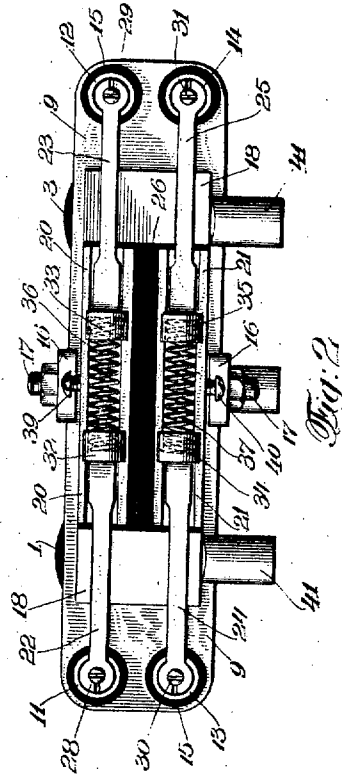
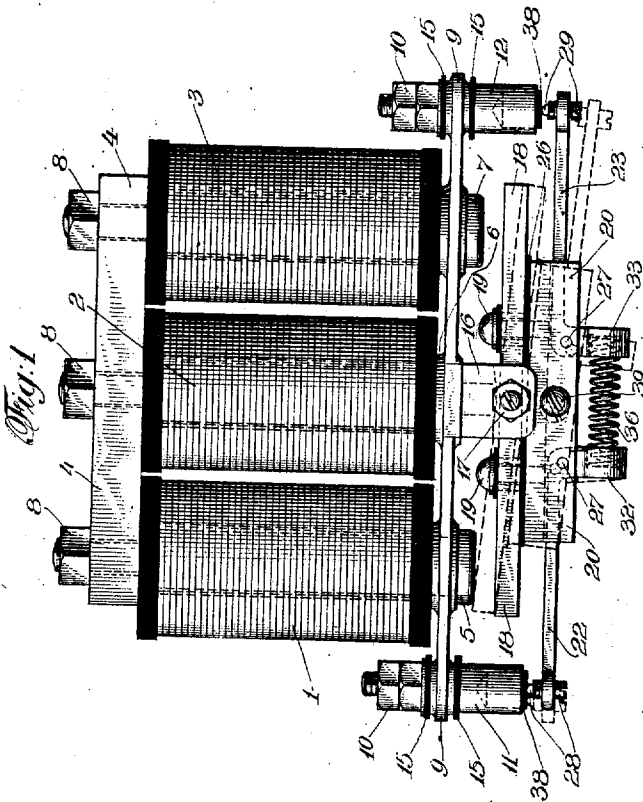
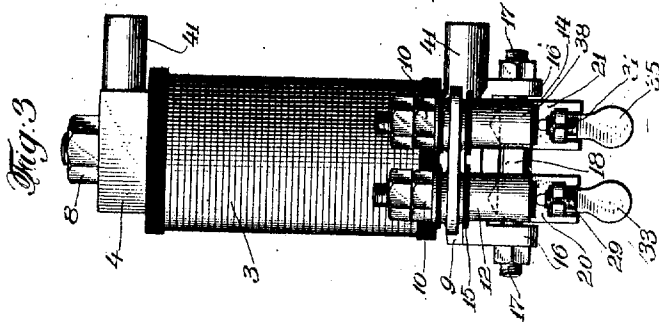


W. A. TURBAYNE.
ELECTRICAL SWITCH.
APPLICATION FILED JUNE 16, 1908.

987,192.

Patented Mar. 21, 1911.

