

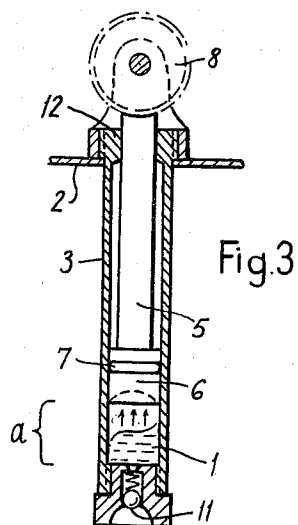
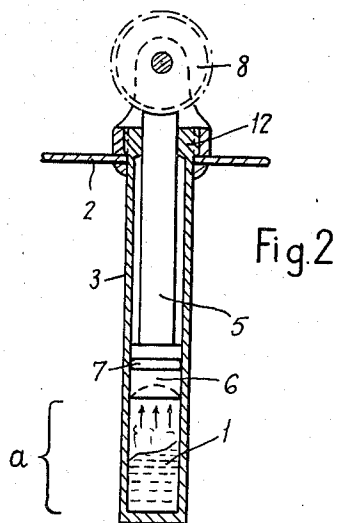
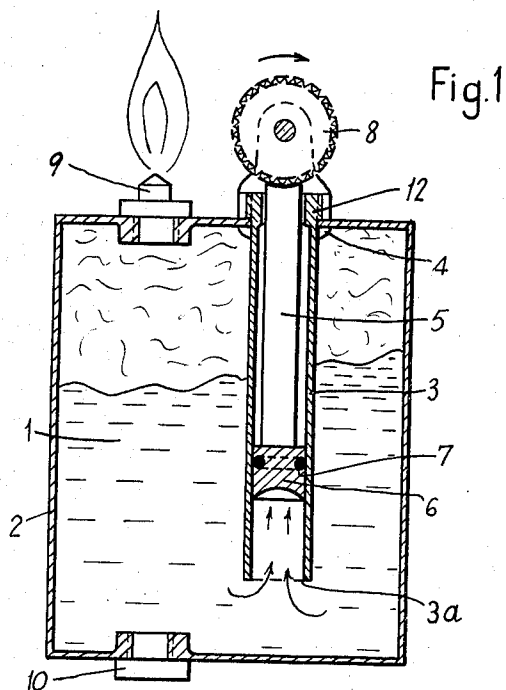
April 19, 1966

