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Description

The present invention relates to a mechanically operated switch according to the preamble of claim 1. Such a switch is known from FR-A-2 565 730. The technical solutions provided by the present invention particularly lend themselves to be applied in the case in which it is necessary to provide switches or the like the operation keys of which have very restricted working strokes, in the range of 2 mm.

It is known that there are many types of switches and the like which have a merely mechanical operation and which comprise a housing accommodating the fixed contacts and at least a movable contact capable of oscillating from a closure position to an opening position respectively to close and break the electrical connection between the fixed contacts. In most known switches the movable contact is formed with a metal element rotatably fitted in the housing and acted upon at least by a release spring which is disposed between the movable contact and an operation key oscillatably mounted in the housing.

The release spring acts such as to cause the movable contact to trip from a closure position to an opening position and viceversa when the key is acted upon by the user. In all mechanically operated switches the operation key must always undergo rather important strokes in order to allow the movable contact to be brought from a closure position to an opening position and viceversa. So it is not possible to use mechanically operated switches in the cases in which the operation key must have very restricted working strokes, which often occurs due to technical and/or commercial requirements. The above specified requirements are presently met by the use of switches interlocked to electrically and/or electronically operated servo-controls which can be actuated upon command of pushbuttons having very restricted working strokes. By virtue of this particular feature servo-controlled switches can be operated by the slight touching of the respective control pushbuttons on the part of the user.

On the other hand, it is rather complicated to produce servo-controlled switches and, as a result, said switches exhibit higher production costs and less reliability in use over a long period of time as compared with only mechanically operated switches.

A further drawback of the known art resides in that it is impossible to achieve several different operation characteristics from a single switch by merely replacing one of its components. On the contrary, in order to make a single switch perform different functions it is always necessary to replace the movable contacts as well as to add and/or to

replace other components.

It is an object of the present invention to solve the drawbacks of the known art by providing a switch which is actuated only mechanically and the operation key of which has very restricted working strokes, in the range of 2 mm.

A further object of the present invention is to provide a switch which is capable of performing different functions by merely replacing only one component thereof.

The foregoing and still further objects which will become more apparent in the course of the present description are substantially attained by a mechanically operated switch according to claim 1.

Further features and advantages will best be understood from the detailed description of a preferred embodiment of a mechanically operated switch according to the present invention, given hereinafter by way of non-limiting example with reference to the accompanying drawings, in which:

- Fig. 1 is a cross-sectional view, taken along different planes, of a mechanically operated switch in accordance with the present invention;
- Fig. 2 shows another example of cam element adapted to be associated with the switch of the invention.

Referring particularly to Fig. 1, a mechanically operated switch according to the invention has been globally identified by reference numeral 1.

The switch 1 comprises a housing 2 substantially formed with a box-shaped portion 3 and a closure portion 4 fitted on the box-shaped portion 3. The box-shaped portion 3 is provided with hooking spring means 5 to allow the switch 1 to be fastened, in known manner, into a shaped opening formed in a supporting board not shown. At least a pair of fixed contacts 6 are fitted in the closure portion 4, each of said contacts facing the inside of the housing 2 and having an attachment portion 7 projecting past the housing.

Also located in the housing 2 is at least a movable contact 8 contained with a slight side floating between the walls of the closure portion 4 and acting upon the fixed contacts 6 to selectively close and break the electrical connection between said fixed contacts. In greater detail, the movable contact 8 has an elongated plate-like configuration and terminates with one bent end 8a forming an arc of a circle and constantly abutting against one fixed contact 6a being part of the pair of fixed contacts 6. On its opposite side the movable contact 8 is provided with a free end 8b extending over the second fixed contact 6b.

The movable contact 8 is submitted to the action of spring compression means tending to urge its ends 8a and 8b against the corresponding fixed contacts 6a and 6b. In the embodiment

shown this spring means consists of a compression spring 9, partially shown, which has one end engaged with a boss 10 formed along the movable contact 8, and abuts against an operation key 11.

The key 11 is slidably guided along the box-shaped portion 3 and projects therefrom on the side thereof opposite that facing the closure portion 4.

