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SNAP SWITCH

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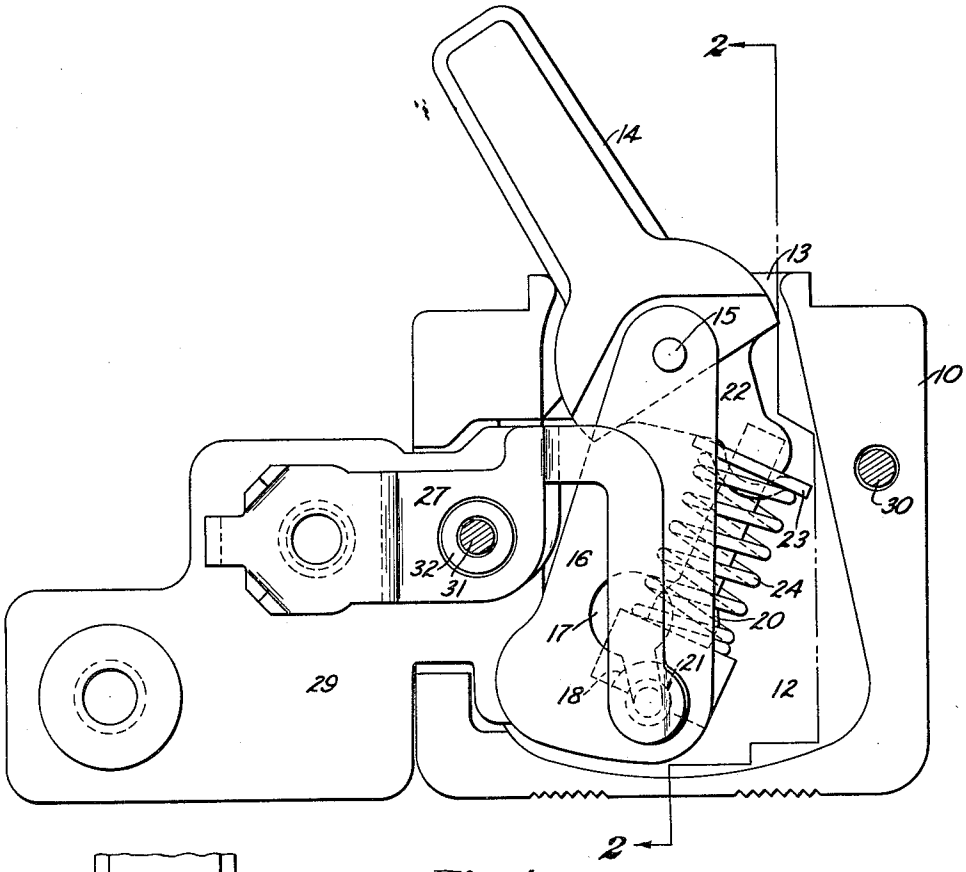


Fig. 1

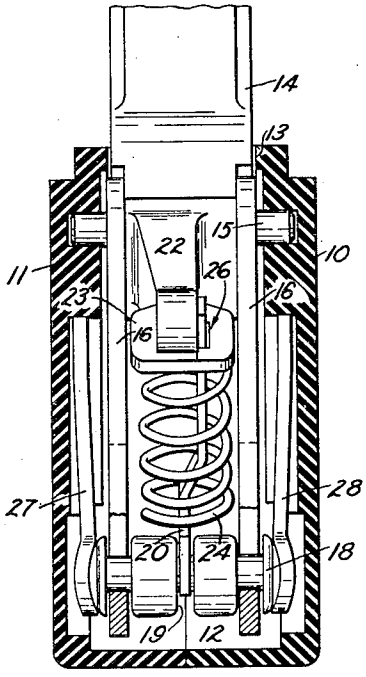


Fig. 2

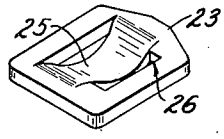


Fig. 3

INVENTOR.
Otis B. Sutton &
Herbert W. Wilson

BY
Harry S. Thuasne
ATTORNEY.

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SNAP SWITCH

Otis B. Sutton, Canton, and Herbert W. Wilson, North Canton, Ohio, assignors to The Hoover Company, North Canton, Ohio, a corporation of Ohio

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4 Claims. (Cl. 200—67)

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This invention relates to an improved snap switch and more particularly to a simplified snap acting toggle mechanism having fewer components of simplified design.

