A utility lighter with a safety device having a trigger, a stop and a safety button. The trigger has a trigger engagement element and a lever. The trigger engagement element is capable of initiating the creation of a spark. The lever is capable of rotational movement about a point located on the trigger and has a lever stop. The safety button comprises a lever engagement portion. The lever has a first position where the lever stop is aligned with the stop and the lever stop will arrest the movement of the trigger preventing the creation of a spark and/or the release of fuel. Thus when a user applies force to the safety button, the lever engagement portion interacts with the lever. The lever engagement portion moves in a direction that is approximately transverse to the direction of movement of the trigger and urges the lever to a second position. When the lever is in the second position, the lever stop is out of alignment with the stop such that the movement of the trigger will not be arrested.
UTILITY LIGHTER WITH A SAFETY FEATURE

RELATED APPLICATIONS


FIELD OF THE INVENTION

[0002] The invention relates to utility lighters with a design to prevent unintended use. In particular, unintended use by children is to be avoided. A utility lighter typically has an extended rod from which a flame is produced when the user performs the necessary steps. Safety lighters typically require either an increased amount of effort by the user or multiple actions by the user to create a flame. The understanding is that by making it harder to create a flame, children will be less likely to cause harm to themselves, others and property. However, in order to be useful and successful lighter, the lighter must allow the user to create a flame without too much inconvenience. Therefore a proper balance between safety and convenience must be struck.

[0003] Lighters must also be relatively inexpensive to make in order to be commercially viable. While elaborate designs may provide for the perfect balance between safety and convenience, if they are not commercially viable, they will not make it to the marketplace. Thus, a major design consideration and goal is to make a device that is as simple as possible yet still prevent unintended ignition.

BACKGROUND OF THE INVENTION

[0004] Utility lighters are very common and have a variety of uses. However, the design of safety lighters must hinder unintended use, particularly use by children. In fact, the United States government mandates that all utility lighters must be child resistant. All utility lighters must meet the Consumer Products Safety Commission safety standards before they may be sold with the US.

[0005] In addition to the safety aspect of the design, the lighter must be easy and inexpensive to produce. Given that the design and material cost are typically increasing, there is a desire to decrease the number of parts, reduce the complexity and limit the minimum number of material needed for each unit. This is typical of most commercially produced products.

[0006] Accordingly, there is a need for a lighter that meets the requirements of the US Government and is both inexpensive and easy to produce. The present invention provides a design that is believed to provide adequate protection for children while providing a convenient to use lighter with a reduction in manufacturing cost.

[0007] The instant invention provides for a device with improved reliability and a low cost of manufacture.

SUMMARY OF THE INVENTION

[0008] In summary the invention is for a new safety feature for a utility lighter. The design provides for a lever to act against a stop and prevent the trigger from actuating both the fuel valve and the piezoelectric unit. A safety button that is pressed towards the body of the lighter engages the lever to move it out of alignment with the stop so that the trigger may be fully actuated. The trigger is then able to cause the creation of a spark and the release of fuel; the elements necessary for the creation of a flame.

[0009] Due to the design of the safety feature, the lighter is economical and provides for the reasonable resistance of use by children.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is an overview of one embodiment of present invention;
[0011] FIGS. 2 and 3 show the trigger of the present embodiment;
[0012] FIG. 4 shows the interaction between the trigger and the stop preventing actuation;
[0013] FIGS. 5 and 6 show the safety button on the axle;
[0014] FIGS. 7-10 show how the present embodiment of the invention in operation to move the lever out of alignment with the stop so as to allow actuation of the trigger;
[0015] FIG. 11 show another embodiment of the invention where the safety button is linearly actuated; and
[0016] FIGS. 12 and 13 shows another embodiment of the invention where the safety button actuates the valve lever.

DETAILED DESCRIPTION OF THE DRAWINGS

[0017] The present invention will hereinafter be described in further detail with reference to the accompanying drawings.

