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STEM FLOW VALVE AND HAND TORCH

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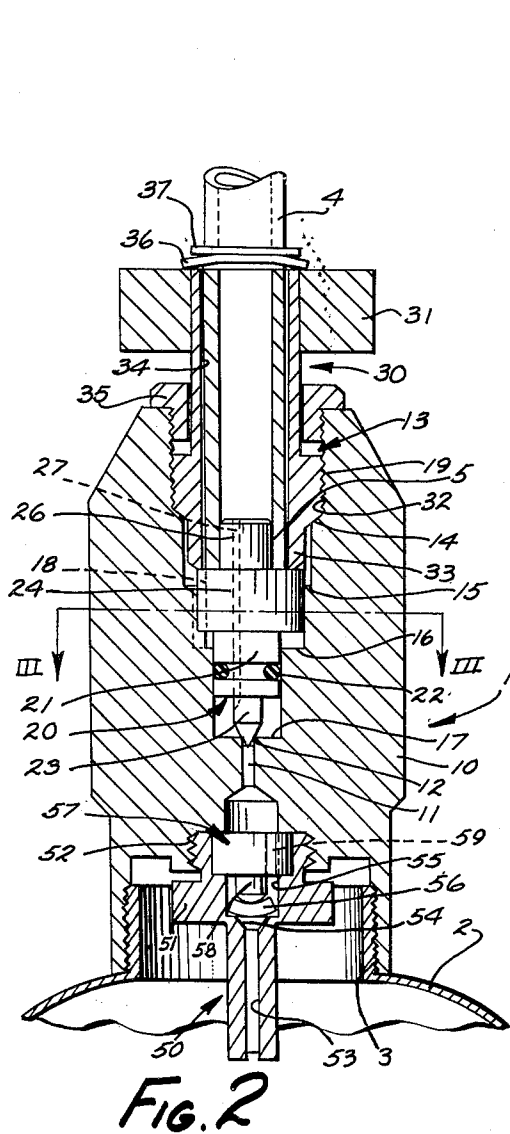


FIG. 2

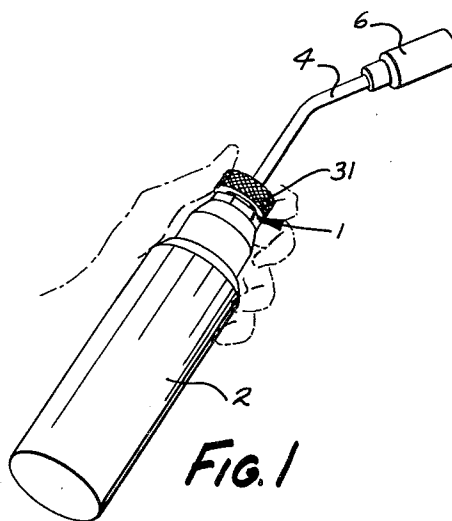


FIG. 1

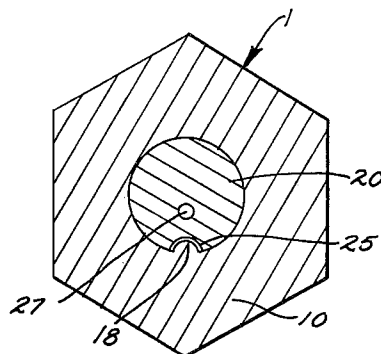


FIG. 3

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STEM FLOW VALVE AND HAND TORCH

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This invention relates to valve mechanisms. More particularly, this invention relates to a valve especially well adapted for use in combination with torches and the like.

Portable structures, such as torches, presently utilize valves which necessitate the use of both hands in their operation. The user must support the torch with one hand, the use of his other hand being necessary to regulate the valve. This causes inconvenience and lessens the efficiency of operation of the portable apparatus. Again using a torch as an example, if the operator is holding the workpiece, he must release it in order to regulate the valve controlling the burner. This clumsiness and inefficiency is created by the inherent structure of valves presently in existence.

It is therefore an object of this invention to provide a valve which utilizes generally aligned inlet and outlet passageways, together with an aligned valve stem whereby the valve may be regulated with the same hand supporting the apparatus on which the valve is mounted.

Another object of this invention is the provision of such a valve which is simple in structure, yet efficient and positive in operation.

