

Description

The invention relates to an electrical switch and more particularly to an electrical switch and actuating mechanism therefor for use with an electrical contact assembly or for operating a movable member.

Electrical switches of the dual in-line package (DIP) type are extensively used, especially on printed circuit boards. Some of these switches are of a size so as to conform to the size of DIP integrated circuits so that they can be automatically inserted by automatic application machinery into selected positions on printed circuit boards. Such switches must also have contact assemblies that will not be affected when the printed circuit boards on which they are mounted are flow soldered. The parts of these DIP switches must be structured so as to be readily assembled into DIP switches.

An object is to provide an improved switch of this kind.

Document EP—A—0,081,929 (which falls under the terms of Art. 54(3) EPC) discloses an electrical switch of the type comprising a dielectric frame having a series of pairs of electrical contact members secured in the frame, aligned contact sections of the contact members being disposed in an upper surface of the frame and terminal sections of the contact members extending outwardly from the frame, movable electrical contact members pivotally mounted on respective ones of the contact section pairs, a housing mounted on the frame, actuating members movably mounted in the housing for movement between first and second positions and associated with respective movable contact members to move them between an actuated position electrically connecting the contact sections and a non-actuated position disconnecting the contact sections. The present invention relates to an electrical switch of the above mentioned type wherein said actuating members further comprise slide members, each of the slide members having an opening extending therethrough, a spring member disposed in said opening and including one section extending along a respective movable contact member to move the movable contact member between the actuated and non-actuated positions and another section engaging an inside top surface of said housing and movable therealong.

The invention includes an actuating mechanism for a switch according to the invention comprising a housing mountable on a switch frame and actuating members movably mounted in the housing for movement between first and second positions and arranged for association with a movable contact member of the switch to move the contact member between an actuated position and a non-actuated position characterised in that said actuating members comprise a slide member having an opening extending therethrough, a spring member disposed in the opening and comprising a sinuous configuration ex-

tending from the slide member between an inside surface of the housing through the opening to an open side of the housing for engagement under compression with the movable contact member of the switch.

According to another embodiment of the present invention, a membrane sealingly covers the recesses and the exposed contact sections along with the respective movable contact members therein thereby forming a sealed electrical contact assembly.

The invention will now be described by way of example with reference to the accompanying partly diagrammatic drawings, in which:—

Figure 1 is a perspective and exploded view of parts of an electrical switch;

Figure 2 is a perspective view of the assembled switch,

Figure 3 is a perspective and exploded view with parts in cross section of part of the housing and the slide member, and

Figure 4 is a cross-sectional view taken along line 4—4 of Figure 2.

Figures 1 through 4 illustrate a sealed electrical contact assembly 10 and the contact-actuating mechanism 12 that is latchably secured thereto thereby forming DIP switch S as illustrated in Figures 1 and 2.

Sealed electrical contact assembly 10 includes dielectric frame 14 which is moulded from a suitable commercially-available plastics material, and a series of aligned electrical contact members 16, 18 is moulded in place therein as shown in Figure 4. Electrical contact members 16, 18 are arranged in dielectric frame 14 having opposed an aligned stationary electrical contact sections 16A, 18A which are exposed in recesses 20 in the top surface of frame 14 and spaced from each other thereby. Each of electrical contact members 16, 18 has an electrical terminal section 22 extending outwardly from frame 14 for electrical connection with plated-through-holes 24 disposed in proper alignment in printed circuit board 26 with holes 24 electrically connected to appropriate circuit paths 28 located thereon. Electrical terminal sections 22 are provided with projections 30 to limit the movement of electrical terminal sections 22 within holes 24 in order to space switch S from board 26. Electrical contact members 18 are provided with upwardly-directed pivot members 32 that have been stamped therefrom.

Electrical contact members 16, 18 are stamped and formed from suitable metal stock in lead frame form. The lead frame acts as a carrier to carry the contact members into position in a mould enabling dielectric frames 14 to be moulded thereon. These assemblies can then be carried to other assembly locations to form completed switches.

Movable electrical contact members 34 have V-shaped embossments 36 formed therein which mate with pivot members 32 and the ends are suitably provided with at least two contact fingers to provide contact redundancy when movable contact members 34 are moved into electrical

(12)

contact with stationary contact sections 16A as illustrated in Figure 4. V-shaped embossments 36 in engagement with pivot members 32 positively position movable contact members 34 relative to the respective sets of stationary contact sections 16A, 18A within recesses 20. Latching lugs 40 having upper bevelled surfaces extend outwardly from the sides of frame 14 between terminal sections 22 on opposite sides of the frame.