[0018] The first embodiment is shown in FIG. 1. The Safety Utility Lighter comprises a body 10, a piezoelectric unit 20, fuel storage 70, a valve lever 43, a trigger 40 and a safety button 50. The trigger 40, when actuated, will release the flow of fuel and initiate the piezoelectric unit 20 to create a change that will result in a spark at the tip of the rod where it will ignite the released fuel. This is typical of many utility lighters.

[0019] Looking at FIGS. 2 and 3, the trigger 40 is shown in great detail. The trigger 40 comprises of a trigger engagement arm 41, a user engagement portion 42, a lever 43, a lever stop 44, a slanted surface 45, and grooves 46. The trigger engagement arm 41 is shown as an elongated member. The trigger engagement arm 41 will cause the actuation of the piezoelectric unit 20 and the valve 50 when the trigger 40 is actuated a predetermined distance. The user will engage the trigger 40 typically by placing a finger on the finger engagement portion 42.

[0020] The trigger 40 also has a lever 43 incorporated in its design. The lever is situated, in the present embodiment, between the two grooves 46. The material in-between the grooves 46 comprises the lever 43. The lever 43 is able move and return to its original position due to the nature of the material used. The resistance and range of movement of the lever 43 can be altered by adjusting the material used, the length, the thickness and/or any combination of factors.

[0021] The lever 43 has a lever stop 44. The lever stop 44 will act against the stop 11 to prevent actuation of the trigger 40. In the normal position, the lever stop 44 is aligned with the stop 11 and will prevent the trigger 40 from fully actuating. The strength of the lever 43 will prevent the user from fully actuating the trigger 40. In the present embodiment the lever stop 44 is shown with an “L” shape. The shape corresponds to that of the stop 11. In other embodiments, lever stop 44 may have no particular shape other than being an extension of lever 43. However the lever stop 44 may have “<” or “>”
shape. The stop 11 may also have corresponding shape, "<" or "">". The purpose of the interaction between the lever stop 44 and the stop 11 is to prevent the lever 43 from moving out of alignment with the stop 11 unless acted upon by the lever engagement portion 51 of the safety button 50. The shape of the lever stop 44 and, correspondingly, the stop 11 can be any geometric shape that will help prevent the lever 43 from slipping out of alignment with the stop 11 when pressure is applied to the trigger 40.

[0022] FIG. 4 shows the interaction between the lever stop 45 and the stop 11 according to the present embodiment. Thus when the trigger 40 is actuated, the lever stop 45 and the stop 11 abut each other and arrest the movement of the trigger 40. In the present embodiment, this limited movement prevents the trigger engagement arm 41 from causing fuel release and the creation of the spark. Other embodiments can limit the distance of the actuation of the trigger 40 before it is arrested so that it may cause the release of fuel but not the creation of a spark or vice versa.

[0023] FIGS. 5 and 6 show the safety button 50 in accordance with the present embodiment. The safety button 50 comprises of a user engagement portion 51; three button stops 52, 53, and 54; pivot 55; a spring groove 56 and a lever engagement portion 57. The safety button 50 of the present embodiment rotates about the axis 52 against the urging force of the spring 60 when the user presses the user engagement portion 51. When the safety button 50 rotates, the lever engagement portion 57 comes into contact with the lever stop 44 and urges the lever 43 out of alignment with the stop 11. While the safety button 50 is being rotated, the movement will be arrested by two of the button stops 52 and 53. Button stop 52 will come to abut the stop 11 and button stop 53 will abut the body 10 of the lighter. It is important to arrest the movement of the safety button 50 because over actuation of the lever 43 will cause the material of the lever 43 to move out of the elastic range and into plastic deformation range. Once a material moves into the plastic deformation range, the material will experience permanent deformation. If the lever 43 experiences permanent deformation, the lever 43 could permanently be out of alignment with the stop 11. In order to vary the properties of the lever 43, other embodiments may have a lever 43 that is made of a material that can withstand more or less actuation and/or change the length of the lever arm to vary the angle of deflection. Also other embodiments may use only one stop, 52 or 53, in lieu of both.

