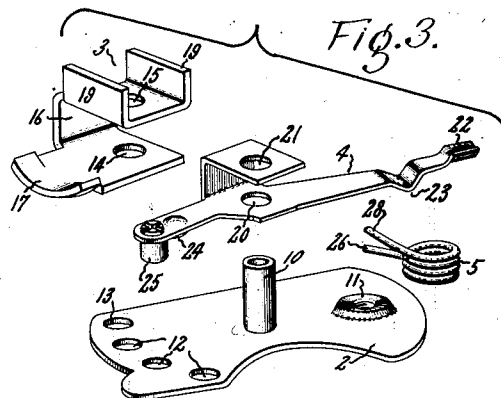
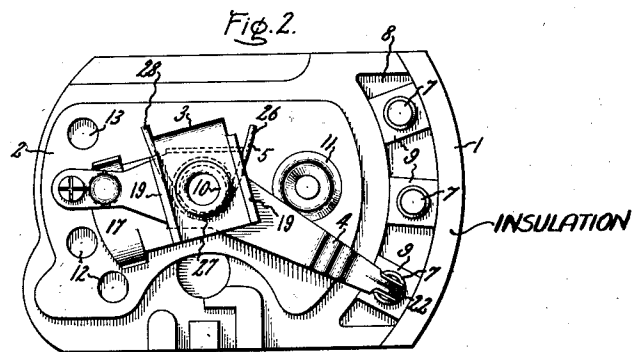
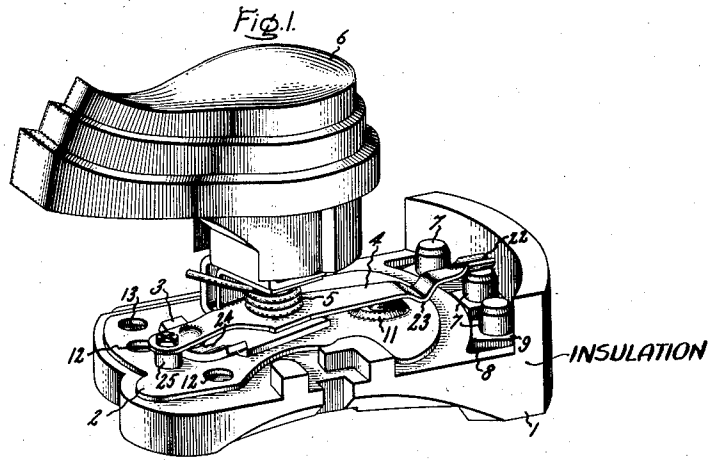


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OSCILLATING SNAP SWITCH
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OSCILLATING SNAP SWITCH

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15 Claims. (Cl. 200-70)

This invention relates generally to switch mechanisms and is directed more particularly to switch mechanisms in which a continuous movement of a switch handle causes a blade of the switch to be rotated over a series of switch contacts with a snap action.

It is an object of this invention to provide a switch of this type which is simple in construction and reliable in its operation.

The invention will be more completely understood by reference to the following description describing a preferred embodiment of the invention and to the accompanying drawing in which Fig. 1 is a perspective view illustrating the assembled switch; Fig. 2 is a plan view of the switch from which the switch handle has been omitted, and Fig. 3 is an exploded view showing the parts of Fig. 2 with the switch base omitted.

Referring now to the drawing, the switch comprises a base 1, a terminal plate 2, a cam member 3, a switch blade 4, a spring 5 and a switch handle 6.

The base 1, which is constructed of suitable insulating material, has disposed in openings therein three spaced contacts 7 arranged in an arc of a circle. The contacts are positioned in a recess 8 on the upper surface of the base 1 and each contact is fastened to the base by a plate 9, integral with the contacts and bearing against the surface of the recess 8, and by a spun-over portion (not shown) bearing against the surface of a recess (not shown) individual to the contact on the bottom of the base. Each contact is provided with a threaded opening extending upwardly from the bottom of the contact and a binding screw (not shown) is adapted to be positioned in this opening thus providing means for connecting a conductor to each of the contacts 7.

A hollow spindle 10 is disposed in an opening of, and rigidly attached to, the base 1. Mounted on the spindle is the terminal plate 2 which is fastened to the base by a metal insert 11. This insert, which is positioned in an opening in the terminal plate, has its lower end in the form of a plate (not shown) disposed in a recess in the bottom of the base 1 and its upper end spun over as shown in Fig. 2. The insert is also provided with a threaded opening into which a binding screw (not shown) is adapted to be positioned from the bottom of the base thus providing means for connecting a conductor to the terminal plate 2. This conductor and the conductors connected to the contacts 7 are extended,

in a manner not material to this invention, to the electrical device with which the switch is employed. The terminal plate 2 is provided with three spaced openings 12 each corresponding to one of the contacts 7 and a fourth opening 13 corresponding to a position of the switch blade 4 in which it is out of engagement with the contacts 7. The openings 12 and 13 are arranged in an arc similar to that in which the contacts 7 are arranged and each of the openings is positioned over a corresponding recess in the base 1. It is to be understood that if additional contacts are disposed on the base, one additional opening in the terminal plate is provided for each added contact.