Accordingly, it is an object of the present invention to provide a snap switch having a simplified toggle mechanism of fewer components, sturdier in construction, more positive in operation and of longer life than those heretofore known. Still other objects and advantages will become apparent from the following description taken in connection with the accompanying drawings in which:

Figure 1 is a vertical sectional view through an illustrative embodiment of the invention;

Figure 2 is a cross sectional view of the assembled switch on line 2—2 of Figure 1; and

Figure 3 is a perspective view of a bearing plate employed in the toggle assembly.

Casing halves 10 and 11 are preferably formed from molded thermoplastic material and meet along a vertical median plane to form a switch housing. An irregularly shaped cavity 12 formed partially in each casing half houses the toggle mechanism, a part of the operating handle, and the inner portion of the terminal members. An opening 13 extends from this cavity through the top of the casing halves and forms an operating passageway for the switch handle 14.

The toggle mechanism unit will now be described. Two side links of stamped insulation material 16—16 have their upper ends journaled on pin 15 which, as shown, also pivotally supports operating handle 14. Each link is provided with a keyhole slot 17 at the opposite end to receive and support a contact bridging spindle 18 having rounded ends to facilitate wiping action with the contacts. This spindle is conveniently turned from brass stock and is provided with end grooves to receive the side links and a substantially centrally disposed groove 19. Journaled in groove 19 is a T-shaped toggle strut 20 which is stamped from sheet material. The top side of the T is notched at 21 to form a bearing with the bottom of groove 19 of the spindle.

Projecting from the lower, pivoted end of handle 14 is a round ended toggle pivot arm 22. This arm is shown integral with the handle and it is offset from the vertical center line of the handle in each of two planes at right angles to one another. The nature and extent of the offset in each direction can be best understood by observation of Figures 1 and 2. It will also be noted from Figure 2 that strut 20 is offset intermediate its end so that its top inner face fits against one face of pivot arm 22. The strut is held in the position just described by a bearing plate 23 in cooperation with compression spring 24 the lower end of which rests against the inside T head of the strut. The opposite

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end of the spring bears against the lower side of plate 23 and holds it firmly against the rounded end of pivot arm 22.

As best shown in Figure 3, washer 23 is dished at its mid portion 25 and is provided with a guide slot 26 to receive the upper end of strut 20. From the foregoing, it will be clear that the peculiar construction of the washer of the bearing plate 23 together with the slot 26 constitutes a very simple and yet positive means lost motion connection for locking the toggle assembly together while permitting limited co-planar movement between the strut and the face of the pivot arm. The spring presses against the T head of the strut to maintain the strut firmly seated in groove 19 of the spindle while its upper end maintains the bearing plate firmly against the rounded edge of pivot arm 22. Thus, the spring always acts to urge the spindle and the pivot arm apart. The flat sides of the bearing plate cooperate with the upper end of the strut, the end of the pivot arm and the inner faces of links 16 to maintain all of the parts in their proper relative position at all times.

The terminal anchor construction will now be described and will be understood to be substantially identical with that disclosed in the application of Herbert W. Wilson (Hoover Case G-19) being filed concurrently herewith. It comprises three separate elements in addition to the two casing halves. These are the two metal terminal strips 27, 28 and separator strip 29 of insulation material. These elements fit about bosses 32 formed integrally with each of the casing halves and described in detail in the above-mentioned application. The inner ends of the terminal strips extend downwardly in cavities formed in the inner walls of the casing halves. The innermost ends terminate in a position to be bridged by contact spindle 18 when the switch handle is in the position shown in Figure 1. However when the handle is oscillated to the opposite right-hand position, spring 24 will operate in well known manner to swing the side links 16, 16 to the right carrying spindle 18 out of bridging contact with the terminal strips.

The casing halves may be held in assembled position by a pair of rivets 30, 31 the latter of which passes through terminals 27, 28 and separator 29, it being understood that the insulated bosses surround rivet 31 and separate it from each of the terminals as well as from the separator strip.

In assembling the toggle mechanism, pin 15 is passed through the opening in handle 14 and side links 16, 16 are fitted over the opposite ends of the pin. Next, spindle 18 is assembled through keyhole openings 17, 17 in the lower end of the side links. Next, spring 24 is inserted over strut 20 and bearing plate 23 is inserted over the upper end of the strut. This assembly is then inserted

between the side links with notch 21 of the T riding in groove 19 of the spindle and the spring is compressed sufficiently to permit bearing plate 23 to be inserted beneath the rounded end of pivot arm 22.

