W. H. GAULKE.

ELECTRIC CONTROLLING APPARATUS.

APPLICATION FILED SEPT. 26, 1911.

1,067,217.

Patented July 8, 1913

3 SHEETS—SHEET 1.

Fig. 2.

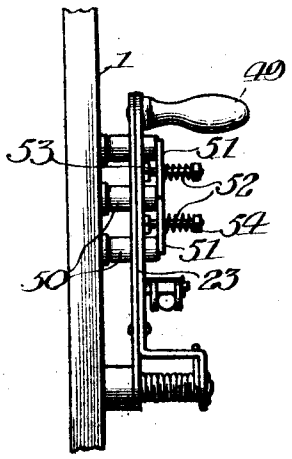


Fig. 3.

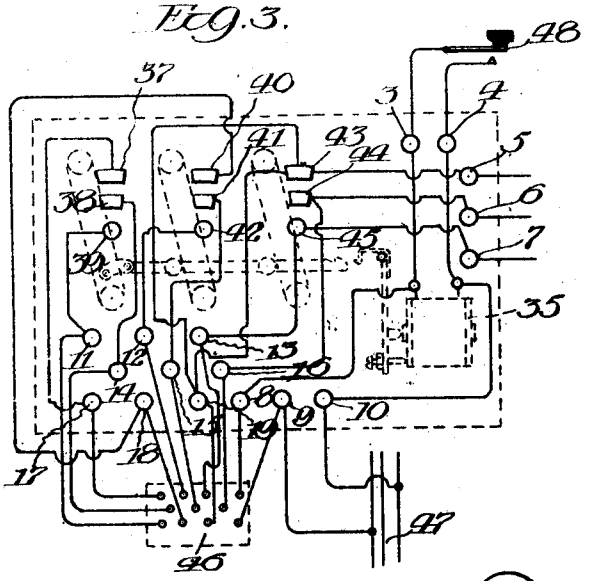
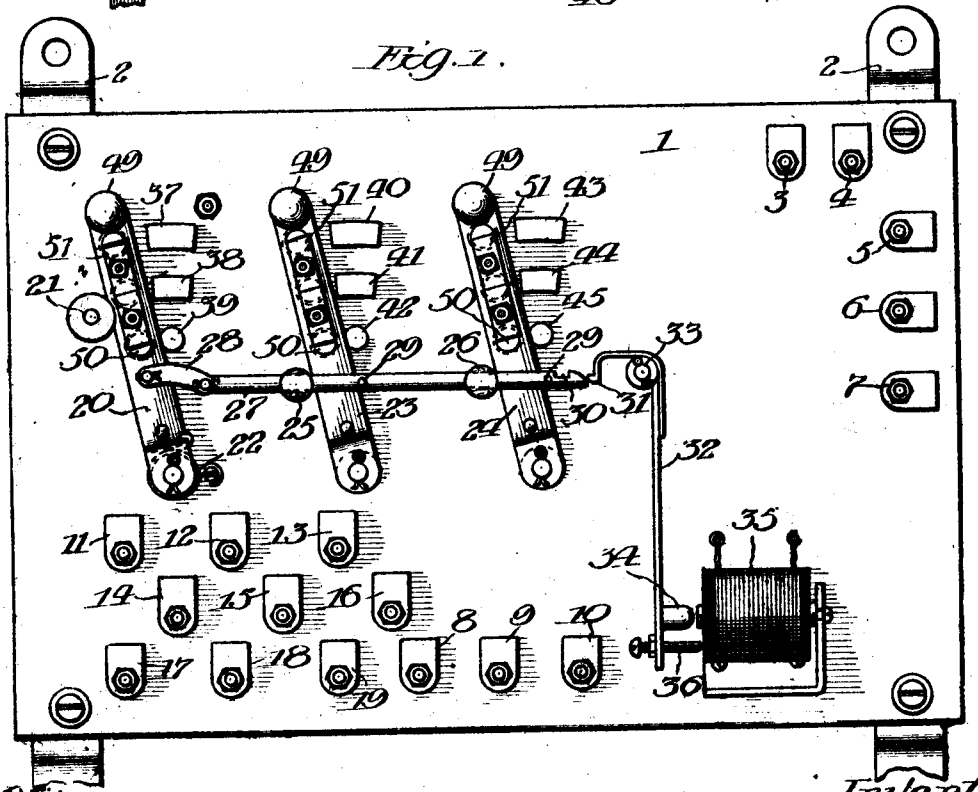


Fig. 1.