The cam or operating member 3 is mounted on the spindle 10 which extends through openings 14 and 15 therein. The cam member is provided with both a lower and an upper branch spaced from one another by the vertical wall 16. The lower branch bears on the terminal plate 2 and is provided with the opening 14 and with the curved cam surface 17. The upper flange is trough-shaped and is provided with the opening 15 and the vertical flanges 19 which have substantially the same length as the distance between their outside faces.

The switch handle 6 is constructed of suitable insulating material and is provided with a pin, not shown, rigidly positioned in the composition of the handle and with oppositely disposed flanges (not shown) on either side of the pin. The distance between the inner surfaces of these flanges is sufficient to allow them to fit over the outside faces or over the ends of the vertical flanges 19. When the pin is positioned within the hollow spindle 10 and the flanges of the handle enclose either the outside faces or the ends of the vertical flanges 19 the cam member may be manually rotated in either direction on the spindle 10 by turning the switch handle.

The switch blade 4 is mounted on the spindle 10 which extends through openings 20 and 21 therein. The switch blade is provided with upper and lower branches which are disposed on the spindle within the upper and lower branches of the cam member 3. The lower branch is provided with a channel-shaped contact portion 22 adapted to engage the contacts 7, depending projection 23 adapted to limit the downward travel of the contact portion 22 of the switch blade when it moves off one of the contacts 7, thus enabling it to ride up onto another contact when the switch blade is snapped; the opening 20, a depending projection 24 adapted to slide on the

cam surface 17 and a depending rider 25 riveted to the lower branch, and adapted to enter both the openings 12 and 13 of the terminal plate and the corresponding openings in the base 1. The upper branch is provided with the opening 21 previously referred to.

When the cam 3, the switch blade 4 and the spring 5 are mounted on the spindle 10 the top of the spindle is spun over as shown at 27 to retain these elements in their assembled relation. When assembled on the spindle, the switch blade 4 is disposed within the branches of the cam 3 and the spring 5 within the branches of the switch blade presses the branches thereof apart; while the ends 25 and 26 of the spring press against the edges of the vertical wall 16 of the cam 3 and against the edges of the vertical wall of the switch blade 4 thereby rotatably coupling the cam and switch blade. The pressure on the lower branch of the switch blade causes the channel portion 22 of the blade 4 to be pressed downwardly to make firm engagement with the contacts 7; the projection 24 of the blade to be operatively associated with the cam surface 17 and the rider 25 to be pressed into one of the openings 12 or 13 of the terminal plate 2.

The operation of the structure just described will now be briefly explained. Let it be assumed that it is desired to move the switch blade 4 from the lowest contact 7, as shown in Fig. 2, to the next higher contact. It is to be noted that with the blade 4 in this position the rider 25 is positioned in the highest of the openings 12 of the terminal plates, though not in the opening 13 which corresponds to a blade position out of engagement with the contacts. The switch handle 6 is manually rotated in the same direction as it is desired to rotate the blade 4, that is, the switch handle is rotated in a counter-clockwise direction. The cam 3 is rotated by this movement of the switch handle but at first the blade 4 remains locked, as shown in Fig. 2, since the rider 25 is positioned in the highest opening 12 by the pressure of the spring 5. As the cam 3 is rotated with the blade 4 locked, the edge of the vertical cam wall 16 presses against the free end 26 of the spring while the other free end 25 of the spring is held by the edge of the vertical wall of the blade 4, as shown in dotted lines in Fig. 2. The spring 5 is thus conditioned or put under tension to rotate the blade 4 with a snap action when the rider 25 is finally moved out of the terminal plate opening 12. The cam surface 17 is so designed that this does not take place until the projection 24 in the blade 4 is substantially near the outer end of the cam surface. The cam surface 17 then lifts the projection 24 high enough to disengage the rider 25 from the opening 12 thus unlocking the blade 4. The edge 26 of the spring thereupon rotates the blade 4 and when the blade reaches the next higher contact 7 the spring forces the rider 25 into the next lower opening 12 thereby locking the blade 4 on the corresponding contact or the one just reached.

