

[54] **PIEZO-ELECTRIC CIGARETTE LIGHTER**

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3,724,993 4/1973 Goto ..... 431/255

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[58] Field of Search ..... 431/255; 317/81

[57] **ABSTRACT**

A piezo-electric lighter wherein the control key thereof is adapted to actuate an intermediate sliding member for compressing the striker spring so that when the key is released the spring expansion causes the assembly to resume automatically its reset position by virtue of the off-setting of the bearing point of this intermediate member in relation to fulcrum of said key.

[56] **References Cited**

**UNITED STATES PATENTS**

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**4 Claims, 6 Drawing Figures**

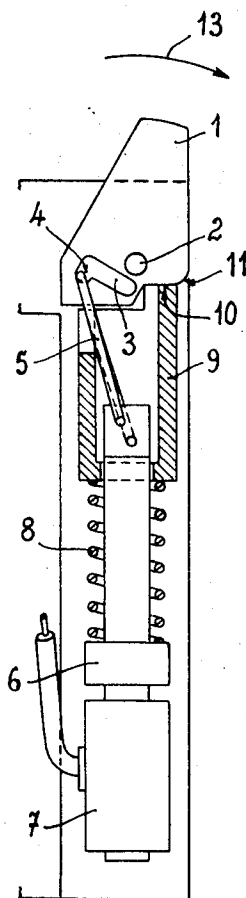


FIG. 1

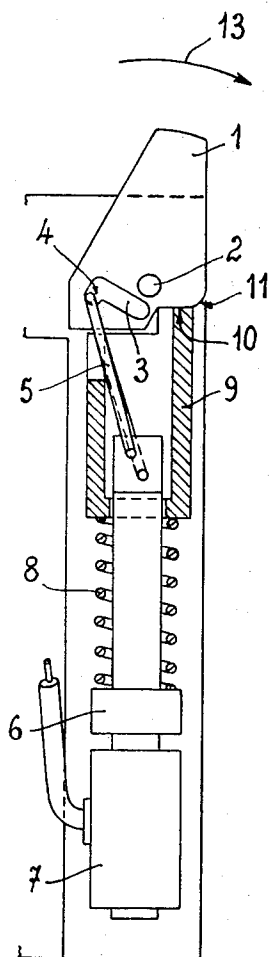


FIG. 2

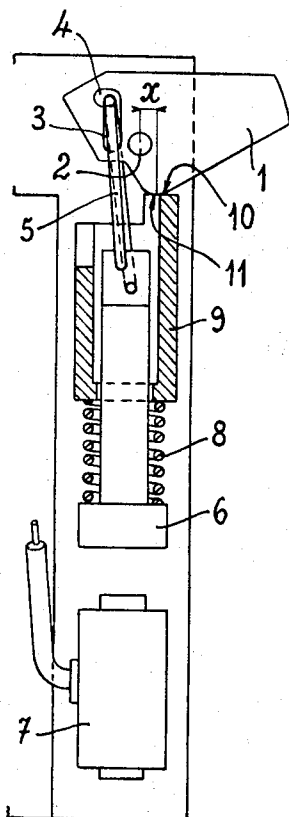


FIG. 3

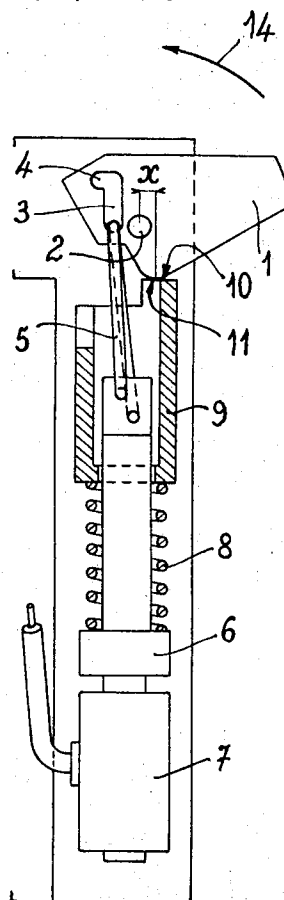


FIG. 4

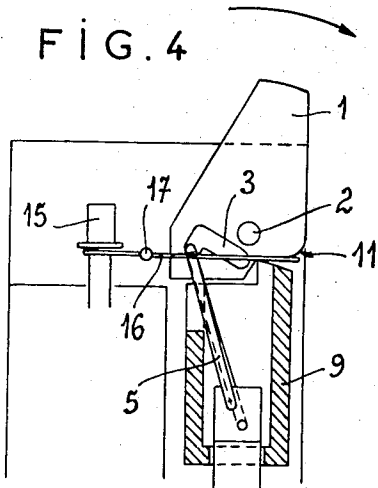


FIG. 5

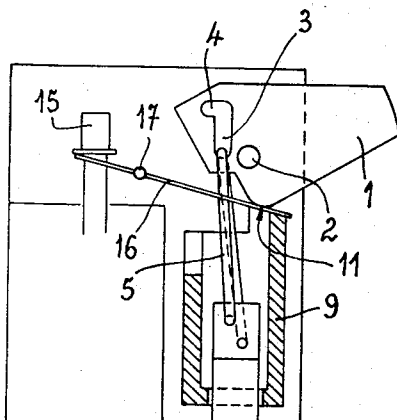
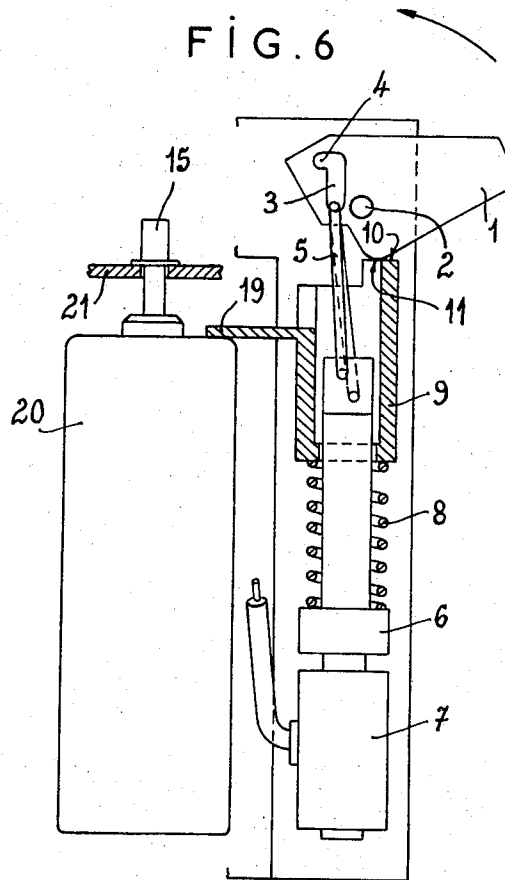


FIG. 6



## PIEZO-ELECTRIC CIGARETTE LIGHTER

## BACKGROUND OF THE INVENTION

The present invention relates in a general to piezo-electric lighters and has specific reference to lighters of the type wherein the rocking of a control member causes a striker to be lifted while compressing a return spring, the sudden release of this striker causing same to hit the piezo-electric crystal.

It is a specific object of this invention to provide an improved lighter of this type with a view to ensure the automatic resetting thereof.

To this end, this invention resides in causing the push-down control member to actuate an intermediate sliding member adapted to compress the striker return spring whereby, when the operator's finger releases the push-down control member, the assembly, due to the spring reaction, resumes automatically its reset position due to the shifting of this intermediate sliding member in relation to the pivot pin or fulcrum of the control member.