A still further object of this invention is the provision of such a valve which is especially well adapted for use in combination with a portable torch.

An additional object of this invention is the provision of a unique means for discharging pressurized fluid from its container to the valve when used in combination with such a container.

These and other objects of this invention will become obvious to those skilled in the valve art upon reading the following specification in conjunction with the accompanying drawings, wherein:

FIG. 1 is a perspective view of the valve comprising this invention, shown mounted on a conventional torch and showing the valve's operability by means of the same hand supporting the torch;

FIG. 2 is a cross-sectional view of the valve shown in FIG. 1, certain interior components not being sectioned and showing the detail thereof; and

FIG. 3 is a cross-sectional view taken along the plane III—III of FIG. 2.

Briefly, this invention relates to a valve structure including a valve housing and an inlet passageway positioned at one end thereof. A valve body is movably positioned within the housing, in one position the valve body closing the inlet passageway and in another position opening the inlet passageway. A hollow valve stem is operably secured to the housing and aligned with the inlet passageway, the valve stem engaging the valve body whereby movement of the valve stem determines the limit of movement of the valve body. Means is secured within the housing defining an outlet passageway extending through the hollow valve stem and communicating with the inlet passageway.

Referring more specifically to the drawings, the reference numeral 1 designates the valve structure of this invention (FIGS. 1 and 2). In the embodiment shown, the valve 1 is secured to the opening of the container 2 by means of a threaded connection 3. A tube 4 is secured to the other end of the valve 1, a conventional burner 6 mounted on the free end of the tube 4. The container 2 is of a type adapted to receive and hold a combustible fluid, such as propane, under pressure. The valve 1

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dispenses this fluid from the container 2 through the tube 4 and to the burner 6. This valve is especially well adapted to be used in combination with such a torch, the structures being uniquely combined into a more efficient torch. However, it is to be specifically understood that the invention is not so limited as this valve may be adapted for use in combination with any apparatus which requires the control of a valve.

Referring specifically to FIG. 2, the valve 1 includes a valve housing 10 having an inlet passageway 11 at one end thereof. A recess 13 is formed in the opposite end of the housing 10, the recess 13 communicating with the mouth 12 of the passageway 11 and in alignment therewith. The recess 13 includes a plurality of shoulders, designated by the reference numerals 14, 15 and 16 which progressively decrease the circumference of the recess 13.

Slidably positioned within the recess 13 is a valve body 20 for restricting the flow of fluid through the inlet passageway 11. The valve body 20 includes a first portion 21 of a size slidably engaging the walls of the recess 13 lying between its base 17 and the shoulder 16. An O-ring 22 is secured to the first portion 21 of the valve body for providing an effective seal with respect to the wall of the recess 13. A needle seat 23 extends from the first portion 21 for engagement with the mouth 12 of the inlet passageway 11. A second portion 24 of the valve body 20 slidably engages the wall of the recess 13 lying between the shoulders 16 and 15. A groove 25 is formed in the second portion 24, the groove 25 slidably receiving the key 18 formed in the wall of the recess 13 (FIGS. 2 and 3). It will be noted that sliding movement of the valve body 20 is provided with respect to the housing 10, however rotational movement with respect to the housing is prevented. A reduced end 26 extends from the second portion 24, the purpose of which will be more fully explained hereinafter. An intermediate passageway 27 extends through the valve body 20, extending through the portions 21 and 24 and the reduced end 26.

A valve stem 30 is secured within the recess 13, the valve stem 30 being in alignment with the inlet passageway 11. The valve stem 30 includes a handle knob 31, a threaded portion 32 and an engaging end portion 33. The valve stem 30 is hollow, the passage 34 extending therethrough. It will be noted that the valve stem 30 may be threaded into the recess 13, threads 19 being provided therein up to the first shoulder 14. A nut 35 slidably fitted on the valve stem 30 is next threaded in the recess 13 to prevent complete removal of the valve stem 30.

The tube 4 extends through the passageway 34 of the valve stem 30, and the end 5 thereof is secured to the reduced end 26 of the valve body 20 by suitable means, such as braising. A conventional spring washer 36 and C-washer 37 are affixed on the tube 4 for providing precise positioning of the valve stem 30 with respect to the valve body 20. It will be noted that the inlet passageway 11, the intermediate passageway 27 and the tube 4 allow passage of fluid from the container 2 to the burner 6 when the needle seat 23 is disengaged from the mouth 12 of the inlet passageway 11.

