United States Patent [19]

Nissen

[11] **3,895,905**

[45] **July 22, 1975**

[54] **LIGHTER**

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[73] Assignee: **The Gillette Company**, Boston, Mass.

[22] Filed: **Nov. 9, 1973**

[21] Appl. No.: **414,267**

[52] **U.S. Cl.** **431/254**; 431/277

[51] **Int. Cl.**[2] **F23Q 2/16**

[58] **Field of Search** 431/254, 277, 344, 130, 431/255; 222/394

[56] **References Cited**

UNITED STATES PATENTS

2,953,284	9/1960	Prussin et al.	222/394
3,154,935	11/1964	Ayres	431/344 X
3,414,363	12/1968	Rosfelder	431/255 X
3,439,994	4/1969	Cassan	431/254
3,493,313	2/1970	Schlamp	431/255
3,523,006	8/1970	Piffath et al.	431/277 X
3,770,367	11/1973	Court	431/277

Primary Examiner—Edward G. Favors

[57] **ABSTRACT**

A lighter includes fuel chamber defining structure having an outlet port, a valve for controlling the flow of fuel from said fuel chamber through said outlet port, the valve including a valve member mounted for movement between a valve closed position and a valve open position, and a valve actuator for moving the valve member. The valve actuator is a one-piece member and includes a first coupling portion secured to a fixed member, a second coupling portion secured to the movable valve member, a spring portion connecting the first and second coupling portion and normally urging the movable valve member to the valve closed position, and an actuator portion at the end of the actuator opposite the coupling portion.

19 Claims, 8 Drawing Figures

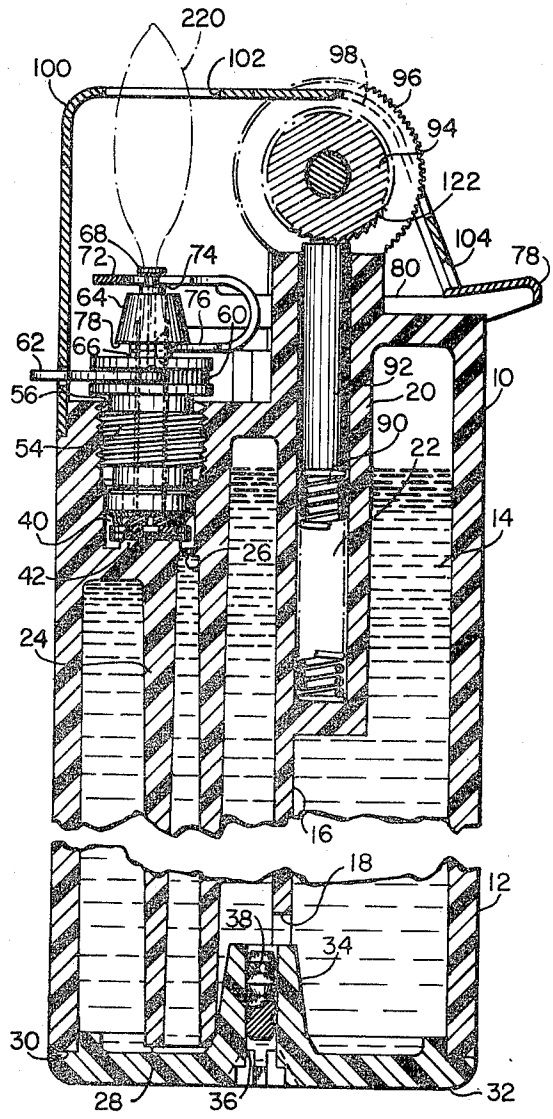
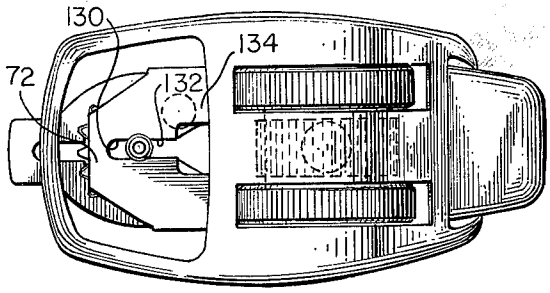


