

The present invention relates to lighter with a sliding operating member, which is resistant to children, that is a lighter where the operating member comprises a pusher button or a rocking lever which can be operated by a sliding part acting on the rear extremity thereof.

In order to reduce the risks to a child from having an accident such as a fire, with use of a cigarette lighter left unfortunately in its position the use of child resistant lighters has been conceived. In these lighters the ignition mechanism comprises a neutralisation means, movable between an active position of neutralisation, in which it prevents operation of the ignition mechanism and an inactive position, in which it permits operation, this movable neutralisation means being displaceable by the user from its active position of neutralisation to its inactive position.

This type of lighter is known in particular from DE-U- 88 02 582. However in this lighter the neutralizing means is not set up so as to be automatically returned to the actuatable neutralizing position after actuation of the igniting mechanism.

This return to the active position can only be obtained by the operation in the opposite direction by the user.

One can easily envisage that simple forgetting of this last step would completely remove all the advantages provided by the presence of the neutralising means.

In WO-A-90/12254 a lighter is known of the type in which the neutralising means of the ignition mechanism is normally maintained in the neutralisation

position and which on the other hand is arranged to be automatically returned to the position of neutralisation and the end of the operation of the ignition mechanism.

The main disadvantage of these systems is that they all add perceptibly to the manufacturing cost of the lighter. At least one additional element must be added to the lighter and frequently the overall construction must be made considerably more complex which significantly increases the manufacturing costs.

The present invention aims to remedy these inconveniences. To this effect the lighter with which we are concerned is one in which the actuating element is slidably mounted, or at least effectively slidably mounted with respect to the body of the lighter and in which the interior face of the actuating element or pressing part of this member is surrounded by a skirt and at least one elastically deformable tongue is arranged in the skirt in a way to present, in the region of its free side, a butting face normally opposite an opposing butting face normally appertaining to the body of the lighter, this tongue being susceptible to being displaced elastically and transversally to bring its butting face in effective position with respect to the opposing butting face of the body and to permit thus the pressing of the actioning part of the operating member in the direction of its course of ignition, this means being such as to maintain this tongue in its effective position during at least a fraction of the course of pressing or travel of the operating member and the means being also provided such that the tongue automatically retakes its active position, under the sole effect of its elasticity, after its liberation by the first means at the end of the course of return to its original position.

In order to use the actuating lever of the ignition mechanism of this lighter it is necessary to displace the safety tongue to the active position which is evidently not possible by a uninformed infant.

According to the most simple form of the invention the means for maintaining the elastic tongue in the effective position during the course of the advance and return of the operating member are comprised by the internal face of the part of the wall of the body of the lighter against which the tongue bears against with its external face.

However according to a further embodiment to considerably improve the use of the lighter, the lighter has inter engaging holding formations on the tongue and on the body for releasable retaining the tongue in its inner position and inter-engaging release formations on the tongue and on the body for freeing the holding formations from each other when the tongue reaches its lower position. This eliminates the need to hold in the tongue while depressing the actuating button; instead the tongue is clicked in and then the button is pushed down. The inter engaging release formations include an inclined end surface on the tongue. The elastic tongue is thus held in the active position by its contact with the internal part of the wall of the body of the lighter until its release at the end of the descending travel of the operating lever.

In the case where the ignition mechanism of the lighter is the piezo electric type for example, the holding formation placed in the path of the inclined end of the free end of the elastic tongue in the active position for inducing disengagement of the detent means in the active position is comprised by a corresponding stop on the fixed element of the piezo electric mechanism.

According to a particular form of execution of the invention the detent means of the elastic tongue in the active position are comprised of two

protuberances where each is located on one of the lateral edges of the tongue, that is to say lodged in the window which separates the relevant side of the elastic tongue from the rest of the skirt of the operating lever, and where each is adapted to engage itself by elastic deformation behind a groove in the skirt of the operating lever.