Assembly and operation

The tube 4 having the conventional burner 6 on one end thereof is inserted through the passageway 34 of the valve stem 30. The end 5 of the tube 4 is then secured to the reduced end 26 of the valve body 20. The end 33 of the valve stem 30 is positioned adjacent the portion 24 of the valve body 20, the spring washer 36 and the C-washer 37 being properly positioned against the handle knob 31 to properly retain the valve stem 30 in this position. The structure thus assembled is inserted into

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the recess 13 of the valve housing 10, the groove 25 on the valve body 20 receiving the key 18 in the recess 13. The valve stem 30 is then threaded into the recess by means of the threads provided, its limit of movement being the complete sealing of inlet passageway 11. The nut 35 is then threaded into the recess 13 to prevent accidental removal of the assembled structure.

The valve 1 operates as follows. The operator grasps the container 2 as shown in FIG. 1, the thumb and forefinger being free to grasp the handle knob 31 of the valve stem 30. When the valve stem 30 is rotated, moving the valve body 20 such that the needle seat 23 seals off the inlet passageway 11, no fluid can escape from the container 2. However, upon rotation of the valve stem 30 by means of the handle knob 31, the valve body 20 moves away from the inlet passageway 11 and fluid is then free to pass through the inlet passageway 11, through the intermediate passageway 27 and into the tube 4 and onto the burner 6. Rotation of the valve body 20 is prevented due to the key 18 sliding within groove 11. The operator may grasp the workpiece in one hand and regulate the handle knob 31 with the same hand holding the container 2.

In order to assure a constant flow of pressurized fuel from the container 2 to the valve 1, and to assure that the workpiece will remain operative in all positions, a means 50 for discharging the fuel from the container is provided (FIG. 2). The means 50 includes a discharging body 51 including a threaded portion 52 removably received in and communicating with the inlet passageway 11. A first passageway 53 communicates with the interior of the container 2. The enlarged end 54 of the passageway 53 is exposed to a well 55 within the discharging body 51, and a flexible, resilient member 56 lies within the well, over the end 54 of the passageway 53. The member 56 may be of any suitable material such as rubber and the like. A holding element 57, having a finger 58, is sealingly fitted in the well 55. A second passageway 59 extends through the element 57, communicating with the inlet passageway 11. The finger 58 holds the member 56 over the first passageway 53. Then, as the pressurized fluid enters passageway 53, the edges of the member 56 are curled upwardly (as shown in FIG. 2), allowing the fluid to pass about its edges and through the second passageway 59, to the valve 10. The resilient member 56 assures a constant flow of pressurized fluid regardless of the positioning of the workpiece, and prevents droplets of fluid from entering the valve 10.

While only one embodiment of this invention has been shown and described, it may be possible to practice the invention without departing from the spirit and scope thereof through the utilization of certain other embodiments. These other embodiments are to be included as part of this invention unless the following claims specifically state otherwise.

I claim:

1. A valve structure, comprising: a valve housing; an inlet passageway positioned at one end of said housing; a valve body slidably positioned within said housing, in one position said valve body closing said inlet passageway and in another position opening said inlet passageway; said valve body including an intermediate passageway extending therethrough; means for preventing rotation of said valve body with respect to said housing; a hollow valve stem threaded in the opposite end of said housing and aligned with said inlet passageway; said valve stem engaging said valve body, whereby movement of said valve stem determines the limit of movement of said valve body; and means secured to said valve body defining an outlet passageway extending through said hollow valve stem and communicating with said intermediate passageway.

2. A valve structure, comprising: a valve housing; an inlet passageway positioned at one end of said housing; a valve body slidably positioned within said housing, in

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one position said valve body closing said inlet passageway and in another position opening said inlet passageway; said valve body including an intermediate passageway extending therethrough; means for preventing rotation of said valve body with respect to said housing; a hollow valve stem threaded in the opposite end of said housing and aligned with said inlet passageway; said valve stem engaging said valve body, whereby movement of said valve stem determines the limit of movement of said valve body; means secured to said valve body defining an outlet passageway extending through said hollow valve stem and communicating with said intermediate passageway; and said valve stem held in position with respect to said means defining said outlet passageway.

