

Multiple switching device

The present invention relates to a multiple switching device of the type comprising:

- a casing;
- at least two contacts which are each formed by a conductive stud carried by the casing and an associated movable conductive finger, the movable conductive finger being movable relative to the associated stud between a position in contact with the stud, which defines a closed state of the contact, and a position remote from the stud, which defines an open state of the contact;
- an operating member for controlling the movable fingers, which operating member can be moved relative to the casing from a rest position, in which each contact is in a first state out of the open and closed states, into at least two separate selection positions by movement in separate senses, in each of which a contact is in a second state; and
- resilient means for biasing the operating member towards the rest position thereof.

Portable telephones and electronic organisers are nowadays equipped with navigation devices which allow a pointer to be moved on the screen in one or other of two directions in order to select a function as well as to validate the function selected when the pointer is in the desired position.

In order to move in two perpendicular directions and to validate, for example, by depressing a validation button, it is known to use an operating member which is articulated about two axes perpendicular to each other. The operating member can further be depressed in a direction perpendicular to the two articulation axes for validation. This arrangement is present in the two arrangements referred to as "joy-sticks" in English or dome-type navigators.

Five contacts are associated with the operating member. Four thereof are arranged at each side of the articulation axes



of the operating member so that one thereof is depressed when the operating member tilts about an axis. A final contact is arranged in the central portion, under the operating member, in order to be depressed when the operating member is pressed.

In order to ensure that the operating member returns towards the rest position thereof, it is urged by resilient biasing means.

Portable electronic devices are used increasingly often for games and it is advantageous for selection using the switching device to be able to be carried out in a very rapid manner.

Although operating members articulated about two perpendicular axes are easy to use, it has been found that the operation speed thereof is limited owing to the specific movement of the finger of the operator.

The object of the invention is to provide a multiple switching device which is very quick to operate.

To this end, the invention relates to a multiple switching device of the above-mentioned type, characterised in that the operating member can be moved slidably relative to the casing in order to switch each of the contacts.

According to particular embodiments, the multiple switching device comprises one or more of the following features:

- the movable conductive fingers are articulated relative to the body;

- the movable conductive fingers extend into the space defined by the continuation of the operating member in the sliding direction thereof associated with the two contacts;
- the movable conductive fingers are integral in the same common conductive member;
- the resilient biasing means comprise at least two resiliently deformable plates which are integral with the common conductive member, the plates being pressed against the operating member in the rest position thereof;
- the resilient plates form a cradle for receiving the operating member;
- each movable conductive finger is carried by a resilient plate;
- it comprises at least four contacts and the operating member can be moved in translation relative to the casing in two senses, in at least two overriding selection directions, the movement of the operating member in one sense in a direction from the rest position into a selection position bringing about the change in state of a contact;
- it comprises four resilient plates which are associated in pairs, the resilient plates of a matching pair having edges for guiding the operating member which extend parallel with an overriding selection direction and which co-operate with lateral faces of the operating member in order to guide it in the overriding selection direction;
- the casing comprises stops which prevent the simultaneous movement of the operating member in two overriding selection directions;
- the operating member can be moved in translation relative to the casing in a direction perpendicular to the two overriding selection directions from the rest position thereof into a selection position, and it comprises a contact which is formed by a conductive stud carried by the casing and an associated movable conductive element, the movable conductive element being movable relative to the associated stud

between a position in contact with the stud, which defines a closed state of the contact, and a position remote from the stud, which defines an open state of the contact, and it comprises additional resilient means for biasing the operating member towards the rest position thereof;

- the movable conductive element comprises a conductive dome which is resiliently deformable under the action of the operating member, which dome is supported on the casing, and forms the additional resilient means for biasing the operating member towards the rest position thereof;
- the movable conductive element is integral with the movable conductive fingers in the common conductive member;
- the casing is generally generated by revolution and comprises bayonet connection profiles which are adapted to cooperate with complementary profiles of a supporting base plate;
- the bayonet connection profiles comprise tabs which protrude radially relative to the casing which is generally generated by revolution; and
- the operating member comprises a control portion which protrudes through an opening provided in an upper surface of the casing and the operating member can be moved slidingly parallel with the upper surface of the casing in order to switch the contacts.