Fig. 3



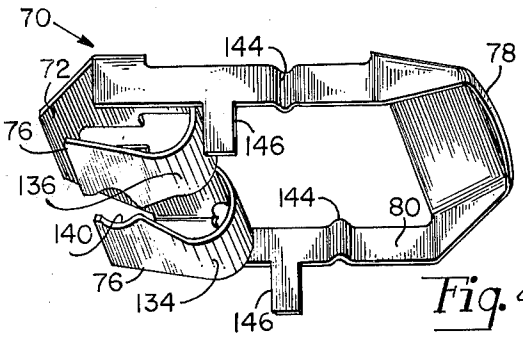


Fig. 4

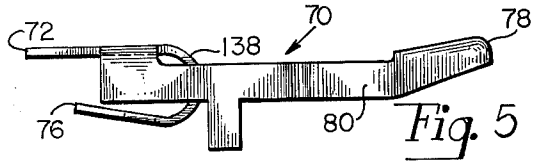


Fig. 5

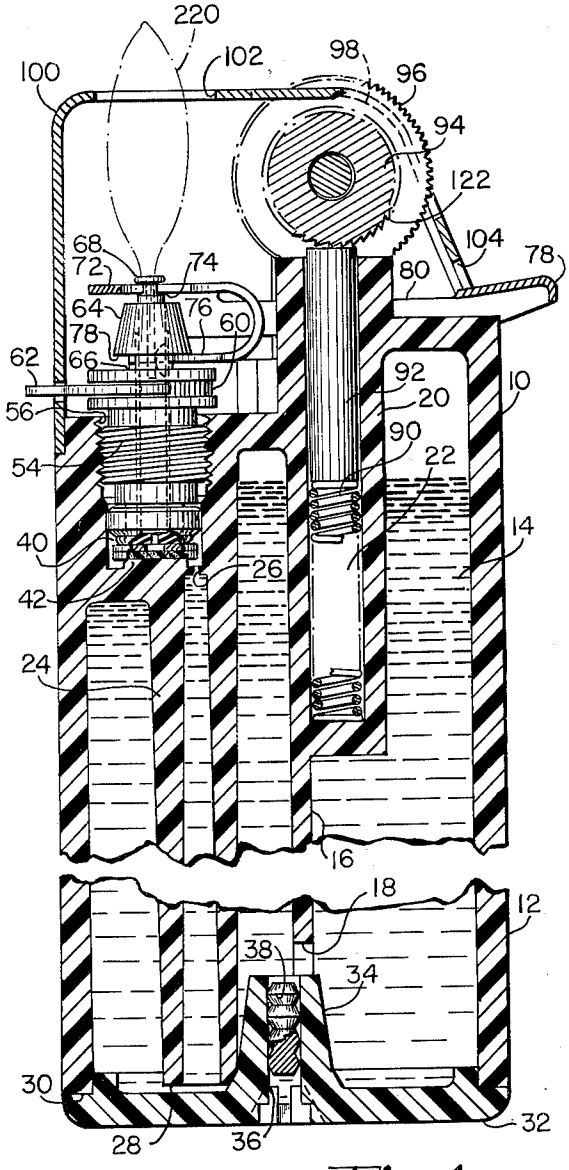


Fig. 1

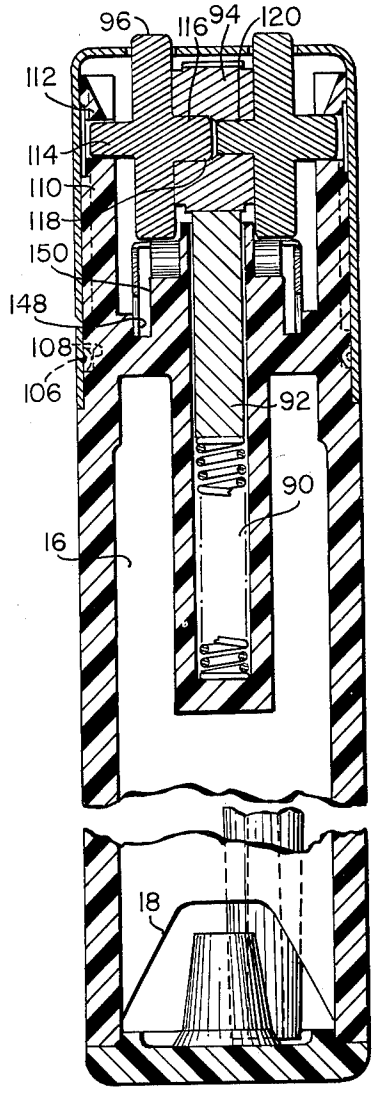


Fig. 2

Fig. 6

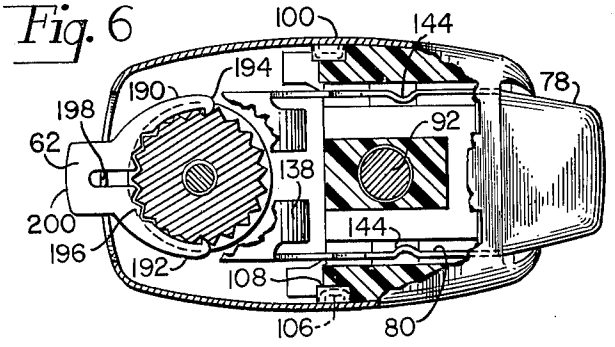


Fig. 7

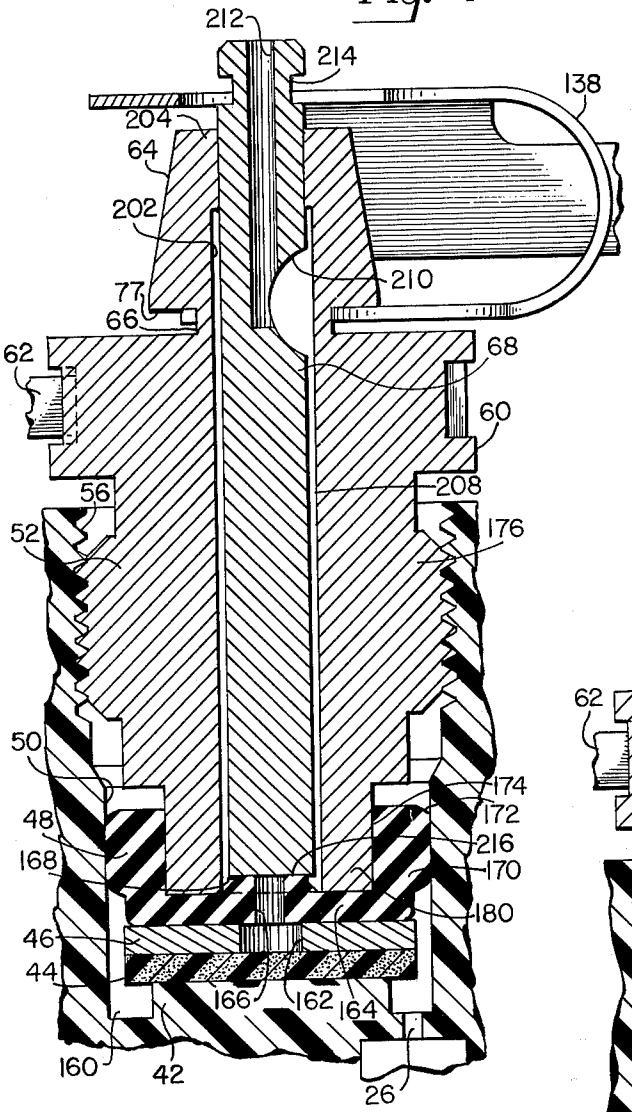
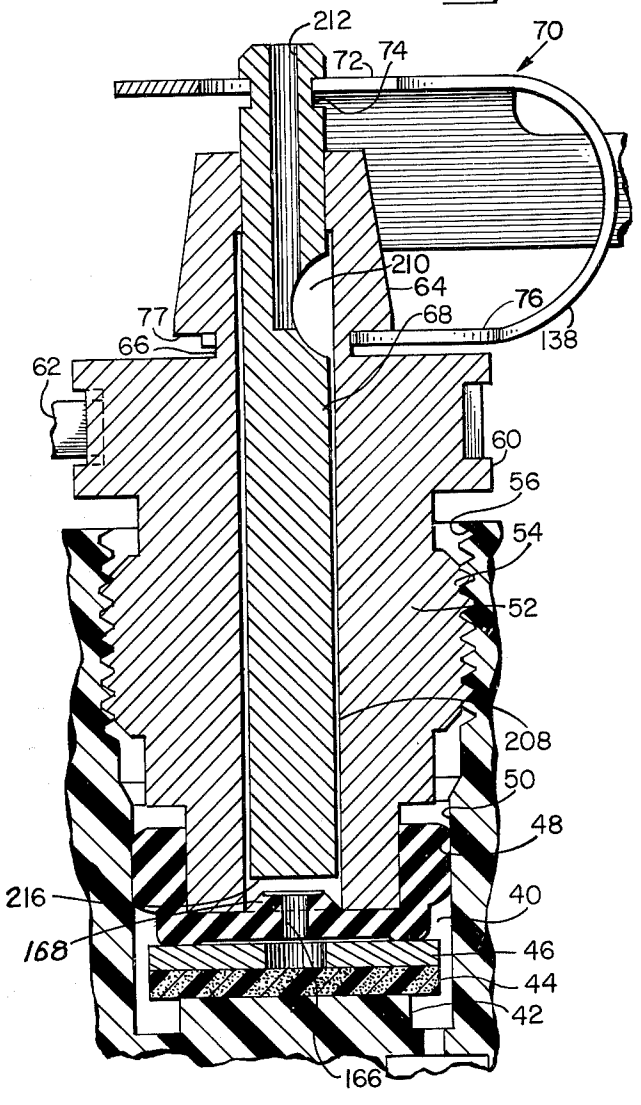


Fig. 8



LIGHTER

SUMMARY OF INVENTION

This invention relates to lighters and more particularly to lighters of the disposable variety, designed to be filled with a single charge of fuel and discarded when the fuel is exhausted. An object of the invention is to provide a simple, reliable and inexpensive lighter design that provides improved flame stability and effecient use of fuel.

While the requirements of simplicity and inexpensiveness favor the elimination of relatively costly features sometimes found in rechargeable lighters, a mechanism for adjustably controlling the flame height has been found to be desirable. The adjustment mechanism should operate consistently and dependably and it is a further object to provide an improved fuel flow adjustment mechanism.

