PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to Lighters Comprising a Device for Adjusting the Delivery of Fuel Feeding the Flame

We, LA NATIONALE S.A., a Company organised under the laws of Switzerland, of 2, Rue des Falaises, Geneva, 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:—

There are known, equally well on petrol and liquefied gas lighters, adjusting devices enabling the supply of fuel to the flame to be modified. These devices mainly consist of a compressed wick or porous body the capiliary passages of which are modified by a variation of the compression on the wick.

It has been found, particularly in gas lighters that the movements to which the parts are to be subjected, for obtaining a variation of the flame from a minimum to an admissible maximum, are of the order of a few microns to some hundredths of a millimetre.

In practice these adjusting devices have the disadvantage, for the user, of being excessively sudden and necessitating, in general, the use of a tool or a spanner for the operation thereof. Further, it is difficult to adjust the flame exactly at the desired size.

On the other hand, it is advantageous, in liquefied gas lighters, to be able to adjust momentarily the gas supply to a value much too high for current usage, so as to cause a large quantity of gas in the liquid state to pass into the porous body and thus obtain a cleansing of the latter for removing the residues which are deposited in the body after a predetermined period of use.

The invention has for its subject a lighter comprising a device for adjusting the supply of fuel feeding the flame, characterised in that the said device comprises at least two actuating members for the adjustment, of which the first permits of a rapid adjustment and the second a fine adjustment.

This device permits of obtaining a fine adjustment of the flame without difficulty, and further, in the case of liquefied gas lighters, comprising a porous body for the evaporation of gas, the member for rapid control of the adjustment permits of momentarily increasing the supply in an exaggerated manner for cleaning the porous body.

One form of construction of a lighter according to the invention and a modification of a burner, are shown diagrammatically and by way of example in the accompanying drawings, wherein:—

Fig. 1 is a vertical section of a lighter according to the invention.

Fig. 2 is a section on the line II—II of Fig. 1.

Fig. 3 is a section of a burner according to another form of construction.

Fig. 4 is a top plan view of a portion of the burner according to Fig. 3.

Fig. 5 shows a key for adjusting the burner according to Fig. 3.

Fig. 6 is a view in perspective of a particular washer used in the burner according to Fig. 3.

The lighter shown in Fig. 1 comprises a body 1 forming a reservoir and surmounted by a cover 2. In the interior of the reservoir is located a tube 3 having an orifice 4 for the passage of gas in the liquid state. In the interior of said tube 3 is located a bearing part 5 secured to a screw 6, capable of being actuated from the outside of the lighter. A fluidtight joint 7 is provided on the screw 6 for preventing leakage of gas to the outside. On the upper face of the bearing part 5 is located a porous body formed by a piece of fabric 8 which is clamped against the bearing part 5 by another part 9 having an orifice 10 for the supply of gas to an outlet fitting formed by a tube 11.

In the interior of said tube 11 slides a rod 12 of which the upper end may be displaced by a part 13 subjected to the action of a spring 14 and located in a part 15 of the cover 2. The lower end of the rod 12 carries

[*Price 3s. 6d.*]

Price 4s 6d.

a fluidtight lining adapted to close the orifice 10 when said rod 12 is pushed downwards by the part 13. When the cover 2 is opened, the rod 12 is pushed upwards by a spring 16 located in a recess at the bottom of the tube 11.

The part 9 is engaged in the lower end of the tube 11 and a fluidtight joint 17 is provided for preventing leakages of gas between the tube 11 and the tube 3 in which it can slide. A spring 18 is located in the lower part of the tube 3 and bears, at one end, against the screw 6, and at the other end, against a sliding part 19 which transmit to the part 9 the action of the spring 18 and repels said part 9 upwardly. This action thus tends to move apart the parts 9 and 5 which are adapted to compress the piece of fabric 8 transversely to the direction of flow of the gas in said fabric.