Membrane 42 of a commercially-available plastic material is sealingly secured on the top surface of frame 14 by a commercially-available adhesive material. Membrane 42 covers all of recesses 20 with movable contact members 34 pivotally mounted on pivot members 32 of electrical contact sections 18A. Another membrane can be adhesively secured onto a bottom surface frame 42 if holes are formed in frame 14 by the use of hold-down members. As can be discerned, membrane 42 not only maintains movable contact members 34 in position in recesses 20 and on pivot members 32 of stationary contact sections 18A, but membrane 42 also seals electrical contact assembly 10 from contaminants, especially during the flow soldering and cleaning operations to which the contact assembly will be subjected and during the operating life thereof. While a membrane has been disclosed to cover the bottom surface of frame 14 to cover holes therein, frame 14 can be moulded as shown without holes therein thereby eliminating the bottom membrane and using only membrane 42 adhered to the top surface of frame 14, if desired.

Contact-actuating mechanism 12 includes housing 48, slide members 50, and springs 52. Housing 48 and slide members 50 are moulded from a commercially-available plastic material.

Housing 48 has separate cavities 56 which receive therein contact-actuating members comprising slide members 50 and springs 52 therein as illustrated in Figure 4. Openings 58 are located in sidewalls 45 of housing 48 and terminate in top wall 47 of housing 48; opposing openings 58 communicate with respective cavities 56. Latches 60 extend outwardly from the bottom surface of housing 48 to mate with latching lugs 40 on frame 14 latchably to secure housing member 48 onto frame 14 with the contact-actuating members in position in cavities 56 thereby forming switch S as illustrated in Figures 2 and 4.

Each of cavities 56 is bounded by inner surfaces 51 of sidewalls 45 and top wall 47. Dividers 53 extend downwardly from top wall 47 and along sidewalls 45 to about midway thereof. Spaced arcuate recesses 57 are located on an inner surface 59 of top wall 47 in each of cavities 56.

Slide members 50 have rectangular openings 62 extending therethrough and projections 64 extending outwardly from end walls of the slide members 50. Thus, slide members 50 fit within respective cavities 56 and with springs 52 in openings 62 are slidably movable therein when housing 48 is latchably mounted on contact

assembly 10. Projections 64 are positioned in openings 58 depending on the position slide members 50 have been moved to.

Each of springs 52 is stamped and formed from suitable metal stock having the necessary spring characteristics and has a generally E-shape configuration. A central section 65 of springs 52 has a U-shape configuration. Contact-actuating section 66 extends outwardly and reversely from the bottom leg of central section 65 and includes an arcuate downwardly projecting section 68 while detent section 70 extends outwardly and reversely from the upper leg of central section 65 and includes an arcuate upwardly projecting section 72. The free ends of sections 66 and 70 are curved inwardly toward the bight of central section 65. As shown in Figure 3, sections 66 and 70 along which arcuate sections 68 and 72 are located are progressively narrower towards the free end. The widths of central section 65 and adjacent integral parts of sections 66 and 70 are the same and are just slightly less than the widths of openings 62 in side members 50 to enable springs 52 to freely move within openings 62 and to stabilise their movements therein as slide members 50 move back and forth in respective cavities 56 of housing 48. Arcuate sections 68 and 72 extend outwardly from the top and bottom surfaces of slide members 50.

The bottom inside edges of the sides of openings 62 are bevelled to facilitate insertion of springs 52 into openings 62 of slide members 50 when slide members 50 are in position in cavities 56 of housings 48 in their inverted positions during the assembling of the sealed contact assemblies 10 to housings 48 to form the switches. After contact assemblies 10 have been made but are still attached to their carrier strips, they are latched onto respective housings 48, terminal sections 22 are sheared from their carrier strips along with sections connecting the terminal sections together between projections 30 whereafter terminal sections 22 are bent to their appropriate angle for insertion into holes 24 of board 26. The board can now be subjected to a flow soldering operation to solder the terminal sections to the holes and the sealed contact assembly is protected from being contaminated during and after such operation. If desired, sockets can be disposed in holes 24 and soldering thereto so that terminal sections can be disposed in holes 24 and soldered thereto so that terminal sections 22 can be electrically connected thereto by insertion into the sockets.