2 SHEETS-SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 4

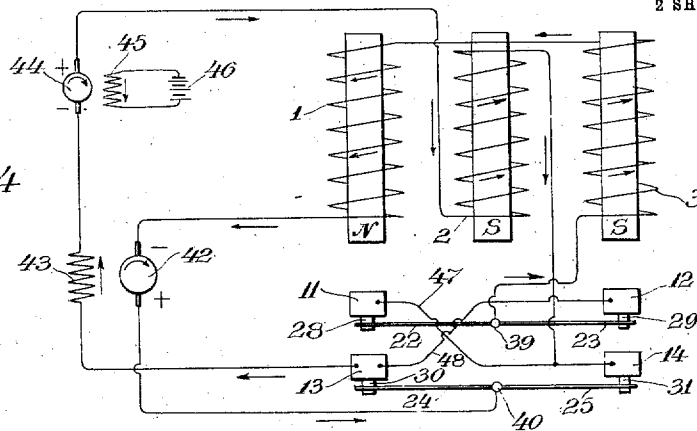


Fig. 5

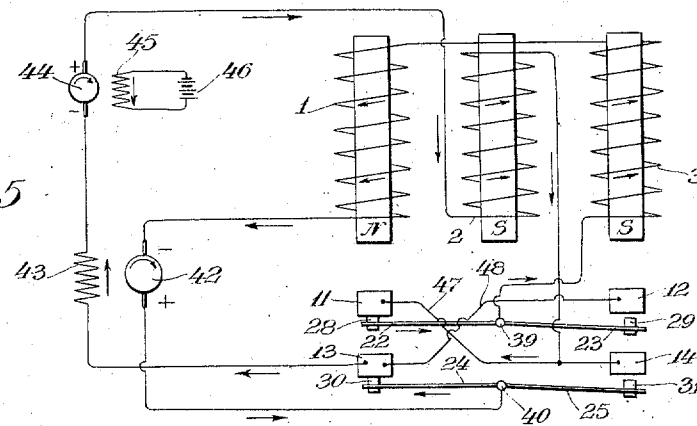
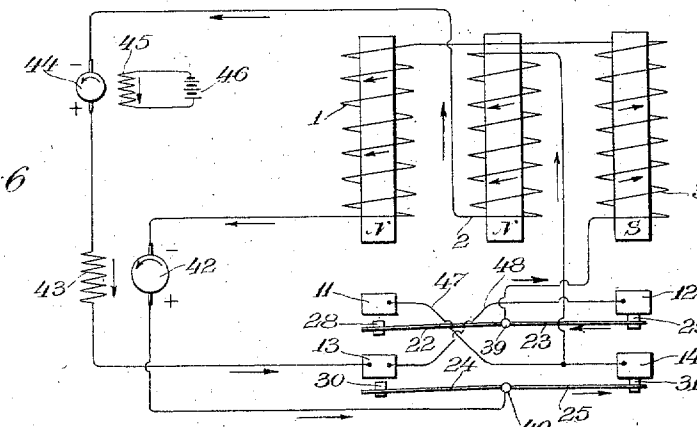


Fig. 6



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UNITED STATES PATENT OFFICE.

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ELECTRICAL SWITCH.

987,192.

Specification of Letters Patent.

Patented Mar. 21, 1911.

Application filed June 16, 1908. Serial No. 438,749.

To all whom it may concern:

Be it known that I, WILLIAM A. TURBAYNE, a citizen of the United States, and a resident of Lancaster, in the county of Erie, State of New York, have invented certain new and useful Improvements in Electrical Switches, of which the following is a specification.

My invention relates to electrical switches and has for part of its objects the provision of a simple, durable and practicable switch especially adapted for maintaining connections between a plurality of circuits and for reversely connecting the conductors of circuits responsive to the electrical condition of part of said circuits.

Various other objects and advantages will more clearly appear from the detail description given below taken in connection with the accompanying drawings.

In the drawings Figure 1 is a vertical side view of switch mechanism embodying one form of my invention. Fig. 2 is a bottom plan view of the switch mechanism shown in Fig. 1. Fig. 3 is a vertical end view of the same. Fig. 4 is a diagrammatical view showing the connections of my switch mechanism when its parts are in a normal or inoperative position. Fig. 5 is a similar view showing the connections when the parts are in operative position, and Fig. 6 is a similar view to that of Fig. 5, but showing parts and conductors reversely connected.

In all the figures like reference characters indicate like parts.