Above the tube 3, the tube 11 is provided with a shoulder 20 against which bears a lever 21 hinged on a ball 22. The upper end of said lever 21 engages with a sleeve 23 sliding in a bore of a wall 24 and provided with a screwed bore which engages the end of a screw 25 forming a control member for fine adjustment. Said screw has a head 26 of which the edge is milled so as to enable it to be turned easily. Said screw has a cylindrical portion in which is provided a groove 27 to allow of axial fixing of said screw by means of a projection 28 engaging with said groove.

By causing the screw 25 to turn, an axial movement of the sleeve 23 is produced, the sleeve engaging in the upper end of the lever 21 in such a manner as not to be capable of turning relatively to the latter. This movement produces a pivoting of the lever about the ball 22, which is translated into a very small movement of the tube 11 in the interior of the tube 3. It is also possible to vary in a very precise manner, the distance between the parts 5 and 9, and thus the compression applied by these parts on the piece of fabric 8.

When the member 26 for the control of fine adjustment is screwed so as to move the sleeve 23 towards the right, the sleeve 23 abuts against the shoulder formed by the unthreaded part of the screw 25, which limits the maximum height to which the flame can be adjusted by said member 26. It is possible to fix a maximum useful height by acting on the member 6 for controlling rapid adjustment. This device eliminates the risk of burns derived from too high a flame at the moment of lighting the burner, especially in the case when the user has actuated the member for fine adjustment, without paying any attention, for example mechanically during the course of a discussion.

The lower limit of the height of the flame which it is possible to obtain by means of the control member for fine adjustment, may be determined by the upper end of the lever 21 coming into contact with the tube 11. This limit may also be determined simply by the increase of the pressure to be applied to the fabric 8, said pressure making it difficult to actuate the member 26 when the fabric 8 is compressed strongly.

It will be seen that the movement transmitted to the part 9 by the member for controlling the fine adjustment formed by the screw 25, is subjected to two successive reductions, namely a reduction obtained by means of the lever 21, and a second reduction obtained by the screwing of the sleeve 23 on the screw 25. The rapid adjustment of the flame of the lighter is effected by more or less turning the screw 6, which produces a rapid movement of the part 5 relatively to the part 9.

Fig. 3 shows another form of construction of a burner wherein there is again provided a porous body formed by a wick 29, which is clamped between a supporting part 30 and a movable part 9 having an orifice 10 for the supply of gas to the burner. The part 30 is screwed into the part 31 before mounting the burner in the lighter. The body 31 is then screwed into a screwed part 32 of the upper wall 33 of the reservoir of the lighter, with the interposition of a fluidtight joint 34.

As in the first form of construction, the part 9 contains a movable rod 12 which is urged upwardly by a spring 16 and of which the lower portion has a fluidtight lining 35 adapted to close the orifice 10 when the rod 12 is pushed downwardly by a cover, not shown. The part 9 is fitted with force into a part 36 of which the upper part is screwed and engaged in a screwed bore of a member 37 for controlling the fine adjustment. Said member 37, of which the outer edge is milled at 38, has a second thread 39 in engagement with a threaded part in the upper part of the body 31.

A spring washer 40 is placed in a seating of the body 31 and bears, at one end, against said latter and at the other end, against an annular projection 41 of the part 36 so as to provide friction rendering it difficult to rotate the latter relatively to the body 31. For increasing said friction said washer is milled at its periphery in such a manner as to cause the appearance of small teeth on its faces bearing against the annular projection 41 and the seating of the body 31. Fig. 6 shows this washer in perspective, said washer being formed by an elastic element tending to space the part 9 from the part 30, that is to say tending to reduce the pressure applied to the wick 29.

The two screw-threads provided on the member 37 for controlling the fine adjustment, have a slight difference in pitch amongst themselves, so that when said member is driven in rotation the movement of the

part 9, relatively to the part 30 is determined by the differential value of these two threads. It is thus possible to obtain a very considerable reduction of the movement of the part 9.