As can be discerned, the nature of the parts of the switches lends them to automatic assembling practices that enables the manufacture of the switches to be substantially increased.

As shown in Figure 4, slide member 50 is in a contact-operated position with arcuate section 68 maintaining movable contact 34 in electrical engagement with contact section 16A through membrane 42 and arcuate section 72 is disposed in the left-handed recess 57. The spring characteristics of sections 65, 66 and 70 of spring 52

coupled with the detent arrangement of arcuate section 72 in recess 57 and arcuate section 68 located on the left side of embossment 36 maintain slide member 50 in this contact-operated position.

A probe (not shown) is used to engage the left projection 64 through opening 58 and pushes slide member 50 toward the right within cavity 56 of housing 48. This causes arcuate sections 68 and 72 to move inwardly against the spring forces of sections 65, 66 and 70 of spring 52. Arcuate section 68 slides along membrane 42, the left side of movable contact member 34, over embossment 36 and onto the right side of contact member 34 which moves the left side of contact member 34 out of electrical engagement with contact section 16A thereby disconnecting contact sections 16A, 18A. Arcuate section 72 is moved into right recesses 57 and this detent arrangement under the spring forces of spring 52 coupled with arcuate section 68 being on the right side of embossment 36 maintains slide member 50 in the non-contact-operated position.

If the force exerted by the probe on slide member 50 is not enough to move the centre of arcuate section 68 beyond the centre of embossment 36, slide member 50 will move back to its original position. If the operating force exerted by the probe is sufficient to move arcuate section 68 beyond the centre of arcuate section 68, the configuration of embossment 36 on pivot member 32 and that of arcuate section 68 plus the action of spring 52 will move slide member 50 to the position opposite to where it was located thereby providing snap action operation. The fingers of movable contact members 34 are wipingly moved along stationary contact section 16A because of the downwardly bent orientation of the movable contact members that begins at a location spaced outwardly from embossments 36.

The construction of DIP switch S with membrane 42 in sealed engagement with the top surface of frame 14 or with membranes in sealed engagement with the top and bottom surfaces of frame 14 provides a DIP switch having a sealed electrical contact assembly that will protect the contact assembly from contaminants when the board 26 is subjected to conventional flow soldering and cleaning operations as well as during the normal operating life of the switch. This eliminates the need to remove a tape seal which is currently used to protect switches during wave soldering operations. The sealed DIP switch S is also smaller in all dimensions than existing DIP switches thereby enabling it to be used in greater density at a lower profile. Switches S can be packaged in tubes in the manner of integrated circuits and subjected to automated insertion equipment. The construction of switch S minimizes parts, moulds to make them, and inventory.

Claims

1. An electrical switch of the type comprising a

dielectric frame (14) having a series of pairs of electrical contact members (16, 18) secured in the frame (14), aligned contact sections (16A, 18A) of the contact members (16, 18), being disposed in an upper surface of the frame (14) and terminal sections (22) of the contact members (16, 18) extending outwardly from the frame (14), movable electrical contact members (34) pivotally mounted on respective ones of the contact section pairs (16A, 18A), a housing (48) mounted on the frame (14), actuating members (50, 52) movably mounted in the housing (48) for movement between first and second positions and associated with respective movable contact members (34) to move them between an actuated position electrically connecting the contact sections (16A, 18A) and a non-actuated position disconnecting the contact sections (16A, 18A) wherein said actuating members (50, 52) further comprise slide members (50), each of the slide members (50) having an opening (62) extending therethrough, a spring member (52) disposed in said opening (62) and including one section (68) extending along a respective movable contact member (34) to move the movable contact member (34) between the actuated and non-actuated positions and another section (70) engaging an inside top surface (59) of said housing (48) and movable therealong.

2. Actuating mechanism for a switch as claimed in claim 1, and comprising a housing (48) mountable on a switch frame (14) and actuating members (50, 52) movably mounted in the housing (48) for movement between first and second positions and arranged for association with a movable contact member (34) of the switch to move the contact member (34) between an actuated position and a non-actuated position characterised in that said actuating members (50, 52) comprise a slide member (50) having an opening (62) extending therethrough, a spring member (52) disposed in the opening and comprising a sinuous configuration extending from the slide member (50) between an inside surface (59) of the housing (48) through the opening (62) to an open side (58) of the housing (48) for engagement under compression with the movable contact member (34) of the switch.