Referring to Figs. 1, 2 and 3 and especially to Fig. 1, reference characters 1, 2 and 3 represent three coils wound about the iron cores 5, 6 and 7 and forming electromagnets. These coils or electromagnets are secured at one end to an iron bridge piece 4 by means of nuts 8. At the other end of said electromagnets and secured thereto by heads on the cores 5, 6 and 7, is a plate or bar 9. The bar 9 carries four binding posts 10 which pass through said bar and are secured to and electrically connected with four terminals or contact posts 11, 12, 13 and 14. These binding and contact posts are insulated from the bar 9 by means of mica or rubber as indicated at 15. Projecting from the sides of the plate or bar 9 intermediate its ends are ears 16 and pivoted thereto by means of screws or bolts 17 is a

magnetizable bar 18. The bar 18 extends over the poles of the electromagnets 1, 2 and 3, the electromagnet 2 being substantially at its center.

Secured upon the bar 18 by means of screws 19 are conducting and connecting guide blocks 20 and 21 which are provided with vertically projecting flanges between which are pivoted the arms 22, 23, 24 and 25. The guide blocks 20 and 21 are insulated from each other and from the bar 18 by means of mica or rubber 26 and the arms 22, 23, 24 and 25 are pivoted on pins 27. Carried on the outer ends of the arms 22, 23, 24 and 25 are contact points or pins 28, 29, 30 and 31 and at the other end of said arms are vertical projections 32, 33, 34 and 35. Between the projections 32 and 33 is a coiled spring 36 and between the projections 34 and 35 is a similar coiled spring 37. These coiled springs tend to force the projections 32 and 33 and 34 and 35 apart and the contact points 28, 29, 30, and 31 against the contact posts 11, 12, 13 and 14 respectively. In order to prevent injurious sparking the contact posts 11, 12, 13 and 14 have carbon blocks 38 in their ends to contact with the contact points 28, 29, 30 and 31.

At the sides of the guide blocks 20 and 21 are binding screws 39 and 40 for securing conductors thereto. The plate 9 and bar 4 are also provided with lugs 41 by means of which the whole mechanism may be secured to a switchboard or other suitable support.

When the electromagnet 1 attracts the bar or magnetizable member 18 it will assume the position shown in dotted lines in Fig. 1, the contact points 29 and 31 being forced away from the contact posts 12 and 14 and breaking contact therewith. The springs 36 and 37, however, still maintain the contact points 28 and 30 in contact with the posts 11 and 13. When the electromagnet 3 attracts the member 18 the reverse operations take place.

In order that the connections and operations of the switch may be more clearly understood I have shown in Figs. 4, 5 and 6 the switch connected to a generator 42, having a field 43, and an auxiliary or exciting generator 44. The auxiliary generator 44 is provided with a field energized by a battery 46.

The armature of the generator 42 is con-

connected in series with the coils of electromagnets 1 and 3 and with the binding screws 39 and 40. The contact posts or conductors 11 and 14 are permanently connected by a conductor 47 and the contact posts or conductors 12 and 13 are permanently connected by a conductor 48. The field 43 of generator 42 is connected in circuit in series with the armature of auxiliary generator 44 and coil 2 and one end of said circuit is connected to the contacts 11 and 14 by the bridging conductor 47 while the other end of said circuit is connected to the contact posts 12 and 13 by bridging conductor 48.

If both of the generators 42 and 44 be driven from the same shaft, then, with the arrangement above described, the generator 42 will always deliver a current in the same direction regardless of the direction of its rotation. Such an arrangement is important in car lighting systems in which the generator is driven from the axle of a car.

When the generators 42 and 44 are at rest the connections will be as shown in Fig. 4. No current will pass through the coils of the electromagnets 1, 2 and 3 and the springs 36 and 37 will maintain contact points 28, 29, 30 and 31 in connection with contact posts 11, 12, 13 and 14. If then, the generators be given rotation in a clockwise direction the auxiliary generator 44 will deliver a current in the direction shown by the arrows which will excite the field 43 and at the same time energize the electromagnet 2 and produce a south pole at its lower end. As the coils 1 and 3 are at this period connected directly across the generator 42 this latter will by reason of its excitation, circulate a current of considerable maintenance through the coils 1 and 3 in a direction indicated by the arrows, producing poles as indicated by the letters N and S. With the condition of things shown in Fig. 4, the electromagnet 2 produces a south pole at the extremities of bar 18 so that the magnet 1 will attract the bar 18 and the magnet 3 will repulse it. As soon as the magnetizing currents reach a great enough value the switch connections assume the position and condition shown in Fig. 5.