The invention will be better understood from a reading of the description below which is given purely by way of example with reference to the drawings, in which:

- Figure 1 is an exterior isometric perspective view of the multiple switching device according to the invention;
- Figure 2 is a cross-section of the device of Figure 1 at rest;

- Figure 3 is an isometric perspective view showing the hidden edges of the base unit of the device according to the invention;
- Figure 4 is an isometric perspective view of the base unit and the common conductive member of the device according to the invention;
- Figure 5 is a perspective view of the common conductive member which is illustrated upside-down;
- Figure 6 is an isometric perspective view of the body of the upside-down operating member;
- Figure 7 is a view similar to that in Figure 2 of the device in the switching position;
- Figure 8 is an isometric perspective view of a specific embodiment of a cover of the casing of the device according to the invention;
- Figure 9 is a perspective view of the base plate for receiving the switching device according to the invention; and
- Figure 10 is a perspective view of the switching device received in the base plate, viewed from the side of the base unit of the device.

The switching device 10 which is illustrated in the Figures and which is visible as an exterior view in Figure 1 is intended to be used in a portable electronic device and in particular a mobile telephone or a personal organiser. This device is generally in the form of a disc having a diameter of approximately 20 mm and a total height of 3.25 mm.

The switching device substantially comprises a casing 12, in which five contacts and an operating member 14 which can be moved relative to the casing 12 in order to bring about a change in state of at least one contact are arranged. These changes in state are produced for four contacts by movements of the operating member 14 in opposite senses of two perpendicular overriding selection directions X-X and Y-Y, as il-

lustrated by arrows 16. The final change in state of a contact is produced by depressing the member 14 into the casing 12 in direction Z-Z which is perpendicular to the two selection directions X-X and Y-Y.

More particularly, and as illustrated in Figure 2, the casing 12 comprises a base unit 18 in the general form of a bowl. This base unit is closed by a cover 20 which has, in the central portion thereof, an opening 22 for the passage of the operating member 14. The cover 20 is held on the base unit 18 by being tightly fitted which is optionally complemented by crimping (not shown) of the cover to the base unit. The operating member 14 comprises a body 24 which is received inside the casing 12 and a button, indicated 26, which protrudes out of the casing through the opening 22. This button can be selected in accordance with the appearance desired for the application in question.

The casing 12 further encloses a one-piece conductive member 28 which is common to the various contacts. This member 28 is deformable under the control of the operating member 14 and ensures the selective formation of electrical connections inside the casing for all of the five contacts.

The base unit 18, illustrated alone in Figure 3, is produced from an insulating material, such as a plastics material. It has a generally annular bottom 30 which is provided at the edge with a cylindrical lateral wall 32, in which four openings 34 are arranged and are regularly distributed over the periphery of the base unit.

Fixing tabs 36 which are integral with the bottom 30 and which protrude radially beyond the lateral wall 32 in the plane of the bottom 30 are provided in accordance with two openings 34. These tabs are provided laterally at the edge

with recesses 38 which are arranged in the bottom and which ensure resilience of the tabs.

These tabs are suitable for fitting the base unit to a receiving base plate by bayonet connection, the protruding ends of the tabs 36 being received in corresponding grooves of the base plate.

In order to ensure retention by resilient engagement of the device on the base plate, each tab 36 comprises a projection 39 on the internal face thereof which is adapted for being received in a complementary recess provided in the base plate.

The bottom 30 has cut-outs 40 which are provided in the region of the other two openings, indicated 42, of the lateral wall 32.

Resilient connections lugs 52A, 52B, 52C, 52D, 52E, 52F extend at right-angles from the cut-outs 40 and protrude beyond the external face of the bottom 30. These conductive lugs are adapted in order to ensure an electrical connection by simple pressure without welding of the switching device to printed circuit tracks, against which the base unit 18 is held.

At the free end thereof, the resilient lugs have a dishing which allows electrical connection by simple contact against corresponding studs of a printed circuit.

The conductive lugs are aligned in groups of three in the cut-outs 40 along chords of the cylindrical bottom 30. Each of the resilient outer lugs 52A, 52B, 52C, 52D is connected by a conductive track 54A, 54B, 54C, 54D to a contact stud 56A, 56B, 56C, 56D.

These contact studs are provided on the internal face of the bottom 30 and are arranged at the four corners of a square.