Another object of the invention is the provision of a novel and improved compact lighter that is inexpensive yet reliable in operation.

In accordance with one aspect of the invention, a lighter is provided that has fuel chamber defining structure, valve means for controlling the flow of fuel from the fuel chamber and an igniter adjacent the valve outlet for igniting fuel flowing from the valve. A compressible flow regulator is disposed between the fuel chamber and the valve outlet to regulate the rate of flow therebetween. The flow regulator comprises an absorbant medium that holds a quantity of liquid fuel and from which fuel is delivered to the valve outlet in vapor form. Adjustable means for controlling the compression of the flow regulator, and thereby the rate of fuel flow to the outlet, include a thermal isolation member bearing against the flow regulator, and means for varying the compression of the flow regulator.

In a particular embodiment, the valve comprises a fixed member and a movable stem member, the stem being normally seated in a flow blocking position and being moved to an open position by an operating lever. In accordance with another feature, the operating lever includes integral spring means which biases the stem toward its normally closed position. An integral actuator portion at the end of the operating lever opposite the spring means is depressible so as to lift the valve stem and thereby open the valve.

In accordance with still another feature, fuel vapor flow of increased stability is maintained over the useful life of the lighter by maintaining the liquid fuel under positive pressure. In a preferred embodiment, the greater part of the fuel chamber is charged with a liquid fuel, and a lesser part of the chamber contains a pressurized gas substantially insoluble in the liquid fuel in a quantity sufficient to occupy substantially the full volume of the fuel chamber at atmospheric pressure. A fuel impermeable tube having a fuel inlet adjacent the base of the fuel chamber and an outlet communicating with the flow regulator, channels fuel to the regulator.

The lighter also includes spark generation means comprising a rotatably mounted member having a directionally roughened contact surface adapted to produce sparks upon rotation in a given direction against a cooperating member, and a pair of actuating members flanking the rotatable member. Each actuating member includes two oppositely extending stub shafts, the two stub shafts being of unlike cross-sectional dimension. Cooperating shaft receiving sockets are provided in the rotatable member and the support walls, the sockets in the rotatable member being of unlike cross-sectional dimension and coordinated with the sockets in the support walls to orient the rotatable member to generate ignition sparks in the direction of the valve means when it is rotated in the given direction.

In a particular embodiment of the invention an annular reservoir surrounds the flow regulator, and a resilient thermal isolation and seal member is interposed between the flow regulator and the valve stem to seal the annular reservoir. In this embodiment, the flow regulator control means includes a rigid intermediate member between the flow regulator and the resilient seal member, the rigid member transmitting a compression force to the fuel regulator and including an interior passageway in registry with a passageway through the resilient seal member. A valve housing member receives the seal member and is threadably engaged in the lighter body for axial movement to adjust the compression of the flow regulator. The valve housing member also includes an elongated bore which houses the valve stem with reduced diameter guiding bore at its upper end. The valve actuator includes a resilient, generally C-shaped spring member having an upper portion which engages the valve stem and a lower portion which engages the valve housing.

The lighter is eaily operated and provides a stable flame over its useful life, the stability of the flame not being significantly affected by the frequency or duration of use of the lighter. The actuator system of the igniter is inexpensive, reliable and easy to use. Adjustment of fuel flow rate is convenient and does not adversely affect the stability of the flame.

Other objects, features, and advantages will occur to one skilled in the art from the following description of a particular embodiment of the invention taken, together with the attached drawings thereof, in which:

FIG. 1 is a partially broken away sectional view in side elevation showing an adjustable lighter embodying the features of the present invention;

FIG. 2 is a sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is a top plan view of the lighter of FIG. 1;

FIG. 4 is a perspective view of the actuating lever employed in the lighter shown in FIG. 1;

FIG. 5 is a side view of the actuating lever shown in FIG. 4;

FIG. 6 is a top view, with parts broken away, showing details of the flame height adjustment lever and the actuating lever; and

FIGS. 7 and 8 are enlarged sectional views in front elevation of the flow regulation and valve apparatus, with the valve, respectively, in closed and open positions.

DESCRIPTION OF PARTICULAR EMBODIMENT

The lighter shown in FIG. 1 includes a molded plastic (Lexan) body structure **10** that includes a peripheral wall **12** that defines a fuel chamber **14.** Extending transversely across chamber **14** is a strengthening rib **16** that has a bottom surface **18** of frustoconical configuration as indicated in FIG. **2.** Structure **20** formed on rib **16** defines a cylindrical recess **22.** Also formed in chamber **14** on the opposite side of rib **16** from recess **22** is a molded tube structure **24** that has a port **26** at its upper end and its lower end **28** is disposed adjacent

the bottom end surface 30 of peripheral wall 12. Bottom cap 32 is secured to surface 30 and defines the lower wall of fuel chamber 14. Cap 32 includes projection 34 which has passage 36 in which is disposed sealing pin 38.