According to a specific embodiment of this invention, the striker is operatively connected to the push-down control member through a small two armed link engaging in a known fashion a retaining notch formed in an elongated aperture of said control member, said link consisting preferably of a spring-steel wire bent to a hairpin configuration and having its two arms attached to the striker at two off-set suspension points, whereby this link, due to the torsion exerted thereon when actuating said control member, acts as a resetting spring.

According to another object of this invention and in the specific case of the application of this device to a cigarette lighter operating on gaseous fuel, advantage is taken of the downward movement of the intermediate member, or of the cam contour of the push-down control member, for controlling a pivoting lever and thus opening the gas control valve.

The downward movement of said intermediate member may also be utilized for opening the gas valve as a consequence of a downward movement of the fuel reservoir, the burner head being in this case retained by a fixed stop member.

## BRIEF DESCRIPTION OF THE DRAWING

A clearer understanding of this invention will be had if reference is made to the attached drawing illustrating diagrammatically by way of example typical embodiment of this invention. In the drawing:

FIGS. 1, 2 and 3 show generally the piezo-electric lighter of the invention in fragmentary sectional-elevational views, namely in the inoperative position, in the position preceding immediately the striker release and in the position following immediately the striker release, respectively

FIGS. 4 and 5 are similar views showing an embodiment of the gas control means in the inoperative closed and operative open positions in the case of a cigarette lighter operating on gaseous fuel; and

FIG. 6 illustrates another embodiment of the gas control means.

