

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) GAS LIGHTERS

(71) We, BUTANE MATCH AG, a body corporate organised according to the laws of Switzerland, of Oetenbachgasse 28, 8001 Zurich, Switzerland, formerly of 79, Bahnhofstrasse, Zurich, Switzerland, 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 a gas lighter using pressurized fuel, for example, butane.

The present invention provides a gas lighter comprising a cartridge containing fuel under pressure and, in screw threaded engagement with the cartridge, a head assembly which is provided with a projecting member for piercing the cartridge upon relative rotation of the head assembly and the cartridge, the head assembly also comprising a passageway through which fuel may pass to an outlet port, wherein the projecting member and the portion of the cartridge which is, in use, pierced together constitute a valve which can be adjusted by relative rotation of the cartridge and the head assembly to regulate the flow of fuel from the cartridge.

In accordance with the present invention, the head assembly is preferably provided with a central externally threaded screw which engages a central internally threaded recess in the cartridge. This normally serves as the sole means securing the head assembly to the cartridge. The head assembly most advantageously comprises a body casting and a screw, one end of which screw is press-fitted into the body casting and the other, free end of which is preferably provided with a tapered projection arranged to pierce the cartridge upon relative rotation of the head assembly and the cartridge. The helical passageway formed by the engaging screw threads advantageously forms part of the passageway through which the fuel may pass.

The head assembly preferably is provided

also with a downwardly extending peripheral skirt and a downwardly extending central sleeve positioned within the skirt, the former being arranged to telescope over a rim on the cartridge and the latter being arranged to contact part of the screw. The head assembly may also be provided with sparking means for igniting the fuel released from the cartridge, and at least part of the sparking means is preferably positioned within the annular space defined by the sleeve and the skirt.

The fuel outlet port is most advantageously arranged in a protruberance extending into a recess in the head assembly, thus minimising transfer of heat from the flame to the body casting.

One form of lighter constructed in accordance with the present invention will now be described in greater detail by way of example only with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of the lighter,

FIG. 2 is a longitudinal sectional view taken substantially on the line 2—2 as shown in FIG. 1,

FIG. 3 constitutes an enlargement of the upper portion of FIG. 2,

FIG. 4 is a transverse sectional view taken substantially on the line 4—4 as shown in FIG. 2,

FIG. 5 is an exploded view partly in section, showing the construction of the head assembly, and

FIG. 6 is a sectional view of the head assembly.

Referring to the drawings, the lighter, generally designated by the reference numeral 10, comprises a cartridge 11 containing fuel under pressure, and a head assembly 12. As shown in the drawings, the cartridge 11 comprises a cylindrical container or tank formed of thermoplastics material suitable for injection moulding. One end of the cartridge 11 is closed by an end wall 13, and the other end is closed by a plug element 14, also formed

of thermoplastics material. The plug element may be sealed to the wall of the cylindrical container in any preferred or convenient manner. It has been found that the conventional technique of spinning the plug element with respect to the container to form a heat seal 15 gives satisfactory results. A flange 16 on the plug element 14 rests on a shoulder 17 on the container.

The chamber 18 within the cartridge 11 may contain open cell polyether foam, and pressurized fuel, for example butane fills the chamber 18 and the foam. A filling opening 19 in the bottom wall 13 provides for initial introduction of the fuel into the chamber 18, and the opening is later closed by a spinning process.

The plug element 14 is provided with an internal recess 22 which contains a pressure regulator generally designated by the reference numeral 23. This regulator 23 comprises a series of discs and regulates the maximum pressure at which the fuel can escape through a pierced opening in a barrier wall 24 of the plug. Thus, the maximum height of the flame is pre-set, and temperature variations and changes of pressure of the fuel in the cartridge have a minimal effect upon the output pressure. Such a flow regulator is described in greater detail in our copending application No. 1669/72 (Serial No. 1,277,294). The barrier wall 24 of the plug element 14 is initially imperforate, so that the pressurized fuel is confined within the cartridge 11 and cannot escape.

The head assembly 12 includes a head casting 26 and a metal screw 27 fixed to the casting. The casting 26 is designed so that it may be produced by low cost die casting procedures, and the screw 27 is a screw machine product. As best shown in Figure 5, the screw 27 has a portion with external threads 28 and a smooth portion 29. The lower end of the screw 27 is provided with a tapered projection 31. The casting 26 is provided with an outer peripheral skirt 32 and an inner concentric sleeve 33, defining an annular space 34 between them. As best shown in FIGS. 5 and 6, an end wall 36 is provided with radiating channels 37. The screw 27 is assembled relative to the casting 26 by pressing the smooth portion 29 into the interior of the central sleeve 33 until the upper end of the screw 27 engages the end wall 36. An axial channel 30 in the wall of the sleeve 33 communicates with the channels 37 in the wall 36, and the channels 37 communicate with an axial passage 38 which leads to the flame port or outlet port 39. The port 39 emerges into a recess 40 through a protuberance 41 projecting into the recess. After assembly, the casting 26 and screw 27 function as a single integral unit.