A recess 40 in the upper part of body structure 10 communicates with port 26. Formed in the base of recess 40 is pedestal 42 on which is seated flow regulator pad 44 and an aluminum plate 46. Disposed on plate 46 is an elastomeric seal member 48 that bears against peripheral wall 50 of recess 40. Seal 48 receives the lower end of valve stem housing 52 that has peripheral threads 54 in engagement with corresponding threads 56 formed in wall 50 of recess 40. Housing 52 has a cylindrical ridged portion 60 above threads 54 which is engaged by an adjusting lever 62. The frustoconical upper end portion 64 of housing 52 is connected to toothed portion 60 by neck 66. The upper end of stem 68 protrudes above frustconical portion 64. A spring-actuator member 70 has a planar upper portion 72 that receives neck 74 of stem 68, lower leg portions 76 disposed under lower surface 77 of frustoconical portion 64, actuator portion 78, and two connector portions 80 that extend from planar portion 72 to actuator portion 78.

Received in recess 22 is a spring 90 and flint 92 which is biased upward by spring 90 into engagement with spark wheel 94. An actuator disc 96 is disposed on each side of spark wheel 94 and each disc 96 protrudes through a corresponding aperture 98 in shield 100. Shield 100 has a second aperture 102 through which a flame passes, and a third aperture 104 through which the actuator portion 78 of actuator-spring member 70 projects and is seated in body structure, being secured in position by projections 106 which engage recesses 108 (FIG. 2). As may be seen with reference to FIG. 2, at the upper end of body 10 are two upwardly projecting webs 110, each of which has an aperture 112 which receives a projecting stub shaft of an actuator disc 96. Each actuator disc 96 has two stub shafts 114, 116, stub shaft 116 being of larger diameter than stub shaft 114. In a particular embodiment disc 96 has a diameter of about 0.4 inch, and the diameter of shaft 116 is about 15% greater than the diameter of shaft 114. Spark wheel 94 has a socket 118 that receives shaft 116 of one actuator disc and a socket 120 (of smaller diameter) that receives shaft 114 of the other actuator disc. Similarly, the aperture 112 in one web 110 is sized to receive a small shaft 114 while the aperture 112 in the other web is sized to receive a larger shaft 116. The spark wheel 94 has teeth of directional (asymmetrical) characteristics as indicated in FIG. 1, and the coordination of the sizes of shafts 114 and 116 with sockets 118 and 120 and the apertures in support webs 110 properly orients the spark wheel 94 and ensures that the asymmetric teeth are properly oriented relative to flint 92. When actuator discs 96 are rotated in the clockwise direction as viewed in FIG. 1, sparks are cast towards valve stem 68.

Additional details of the spring-actuator member 70 may be had with reference to FIGS. 3–5. That member, formed of a single piece of sheet metal stock, includes a planar portion 72 at one end in which is formed a slot 130 that has parallel side surfaces 132. Rearwardly of slot 130 are two spaced legs 134, 136, each of which is bent downwardly and then forwardly, forming a curved spring portion 138 and a forwardly extending leg portion 76 disposed below portion 72. Each leg portion 76, in unstressed condition, is disposed at an upwardly inclined angle of about 10° as indicated in FIG. 5. The inner surface of each leg portion 76 includes a curved recess surface 140 which is adapted to snap over the connecting neck portion 66 of stem housing 52. At each outside edge of portion 72 is a connector portion 142 that is bent downwardly and extends rearwardly to actuator portion 78. Formed in each connector portion is an inwardly extending projection 144 and extending downwardly from each connector 142 is a leg 146. Legs 146 are received in recesses 148 of body 10, as may be seen with reference to FIG. 2, and projections 144 provide lateral positioning as indicated in FIG. 6.

Additional details of the valve assembly may be seen with reference to FIGS. 7 and 8. That valve assembly is received within recess 40. In this embodiment, pedestal 42 has a diameter of 0.14 inch and a height of 0.02 inch so that an annular channel 160 about 0.03 inch in width is defined in which fuel supply port 26 (of 0.025 inch diameter) is formed. Seated on pedestal 42 is a flow control pad 44 of thermally reticulated polyester foam that has been compressed by a factor of approximately 25 times to a thickness of about 0.04 inch. Disposed on flow control pad 44 is an aluminum spacer disc 46, 0.015 inch thick that has a central port 162, 0.035 inch in diameter. Disposed on spacer 46 is a seal member 48 on Buna N rubber having a Shore A hardness of 60 durometer that includes a base 164 in which is formed a port 166 of about 0.02 inch diameter which is surrounded by a frustoconical valve seat portion 168 that projects about 0.01 inch above the upper surface of base 164. At the periphery of base 164 and upstanding therefrom is an annular wall 170 that has a circumferential projection 172 formed in its outer surface in sealing engagement with recess surface 50.

