

J. W. JEPSON & W. F. BOUCHÉ.

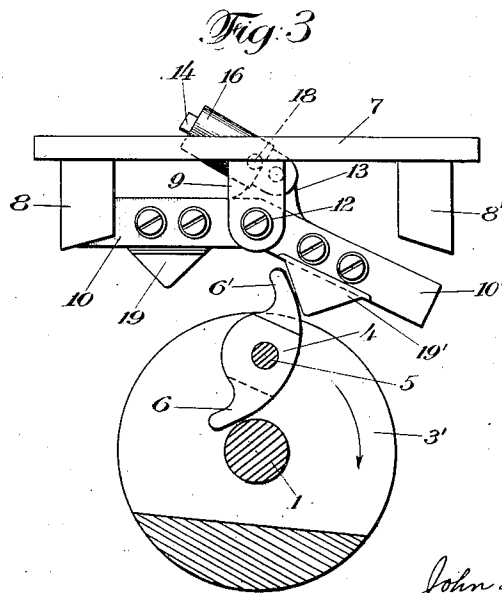
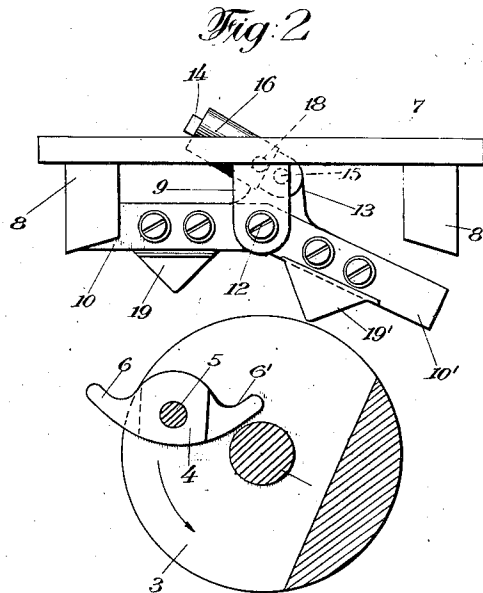
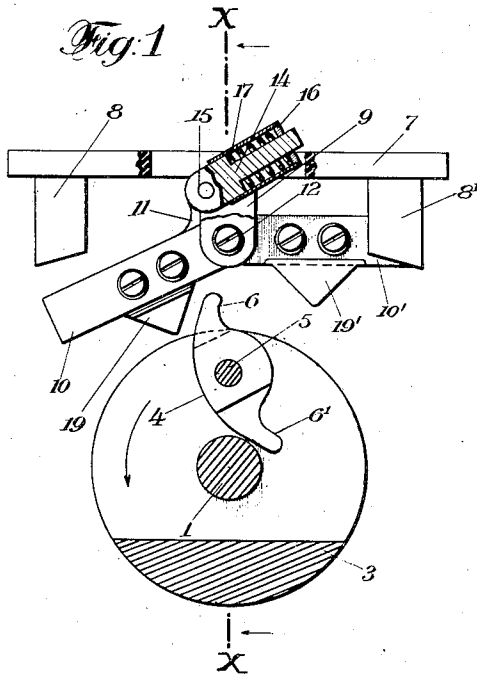
SWITCH.

APPLICATION FILED JUNE 10, 1910.

993,378.

Patented May 30, 1911.

2 SHEETS—SHEET 1.



Witnesses:
Samuel M. Ward Jr.
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John H. Jepson,
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 Inventors,