[0024] In the present embodiment the safety button 50 works against the urging force of the spring 60. The spring rests against the safety button 50 in a groove 56. The groove 56 is best seen in FIG. 7. When the user releases the button 50, the urging force of the spring 60 will force the safety button back to its original position. When moving back to its original position, the button stop 54 will arrest the return movement of the safety button 50 when the button stop 54 abuts the body 10. In other embodiments, there is no need for the spring 60. The lever 43 will supply both the resistive and the return force. In those embodiments the lever 43 will be configured, by material and shape, to provide both required resistive force to safety button 50 actuation and the return force to force the safety button 50 back to its original position. In one embodiment the resistive force provided by the lever 43 will require the user to exert a pound or more of force on the safety button 50.

[0025] FIGS. 7-10 show how the present embodiment works. The user will first actuate the safety button 50, overpowering the urging force of the spring 60 and lever 43, such that the lever engagement portion 57 will engage the lever 43 and move the lever stop 44 out of alignment with the stop 11. The safety button 50 engages the lever 43 in approximately a perpendicular direction. The perpendicular engagement will provide for an efficient means to move the lever 43. At which point the user is able to actuate the trigger 40 by applying pressure via the finger engagement portion 42. The trigger 40 will move along its path and actuate the control arm 31 to open the valve 30 and release fuel and actuate the piezoelectric unit 20 to create a spark. As seen in FIG. 10, the back side of the stop 11 has a shape, slanted in this case, to allow the lever 43 to return to its original position when the trigger 40 is actuated such that the lever stop 44 has moved past the stop. Once the user is finished, the user will release the trigger 40 and the safety button 50, allowing all the elements to return to their original unactuated position. In the present embodiment, the piezoelectric unit 20 will force the trigger 40 back to its original position, and the spring 60 will force the safety button back 50 to its original position. Thus when the trigger 40 is returning to its original position, the slanted surface 45 will slide against and under the stop 11 and return the lever original position and the lever stop 44 is once again aligned with the stop 11. As shown, the stop 11 has a slanted surface that engages the slanted surface 45 to assist the lever stop 44 move underneath the stop 11 and into the original position. However if the user has maintained the safety button 50 in the actuated position, the lever engagement portion 57 will keep the lever stop 44 out of alignment with the stop 11 so that the user can repeatedly actuate the trigger 40 as is often required to ignite lighters. Also during use, the user can release the safety button and maintain the trigger 40 in the actuated position, the fuel will continue to flow and feed the flame.

[0026] In other embodiments, the stop 11 will not allow the lever 43 to return to an unbent position when the trigger 40 is full actuated. It is also possible to design the stop 11, the lever stop 44 and the slanted surface 45 such that the parts will act to return the trigger 40 to its original position. This is accomplished by having the lever 43 act and stop 11 of a shape and interaction such that the restorative force of the lever 43 against a shape of the stop 11 will translate the vertical force of the lever 43 into lateral force to move the trigger 40 to its original position. Obviously the lever stop 44 and the stop 11 must function to prevent unintended ignition.

[0027] FIG. 11 shows an embodiment wherein the safety button 50 has linear movement as opposed to rotational movement. The lever engagement portion 57 of the safety button 50 engages the lever 43 in a substantially perpendicular direction. As with the other embodiment, the user will press the safety button 50 to move the lever 43/lever stop 44 out of alignment with the stop 11 so that the user is able to fully actuate the trigger 40 and cause the piezoelectric unit 20 to create a charge for a spark.

[0028] FIGS. 12 and 13 shows an embodiment wherein the safety button 50, in addition to actuating the lever 43, actuates the valve lever 31. FIG. 12 shows an embodiment wherein the valve lever 31 and the safety button 50 are integral or made of a single piece of material. FIG. 13 shows an embodiment wherein the safety button 50 is separate from the valve lever 31. While these embodiments are shown with a rotating safety button 50, it is contemplated that these embodiments can employ a linearly actuating safety button 50. In these embodiments when the user actuates the safety button 50, the valve lever 31 is actuated by the safety button 50 to cause the
valve 30 to release fuel. Thus the user needs only to actuate the trigger 40 to cause the piezoelectric unit 20 to create a spark. Once a flame is created, the user can release the trigger 40 and maintain a flame by keeping the safety button 50 actuated.

