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H. KONRAD

2,451,188

PYROPHORIC LIGHTER

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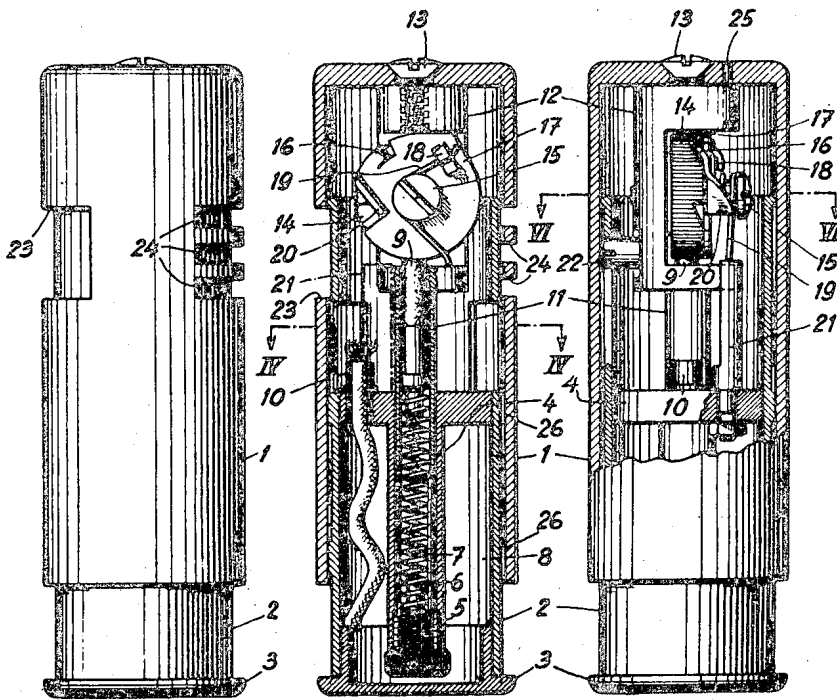


Fig. 1

Fig. 3

Fig. 5

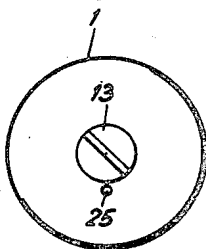


Fig. 2

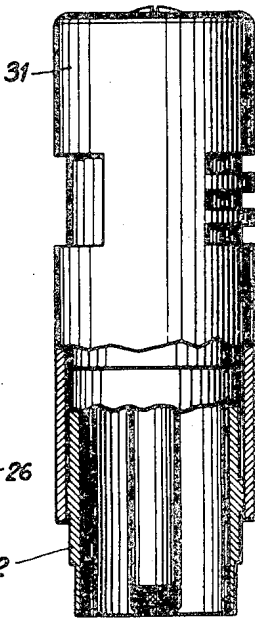


Fig. 7

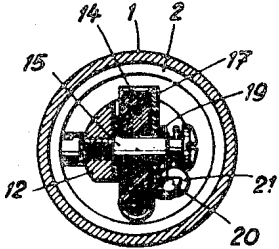


Fig. 6

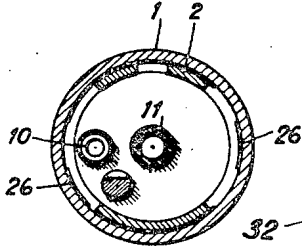


Fig. 4

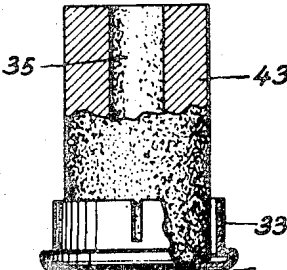


Fig. 8 Inventor:  
By Hermann Konrad  
By [unclear] [unclear] [unclear] Attys.

# UNITED STATES PATENT OFFICE

2,451,188

## PYROPHORIC LIGHTER

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Application November 28, 1945, Serial No. 631,300  
In Switzerland November 27, 1944

Section 1, Public Law 690, August 8, 1946  
Patent expires November 27, 1964

9 Claims. (Cl. 67-7.1)

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This invention relates to pyrophoric lighters of the type in which an inner and outer casing are telescopically arranged and telescopic movement of the casings is employed for actuating a sparking mechanism for igniting a wick and also for extinguishing the flame. Heretofore such lighters have generally been complicated in design and construction and inefficient in operation. An important object of the present invention is to provide an improved lighter of this general type in which simplicity in design and construction is combined with efficiency and durability in operation.

The accompanying drawings illustrate, by way of examples, two embodiments of the object of invention.

Fig. 1 is an elevation of the first embodiment,

Fig. 2 is a plan view thereof,

Fig. 3 is an axial section of the first example,

Fig. 4 is a section along the line IV—IV in Fig. 3,

Fig. 5 is a partial upright section, showing the ignition device of the first embodiment,

Fig. 6 is a section along the line VI—VI in Fig. 5, going through the axis of the milling wheel,

Fig. 7 is an elevation of the second example, with parts broken away,

Fig. 8 shows an element of this second device, partly in section.