The casting 26 may be knurled or otherwise roughened on its outer surface, as shown at 42 and 43, to facilitate manual grasping of

the head assembly 12 for turning it with respect to the cartridge 11. The plug element 14 is provided with a central upstanding tubular portion 44 provided with internal threads 45. When the screw 27 is threaded into the plug element 14, the lower tapered projection 31 first punctures the barrier wall 24. Turning movement of the head assembly 12 in the opposite direction then lifts the tapered projection 31 of the screw to permit flow of fuel under pressure through the regulator assembly 23, and through a small opening pierced in the barrier wall 24, and through the clearance space between the internal threads 45 and external threads 28. The screw threads thus form a helix path for flow of fuel under pressure to the upper end of the plug element 14. The fuel under pressure the flows upwardly through the axial channel 30 and radial channels 37 to the passageway 38 and to the outlet port 39.

Sparkign means is provided for igniting the fuel escaping from the outlet port 39 to form a flame. As shown in the drawings, this sparkign means includes a wheel 47 having a serrated periphery 48 and provided with oppositely extending integral hubs 49. These hubs 49 are received in aligned recesses 50 provided on an upper wall 52 of the casting 26, and the wheel 47 extends through a slot 51 in this wall. A portion of the wall 52 is deformed to retain both hubs 49 in position, to prevent disassembly. A solid cylinder of spark-producing material 53 is slidably mounted within an integral guide tube 54 provided on the head casting 26, and extends through an opening 55. A coiled compression spring 56 within the tube 54 urges the member 53 in an upward direction to contact the periphery 48 of the wheel 47. The lower end of the spring 56 engages a flange 57 which is supported on the outer surface of the sleeve 33 by friction-gripping leg elements 58. It will be observed that the tube 54 and spring 56 are positioned in the annular space 34 between the skirt 32 and the central sleeve 33. The skirt telescopes over the upward extending rim of 60 of cartridge 11 to exclude foreign matter from the annular space 34.

In operation, the cartridge 11 is connected to the head assembly 12 by relative turning movement between the threads 28 and 45, to cause the tapered projection 31 of the screw 27 to puncture the barrier wall 24, as described above. The head assembly 12 is then turned in the opposite direction for a part of one revolution to permit gas under pressure to escape through the outlet port 39. The sparking wheel 47 is then manually rotated to ignite the fuel and form a flame 62 at the outlet port 39. The protuberance 41 keeps the flame spaced from the floor of the recess 40 to minimize transfer of the heat into the head casting 26. The height of the flame 62 is adjusted by turning of the head assembly 12 with

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respect to the cartridge 11; this relative turning movement changes the spacing of the tapered projection 31 of the screw with respect to the opening which it has pierced in the barrier wall 24, and this tapered projection 31 serves as a valve to regulate the height of the flame 62. The maximum height of the flame is pre-set by the regulator assembly 23. In order to extinguish the flame, the head assembly 12 is turned with respect to the cartridge 11 to move the tapered projection 31 of the screw 27 back into the barrier wall opening to shut off all flow of gas. From the above description, it will be understood that the screw 27 serves as the sole connecting means between the head assembly 12 and the fuel cartridge 11, pierces the cartridge wall 24 to permit escape of fuel under pressure, provides a helix flow path through the clearance space between the threads 28 and 45, and serves as a regulator valve for adjusting the height of the flame, and as a shutoff valve for extinguishing it.

When the supply of fuel has been exhausted from the cartridge 11, the head assembly 12 is unscrewed from the cartridge and the cartridge is thrown away. A new duplicate cartridge having a supply of fuel under pressure is then threadedly connected by inserting the screw 27 into the internal threads 45 and then turning the head assembly 12 to cause the tapered projection 31 to pierce the barrier wall 24. Subsequent operation of the lighter 10 is the same as that previously described. When it is necessary to install a new solid cylinder 53 of sparking material, the head assembly 12 is unscrewed from the cartridge 11 to expose the flange 57. The flange is then manually moved in a direction away from the outlet port 39, the friction legs 58 sliding on the outer surface of the central sleeve 33. The spring 56 may then be withdrawn axially from the tube 54, and a new solid cylinder 53 of sparking material inserted into the open end of the tube. The spring 56 and flange 57 are then reassembled, and the head assembly 12 is reinstalled on the cartridge 11.

WHAT WE CLAIM IS:—

1. A gas lighter comprising a cartridge containing fuel under pressure and, in screw threaded engagement with the cartridge, a head assembly which is provided with a projecting member for piercing the cartridge upon relative rotation of the head assembly and the cartridge, the head assembly also comprising a passageway through which fuel may pass to an outlet port, wherein the projecting member

and the portion of the cartridge which is, in use, pierced together constitute a valve which can be adjusted by relative rotation of the cartridge and the head assembly to regulate the flow of fuel from the cartridge.