Switch 1 further comprises trip means drivably operated by the key 11 so that they cause the movable contact 8 to move from a closure position (not shown in the drawing) in which the fixed contacts 6 are electrically connected to each other, to an opening position (diagrammatically shown in phantom) in which the electrical connection between the fixed contacts is broken. According to the present invention said trip means comprises a cam element 12 rotatably engaged about one pivot 13 extending through the closure portion 4 at right angles to the longitudinal extension of the movable contact 8.

The cam element 12 is provided with one projection 12a to which one end of a release spring 14 is fastened, the other end of the spring engaging with a second projection 15 provided on the bottom of the closure portion 4. On its opposite sides the cam element 12 also has one abutment surface 16a and a second abutment surface 16b, each of them being designed to abut against a corresponding wall of the closure portion 4 to counteract the action exerted by the release spring 14 when the cam element 12 is held in a respective working position.

As shown in the accompanying drawings, extending radially from the cam element 12 with respect to the pivoting axis of the cam element itself is at least a lifting arm 17 the free end 17a of which operates between the ends 8a and 8b of the movable contact 8 to bring the latter, against the action of the compression spring 9, from a closure position to an opening position when the cam element 12 is brought from a first to a second working positions, as more clearly seen in the following.

Also symmetrically formed on the cam element 12, on its side opposite the projection 12a, is one locating seat 18a and a second locating seat 18b followed by one sliding surface 19a and a second sliding surface 19b. The sliding surfaces 19a and 19b symmetrically converge towards each other so as to form a cusp 20 which is in alignment with the axis of the pivot 13 and the projection 12a.

Advantageously, each locating seat 18a, 18b is spaced apart from the pivoting axis of the cam element 12 a distance smaller than the distance between the free end 17a of the lifting arm 17 and the pivoting axis itself. By virtue of such an arrangement, a global lowering of the thrust element 21 allows the free end 8b of the contact 8 to carry

out a corresponding raising the amount of which is directly proportional to the ratio of the distance between the free end 17a of the lifting arm 17 and the pivoting axis of the cam element 12 to the distance between the locating seat 18a or 18b and the pivoting axis itself.

The switch 1 further comprises a thrust element 21 provided with one fork-shaped end 21a rotatably engaged about a second pivot 22 fastened to the operation key 11 and extending parallelly to the first pivot 13. On its opposite side, the thrust element 21 has a free end 21b disposed in the vicinity of the cam element 12.

The thrust element 21 can elastically oscillate about the second pivot 22 in opposition to elastic deformations consequently undergone by return arms 23 extending symmetrically from the thrust element and exhibiting respective free ends 23a which abut against a bottom wall 24 of the operation key 11.

In a preferred embodiment the key 11 is associated with an indicator element 25 adapted to reveal the operation state of the switch 1. The indicator element 25 comprises a block 26 supported by a swinging arm 27 rotatably pivoted to the key 11 according to an axis parallel to the second pivot 22. The free end 27a of the swinging arm 27 is interposed between the two half-portions of the fork-shaped end 21a.

Formed on the block 26 and exactly on its side opposite that facing the swinging arm 27 is one indicating surface 26a and a second indicating surface 26b designed to alternately and selectively appear at a reading slot 28 formed in the upper part of the key 11. On each surface 26a and 26b there are indications concerning the operation state of the switch 1. Said indications may for example consist of a printed inscription, or the surfaces may be differently coloured.

Operation of the switch according to the invention described above mainly as regards structure, is as follows.

In figure 1 there is shown a condition of normal operation of switch 1, in which the cam element 12, by virtue of the release spring 14, is kept in the first working position corresponding to the first abutment surface 16a bearing against the wall of the closure portion 4. In this condition the lifting arm 17 extends parallelly below the movable contact 8 which is kept in a closed condition being acted upon by the compression spring 9, so that the closure of the electrical connection between the fixed contacts 6a and 6b is ensured.

Still by the action of the compression spring 9, the operation key 11 is kept in a rest condition in which it projects to its greatest extent from the box-shaped portion 3 of housing 2. The orientation of the indicator element 25 is like that of the cam

element 12 and the first indicating surface 26a thereof faces the slot 28. When the key 11 is not actuated, the thrust element 21 acted upon by the return arms 23, keeps such an orientation that it is in alignment with the centres of pivots 13 and 22. As a result of a light pressing action carried out by the user, the key 11 is slightly moved towards the inside of the housing 1, being counteracted by the compression spring 9. So there is first the shifting of the thrust element 21 towards the cam element 12 as far as the free end 21b thereof comes in contact with the first sliding surface 19a.