3. An electrical switch as set forth in claim 1, or an actuating mechanism as claimed in claim 2, characterised in that each spring member (52) has an E-shape configuration including a U-shape central section (65), and integral sections (66) and (70) extending outwardly and reversely from respective legs of said central section (65).

4. An electrical switch as set forth in claim 1 or an actuating mechanism as claimed in claim 2, characterised in that each of said inside top surfaces (59) has spaced recesses (57), said other section (70) of each spring member (52) having an arcuate section (72) cooperable with said spaced recesses (57) thereby defining a detent arrangement to maintain actuating members (50) in the first or the second position.

5. An electrical switch as set forth in claim 1, characterised in that the upper surface of frame

coupled with the detent arrangement of arcuate section 72 in recess 57 and arcuate section 68 located on the left side of embossment 36 maintain slide member 50 in this contact-operated position.

A probe (not shown) is used to engage the left projection 64 through opening 58 and pushes slide member 50 toward the right within cavity 56 of housing 48. This causes arcuate sections 68 and 72 to move inwardly against the spring forces of sections 65, 66 and 70 of spring 52. Arcuate section 68 slides along membrane 42, the left side of movable contact member 34, over embossment 36 and onto the right side of contact member 34 which moves the left side of contact member 34 out of electrical engagement with contact section 16A thereby disconnecting contact sections 16A, 18A. Arcuate section 72 is moved into right recesses 57 and this detent arrangement under the spring forces of spring 52 coupled with arcuate section 68 being on the right side of embossment 36 maintains slide member 50 in the non-contact-operated position.

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The construction of DIP switch S with membrane 42 in sealed engagement with the top surface of frame 14 or with membranes in sealed engagement with the top and bottom surfaces of frame 14 provides a DIP switch having a sealed electrical contact assembly that will protect the contact assembly from contaminants when the board 26 is subjected to conventional flow soldering and cleaning operations as well as during the normal operating life of the switch. This eliminates the need to remove a tape seal which is currently used to protect switches during wave soldering operations. The sealed DIP switch S is also smaller in all dimensions than existing DIP switches thereby enabling it to be used in greater density at a lower profile. Switches S can be packaged in tubes in the manner of integrated circuits and subjected to automated insertion equipment. The construction of switch S minimizes parts, moulds to make them, and inventory.

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2. Actuating mechanism for a switch as claimed in claim 1, and comprising a housing (48) mountable on a switch frame (14) and actuating members (50, 52) movably mounted in the housing (48) for movement between first and second positions and arranged for association with a movable contact member (34) of the switch to move the contact member (34) between an actuated position and a non-actuated position characterised in that said actuating members (50, 52) comprise a slide member (50) having an opening (62) extending therethrough, a spring member (52) disposed in the opening and comprising a sinuous configuration extending from the slide member (50) between an inside surface (59) of the housing (48) through the opening (62) to an open side (58) of the housing (48) for engagement under compression with the movable contact member (34) of the switch.

3. An electrical switch as set forth in claim 1, or an actuating mechanism as claimed in claim 2, characterised in that each spring member (52) has an E-shape configuration including a U-shape central section (65), and integral sections (66) and (70) extending outwardly and reversely from respective legs of said central section (65).

4. An electrical switch as set forth in claim 1 or an actuating mechanism as claimed in claim 2, characterised in that each of said inside top surfaces (59) has spaced recesses (57), said other section (70) of each spring member (52) having an arcuate section (72) cooperable with said spaced recesses (57) thereby defining a detent arrangement to maintain actuating members (50) in the first or the second position.

5. An electrical switch as set forth in claim 1, characterised in that the upper surface of frame



(14) has recesses (20) in which respective pairs of contact sections (16A, 18A) are exposed, and a membrane (42) is sealingly secured to said upper surface sealing by covering the contact sections (16A, 18A) and movable contact members (34).

6. An electrical switch as set forth in claim 4, characterised in that one (18A) of the contact sections (16A, 18A) has a pivot section (32), and said movable contact members (34) have embossments (36) engaging respective pivot sections (32).