2. A lighter as claimed in claim 1, wherein the head assembly is provided with a central externally-threaded screw which engages a central internally threaded recess in the cartridge.

3. A lighter as claimed in claim 2, wherein the bottom of the screw carries a tapered projection arranged to pierce the cartridge upon relative rotation of the head assembly and the cartridge.

4. A lighter as claimed in claim 3, wherein the head assembly consists of a body casting and a screw, which screw has a portion at its end remote from the tapered projection which is press-fitted into the body casting.

5. A lighter as claimed in claim 4, wherein the helical passageway formed by the engaging screw threads forms part of the passageway through which the fuel may pass.

6. A lighter as claimed in any one of claims 1 to 5, wherein the head assembly is provided at its end remote from the outlet port with a peripheral skirt which telescopes over a rim on the cartridge.

7. A lighter as claimed in claim 6, wherein the head assembly is provided with a central sleeve positioned concentrically within the skirt and arranged to contact part of the screw.

8. A lighter as claimed in claim 7, wherein the head assembly is also provided with sparking means at least part of which is positioned within the annular space defined by the sleeve and skirt.

9. A lighter as claimed in any one of claims 1 to 8, wherein the head assembly contains an upper recess and a protruberance extending into the recess, the fuel outlet port being positioned in the protruberance.

10. A lighter as claimed in any one of claims 1 to 9, wherein the engaging threads on the head assembly and the cartridge constitute the sole means securing the cartridge to the head assembly.

11. A gas lighter substantially as described herein with reference to and as shown in the accompanying drawings.

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respect to the cartridge 11; this relative turning movement changes the spacing of the tapered projection 31 of the screw with respect to the opening which it has pierced in the barrier wall 24, and this tapered projection 31 serves as a valve to regulate the height of the flame 62. The maximum height of the flame is pre-set by the regulator assembly 23. In order to extinguish the flame, the head assembly 12 is turned with respect to the cartridge 11 to move the tapered projection 31 of the screw 27 back into the barrier wall opening to shut off all flow of gas. From the above description, it will be understood that the screw 27 serves as the sole connecting means between the head assembly 12 and the fuel cartridge 11, pierces the cartridge wall 24 to permit escape of fuel under pressure, provides a helix flow path through the clearance space between the threads 28 and 45, and serves as a regulator valve for adjusting the height of the flame, and as a shutoff valve for extinguishing it.

When the supply of fuel has been exhausted from the cartridge 11, the head assembly 12 is unscrewed from the cartridge and the cartridge is thrown away. A new duplicate cartridge having a supply of fuel under pressure is then threadedly connected by inserting the screw 27 into the internal threads 45 and then turning the head assembly 12 to cause the tapered projection 31 to pierce the barrier wall 24. Subsequent operation of the lighter 10 is the same as that previously described. When it is necessary to install a new solid cylinder 53 of sparking material, the head assembly 12 is unscrewed from the cartridge 11 to expose the flange 57. The flange is then manually moved in a direction away from the outlet port 39, the friction legs 58 sliding on the outer surface of the central sleeve 33. The spring 56 may then be withdrawn axially from the tube 54, and a new solid cylinder 53 of sparking material inserted into the open end of the tube. The spring 56 and flange 57 are then reassembled, and the head assembly 12 is reinstalled on the cartridge 11.

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and the portion of the cartridge which is, in use, pierced together constitute a valve which can be adjusted by relative rotation of the cartridge and the head assembly to regulate the flow of fuel from the cartridge.

2. A lighter as claimed in claim 1, wherein the head assembly is provided with a central externally-threaded screw which engages a central internally threaded recess in the cartridge.

3. A lighter as claimed in claim 2, wherein the bottom of the screw carries a tapered projection arranged to pierce the cartridge upon relative rotation of the head assembly and the cartridge.

4. A lighter as claimed in claim 3, wherein the head assembly consists of a body casting and a screw, which screw has a portion at its end remote from the tapered projection which is press-fitted into the body casting.

5. A lighter as claimed in claim 4, wherein the helical passageway formed by the engaging screw threads forms part of the passageway through which the fuel may pass.

6. A lighter as claimed in any one of claims 1 to 5, wherein the head assembly is provided at its end remote from the outlet port with a peripheral skirt which telescopes over a rim on the cartridge.

7. A lighter as claimed in claim 6, wherein the head assembly is provided with a central sleeve positioned concentrically within the skirt and arranged to contact part of the screw.

8. A lighter as claimed in claim 7, wherein the head assembly is also provided with sparking means at least part of which is positioned within the annular space defined by the sleeve and skirt.

9. A lighter as claimed in any one of claims 1 to 8, wherein the head assembly contains an upper recess and a protruberance extending into the recess, the fuel outlet port being positioned in the protruberance.

10. A lighter as claimed in any one of claims 1 to 9, wherein the engaging threads on the head assembly and the cartridge constitute the sole means securing the cartridge to the head assembly.

11. A gas lighter substantially as described herein with reference to and as shown in the accompanying drawings.

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