon,) and the blocks are removably seated in the sockets 16, so that when they have become burned or wasted away so as to be unserviceable they may be removed and replaced by new blocks.

In the operation of this switch the rock-shaft 10 may be rotated in either direction to throw the pair of contact-arms 11 into engagement with the main-line contacts 4 at either end of the switch and at the same time to throw the contact-arms 12 at the corresponding end of the switch into engagement with the contacts 6 and 8 of the armature and field circuits. By this means the circuit of electrical current is completed through the contacts 4 of the main line, the contact-arms 11, contact-arms 12, and the contacts 6 and 8, that have connection with the armature and field wires. When the motor is to be reversed, the rock-shaft 10 is rotated in the opposite direction, which results in the following: The arms 11, being carried by the rock-shaft, partake of the movement of the shaft and are thrown out of engagement with the contacts 4, thereby cutting the main line out of the circuit. As the arms 11 leave the contacts 4 they remain for a short time in contact with the arc-receiving blocks 17 by reason of the springs 15 carrying the blocks beyond the ends of the contacts. It will therefore be readily apparent that no arc is formed on the contacts as the arms 11 leave the contacts 4, and the contacts 4 are therefore not burned, as the arms 11 are separated from them, but instead the arcs are received by the blocks 17, which may be removed and replaced at any time at a small expense.

The collars of the arms 12 being loosely mounted on the collars of the arms 11, said arms 12 are not disengaged from the armature and field contacts 6 and 8 until after the arms 11 have been entirely moved from the main-line contacts 4, as shown in Fig. III. In this way the electrical current in the field is permitted to be discharged through the arms 12 and contacts 6 and 8 through the armature before the arms 12 are disengaged from such contacts. As the arms 11 are thrown from the position shown in Fig. III into engagement with the contacts 4 at the other end of the switch from that referred to, the projections 11^b on the collars of such arms are

caused to strike the projections 14 on the collars of the arms 12, and the arms 12 at the first end of the switch are disengaged and those at the reverse end are brought into contact with the armature and field contacts, and the electrical circuit is again established, but in a reverse relation with respect to the armature and field.

I claim as my invention—

1. A reversing-switch for electric motors, comprising a base, insulator-plates, two sets of "main-line" binding-posts, having spring-contacts, the bow-springs having their inner ends located beneath the "main-line" binding-posts, and their free ends formed with sockets contiguous to the spring-contacts of the "main-line" binding-posts, the arc-receiver blocks located in the sockets, the two sets of "armature" binding-posts having spring-contacts, the two sets of "field" binding-posts, having spring-contacts, the bearing-brackets, the rock-shaft journaled in the brackets, the two single contact-arms keyed to the shaft, having sleeve extensions, and the double contact-arms loosely mounted on the sleeve extensions and oscillated by connection with the single contact-arms; substantially as described.

2. A reversing-switch for electric motors, comprising a base, insulator-plates, two sets of "main-line" binding-posts, having spring-contacts, the bow-springs having their inner ends located beneath the "main-line" binding-posts and their free ends formed with sockets contiguous to the spring-contacts of the "main-line" binding-posts, the arc-receiver blocks located in the sockets, the two sets of "armature" binding-posts having spring-contacts, the two sets of "field" binding-posts, having spring-contacts, the bearing-brackets, the rock-shaft journaled in the brackets, the two single contact-arms having collars formed with sleeve extensions, with segmental facing projections and with segmental recesses, cross-pins whereby the single contact-arms are keyed to the shaft, and the double contact-arms having collars loosely mounted on the sleeve extensions and formed with segmental facing projections and segmental recesses interlocked by the corresponding parts on the collars of the single contact-arms, and the retaining-rings surrounding the shaft and fastened to the sleeve extensions; substantially as described.

ELLWOOD V. MATLACK.

In presence of—

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G. A. TAUBERSCHMIDT.