It is evident without further explanation that if the switch handle 6 is rotated far enough to cause the blade 4 to rotate over several contacts, the blade will be rotated in the manner described from contact to contact. During this movement of the blade, the rider 25 will be momentarily positioned in successive terminal plate openings 12 to lock the blade upon its engagement with successive contacts, while the cam surface 17 will cooperate with the projection 24 to move the rider

25 almost immediately out of successive openings 12 in the terminal plate.

The switch mechanism described herein may, for example, be employed to control the motor of an electrical food mixing device or may be employed to control any electrical device with which it is desirable or necessary to use a switch having a snap action. From the foregoing description it is evident that the invention provides a switch structure in which a single spring serves to rotatably couple the switch blade with a cam rotated by the switch handle and also serves to operatively associate the means for locking the blade on each of the switch contacts as well as the means for unlocking the blade from each of these contacts. As only a single spring is employed to control the moving parts of the switch, the switch is dependable in its operation and simple in its construction.

The invention is not to be restricted to the particular form or arrangement of parts herein shown and described as it is evident that they may be changed or modified without departing from the scope of the invention.

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

1. In a switch mechanism, the combination of a base of insulating material provided with spaced contacts, a switch blade rotatable over the contacts, spring means for rotating the blade and for pressing the blade against the contacts, means for locking the blade whenever it engages one of the contacts, and means for tensioning the spring means whenever the blade is locked on one of the contacts and for freeing the blade for rotation after the spring means is tensioned sufficiently to rotate the blade with a snap action.

2. In a switch mechanism, the combination of a base of insulating material provided with spaced contacts and spaced stops, a switch blade, spring means adapted to press the blade against and to rotate it over the contacts, a rider on the blade positionable in the stops under the pressure of the blade for locking the blade whenever it engages one of the contacts, a rotatable cam for tensioning the spring means whenever the blade is locked on one of the contacts, and a projection on the blade, operatively associated with the cam by the pressure of the blade for disengaging the rider from the stops to free the blade for rotation after the spring means is tensioned sufficiently to rotate the blade with a snap action.

3. In a switch mechanism, the combination of a base of insulating material having spaced contacts, spaced stops and a spindle disposed thereon, said spindle having mounted thereon a rotatable branched cam member, a branched switch blade disposed within the branches of the cam member and rotatable over the contacts, a spring disposed within the branches of the blade and rotatably coupling the blade and cam member, a rider on one branch of the blade, positionable in the stops under the pressure of the blade for locking the blade whenever it engages one of the contacts, and a projection on the same branch, operatively associated with the cam member by the pressure of the blade, for moving the rider out of the stops to free the blade for rotation without interfering with the rotation of the blade after the spring means is tensioned sufficiently by the rotation of the cam member to rotate the blade with a snap action.

4. In a switch mechanism, the combination of a base of insulating material provided with spaced contacts, a switch blade, spring means

adapted to press the blade against and to rotate it over the contacts, means operatively associated by the pressure of the blade for locking the blade against rotation whenever it engages one of the contacts, means for tensioning the spring means whenever the blade is locked on one of the contacts, and additional means, including the last mentioned means, operatively associated by the pressure of the blade, for freeing the blade for rotation after the spring means is sufficiently tensioned to rotate the blade with a snap action.

5. In a switch mechanism, the combination of a base of insulating material having thereon spaced contacts and a terminal plate provided with spaced openings, a switch blade for connecting the terminal plate to and disconnecting it from the contacts, a rotatable cam, a spring pressing against the blade and rotatably coupling the blade and cam, a rider on the blade, positionable in the openings of the plate under the pressure of the blade for locking the blade whenever it engages one of the contacts, and a projection on the blade, operatively associated with the cam by the pressure of the blade, for disengaging the rider from the openings to free the blade for rotation after the spring is tensioned sufficiently, by the rotation of the cam, to rotate the blade with a snap action.

6. In a switch mechanism, the combination of a base of insulating material having disposed thereon spaced contacts, a terminal plate provided with spaced openings and a spindle, said spindle having mounted thereon a switch blade for connecting the terminal plate to, and disconnecting it from, the contacts, a rotatable cam, and a spring pressing the blade against the contacts and rotatably coupling the blade and cam, a rider on the blade, positionable in the openings of the plate under the pressure of the blade for locking the blade whenever it engages one of the contacts, and a projection on the blade, operatively associated with the cam by the pressure of the blade, for disengaging the rider from the openings to free the blade for rotation after the spring is tensioned sufficiently by the rotation of the cam, to rotate the blade with a snap action.

7. In a switch mechanism, the combination of a base of insulating material having disposed thereon spaced contacts, a terminal plate provided with spaced openings and a spindle, said spindle having mounted thereon a rotatable branched cam, a branched switch blade disposed within the branches of the cam for connecting the terminal plate to, and disconnecting it from, the contacts, and a spring disposed within the branches of the switch blade and rotatably coupling the blade and cam, a rider on one branch of the blade, positionable in the openings of the plate under the pressure of the same branch, for locking the blade whenever it engages one of the contacts, and a projection on the same branch, operatively associated with the cam by the pressure of the branch, for disengaging the rider from the openings to free the blade for rotation without interfering with the rotation of the blade after the spring is tensioned sufficiently, by the rotation of the cam, to rotate the blade with a snap action.