H. H. QUANDT
PYROPHORIC LIGHTERS

3,246,490

Filed Feb. 6, 1964

2 Sheets-Sheet 1



Inventor

H. H. QUANDT

By
Holcombe, Wetzel & Riebois
Attorneys

April 19, 1966

H. H. QUANDT
PYROPHORIC LIGHTERS

3,246,490

Filed Feb. 6, 1964

2 Sheets-Sheet 2

Fig.4

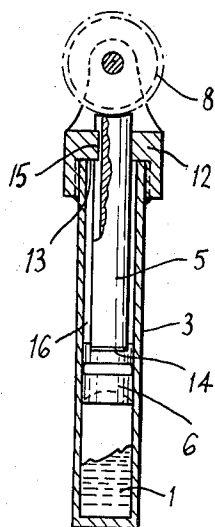


Fig.5

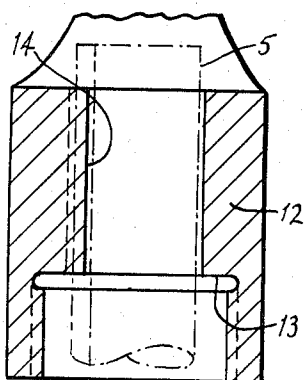


Fig.8

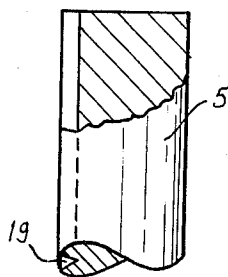


Fig.9

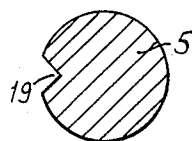


Fig.7

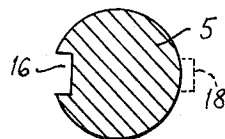


Fig.6

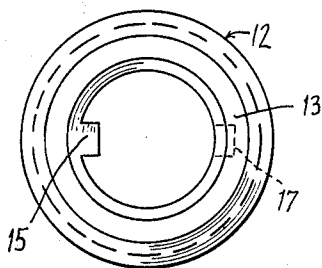
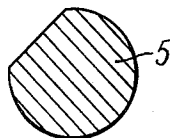


Fig.10



Inventor

H. H. QUANDT
By
Holcombe, Wetzel & Bristol
Attorneys

1

3,246,490

PYROPHORIC LIGHTERS

Hans Hubert Quandt, Baden-Baden, Germany, assignor
of one-half to Rudolf Mohr
Filed Feb. 6, 1964, Ser. No. 342,960
Claims priority, application Germany, Feb. 19, 1963,
Q 736; Sept. 14, 1963, Q 708
7 Claims. (Cl. 67-7.1)

The present invention relates to pyrophoric lighters such as cigarette lighters, in which a flint is pressed against an abrasive or friction wheel to produce hot sparks when the wheel is rotated.

In known lighters of this type, the pressure acting on the flint, and the advance of the flint have been effected by means of a spring. A serious disadvantage of this arrangement is that the spring pressure diminishes as the flint is worn away, and in many cases an adjustment, for example a screw, is provided to compensate for the wear of the flint, by increasing the pressure exerted on the flint. With this arrangement, only relatively short flints can be used necessitating frequent renewal of the flint, which is a further disadvantage. Moreover, when the flint is being adjusted or replaced in many of these lighters, particularly gas-fueled cigarette lighters, an extensive opening of the gas outlet aperture is necessary, resulting in a wasteful loss of gas.

It is an object of the invention to provide a substantially constant pressure on the flint during the life thereof, whilst avoiding the above-mentioned disadvantages. This is achieved, according to the present invention, by a pyrophoric lighter wherein advancement of the flint is effected by gas pressure.

The gas may be butane and/or propane contained, for example, in liquid form in the lighter, or alternatively may be carbon dioxide contained, for example, in solid form in the lighter. Since the spring has been dispensed with, a larger flint can be provided in the space hitherto occupied by the spring, and the adjustment screw can also be dispensed with.

In order that the invention may be more readily understood, various embodiments thereof will now be described with reference to the accompanying drawings, in which:

FIGURE 1 is a longitudinal section of a pyrophoric lighter according to one embodiment of the invention,

FIGURES 2, 3 and 4 are longitudinal sections of various embodiments of flint housings which are closed at their lower ends,

FIGURE 5 is an enlarged longitudinal section of the upper end of the flint housing shown in FIGURE 4.

FIGURE 6 is an underneath plan view of the housing shown in FIGURE 5.

FIGURE 7 is a transverse section of the flint for use in the housing of FIGURES 4, 5 and 6.

FIGURE 8 is a side elevation, partly in section, of a portion of a modified form of flint.

FIGURE 9 is a transverse section of the flint shown in FIGURE 8.

FIGURE 10 is a transverse section of a flint according to a further modification.

The pyrophoric lighter shown in FIGURE 1 is a pocket cigarette lighter comprising a reservoir or container 2 filled with a fuel, for example, liquefied butane 1. A flint housing 3 extends into the container 2, and a gas-tight connection is provided at 4 between the housing and the container. The flint housing 3 is open at its lower end 3a, and a flint 5 is disposed within and guided by the housing 3. A piston 6 is slidable within the housing 3, below the flint 5 and forms a seal against the inner wall of the housing 3, for example, by means of a sealing ring 7. The pressure of the gaseous butane acts through the liquid against the bottom of the piston 6 and forces the piston 6

2

against the flint 5 in the direction of the arrows, thereby urging the latter, with a substantially constant pressure which is generally independent of the length of the flint, against an abrasive or friction wheel 8.