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Kenny & Kenyon

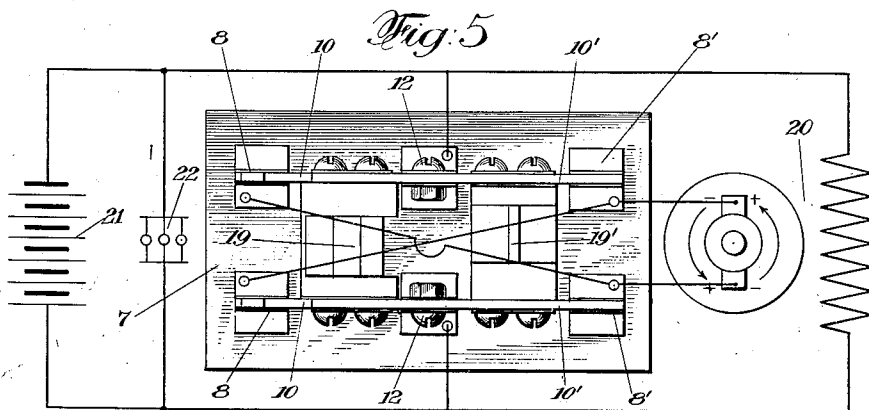
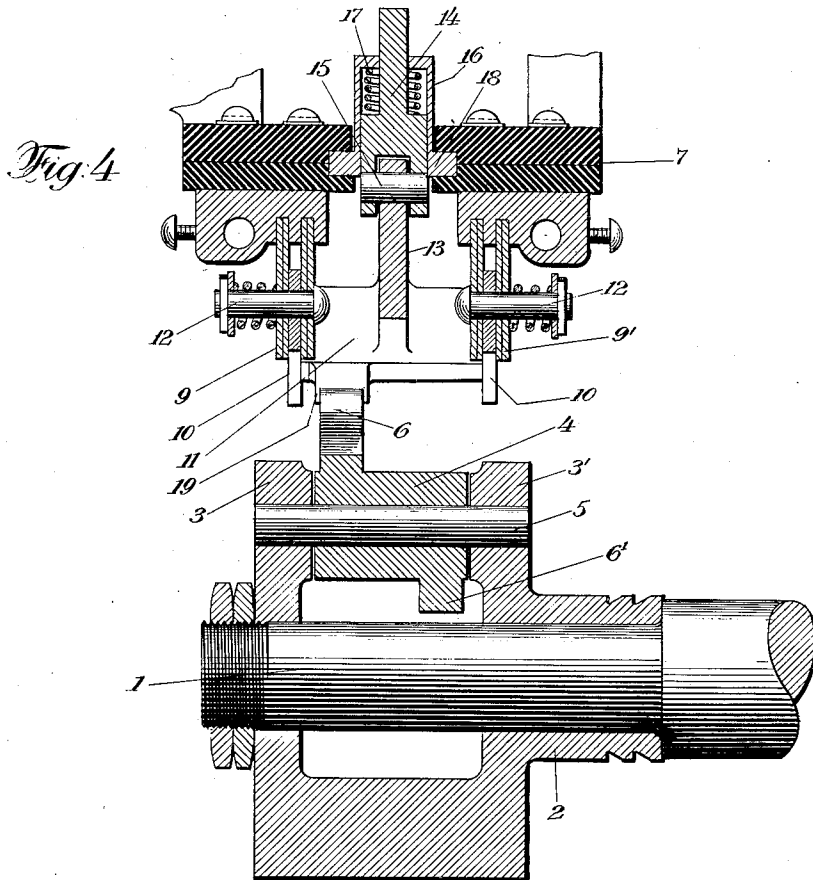
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UNITED STATES PATENT OFFICE.

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SWITCH.

993,378.

Specification of Letters Patent.

Patented May 30, 1911.

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To all whom it may concern:

Be it known that we, JOHN W. JEPSON, of Depew, Erie county, New York, and WILLIAM F. BOUCHÉ, of Buffalo, Erie county, New York, have invented certain new and useful Improvements in Switches, of which the following is a specification.

Our invention relates to switches, and more particularly to switches operated by a part carried on a rotatable member for changing or reversing the electrical connections of a circuit whenever the direction of rotation of said member is reversed. Such switches may be used in connection with various electrical circuits and apparatus, and for numerous purposes such, for instance, as signaling to a remote point the direction of rotation of some member; or, in car lighting systems in which the generator is driven from one of the car axles so that its direction of rotation changes with the direction of travel of the car. In such car lighting systems, in order that the generator will always be properly connected with the storage battery used therewith, it is necessary to provide a pole changer to reverse the connections from the generator to the battery whenever the direction of rotation of the generator is reversed.

One object of the invention is to produce a practical and reliable switch of the character described, which is of simple, inexpensive and durable construction and is positive and quick in action.

Another object of the invention is to provide a switch of the above type the actuating parts of which are so constructed and arranged that the switch is engaged by a part on the rotating member during its first or first few rotations and thrown out of the path of the farthest possible projection of said member, after which the switch cannot again be engaged by said member until the direction of its rotation is changed.

Another object of the invention is to provide a means for completing the movement of the switch member after it has been engaged by said rotating part, so that it will be thrown well beyond the path of the same and thus avoid all clicking or other objectionable sounds which would result from yielding engagements of the parts thereof, as well as the necessary wear on said parts;

and to this end, in the present embodiment of our invention, we provide a member rotatable in opposite directions, upon which member is mounted a switch-engaging device having two projections each in a different plane of revolution, the device being so mounted that it will assume different positions upon the revolving member, depending upon its direction of rotation; and operatively related to this device, a switch member is provided having two engaging parts lying in planes corresponding respectively to the planes of revolution of the projections from said device, the arrangement being such that when the switch-engaging device assumes one of its positions it engages the switch member to throw it in a direction out of the path of said device during subsequent rotations in that direction, and when said device assumes its other position on the reverse rotation, its other projection is brought into position to engage the switch member and throw the switch in the opposite direction and out of the path of said device.