The lighter represented in Figs. 1 to 6 comprises two metallic tubes, viz: an outer tube 1 and an inner tube 2, which form together a telescopic device. At one end a cover 3 is screwed to the inner tube 2, while at its other end this tube 2 carries a hollow cylinder 4 closed by a plug 5 with a knurled head. This plug 5 carries a pin 6 serving as a guide for the return spring 7 the action of which will be described later on. The ignition stone is illustrated at 9. The space 8 serves as a receiver for a wick and for the liquid fuel such as benzine. The bottom of the cylinder 4 is pierced by an eccentrically arranged hole receiving the burner 10 and by a concentrically placed hole serving as a guide for the central slide-tube 11. This latter is fixed to a block 12 screwed to the bottom of the outer tube 1 by means of a bolt 13. The block 12 serves as a carrier for the milling wheel 14 loosely mounted on an axle 15 screwed to the block 12. The milling wheel has notches for the transient cooperation with the catch 16 of a driving disc 17 having an abutment means 20. This disc 17 carries a tongue 18 on which the one end of a helical spring 19 is supported, the other end of this spring abutting on a flat part of the block 12. This spring has not only the tendency to rotate

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the disc 17, seen in Fig. 3, in the anticlockwise direction, but presses this disc against the milling wheel 14. A pin 21 serving as a stop for the abutment means 20 of the driving disc 17 is fixed to the bottom of the cylinder 4. The pin 22 screwed to the block 12 and entering a slot of tube 2 limits the total stroke of the tube 1 with regard to tube 2. The outer tube 1 has a window 23 for the passage of the flame, while other windows 24 of any desired number are provided for ventilating purposes. Pin 25 prevents relative rotation between block 14 and tube 1, i. e. an injurious change in the mutual angular position of burner 10 and window 23. Grooves 26 in ridges of the tube 2 (Fig. 4) allow the passage and thus the evacuation of the powder produced by the wear of the stone 9.

The lighter shown and described works as follows:

One seizes the lighter horizontally between the thumb and the forefinger and presses upon the two bottoms against the effect of spring 7. The outer tube 1 is thereby displaced with regard to the inner tube 2 and takes the milling wheel 14 and the driving disc 17 along. When the abutment means 20 of the driving disc 17 strikes against the stop pin 21, the disc 17, on further relative movement of the tubes 1 and 2, is rotated in the clockwise direction (seen in Fig. 3) and, as the catch 16 of the disc 17 enters a notch of the milling wheel 14, takes the latter along in the same direction, so that, by the cooperation of wheel 14 and stone 9, sparks are produced, creating a flame on the burner. On releasing the lighter, the tubes 1 and 2, under the influence of the spring 7, which serves likewise for pressing the stone 9 against the wheel 14, move back into their outgoing position. On this return movement the flame is extinguished when the window 24 is again covered by the inner tube 2.

In the embodiment of Figs. 7 and 8 the receiver is filled with felt which can be removed from the receiver for being dipped into a liquid fuel. This form of performance has likewise two tubes 31 and 32 telescopically fitted into each other and comprises a mechanism similar to that of Figs. 1 to 6. Tube 32 serves as a receiver. It is cylindrical and closed by a cover 33 which is illustrated in Fig. 8 and carries a cylindrical piece of felt 34, pierced over its total length by a hole 35 and glued on to the cover. On removing the latter from the receiver, the piece of felt is likewise taken out, so that it can be dipped into liquid fuel. When refilled, the felt piece is inserted into the receiver where it feeds the non-

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represented wick with fuel. In this way any inundation of the lighter is avoided and, nevertheless, sufficient fuel is available for good work of the lighter.

What I claim is:

1. In a pyrophoric lighter, an inner casing and an outer casing telescopically arranged, a sparking mechanism comprising a milling wheel assembly and an ignition stone, said wheel assembly being mounted within and carried by the outer casing, said inner casing having a transverse web formed intermediate the ends thereof and a closed outer end to provide a fuel reservoir therebetween, a wick supported by said web and extending into said fuel reservoir, and means carried by the web for actuating the wheel assembly to produce a spark for igniting the wick upon compression of the casings.

2. In a pyrophoric lighter, the combination of an inner casing and an outer casing telescopically arranged, a sparking mechanism comprising a milling wheel assembly and an ignition stone, said wheel assembly being carried by the outer casing and disposed within said casing, said inner casing having a transverse web and a closed outer end providing a fuel reservoir therebetween, means attached to the web and engageable with the wheel assembly for rotatably actuating the latter upon compression of the casings, a wick supported by said web, said inner casing having a longitudinal slot, and a transverse pin carried by the wheel assembly and engaged in said slot to limit relative movement of the casings.