Patentansprüche

1. Elektrischer Schalter des Typs, der aufweist: einen dielektrischen Rahmen (14) mit einer Reihe von Paaren elektrischer Kontaktelemente (16, 18), die in dem Rahmen (14) befestigt sind, wobei miteinander ausgerichtete Kontaktabschnitte (16A, 18A) der Kontaktelemente (16, 18) in einer oberen Fläche des Rahmens (14) angeordnet sind und sich Anschlußabschnitte (22) der Kontaktelemente (16, 18) von dem Rahmen (14) nach außen erstrecken, bewegliche elektrische Kontaktelemente (34), die an entsprechenden Paaren der Kontaktabschnitte (16, 18) schwenkbar gehalten sind, ein an dem Rahmen (14) montiertes Gehäuse (48), sowie Betätigungsglieder (50, 52), die in dem Gehäuse (48) zur Ausführung einer Bewegung zwischen einer ersten Position und einer zweiten Position beweglich angebracht sind und entsprechenden beweglichen Kontaktelementen (34) zugeordnet sind, um diese zwischen einer betätigten Position, in der die Kontaktabschnitte (16A, 18A) elektrisch miteinander verbunden sind, und einer nicht betätigten Position, in der die Kontaktabschnitte (16A, 18A) voneinander getrennt sind, zu bewegen, wobei die Betätigungsglieder (50, 52) außerdem Gleitelemente (50) umfassen und jedes der Gleitelemente (50) eine sich durch dieses hindurcherstreckende Öffnung (62) aufweist, und wobei ein Federelement (52) in der Öffnung (62) angeordnet ist und einen sich entlang eines entsprechenden beweglichen Kontaktelements (34) erstreckenden Abschnitt (68) zur Bewegung des beweglichen Kontaktelements (34) zwischen der betätigten und der nicht betätigten Position, sowie einen weiteren Abschnitt (70) aufweist, der an einer innenliegenden oberen Fläche (59) des Gehäuses (48) angreift und an dieser entlangbewegbar ist.

2. Betätigungsmechanismus für einen Schalter nach Anspruch 1, mit einem auf einem Schalterrahmen (14) montierbaren Gehäuse (48) und mit Betätigungsgliedern (50, 52), die in dem Gehäuse (48) zur Ausführung einer Bewegung zwischen einer ersten Position und einer zweiten Position beweglich angebracht sind und die derart angeordnet sind, daß sie einem beweglichen Kontaktelement (34) des Schalters zugeordnet sind, um das Kontaktelement (34) zwischen einer betätigten Position und einer nicht betätigten Position zu bewegen, dadurch gekennzeichnet, daß die Betätigungsglieder (50, 52) ein Gleitelement (50) umfassen, das eine sich durch dieses hindurcher-

streckende Öffnung (62) aufweist, und daß ein Federelement (52) in der Öffnung angeordnet ist und eine gewundene Konfiguration besitzt und sich von dem Gleitelement (50) zwischen einer innenliegenden Fläche (59) des Gehäuses (48) durch die Öffnung (62) hindurch zu einer offenen Seite (58) des Gehäuses (48) erstreckt, um unter Kompression an dem beweglichen Kontaktelement (34) des Schalters anzugreifen.

3. Elektrischer Schalter nach Anspruch 1 oder Betätigungsmechanismus nach Anspruch 2, dadurch gekennzeichnet, daß jedes Federelement (52) eine E-förmige Konfiguration besitzt, die einen U-förmigen zentralen Abschnitt (65) beinhaltet, und daß sich integrale Abschnitte (66) und (70) von entsprechenden Schenkeln des zentralen Abschnitts (65) nach außen und in gegenläufiger Richtung erstrecken.

4. Elektrischer Schalter nach Anspruch 1 oder Betätigungsmechanismus nach Anspruch 2, dadurch gekennzeichnet, daß jede der innenliegenden oberen Flächen (59) voneinander beabstandete Ausnehmungen (57) aufweist und der genannte weitere Abschnitt (70) jedes Federelements (52) einen bogenförmig gekrümmten Abschnitt (72) aufweist, der mit den voneinander beabstandeten Ausnehmungen (57) zusammenwirken kann, wodurch eine Festhalteanordnung definiert ist, um die Betätigungsglieder (50) in der ersten Position oder in der zweiten Position festzuhalten.

5. Elektrischer Schalter nach Anspruch 1, dadurch gekennzeichnet, daß die obere Oberfläche des Rahmens (14) Ausnehmungen (20) aufweist, in denen entsprechende Paare von Kontaktabschnitten (16A, 18A) freiliegen, und daß eine Membran (42) in abdichtender Weise an der oberen Oberfläche befestigt ist, die dadurch eine Abdichtung schafft, daß sie die Kontaktabschnitte (16A, 18A) und die beweglichen Kontaktelemente (34) überdeckt.