Other objects of the invention and the construction and operation of the parts thereof will more fully appear from the following description taken in connection with the accompanying drawings in which—

Figure 1 is a side elevation of the switch with certain parts broken away showing the position of the switch-engaging device when rotated in an anti-clockwise direction and just before it engages the switch member; Fig. 2 shows the position of the switch-engaging device just after it has engaged the switch member and thrown the same to close the left-hand contacts; Fig. 3 is a similar view showing the position of the switch-engaging device when rotated in a clockwise direction and just before it engages the switch member to throw the same to close the right-hand contacts; Fig. 4 is a cross sectional view taken on line $x-x$ of Fig. 1; but with the switch just on center, and looking in the direction of the arrow; and Fig. 5 is a diagrammatic view showing the switch connecting a generator and a storage battery for use in connection with car lighting systems.

Referring to the drawings, 1 is a shaft rotatable in opposite directions depending

upon the direction of rotation of the dynamo in connection with which the switch is to be used, and in this instance, is intended to illustrate the end of the dynamo armature shaft. Upon this shaft is mounted a sleeve 2 provided with two annular flanges 3, 3', suitably separated for the reception of a dog 4 which is pivotally mounted upon a pin 5 extending between said flanges. The dog 4 is provided at opposite ends with lugs or projections 6, 6' which are offset relatively to each other, so that in the rotation of the dog carrier or sleeve 2, these lugs will travel in different parallel planes. The dog is pivoted eccentrically with respect to the sleeve and at the side of its own center of gravity nearest the shaft 1. This is accomplished in the embodiment of the invention herein illustrated, by constructing the dog with a heavy or thickened portion intermediate the projections 6, 6' and extending to one side of its own pivot, in which case, when the shaft is rotated to the left, as indicated in Fig. 1, the dog will tilt in the position shown, with the projection 6 extending beyond the flanges 3, 3' and with the projection 6' resting against the shaft 1, so as to resist the impact of the projection 6 upon the part of the switch with which it is to engage, and likewise, when the shaft is rotated in the opposite direction, the dog will tilt in a direction to assume the position shown in Fig. 3, in which the projection 6' extends out beyond the flanges 3, 3' so as to engage a second projection on the switch member for throwing the switch in the opposite direction.

Any suitable form of switch or pole changer may be used in connection with the part of the device heretofore described, and in the drawings we have shown a pole changer having a suitable base plate 7 of insulating material, which is secured in any desired manner in operative relation to the dog 4, and which is provided with suitable contact clips 8, 8' and with suitable standards 9, 9' in which contact blades 10, 10' of a suitable switch member 11 are pivoted by means of suitable pins 12. The contact blades are insulated from the switch member or body portion 11 in any desired manner, and the body portion 11 is further provided with a projection 13 to which is pivoted a plunger 14 by means of a pin 15, which plunger works within a cylinder 16 provided with a spring 17 and suitably journaled, by means of bosses 18, within an opening in the base plate 7. The bosses 18 are pivoted eccentrically with respect to the pivot of the switch member 11, so that when either of the projections on the dog 4 engages the switch member to throw it, the spring will come into action as soon as the pivot 15 is thrown from one side of the switch pivot 12 to the other, and thereby

give the switch member a quick snap movement to throw the device out of the path of the dog, and the switch blades into good contact with the corresponding clips. The switch member is provided with a projection 19 extending in the plane of revolution of the projection 6 of the dog 4, and with a second projection 19' extending in the plane of revolution of the projection 6' of the dog, so that the projection 6 of the dog cannot engage with the projection 19' of the switch member, nor can the projection 6' of the dog engage with the projection 19 of the switch member. The projections 19, 19' are of such height that after they have been engaged by the corresponding projections on the dog to throw the switch member in engagement with its corresponding contacts, the projection of the switch member will be moved out of the path of travel of said projection in its subsequent rotations.