Afterwards, as the lowering of the key 11 goes on, the free end 21b slides along the surface 19a so that the thrust element 21 is slightly rotated clockwise with reference to the figure, until said free end engages with the first locating seat 18a. The angular rotation carried out by the thrust element 21 causes the fork-shaped end 21a to act on the free end 27a of the swinging arm 27 such as to cause a variation in the orientation of the indicator element 25 and, as a result, the second indicating surface appears at the reading slot 28. The positioning of the indicator element 25 in its two working conditions as described above is maintained by virtue of a boss 29 provided sideways on the block 26 and adapted to engage in grooves 29a formed in an inner wall of the operation key 11, as diagrammatically shown in dotted line. When the free end 21b is engaged in the locating seat 18a, by further lowering the key 11 it is possible to achieve an angular rotation of the cam element 12.

Then the key 11 comes to the end of its stroke and in this condition the lower edge 11a of the key abuts against the edge 4a of the closure portion 4. Under this situation the angular rotation undergone by the cam element 12 is such that the projection 12a of the latter is brought slightly past the axis of alignment between the second projection 15 and the centre of pivot 13.

Therefore the action of the release spring 14 causes a further angular rotation of the cam element 12 so that the latter is brought to the second working position in which the second surface 16b abuts against the corresponding inner wall of the closure portion 4. As a result of the angular rotation of the cam element 12, the lifting arm 17 causes the movable contact 8 to move from its closure position to its opening position, by raising the free end 8b thereof with respect to the second fixed contact 6b. So the electrical connection between the fixed contacts 6a and 6b is interrupted. Since the lifting arm 17 acts between the boss 10 and free end 8b, as shown in the figure, the action exerted by the compression spring 9 is capable of maintaining the end 8a against the fixed contact 6a even when the movable contact 8 is brought to the opening position.

Once the thrust action on the key 11 has ceased, the latter is returned to its rest condition by the action of the compression spring 9, and the thrust element 21 is brought to a rest condition as well by effect of the elastic action exerted by the return arms 23.

After the above described operating sequence, the cam element 12 is oriented in such a way that when a subsequent thrust action is exerted on the key 11, the free end 21b of the thrust element 21 comes in contact with the second sliding surface 19b. As a result the thrust element 21 will be angularly rotated in a direction opposite the previous one so that the indicating surface 26a of the indicator element 25 will face again the reading slot 28. Furthermore, the cam element 12 will undergo an angular rotation in a direction opposite the previous one, which will involve the new arrangement of the movable contact 8 in a closure position by the action of the compression spring 9.

In the embodiment described with reference to figure 1 the switch 1 is provided with only a pair of fixed contacts 6 and therefore with a single movable contact 8. In this case, as shown in figure 1, the cam element 12 has only one lifting arm 17.

On the contrary in the embodiment of figure 2 it is shown a cam element designated by reference numeral 30 which is adapted to be used when the switch 1 is provided with two pairs of fixed contacts, a movable contact being associated with each of said pairs. The cam element 30 is equipped with a first lifting arm 31 and a second lifting arm 32 having a mutually offset orientation according to an angle equal to the angle of the rotation performed by the cam element on passing from the first to the second working positions and viceversa. Due to the arrangement of arms 31 and 32, when the key 11 is actuated one of the movable contacts will be disposed in an opening position and at the same time the other movable contact will be disposed in a closure position. In this manner the switch 1 can perform the function of a shunter.

Obviously the two arms 31 and 32 can also be disposed in parallel relationship with respect to each other. In this case the switch lends itself to carry out the simultaneous opening and closing of two distinct electrical circuits.

The present invention attains the intended purposes.

In fact the switch of the invention exhibits several technical features by virtue of which the distance between the fixed contact 6b and the free end 8b of the movable contact 8 in an opening position (which must meet a minimum value as stated by the rules) is greater than the working stroke performed by the key 11 to bring the movable contact 8 to an opening position.

Said technical features are essentially achieved due to the presence of the thrust element 21 acting together with the release spring 14, and the particular positioning of the locating seats 18a, 18b, as well as to the particular arrangement of the movable contact 8 enabling the same to rotate about its first end 8a when acted upon by the lifting arm 17 which is operative between said first end and the free end 8b.