As shown in Fig. 5, the generator 42 is connected in series with the auxiliary or exciting generator 44 and in such a manner that the current in field 43 is in such a direction as to maintain the polarity of the generator 42, the same as when the condition of things were as shown in Fig. 4. The direction of the currents is as shown by the arrows and the generator 42 connected to aid generator 44 in exciting the field 43. The current from the auxiliary generator 44 may be traced from the positive pole thereof, through electromagnet 2, conductor 47, contact post 11, contact point 28, arm 22, binding screw 39, electromagnets 3 and 1,

generator 42, binding screw 40, arm 24, contact point 30, contact post 13, and field 43 back to the exciting generator 44. If, however, the generators 42 and 44 are given rotation in a counter-clockwise direction (see Fig. 6) the generator 44 will deliver a current in the opposite direction and a north pole will be produced at the lower end of the electromagnet 2. The bar 18 then becomes oppositely polarized causing the electromagnet 3 to attract it and the magnet 1 to repulse it. This causes the contact points 28 and 30 to break contact with the contact posts 11 and 13 but still maintains the contact points 29 and 31 in contact with the contact posts 12 and 14. The current from exciting generator 44 now passes from the opposite but positive brush through the field 43 in the opposite direction, through post 30, conductor 48, post 12, point 29, arm 23, screw 39, electromagnets 3 and 1, through generator 42 in the same direction as before, through screw 40, arm 25, point 31, post 14, conductor 47, electromagnet 2 in the opposite direction and back to the auxiliary generator. Since the field of generator 42 has been reversed and its direction of rotation reversed it will produce an electromotive force in the same direction as before and will aid the generator 44.

The electromagnet 2 magnetizes and so polarizes the member or bar 18 as to cause it to be attracted by the magnet 1 or the magnet 3 according to the direction of current in the coil of said magnet 2 and field 43.

The switch is simple, easy of construction, strong, and practicable in every way. It is evident from the above description that it is especially adapted for reversing the current in a plurality of conductors responsive to the current in certain of those conductors. But, I do not desire to be limited by the special arrangement and construction shown and described since the switch may well be adapted to other purposes and many changes and modifications may be made therein without departing from the scope and spirit of my invention.

What I claim and desire to secure by Letters Patent, is:

1. In an electrical switch the combination of suitable conductors, a movable member arranged to normally contact with at least four of said conductors, and means arranged to cause said member to break contact with part of said conductors while maintaining contact with the other part, responsive to the current in part of said conductors, said means including an electromagnet coil connected to have its polarity reversed.

2. In an electrical switch the combination of suitable conductors, a movable member arranged to normally contact with at least four of said conductors at once, an electromagnet arranged to cause said member to

break contact with part of said conductors while maintaining contact with the other part, an electromagnet arranged to cause said member to break contact with the other part of said conductors, and a coil connected to have its polarity reversed for controlling the movement of said member.

3. In an electrical switch the combination of suitable conductors, a movable member arranged to contact with four of said conductors at once, automatic means arranged to cause said member to break contact with two of said conductors while maintaining contact with the other two responsive to currents in certain of said conductors and magnetic means for governing the action of said automatic means, said means including an electromagnet coil connected to have its polarity reversed.

4. In an electrical switch the combination of a movable member of magnetic material having a plurality of contact points resiliently mounted thereupon and adapted to engage a plurality of conductors simultaneously, automatic means for moving said member in one direction to cause part of said contact points to break contact with part of said conductors, automatic means for moving said member in another direction for causing another part of said contact points to break contact with another part of said conductors and a coil for controlling the operation of both of said means, said coil being arranged to have its polarity reversed.

5. In an electrical switch the combination of a movable member of magnetic material having a plurality of contact points resiliently mounted thereon and adapted to engage a plurality of conductors simultaneously, electromagnetic means for moving said member in one direction to cause part of said contact points to break connection with part of said conductors, electromagnetic means for moving said member in another direction for causing another part of said contact points to break connection with another part of said conductors and electromagnetic means for governing the movement of said member.

6. In an electrical switch the combination of a movable member of magnetic material, a set of contact points pivotally mounted on said member, a second set of contact points pivoted to said member and movable independently of the first set and insulated therefrom, means for resiliently holding said contacts in place, and electromagnetic means for polarizing said member.