In addition, the central lug 52E is connected by a conductive track 54E to a central contact stud 56E which is arranged at the intersection of the diagonals of the square which are defined by the studs 56A, 56B, 56C, 56D.

Finally, the central lug 52F is connected by a conductive track 54F to a conductive portion 56F which is provided on the internal surface of the bottom 30. This conductive region is in the form of a circular arc which extends through substantially 270° and which is centred about the central stud 56E in order to ensure electrical contact with the common conductive member 28, irrespective of the movement direction of the operating member.

The tracks 54A, 54B, 54C, 54D, 54E and 54F are formed by conductive strips which are partially embedded by over-moulding in the material which forms the bottom 30.

The assembly of the conductive lugs, conductive tracks, contact studs and the conductive region is formed in the same metal plate, in particular a plate of a conductive alloy, such as stainless steel. This plate is stamped and swaged in order to obtain the desired forms by cutting.

After the over-moulding operation, the exposed portion of the conductive lugs, conductive tracks, contact studs and the conductive region is coated or silvered.

Furthermore, four through-holes 58 for guiding the operating member 14 when it is moved along axis Z-Z are provided through the bottom 30 at the four corners of a square which

is centred about the central stud 56E. These holes are progressively flared towards the internal surface of the bottom in order to form a centring profile.

Two holes extend through the tracks 54E and 54F, which have portions which extend round the holes.

As illustrated in Figures 2, 4 and 5, the common conductive member 28 rests, over a generally flat base 60, on the internal surface of the bottom 30 of the base. This base 60 has a square external shape and is provided at the edge with four resilient plates 62A, 62B, 62C, 62D which are bent over at the same side of the base and which together delimit a cradle 64 for receiving the body 24 of the operating member.

These plates 62A to 62D are integral with the base 60 and are generally resiliently articulated partially to the sides of the square base.

In greater detail, the base 60 is generally flat and has, in the central portion thereof, a dome 70 which protrudes into the cradle 64, that is to say, away from the bottom 30 of the base unit. This dome 70 generally extends opposite the central contact stud 56E and is adapted for being resiliently deformed until it comes into contact with the stud 56E, ensuring an electrical connection.

The dome 70 at rest has a height in the order of 0.35 mm with a diameter which is approximately from 10 to 20 times greater and, in this case, which is 6 mm.

The dome 70 is surrounded by an annular flat region 72 of the base 60, this region 72 being supported on the conductive region 56F.

The base 60 has, in the flat region 72 thereof, four holes 74 which are aligned with the holes 58.

The four corners of the base 60 are provided with a V-shaped notch 76 which allows at least two thereof to receive fixing studs 78 which protrude relative to the internal surface of the bottom 30 in the region of the tabs 36. These studs 78 are integral with the bottom and rest on the two edges which define the notch 76, thereby ensuring positioning and fixing of the resilient member 28 in the plane of the bottom of the base unit.

The resilient plates 62A, 62B, 62C, 62D are each generally flat. They are connected to the base at the ends thereof by bent arms 79, forming hair pins which form hinges. The radius of curvature is in the order of 0.1 mm. These arms are a constituent part of the plates and are integral with the base 60.

A portion of each bent arm 80 extends in the continuation of the flat region 72 of the base unit, whereas the adjacent portion of the arm extends in the continuation of the associated resilient plate.

In order to allow an adequate articulation of the hinge which is formed by the bent zone of the arm, a slot 80 is provided in the internal surface of the bottom 30 of the base unit below each bent zone of an arm.

The slots are generally of rectangular form, the length thereof being greater than the width of the corresponding arm 79. They are adapted for receiving the portion which forms the hinge of the arm during the resilient deformation of the associated plate.

The opposing resilient plates 62A, 62B, 62C, 62D converge relative to each other towards the free end thereof.

Each plate 62A to 62D extends at rest above the base 60 and generally defines therewith an angle in the order of 55°.

The free edge 81 of each plate opposite the base 60 is slightly curved towards the outer surface of the cradle 64 in order to form an edge for support on the body 24 of the operating member.