Received in the recess formed by annular wall 170 of the sealing member is the base 174 of stem housing 52 which acts to urge sealing surface 172 outwardly into firm sealing engagement with recess surface 50. The body portion 176 of housing 52 includes an external thread portion 54 which engages thread portion 56. Each thread portion 54, 56 has forty threads per inch, and a 75° rotation of housing 52 produces a vertical movement of slightly more than 0.005 inch.

Rotation of housing member 52 is produced by movement of adjusting lever 62 which is a sheet metal member that has arcuate finger portions 190, 192, each of which includes a latch tooth 194 at its end and drive teeth 196 that engages groove of the housing portion 60. Slot 198 increases the resilient motion of fingers 190, 192 so that they may be snapped into engagement with teeth 60. Lever 62 has a handle portion 200 that projects beyond shield 100 and enables rotation of housing 52 over a 75° range.

Above grooved portion 60 of housing 52 is neck portion 66 and frustoconical head portion 64. Bore 202 of about 0.07 inch diameter extends down through housing 52 and has a lip or guide portion 204 at the upper end that defines a passage of about 0.06 inch diameter. Received within bore 202 in guided fit with lip 204 is stem 68, the annular space 208 between stem 68 and bore 202 providing a gas flow passage. An arcuate recess 210 formed in the wall of cylindrical stem 68 provides communication with axial passage 212 at the upper end of the stem. Stem 68 has reduced neck por-

tion 74 which receives slot 130 of spring-actuator member 70. Legs 76 of member 70 engage neck 66 of housing 52 so that portions 76 are parallel to portion 72, thus stressing curved portions 138 providing a biasing force that urges stem 68 downward relative to housing 52. In that portion, the base surface 216 of stem 68 is seated on boss 168 of the seal member, blocking flow through port 166.

After assembly of the components, liquid fuel (e.g. butane) is introduced into chamber 14 through port 36. The air initially in chamber 14 is compressed as the chamber is filled. Typically, about 85% of chamber 14 is occupied by liquid fuel, so that the compressed air creates a pressure of approximately 96 p.s.i. in the chamber 14. After filling, pin 38 is promptly inserted in port 36 to seal the fuel chamber. Due to the air pressure in chamber 14, liquid fuel is forced up through fuel supply tube 24 and through port 26 into the annular chamber 160 that is sealed by seal member 48. The liquid fuel saturates flow control pad 44.

When it is desired to open the valve, actuator surface 78 is depressed. As the spring-actuator lever member 70 is supported relative to the fuel chamber and valve assembly solely by the engagement of legs 76 with the under surface 77 of frustoconical housing portion 64, this action tends to raise stem connection portion 72 against the stem surface immediately above neck 74 and then raising stem 68 to the position shown in FIG. 8. In that position, stem surface 216 is spaced from valve seat 168 and the liquid fuel is exposed to atmospheric pressure. The liquid fuel vaporizes and fuel vapor flows upward through the annular passage 208 between stem 68 and housing bore 202, into recess 210 and out through stem passage 212. Fuel vapor continues to flow at a rate controlled principally by the compression of flow control pad 44 from the fuel chamber through port 26, pad 44, plate 46 and valve member 48. When the pressure on actuator surface 78 is released, the spring portions 138 tend to cause legs 72, 76 to return towards the position shown in FIG. 5, forcing stem 68 downwardly so that surface 216 seats on cooperating surface 168, closing the valve.

In operation, the lighter may be held in one hand with the operator's thumb in engagement with actuator discs 96. A downward stroke of the thumb rotates the actuating discs which drive spark wheel 94 across flint 92, generating sparks which are cast towards the stem orifice 212. Continued downward motion of the thumb engages actuator surface 78, depressing that surface and opening the valve as described above. Gaseous fuel flows from orifice 212 and is ignited by the sparks to produce the flame 220 as indicated in FIG. 1. The height of this flame above shield 100 is adjusted by rotation of valve housing 52 by lever 62. In a device constructed as shown in the drawings, the height of the flame can be adjusted over a range of about one-fourth inch to approximately 6 inches. The closing forces on the valve are independent of this fuel flow adjustment. Fuel flow to orifice 26 continues even with low fuel levels due to the pressurized gas and the elongated supply tube 24 and a more stable fuel vapor flow rate is maintained throughout the useful life of the lighter.

While a particular embodiment of the invention has been shown and described, modifications thereof will be apparent to those skilled in the art, and therefore it is not intended that the invention be limited to the disclosed embodiment or to the details thereof, and departures may be made therefrom within the spirit and scope of the invention as defined in the claims.

