

Feb. 1, 1938.

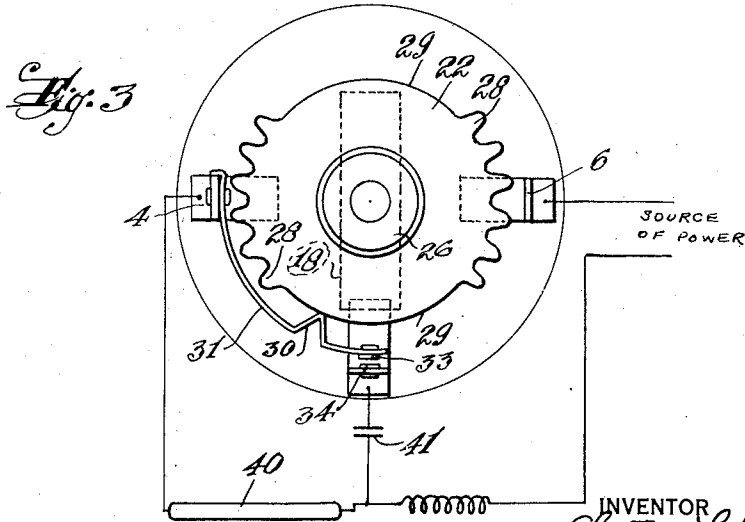
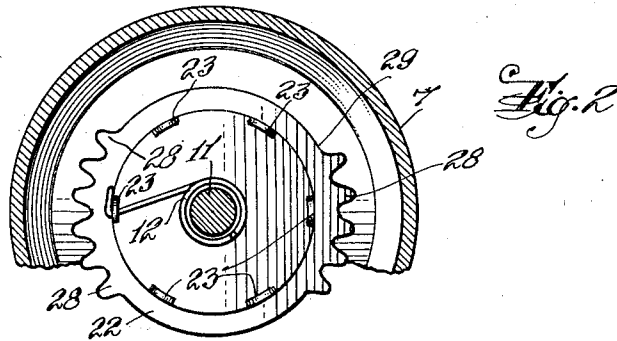
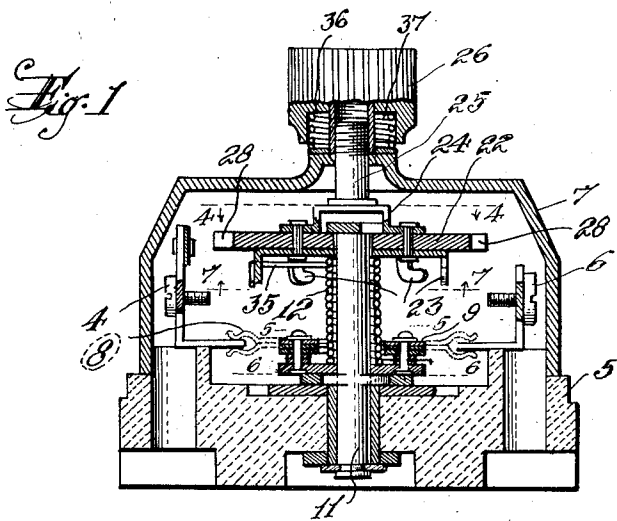
L. F. BIRD