7. In an electrical switch, a set of two contacts, a second set of two contacts insulated from the first set, a circuit subject to reversal of current, electromagnetic means for moving one contact of each set when the current in said circuit is in one direction and

moving the other contact of each set when the current in said circuit is in the other direction, and means whereby all of said contacts are electrically connected when there is no current flowing in said circuit.

8. In an electrical switch the combination of a movable member, a set of rigid contact points each pivotally and resiliently mounted with respect to said member and electrically connected with each other, a second set of rigid contact points each pivotally and resiliently mounted with respect to said member and electrically connected with each other but insulated from said first mentioned set, electromagnetic means for operating upon said member and an electromagnet for polarizing said member.

9. The combination of two distinct circuits, contact points arranged to close said circuits and to connect said circuits with each other, and electromagnetic means for disengaging part of said contact points to arrange said circuits in series.

10. The combination of a movable member of magnetic material, two distinct circuits, contact points arranged to close said circuits and to connect said circuits with each other and electromagnets arranged to act upon said member to disengage part of said contact points to arrange said circuits in series.

11. The combination of a movable member of magnetic material, a plurality of distinct circuits and sources, contact points arranged to close said circuits and to connect said circuits with each other, and electromagnets supplied from said distinct sources for acting upon said member to disengage part of said contact points to arrange said sources and circuits in series, so that said sources will act in the same direction.

12. The combination of a movable member of magnetic material, two distinct circuits and sources, four contact points normally closing said circuits, and electromagnets supplied from said distinct sources arranged to act upon said member to disengage part of said contact points to arrange said sources and circuits in series.

13. The combination of a movable member of magnetic material, two distinct circuits containing distinct sources of electromotive force, four contact points normally closing said circuits and connecting them with each other, and electromagnetic means supplied from said sources for acting upon said member to disengage two of said contact points to arrange said circuits in series such that said sources will act in the same direction.

14. In a switch mechanism, a movable member, a polarizing magnet therefor, a magnet for moving the member in one direction, a magnet for moving the member in another direction, two sets of two contact

members each resiliently mounted on said member each set being insulated from the other set, contacts therefor, said contact members being so arranged that when the first member is in its neutral position all the contact members are in engagement with their contacts, and when the first member is moved in one direction or the other one contact member of each set breaks engagement with its contact.

15 15. In a switch mechanism, a movable member, a polarizing magnet therefor, a magnet for moving the member in one direction, a magnet for moving the member in
20 another direction, two sets of two contact members each resiliently mounted on said member, each set being insulated from the other set, contacts therefor, said contact
25 members being so arranged that when the first member is in its neutral position all the contact members are in engagement with their contacts, and when the first member is moved in one direction or the other one
30 contact member of each set breaks engagement with its contact, said contact members being pivotally mounted on said first member and said first member forming the armature for said magnets.

35 16. The combination of two distinct circuits, contact points arranged to close said circuits and to connect said circuits with each other, the current in one of said circuits being subject to reversals, and electromagnetic means for disengaging part of
40 said contact points to arrange said circuits in series or to disengage the other part of said contacts to arrange said circuits in a different series relation, in accordance with

the direction of flow of said reversing current.

40 17. In a switch, two circuits, a movable member, electromagnetic means for operating the same and two sets of spring pressed contact arms pivotally mounted on said member, each set being insulated from the other and arranged to connect said circuits
45 in series in one direction or the other in accordance with the direction of movement of said movable member.

50 18. In a switch mechanism, a movable member, a magnet for moving said member in one direction, a magnet for moving the member in another direction, a polarizing magnet, two sets of spring pressed contact
55 arms pivotally mounted on said member each set being insulated from the other, and a plurality of independent cooperating contacts for each set.

60 19. In a switch mechanism, a movable member, electromagnetic means for operating the same, and two sets of spring pressed contact arms pivotally mounted on said member each set being insulated from the other, contacts therefor, one contact arm of
65 each set being arranged to be engaged by said member and moved away from its contact when said member is moved in one direction or the other.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

WILLIAM A. TURBAYNE.

Witnesses:

W. H. PATTENDEN,
H. J. EISS.