The operation of the device when constructed as above described, is as follows: Assuming that the switch member 11 is in the position shown in Fig. 1, and that the dynamo is rotated in a direction to revolve the sleeve to the left as indicated by the arrow, due to the construction and position of the dog, it will be tilted so as to throw the projection 6 beyond the flanges 3, 3' and into position to engage the corresponding projection 19 on the switch member, and thereby throw the switch blades into engagement with the clips 8, as shown in Fig. 2, after which, during subsequent rotations of the sleeve and dog, neither of the projections 6 or 6' will engage either of the switch projections 19 or 19', since the projection 19 in the plane of revolution of projection 6 has been moved by the action of spring 17 beyond the path of rotation of said projection; and projection 19' being out of the plane of revolution of the projection 6, will not be engaged thereby; while the projection 6', which is in the same plane as the switch projection 19', remains within the circumference of the flanges 3, 3'. It will be seen that by this construction, after the dog has engaged the switch to throw it into its proper position, there will be no further engagement between any rotating part with any stationary part, so that the device is thereafter noiseless and free from undesirable clicking or hammering noises, which are not only objectionable, but cause serious wear and tear on the parts. With a switch constructed in accordance with this principle, if any clicking or hammering noises are observed after the switch has been thrown, it will be an indication that some part or parts of the apparatus are out of order; whereas, if yieldable engagement of any of the parts was permitted after the switch is thrown to its normal position, a continual clicking or hammering noise will

occur and it will be impossible to detect any trouble or disarrangement of the parts until the switch is probably seriously damaged, if not entirely destroyed.

5 In Fig. 5, we have shown a switch wired in the usual manner for pole changers and utilized as such in the connections between a generator 20 and a storage battery 21 which may be used in a car lighting system
10 to supply lamps 22.

The eccentrically pivoted spring performs the double function of throwing the switch member well beyond the path of travel of any projecting part of the dog during subsequent rotations of the revolving member, and of giving a quick make-and-break or snap action to the switch blades, thus preventing subsequent engagement between the parts and decreasing the chance of sparking and insuring better contact between the switch contact members. While the spring is an important feature of the switch herein shown, it is not essential to switches constructed in accordance with the broad principles of this invention, nor to the specific embodiment shown, since the engagement of the projections on the dog with the respective projections on the switch member will move the switch blades into electrical contact with the corresponding switch clips and after a few rotations, out of the path of the dog during subsequent rotations thereof.

While we have shown and described our invention with particularity in the best form now known to us, it is obvious to those skilled in the art that many changes and modifications may be made therein without departing from the spirit of our invention, and we do not wish to be understood as limiting our invention other than as indicated in the appended claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:

45 1. In mechanism for operating a pole changing switch from a member rotatable in opposite directions, said member, a switch engager pivoted eccentrically thereon at one side of its own center of gravity and free to rock on its pivot to assume different positions depending upon the direction of rotation of said member, and a stop for said engager.

55 2. In switch mechanism, a switch, a member rotatable in opposite directions, and a device for engaging said switch pivoted eccentrically on said member and weighted to assume different positions thereon depending upon the direction of rotation of said member.
60 ber.

3. In switch mechanism, a switch, a member rotatable in opposite directions, and a device for engaging said switch pivoted eccentrically on said member and free to rock
65 on its pivot in response to the rotations of

said member, to assume different positions depending upon the direction of rotation of said member.

4. In switch mechanism, a switch, a member rotatable in opposite directions, and a device for engaging said switch pivoted eccentrically upon said member and at one side of its own center of gravity nearest the axis of said member whereby said device assumes different positions upon said member depending upon its direction of rotation. 75

5. In a switch mechanism, a switch, a member rotatable in opposite directions, a switch-engaging device pivoted eccentrically upon said member and at one side of its own center of gravity nearest the axis of said member whereby said device assumes different positions upon said member depending upon its direction of rotation, and a projection at each end of said device for engaging
85 said switch.

6. In mechanism for operating a pole-changing switch from a rotary member, said member, a switch-operating dog pivoted eccentrically thereon and at one side of its own center of gravity nearest the axis of said member, a projection at each end of said dog, said projections lying in different planes of revolution, and a stop for limiting the movements of said dog with respect to
95 said member.

7. The combination of a switch, a member rotatable in opposite directions, a switch-operating device pivoted eccentrically upon said member and operatively related to said switch and moved to one of a plurality of positions depending upon the direction of rotation of said member, said device when the member is rotated in one direction assuming a position to engage the switch to move it out of the path of said device while rotating in said direction, and when the member is rotated in the opposite direction, assuming a different position to engage the switch and move it to another position out of the path of said device while rotating in
105 said last direction.

8. The combination of a switch, a member rotatable in opposite directions, a switch-operating device pivoted eccentrically upon said member and operatively related to said switch and moved to one of a plurality of positions depending upon the direction of rotation of said member, said device when the member is rotated in one direction assuming a position to engage the switch to move it in one direction, and when the member is rotated in the opposite direction assuming a position to engage the switch to move it to another position, and means for further throwing the switch after it has been engaged by said device. 125

9. The combination of a plurality of electrical contacts, a member rotatable in opposite directions, and a contact-operating de-
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vice moved therewith and assuming different positions with respect to said member depending upon the direction of rotation of said member, said device operating to close one of said contacts when the member is rotated in one direction, and operating to close another of said contacts when the member is rotated in the opposite direction.