5 The container 2 has a gas outlet valve or point 9 where the gas is ignited by sparks from the flint and a filling or topping-up valve 10 in the base of the container 2.

To replace the flint 5 it is necessary to remove the abrasive wheel 8 which may be effected by simple means. To prevent the piston 6 from being forced out of the housing by the gas pressure when the flint 5 is being renewed, an abutment member 12, for example, an inner shoulder, is provided, which forms a stop for the piston.

The modified flint housing shown in FIGURE 2 is closed at its lower end to form a chamber a for liquefied gas 1 isolated from the rest of the container 2. The expansion pressure of this gas acts on the piston 6 and thus urges the flint 5 against the friction wheel 8.

To fill or top up the chamber a with liquefied gas, a topping-up valve 11 is arranged in the chamber a, as shown in FIGURE 3, in the base of the housing 3.

When the gas pressure is insufficient to apply the flint against the friction wheel, as for example, when the lighter is cooled or the pressure has dropped, the flint is free to rotate and, when it is re-applied to the friction wheel, the concavity worn in the top of the flint by the curvature of the friction wheel may no longer coincide with the curvature of the friction wheel. This results in the production of a spark having a reduced intensity due to the reduction in the area of contact of the flint with the friction wheel, until the flint wears down. This rotation may, moreover, result in the jamming of the friction wheel.

It is a feature of the invention to prevent rotation of the flint within its housing and this is achieved by providing the flint and the housing or the member 12 thereof with a corresponding shape or profile, for example by providing the flint and housing with one or more complementary engaging portions as shown in FIGURES 4 to 10.

Referring to FIGURES 4 to 6, the friction wheel 8 is supported by an abutment member 12 which is fixed to the upper end of the housing 3. The inner shoulder 13 of the abutment member 12 serves as a stop for the piston 6 when the wheel 8 is removed. This piston 6 is recessed at 14 to receive and locate the lower end of the flint 5.

The abutment member 12 is provided with a rectangular projection 15 which slidably engages in a corresponding rectangular axial slot 16 in the flint 5 shown in FIGURE 7, and/or may be formed with a rectangular recess 17 (FIGURE 6) which is cooperable with a rectangular projection or spline 18 on the flint (FIGURE 7).

Alternatively, the abutment member may be provided with a V shaped projection (not shown) which cooperates with a V shaped groove 19 in the flint 5 as shown in FIGURES 8 and 9, or with a flat (not shown) which cooperates with the flat 20 of the flint 5 shown in FIGURE 10.

It will be understood that various modifications may be made without departing from the scope of the present invention as defined in the appended claims. Although, in the embodiment shown in FIGURE 1, the pressure of the gaseous fuel, such as butane or propane, is used to advance the flint, in the embodiments shown in FIGURES 2 to 4, as an alternative, a different gas may be used. This gas may be, for example, a non-inflammable gas such as carbon dioxide produced from solid carbon dioxide or Dry Ice, although other gas-producing pellets may be employed. The embodiments described with reference to FIGURES 3 to 4, although particularly applicable to gas-filled lighters, are also applicable to other types of lighters for example those incorporating an igniter wick and non-pressurised reservoir containing

a petrol soaked wadding; when the flint housings of these embodiments are isolated from the reservoir.

Moreover the flint housing and/or the abutment member thereof, and flint, may have a cross-section which varies from the circular, oval or polyhedral, to prevent rotation of the flint.

In the embodiment shown in FIGURE 1, the frictional fit of the piston within the flint housing may be adequate to prevent the piston passing out of the lower open end of the flint housing into the container, due to its own weight when the gas pressure falls. However, additional means may be provided, for example a shoulder may be formed at the lower end of the housing.