2,107,138

ELECTRIC SWITCH

Filed June 28, 1937

2 Sheets-Sheet 1



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Fig. 4

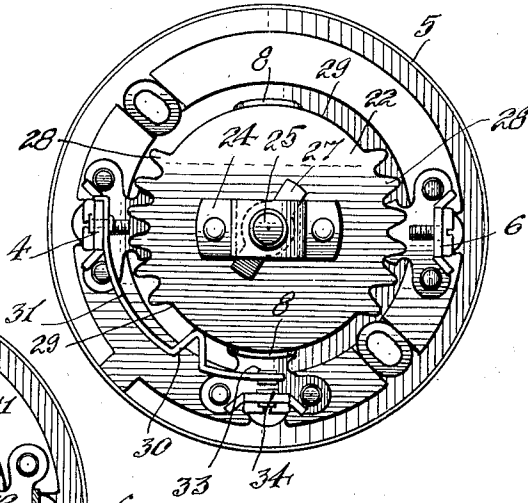


Fig. 5

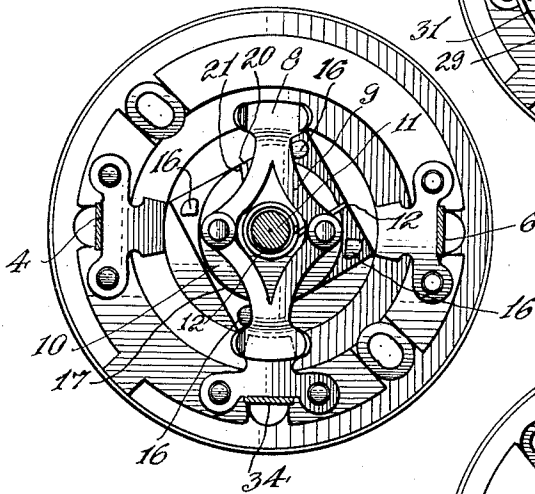


Fig. 6

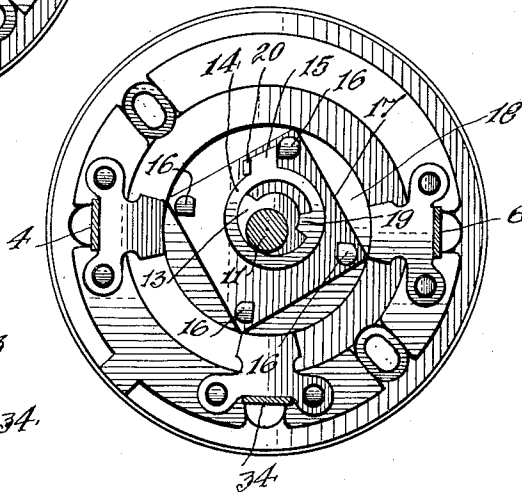
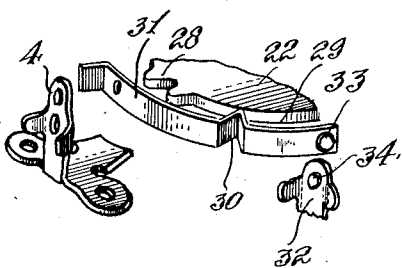


Fig. 7



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UNITED STATES PATENT OFFICE

2,107,138

ELECTRIC SWITCH

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Application June 28, 1937, Serial No. 150,698

5 Claims. (Cl. 200—1)

This invention relates to electric switches and more particularly to the provision of means for starting gas or vapor filled electric discharge tubes operating on low voltages.

In the operation of electric discharge tubes on the low voltages such as commonly used for house lighting purposes, difficulties in starting are due to static charges which collect on the walls of such tubes and prevent the static fields produced by application of potentials to the electrodes of being effective at the opposite ends of the tube, thus preventing a discharge. If the potential at the electrode is increased sufficiently, these static charges are overcome and a discharge is started. Heretofore, to overcome these static charges, there has been provided means for automatically shocking the discharge tube with a surge of relatively high frequency electricity at elevated voltages after the power is applied to the tube. Such means have comprised generally the provision of a capacitor in parallel with the tube, which capacitor is intermittently connected and disconnected from the electrical circuit after the application of power to the tube. A starting device of this type is disclosed in U. S. Patent 2,082,939, issued to Lester F. Bird on June 8, 1937.

It is, therefore, an object of this invention to provide a snap switch for use in a starting device for low voltage electric discharge tubes, which snap switch has means for applying power to the discharge tube and immediately thereafter to automatically connect and disconnect a capacitor in a parallel circuit.

A further object is the provision of a snap switch in which the simple operation of turning the switch to the "on" position automatically applies power and after the application of power immediately connects and disconnects a parallel circuit a plurality of times.