The butting face of the elastic tongue can be comprised by its lower free side and the opposing butting face of the of the body of the lighter can be comprised by the upper side of the part of its wall located underneath the free lower side of the tongue. however following a preferred form of execution of the invention which improves the functioning of the lighter, the butting face of the elastic tongue is comprised of a external shoulder orientated towards the upper edge of the part of the wall of the body of the lighter located opposite, such upper edge which comprises the opposing butting face of the body of the lighter, the part of the elastic tongue located below the shoulder, which constitutes its butting face, being normally stressed elastically against the internal face of the corresponding part of the body of the lighter.

This arrangement presents the advantage that, if the elastic tongue is not previously displaced transversally in the direction interior of the skirt of the operating lever, the operation of this lever in the direction of ignition of the lighter is surely impossible because the shoulder comprises the butting face of the tongue surely engaging the opposing butting face of the body of the lighter.

In any case the invention is comprised in the following embodiment of the

lighter as a non limiting example with the help of the following description reference being made to the accompanying drawings in which:

Fig. 1 is a vertical longitudinal section;

Fig. 2 is a bottom view of the actuating element of the lighter of figure 1 shown separately;

Fig. 3 is a side view of the actuating element of figure 2, taken in the direction of arrow III of Fig. 2;

Fig. 4 and 5 are sections through a detail of the object of figure 1 showing the actuating element of the lighter shown respectively in the ready to be depressed in the direction of the ignition actuator and at the end of the ignition actuator;

The lighter represented in the drawings is of the type in which the ignition mechanism 2 is piezoelectric igniter having an upper part 2a, and movable towards a lower part 2b, against the force of a return spring not shown in the drawings. A second spring 4 is braced between the bottom part 2b and the body 8 and is somewhat softer than the spring 2c and the lighter body is provided with a burner 5 having a valve 5b and a nozzle 5a forming with an electrode 6 mounted on an adjacent housing partition 7 the two electrodes between which a spark is drawn when the igniter parts 2a and 2b are pressed together.

In this lighter the actuating element or button 11 has a lower surface 11a sitting atop the upper igniter part 2a and can be pressed longitudinally downward in the direction of arrow 3 so as first to push down a lever 9 that

opens the valve 5b and causes the nozzle 5a to emit a jet of gasified butane, and then to strike a spark between the electrode 6 and the nozzle 5a to ignite this gas jet.

As is shown in the drawings the actuating button 11 is formed with a downwardly projecting skirt 12 that normally fits just within the complementary inner surface of the lighter body 8.

As shown in particular in figures 2 to 5, according to the invention a portion of this skirt is formed as a longitudinally downwardly projecting tongue 13 standing out in the rear part, that is to say the part located on the right in the drawing. As shown in figure 1, when the button 11 is in the rest position the lower free end 13a of the elastic tongue 13 is engaged with the interior of the upper end 8a of the part with respect to the wall of the body 8 of the lighter. Besides the elastic tongue 13 is formed in such a way that the external face 13'a of its lower free end 13a is maintained elastically in a stressed condition against the internal face 8'a of the said part 8a of the wall of the body 8 of the lighter.

This tongue 13 comprises above its lower free end 13a engaged with the interior of the body 8 of the lighter, a shoulder 14 orientated in the direction of the upper side 8''a of the said part of the wall of the body 8 and projecting on its external face. The shoulder 14 of the tongue 13 comprising its butting face destined to enter into contact with the said upper side 8''a of the corresponding part of the wall of the body 8 of the lighter when the button 11 is displaced in the direction corresponding to the ignition of the lighter that is to say in the direction of arrow 3. The free side 8''a of the said part of the wall of the body 8 of the lighter comprises the opposing butting face fixed opposite to the butting face 14 of the shoulder of the elastic tongue 13.

One can easily imagine that the fact that the butting face 14 of the tongue 13 enters into contact with the opposing butting face 8''a of the body 8 of the lighter opposing displacement of the button 11 in the direction of ignition of the lighter. The tongue occupies in this case the active position of neutralisation of the operating member 11.