In addition, each plate 62A, 62B, 62C, 62D has, in the central portion thereof, a conductive tab 82A, 82B, 82C, 82D which is integral with the associated plate and resiliently deformable. Each tab 82A, 82B, 82C, 82D is bent relative to the associated plate towards the outer surface of the cradle 64. The bent end thereof which forms a contact finger 83A, 83B, 83C, 83D defines, with the associated plate, an angle of approximately 100°. The tabs are bent substantially in accordance with the axis of articulation of the plates 62A, 62B, 62C, 62D parallel with the sides of the base 60.

The common conductive member 28 is formed from the same stainless spring steel plate which is approximately 50 μ m thick and which has been cut and shaped, then coated or silvered.

As illustrated in the Figures, each contact finger generally extends at right-angles to an associated contact stud 56A, 56B, 56C, 56D.

At rest and as illustrated in Figures 2 and 4, the contact fingers 83A, 83B, 83C, 83D are remote from the associated conductive studs and define an angle of approximately 25° therewith.

The body 24 of the operating member is illustrated alone in Figure 6. It is generally in the form of a parallelepipedal stud. The outside dimensions thereof are very slightly greater than those of the cradle 64 which is defined by the plates 62A, 62B, 62C, 62D so that the body is held and positioned without play between the plates 62A, 62B, 62C, 62D in a central rest position. The body 24 is received in the cradle 64 between the resilient plates which are supported over lateral faces 90A, 90B, 90C, 90D of the body. These lateral faces each have a central cut-out 91 so that the resilient plates press along the free edge 82 thereof only on the outer portions of the lateral faces of the body allowing torsion of the plates 62A, 62B, 62C, 62D in the central portion thereof.

At the lower face of the body designated 92, the body 24 has, in the central portion thereof, an annular bowl 94 which delimits a stud 96 in a central position which is adapted for pressing on the top of the resilient dome 70, whereas the body is kept in contact against the cover 20 at another face. The diameter of the stud 96 is approximately half of the diameter of the dome, that is to say, approximately 3 mm, in order to ensure permanent contact of the top of the dome 70 against the stud 96 and thus to hold the body 24 against the cover 20, irrespective of the selection position or rest position of the operating member.

In addition, four pins 98 protrude from the lower face 92 of the body 24. They have a peripheral centring chamfer at the top thereof. These studs are adapted for being received in holes 58 of the base unit when the operating member is depressed.

At the upper face thereof and as illustrated in Figure 2, the body 24 has a space 102, in which a protruding portion 104 of the button 26 is force-fitted, which portion is provided with an annular retention portion. The button is generally generated by revolution and has, at the exposed face thereof designated 106, a receiving indentation 108 for a finger for operating the device. This indentation is provided with an anti-slip surface state, such as a spiral groove, and can be provided with a coating of a polymer, such as polyurethane.

This indentation 108 is provided at the edge with a collar 110 which increases laterally the surface of the button beyond the periphery of the opening 22. The outside diameter of the button is 11 mm.

The button 26 protrudes outside the casing 12 by a height which is far less than the diameter thereof. This height is in the order of 1 mm, allowing vertical travel of approximately 0.35 mm when the button is depressed.

It will be appreciated that the body 24 is movable in translation in all directions perpendicular to axis Z-Z whilst being held in contact against the cover 20 by the resilient action of the dome 70.

The form of the four flat resilient plates, two plates being arranged parallel with two others, combined with the flat lateral surfaces which are provided on the body 24 reduces the possibility of rotation of the operating member 14 about the vertical axis thereof and, in the rest state, bring the button back into the starting position thereof.

According to a first embodiment, the opening 22 is circular, allowing movement of the same magnitude of the operating member 14 in all directions perpendicular to axis Z-Z.

When the operating member is moved laterally, as illustrated in Figure 7, one or two resilient plates, such as plate 62B, is resiliently deformed and straightened relative to the base 60 by being tilted outwards, which brings about the lowering of the associated contact finger 83B by tilting. This finger then comes into contact with the stud 56B underneath, thereby ensuring an electrical connection between the corresponding stud 56B and the common conductive member 28.

Insofar as the conductive stud 56B is connected to a lug 52B whilst the base 60 is connected by being supported on the conductive surface 56F to the lug 52F, an electrical connection is brought about between the lugs 52B and 52F.

When the operating member 14 is released, it is urged by the initially deformed resilient plate(s) and is brought back towards the rest position thereof, as illustrated in Figure 2. In this position, no electrical connection is produced, the contact fingers all being moved away from the associated studs.

