

March 9, 1954

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2,671,329

MECHANICAL POCKET LIGHTER

Filed Nov. 29, 1950

Fig. 1.

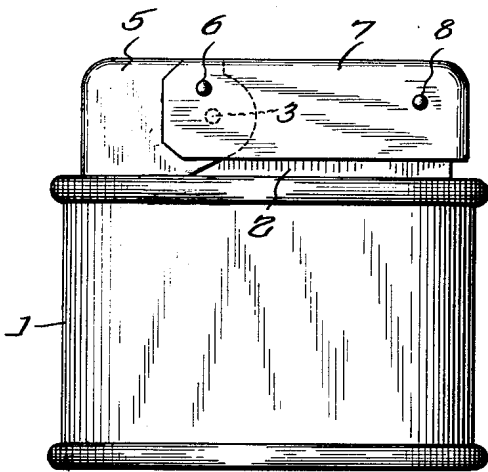


Fig. 2.

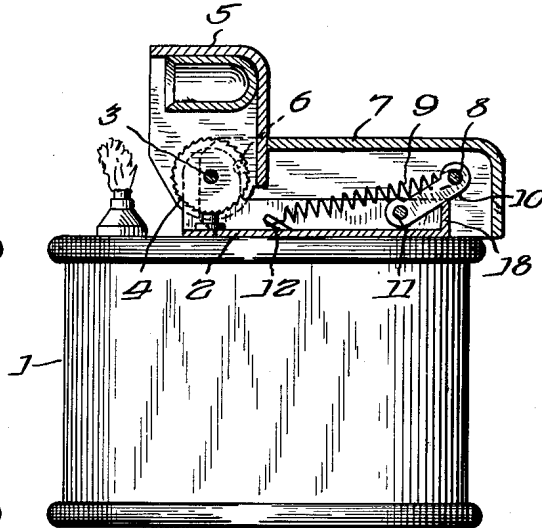


Fig. 3.

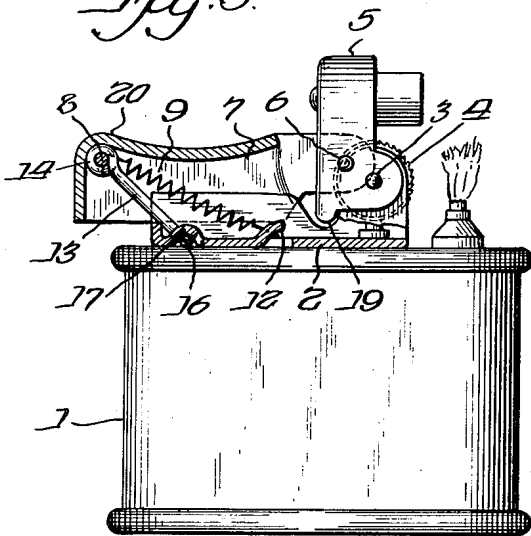
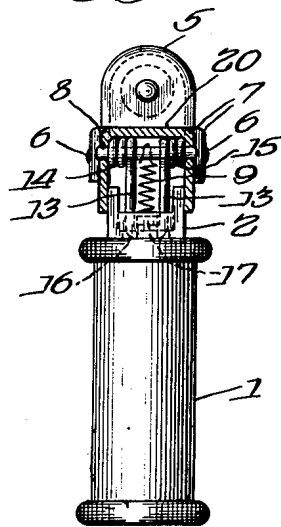


Fig. 4.



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UNITED STATES PATENT OFFICE

2,671,329

MECHANICAL POCKET LIGHTER

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Application November 29, 1950, Serial No. 198,063

Claims priority, application Germany
December 27, 1949

2 Claims. (Cl. 67—7.1)

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This invention is concerned with a mechanical lighter having a boxlike actuating element which encloses the operating mechanism and which is linked therewith in such a manner that downward pressure exerted thereon causes displacement thereof in a direction substantially in parallel with the top of the lighter casing, thereby operating the flint wheel and also displacing the wick-cap carrier into open position.

