Dec. 29, 1953 E. G. GESSMANN 2,664,008

LIGHTER

Filed Aug. 14, 1950 2 Sheets-Sheet 1

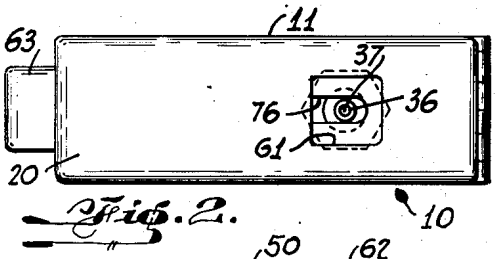

Fig. 2.

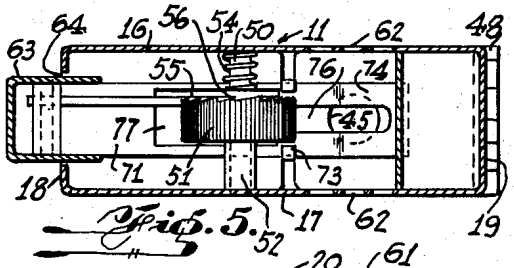

Fig. 5.

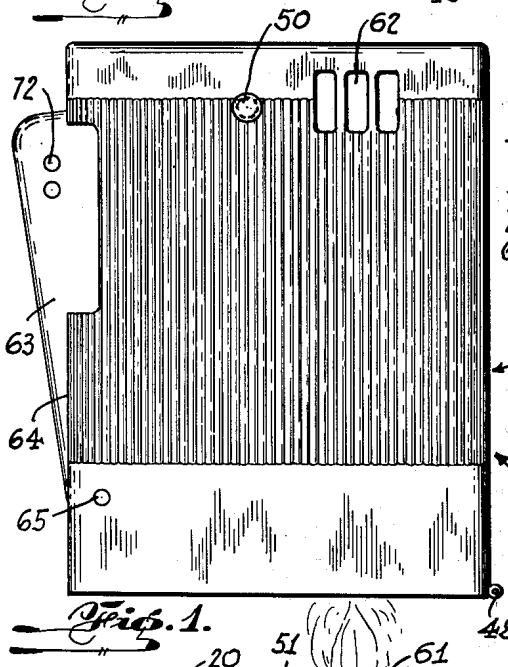

Fig. 1.

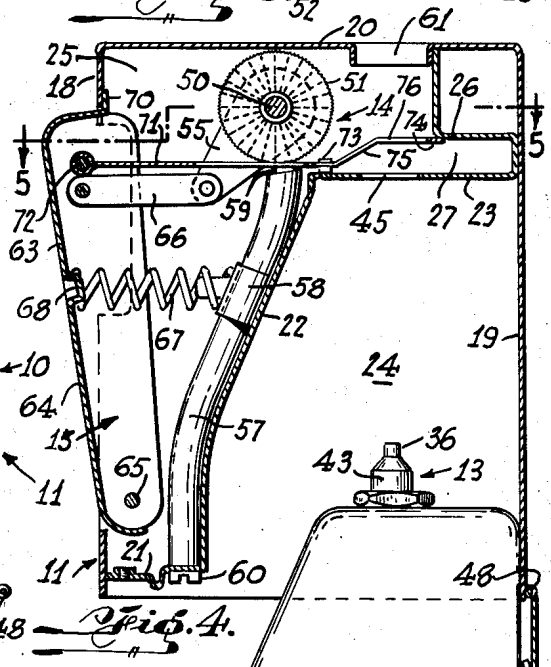

Fig. 4.