10. The combination of a plurality of electrical contacts, a member rotatable in opposite directions and a contact-operating device carried thereby and controlled by the rotation of said member to assume different positions thereon depending upon its direction of rotation, said device in one position engaging a part connected with said contacts, and when in another position, engaging another part connected with said contacts, and means for moving said engaged parts out of the path of revolution of said device and giving a quick action to said contacts when they are operated by said device.

11. The combination of a member rotatable in opposite directions, a switch having a plurality of engaging parts lying in different planes parallel to the plane of rotation of said member, and a switch-engaging device operated by the rotation of said member to assume one of a plurality of positions relative to said member depending upon the direction of rotation of said member, and engaging one of said switch parts when said member is rotated in one direction, and engaging another of said switch parts when the member is rotated in the opposite direction.

12. The combination of a member rotatable in opposite directions, a switch having a plurality of engaging parts lying in different planes parallel to the plane of rotation of said member, a switch-engaging device operated by the rotation of said member to assume one of a plurality of positions relative to said member depending upon the direction of rotation of said member, and engaging one of said switch parts when said member is rotated in one direction, and engaging another of said switch parts when the member is rotated in the opposite direction, and means for moving said parts out of the path of said device after they have been engaged thereby.

13. The combination of a rotary dog carrier, a switch actuating dog which is movably mounted on said carrier and is moved to different positions by reversing the rotation of said carrier, said dog having projections located in different planes, and a switch having a movable member provided with two parts each arranged in the plane of movement of one of said dog projections, one of said projections being adapted to engage one of said parts to shift said switch member to one position when said carrier is rotated in one direction, and said other

projection being adapted to engage said other part and shift said switch member to a different position when the rotation of said carrier is reversed, substantially as set forth.

14. The combination of a rotary dog carrier, a switch actuating dog which is movably mounted on said carrier and is moved to different positions by reversing the rotation of said carrier, said dog having projections located in different planes, and a switch having a lever which is pivoted between its ends and is provided with two parts each arranged in the plane of movement of one of said dog projections, one of said projections being adapted to engage one of said parts to swing said lever in one direction when said carrier is rotated in one direction, and said other projection being adapted to engage said other part to swing said lever in the opposite direction when the rotation of said carrier is reversed, substantially as set forth.

15. The combination of a rotary dog carrier, a switch actuating dog which is pivoted eccentrically between its ends on said carrier and is reversed in position by reversing the rotation of said carrier, said dog having projections at opposite ends located in different planes, and a switch having a movable member provided with two parts each arranged in the plane of movement of one of said dog projections, one of said projections being adapted to engage one of said parts to shift said switch member to one position when said carrier is rotated in one direction, and said other projection being adapted to engage said other part and shift said switch member to a different position when the rotation of said carrier is reversed, substantially as set forth.

16. The combination of a rotary dog carrier, a switch actuating dog which is movably mounted on said carrier and is moved to different positions by reversing the rotation of said carrier, said dog having projections located in different planes, a switch having a lever which is pivoted between its ends and is provided with two parts each arranged in the plane of movement of one of said dog projections, one of said projections being adapted to engage one of said parts to swing said lever in one direction when said carrier is rotated in one direction, and said other projection being adapted to engage said other part to swing said lever in the opposite direction when the rotation of said carrier is reversed, and a spring which acts after said dog has moved the lever in either direction beyond a central position to complete the movement of the lever, substantially as set forth.

17. The combination of a rotary dog carrier, a switch actuating dog which is movably mounted on said carrier and is moved

to different positions by reversing the rotation of said carrier, said dog having projections located in different planes, a switch having a lever which is pivoted between its
5 ends and is provided with two parts each arranged in the plane of movement of one of said dog projections, one of said projections being adapted to engage one of said parts to swing said lever in one direction when
10 said carrier is rotated in one direction, and said other projection being adapted to engage said other part to swing said lever in the opposite direction when the rotation of said carrier is reversed, and a spring

which is pivotally mounted and is pivoted 15 to said lever and acts after said dog has moved the lever in either direction beyond a central position to complete the movement of the lever, substantially as set forth.

In testimony whereof, we have signed our 20 names to this specification, in the presence of two subscribing witnesses.

JOHN W. JEPSON.
WILLIAM F. BOUCHÉ.

Witnesses:

JAMES McGRATH,
W. H. PATTENDEN.