Thanks to these solutions it is possible to manufacture mechanically operated switches the operation keys of which have very restricted strokes, even lower than 2,5 mm. In this way particular commercial requirements can be met in accomplishing lighting installations and electrical equipments in general without being obliged to resort to the expensive switches assisted by electric and/or electronic servo-controls which on the other hand have also proved to have a lower liability over time than the mechanically operated switches.

Furthermore and advantageously, in the case of multipolar switches, with two or more pairs of fixed contacts, the present invention allows the accomplishment of different operational characteristics from one and the same switch by merely replacing the cam element thereof. For example, with reference to figure 2, starting from a switch arranged to perform the functions of a shunter, it is possible to produce a switch adapted to carry out the simultaneous opening and closing of two electrical circuits by replacing the cam element of figure 2 with a cam element having parallel lifting arms.

Claims

1. A mechanically operated switch comprising:

- a housing (2);
- at least a pair of fixed contacts (6a, 6b) located within the housing (2);
- at least a movable contact (8) located within the housing (2) and capable of oscillating, against the action of spring compression means (9), from a closure position to an opening position respectively to close and electrically disconnect the fixed contacts (6a, 6b) from each other;
- trip means operable upon command of an operation key (11) and acting on the movable contact (8) to move it from a closure position to an opening position, said trip means having:
- a cam element (12, 30) rotatably engaged in the housing (2) and adapted to oscillate from a first to a second working position;

- at least a lifting arm (17, 31, 32) extending from the cam element (12, 30) and acting on the movable contact (8) to move it from a closure position to an opening position when the cam element (12, 30) is brought from its first working position to its second working position;
- at least a release spring (14) acting between said housing (2) and the cam element (12, 30) to hold the latter at its first working position and at its second working position;
- and a thrust element (21) pivoted to the operation key (11) so that it may oscillate with respect to the latter, and abutting against locating seats (18a, 18b) exhibited by the cam element (12, 30) to cause the rotation of the cam element from its first to its second working position and viceversa depending upon the operation of said key (11) and simultaneously with the action of said release spring (14), said thrust element acting on said locating seats (18a, 18b) by one free end (21a) thereof, characterized by the fact that said thrust element (21) oscillates with respect to said operation key (11) in opposition to elastic deformations undergone by return arms (23) symmetrically diverging from the thrust element (21) and abutting against the bottom wall (24) of said key (11) whereby said free end (21a), when the thrust element is at rest, is substantially aligned with the rotation centres of the thrust element (21) and cam element (12, 30).

2. A switch according to claim 1, characterized in that each of said locating seats (18a, 18b) is spaced apart from the pivoting axis of the cam element (12, 30) an amount lower than the distance between the free end (17a) of the lifting arm (17) and said pivoting axis.

3. A switch according to claim 1, characterized in that said movable contact (8) has one end (8a) constantly acting against one fixed contact (6a) and a free end (8b) which is movable with respect to a second fixed contact (6b) when the movable contact (8) is brought from a closure position to an opening position and viceversa, said lifting arm (17, 31, 32) acting between said first end (8a) and free end (8b).

4. A switch according to claim 1, characterized in that the working stroke of said operation key (11) is lower than the minimum distance between the movable contact (8) and at least one

(6a) of the fixed contacts when the movable contact (8) is in an opening position.

5. A switch according to claim 1, characterized in that said cam element (12) is provided with a lifting arm (17) extending radially to the pivoting axis of the cam element and acting on said movable contact (8) to move it from a closure position to an opening position. 5
6. A switch according to claim 1, characterized in that said cam element (30) comprises one lifting arm (31) extending radially to the pivoting axis of the cam element to bring one movable contact from a closure position to an opening position when the cam element (30) is rotated from its first to its second working position, and a second lifting arm (31) extending radially to the pivoting axis of said cam element to bring a second movable contact from a closure position to an opening position when the cam element (30) is rotated from its second to its first working position. 10 15 20
7. A switch according to claim 1, characterized in that said cam element is provided with a pair of lifting arms extending radially to the pivoting axis of the cam element and parallelly to each other to move the respective one of said movable contacts from a closure position to an opening position as a result of the angular rotation of the cam element from its first to its second working position. 25 30
8. A switch according to claim 1, characterized in that an indicator element (25) is associated with said operation key (11), which element comprises a block (26) provided with a first and a second indicating surfaces (26a, 26b) arranged such as to alternately and selectively appear at a reading slot (28) formed in the key, said block being firmly supported by a swinging arm (27) rotatably pivoted with respect to the key (11) according to an axis parallel to the pivoting axis of said thrust element (21) and having one free end (27a) engaging between the two half-portions (25a) of a fork-shaped element exhibited by the thrust element. 35 40 45