Mechanical lighters are known in which the flint wheel and wick-cap carrier are mounted on the same axis and are operated by an actuating member moving over the top or cover of the lighter body or casing. In the known structures, the flint wheel axis, the pivot of a retaining lever which holds the actuating member on the top of the lighter casing, and the pivots connecting the actuating member to the retaining lever and the wick-cap carrier form a four-point linkage. Lighters of this type are operated by drawing back the actuating member by the thumb of the hand holding the lighter, whereby a spring attached at one end to the pivot connecting the actuating member to the retaining lever and at the other end to the top of the lighter, is extended and, after release of the thumb pressure on the actuating member, returns the latter together with the wick-cap carrier into the original closed position.

A disadvantage of this type of lighter, in addition to its complicated mechanical construction and to having parts exposed, is that, when the lighter is actuated, the actuating member is made to move backward and at the same time tilt obliquely downward, in such a manner that the operator's thumb tends to slip off. The thumb is also in an unnatural, strained position. Lighters of this type have not, therefore, found much favor with the public.

It has been proposed to obviate this disadvantage by an arrangement in which the actuating member moves in a slot in a guide frame secured to the top of the lighter casing, an additional tension member being provided between the actuating member and the wick-cap carrier, which actuates the flint wheel in such manner that the lighter is operated by pressing the actuating member down on the top of the lighter casing. In contradistinction to the previously mentioned structure, the motion of the actuating member is in this embodiment in a forward and obliquely upward direction, instead of backward and obliquely downward. However, such position and operation also fail to correspond to the natural position of the thumb in exerting the required pressure; and, furthermore, such arrangement

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of the mechanism requires the provision of additional tensioning members and linkages which not only increase the production cost but, in particular, impair the reliability of operation.

A particular disadvantage of the type of lighter just described is, further, that the manner of connecting the actuating member to the mechanism increases the resistance to its required motion, since the displacement entailed in its angular position relative to the top of the lighter casing causes the thumb to exert an increased pressure on the latter instead of pressing in the contrary direction to reduce the resistance encountered. The total resistance to be overcome in operating the lighter is thus increased, and a considerable force is required to open or actuate the lighter, rendering its operation more difficult.

In addition, the construction of the parts and guide elements of the lighter mechanism is not the most favorable for the purpose, thereby further adversely affecting the reliability of operation.

The present invention obviates the above-noted disadvantages by the provision of an actuating mechanism based on the principle of a four-point linkage formed, respectively, by the axis of the flint wheel, the pivot of the retaining lever on the lighter casing, and the pivots connecting the actuating member to the retaining lever and to the wick-cap carrier, respectively.

In accordance with the invention, the two pivots connecting the actuating member to the wick-cap carrier are located in normal position of the actuating member slightly in front of and above the flint wheel axis, while the pivots connecting the actuating member to the retaining lever are arranged approximately at the same level, and in such relation to the axis of the flint wheel and to the pivot of the retaining lever that, when the lighter is operated, the actuating member is moved in a direction nearly parallel to the top of the lighter casing. This eliminates undesired additional pressure on the actuating member due to angular displacement thereof with reference to the top of the lighter casing, so that only the usual resistance has to be overcome, which is mainly that due to the pressure of the flint against the flint wheel. Furthermore, the thumb is not required to assume any unnatural or constrained position, but only to exert a naturally convenient downward pressure.

The actuating member is suitably of boxlike shape, open at the bottom and closed at the top and one end, the inner faces of its side walls being guided on a frame secured to the top of the lighter casing. The auxiliary operating ele-

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ments, such as rocker arms and spring, are thus covered and an exceedingly compact arrangement is produced which does not exhibit any exteriorly protruding parts.