I claim:

1. In a pyrophoric lighter, a container for a pressurised fuel, a generally cylindrical open-ended flint housing mounted in a wall of said container with the inner end thereof opening into the container and the outer end thereof underlying a rotatable abrasive wheel, a piston and a flint slidably mounted in said housing, with said flint disposed between said wheel and piston and being normally urged into engagement with the abrasive wheel by the pressure of said fuel within the container which acts on said piston.

2. For a pyrophoric lighter, an igniter assembly including a generally cylindrical flint housing, one end of which is closed, and the other end of which is provided with a passage adapted to slidably receive a flint, a rotatable friction wheel overlying said other end of said passage, a piston, provided with a flint engaging portion, slidably mounted within the housing, means forming a gas-tight seal between said piston and housing, a chamber between said piston and closed end of said housing for receiving a gas under pressure, and a flint located in said housing against said flint engaging portion of said piston, said flint being normally urged through said passage into engagement with said abrasive wheel by the pressure of the gas acting on said piston.

3. A lighter according to claim 2, including stop means associated with said housing, said means being engageable with said piston to limit the sliding movement of said piston within said housing.

4. A lighter according to claim 2, including at least one projection and recess associated with the housing and flint, said at least one recess in one member being co-operable with the projection on the other member to prevent rotation of said flint within said housing but permit relative sliding movement therebetween.

5. A lighter according to claim 2, including a filling valve in the closed end of said housing.

6. A gas lighter including a reservoir, a filling valve in said reservoir for the admission of a gaseous or liquid fuel into said reservoir, an outlet valve in the reservoir for gaseous fuel to be ignited, a generally cylindrical, open-ended, flint housing secured to and extending through a wall of said reservoir, an apertured abutment

member located at the outer open end of said housing and carrying a rotatable friction wheel which overlies said outer end, a piston mounted within said housing for sliding movement towards or away from said wheel, said sliding movement towards said wheel being limited by said abutment member, at least one sealing ring carried by said piston, disposed between said housing and piston, a flint engaging portion on said piston for engaging a flint when disposed so as to extend out of said housing through said aperture in the abutment member, between said piston and friction wheel, said aperture having at least one surface co-operable with at least one corresponding surface of the flint to prevent rotation of the latter, the flint being normally urged into engagement with the friction wheel with a generally constant pressure by the piston on which the pressure of said gaseous fuel within the reservoir acts, through the lower open end of said housing.

7. A pyrophoric lighter comprising a reservoir, a first filling valve in said reservoir for admitting a pressurised, inflammable, at least partially gaseous fuel into said reservoir, an outlet valve in said reservoir for the gas to be ignited, a cylindrical flint housing secured to and extending into said reservoir adjacent said outlet valve, the interior of said housing being isolated from the interior of said reservoir, an apertured abutment member located at the outer open end of said housing and carrying a rotatable and detachable friction wheel overlying the aperture in said member, a piston slidably mounted within said housing, a sealing ring carried by said piston to provide a gas-tight seal between said housing and piston, a shoulder on said abutment member engageable with said piston upon removal of said friction wheel to prevent the exit of said piston from the housing, a flint slidably disposed within said housing and aperture between said piston and friction wheel, a projection on said abutment member co-operable with a correspondingly shaped longitudinal recess in the flint, to prevent rotational movement of the flint, said flint being normally urged into engagement with the friction wheel with a pressure substantially independent of the length of the flint by a pressurised gas disposed within said housing between said piston and closed inner end of said housing, said gas acting through the intermediary of said piston, a second filling valve being mounted in said inner end of the housing for admitting said gas or a gas generating substance into said space.

References Cited by the Examiner

UNITED STATES PATENTS

1,762,218	6/1930	Stecker	67—7.1
2,042,572	6/1936	Wise	67—7.1
2,462,467	2/1949	Clamp	67—7.1
2,743,597	5/1956	Newman	67—7.1

EDWARD J. MICHAEL, *Primary Examiner*.