Patentansprüche

1. Mechanisch betätigter Schalter bestehend aus:
 - einem Aufnahmegehäuse (2);
 - mindestens einem Paar von feststehenden im Gehäuse (2) aufgenommenen Kontakten (6a, 6b);
 - mindestens einem beweglichen Kontakt (8), der im Aufnahmegehäuse (2) aufge-

nommen ist und gegen die Wirkung von elastischen Druckmitteln (9) von einer Einschaltstellung in eine Ausschaltstellung verschwenkbar ist, um jeweils die feststehenden Kontakte (6a, 6b) untereinander zu schließen und zu unterbrechen;

- Freigabemitteln, die durch Betätigung einer Bedienungstaste (11) betätigbar sind und auf den beweglichen Kontakt (8) wirken, um ihn von einer Einschaltstellung in eine Ausschaltstellung zu versetzen, wobei die Freigabemittel bestehen aus:
 - einem Nockenglied (12, 30), das im Aufnahmegehäuse (2) drehbar eingreift und von einer ersten Arbeitsstellung in eine zweite verschwenkbar ist;
 - mindestens einem Hebearm (17, 31, 32), der sich vom Nockenglied (12, 30) erstreckt und auf den beweglichen Kontakt (8) wirkt, um ihn von einer Einschaltstellung in eine Ausschaltstellung zu versetzen, sobald das Nockenglied (12, 30) von seiner ersten Arbeitsstellung in die zweite Arbeitsstellung gebracht wird;
 - mindestens einer Auslösefeder (14), die zwischen dem Aufnahmegehäuse (2) und dem Nockenglied (12, 30) wirkt, um dieses letztere in seiner ersten Arbeitsstellung und in seiner zweiten Arbeitsstellung zu halten;
 - und einem Schubelement (21), das an der Bedienungstaste (11) zu deren Verschwenkung gegenüber dem letzteren angelenkt ist und gegen vom Nockenglied (12, 30) aufgewiesenen Anschlagaufnahmen (18a, 18b) anschlagen, um die Verschwenkung des Nockenglieds von seiner ersten Arbeitsstellung in seine zweite Arbeitsstellung in Abhängigkeit der Betätigung der Taste (11) und unter Mitwirkung der Auslösefeder (14) herbeizuführen, wobei das Schubelement auf die Anschlagaufnahmen (18a, 18b) mit seinem freien Ende (21a) einwirkt,

dadurch gekennzeichnet, daß das Schubelement (21) gegenüber der Bedienungstaste (11) in Gegenwirkung zu den elastischen Verformungen schwenkt, die Rückholarme (23) erfahren, die symmetrisch vom Schubelement (21) auseinanderlaufen und gegen die Bodenwand (24) der Taste (11) anschlagen, wodurch dieses freie Ende (21a), bei Ruhestellung des Schubelements, im wesentlichen mit den Verschwenkmittelpunkten des Schubelements (21) und des Nockengliedes (12, 30) fluchtet.

2. Schalter nach Anspruch 1, dadurch gekennzeichnet, daß jede der Anschlagaufnahmen

(18a, 18b) von der Anlenkachse des Nockengliedes (12, 30) um ein Maß beanstandet ist, das unterhalb des Abstandes zwischen dem freien Ende (17a) des Hebearmes (17) und der Anlenkachse liegt.