Another substantial advantage of the lighter made in accordance with the invention is that the structure is exceedingly simple, the mechanism consisting merely of the wick-cap carrier, actuating member, and spring-loaded retaining lever. The assembly of the parts is very simple. Complete reliability of action is assured, and repairs, which are frequently necessary in the usual lighters, are practically excluded or at least held at a minimum.

The retaining lever, which is hinged at one end to the guide frame on the lighter top and at the other end to the actuating member, is suitably made in one piece, e. g., in the form of a flat rocker arm.

Alternatively, the retaining lever may be in the form of a U-shaped member, the free ends of which are so shaped as to form bearing eyes for the pivot pin retaining the lever on the actuating member. The base is directly connected to the guide frame of the lighter mechanism. For this purpose, a tongue is punched out of the bottom of the frame and bent upward to form an eye. For assembling, the base of the retaining lever is passed under the tongue of the guide frame and the latter is then pressed down, so as to form a bearing.

The substantially parallel and consequently advantageous movement of the actuating member relative to the top of the lighter casing, as contemplated by the present invention, may be further aided by forming a shallow depression in its upper surface, in which the thumb of the hand operating the lighter can conveniently rest.

The invention provides a simple and consequently economical means of insuring a reliable and easy actuation of the lighter and satisfactory guidance of the actuating member. To reduce friction, it is recommended to make the retaining lever of steel, and the pivots of suitable material, e. g., of brass. The structure may be further enhanced by making the retaining lever in the form of a U-shaped wire and coiling the free ends thereof so as to act as elastically disposed bearing eyes which insure gentle contact with the inside walls of the actuating member.

The above-noted objects and additional objects and features will appear from the detailed description which will presently be rendered with reference to the accompanying drawings showing examples of pocket lighters. In these drawings,

Fig. 1 shows an elevation of an example of lighter in the closed position;

Fig. 2 indicates the lighter mechanism of Fig. 1 in open position, with some parts in section;

Fig. 3 illustrates another embodiment, in open or actuated position, with some parts shown in elevation and others in sectional view; and

Fig. 4 is a view of the lighter, as seen from the left or rear of the structure shown in Fig. 3, with the rear end of the slide mechanism removed.

In all figures, numeral 1 indicates the lighter casing, 2 the guide frame disposed on the top thereof, 3 the common pivot for the flint wheel shown at 4, and 5 the wick-cap carrier. The latter is connected to the actuating member 7 at the points 6 which, in the closed position of the lighter, are situated slightly in front of and above the flint wheel pivot 3. The actuating

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member 7 is pivotally connected at 8 at approximately the same level as the points 6 to a retaining lever 10 and 13, respectively. A tension spring 9 is secured at one end, at 12, to the top of the lighter casing 1 and at the other end to the pivot 8 of the retaining lever. When the lighter is actuated by pressing down the actuating member 7, this spring is extended and, after release of the pressure, returns the actuating member and therewith the wick-cap carrier 5 into the normal closed position.

In the structure shown in Figs. 1 and 2, the retaining lever 10, which is pivoted at 8 to the member 7, is in one piece and is in the form of a flat rocking arm which is pivoted at 11 to the guide frame 2. The tensioning spring 9 is attached to the guide frame 2 by a separate pin 12.

In the structure according to Figs. 3 and 4, the retaining lever 13 is made in the form of a U-spring, both arms of which are bent at their ends to form short coils 14 and 15 which act as bearings for the pivot pin 8. These coils are resilient and bear gently in axial direction against the inner walls of the actuating member, thus assisting in holding it in proper position at rest as well as during its displacement. The base 16 joining the two arms of the U-shaped retaining lever 13 acts in the guide frame 2 directly as a bearing for the actuating member. Upon assembling the mechanism, the base 16 is placed behind a tongue 17 punched out of the guide frame 2, and the latter is then pressed down, forming a journal therefor. The spring 9 returns the actuating member 7, after release thereof, into the initial normal position, in the same manner as already described in connection with Figs. 1 and 2.

