

No. 809,677.

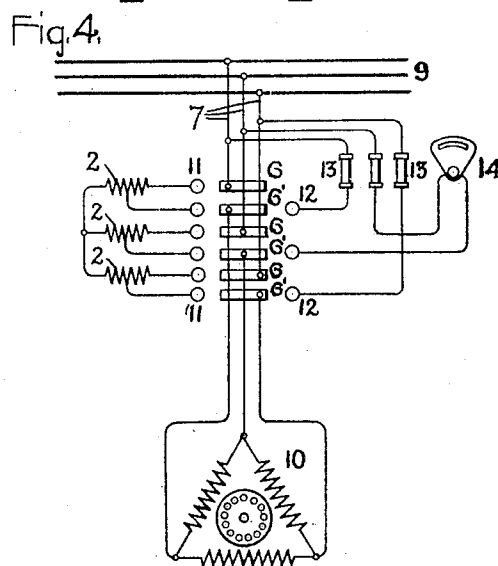
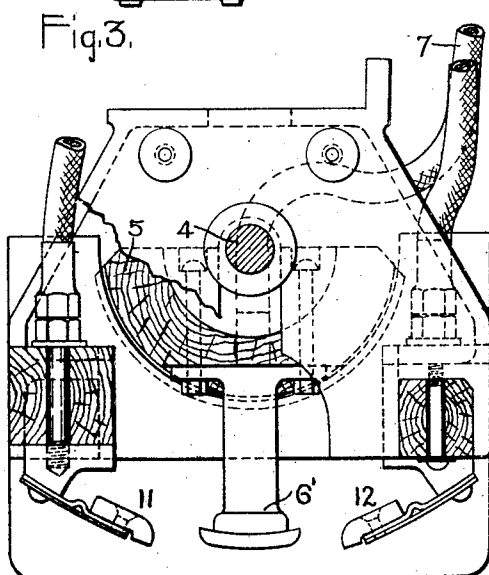
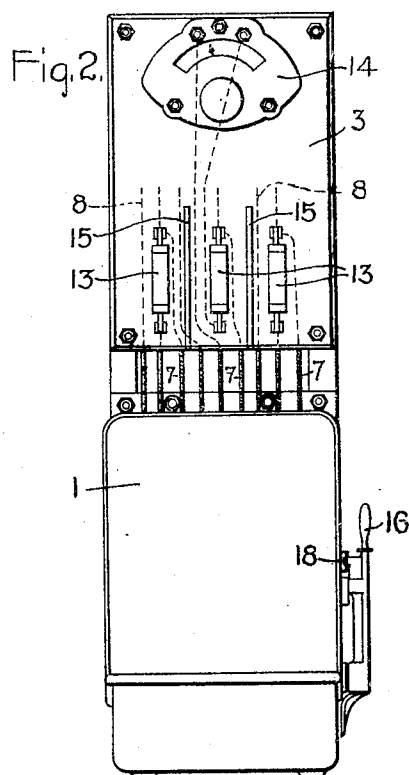
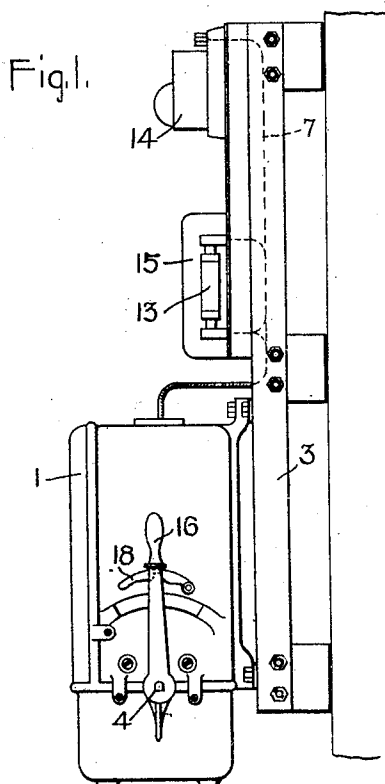
PATENTED JAN. 9, 1906.

E. F. GEHRKENS.

STARTING COMPENSATOR FOR ALTERNATING CURRENT MOTORS.

APPLICATION FILED JUNE 24, 1904.

2 SHEETS—SHEET 1.



WITNESSES:

Ernest R. Murray
Helen A. Ford

INVENTOR:

Edward F. Gehrrens:
by *Albert S. Davis*
ATTY.

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2 SHEETS—SHEET 2.

Fig. 5.

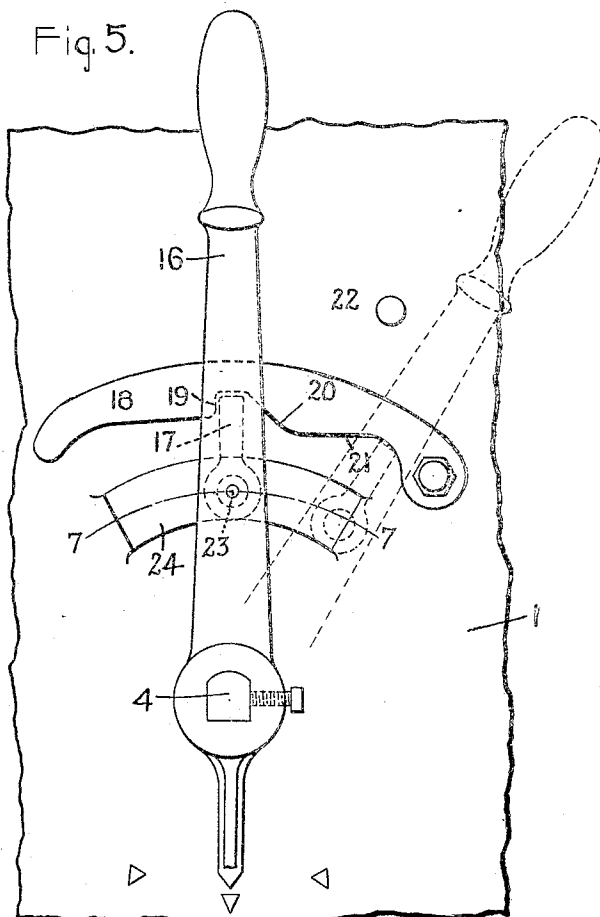


Fig. 6.

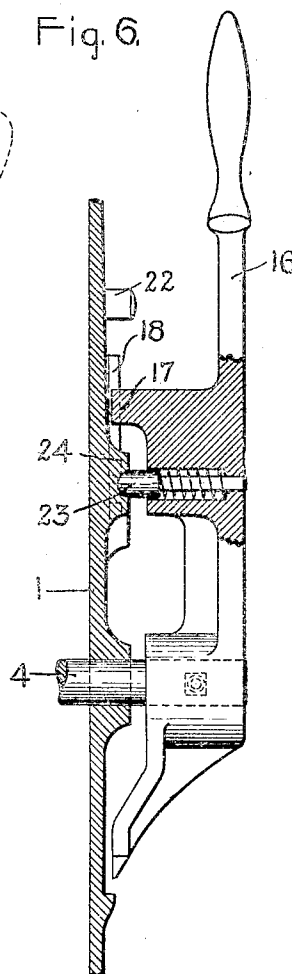
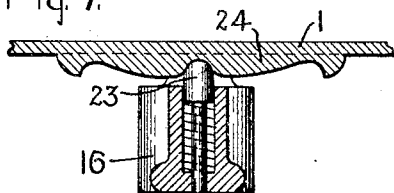


Fig. 7.



WITNESSES:

Ernest R. Loring
Helen A. Ford

INVENTOR:

Edward F. Gehrkens:
by *Albert S. Davis*
Att'y.

UNITED STATES PATENT OFFICE.

EDWARD F. GEHRKENS, OF SCHENECTADY, NEW YORK, ASSIGNOR TO
GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

STARTING-COMPENSATOR FOR ALTERNATING-CURRENT MOTORS.

No. 809,677.

Specification of Letters Patent.

Patented Jan. 9, 1906.

Application filed June 24, 1904. Serial No. 213,941.

To all whom it may concern:

Be it known that I, EDWARD F. GEHRKENS, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Starting-Compensators for Alternating-Current Motors, of which the following is a specification.

This invention relates to devices for starting alternating-current motors; and its object is to provide a simple and efficient switch for use in connection with a compensator and circuit-fuses, so that in starting the motor the compensator will be in circuit and the fuses cut out, but in the running position the compensator is cut out and the fuses are in circuit. A meter may be arranged in series with one of said fuses, if desired.

It is customary to use a switch in connection with compensators for starting alternating-current motors, so that by bringing said switch to the neutral position the motor will be disconnected from the feed-lines, while by moving it to the starting position the motor will be connected to the feed-lines at a proper point on the compensator-coils to give the proper voltage for starting, and in the running position these coils will be cut out and the motor connected directly to the feed-lines. The switch is preferably so constructed that the neutral position of its handle stands between the starting and running positions. I provide the handle with a latch of peculiar construction, which prevents the switch from being moved from the neutral position directly to the running position, but compels the operator to move it always first to the starting position.

In the accompanying drawings, Figure 1 is a side elevation of a starting-compensator embodying my invention. Fig. 2 is a front elevation. Fig. 3 is an end view of the mechanism on a larger scale, partly broken away. Fig. 4 is a diagram of circuits. Fig. 5 is an elevation of the switch-handle and latch on a larger scale. Fig. 6 is a vertical section of the same, and Fig. 7 is a horizontal cross-section thereof on the line 7 7, Fig. 5.

The box 1, containing the compensator-coils 2, is fastened to a supporting-panel 3. In the lower part of the box is a transverse shaft 4, to which is secured a block 5, of wood or other insulation, carrying a set of contact-

segments, three of which (numbered 6) are in electrical connection, by means of leads 7, with the terminals 8, by which connection is made with the mains 9. The other three segments (numbered 6') and alternating with the others are connected with the terminals of the motor 10. In coöperative relation to the segments are two sets of fingers 11 12. The first set has three pairs, each pair connected with a compensator-coil, as shown in Fig. 4. The other set comprises three fingers, each connected with a separate lead 7 through a fuse 13 and adapted to make contact with a segment 6'. A meter 14 may be connected in series with one of the fuses. The fuses are conveniently mounted on the panel 3 above the box 1 and are separated by barriers 15 of insulation. The shaft 4 extends through one end of the box and has a handle 16 for operating the switch. The handle stands normally in a central neutral position. When it is swung over to the rear, the segments 6 6' make contact with the fingers 11, so that a portion of each compensator-coil is in series with the motor. This is the starting position. When the motor has speeded up, the handle may be swung forward to cut out the compensator-coils and cause the segments 6' to make contact with the fingers 12. This connects the motor directly with the mains with a fuse in each leg of the circuit.

On the back of the handle 16 is a lug 17, which engages with a latch 18, pivoted at one end to the box. The lower edge of the latch rests on the lug and has an abrupt shoulder 19 to engage therewith and prevent the handle from being pulled forward. Rearwardly from the shoulder 19 the under edge of the latch has a double incline 20 21, which does not prevent the handle from being moved backward to put the compensator-coils in circuit. In this position the rear end of the incline 21 rests on the lug. When the handle is to be moved forward to the running position with the fuses in circuit, it must be pulled over sharply. The movement of the lug along the incline 21 causes the latch to be tilted so that the handle can be brought fully forward before the latch has time to fall back to the original position. A stop 22 prevents the latch from going too high. In order to retain the handle yieldingly in its three positions and prevent it from being accidentally

displaced, it has a spring-actuated detent-pin 23, whose rounded tip engages with curved depressions suitably located in a quadrant 24 on the end of the box 1.

5 The foregoing description and the accompanying illustration relate to a three-phase system; but it will be evident to a skilled electrician that with slight changes not involving a material departure therefrom the invention
10 can be applied to a quarter-phase system.

According to the provisions of the Patent Statutes I have described the principle of operation of my invention, together with the
15 apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means. For instance, in place of the thermal cut-outs
20 (fuses) I may substitute any other well-known automatic cut-outs.

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

1. The combination with a compensator
25 for starting an alternating-current motor, of a plurality of fuses, and means for connecting said compensator and fuses alternately with the motor-circuit.

2. The combination with a switch having
30 contact-segments, of a compensator having its coils connected to fingers coöperating with said segments, and fuses connected to a second set of fingers adapted to make contact with said segments.

3. In combination, a switch having contact-segments and movable into a neutral position and into two operative positions, one at each side of said neutral position, two sets of contact-fingers one on each side of said
40 segments, compensator-coils connected to one set and fuses connected to the other set, said segments engaging one set of said fingers when the switch is in one operative position, and engaging the other set of said fingers
45 when the switch is in the other operative position.

4. The combination with a switch having contact-segments alternately connected with line-terminals and motor-terminals, of two
50 sets of coöperating fingers, compensator-coils connected with one set, and fuses connected with the other set and with the line-terminals, the latter set of fingers coöperating only with the segments connected with the motor-terminals.
55

5. The combination with an alternating-current motor, of a plurality of fuses, a switch for connecting said fuses respectively

in the legs of the circuit, and a meter in series with one of said fuses.

6. The combination with a compensator, of a plurality of fuses, a switch for connecting the compensator and fuses alternately with the terminals of an alternating-current motor, and means for compelling the compensator to be so connected before the fuses are.

7. The combination with a compensator, of a switch movable both ways from a neutral position, and a pivoted latch normally preventing said switch from being moved in one direction.

8. The combination with a motor-starting compensator, of a switch movable one way from a neutral position to a starting position and the other way to a running position, a switch-handle having a lug, and a pivoted latch engaging therewith and provided with a shoulder and an inclined surface adjacent thereto.

9. The combination with a circuit-controlling device having a handle movable both ways from a neutral position, and provided with a lug, of a pivoted latch engaging said lug by gravity and having on its under side a shoulder and a double incline, whereby when the lug is under the incline, a quick movement of the handle will throw the latch high enough to permit the lug to pass by the shoulder before the latch can fall.

10. The combination with a handle movable both ways from a given position, of a lug, and a pivoted latch engaging said lug by gravity and having on its under side a shoulder and a double incline adjacent thereto, said lug and latch being relatively movable lengthwise of said latch.

11. In combination, a motor, a source of alternating current, compensator-coils, fuses, and means for connecting said motor to said source alternately through said coils and said fuses.

12. In combination, a motor, a source of alternating current, compensator-coils, fuses, and means for connecting said motor to said source alternately through said coils and said fuses, said means comprising a movable switch member and two sets of contact-fingers, one set connected to the compensator-coils and the other to the fuses.

In witness whereof I have hereunto set my hand this 22d day of June, 1904.

EDWARD F. GEHRKENS.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.