On the other hand, as shown by the spring in figures 4 and 5 of the drawings, to permit displacement of the button 11 in the direction of ignition of the lighter, that is to say in the direction of arrow 3, to the end of the travel shown in figure 5, it is sufficient to transversally displace the lower side of the elastic tongue 13 in the direction of the interior of the skirt 12 of the button 11, that is to say in the direction of arrow 15, until the position illustrated in figure 4, in which position the butting face 14 of the shoulder of the tongue 13 occupies a position in which its trajectory escapes the opposing butting face 8''a of the wall of the body 8 of the lighter. In this position active of the tongue 13, the button 11 can be pressed to the end of the ignition travel as shown in figure 5.

This displacement of the tongue 13 in its active position of figure 4 can be obtained easily by the user of the lighter by which it is sufficient to exercise a pressure on the tongue in the direction of arrow 15 and at the same time pressure on the button in the direction of arrow 3 for operating the ignition of the lighter. Naturally as soon as the butting face 14 is displaced towards the base below the level of the upper edge of the wall of the body 8 of the lighter comprising the opposing butting face 8''a, the user can loosen the tongue 13 then, even if its elasticity tend to make it return to its original position illustrated in figure 1, it will be stopped during its course of rearrangement by the force of the rear face of its shoulder against the interior face 8'a of the wall of the body 8 of the lighter.

It is only at the end of the course of return of the button 11 in the high position, as illustrated in figure 1, that the rear face of the shoulder of the tongue 13 escapes the upper edge 8''a of the wall of the body of the lighter, the tongue is able to retake its normal original position, that is to say the active position of safety.

As one can see the quality of the "resistance to children" of this lighter does not necessitate the presence of any supplementary components and consequently does not complicate its manufacture in any way, nor the assembly of the lighter.

In the example just described, the user of the lighter is obliged to maintain the tongue in the pressed position at the same time as he pushes the button 11 in the direction of the arrow 15 to permit the shoulder 14 to pass the opposing butting face 8''a of the wall of the body 8 of the lighter. Naturally one easily imagines that this operation is not extremely simple. This is why as shown more particularly in figures 2 and 3, following a perfected embodiment of the invention, the tongue 13 carries on each of its lateral edges 13''a a protuberance 13b projecting in the opening 17 which separates the respective edge 13''a from the rest of the skirt 12 of the button 11, each of the protuberances 13b being destined to assure the retention of the tongue 13 in the active position after its engagement beyond a stop 16 of the skirt 12 limiting the internal side of the respective opening 17. This engagement, which is only permitted by means of the elasticity of the material used, assures the retention of the tongue 13 in the active position for use.

Thanks to this arrangement the user can easily proceed then with the pressing of the button 11 to obtain ignition of his lighter.

Naturally it is indispensable that the means for assuring the return of the tongue 13 to the active position of neutralisation of the ignition mechanism 2 as soon as the button is returned to its top position of rest.

According to this form of execution illustrated in the drawings, the means of assuring the return of the tongue 13 to the position active of neutralisation are simply provided by one part, by an inclined edge 13''a provided at the free end 13a of the tongue 13 and by the other part the upper stop 2'b of the rear face of the fixed element 2b of the ignition mechanism 2.

In effect, examination of figure 4 shows that this stop 2'b finds itself on the trajectory of the inclined edge 13''a of the tongue 13 when the button 11 is displaced in the direction of arrow 3, its position being beyond located on a level higher than that occupied by the inclined edge 13''a when the button 11 occupies the release position of the ignition mechanism 2.

Naturally in the course of the return travel. That is to say the ascendance of the button 11, the tongue 13 is retained in the active position by the contact on its rear face with the interior face 8a of the wall of the body 8 of the lighter. But, when the protuberance 14 passes the level of the opposing butting face 8''a of the body 8 of the lighter, the tongue is returned by its own elasticity to its active position of neutralisation such as is represented in figure 1.