When it is desired to effect a rapid adjustment of the flame, for example, for washing the part of the wick 29 at which the evaporation of the gas is effected, it is possible to turn the part 36 relatively to the member 37 for fine adjustment, which is held stationary. For this purpose, the part 36 is provided, near its upper end with a part of non-circular section which is visible in Fig. 4. Fig. 5 shows a spanner 42 having two orifices 43 and 44 of which the section corresponds with that of the upper part 36, in such a manner as to permit of the use of said spanner so as to screw or unscrew the part 36 relatively to the member 37. This operation requires the use of a spanner as it necessitates a fairly strong force by reason of friction which is produced by the resilient washer 40 between the part 36 and the body 31 of the burner.

In the form of construction shown in Fig. 3, it is advantageous for the two threads of the member 37 to have left-hand threads in order to obtain a stop limiting the movement of the member 37 so as to fix the maximum height of the flame. In fact, it is desirable that, according to use, a rotation of the member 37 in an anti-clockwise direction produces an increase in the height of the flame. This height is limited when the inner surface 45 of the member 37 comes into contact with the upper annular face 46 of the body 31. For obtaining a reduction in height of the flame, it is necessary to turn the member 37 in a clockwise direction, which corresponds, by reason of the left-hand threads, to an unwinding of this member on the body 31. This unscrewing is limited progressively by the greater and greater force which must be applied to the member for effectively compressing the wick 29 between the parts 9 and 30.

The burner according to Fig. 3 is provided in all with three adjusting control members, as the part 30 can be screwed more or less into the body 31 of the burner, which permits of varying the tension of the spring formed by the washer 40. Said part 30 thus forms a third member for controlling the adjustment, the first two members being respectively formed by the member 37 and the part of non-circular section of the part 36.

The burner above described is very advantageous, as it consists of an assembly capable of being secured to the reservoir of the lighter, which simplifies the construction of the latter.

It will be understood that the forms of construction described may be modified considerably. The burner shown in Fig. 3 may, in particular, be provided with a sufficiently long body so as to pass through the whole of the reservoir, in such a manner that the part 30 may be screwed, more or less, into the body 31 by acting thereon from the outside. In this case it is possible to omit the spanner shown in Fig. 5 and not to impart a particular shape to the part above the member 36, as the rapid adjustment may also be obtained simply by screwing the part 30 more or less into the body 31.

It will be understood that all types of reducing means may be provided for obtaining fine adjustment, for example by using a worm, a combination of levers, planetary gears and so forth. In the forms of construction described, the fine adjustment range was smaller than that of rapid adjustment, by reason of the construction adopted, but it will be understood that the range of fine adjustment may also be at least as large as that of rapid adjustment.

Finally, the examples described relate to lighters in which the fuel is a liquefied gas, but it will be understood that analogous devices may be applied to petrol lighters.

WHAT WE CLAIM IS:—

1. A lighter comprising a device for adjusting the supply of fuel feeding the flame, characterised in that the said device comprises at least two actuating members for the adjustment, of which the first permits of a rapid adjustment and the second a fine adjustment.

2. A lighter according to Claim 1, characterised in that at least two members for controlling the adjustment are so arranged as to be accessible from the outside of the lighter so as to enable it to be actuated without dismantling the latter.

3. A lighter according to Claim 1, characterised in that the movement of the fine adjusting member is limited so that the range of fine adjustment is less than that for coarse adjustment.

4. A lighter according to Claim 1, wherein the fuel is a liquid gas, said gas having to pass through a porous body so as to reach said burner, means being provided for applying compression to the porous body so as to adjust the supply of fuel, characterised in that the two members for controlling the adjustment are provided so as to vary the compression applied to the porous body.

5. A lighter according to Claims 1 and 4, wherein the porous body is clamped between two parts of which one has a supply passage for gas to an outlet nozzle, characterised in that the two clamping members for the porous body are subjected to the action of an elastic element tending to separate them from one another, the adjusting members being actuated so as to press these clamping parts one against the other, against the action of said elastic element.

6. A lighter according to Claim 1, characterised in that it comprises a burner forming

part 9, relatively to the part 30 is determined by the differential value of these two threads. It is thus possible to obtain a very considerable reduction of the movement of the part 9.