The action of the four resilient plates on the lateral flat surfaces of the body of the operating member allows the operating member to be brought back, on the one hand, into the starting position thereof relative to the casing and, on the other hand, with the starting orientation thereof, in particular with regard to the angular position about axis Z-Z.

It will be appreciated that the movement of the operating member 14 in one of the two main directions X-X, Y-Y perpendicular to axis Z-Z allows the lug 52F to be connected to at

least one of the studs 56A, 56B, 56C, 56D, and thereby the lug 52F to be placed in communication with one of the terminals 52A, 52B, 52C, 52D via the conductive member 28.

During the sliding movement in a main direction X-X or Y-Y, the body 24 of the operating member is guided laterally at both sides by the free edges 81 of the resilient plates which generally extend parallel with the movement direction. The travel of the operating member in a main direction in order to bring about switching is approximately 0.8 mm.

Furthermore, during a movement of the operating member 14 along a diagonal of the square defined by the resilient plates 62A, 62B, 62C, 62D, that is to say, in a direction extending at 45° relative to the main directions X-X and Y-Y, two adjacent resilient plates are resiliently deformed and urged outwards, leading to contact fingers and associated conductive studs being simultaneously placed in contact, which ensures that the lug 52F is placed in communication with the two lugs which correspond to the studs, against which the contact fingers are pressed.

In this manner, the selection device forms a selector having eight selection paths and one validation path.

Finally, when the operating member 14 is in the rest position thereof, as illustrated in Figure 2, the pins 98 are arranged facing holes 58, thereby allowing movement of the operating member 14 along axis Z-Z by the operating member 14 being depressed inside the casing 12. The chamfers provided at the periphery of the pins 98 facilitate the engagement and the centring thereof inside the holes 58, which are themselves flared at the end thereof that opens at the internal face of the bottom 30.

When the operating member 14 is depressed, the dome 70 is resiliently deformed and the central portion thereof is pressed against the central stud 56E by the stud 96, thereby ensuring that the lugs 52F and 52E are placed in communication via the conductive member 28.

The shape of the dome, which is known per se, is adapted so that the force necessary for deformation in accordance with the level of deformation is non-linear and, in particular, the development of this force has a local minimum which is perceptible to the user which ensures a tactile effect informing the user of the correct depression of the operating member and the electrical switching. The change in state of the electrical contact is carried out simultaneously with the variation in depression force producing the tactile effect, as known per se.

The presence of the pins 98 and complementary holes 58 ensures that the depression of the operating member, and therefore the placing of the central stud 56E in communication with the conductive member 28, is possible only when the operating member is in the rest position thereof, as illustrated in Figure 2.

It should be noted that, in this position, the guiding in translation along axis Z-Z of the operating member is also ensured by the resilient plates 62A, 62B, 62C, 62D which apply a centring action to the operating member.

As a variant, these pins are dispensed with in order to permit depression of the operating member, and therefore validation, irrespective of the position of the operating member.

According to another embodiment, the switching device is adapted in order to allow the terminal 52F to be placed in communication only with a single stud 56A, 56B, 56C, 56D at a time so that the device forms a selector having four selection paths and one validation path.

To this end, and as illustrated in Figure 8, the casing cover indicated 120 has an opening 122 which is shaped so as to limit the movement of the operating member in some directions. In particular, the opening 122 is generally in the form of a trefoil which has four recesses 122A, 122B, 122C, 122D which are arranged in the overriding movement directions X-X and Y-Y, bulging portions 124A, 124B, 124C, 124D which form stops being arranged between the recesses in order to limit the movement of the operating member 14 in directions which extend at 45° relative to the overriding directions X-X and Y-Y.

When such a switching device is used, the movement in translation of the operating member in parallel with the bottom of the casing allows an extremely rapid connection of the contact fingers 83A, 83B, 83C, 83D to the corresponding studs as well as a very rapid disengagement of the fingers from the associated studs. In this manner, the switching device can be used to carry out very rapid control of a portable electronic device, in particular in the games sector. Such a device is particularly advantageous for arcade games.

In order to move the switching device successively and rapidly towards a selection position, it is possible to brush the upper surface of the button with an alternating movement of the finger, the finger drawing the button in one sense and allowing the button to move automatically back towards the rest position thereof when the finger is on its return travel, being slightly disengaged from the button.