3. Schalter nach Anspruch 1, dadurch gekennzeichnet, daß der bewegliche Kontakt (8) ein erstes Ende (8a), das durchgehend auf den ersten, festliegenden Kontakt (6a) wirkt, und ein freies Ende (8a) besitzt, das gegenüber den zweiten, festliegenden Kontakt (8a) beweglich ist, sobald der bewegliche Kontakt (8) von einer Einschaltstellung in eine Ausschaltstellung und, umgekehrt, gebracht wird, wobei der Hebearm (17, 31, 32) zwischen dem ersten Ende (8a) und dem freien Ende (8b) wirkt. 10
4. Schalter nach Anspruch 1, dadurch gekennzeichnet, daß der Arbeitsweg der Bedienungstaste (11) niedriger ist als der Mindestabstand zwischen dem beweglichen Kontakt (8) und mindestens einem (6a) der festliegenden Kontakte, wenn der bewegliche Kontakt (8) sich in einer Ausschaltstellung befindet. 15
5. Schalter nach Anspruch 1, dadurch gekennzeichnet, daß das Nockenglied (12) mit einem Hebearm (17) versehen ist, der sich radial zur Anlenkachse des Nockengliedes erstreckt und auf den beweglichen Kontakt (8) einwirkt, um ihn von einer Einschaltstellung in eine Ausschaltstellung zu versetzen. 20
6. Schalter nach Anspruch 1, dadurch gekennzeichnet, daß das Nockenglied (30) einen Hebearm (31), der sich radial zur Anlenkachse des Nockengliedes erstreckt, um den ersten, beweglichen Kontakt von einer Einschaltstellung in eine Ausschaltstellung zu bringen, wenn das Nockenglied (30) von seiner ersten Arbeitsstellung in seine zweite Arbeitsstellung verschwenkt wird, und einen zweiten Hebearm (31) umfaßt, der sich radial zur Anlenkachse des Nockengliedes erstreckt, um einen zweiten, beweglichen Kontakt von einer Einschaltstellung in eine Ausschaltstellung zu bringen, wenn das Nockenglied (30) von seiner zweiten Arbeitsstellung in seine erste Arbeitsstellung verschwenkt wird. 25
7. Schalter nach Anspruch 1, dadurch gekennzeichnet, daß das Nockenglied mit einem Paar von Hebearmen versehen ist, die sich radial zur Anlenkachse des Nockengliedes und zueinander parallel erstrecken, um jeden der beweglichen Kontakte von einer Einschaltstellung in eine Ausschaltstellung zufolge der Winkel-

drehung des Nockengliedes von seiner ersten in seine zweite Arbeitsstellung zu versetzen.

8. Schalter nach Anspruch 1, dadurch gekennzeichnet, daß der Bedienungstaste (11) ein Anzeigeelement (25) zugeordnet ist, das ein Klötzchen (26) umfaßt, das eine erste und eine zweite Anzeigefläche (26a, 26b) aufweist, die derart angeordnet sind, daß sie wechsel- und wahlweise einem in der Taste ausgenommenen Leseschlitz (28) gegenüberliegen, wobei das Klötzchen von einem Schwenkarm (27) starr gelagert wird, der gegenüber der Taste (11) längs einer zur Anlenkachse des Schubelementes (21) parallelen Achse drehbar angelenkt ist und ein freies Ende (27a) aufweist, das zwischen den Halbtteilen (25a) eines gabelförmig ausgebildeten das Schubelement aufweisenden Elementes eingreift. 30

Revendications

1. Interrupteur actionné mécaniquement, comprenant :
 - un boîtier (2);
 - au moins une paire de contacts fixes (6a, 6b) placés dans le boîtier (2);
 - au moins un contact mobile (8) placé dans le boîtier (2) et susceptible d'oscillation, contre l'action de moyens de compression élastiques (9), d'une position de fermeture à une position d'ouverture, respectivement pour fermer et ouvrir électriquement les contacts fixes (6a, 6b), l'un par rapport à l'autre;
 - des moyens de déclenchement commandés par une touche de commande (11) et agissant sur le contact mobile (8) pour le déplacer d'une position de fermeture à une position d'ouverture, lesdits moyens de déclenchement ayant;
 - un élément à came (12, 30) engagé à rotation dans le boîtier (2) et susceptible d'osciller d'une première position de travail à une deuxième position de travail;
 - au moins un bras de levage (17, 31, 32) s'étendant à partir de l'élément à came (12, 30) et agissant sur le contact mobile (8) pour le déplacer d'une position de fermeture à une position d'ouverture quand l'élément à came (12, 30) est amené de sa première position de travail à sa deuxième position de travail;
 - au moins un ressort de détente (14) agissant entre ledit boîtier (2) et l'élément à came (12, 30) pour retenir ce dernier à sa première position de travail et à sa deuxième position de travail;