## SPECIFIC DESCRIPTION

Referring to the drawings, the reference numeral 1 designates the control or push-down lever or key ful-

crumed about a fixed pivot pin 2 and formed with an elongated slot or groove 3 having at its inner end a retaining notch 4; this slot or groove 3 is engaged by a link 5 from which the striker 6 is suspended; the piezo-crystal is designated at 7 and the spring 8 is adapted, when released, to cause the striker 6 to hit the piezo-crystal 7.

According to this invention, this spring 8 is retained on the one hand between the head portion of striker 6 and an intermediate sliding member 9 engaging with its upper face, at 10, the lower-cam forming portion 11 of key 1. As shown, this bearing point 10 is off set by a distance  $x$  in relation to the vertical projection of pivot pin 2.

When inoperative, the lighter elements are positioned as shown in FIG. 1. When the key 1 is pivoted in the direction of the arrow 13, the striker 6 is pulled upwards by the link 5 retained in notch 4, so that the spring 8 is compressed (FIG. 2).

At the end of the pivotal movement of key 1 the linkage 5 escapes from said notch 4 and is thereby released, thus freeing the striker 6 which hits the piezo-crystal 7 and causing the ignition.

When the operator's finger is removed from the key 1, the reaction of spring 8 is exerted against the intermediate member 9 and as a consequence of the off-set  $x$  the key 1 is returned to its inoperative position by pivoting in the direction of the arrow 14 (FIG. 3), thus restoring the assembly to reset position shown in FIG. 1.

The link 5 consists of a spring-steel wire bent to a hairpin configuration and having its two ends retained in the shank of the striker 6 but at two anchor points somewhat off-set from one another whereby the torsion movement thus imparted to this link will cause the latter to re-engage automatically the notch 4.

In the embodiment illustrated in FIGS. 4 and 5 illustrating the application of this invention to a cigarette lighter operating on gaseous fuel and equipped with a burner 15, a burner control lever 16 is fulcrumed about a fixed pivot pin 17 carried by the head of the lighter and retained under a shoulder of said burner 15. This lever 16 bears with its opposite end on the top face of the intermediate member 9 or under the cam portion 11 of key 1, whereby, during the rocking movement impressed by this key (FIG. 5), the lever 16 is pivoted and lifts the burner 15, thus opening the gas valve (not shown).

In a modified embodiment shown in FIG. 6 the intermediate member 9 comprises a projection 19 engaged from beneath by the fuel reservoir 20 of the lighter. This reservoir 20 is suspended by means of its burner 15 from the fixed head 21. As a result, when the intermediate member 9 is lowered, the reservoir 20 is also lowered and pulls the burner 15 to open the gas valve.

It will readily occur to those skilled in the art that various modifications and variations may be brought to the specific forms of embodiment of the invention which are shown and described herein, without inasmuch departing from the basic principle of the invention as set forth in the appended claims.

What I claim as new is:

1. A piezo-electric cigarette lighter comprising a body, a piezo-electric crystal mounted in said body, a striker juxtaposed with said crystal and displaceable in said body from a position remote from said crystal into

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impact therewith to ignite the lighter, an intermediate member movable in said body, a spring compressible between said striker and said intermediate member upon relative displacement thereof toward one another and movement of said striker into said position, a key 5 pivotally mounted on said body and having a bearing portion offset from its pivot and cammingly engageable with said intermediate member, and a link connecting said key with said striker to draw said striker into said position upon rotation of said key and thereafter re- 10 lease said striker for impact against said crystal, said bearing portion being positioned relative to said pivot and being shaped so as to rotate said key to reset the same upon release of said striker.

2. The cigarette lighter defined in claim 1 wherein 15 said link comprises a steel spring wire bent in a hairpin

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configuration and having a pair of arms engaging said striker at locations offset from one another whereby said arms resiliently bias said key toward its reset position, said link constituting thereby a resetting spring.

3. The lighter defined claim 1 wherein said body is provided with a gas control valve for releasing ignitable gas, further comprising a pivotal lever on said body dis- placeable by said key and operatively connected with said control valve for operating same.

4. The lighter defined in claim 1 wherein said body is formed with a fuel reservoir and a gas valve openable by displacement of said fuel reservoir, said member being engageable with said reservoir for displacing 15 same to open said valve.

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