This alternating brushing movement by the finger of the user is very readily carried out so that a plurality of successive selections can be carried out very rapidly owing to the sliding of the operating member.

Furthermore, the use of a single member which simultaneously ensures the five contacts, the resilient biasing of the operating member 14 towards the rest position in translation and angular position thereof and the guiding of this operating member allows a switching device to be obtained at a very low cost, only one piece being used to ensure the five contacts and the five resilient urging actions and the guiding of the operating member.

Finally, the movement in translation of the operating member 14, in particular associated with the articulated contact fingers 83A, 83B, 83C, 83D positioned in the continuation of the operating member 14, allows the casing to have a greatly reduced height.

In the device described here, the movement of the operating member 14 towards a selection position brings about closing of the associated contact. In a variant, the contacts are closed when the operating member is at rest and the movement of this member towards a selection position brings about the opening of the associated contact.

Figure 9 illustrates a base plate 100 for receiving a switching device according to the invention.

The base plate is formed, for example, in the outer casing of a piece of portable electronic equipment, in which the switching device is integrated. This is, for example, the upper face of a mobile telephone. In this manner, the base

plate is defined in a wall 102 of plastics material. The base plate comprises a generally cylindrical shaft 104 for receiving the body of the switching device. This shaft is of reduced height substantially corresponding to the height of the casing 12. It has, at the lower end thereof, two helical ribs 106 which are symmetrical relative to the axis of the shaft. The ribs extend substantially through 120° and together delimit two through-openings 108 for fixing tabs 106 which protrude radially beyond the outer lateral surface of the casing.

The ribs 106 have an increasingly large thickness starting from the openings 108 towards the other end thereof in order to form a ramp for retaining the tabs 36 by a wedging effect. Stops 110 are further provided on the ribs 106 opposite the openings 108 in order to define the fixing position of the switching device. The ribs are further each provided with a recess which is adapted to receive the projection 39 in order to ensure resilient engagement of the tabs 36 in the base plate.

As illustrated in Figure 10, it will be appreciated that the switching device is engaged in the base plate 100 at the outer face of the electronic equipment. In particular, the tabs 36 are engaged in the openings 108.

The device is then rotated about itself through 40° so that the tabs 36 engage below the ribs 106 until the tabs abut the stops 110 and the projections 39 engage in the complementary recesses.

The device is then in the position in Figure 10, where it is held by the bayonet arrangement and the resilient engagement of the complementary projections and recesses provided on the tabs and slots. The conductive lugs 52A, 52B, 52C, 52D,

52F then come into contact with the printed circuit of the electronic equipment when the wall 102 and the printed circuit are assembled.

It will be appreciated that the base plate having a cylindrical shaft which is associated with the generally cylindrical shape of the switching device and the arrangement of bayonet retention means allows centring of the switching device relative to the base plate. In particular, at the outer face of the electronic equipment, the switching device can be precisely flush, without any unattractive play between the switching device and the casing of the equipment in which it is integrated. The absence of play brings about sealing against dust between the outside and the inside of the electronic equipment as well as a "sealing" in respect of the illuminating light which can emanate from electroluminescent diodes positioned on the printed circuit near the switching device.

CLAIMS

1. Multiple switching device (10) comprising:

- a casing (12);
 - at least two contacts which are each formed by a conductive stud (56A, 56B, 56C, 56D) carried by the casing (12) and an associated movable conductive finger (83A, 83B, 83C, 83D), the movable conductive finger (83A, 83B, 83C, 83D) being movable relative to the associated stud (56A, 56B, 56C, 56D) between a position in contact with the stud, which defines a closed state of the contact, and a position remote from the stud, which defines an open state of the contact;
 - an operating member (14) for controlling the movable fingers (83A, 83B, 83C, 83D), which operating member (14) can be moved relative to the casing (12) from a rest position, in which each contact is in a first state out of the open and closed states, into at least two separate selection positions by movement in separate senses, in each of which a contact is in a second state; and
 - resilient means for biasing the operating member (14) towards the rest position thereof,
- characterised in that the operating member (14) can be moved slidably relative to the casing (12) in order to switch each of the contacts.

2. Multiple switching device according to claim 1, characterised in that the movable conductive fingers (83A, 83B, 83C, 83D) are articulated relative to the body (12).