The toggle unit is a stable assembly at this stage and may be readily handled without danger of the parts separating from one another. Next, place terminal strip 28 in position over boss 32 in casing half 10, and insert the toggle unit in its proper position in cavity 12. Separator 29, top terminal 27 and casing half 11 are added in the order mentioned. Thereafter the assembly is securely locked together by the placement of rivets 30 and 31.

As will be understood from the foregoing, the entire switch is readily assembled without the use of any tools whatsoever it being merely necessary to slip the parts together and place them between the casing halves. Furthermore it is noteworthy that no special jigs or other fixtures are required in the assembly operation.

The described construction permits of the use of a heavy compression spring which is maintained against buckling by the single strut 20 stamped from heavier material than is feasible to use with prior constructions making use of U-shaped toggle struts or their equivalent. It will further be clear that the use of a single strut permits the use of stronger and heavier parts in all components of the toggle unit without increasing the over-all dimensions thereof. This adds greatly to the reliability, sturdiness, and positiveness of action of the switch. It will be equally clear that the life of the parts will be materially increased and that there will be far less likelihood of damage thereto in the assembly operation.

While only a single embodiment of the invention has been disclosed, it is to be understood that numerous variations in the design and disposition of the parts is contemplated without departing from the spirit of the present invention.

It is to be understood that the protection herein applied for is not confined to the particular features or elements set out in the following claims. Protection is herein applied for for any one or more of the features or elements referred to in the following claims or described in the foregoing specification or shown in the accompanying drawings either independently or in combination.

We claim:

1. A toggle mechanism for a snap action switch comprising a generally U-shaped contact bridging means, means for pivotally supporting the upper ends of said U-shaped means for limited oscillatory movement between closed-switch and open-switch positions, an operating handle for said toggle mechanism, means providing a common pivotal axis for said handle and for the upper ends of said U-shaped means, said handle including a pivot arm positioned between the legs of said U-shaped means, a toggle strut comprising a single substantially flat, one piece, T-shaped member having a single leg and a single head of uniform thickness, a centrally disposed notch in the top edge of said T-head, a single centrally disposed annular groove in the bight portion of said U-shaped means having a width slightly greater than the thickness of said toggle strut for receiving and pivotally supporting the notched T head of said strut, the other end of said strut being disposed against one face of the pivot arm on said operating handle, a bearing plate having a dished central portion adapted to bear against

the end of said pivot arm and a single slot adjacent thereto adapted to receive the end of said strut for free to and fro movement therethrough, and a compression spring supported between said bearing plate and the T head on said strut, said spring acting to hold the aforementioned elements of said toggle mechanism in assembled position as well as means for resiliently holding said U-shaped contact bridging means in either said closed-switch or said open-switch position.

2. A snap action switch comprising a two part housing of insulating material, a switch operating handle opening in said casing, a pivot pin extending crosswise of said opening and supported by said casing, an operating handle mounted on said pivot pin and having a pivot arm extending into said casing, a pair of links having one end pivoted to said pin at either side of said pivot arm, a contact bridging member carried in the opposite ends of said links, a single one piece, T-shaped toggle strut having a single leg and a single head stamped from sheet material, a centrally disposed bearing notch on the top of the T head of said strut, a single centrally disposed groove in said contact bridging member having a width slightly greater than the thickness of said strut in which said notched T head is pivotally seated, the end of said strut opposite said T head being disposed adjacent one face of said pivot arm, a bearing plate having a central depression to receive the end of said pivot arm and a slot through which the end of said strut slides freely, a compression spring closely embracing said strut and disposed between said T head and said bearing plate so as to urge said pivot arm away from said contact bridging member, and a pair of switch contact members supported in said casing and disposed to be bridged by said contact bridging member when said snap acting mechanism is in one of its two stable positions.

3. A toggle mechanism as defined in claim 1 in which the center line of said pivot arm is off set laterally from a median plane between and parallel to the legs of said U-shaped contact bridging member, said toggle strut being disposed on that side of said pivot arm closer to said median plane whereby said strut and said compression spring function smoothly and without transmitting a twisting movement to said U-shaped member.

4. A toggle mechanism as defined in claim 1 in which the end of said pivot arm in contact with said bearing plate is off set laterally from a plane which includes the entire pivotal axis of said operating handle and the longitudinal center line of said handle whereby said spring is more effective in holding said contact bridging means in closed-switch position than in said open-switch position.

OTIS B. SUTTON.
HERBERT W. WILSON.

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