What is claimed is:

1. A lighter comprising fuel chamber defining structure having an outlet port, valve means for controlling the flow of fuel from said fuel chamber through said outlet port, said valve means including a first valve member and a second valve member mounted for movement between a valve closed position and a valve open position, a valve actuator for moving said movable member, said valve actuator being a one-piece member and including a first coupling portion secured to said first member, a second coupling portion juxtaposed to said first coupling portion and secured to said second member, a spring portion connecting said first and second coupling portions and normally urging said first and second coupling portions towards one another to move said first and second valve members towards said valve closed position, and an exposed surface portion at the end of said actuator remote from said coupling portions, and manually operated ignition means adjacent said exposed surface portion for operation in coordination with opening of said valve by said valve actuator in response to manual engagement of said exposed surface.

2. A lighter as claimed in claim 1 wherein said spring portion comprises a resilient, generally C-shaped member disposed between said first and second juxtaposed valve member coupling portions.

3. A lighter as claimed in claim 1 wherein said second valve member is a cylindrical stem and said first valve member is a resilient member that defines a valve port and a valve seat surrounding said valve port, and said spring portion biases said stem against valve seat to close said valve port.

4. A lighter as claimed in claim 3 and further including a compressible flow regulator member between said fuel chamber and said valve means to regulate the rate of fuel flow therebetween, and further including a threadedly mounted stem housing member, said resilient member being secured on the base of said stem housing member and acting against said flow regulator member so that rotation of said housing member adjusts the compression of said flow regulator and thereby controls the rate of fuel flow to said valve means.

5. A lighter as claimed in claim 4 wherein said compressible flow regulator comprises a porous member that is saturated with liquid from said fuel chamber and from which fuel vaporizes when said valve means is open whereby fuel flows from said valve means in vapor form.

6. A lighter as claimed in claim 5 wherein said porous member is of plastic foam material.

7. A lighter as claimed in claim 6 wherein said porous member is of thermally reticulated polyester foam.

8. A lighter as claimed in claim 1 and further including a fuel impermeable tube integral with said fuel chamber defining structure, said tube having a fuel inlet adjacent the lower end of said chamber and a fuel outlet communicating with said valve means, said chamber being charged with a liquid fuel supply that occupies the greater part of said chamber and a compressed gas substantially insoluble in the liquid fuel that occupies the remainder of said chamber, said substantially insoluble gas in said chamber having a volume at atmospheric pressure at least substantially equal to the

volume of said fuel chamber so that said compressed gas in said chamber urges liquid fuel in said chamber through said tube toward said valve means under positive pressure throughout the entire useful life of the lighter.

9. A lighter comprising fuel chamber defining structure having an outlet port, valve means for controlling the flow of fuel from said fuel chamber through said outlet port, said valve means including a first valve member and a second valve member mounted for movement between a valve closed position and a valve open position, a valve actuator for moving said movable member, said valve actuator being a one-piece member and including a first coupling portion secured to said member, a second coupling portion juxtaposed to said frist coupling portion and secured to said second member, a spring portion connecting said first and second coupling portions and normally urging said first and second portions towards one another to move said first and second valve members towards said valve closed position, and an exposed surface portion at the end of said actuator remote from said coupling portions, and manually operated ignition means adjacent said exposed surface portion for operation in coordination with opening of said valve by said valve actuator in response to manual engagement of said exposed surface, a fuel impermeable tube integral with said fuel chamber defining structure, said tube having a fuel inlet adjacent the lower end of said chamber and a fuel outlet communicating with said valve means, said chamber being charged with a liquid fuel supply that occupies the greater part of said chamber and a compressed gas substantially insoluble in the liquid fuel is in the remainder of said chamber, said substantially insoluble gas in said chamber having a volume at atmospheric pressure at least substantially equal to the volume of said fuel chamber so that said compressed gas in said chamber urges liquid fuel in said chamber through said tube toward said valve means under positive pressure throughout the entire useful life of the lighter, a flow regulator between said fuel chamber and said valve means, said liquid fuel saturating said flow regulator and the fuel being transmitted to said valve means in vapor form for ignition by said ignition means when said valve means is open, and means for moving said first valve member to change the compression of said flow regulator to vary the fuel vapor flow rate.

10. A lighter as claimed in claim 9 wherein said second valve member is a cylindrical valve stem and said first valve member is a resilient member defining a valve seat surrounding a valve port, and said spring portion biases said stem against said valve seat to close said valve port.

11. A lighter as claimed in claim 10 wherein said flow regulator is a plastic foam member.

12. In a gas lighter having structure defining a fuel chamber, valve means for controlling the flow of fuel from said chamber, and ignition means adjacent said valve means for igniting fuel flowing from said valve means, the improvement comprising a fuel impermeable tube integral with said chamber defining structure, said tube having a fuel inlet port at its lower end adjacent said lower end of said chamber and a fuel outlet port at its upper end communicating with said valve means, said chamber being charged with a liquid fuel supply that occupies the greater part of said chamber and a compressed gas substantially insoluble in the liquid fuel that occupies the remainder of said chamber, said substantially insoluble gas in said chamber having a volume at atmospheric pressure at least substantially equal to the volume of said fuel chamber so that said compressed gas in said chamber urges liquid fuel in said chamber through said tube toward said valve means under positive pressure throughout the entire useful life of the lighter.