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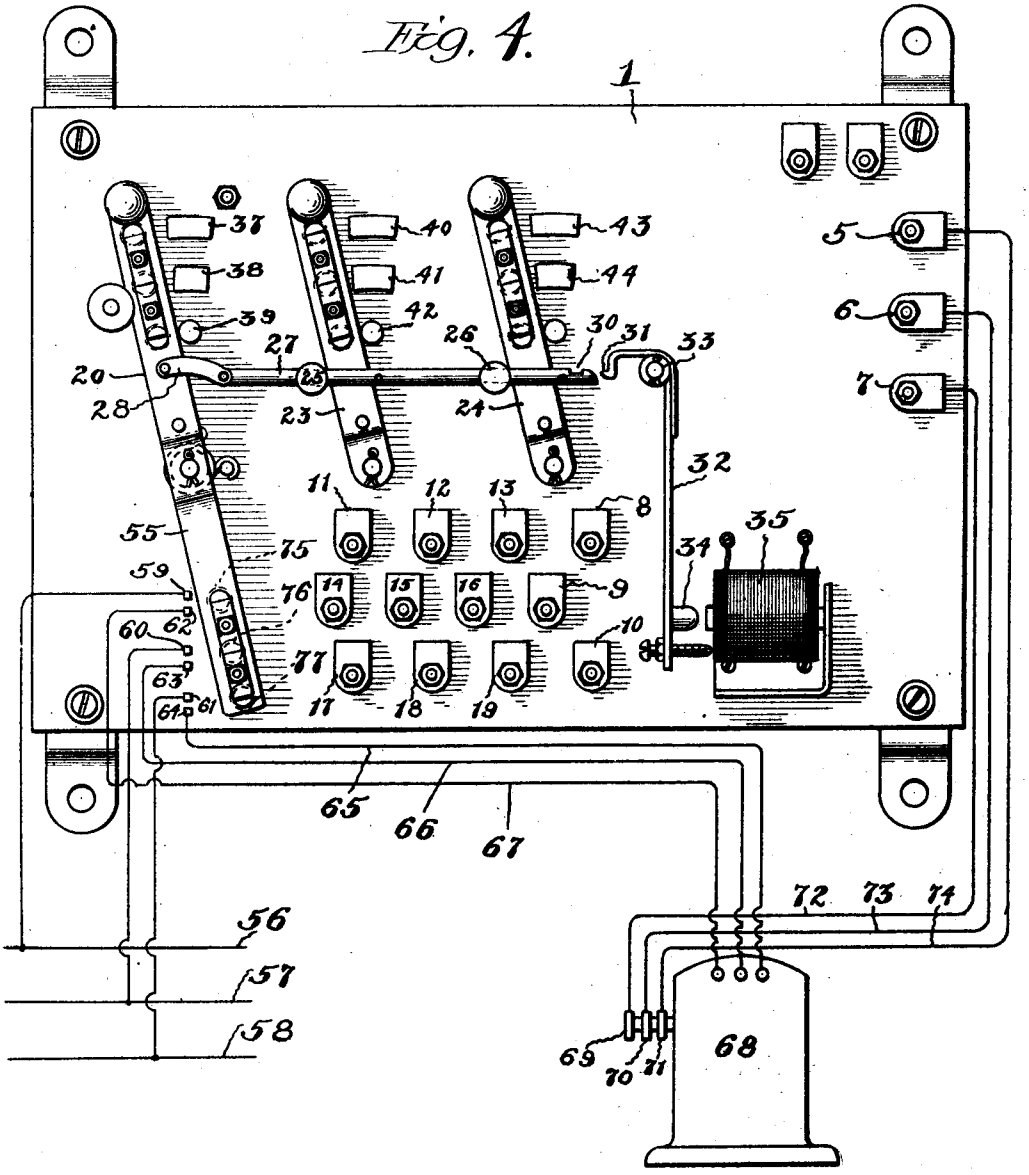
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2 SHEETS—SHEET 2.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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ELECTRIC CONTROLLING APPARATUS.

1,067,217. Specification of Letters Patent. Patented July 8, 1913.

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To all whom it may concern:

Be it known that I, WILLIAM H. GAULKE, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Electric Controlling Apparatus, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to electric controlling apparatus and has for its object the provision of an improved switching device in which speed or kindred control may be satisfactorily effected in combination with satisfactory release facilities.

In one embodiment which my invention may take and which said embodiment is set forth herein, I provide a plurality of switch levers partially interlocked, yet to a certain extent free to move independently, which arms may be, however, when in operative condition, simultaneously released. It will of course be understood that in describing herein this particular embodiment specifically, I am not limiting myself to this embodiment or its specific constructional arrangements, as many modifications may be made without departing from the broad spirit of specialized control and simultaneous or complete release. I will describe herein specifically this above mentioned form which my invention may take in connection with the accompanying drawing illustrating this embodiment specifically, in which:

Figure 1 is a front view of a controller constructed in accordance with my invention; Fig. 2 is a side view thereof; Fig. 3 illustrates the circuit arrangements, and Fig. 4 is a view of a modification.

Referring more particularly to Fig. 1, I set forth a base plate 1 upon which the instrumentalities to be presently described are suitably mounted, and which base plate by means of legs 2 may be suitably mounted upon a wall or switch panel or the like. Terminal contact elements 3 and 4 are mounted on this base plate, as also contact elements 5, 6 and 7. Three contact making elements 8, 9 and 10 are likewise mounted on the plate 1 along the lower edge, as likewise nine contact making elements 11, 12, 13, 14, 15, 16, 17, 18 and 19. On the face of the plate 1 I provide a switch lever 20 which is normally held in the position indicated in Fig. 1 against a preferably rubber coated stop 21 by means of a strong spring 22. Two additional contact levers 23 and 24 also pivotally mounted on the base plate 1 normally rest alongside of posts 25 and 26. No springs actuate the arms 23 and 24. A rod 27 is pivotally associated with the arm 20 by means of the link 28. This rod 27 slides through apertures provided in the posts 25 and 26. This rod 27 has pins 29, 29 which project into the path of the switch arms 23 and 24 and obstruct their movement except when said rod 27 is moved to the right so that after such movement the arms 23 and 24 may freely rotate clockwise until they engage said pins 29. The rod 27 has a notch 30 which is adapted to be engaged by the prong 31 carried by the arm 32, which arm is pivotally mounted on the shaft 33. The arm 32 has at its lower extremity an armature 34 which is adapted for coöperation with a holding magnet 35. An adjusting screw 36 controls the air gap between the armature 34 and the core of the magnet 35. Contact segments 37, 38 and 39 are provided in coöperative relation with the switch arm 20. Contact segments 40, 41 and 42 are provided in coöperative relation with the switch arm 23 and contact segments 43, 44 and 45 are provided in coöperative relation with the switch arm 24. These various contact segments 37 to 45 inclusive are associated with the nine contacts 11 to 19 inclusive as will be apparent from Fig. 3. The contact terminals 11 to 19 inclusive are respectively associated with the terminal points of various resistances in a resistance box 46. The incoming line wires are set forth at 47. Contact terminals 3 and 4 are connected each to each to the terminals of the magnet 35 and a push button 48 is provided so that when this push button is in close circuit the magnet 35 may be short circuited to release its armature 34 as will presently appear. The contacts 5, 6 and 7 are adapted respectively for connection with the rotor of a motor. The contact segments 8 and 9 are connected with the resistance box 46 to provide resistance for the magnet 35. The contact elements 9 and 10 receive their current from the line circuit 47.

Now if it is desired to start the motor, then the switch arm 20 by means of its

handle 49 is moved in a clockwise direction, whereupon the catch 31 engages the notch 30 and holds the bar 27 in its farthermost position toward the right. The magnet 35 is energized immediately contact is made through the elements 37, 38 and 39, and by means of its armature 34 maintains the catch 31 within the notch 30. The motor is now at one of its speeds and should it be desired to change the speed, such speed change may be effected without moving the switch arm 20. For instance, if a different speed is desired, switch arm 23 is moved, and if a further change in speed is desired switch arm 24 is moved in a clockwise direction. If a return to the second speed condition is desired, switch arm 24 may be restored to the position shown in Fig. 1, without disturbing the arm 20, the arm 23 or the magnet controlled holding devices 30 and 31. Similarly the switch arm 23 may be restored. Now however, should the circuit be broken, or should the push button 48 be close circuited, all of the switch arms 23 and 24 which are in association with their operative contacts will be returned to the position shown in Fig. 1 by means of the power exerted by the spring 22. The spring 22 returns the arm 20 against the stop 21 and by drawing the rod 27 to the left also draws any of the arms 23 and 24 which are in a righthand position to the left by reason of the pins 29. The advantages of thus obtaining a speed control without changing the original starting mechanism will be readily apparent. The switch arms are each provided with three contacts 50 which project through the arm and which are held toward the face plate 1 by means of the bridges 51, 51 and the springs 52, 52. Stems 53 secured to the arm 23 compress the springs by means of nuts 54. The circuit arrangements it is thought will be obvious from what has been said.

In Fig. 4 I show a modification in which the arm 20 is provided with an extension 55 so that the primary circuit as supplied from the line conductors 56, 57 and 58 may also be controlled upon the initial operation of the device. The circuit extends from these conductors 56, 57 and 58 to contact elements 59, 60 and 61 respectively, which are placed in coöperative relation with contacts 62, 63 and 64, which latter contacts by means of conductors 65, 66 and 67 lead to the energizing circuit of the motor 68. The slip ring contacts 69, 70 and 71 of the motor extend by means of the conductors 72, 73 and 74 to the contact elements 5, 6 and 7 respectively to be there controlled by the switch arms 20, 23 and 24 also described in connection with Figs. 1 and 3. It will thus be seen that when the arm 20 is first moved into its operative position, it closes the primary circuit of the motor 68 through the agency of contact elements 75, 76 and 77, and at the same time by engaging contact elements 37, 38 and 39 serves to place the rotatable portion of said motor into its starting circuit condition. The switch thus serves also to control the primary circuit.

As before stated it will of course be understood that the specific description of one embodiment of my invention herein is not intended to limit my invention to this embodiment, but

Having thus described a device, portions of which are constructed in accordance with my invention, what I claim as new and desire to secure by Letters Patent is:

1. A device of the character described having a circuit controlling element, electromagnetic means for controlling said element when said element is in its actuated position, a second circuit controlling element, and means whereby said first circuit controlling element when in its normal position obstructs actuation of said second circuit controlling element, said second circuit controlling element being free to move to and fro when said first aforesaid circuit controlling element is in its actuated position.

2. A device of the character described having a circuit controlling arm, electromagnetic means for holding said arm when in its actuated position, a plurality of additional circuit controlling arms independently movable to operative position when said first aforesaid arm is in its actuated position, and means whereby said first aforesaid arm when in its normal position obstructs the actuation of said additional circuit controlling arms.

3. A device of the character described having a circuit controlling arm, electromagnetic means for holding said arm when in its actuated position, a plurality of additional circuit controlling arms independently movable to and fro when said first aforesaid arm is in its actuated position, and means whereby said electromagnetic means controls the simultaneous restoration to normal of all actuated controlling arms aforesaid.

4. A device of the character described having a circuit controlling arm, electromagnetic means for holding said arm when in its actuated position, an additional circuit controlling arm independently operatively movable to and fro when said first aforesaid arm is in its actuated position, and means whereby said first aforesaid arm when in its normal position obstructs the actuation of said additional circuit controlling arm.

5. A device of the character described having a circuit controlling arm, electro-magnetic means for holding said arm when in its actuated position, an additional circuit con-

trolling arm independently operatively movable to and fro when said first aforesaid arm is in its actuated position, and means whereby said electromagnetic means controls the simultaneous restoration to normal of all actuated controlling arms aforesaid.

6. A device of the character described having a circuit controlling element, electromagnetic means for controlling said element when said element is in its actuated position, a second circuit controlling element independently movable to and fro upon actuation of said first aforesaid circuit controlling elements, and means whereby said electromagnetic means controls the simultaneous restoration to normal of all actuated circuit controlling elements aforesaid.

7. A device of the character described having a circuit controlling element, electromagnetic means for controlling said element when said element is in its actuated position, a plurality of additional circuit controlling elements independently movable to and fro upon actuation of said first aforesaid circuit controlling elements, and means whereby said electromagnetic means controls the simultaneous restoration to normal of all actuated circuit controlling elements aforesaid.

8. A device of the character described having a switch arm, electromagnetic means for controlling said arm when in its actuated position, means to effect the restoration of said arm to normal, a plurality of additional switch arms independently operatively movable to and fro when said first aforesaid switch arm is in actuated position, and means whereby said electromagnetic means controls the simultaneous restoration to normal of all actuated switch arms, said means including an interlocking bar associated with all of said switch arms.

9. In a motor starting device, the combination with a starting switch, electromagnetic means to control same, additional speed changing switches independently operatively movable to and fro after operation of the starting switch, and means whereby said electromagnetic means controls the simultaneous restoration to normal of all actuated switches aforesaid.

10. A system of the character described, in combination with a motor having primary operating windings and speed changing windings all served by the same line circuit, a switch element controlling when actuated the primary operating windings and also the speed changing windings, and additional independently operable switching devices for further changing the speed changing windings.

In witness whereof, I hereunto subscribe my name this 9th day of September A. D., 1911.

WILLIAM H. GAULKE.

Witnesses:
MAX W. ZABEL,
HAZEL JONES.