8. In a switch mechanism, the combination of a base provided with spaced contacts, a switch blade rotatable over the contacts, a spring for rotating the blades and for pressing the blades against the contacts, means for positively locking the blade in the position whenever it engages

one of the contacts, means for tensioning the spring, and means dependent upon the spring being tensioned sufficiently to rotate the blade with a snap action for positively freeing the blade for rotation.

9. In a switch mechanism, the combination of a base provided with spaced contacts and a spindle, a branched operating member rotatably mounted on said spindle, a switch blade disposed within the branches of said operating member, means including a spring disposed within the branches of said operating member and urging the blade against one of the branches of said operating member for holding the operating member and blade in assembled relation and for rotatably coupling the operating member and blade, means for locking the blade whenever it engages one of the contacts, means for tensioning the spring, and means dependent upon the spring being tensioned sufficiently to rotate the blade with a snap action for freeing the blade for rotation.

10. In a switch mechanism, the combination of a base provided with spaced contacts and a spindle, a branched operating member rotatably mounted on said spindle, a switch blade disposed within the branches of said operating member, means including a spring disposed within the branches of said operating member and urging the blade against one of the branches of said operating member for holding the operating member and blade in assembled relation and pressing the blade against the contacts and for rotatably coupling the operating member and blade, means for locking the blade whenever it engages one of the contacts, means for tensioning the spring, and means dependent upon the spring being tensioned sufficiently to rotate the blade with a snap action for freeing the blade for rotation.

11. In a switch mechanism, the combination of a base provided with spaced contacts and a spindle, an operating member rotatably mounted on said spindle, a switch blade rotatably carried by said spindle, said switch blade having a separate flexible arm, means urging said flexible arm against stops for locking said blade in a position engaging one of said contacts, a spring for rotatably coupling said blade and said operating member and pressing said switch blade against said contacts, means for tensioning said spring, and means dependent upon the spring being tensioned sufficiently to rotate the blade with a snap action for positively freeing said flexible arm from said stops.

12. In a switch mechanism, the combination of a base provided with a contact, a switch blade rotatably carried on said base, said switch blade having a separate flexible arm, means urging said flexible arm against stops for locking said blade into position, an operating member carried by said base, a spring for rotatably coupling said blade and said operating member, means for tensioning said spring, and means dependent upon said spring being tensioned sufficiently to rotate the blade with a snap action for lifting said flexible arm away from said stops without interfering with the rotation of said switch blade.

13. In a switch mechanism, the combination of a base having disposed thereon spaced contacts, spaced stops, and a spindle, said spindle having mounted thereon a rotatable branched cam member, a branched switch blade disposed within the branches of the cam member and rotatable over the contacts, a spring disposed within the branches of the blade for rotatably cou-

- pling the blade and cam member, a flexible arm on one branch of the blade having a rider biased into engagement with said stops for locking the blade whenever it engages one of the contacts, and means on said cam member operatively associated with the flexible arm for moving the rider out of engagement with the stops to free the blade for rotation after the spring means is tensioned sufficiently to move the blade with a snap action.
14. In a switch mechanism, the combination of a base having disposed thereon spaced contacts, a terminal plate provided with spaced openings and a spindle, said spindle having mounted thereon a switch blade for connecting the terminal plate to, and disconnecting it from the contacts, a rotatable cam, and a spring rotatably coupling the blade and cam, a flexible arm on the blade having a rider biased into the openings of the terminal plate for locking the blade whenever it engages one of the contacts, means on the cam operatively associated with the flexible arm for disengaging the rider from the open-

ings to free the blade for rotation after the spring is tensioned sufficiently by the rotation of the cam to rotate the blade with a snap action.

15. In a switch mechanism, the combination of a base having disposed thereon spaced contacts, a terminal plate provided with spaced openings and a spindle, said spindle having mounted thereon a rotatable branched cam, a branched switch blade disposed within the branches of the cam for connecting the terminal plate to, and disconnecting it from the contacts, and a spring disposed within the branches of the switch blade and rotatably coupling the blade and cam, a flexible arm on one branch of the blade having a rider biased into the openings of the terminal plate for locking the blade whenever it engages one of the contacts, and means on said cam operatively associated with the flexible arm for disengaging the rider from the openings to free the blade for rotation after the spring is tensioned sufficiently by rotation of the cam to rotate the blade with a snap action.

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