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PORTABLE APPARATUS UTILIZING PRESSURIZED GAS FUEL

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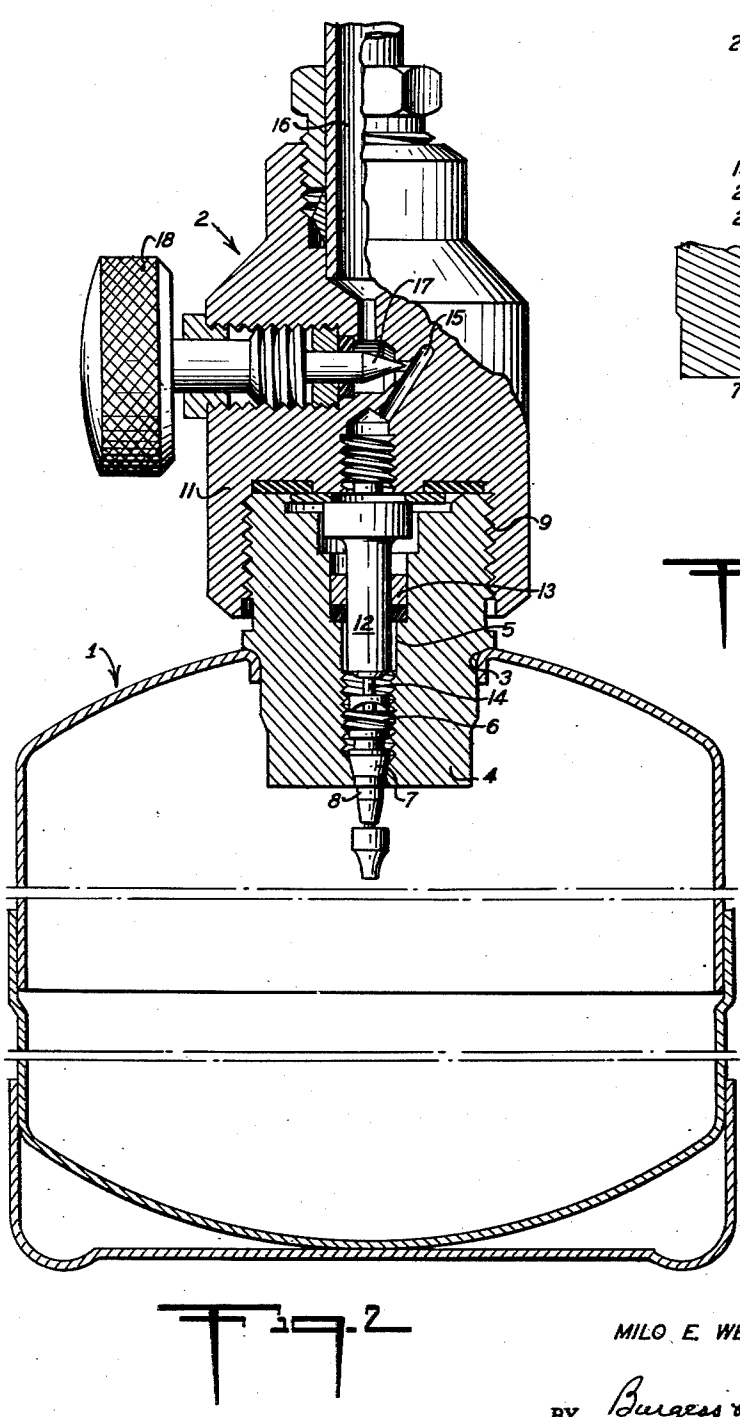

FIG. 2

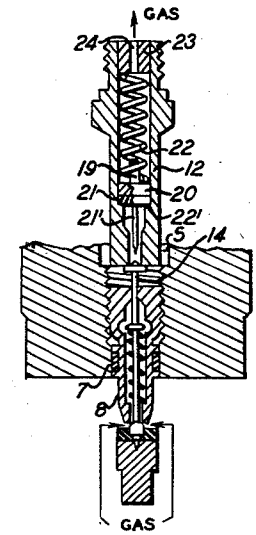

FIG. 3

FIG. 1

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PORTABLE APPARATUS UTILIZING PRESSURIZED GAS FUEL

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7 Claims. (Cl. 62—1)

This invention relates to an improved portable apparatus which utilizes pressurized gas fuel.