[0029] The present invention may be embodied in other specific forms without departing from the essential characteristics. While the invention has been described above with respect to several different embodiments, any element or method described in reference to any particular embodiment is hereby disclosed to be associated with any other embodiment of the invention. The described embodiments are to be considered in all respects as illustrative and not restrictive.

What is claimed is:

1. A utility lighter comprising:
   a body, a fuel storage container, a spark generation unit, a trigger, a stop and a safety button;
   wherein the trigger comprises a trigger engagement element, a finger engagement portion, and a lever;
   wherein the trigger engagement element is capable of initiating creation of a spark;
   wherein the lever is capable of rotational movement about a point located on the trigger, and
   wherein the lever comprises a lever stop; the safety button comprises a user engagement section and a lever engagement portion;
   wherein the lever has a first position, in the first position the lever stop is aligned with the stop such that when the trigger is actuated the interaction between the stop and the lever stop will arrest the movement of the trigger;
   wherein when a user applies force to the user engagement section, the safety button is moved and causes the lever engagement portion to interact with the lever; the lever engagement portion moves in a direction that is substantially perpendicular to a path the trigger takes when being actuated and urges the lever to a second position; wherein when the lever is in the second position, the lever stop is out of alignment with the stop such that the movement of the trigger will not be arrested.

2. The lighter of claim 1 wherein the safety button is configured to actuate the valve lever when the safety button is actuated.

3. The lighter of claim 1 wherein the trigger engagement element is configured to actuate the valve lever when the trigger is actuated.

4. The lighter of claim 1 wherein the safety button rotates about a pivot.

5. The lighter of claim 1 wherein the safety button linearly actuates.

6. The lighter of claim 1 wherein a resistive force of a pound or more against actuation of the safety button exist as measured by the user engagement portion.

7. A lighter comprising:
   a body, a trigger, a stop, a safety button, a piezoelectric unit, a fuel release element and a fuel storage container;
   wherein the trigger comprises of a finger engagement portion, a trigger engagement element, and a lever;
   wherein the finger engagement portion is exposed so that a user is able to actuate the trigger along a set path, wherein the trigger engagement element serves to cause the actuation of the piezoelectric unit when the trigger is moved a predetermined distance along the set path, and
   wherein the lever is capable of movement about a connection point on the trigger; and the lever comprises of a lever stop that is aligned with the stop when the lever is in a first position; thus when the lever is in the first position the trigger, is prevented from moving fully along the path as the lever stop is aligned with and will abut the stop when a user actuates the trigger, the engagement of the lever stop and the stop occurs before the trigger engagement element is able to actuate the piezoelectric unit;
   the safety button comprises of a user engagement portion and a lever engagement portion, wherein the user engagement portion is exposed so that a user is able to actuate the safety button, wherein the lever engagement portion is located inside the body and engages the lever by moving in a direction that is substantially transverse to the path of the trigger;
   wherein when a user actuates the safety button, the lever is moved by the lever engagement portion to a second position, wherein when the lever is in the second position, the lever stop is out of alignment with the stop, the trigger is free to move along the path and the trigger engagement element is able to cause the actuation the piezoelectric unit.

8. The lighter of claim 7 wherein the safety button is configured to actuate the valve lever when the safety button is actuated.

9. The lighter of claim 7 wherein the trigger engagement element is configured to actuate the valve lever when the trigger is actuated.

10. The lighter of claim 7 wherein the safety button rotates about a pivot.

11. The lighter of claim 7 wherein the safety button linearly actuates.

12. The lighter of claim 7 wherein a resistive force of a pound or more against actuation of the safety button exist as measured by the user engagement portion.

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