Naturally the same arrangement could be provided to a lighter of a different type, that is to say a lighter in which the ignition mechanism is not the piezo electric type and in which the sliding operating member is not provided by a button. In effect this arrangement can also be provided to a lighter with an operating member which is provided on the free rear end of a rocking

lever where the interior face would be surrounded by a skirt oriented towards the body of the lighter and in which would be arranged an elastic tongue 13 similar to the tongue in the example described.

CLAIMS

1. A lighter, resistant to children, having a sliding ignition operating member, of the type in which the operating member 11 of the ignition is slidably mounted, or effectively slidably, with respect to the body 8 of the lighter and in which the lower face 11a of the actioning part or pressing part of the member 11 is surrounded by a skirt, characterised in that,
at least one tongue 13 elastically deformable is arranged in the skirt 12 in a manner to present in the region of its free edge a butting face 14 normally opposite a opposing butting face 8''a appertaining to the body 8 of the lighter this tongue being susceptible to being displaced elastically and transversally to bring its butting face 14 in effective position with respect to the opposing butting face 8''a of the body 8 and to permit thus the pressing of the actioning part of the operating member 11 in the direction 3 of its course of ignition, this means being such as to maintain this tongue 13 in its effective position during at least a fraction of the curse of pressing or travel of the operating member 11 nd the means being also provided such that the tongue 13 automatically retakes its active position, under the sole effect of its elasticity, after its liberation by the first means at the end of the course of return to its original position.
2. The lighter according to claim 1, characterised in that the means for maintaining the elastic tongue 13 in the effective position during the course of the forward and return of the operating member 11 are comprised by the internal face 8'a of the part of the wall of the body 8 of the lighter against which the tongue 13 acts by its external face.



3. A lighter according to claim 1, characterised in that the means for maintaining the tongue 13 in its effective position during at least a fraction of the course of pressing of the operating member 11 are comprised by the detent means provided on the tongue 13 and on the skirt 12 and which are brought into the position of reciprocal engagement by displacement of the elastic tongue 13 in the effective position, the means for obtaining their disengagement after at least a fraction of the course of pressing of the operating member 11 is comprised of one part by an inclined edge 13''a provided at the free end of the elastic tongue 13 with the appropriate orientation and of the other part by a stop placed in the trajectory of this inclined edge 13''a, the elastic tongue 13 being then maintained in the effective position by its contact with the internal face 8'a of the corresponding part of the wall of the body 8 of the lighter, until its complete freeing, at the end of the course of ascendance of the operating member 11.
4. A lighter according to claim 3, characterised in that the stop placed in the trajectory of the inclined edge of the free end of the elastic tongue 13 in the effective position to induce engagement of the detent means in the effective position is comprised by the corresponding stop 2b of the fixed element of the piezo electric element.
5. A lighter according to claim 3 or 4, characterised in that the detent means of the elastic tongue 13 in the effective position are comprised by two protuberances 13b wherein each is situated on one of the lateral edges of the tongue 13, that is to say is located in the opening 17 which separates, the respective edge of the elastic tongue 13 from the rest of the skirt of the operating member 11, and wherein each is adapted to engage itself by elastic deformation behind a groove or



stop 2'b of the skirt 12 of the operating member 11.

6. A lighter according to any one of claims 1 to 5, characterised in that the opposing butting face 8a of the body 8 of the lighter is comprised by the upper side 8''a of the part of the wall of the body 8 located below the tongue 13.
7. A lighter according to any one of the claims 1 to 6, characterised in that the butting face of the elastic tongue 13 is comprised by its free lower side.
8. A lighter according to any one of claims 1 to 7, characterised in that the butting face of the elastic tongue 13 is comprised by an external shoulder 14 orientated towards the upper side 8''a of the part of the wall of the body 8 of the lighter located opposite.