Portable hand torches, stoves, lamps and the like, utilizing a pressurized container of gas fuel, as, for example, a pressurized container of liquefied propane as a fuel supply, are known.

The fuel container consists of a pressure-tight container or cylinder provided with an outlet hole or discharge opening which contains a closure valve. In order to tap the container, the burner appliance, such as the torch head, stove, lamp or the like, has a tap arrangement provided with an elongated hollow stem. The hollow stem is inserted in the discharge hole or opening in sealing contact with a sealing member positioned in this hole as, for example, a resilient O ring. The elongated stem then depresses the valve positioned in the discharge opening, opening the same, and allowing gas communication from the interior of the cylinder through the hollow stem to the burner appliance. An additional adjusting valve may be provided in the gas conduit leading from the stem to the burner appliance. The discharge hole or opening from the container may be provided through a threaded plug which may be screw-connected with a corresponding threaded sleeve, at least partially surrounding the stem to make the connection. The container may comprise a throw-away cylinder which is purchased full of the liquefied fuel and which is thrown away when empty.

The above-mentioned portable devices were often operated in various positions, as, for example, with the cylinder upright, on its side, or even upside down, and the quantity of liquefied fuel changed by diminishing during operation. It thus was not possible to obtain an even discharge of the fuel from the cylinder and an even feeding of the fuel to the burning device in all operating positions and under all operating conditions. Thus, for example, in connection with a hand torch, the same could be adjusted for the optimum flame for a particular job in the upright position and for a given quantity of fuel in the cylinder. When, however, the torch was tilted on its side during operation, the flame would become erratic and when the torch was inverted during operation, the flame would often extinguish. Further, in some construction as the fuel was used up and the pressure in the cylinder would decrease, the flame would correspondingly change. Very often during operation particles of droplets of the liquid fuel would enter the conduits leading from the cylinder to the burner, causing the flame to become erratic or extinguished. All these features were, of course, highly undesirable and interfered with normal operation.

Various attempts were made to overcome these disadvantages. These attempts included the positioning of a filter, such as a cotton filter, in the discharge conduit from the cylinder to prevent discrete particles of liquefied fuel from passing therethrough; providing a long, tortuous path of flow for the fuel prior to immediate discharge from the cylinder, and providing pressure-reducing flow-resistricting outlet means, such as restricted or capillary ducts, orifices, or the like, in the discharge from the cylinder, as, for example, in the elongated stem, which is inserted in the cylinder opening, and depresses the valve. These attempts, however, did not prove entirely satisfactory.

One object of this invention is an improved discharge from a portable pressurized fuel container which completely overcomes the above-mentioned difficulties and insures an even discharge from the cylinder under all operating conditions and positions of the cylinder. This and still further objects, will become apparent from the following description, read in conjunction with the drawings, in which:

Fig. 1 is a side elevation of an embodiment of a torch in accordance with the invention;

Fig. 2 is a partial vertical section of the torch shown in Fig. 1;

Fig. 3 is a vertical section showing the details of the valve and pressure-reducing valve assembly in accordance with the invention.

It has now been found that if the discharge passage from the cylinder leading to the burner appliance contains a valve which seats against the gas pressure in the container, and is resiliently urged towards its seating position, as, for example, by a spring with a predetermined force, that this valve will act as an accurate pressure-reducing valve, allowing the outlet passage of gas therethrough while minimizing the flow of liquid and will insure an even, uniform flow of gas to the burner of the appliance irrespective of pressure changes in the cylinder and/or its operating position.

Referring to the embodiment shown in the drawings, the throw-away pressure cylinder **1**, as, for example, for liquid propane, has the torch head **2** attached. The torch head **2** has a conventional burner for soldering, brazing, sweat-fitting, or the like.

The cylinder **1**, as may best be seen from Fig. 2, comprises a cylindrical pressure-tight hollow cylinder with an upper and lower cylindrical part, which may be formed, for example, by spinning or drawing. The upper cylindrical part as shown, is fitted into the lower cylindrical part and joined thereto, as, for example, by brazing, welding or the like.

The upper cylindrical part has a hole indicated at **3** into which is inserted a substantially cylindrical plug **4** which is sealed in place in a pressure-tight manner by a press-fitting, brazing, soldering, welding or the like.

The plug **4** has a central bore **5**, which extends longitudinally therethrough, and which decreases in diameter in a step-wise manner toward the interior of the cylinder. A standard tire valve **8** is screwed into the threaded portion **6** of the bore and seals the bore with the gasket seal at **7**. The outer portion of the plug **4** is male-threaded at **9**.

The top connection and valve assembly **11** of the torch head **2** is formed at its base portion as a female-threaded sleeve **11**, which is screwed in engagement with the thread **9** of the plug **4**. The assembly **11** has the elongated stem **12**, which extends into the bore **5**. As the assembly **11** is screwed into on the cylinder, the stem **12** makes contact with the elastic O ring seal **13**, sealing the annular space formed between the stem **12** and bore **5**. As the assembly **11** is further screwed tight over the plug **4**, the stem **12** presses on the stem **14** of the tire valve **8**, opening the tire valve. The stem **12** is hollow and has a gas passage extending longitudinally therethrough in communication with the passage **15**. Gas can thus pass from the cylinder through the valve **8**, which is held in the open position by the stem **10** through the interior or the stem **10** to the passage **15**. The needle valve **17** controlled by the thumb screw **18**, may close or vary the communication between the passage **15** and the passage **16**, leading to the burner

head. The flame of the burner head may be controlled by the thumb screw **18**.

Instead of the passage **16** leading to the burner head or torch as illustrated, the same may lead to the burner of any appliance as, for example, a burner of a stove or a lamp or the like.

In accordance with the invention, as illustrated in Fig. 3, the stem **12** has the hollow bore **19** extending longitudinally therethrough, in which there is positioned the valve **20**. The valve **20** has a resilient seal, such as a rubber seal **21**, which seats on the shoulder **22'** in the bore **19** to seal the bore. The valve **20** has a guide pin **21'** and a spring **22** urges the same toward the seated position. The spring **22** is maintained in place, by means of a pressed plug **23** with an orifice **24**, which allows passage of the gas therethrough.

In operation, the pressure of the gas from the cylinder acts against the valve **20** and lifts the same, allowing a constant and uniform flow of gas therethrough dependent on the pressure of the spring **22**. The valve **20** will prevent droplets of liquid from passing up through the bore **19** and thus prevent clogging and extinguishing of the flame during operation.

The tension of the spring **22** should be so set that the valve **20** will lift and allow the passage of gas therethrough at any pressure above the minimum pressure of satisfactory operation of the gas appliance. In this manner, the cylinder in operation may be utilized to the greatest maximum extent.

In operation, once the thumb screw **18** is set for the desired flame, the flame will remain at this setting, regardless of the position of the container, etc., even if the container is completely inverted.

While the invention has been described in detail with reference to the specific embodiment illustrated, variations and modifications will, of course, become apparent to the artisan which fall within the spirit of the invention in the scope of the appended claims.

I claim:

1. In a portable gas fuel appliance, having a container for pressurized fuel with a discharge opening, a valve member closing said discharge opening and a tap connection for said discharge opening including an elongated stem member with a longitudinal bore for insertion into said discharge opening to contact and forcibly open said valve member, the improvement which comprises a pressure reducer and regulator comprising valve means positioned in the longitudinal bore of said stem member freely movable to close in a direction against the pressure in said container, and means for resiliently urging said valve means closed with a lesser force than the force exerted by the pressure in said container on said valve means.

2. Improvement according to claim 1 in which said means resiliently urging said valve means closed is spring means.

3. Improvement according to claim 2 in which said valve has an annular resilient sealing member seating against an annular shoulder defined in the longitudinal bore of said elongated stem member.

4. Improvement according to claim 1, in which said portable gas fuel appliance is a portable liquefied propane hand torch.

5. Improvement according to claim 1, in which said portable gas fuel appliance is a portable, liquefied fuel appliance.

6. In an appliance having a container with a pressurized fluid, means defining a path of fluid flow from the interior of the container through the appliance, and a shut-off valve for interrupting fluid flow through said path, the improvement which comprises a pressure reducer and regulator comprising valve means positioned in said path of fluid flow movable to close in a direction against the pressure in said container, and means resiliently urging said valve means closed with a lesser force than the force exerted on said valve means by the pressure of said pressurized fluid in said container with said shut-off valve open.

7. Improvement according to claim 6, in which said means resiliently urging said valve means closed is spring means.

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