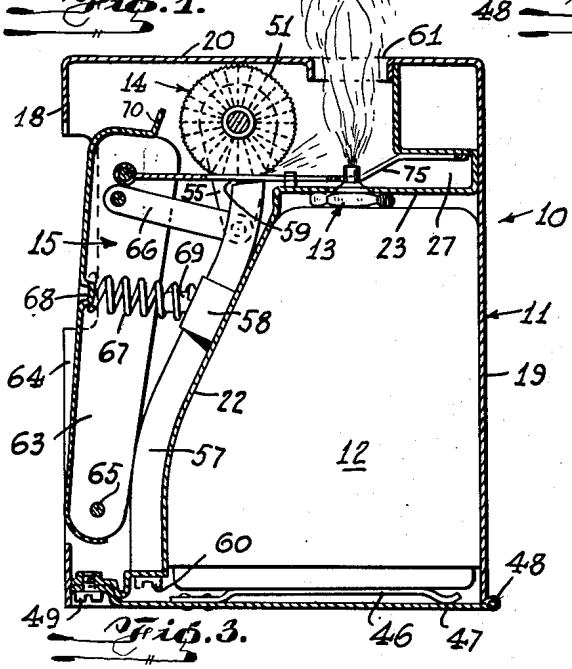

Fig. 3.

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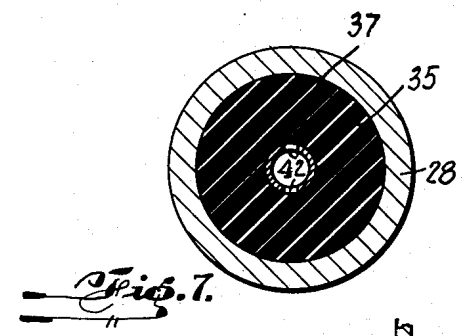

Fig. 7.

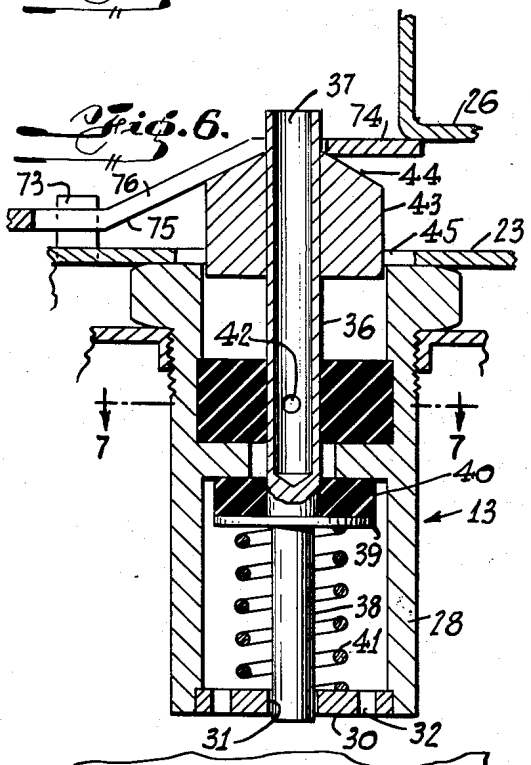

Fig. 6.

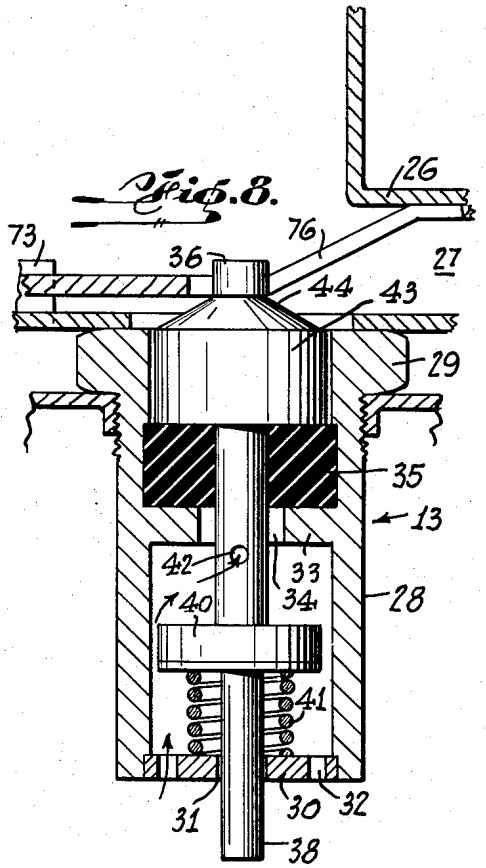

Fig. 8.

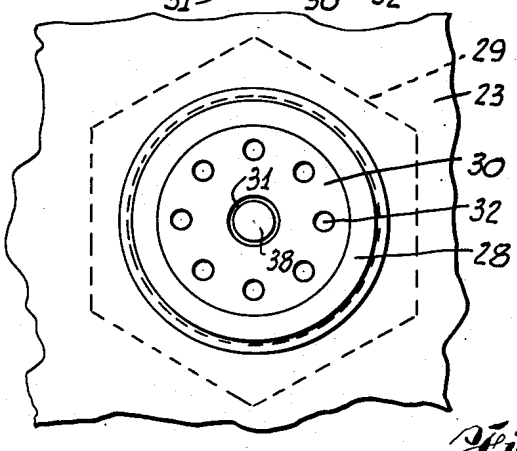

Fig. 9.

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Application August 14, 1950, Serial No. 179,200

3 Claims. (Cl. 67—7.1)

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The present invention relates to pyrophoric lighters, and particularly to lighters for cigars, cigarettes or the like burning a liquified compressed gas.

An object of the present invention is to provide a pyrophoric lighter of the type burning a liquified compressed gas having an improved valve assembly for sealing the gas containing tank.

Another object is to provide a lighter of the type burning a liquified compressed gas wherein the valve sealing the fuel tank is opened to permit escape of the gas from the tank simultaneously with actuation of the spark producing means so that the gas emitted from the tank is immediately ignited and there is no danger of the accumulation of considerable quantities of unburned gases which may flare-up or explode upon being ignited.

A further object is to provide a pyrophoric lighter of the character indicated wherein the gas containing tank is removable as a unit with the valve assembly from the lighter casing or housing, and the valve assembly and its actuating mechanism are constructed and arranged to permit easy installation and removal of the tank.

Still another object is to provide a pyrophoric lighter of the character indicated wherein the flint is easily removed and replaced without requiring the removal of the gas containing tank or of any other element of the assembly.

A still further object of the present invention is to provide a pyrophoric lighter having the aforementioned characteristics which is simple in construction, easy to assemble and disassemble, and attractive in appearance.

Other objects, features and advantages of the present invention will be manifest in the following detailed description read in connection with the accompanying drawings.

In the drawings:

Fig. 1 is a side elevational view of a pyrophoric lighter embodying the present invention;

Fig. 2 is a top view of the lighter illustrated in Fig. 1;

Fig. 3 is a vertical sectional view illustrating the operating mechanism of the lighter in its igniting position;

Fig. 4 is a vertical sectional view of the lighter with the operating mechanism released, and with the gas containing tank partially removed from the lighter casing;

Fig. 5 is a horizontal sectional view taken along the line 5—5 of Fig. 4;

Fig. 6 is a vertical sectional view taken through the center of the valve assembly of the lighter shown in Fig. 1, with the valve being disposed in its closed position;

Fig. 7 is a horizontal sectional view taken along the line 7—7 of Fig. 6;

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Fig. 8 is a vertical sectional view similar to Fig. 6 but with the valve member shown in open position; and

Fig. 9 is a bottom view of the valve body or housing shown in Figs. 6 and 8.

Referring to the drawings, wherein the same reference numerals are used throughout to designate the same parts, a lighter 10 is shown which embodies the present invention. The lighter 10 includes, as its major components, a housing or casing 11, a tank 12 fitting into the housing 11 and containing a liquified compressed gas, such as butane gas, a valve assembly 13 normally sealing the tank 12, a spark producing assembly 14, and an operating device, broadly indicated by the reference numeral 15, for simultaneously opening the valve assembly 13 and actuating the spark producing assembly 14 so that no appreciable accumulations of unburned gas may develop to prevent the danger of explosion or flaring-up when the gas is finally ignited.

The casing 11 includes side walls 16 and 17, relatively narrow end walls 18 and 19, and a top wall 20 all formed to provide a relatively flat downwardly opening structure. A partition extends between the side walls 16 and 17 and includes a lower portion 21 extending from the bottom portion of end wall 18, a generally inclined portion 22 extending from the end of portion 21, and a top portion 23 extending from the upper end of inclined portion 22 to the end wall 19 and disposed substantially parallel to top wall 20. The partition thus formed divides the interior of casing 11 into substantially two compartments. One compartment 24 defined at the top by partition portion 23 and at its ends by wall 19 and partition portion 22 opens downwardly to receive the tank 12, while the other compartment 25, substantially having the shape of an inverted L, is defined by the top wall 20, end wall 18 and the partition portions 21, 22 and 23 to receive the spark producing assembly 14 and the operating device 15.

The partition described above dividing the casing into the compartments 24 and 25 is preferably welded, brazed or soldered in position within the casing, and includes a portion at the end of top portion 23 which is bent upwardly then reverted to overlie portion 23, as at 26, and finally bent upwardly to be secured to top wall 20 (Figs. 3 and 4) to provide a channel or guideway 27 between portions 23 and 26 of the partition.

The gas containing tank 12 is formed, as indicated in Figs. 3 and 4, to fit within compartment 24 of the casing and is therefore provided with one end wall inclined and shaped to correspond to the configuration of portion 22 of the partition and the other end wall straight to conform to the corresponding end wall 19 of the casing.

The valve assembly 13, shown in detail in Figs. 6–9 of the drawings, includes a cylindrical body or housing 28 threaded into the tank 12 through the top wall of the latter and provided with a polygonal shaped flange 29 at its top end for wrench engaging purposes which seats on the top wall of the tank when the valve assembly is installed. A perforated wall 30 extends across the lower end of cylinder 28 and is formed with a central opening 31 to provide a lower bearing for the valve stem, to be later described, and with a plurality of spaced openings or perforations 32 through which the gas passes from the tank into valve body 28. A transverse wall 33 extends across the valve body 28 between the upper and lower ends of the latter and is formed with a central opening 34. A first valve sealing member 35, preferably formed of rubber or other similar resilient material, is fixed within the body 28 and seats on top of transverse wall 33. The sealing member 35 is formed with a central vertical bore of a diameter less than that of the opening 34 and concentric with the latter. The valve member working within body 28 includes an elongated member having an upper portion 36 formed with an upwardly opening axial bore 37 and slidably extending through the sealing member 35, and a lower portion 38 of smaller diameter which extends through the central opening 31 of the wall 30. A seal retaining disc 39 bears against the shoulder between the upper and lower portions 36 and 38, respectively, and a second resilient sealing member 40, moving with the valve member, is positioned above disc 39. Both the disc 39 and the sealing member 40 are formed with diameters that are substantially less than the internal diameter of body 28. A spring 41 extends around portion 38 of the valve member and abuts at its opposite ends against wall 30 and disc 39 to thereby continuously urge the valve member upwardly and the sealing member 40 into seating engagement with the lower surface of the transverse wall 33, as in Fig. 6. The upper portion 36 of the valve member is formed with radial openings 42 which are positioned to be covered and sealed by the first sealing member 35 when the valve member is in its raised position (Fig. 6) and are uncovered when the valve member is depressed against the force of the spring 41 (Fig. 8). As seen in Fig. 6, the sealing member 40 provides a double barrier to the escape of the compressed gas from the tank 12 so that the gas will not seep upwardly around the member 36 when the valve is in its raised position, and when the valve member is depressed (Fig. 8), the sealing member 40 moves away from wall 33. With the valve member depressed (Fig. 8), the gas flows through openings 32 into valve body 28 then around sealing member 40 and disc 39 and through openings 42 into bore 37 for discharge from the upper open end of the latter. The valve assembly is completed by a plunger 43 fixed to the portion 36 of the valve member adjacent its upper end while working in the upper portion of the cylindrical body 28 and formed with a frusto-conical upper portion 44 which is engaged by an element of the operating device 15, as will hereinafter appear. When the valve member is in its closed position (Fig. 6), the frusto-conical portion 44 of the plunger projects substantially above the upper end of the valve body, and when the valve member is in its open position (Fig. 8), the cylindrical portion of the plunger 43 is retracted into the valve body 28 and only the conical portion 44 extends from the latter.

In order to accommodate the plunger 43 of the valve assembly 13, the top portion 23 of the casing partition is formed with an opening 45 through which the plunger 43 and the upper portion 36 of the valve member loosely extend (Figs. 3 and 6) when the tank 12 is disposed within the compartment 24 of the casing. The tank 12 is held in compartment 24, with the flange 29 of the valve body bearing against portion 23 of the partition, by a bowed spring member 46 carried by a bottom closure 47 which is preferably pivoted at one end on the lower end of wall 19 by a hinge 48 and held in closed position by a screw member 49 tapped into a suitable opening formed in the lower portion 21 of the casing partition. Thus, it is necessary only to release the screw 49 and swing the closure 47 downwardly (Fig. 4) to permit the tank to be removed from the casing.

The spark producing assembly 14 includes a shaft 50 carried at its opposite ends by the casing side walls 16 and 17 and positioned within compartment 25 above the plane of portion 23 of the partition. An abrading wheel 51 is rotatable on shaft 50 and is spaced from side wall 17 by a suitable tubular spacer 52 (Fig. 5). The abrading wheel 51 is formed with ratchet teeth 53 on the side surface facing side wall 16, which teeth are engaged by the tooth or pawl 54 formed on the arm 55 pivoted on shaft 50. A coil spring 56 is disposed on shaft 50 and constantly urges the arm 55 into facial contact with the toothed surface of the abrading wheel 51. A flint holder is provided by the tubular member 57 which is secured to the inclined portion 22 of the casing partition and opens at its lower end through the partition portion 21 while terminating at its upper end below the wheel 51. The tubular member 57 is preferably welded, brazed or soldered to the portion 22 of the partition and its mounting is further secured by a band 58 extending therearound and fixed to the partition. A flint 59 is slidable in tube 57 and is urged upwardly against the periphery of abrading wheel 51 by a suitable spring (not shown) disposed in the tube 57 and abutting at its lower end against a threaded closure 60.

The top wall 20 of the casing 11 is formed with an opening 61 aligned with the opening 45 of the partition through which the flame may escape when the valve member is depressed to permit discharge of the gas from the tank and the wheel 51 is rotated to produce an igniting spark. The side walls of the casing are also preferably formed with vents or louvres 62 (Fig. 1) to provide for the supply of combustion sustaining air to the flame area.

To prevent the accumulation of substantial quantities of unburned gases, the operating mechanism 15 is provided to actuate the abrading wheel 51 substantially simultaneously with the depression of the valve member. The mechanism 15 includes a finger piece 63 projecting through a suitable opening 64 formed in end wall 18 and pivoted at its lower end on a pivot member 65 carried by the side walls of the casing, and a link 66 pivoted at its opposite ends to the finger piece 63 and the rock arm 55. A compression spring 67 abuts at one end against a seat 68 formed on the finger member and at its other end receives a projection 69 preferably extending from the band 58. The spring 67 constantly urges the finger member to rock outwardly through the opening 64, and the finger member 63 is formed with a lug or stop 70 at its

upper end which is engageable with the end wall 18 above the opening 64 to limit the spring urged movement of the finger member. The tooth or pawl 54 on the rock arm 55 is formed to rotate the abrading wheel 51 when the finger member 63 is urged into the casing against the force of spring 67 (Fig. 3), and skips over the ratchet teeth on the wheel 51 when the finger member is permitted to return to its at rest position (Fig. 4).

The valve operating portion of the mechanism 15 includes an operating link 71 pivoted at one end on the pivot pin 72 carried by the finger member 63. A pair of spaced guides 73 are preferably struck out of the portion 23 of the casing 11 and the valve operating link 71 extends slidably through these guides. The free end of the operating link 71 is upwardly offset, as at 74, and extends into the guideway 27 and underlies the reverted portion 26 of the partition. Thus, the link 71 is guided in its longitudinal movement by the guides 73 and the portion 26 of the partition with the latter preventing any upward displacement of the link when operating the valve member. The upwardly offset portion 74 of the link 71 is joined to the remainder thereof by an inclined portion 75 which engages the frusto-conical part 44 of plunger 43 on the valve member to actuate the latter. In order to permit the engagement of the link 71 with the valve member, the link 71 is formed with a longitudinal slot 76 extending from the offset portion 74 along the inclined portion 75 to receive the upper end of the portion 36 of the valve member (Figs. 3, 6 and 8). The body of link 71 is formed with a relatively wide longitudinal slot 77 (Fig. 5) through which the arm 55 and wheel 51 extend.

When the finger member 63 is extended from the casing in its position of rest (Figs. 4 and 6), the upwardly offset portion 74 of link 71 engages the conical portion 44 of the valve plunger and the valve is raised to closed position by spring 41. When the finger member is depressed (Figs. 3 and 8) the abrading wheel 51 is rotated, in the manner previously indicated, and the inclined portion 75 of the link 71 rides over the valve plunger to depress the latter and open the valve so that gas will escape from the upper open end of portion 36 of the valve member. Furthermore, since the engagement of the valve member with its operating link 71 is effected merely by extending the portion 36 upwardly into slot 76 of the link, the latter presents no obstacle to the easy removal and replacement of the tank 12.

From the above description of a preferred embodiment, it is apparent that the present invention provides a lighter of the class described wherein the valve is opened and the spark is produced simultaneously, the tank is doubly-sealed by the novel valve construction, and the tank is easily removed from or installed in the casing.

While the preferred embodiment of the invention has been described and illustrated in detail, it is to be understood that the invention is not limited to that precise embodiment, and that various changes and modifications may be effected therein without departing from the spirit or scope of the invention.

What is claimed is:

1. A pyrophoric lighter comprising a casing formed with a downwardly opening compartment defined by one end wall of the casing and by a partition in the casing having a top portion spaced downwardly from the top wall of the casing and a side portion spaced from the other end wall of the casing, a tank for containing a compressed gas fitting removably into said compartment, an opening formed in said top portion of the partition, valve means on the top of said tank including an actuating plunger extending upwardly through said opening for linear reciprocation to effect opening and closing of said valve means, said other end wall of the casing having an opening, a finger member pivoted on said casing and projecting outwardly through said opening in the other end wall, and a valve operating link pivotally connected to said finger member and extending slidably over said top portion of the partition for linear movement in a plane at right angles to the direction of reciprocation of said valve actuating plunger and including a portion engaging slidably from above with said valve plunger, said portion of the valve operating link being inclined to effect depression of said plunger when said link is displaced linearly in a selected direction by rocking of the finger member.

2. A pyrophoric lighter according to claim 1; wherein said inclined portion of said valve operating link is longitudinally slotted, and said plunger includes a reduced diameter end adapted to extend from below loosely into the slot of said inclined portion.

3. A pyrophoric lighter comprising a casing formed with a downwardly opening compartment defined by one end wall of the casing and by a partition in the casing having a top portion spaced downwardly from the top wall of the casing and a side portion spaced from the other end wall of the casing, a tank for containing a compressed gas fitting removably into said compartment, an opening formed in said top portion of the partition, valve means on the top of said tank including an actuating plunger extending upwardly through said opening, said other end wall of the casing having an opening, a finger member pivoted on said casing and projecting outwardly through said opening in the other end wall, a valve operating link pivotally connected to said finger member and extending slidably over said top portion of the partition for slidable engagement from above with said valve plunger, a portion of said valve operating link being inclined to effect depression of said plunger when said link is displaced in a selected direction by rocking of the finger member, said inclined portion of the valve operating link having a longitudinal slot and said plunger including a reduced diameter end extending from below loosely into said slot of the inclined portion, and guide means slidably engaging said valve operating link at the opposite ends of said inclined portion to resist vertical movement of said operating link.

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