3. In a pyrophoric lighter, provided with a fuel reservoir and a wick extending into said reservoir, an inner casing and an outer casing telescopically arranged, to form a combustion chamber, a sparking mechanism comprising a milling wheel and a support for said milling wheel, said support being carried by said outer casing and being provided with an integral, elongated tubular portion, a cooperating tubular member located within said inner casing and having reciprocal, telescopic engagement with said elongated tubular portion upon telescopic movement of the inner and outer casings, an ignition stone disposed within said elongated tubular portion, resilient means urging said stone into engagement with the milling wheel and means for actuating the sparking mechanism upon telescopic movement of the casings to ignite said wick.

4. In a pyrophoric lighter having a fuel reservoir and a wick, an inner casing and an outer casing telescopically arranged, said casings having closed outer ends to afford a substantially airtight combustion chamber within said telescopically arranged chambers and having window openings normally out of alignment with one another but adapted to be brought into alignment when the telescopic members are collapsed to admit air to the combustion chamber, a milling wheel in the combustion chamber, said wheel being carried by the outer casing, an ignition stone in the chamber, means within the combustion chamber to actuate the milling wheel during collapsing movement of the casings to produce a spark and ignite the wick, and resilient means tending to maintain the casings normally extended, said resilient means additionally serving to maintain the ignition stone in yielding engagement with the milling wheel.

5. In a pyrophoric lighter, provided with a wick and a sparking mechanism, an inner casing and an outer casing telescopically arranged, said casings having closed outer ends to afford a sub-

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stantially air-tight combustion chamber within said telescopically arranged chambers and having window openings normally out of alignment with one another but adapted to be brought into alignment when the telescopic members are collapsed to admit air to the combustion chamber, said sparking mechanism comprising a milling wheel assembly located in the combustion chamber and carried by the outer casing, and means associated with the milling wheel assembly and engaging the inner casing for limiting relative movement between the inner and outer casings.

6. In a pyrophoric lighter provided with a fuel container and a wick extending into said container, an inner casing and an outer casing telescopically arranged, said casings having closed outer ends to provide a substantially air-tight combustion chamber therein and having window openings normally out of alignment with one another but adapted to be brought into alignment when the telescopic casing members are collapsed to admit air to the combustion chamber, a sparking mechanism comprising a milling wheel assembly located in the combustion chamber and supported by the outer casing, an ignition stone in engagement with the milling wheel and means to actuate said milling wheel to ignite the wick towards the end only of the collapsing movement of said casings.

7. In a pyrophoric lighter, the combination of inner and outer telescopic casing members having windows therein which are staggered when the members are extended to provide a substantially air tight chamber therein and juxtapositioned when the members are collapsed to admit air to the chamber, a fuel reservoir within the inner casing a wick within said chamber and extending into the fuel reservoir, a milling wheel within said chamber, said wheel being supported by the outer casing member, an ignition stone also within said chamber, resilient means holding the stone in continuous contact with the wheel, and means actuated by telescopic collapse of the casings for operatively rotating the wheel to strike a spark, said last means being inoperative until the windows are in substantial juxtaposition.

8. In a pyrophoric lighter an inner casing and an outer casing telescopically arranged, said casings having closed outer ends to provide a substantially air-tight combustion chamber therein and having window openings normally out of alignment with one another but adapted to be brought into alignment when the telescopic casing members are collapsed to admit air to the combustion chamber, a sparking mechanism comprising a milling wheel assembly located in the combustion chamber, an ignition stone in engagement with the milling wheel, a wick, means to actuate said milling wheel to ignite said wick, a fuel reservoir into which said wick extends, said reservoir being provided with an inlet, absorbent material in said reservoir, and a removable plug for said inlet at least some of the absorbent material being affixed thereto and removable there-with.

9. In a pyrophoric lighter, an inner casing and an outer casing telescopically arranged, a sparking mechanism comprising a milling sparking mechanism and an ignition stone, said wheel assembly being mounted within said casings, said inner casing having a transverse web formed intermediate the ends thereof and a closed outer end to provide a fuel reservoir therebetween, said web being provided with a depending tubular member, a wick extending into said reservoir and

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means for actuating the wheel assembly to produce a spark for igniting the wick upon compression of the casings, said lighter consisting essentially of four separable parts: (1) the outer casing (2) the inner casing (3) the ignition wheel assembly and (4) resilient means located within the tubular member tending to maintain the casings normally extended.

HERMANN KONRAD.

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**Certificate of Correction**

Patent No. 2,451,188.

October 12, 1948.

HERMANN KONRAD

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 4, lines 68 and 69, for "milling sparking mechanism" read *milling wheel assembly*; lines 69 and 70, for "wheel assembly" read *sparking mechanism*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 18th day of January, A. D. 1949.

[SEAL]

THOMAS F. MURPHY,  
*Assistant Commissioner of Patents.*