- et un élément de poussée (21) monté à pivotement sur la touche de commande (11) de manière qu'il peut osciller par rapport à cette dernière, et venant buter contre des sièges de référence (18a, 18b) présentés par l'élément à came (12, 30) pour causer la rotation de l'élément à came de sa première position de travail à sa deuxième position de travail et vice-versa, en fonction de l'actionnement de ladite touche (11) et en même temps que ledit ressort de détente (14) exerce son action, ledit élément de poussée agissant sur lesdits sièges de référence (18a, 18b) par son extrémité libre (21a),
caractérisé en ce que ledit élément de poussée (21) oscille par rapport à ladite touche de commande (11) en opposition à des déformations élastiques subies par des bras de rappel (23) divergeant symétriquement de l'élément de poussée (21) et venant buter contre la paroi inférieure (24) de ladite touche (11) de sorte que ladite extrémité libre (21a), quand l'élément de poussée est au repos, est sensiblement en alignement avec les centres de rotation de l'élément de poussée (21) et de l'élément à came (12, 30). 5 10 15 20 25
- 2. Interrupteur selon la revendication 1, caractérisé en ce que chacun desdits sièges de référence (18a, 18b) est écarté de l'axe d'articulation de l'élément à came (12, 30) d'une distance inférieure à la distance entre l'extrémité libre (17a) du bras de levage (17) et ledit axe d'articulation. 30 35
- 3. Interrupteur selon la revendication 1, caractérisé en ce que ledit contact mobile (8) a une première extrémité (8a) agissant constamment contre un premier contact fixe (6a) et une extrémité libre (8b) qui est mobile par rapport à un deuxième contact fixe (8b) quand le contact mobile (8) est amené d'une position de fermeture à une position d'ouverture et vice-versa, ledit bras de levage (17, 31, 32) agissant entre ladite première extrémité (8a) et l'extrémité libre (8b). 40 45
- 4. Interrupteur selon la revendication 1, caractérisé en ce que la course de travail de ladite touche de commande (11) est plus courte que la distance minimum entre le contact mobile (8) et au moins un (6a) des contacts fixes, quand le contact mobile (8) est dans une position d'ouverture. 50 55
- 5. Interrupteur selon la revendication 1, caractérisé en ce que ledit élément à came (12) est

pourvu d'un bras de levage (17) s'étendant radialement à l'axe d'articulation de l'élément à came et agissant sur ledit contact mobile (8) pour le déplacer d'une position de fermeture à une position d'ouverture.

- 6. Interrupteur selon la revendication 1, caractérisé en ce que ledit élément à came (30) comporte un premier bras de levage (31) s'étendant radialement à l'axe d'articulation de l'élément à came pour porter un premier contact mobile d'une position de fermeture à une position d'ouverture, quand on cause la rotation de l'élément à came (30) de sa première position de travail à sa deuxième position de travail, et un deuxième bras de levage (31) s'étendant radialement à l'axe d'articulation dudit élément à came pour porter un deuxième contact mobile d'une position de fermeture à une position d'ouverture quand on cause la rotation de l'élément à came (30) de sa deuxième position de travail à sa première position de travail.
- 7. Interrupteur selon la revendication 1, caractérisé en ce que ledit élément à came est pourvu d'une paire de bras de levage s'étendant radialement à l'axe d'articulation de l'élément à came et parallèles entre eux, pour déplacer le respectif contact mobile d'une position de fermeture à une position d'ouverture, à la suite de la rotation angulaire de l'élément à came de sa première à sa deuxième position de travail.
- 8. Interrupteur selon la revendication 1, caractérisé en ce qu'un élément indicateur (25) est associé à ladite touche de commande (11), cet élément indicateur comprenant un bloc (26) pourvu d'une première et d'une deuxième surface d'indication (26a, 26b) disposées de manière qu'elles apparaissent alternativement et sélectivement en correspondance d'une fente de lecture (28) formée dans la touche, ledit bloc étant supporté rigidement par un bras oscillant (27) monté à pivotement sur la touche (11) suivant un axe parallèle à l'axe d'articulation dudit élément de poussée (21) et ayant une extrémité libre (27a) qui s'engage entre les deux moitiés (25a) d'un élément en forme de fourche présenté par l'élément de poussée.