13. A lighter comprising structure defining a fuel chamber adapted to receive a liquid fuel supply,

structure defining a valve chamber,

barrier structure between said fuel chamber defining structure and said valve chamber defining structure,

a passage in said barrier structure providing communication between said fuel chamber and said valve chamber,

a compressible flow regulator disposed at the base of said valve chamber,

a stem housing member in said valve chamber, said stem housing member having an axially extending passage therethrough,

an elastomeric member secured at the base of said stem housing member and bearing against said flow regulator, said elastomeric member including a peripheral seal portion engaging the wall of said valve chamber, a port in said elastomeric member in alignment with said axial passage, and a valve seat portion surrounding said port,

a stem member disposed in said axial passage, said stem member having an end surface normally biased into sealing engagement with said valve seat portion,

means for axially moving said stem housing member in said valve chamber for varying the compression of said flow regulator thereby controlling the rate of fuel flow from said fuel chamber through said flow regulator to said port in said elastomeric member,

a valve actuator for moving said stem member axially away from said elastomeric member, and

manually operated ignition means adjacent said actuator for operation in coordination with movement of said stem away from said valve seat portion to open said valve to ignite gaseous fuel flowing from said valve chamber through said axial passage in response to manual engagement of said exposed surface.

14. The lighter as claimed in claim 13 wherein said compressible flow regulator comprises a porous member that is saturated with liquid fuel from said fuel chamber and from which fuel vaporizes when said valve means is open whereby fuel flows from said valve means in vapor form.

15. The lighter as claimed in claim 14 wherein said flow regulator is a plastic foam member.

16. The lighter as claimed in claim 15 wherein said porous member is of thermally reticulated polyester foam.

17. A lighter as claimed in claim 16 and further including a fuel impermeable tube integral with said fuel chamber defining structure, said tube having a fuel inlet adjacent the lower end of said chamber and a fuel outlet communicating with said valve means, said chamber being charged with a liquid fuel supply that occupies the greater part of said chamber and a compressed gas substantially insoluble in the liquid fuel is

in the remainder of said chamber, said substantially insoluble gas in said chamber having a volume at atmospheric pressure at least substantially equal to the volume of said fuel chamber so that said compressed gas in said chamber urges liquid fuel in said chamber through said tube toward said valve means under positive pressure throughout the entire useful life of the lighter.

18. A lighter comprising structure defining a fuel chamber adapted to receive a liquid fuel supply,

structure defining a valve chamber,

barrier structure between said fuel chamber defining structure and said valve chamber defining structure,

a passage in said barrier structure providing communication between said fuel chamber and said valve chamber,

a compressible flow regulator disposed at the base of said valve chamber,

a stem housing member in said valve chamber, said stem housing member having an axially extending passage therethrough,

an elastomeric member secured at the base of said stem housing member and bearing against said flow regulator, said elastomeric member including a peripheral portion engaging the wall of said valve chamber, a port in said elastomeric member in alignment with said axial passage, and a valve seat portion surrounding said port,

a stem member disposed in said axial passage, said stem member having an end surface in alignment with said valve seat portion,

means for axially moving said stem housing member in said valve chamber for varying the compression of said flow regulator thereby controlling the rate of fuel flow from said fuel chamber through said flow regulator to said port in said elastomeric member,

a valve actuator for moving said stem member axially away from said elastomeric member, said valve actuator being a one-piece member and including a first coupling portion secured to said stem housing member, a second coupling portion secured to said stem member, a spring portion connecting said first and second coupling portions and normally urging said end surface of said stem member into sealing engagement with said seat portion, and an exposed surface portion at the opposite end of said valve actuator from said coupling portions and

manually operated ignition means adjacent said exposed surface for operation in coordination with movement of said stem away from said valve seat portion to open said valve to ignite gaseous fuel flowing from said valve chamber through said axial passage in response to manual engagement of said exposed surface.

19. The improvement as claimed in claim **18** wherein said spring portion comprises a resilient, generally C-shaped member disposed between said first and second coupling portions.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,895,905

DATED : July 22, 1975

INVENTOR(S) : Warren I. Nissen

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 9, "effe-" should be --effi- --;
line 28, before "flow", insert --fuel--.
Column 2, line 28, "eaily" should be --easily--.
Column 3, line 19, "frustconical" should be --frustoconical--.
Column 4, line 29, "on" should be --of--.
Column 5, line 6, "portion" should be --position--.
Column 6, line 31, before "stem", insert --valve--;
line 49, after "liquid", insert --fuel--.
Column 7, line 16, "frist" should be --first--.
Column 8, line 60, "16" should be --14--.
Column 9, line 26, after "ripheral", insert --seal--.

Signed and Sealed this

fourth Day of *November 1975*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks