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(54) AN IMPROVED GAS FUELLED LIGHTER

(71) We, FLAMAGAS S.A., of Sales y Ferrer 7, Barcelona, Spain a Spanish body corporate, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to gas fuelled lighters and more especially, but not exclusively, to cigarette lighters run on gas and ignited by striking a flint.

An object of the invention is to provide an easily produced gas fuelled lighter which is refuellable.

According to the invention a lighter comprises a hollow body forming a reservoir for gas fuel, a lower end of the body having a stopper friction welded thereto and provided with a first valve for filling the reservoir with fuel, an upper end of the body having a pocket provided with a second valve for releasing fuel from the reservoir and openable by a lever spring urged to retain the second valve in a closed position, a lever stop for preventing over-travel of the lever, a recess in the exterior of the body adjacent the second valve, and an ignition mechanism removably secured in the recess.

The ignition mechanism may comprise a flint urged into contact with a wheel having an abrasive surface for directing sparks for igniting fuel by rotation about a spindle extending axially through the wheel and removably carried between support ears located on the upper end of the body.

A gas release throttle is preferably provided for controlling the rate of fuel released through the second valve. The throttle may comprise an element of porous, resilient and compressible material, for example foamed plastics material.

The ignition mechanism may have two resilient support ears each provided with a slot which converges to a hole central of the ear for removably retaining the spindle by inserting via the slot.

The invention will now be further described by way of example with reference to

the accompanying drawings in which:—

Fig. 1 is a side view of the main body of a gas fuelled lighter embodying the invention;

Fig. 2 is a rear elevation of the main body of the lighter;

Fig. 3 is a front elevation of the main body of the lighter;

Fig. 4 is a plan view of said body of the lighter;

Fig. 5 is a sectional side elevation of the main body of the lighter;

Fig. 6 shows a plan and cross-sectional view of a reservoir cap of the lighter;

Fig. 7 is a sectional side elevation of the lighter;

Fig. 8 is a side elevation of the lighter;

Fig. 9 is a rear elevation of the lighter;

Fig. 10 is a perspective view of a lever of the lighter;

Fig. 11 shows a side elevation plan and developed view of a spring of the lighter;

Fig. 12 shows a side elevation, a sectional end elevation and a plan view of an ignition mechanism of the lighter;

Fig. 13 is a sectional side elevation of part of the bottom of the main body and reservoir cap of the lighter prior to welding; and

Fig. 14 is a sectional side elevation of the lower portion of the lighter prior to welding.

Referring now to the drawings, a gas fuelled lighter comprises a main body formed of a hollow piece —1— of cylinder-shaped tube, preferably made of synthetic plastics material moulded into shape.

Said body —1— with its interior cell —2— forms the reservoir designed to hold the liquified-gas fuel. Such body may be made of translucent or transparent materials, so that the amount of fuel left in the reservoir —2— is visible.

The top —3— of the moulded piece —1— is closed, and the bottom —4— open, but sealed with a stopper (Fig. 6) which is attached to the body —1— by means of a welding process.

The top 3 has a pair of pockets 5 and

6 which extend in to the inside of the cell 2. The first of these pockets is open at the top 7 to the outside and closed at the bottom 8 to hold a lighting device (Figs. 7 and 12), and retain it in place by inserting a simple retaining device.

In order that this lighting device can be easily and correctly installed, the pocket 5 has a longitudinal groove along its interior wall 9 which cooperates with a rib 9a on the lighting device so that the lighting device is locatable in the pocket by a sliding action into an optimal position for igniting the fuel in use.

The main body 1 is provided with a hollow, wedge-shaped ridge 10 which protrudes radially from, and is positioned longitudinally of, the body.

The ridge is designed to (a) support and hold the lower end of the spring which biases the gas release valve into the closed position, (b) protect the lever which operates the gas release valve from over-travel and accidental operation, (c) facilitate manipulation and operation of the lighter, and (d) reinforce the walls of the lighter.

In a parallel position to the pocket 5 is a second pocket 6. This second pocket has portions, 6, 11, 12, 13 of successively decreasing diameter, and has a small hole 14 in the bottom which leads to the reservoir. The edge 15 of this second pocket where it is connected to the top 3 of the body is bevelled. The gas release valve is housed in this pocket 6.

The main body 1 is provided with two opposed lugs 16, 17 (not shown in Fig. 7), upstanding from the top 3 adjacent the pocket 5. The external sides 18, 19 of the lugs form part of a cylinder coaxial with the main body 1 and the internal sides 20 and 21 are planar and parallel and together with the top 3 define a channel diametrical of the main body. The edges 22 of the sides 20, 21 are each provided with a notch 24 having an upper edge 25 parallel to the top 3 and a lower edge 26.

Reinforcement lips 27 are provided on the edges 22. A circular recess 28 is provided on each lug 16, 17 for receiving in pivotal engagement, cooperative pegs 28a of a cap 29. Locating grooves may be provided on the inside of the cap for receiving the pegs.

Projections 31 on each lug provide a seating to accommodate the rim 30 of the cap. The base of the cap is accommodated on the ledge 31a between the lugs 16, 17 and the top 3.

A stopper 32 seals off the bottom and accommodates the refill valve.

A fuel release valve is located in the cylindrical pocket 6 and includes a cap 34 having a recess 35 in the perimeter. The edge 36 of the recess 35 and the base 37

of the cap are cooperatively bevel-edged to retain the cap 34 in place in the main body 1 after insertion of the fuel release valve into the body.

The cap 34 holds the valve body 38 in screw threaded engagement. The body 38 consists of a cylindrical tube open at one end and closed at the other, the closed end having a central hole 39 and a rim 40 on which a resilient member, 41 is carried for sealing the hole. The member 41 is located between the rim 40 and the lower part 42 of the tube 43. The outside of the upper edge of the valve body 38 is provided with teeth 38a cooperatively engaging with, for manual rotation by, a toothed semicircular flame regulating control 44 having an arm 45 extending through the cap 29.

The valve body 38 has three peripheral recesses 46, 47, 48 the first of which separates the teeth 38a from the screw-threaded portion of the cap 34, the second extends from the latter downwardly towards the bottom of the body 38, close to which the third 48 is located. Around recess 48 a resilient O-ring seal 49 is located. This O-ring 49 provides a gas tight seal whilst allowing rotation between the valve body 38 and the portion 12 of the main body.

In replacing the O-ring the valve body 38 is simply removed with the O-ring remaining in situ in recess 48. The periphery of the closed end of the valve body 38 is bevelled.

A cylindrical burner tube 43 is fitted into the smooth inside of the valve body 38, movable axially relatively to the body 38. This tube 43 rests on the resilient member 41, and has an axial hole 51 extending the length of the tube which branches off in ports 52 extending radially from the hole 51 communicating with the outside of the tube 43. The upper edge 53 of the tube 43 is bevel edged. A recess 54 is provided for locating part of a lever 55 for moving the tube 43 vertically thus allowing gas past the resilient member 41. The lever is biased into a closed position, where pressure of the tube 43 on the member 41 seals the hole 39, by a laminated spring 65 located below the lever 55.

At the bottom of the pocket 6 in which the valve is carried, a piece 66, comprising a short cylindrical centre part, a frusto-conical bottom part 67 having a diametrical groove 69 which extends to the top of the centre part, and a frusto-conical top part 70, is provided. A porous foamed polyurethane disc 71 is carried for compression between the piece 66 and the bottom edge 50 of the valve body 38 by rotation of the valve body 38 in the cap 34 by manipulation of arm 45.

In use the gas fuel in liquefied form rises through a wick 72 held in the hole 14 leading from the reservoir 2 to the pocket 130

6 thence through the groove of the piece 66.

A stopper 32 is welded to the bottom 4 of the reservoir 2 and is provided with a tubular projection 73 in which a refill valve is carried. The upper inside edge 74 of the projection 73 is bevelled and below said edge is a recess 75 whose upper face 76 is inclined to the longitudinal axis of the projection 73.

The lower edge of recess 75 is perpendicular to the longitudinal axis of the projections 73 and retains and locates a hollow support 77 having a collar 78.

The refill valve consists of a cylindrical body 80, having an upper part 81, provided with longitudinal grooves, which is slidably carried in the hollow support 77, and a lower part 84 extending through a central hole in the stopper 32.

A sealing gasket 86 is carried around the lower part 84, and urged into sealing contact with a collar 82 on the refill valve and a rim 83 on the stopper 32 by a helical spring 79 located around the refill valve between the collars 78 and 82. In refilling the fuel reservoir 2 the nozzle of a pressurised fuel container is inserted in the central hole of the stopper 32, which displaces the lower part 84 thus moving the collar 82 from sealing contact with the gasket 86 and allowing fuel to pass into the reservoir 2 through the grooves of the upper part 81 of the refill valve.

A lever for operation of the gas release valve comprises a generally rectangular piece 55 having support appendages 56, 57, which are located in notches 24 in the lugs 16, 17.