These and other advantageous objects, which will later appear, are accomplished by the simple and practical construction and arrangement of parts hereinafter described and exhibited in the accompanying drawings, forming part hereof, and in which:

Fig. 1 is a vertical sectional view of a snap switch embodying my invention.

Fig. 2 is a sectional view looking upwardly on line 2—2 of Fig. 1.

Fig. 3 is a wiring diagram showing the application of the switch for starting a vapor electric device.

Fig. 4 is a sectional view taken on line 4—4 of Fig. 1.

Fig. 5 is a sectional view taken on line 5—5 of Fig. 1.

Fig. 6 is a sectional view taken on line 6—6 of Fig. 1.

Fig. 7 is a fragmentary perspective view of details of the invention.

Referring to the drawings, it will be seen that the switch mechanism is mounted on an insulating base 5 carrying combined wire and switch terminals 4 and 6, and provided with an enclosing cover 7. The switch blades 8 are integral with a yoke 9 which is fastened to a disc 10, loosely mounted on a shaft 11, which is encircled by a torsion spring 12. Fixed to shaft 11 is a cam 13, bearing against the inner surface of an annular member 14, which is provided with a projection 15, engageable with stops 16 on a plate 17, fixed in a recess 18 in the base 5, (see Figs. 4, 5, 6). The member 14 has an inwardly projecting lug 19, engageable by the cam to move the projection 15 from engagement with the stops 16, the projection 15 being provided with a lug 20 movable in a guide slot 21 in the disc 10.

Loosely mounted at the upper end of the shaft 11 and resting on the torsion spring 12 is a dial 22 having depending lugs 23 for engaging an end 35 of the torsion spring 12. Fixed to the upper side of the dial 22 is a small bridge 24 to which is fixed a small stub shaft 25 having the upper end thereof screw threaded to receive an internally threaded knob 26; the latter being provided with a recess 36 in which is positioned a coil spring 37 resting upon the casing 7 when the knob is screwed on to the stub shaft.

Fixed to the upper end of the shaft 11 is a small bar 27 extending transversely of the bridge 24, so that after the dial has made a predetermined free movement on the shaft 11, the bar 27 will engage the bridge 24 to cause the shaft to move with the dial. The dial has on the periphery thereof diagonally arranged sections of teeth 28 and recessed portions 29. The teeth 28, when the dial is moved to a predetermined position, engage a bent portion 30 of a leaf spring 31 to move the contact 33 at the end of the spring into engagement with the contact 34 mounted on a terminal 32, the other end of the leaf spring 31 being attached to the terminal 4.

In operation, when the knob 26 is rotated, the dial 22 rotates freely on the shaft 11 until the bar 27 engages the bridge 24, after which the shaft and dial will rotate together. During the free movement of the dial 22, the torsion spring 12 is wound up due to the fact that the lower end of the spring is fastened to the disc 10.

which is prevented from rotating by the lug 20 in slot 21, movement of said lug 20 being prevented by the stop 16. Further rotation of the dial 22 causes the bridge 24 to engage the bar 27 and to rotate the shaft 11, to also rotate the cam within the annular member 14. As the cam rotates, it bears against the inwardly projecting lug 19 to move the annular member 14 linearly which causes the projection 15 to become disengaged from the stop 16, thus allowing all of the parts to rotate until the projection 15 engages the next adjacent stop 16. The switch blades have now been brought into contact with the terminals 4 and 6 to apply power, and after the switch blades have been moved to such position and the knob released, the wound up torsion spring 12 causes the dial 22 to rotate in the opposite direction, during which the teeth 28 bear against the bent portion 30 of the leaf spring 31 to make a plurality of successive engagements of the contact members 33 and 34.

