

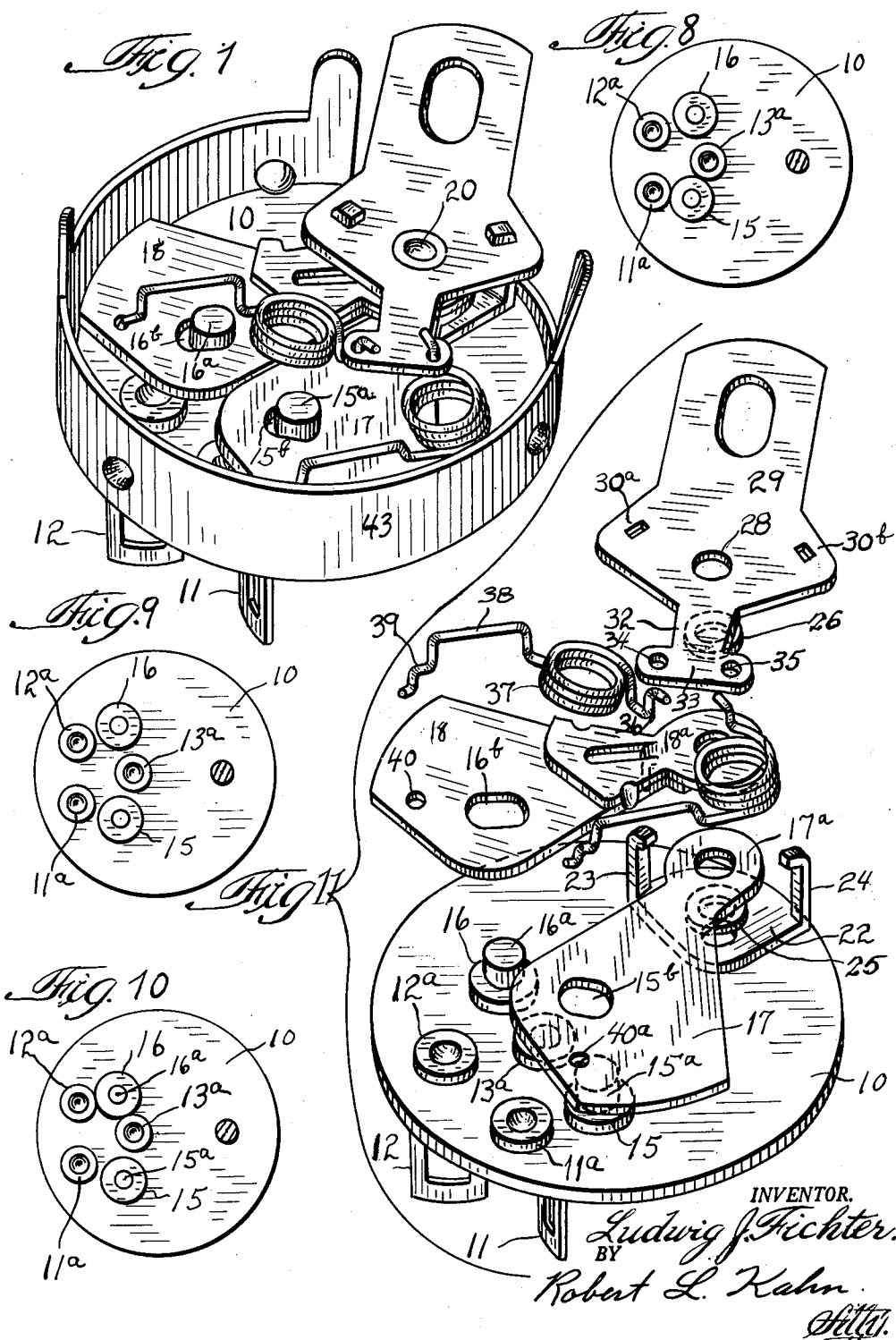
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ELECTRIC SWITCH

3,015,706

Filed Sept. 19, 1960

2 Sheets-Sheet 1



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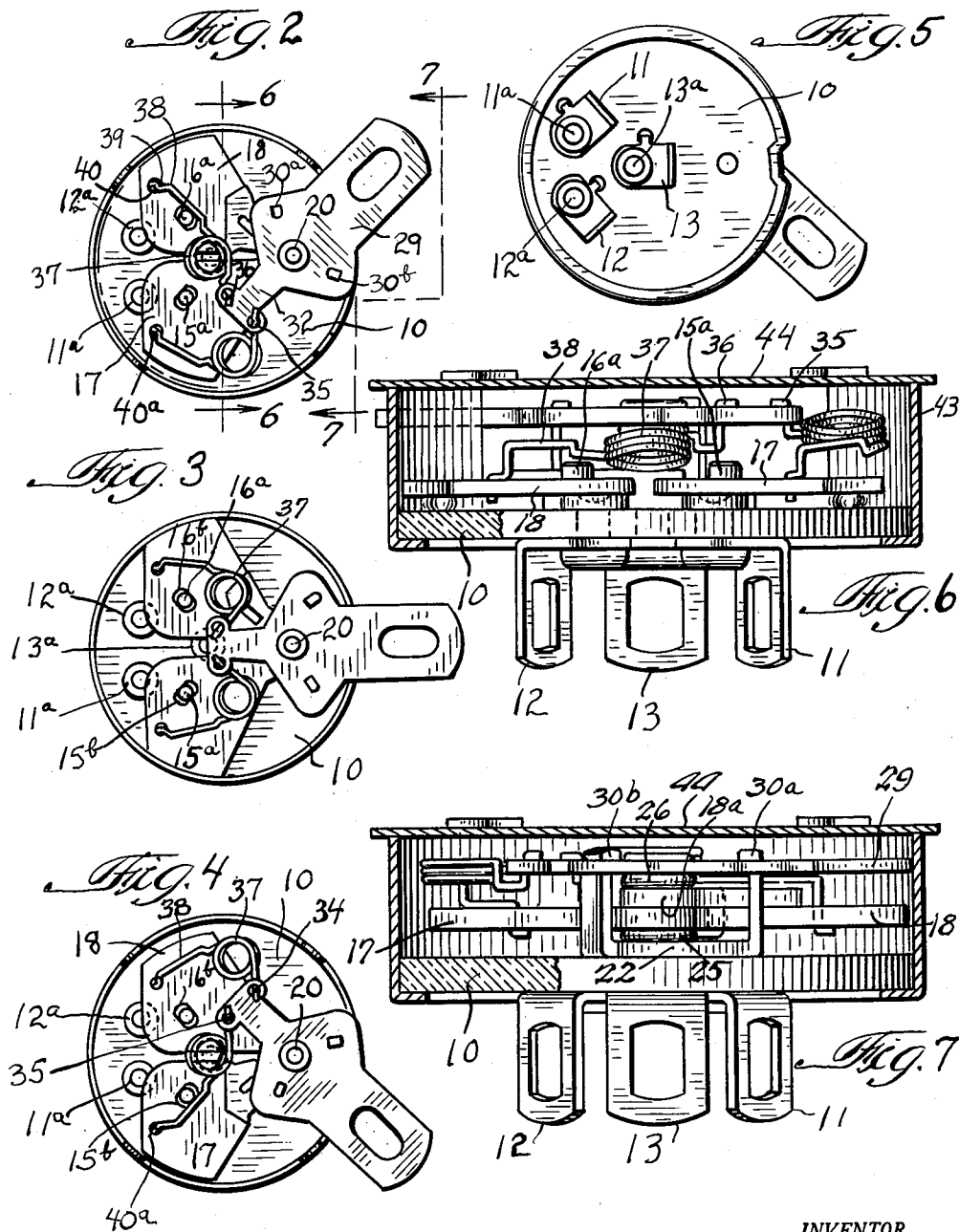
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2 Sheets-Sheet 2



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ELECTRIC SWITCH

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4 Claims. (Cl. 200—67)

This invention relates to an electric switch and more particularly to a small snap switch of the single pole, double throw variety wherein said switch has a neutral position with the switch open. The invention in particular relates to a small snap switch of the type used in such devices as phonographs and the like wherein a coil spring and movable part are so mounted as to provide an over center action similar to a toggle.

In order that the invention may be fully understood, reference will be made to the drawings wherein:

FIGURE 1 is a perspective view of a switch embodying the present invention, the switch having the cover removed to show the parts more clearly;

FIGURE 2 is a plan view of the switch of FIGURE 1 with the various members in one extreme position corresponding to one switch closed position;

FIGURE 3 is a view similar to FIGURE 2 but showing the parts in a neutral position wherein the switch is open;

FIGURE 4 is a view similar to FIGURE 2 but with the parts in the other extreme position corresponding to the other closed position of the switch;

FIGURE 5 is a bottom view of the switch showing the terminals;

FIGURE 6 is a section along line 6—6 of FIGURE 2;

FIGURE 7 is a view partly in section with certain parts broken away along line 7—7 of FIGURE 2;

FIGURE 8 is a view illustrating the position of the switch contacts corresponding to the switch position illustrated in FIGURE 2;

FIGURE 9 is a view similar to FIGURE 8 showing the position of the switch contacts corresponding to the switch position illustrated in FIGURE 3;

FIGURE 10 is a view similar to FIGURES 8 and 9 but showing the switch contacts corresponding to the switch position illustrated in FIGURE 4; and

FIGURE 11 is an exploded view of the switch showing various portions of the mechanism.

The switch includes base 10 of insulating material such as fiber, Bakelite or the like. Base 10 may conveniently be in the form of a circular disk. Base 10 has secured therein terminals 11, 12 and 13. Terminal 11 or 12 may be electrically connected to terminal 13 by virtue of switch operation, it being understood that terminal 13 may never be connected to both at the same time.

As illustrated in FIGURE 5, terminal 13 which may be considered as neutral, is substantially near the center of insulating disk 10 while terminals 11 and 12 are symmetrically disposed with respect to contact 13. As shown in FIGURES 8 to 10 inclusive, terminals 11 to 13 inclusive are rigidly attached to contact buttons 11a, 12a and 13a extending through disk 10.

Cooperating with contacts 11a and 13a is movable contact 15. Cooperating with contacts 12a and 13a is movable contact 16. These movable contacts 15 and 16 are adapted to be moved in such manner that contacts 11a and 13a are connected, or contacts 12a and 13a are connected or no contacts are connected.

Movable contacts 15 and 16 have flat bottoms resting on insulating disk 10. Movable contacts 15 and 16 have reduced upper portions 15a and 16a extending into apertures 15b and 16b of fan shaped contact moving blades 17 and 18 of flat insulating material. Blade 17 is provided with a pivot portion 17a. Blade 18 is cut short and

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is carried by metal pivot portion 18a. These blades are generally similar except that blade 18 has its pivot portion 18a laterally offset to permit pivot portions 17a and 18a to live one above the other while the bodies of the blades may be coplanar.

Pivot portions 17a and 18a of the fan shaped blades are apertured to accommodate pivot pin 20 rigidly secured to disk 10. Threaded over pivot pin 20 and resting upon disk 10 is metal rocker 22 having fingers 23 and 24 extending upwardly from the disk 10. Rocker 22 has fingers 23 and 24 spaced far enough to lie on opposite sides of the stack including blade pivot portions 18a and 17a. Washers 25 and 26 are on opposite sides of the stack. Above washer 26 is apertured pivot portion 28 of flat operating member 29 of insulating material.

Laterally of pivot portion 28 are attaching wing portions 30a and 30b forming part of the operating member. Wing portions 30a and 30b are apertured to accommodate rocker fingers 23 and 24, the free tips of these fingers being bent over above the operating member. Thus the entire stack consisting of operating member 29, contact operating blades 17 and 18, and washers 25 and 26 is maintained intact on pivot pin 20.

Operating member 29 has neck 32 extending beyond pivot portion 28 of the operating member. Neck 32 carries head 33 provided with laterally spaced apertures 34 and 35. Aperture 34 accommodates hooked end 36 of coil spring 37, the coils of which form a helix whose axis is generally perpendicular to disk 10. Coil spring 37 has long arm 38 extending along contact operating blade 18 and laterally offset therefrom to clear reduced portion 16a of movable contact button 16. Long arm 38 terminates in hooked end 39 which is threaded into aperture 40 in contact operating blade 18. Aperture 40 is near the tip of blade 18 remote from pivot pin 20. Between aperture 35 in head 33 and aperture 40a in contact operating blade 17 there is a corresponding arrangement of spring 37a.

Disk 10 is provided with metal housing flange 43 undercut to clear operating member 29. Cover plate 44 of insulation material or of metal is attached to flange 43.

The operation of the switch is as follows. Assume the switch is in the position illustrated in FIGURES 2 and 8. Looking down on the switch as shown in FIGURE 2, operating member 29 is turned clockwise on pivot 20. Coil spring 37a, which has been uncoiled to force movable contact 15 in position, shown in FIGURE 8, is now tightened. Blade 17 moves from the position shown in FIGURE 2 to the position shown in FIGURE 3. Movable contact 15 is moved to an open position.

It will be noted that apertures 15b and 16b are somewhat larger than reduced portions 15a and 16a of the movable contacts. This permits a movable contact to accommodate itself in proper position against the corresponding fixed contacts when either closed switch position is reached. Rim 43 of the housing limits the outward movement of blades 17 and 18.

If member 29 is turned to the position illustrated in FIGURE 4, coil spring 37 is relaxed and moves blade 18 from the position shown in FIGURE 3 to the FIGURE 4 position. This causes movable contact 16 to move from the position shown in FIGURE 9 to that of FIGURE 10.

It is evident that a three position switch has been provided. The movement of the blades is fast and the spring action operates in a manner to provide snap action.

What is claimed is:

1. An electric switch comprising a flat insulating base, three fixed contacts carried by said base and extending upwardly from one face thereof, one contact being common and the other two contacts being symmetrically arranged with respect to said common contact, said base having a pivot point position that is symmetrical with

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respect to said two other contacts, said common contact being disposed between said pivot point and said two other contacts, a pair of flat insulating blades mounted parallel to said one face for pivotal movement with respect to said pivot point along said one face, said blades being spaced from the one face of said insulating base, said blades having the bodies thereof co-planar and being adjacent the contacts, each blade having an aperture in a portion of the blade, said fixed contacts making two contact pairs with said common contact as one of each pair, a blade cooperating with one contact pair, each blade being movable so that the apertured portion thereof moves toward or away from its contact pair, a movable contact for each blade, each movable contact having a portion for engaging the apertured portion of its blade, each blade being movable from a neutral position to a position where its movable contact closes against its cooperating contact pair, an operating member pivoted at said pivot portion, a coiled helical spring for each blade, said two springs having the axes of the coils laterally offset and disposed generally perpendicular to the base, each spring having end portions extending into apertures in said operating member and a corresponding blade, and means for limiting the movement of said blades away from the corresponding cooperating contact pair, said coil springs being arranged so that said operating member transmits a force to each blade whereby when said

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operating member is in a neutral position, said two blades are in neutral positions with the movable contacts away from the contact pairs so that no electrical connections are established, said operating member when turned in one direction from said neutral position causing one blade only to move its contact toward the cooperating contact pair to close against the contact pair, said operating member when moved in the other position accomplishing the same for the other blade and its fixed contact, said switch having three stable positions with snap action in moving between positions.

2. The construction according to claim 1 wherein said movable contacts have reduced portions entering apertures in said blades, the contact part of each movable contact being slidable on said insulating base but being coupled to a blade by said reduced portion.

3. The construction according to claim 2 wherein a blade has an enlarged aperture for accommodating the contact portion permitting said movable contact to accommodate itself to the contact pair.

4. The construction according to claim 3 wherein said base has a housing around the same, said housing providing the means for limiting the outward movement of said blades away from the cooperating contact pairs.

No references cited.