3. Multiple switching device according to claim 1 or claim 2, characterised in that the movable conductive fingers (83A, 83B, 83C, 83D) extend into the space defined by the continuation of the operating member in the sliding direction thereof associated with the two contacts.

4. Multiple switching device according to any one of the preceding claims, characterised in that the movable conductive fingers (83A, 83B, 83C, 83D) are integral with the same common conductive member (28).

5. Multiple switching device according to claim 4, characterised in that the resilient biasing means comprise at least two resiliently deformable plates (62A, 62B, 62C, 62D) which are integral with the common conductive member (28), the plates being pressed against the operating member (14) in the rest position thereof.

6. Multiple switching device according to claim 5, characterised in that the resilient plates (62A, 62B, 62C, 62D) form a cradle (64) for receiving the operating member (14).

7. Multiple switching device according to either claim 5 or claim 6, characterised in that each movable conductive finger (83A, 83B, 83C, 83D) is carried by a resilient plate (62A, 62B, 62C, 62D).

8. Multiple switching device according to any one of the preceding claims, characterised in that it comprises at least four contacts, and in that the operating member (14) can be moved in translation relative to the casing (12) in two senses, in at least two overriding selection directions (X-X, Y-Y), the movement of the operating member (14) in one sense in a direction from the rest position into a selection position bringing about the change in state of a contact.

9. Multiple switching device according to claims 5 and 8, characterised in that it comprises four resilient plates (62A, 62B, 62C, 62D) which are associated in pairs, the resilient plates of a matching pair having edges (81) for guiding the operating member (14) which extend parallel with

a overriding selection direction (X-X, Y-Y) and which co-operate with lateral faces (90A, 90B, 90C, 90D) of the operating member (14) in order to guide it in the overriding selection direction (X-X, Y-Y).

10. Multiple switching device according to claim 8 or claim 9, characterised in that the casing (12) comprises stops (124A, 124B, 124C, 124D) which prevent the simultaneous movement of the operating member (14) in two overriding selection directions (X-X, Y-Y).

11. Switching device according to any one of claims 8 to 10, characterised in that the operating member (14) can be moved in translation relative to the casing (12) in a direction (Z-Z) perpendicular to the two overriding selection directions (X-X, Y-Y) from the rest position thereof into a selection position, and it comprises a contact which is formed by a conductive stud (56E) carried by the casing (12) and an associated movable conductive element (70), the movable conductive element (70) being movable relative to the associated stud (56E) between a position in contact with the stud, which defines a closed state of the contact, and a position remote from the stud, which defines an open state of the contact, and in that it comprises additional resilient means (70) for biasing the operating member (14) towards the rest position thereof.

12. Multiple switching device according to claim 11, characterised in that the movable conductive element (70) comprises a conductive dome which is resiliently deformable under the action of the operating member (14), which dome (70) is supported on the casing (12), and forms the additional resilient means for biasing the operating member towards the rest position thereof.

13. Multiple switching device according to claim 11 or 12 and claim 4, characterised in that the movable conductive element (70) is integral with the movable conductive fingers (83A, 83B, 83C, 83D) in the common conductive member (28).

14. Device according to any one of the preceding claims, characterised in that the operating member comprises a control portion (26) which protrudes through an opening (22) provided in an upper surface (20) of the casing, and in that the operating member can be moved slidably parallel with the upper surface (20) of the casing (12) in order to switch the contacts.

15. Multiple switching device according to any one of the preceding claims, characterised in that the casing (12) is generally generated by revolution and comprises bayonet connection profiles (36) which are adapted to co-operate with complementary profiles of a supporting base plate.

16. Device according to claim 15, characterised in that the bayonet connection profiles comprise tabs (36) which protrude radially relative to the casing (12) which is generally generated by revolution.

17. A piece of electronic equipment comprising an outer wall (102), in which a base plate (100) for receiving a switching device according to claim 15 or 16 and a switching device (10) according to claim 15 or 16 is defined, which base plate (100) comprises bayonet connection profiles (106) which are complementary to the connection profiles (36) of the switching device (10).

18. A piece of electronic equipment according to claim 17, characterised in that the complementary bayonet connection profiles of the base plate (100) and the switching device

(10) comprise protruding and indented resilient engagement profiles (39).