In the structure according to Figs. 1 and 2, the stop which limits the displacement of the actuating member 7 and the wick-cap carrier 5 is the rear wall 18 of the guide frame 2 against which the rocker arm 10 comes to abut. In the structure according to Figs. 3 and 4, there is provided a recess 19 in the guide frame 2 against which the rear end of the wick-cap carrier 5 abuts in open position thereof, the recess thus functioning as a stop.

The actuating member 7 is in either embodiment a box-shaped element which is closed on top and at the rear end, fitting on both side walls on the guide frame 2 and enclosing the lighter mechanism, so that the outside of the lighter is smooth and without exteriorly protruding parts, thus appreciably enhancing the appearance and reliability of the mechanism. The pivot points 3, 6, 8 and 11 of the lighter mechanism are so arranged, in accordance with the invention, that the movement of the member 7 by the pressure of the operator's thumb is nearly parallel to the top of the lighter casing 1. This arrangement of the elements of the actuating mechanism, in conjunction with the simplicity of construction, in particular of the retaining lever as a U-shaped element, insures not only an easy and reliable operation, but also a very compact structure which can be produced and sold at reduced cost. The friction is less, and the operator's thumb is not required to exert any unnecessary pressure.

The operation is further facilitated by the provision of the shallow depression 20 in the top of the actuating member 7, for accommodating the thumb, as shown in Figs. 3 and 4.

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Changes may be made within the scope and spirit of the appended claims.

I claim:

1. In a mechanical pocket lighter having a casing forming a lighter fluid reservoir from the top wall of which extends at one end thereof a duct containing a wick and having a frame providing a bottom wall disposed on said top wall and upwardly directed side walls and having a flint wheel rotatably mounted between the side walls of said frame at the inner end thereof which is adjacent said wick duct and having a cross-sectionally generally U-shaped actuating member forming a top wall and side walls extending therefrom which is disposed in inverted position on said frame rearwardly of said wick duct with its side walls depending downwardly and overlapping the outside of the upwardly directed side walls of said frame and having a wick cap carrier which is pivotally linked with said actuating member at the inner end thereof which faces said wick duct, a device for linking the rear end of said actuating member with said frame to dispose it thereon in a normal position extending substantially in parallel with the top wall of said casing and with said wick cap carrier extending therefrom in close position in a substantially common plane for displacement relative to said frame responsive to downward pressure exerted thereon which causes such actuating member to move downwardly and simultaneously rearwardly sideways away from said flint wheel and substantially in parallel with the top of said casing so as to move said wick cap carrier angularly into open position and to rotate said flint wheel to strike a spark for igniting the wick; said device comprising a retainer member having a base which extends transversely within said frame at the bottom and substantially at the rear end thereof, legs extending angularly upwardly from said base integral therewith in the manner of the legs of a U, the free end of each of said legs being shaped to form a coil

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laterally extending therefrom in a direction which extends substantially in parallel with said base, a bearing pin extending transversally of the depending side walls of said actuating member substantially at the rear end and underneath the top wall thereof, said coils formed at the free ends of the legs of said retainer member surrounding said pin as a bearing therefor and the laterally directed free outer ends of said coils resiliently abutting the inside of the depending side walls of said actuating member, and a spring having one end anchored on said bearing pin and the other on the bottom wall of said frame which exerts a pull on said bearing pin and therewith on said actuating member to restore such actuating member to its normal position responsive to release of the pressure exerted thereon to operate it to actuated position, said bottom wall having an eyelet struck therefrom forming a journal pivotally securing the base of said retainer member to said frame.

2. The structure defined in claim 1, comprising an extension projecting rearwardly from said wick cap carrier, a recess being formed in a side wall of said frame to receive said extension in stop engagement therewith when said wick cap carrier is moved to open position by the operation of said actuating member.

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