In Fig. 3 is shown a wiring diagram of a circuit for a vapor electric discharge tube 40, having in parallel therewith a condenser or capacitor 41. It will be seen that after power has been applied by means of the terminals 4 and 6 to the discharge tube, the production of a plurality of successive makes and breaks of the circuit through the condenser by means of the teeth 28 engaging the projection 30, produces the necessary shocking or instantaneous high frequency voltage for starting the tube on a low voltage circuit.

When the knob is again rotated in the same direction, the switch blades are moved to the "off" position, under which circumstances the depressed portion 29 is presented adjacent the bent portion 30 of a spring 31, and accordingly, no contact is made between the contacts 33 and 34.

From the above description it will be seen that there has been provided a simple and reliable switching device for applying power to an electrical discharge tube for example, and immediately after the application of power to automatically successively make and break a circuit a plurality of times through a capacitor in parallel with the discharge tube.

The foregoing disclosure is to be regarded as descriptive and illustrative only, and not as restrictive or limitative of the invention, of which obviously embodiments may be considered, including many modifications, without departing from the general scope herein indicated and denoted in the appended claims.

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

1. In a switch for starting vapor electric discharge devices, a pair of terminals adapted to be connected to a source of power, a base upon which the terminals are mounted, a spindle rotatably mounted in said base, means carried by the spindle for closing a circuit between said terminals, a dial rotatably mounted on the spindle, a torsion spring resisting rotation of said dial, means for producing a lost motion connection between said spindle and dial, a leaf spring attached to one of said terminals, said spring having an inwardly bent portion, said dial having sections of its periphery provided with teeth adapted to engage said bent portion of the leaf spring, and a third terminal mounted upon said base and positioned to intermittently engage said leaf spring

when the teeth on the dial engage said bent portion.

2. In a switch for starting vapor electric discharge devices, a base, a pair of terminals mounted on said base and adapted to be connected to a source of power, means for closing a circuit between said terminals, a dial, means for rotatably supporting said dial on the base, a torsion spring resisting rotation of said dial, a contact member comprising a strip of resilient material with a bent portion attached to one of said terminals, said dial having sections of its periphery provided with teeth adapted to engage said bent portion of the contact member, and a third terminal mounted on said base and positioned to be intermittently engaged by said contact member when the teeth on the dial engage said bent portion.

3. In a switch for starting vapor electric discharge devices, a base, a pair of terminals mounted on the base and adapted to be connected to a source of power, a dial having sections thereof provided with spaced projections, said dial being rotatably mounted on said base, a torsion spring resisting rotation of said dial, a flat spring member having a bent portion and attached to one of said terminals, the projections on said dial being adapted to engage said bent portion, a third terminal mounted on said base and adapted to be engaged by said flat spring member when the projections on the dial engage the bent portion, and means to close the circuit between said first pair of terminals, said torsion spring after the closing of said circuit automatically rotating the dial in an opposite direction to cause the projections thereof to intermittently engage the bent portion of said member and thus produce a plurality of closings in rapid succession of a circuit through said third terminal.

4. In a switch for starting vapor electric discharge devices, a base, a pair of terminals mounted on said base and adapted to be connected to a source of power, a leaf spring having a bent portion connected to one of said terminals, a third terminal mounted on said base, a dial having sections thereof provided with projections adapted to engage said bent portion to cause said leaf spring to contact the third terminals, means associated with said dial whereby the rotation of the dial will close a circuit between the first pair of terminals, and spring means for reversing the rotation of the dial immediately after the closing of said circuit, to cause the projections on the dial to engage the bent portion to cause the spring to intermittently engage said third terminal a plurality of times in succession.

5. In a switch for starting vapor electric discharge devices, a base, a pair of terminals mounted on said base adapted to be connected to a source of power, a third terminal mounted on said base, a dial, means associated with the dial so that the rotation of the dial in one direction will close a circuit between said first pair of terminals, spring means resisting rotation of said dial in said direction, and means associated with said dial to open and close a circuit between said third terminal and one of said pair of terminals a plurality of times in succession when the spring means rotate said dial in the reverse direction after the closing of the circuit between said first pair of terminals.

LESTER F. BIRD.