A notch 60 defines two arms 58, 59 which engage a groove 54 in the tip 43 of the burner tube of the gas release valve. Rims 63, 64 are provided on the lever for retaining and locating a laminar spring 65 which urges the lever into a closed position in which the gas release valve is closed.

A notch 65a is provided in the spring 65. A tab 65b is provided on the spring 65 for engaging in the opening of the wedge shaped ridge 10.

The lighting mechanism is carried in a cylindrical tube 87 having one end closed off, and a cut-out 88 at the closed end, which closed end is provided with a semi-circular base piece 90.

The open end of the tube is provided with a U-shaped cap having channels 96, 97 in the arms 91, 92 respectively of the U-shaped cap. The spindles 98, 99 of the knurled wheel are retained by a push fit in the channels 96, 97.

A flint 93 is inserted through the open end of the tube 87 into the central cavity 89, as is the spring 94 which urges the flint into contact with a knurled wheel 95.

The lighting mechanism is carried in the pocket 5 by means of a rib 9a on the

mechanism which is slidably located in a groove 9 in the pocket 5.

In operating the lighter the knurled wheel 95 is rotated, providing a shower of sparks. The lever 55 is simultaneously pressed and held adjacent the ridge 10 to allow gas through the fuel release valve, whereupon the gas is ignited and a flame is produced. On releasing the lever 55, the spring 65 returns the lever and release valve to the closed position.

The welding method used in the illustrated lighter to seal the body 1 with the stopper 32 is designed to overcome the disadvantages of burr formation, particularly with joints below a certain thickness, which may occur with friction welding. The method comprises forming the body and the stopper of plastics material, providing an annular recess 33 in the bottom 4 and an annular groove 105 defined by a rim 104 on the stopper 32. The stopper 32 is rotated in contact with and relatively to the body 1, which is held in a gripping device, by applying torque to the fins 108 and the friction causes a softening of the contacting parts which flow to occupy the cavity 109, providing a substantially leakproof seal.

A removable cap 29 is provided on the upper part of the lighter. A rim 30 engages the edge 31. An aperture is provided to allow access to the flame regulation lever 45. Two ribs 28a engage in cooperative recesses 28. An upper aperture 110 is provided for access to the knurled wheel 95 and associated toothed wheels 111, 112, and a lower aperture 113 through which the lever 55 protrudes. Extensions 114, 115 of the cap 29 are located between the lever 55 and the knurled wheel 95.

WHAT WE CLAIM IS:—

1. A lighter comprising a hollow body forming a reservoir for gas fuel, a lower end of the body having a stopper friction welded thereto and provided with a first valve for filling the reservoir with fuel, an upper end of the body having a pocket provided with a second valve for releasing fuel from the reservoir and openable by a lever spring urged to retain the second valve in a closed position, a lever stop for preventing over-travel of the lever, a recess in the exterior of the body adjacent the second valve, and an ignition mechanism removably secured in the recess.

2. A lighter as claimed in claim 1 in which the ignition mechanism comprises a flint urged into contact with a wheel having an abrasive surface for directing sparks for igniting fuel by rotation about a spindle extending axially through the wheel and removably carried between support ears located on the upper end of the body.

3. A lighter according to claim 1 or 2

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3. A lighter according to claim 1 or 2



in which the body is cylindrical, the stopper is of circular section, and the stopper and the body are of plastics material.

4. A lighter as claimed in any of the preceding claims in which the lever stop comprises a hollow wedge-shaped ridge which protrudes from, and is positioned longitudinally of the body.
5. A lighter as claimed in claim 2 in which two resilient support ears of the ignition mechanism are each provided with a slot which converges to a hole central of the ear for removably retaining the spindle by inserting via the slot.
6. A lighter as claimed in any of the preceding claims provided with a glass release throttle comprising an element of porous resilient material compressible between the gas release valve and a support member, carried adjacent the fuel reservoir, for offering a variable resistance to fuel flow.
7. A lighter as claimed in claim 6 in

which the element is of foamed plastics material.

8. A lighter as claimed in claims 6 or 7 in which the second valve comprises a valve body in cooperative screw threaded engagement with an insert carried in the pocket, a burner tube slidably carried in a bore extending axially through the valve body, a resilient valve seal which in the closed position of the second valve is compressed between and in sealing contact with the burner tube and a stop rim in the bore, and a lever manually operable to rotate the valve body in the insert to compress or decompress the gas release throttle element.
9. A lighter constructed, arranged, and adapted to operate substantially as herein described with reference to, and as illustrated by the accompanying drawings.

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