3. A torch comprising: a container for receiving combustible fluid under pressure; a valve housing secured to said container; an inlet passageway connecting said valve housing and said container; a valve body slidably positioned within said housing, in one position said valve body closing said inlet passageway and in another position opening said inlet passageway; said valve body including an intermediate passageway extending therethrough; means for preventing rotation of said valve body with respect to said housing; a hollow valve stem threaded in said housing and aligned with said inlet passageway; said valve stem engaging said valve body, whereby movement of said valve stem determines the limit of movement of said valve body; a tube, having a burner at the free end thereof, secured to said valve body and extending through said hollow valve stem, said tube communicating with said intermediate passageway.

4. A torch comprising: a container for receiving combustible fluid under pressure; a valve housing secured to said container; an inlet passageway connecting said valve housing and said container; a valve body slidably positioned within said housing, in one position said valve body closing said inlet passageway and in another position opening said inlet passageway; said valve body including an intermediate passageway extending therethrough; means for preventing rotation of said valve body with respect to said housing; a hollow valve stem threaded in said housing and aligned with said inlet passageway; said valve stem engaging said valve body, whereby movement of said valve stem determines the limit of movement of said valve body; a tube, having a burner at the free end thereof, secured to said valve body and extending through said hollow valve stem, said tube communicating with said intermediate passageway; and said valve stem held in position with respect to said tube.

5. A means for discharging pressurized fluid from a container, comprising: a container for receiving pressurized fluid; a discharging body including a well terminating with a first passageway communicating with said container; a resilient member positioned in said well and lying over said first passageway; a holding element positioned in said well and engaging generally the center of said member above said first passageway; and a second passageway extending through said holding element and communicating with said exterior of the container whereby the pressurized fluid passes through said first passageway, curling the edges of said resilient member away from said first passageway and passes to the exterior of said container through said second passageway.

6. A means for discharging pressurized fluid from a container, comprising: a container for receiving pressurized fluid; a discharging body including a well terminating with a first passageway communicating with said container; a resilient member positioned in said well and lying over said first passageway; a holding element slidably engaging the side walls of said well and having a finger engaging said member; and a second passageway extending through said element and communicating with the exterior of said container whereby the pressurized fluid passes through said first passageway, curling the edges of said resilient member away from said first passageway

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and passes to the exterior of said container through said second passageway.

7. A torch comprising: a container for receiving combustible fluid under pressure; a discharging body including a first passageway communicating with the container; a resilient member lying over said first passageway; a holding element engaging said member; and a second passageway communicating with the exterior of the container whereby the pressurized fluid passes through said first passageway, curling the edges of said resilient member away from said first passageway and passes to the exterior of the container through said second passageway; a valve housing secured to said container and enveloping said discharging body; an inlet passageway connecting said valve housing and said second passageway; a valve body movably positioned within said housing, in one position said valve body closing said inlet passageway and in another position opening said inlet passageway; a hollow valve stem operably secured to said housing and aligned with said inlet passageway; said valve stem engaging said valve body, whereby movement of said valve stem determines the limit of movement of said valve body; a tube, having a burner at the free end thereof, secured within said housing and extending through said hollow valve stem; and passage means allowing fluid to flow past said valve body to said tube when said inlet passageway is open.

8. A torch comprising: a container for receiving combustible fluid under pressure; a discharging body including a well terminating with a first passageway communicating with the container; a resilient member positioned in said well and lying over said first passageway; a holding element slidably engaging the side walls of said well and having a finger engaging said member; and a second passageway extending through said element and communicating with the exterior of the container whereby the pressurized fluid passes through said first passageway, curling the edges of said resilient member away from said first

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passageway and passes to the exterior of the container through said second passageway; a valve housing secured to said container and enveloping said discharging body; an inlet passageway connecting said valve housing and said second passageway; a valve body slidably positioned within said housing, in one position said valve body closing said inlet passageway and in another position opening said inlet passageway; said valve body including an intermediate passageway extending therethrough; means for preventing rotation of said valve body with respect to said housing; a hollow valve stem threaded in said housing and aligned with said inlet passageway; said valve stem engaging said valve body, whereby movement of said valve stem determines the limit of movement of said valve body; a tube, having a burner at the free end thereof, secured to said valve body and extending through said hollow valve stem, said tube communicating with said intermediate passageway; and said valve stem held in position with respect to said tube.

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