6. Elektrischer Schalter nach Anspruch 4, dadurch gekennzeichnet, daß einer (18A) der Kontaktabschnitte (16A, 18A) einen Schwenkpunktabschnitt (32) besitzt, und daß die beweglichen Kontaktelemente (34) Ausbuchtungen (36) aufweisen, die an entsprechenden Schwenkpunktabschnitten (32) angreifen.

Revendications

1. Commutateur électrique du type comprenant un bâti diélectrique (14) comportant une série de paires d'éléments de contacts électriques (16, 18) fixés dans le bâti (14), des sections de contacts alignées (16A, 18A) des éléments de contacts (16, 18) étant disposées dans une surface supérieure du bâti (14) et des sections de bornes (22) des éléments de contacts (16, 18) s'étendant vers l'extérieur du bâti (14), des éléments de contacts électriques mobiles (34) étant montés de façon pivotante sur certaines, respectives, des paires de sections de contacts (16A, 18A), un boîtier (48) monté sur le bâti (14), des éléments de commande (50, 52) montés de façon mobile dans le



boîtier (48) pour se déplacer entre des première et seconde positions et associés à des éléments de contacts mobiles respectifs (34) pour les déplacer entre une position commandée, connectant électriquement les sections de contacts (16A, 18A), et une position non commandée déconnectant les sections de contacts (16A, 18A), dans lequel lesdits éléments de commande (50, 52) comprennent en outre des éléments coulissants (50), chacun des éléments coulissants (50) étant traversé par une ouverture (62) et comportant un élément à ressort (52) disposé dans ladite ouverture (62) et comprenant une section (68) s'étendant le long d'un élément de contact mobile respectif (34) afin de déplacer l'élément de contact mobile (34) entre les positions commandée et non commandée, et une autre section (70) portant contre une surface supérieure intérieure (59) dudit boîtier (48) et mobile le long de cette surface supérieure.

2. Mécanisme de commande pour un commutateur selon la revendication 1, et comprenant un boîtier (48) pouvant être monté sur un bâti (14) de commutateur et des éléments de commande (50, 52) montés de façon mobile dans le boîtier (48) afin de se déplacer entre des première et seconde positions, et agencés pour être associés à un élément de contact mobile (34) du commutateur afin de déplacer l'élément de contact (34) entre une position commandée et une position non commandée, caractérisé en ce que lesdits éléments de commande (50, 52) comprennent un élément coulissant (50) traversé par une ouverture (62) et comportant un élément à ressort (52) disposé dans l'ouverture, présentant une configuration sinueuse, s'étendant à partir de l'élément coulissant (50), entre une surface intérieure (59) du boîtier (48), à travers l'ouverture (62) et jusqu'à un côté ouvert (58) du boîtier (48)

pour s'appliquer sous compression contre l'élément de contact mobile (34) du commutateur.

3. Commutateur électrique selon la revendication 1, ou mécanisme de commande selon la revendication 2, caractérisé en ce que chaque élément à ressort (52) présente une configuration de forme en E comprenant une section centrale de forme en U, réalisée d'une seule pièce avec les sections (66 et 70) qui s'étendent vers l'extérieur et reviennent, à partir de branches respectives de ladite section centrale (65).

4. Commutateur électrique selon la revendication 1, ou mécanisme de commande selon la revendication 2, caractérisé en ce que chacune desdites surfaces supérieures intérieures (59) présente des évidements espacés (57), ladite autre section (70) de chaque élément à ressort (52) comportant une section incurvée (72) pouvant coopérer avec lesdits évidements espacés (57) afin de définir un agencement d'encliquetage destiné à maintenir les éléments de commande (50) dans la première ou la seconde position.

5. Commutateur électrique selon la revendication 1, caractérisé en ce que la surface supérieure du bâti (14) présente des évidements (20) dans lesquels des paires respectives de sections de contacts (16A, 18A) sont à découvert, et une membrane (42) qui est fixée de façon étanche à ladite surface supérieure, protégeant de façon hermétique, en les recouvrant, les sections de contacts (16A, 18A) et les éléments de contacts mobiles (34).

6. Commutateur électrique selon la revendication 4, caractérisé en ce que l'une (18A) des sections de contacts (16A, 18A) comporte une section de pivot (32), et lesdits éléments de contacts mobiles (34) comportent des bossages (36) s'enclenchant avec les sections de pivot respectives (32).