When it is desired to effect a rapid adjustment of the flame, for example, for washing the part of the wick 29 at which the evaporation of the gas is effected, it is possible to turn the part 36 relatively to the member 37 for fine adjustment, which is held stationary. For this purpose, the part 36 is provided, near its upper end with a part of non-circular section which is visible in Fig. 4. Fig. 5 shows a spanner 42 having two orifices 43 and 44 of which the section corresponds with that of the upper part 36, in such a manner as to permit of the use of said spanner so as to screw or unscrew the part 36 relatively to the member 37. This operation requires the use of a spanner as it necessitates a fairly strong force by reason of friction which is produced by the resilient washer 40 between the part 36 and the body 31 of the burner.

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It will be understood that all types of reducing means may be provided for obtaining fine adjustment, for example by using a worm, a combination of levers, planetary gears and so forth. In the forms of construction described, the fine adjustment range was smaller than that of rapid adjustment, by reason of the construction adopted, but it will be understood that the range of fine adjustment may also be at least as large as that of rapid adjustment.

Finally, the examples described relate to lighters in which the fuel is a liquefied gas, but it will be understood that analogous devices may be applied to petrol lighters.

WHAT WE CLAIM IS:—

1. A lighter comprising a device for adjusting the supply of fuel feeding the flame, characterised in that the said device comprises at least two actuating members for the adjustment, of which the first permits of a rapid adjustment and the second a fine adjustment.

2. A lighter according to Claim 1, characterised in that at least two members for controlling the adjustment are so arranged as to be accessible from the outside of the lighter so as to enable it to be actuated without dismantling the latter.

3. A lighter according to Claim 1, characterised in that the movement of the fine adjusting member is limited so that the range of fine adjustment is less than that for coarse adjustment.

4. A lighter according to Claim 1, wherein the fuel is a liquid gas, said gas having to pass through a porous body so as to reach said burner, means being provided for applying compression to the porous body so as to adjust the supply of fuel, characterised in that the two members for controlling the adjustment are provided so as to vary the compression applied to the porous body.

5. A lighter according to Claims 1 and 4, wherein the porous body is clamped between two parts of which one has a supply passage for gas to an outlet nozzle, characterised in that the two clamping members for the porous body are subjected to the action of an elastic element tending to separate them from one another, the adjusting members being actuated so as to press these clamping parts one against the other, against the action of said elastic element.

6. A lighter according to Claim 1, characterised in that it comprises a burner forming

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an assembly capable of being secured to said reservoir, said assembly comprising said members for controlling the adjustment of the supply of fuel.

7. A lighter according to Claims 1 to 6, characterised in that the member for fine adjustment is formed by a part having two threads, and having between them different pitches, one of said threads being in engagement with a stationary threaded part of the lighter, the other thread being in engagement with a threaded part provided on one of the two parts for clamping the porous body.

8. A lighter according to Claims 1 to 7, characterised in that the part clamping the porous body, which is provided with the screwed part engaging with the member for fine adjustment, comprises an internal passage of which one end forms said burner, said end having a part of non-circular cross-section so as to enable this part to be turned by means of a spanner applied to this non-circular part, in order to screw on and unscrew this clamping part relatively to the member for fine adjustment and thus obtain a quick adjustment, means being provided for applying friction between the clamping part and a stationary part of the lighter so as to obviate that the clamping part is set in rotation during actuation of the member for fine adjustment.

9. A lighter according to Claims 1 to 5, characterised in that one of the clamping parts is screwed into a stationary part of the lighter, the other clamping part being mounted in a sliding manner in a guide tube and subjected to the action of a lever of which one end is movable by means of a screw forming said member for fine adjustment, the member for quick adjustment being formed by a part screwed into the stationary part of the lighter.

10. A lighter according to Claim 1, wherein the fuel is a liquefied gas, said gas being capable of passing through a porous body so as to reach a burner, means being provided for applying a compression on the porous body in order to adjust the feed of fuel, characterised in that the said means are actuated in such a manner as to apply the compression transversely to the direction of flow of the gas in the porous body.

11. Pyrophoric lighters according to any one of the preceding claims, constructed, arranged and operating in the manner hereinbefore described and as shown in the accompanying drawings.

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