

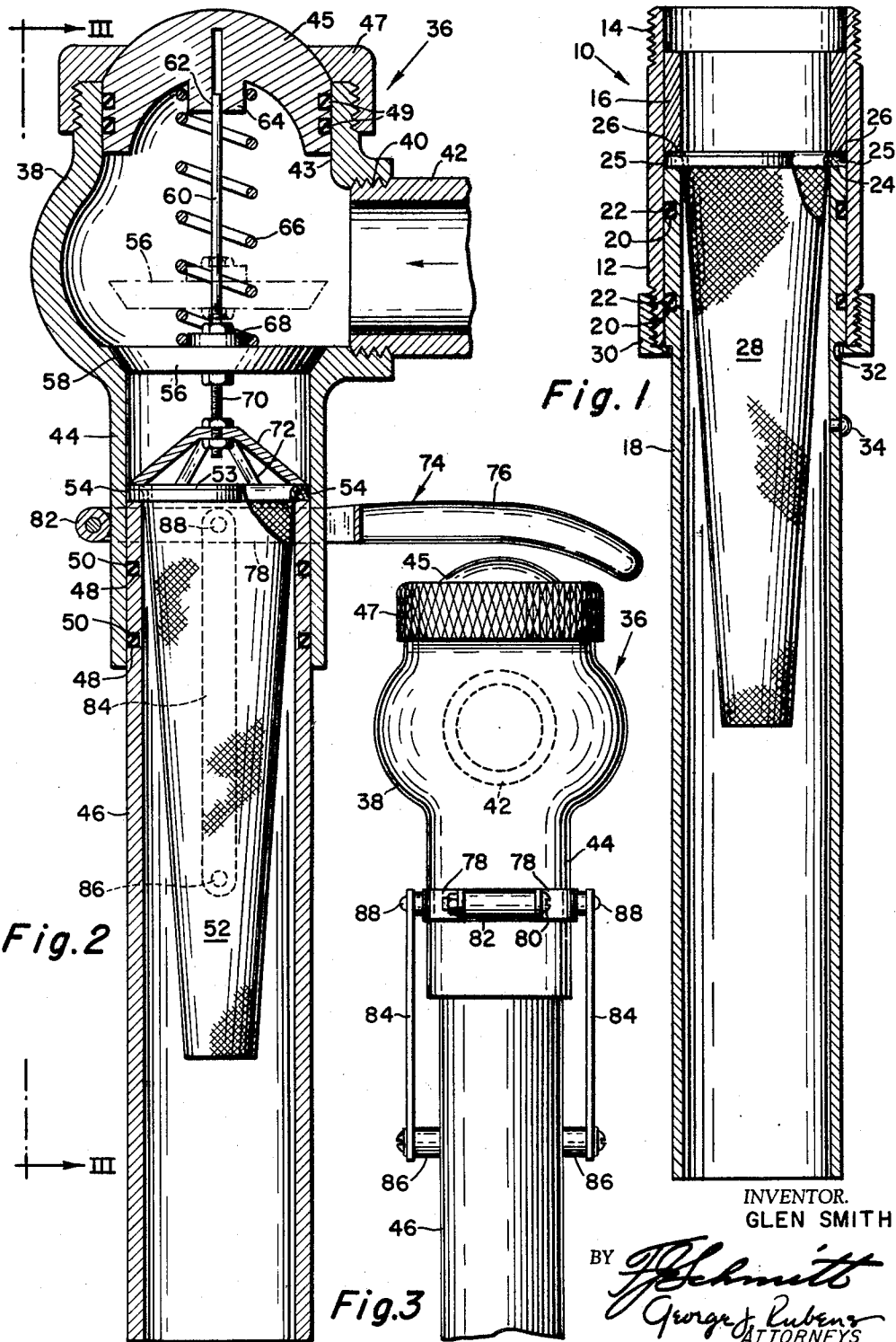
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FUEL DISPENSING NOZZLE, SPOUT AND SCREEN ASSEMBLY

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FUEL DISPENSING NOZZLE, SPOUT AND SCREEN ASSEMBLY

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The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

This invention relates to nozzles and more particularly to a fuel dispensing nozzle having a removable screen assembly capable of being readily inspected and cleaned.

In the fueling of naval aircraft, fuel dispensing nozzles are employed having screens that filter out foreign matter, such as fragments of worn gaskets, etc., from passing through the nozzle and contaminating the fuel. It is a U.S. Navy requirement that these screens be inspected before each aircraft fueling operation.

Some prior art fuel dispensing nozzles of this type utilize gaskets compressed by a packing gland when the nozzle is assembled and tightened by a wrench to obtain a sealed joint. Frequent disassembly of such devices in compliance with Navy regulations results in excessive wear of the gaskets causing leakage, requires frequent and expensive replacement, and increases the likelihood of fuel contamination. Furthermore, these gaskets have a tendency to become dislodged and lost in the fuel hose.

Other nozzles in use are manufactured with a ground seat inside of the nozzle body providing a metal-to-metal seal that will leak unless secured tightly by a wrench, making it difficult for ready inspection. Frequent disassembly will damage the ground joint, as will accidental dropping of the nozzle on the concrete apron of a landing strip.

The fuel dispensing nozzle of this invention is constructed with a spout slidably mounted in the nozzle and sealed thereto by one or more O-rings seated in annular recesses in the spout wall. In one embodiment a nut restrains the spout on the nozzle. A removable screen is mounted between the inner end of the spout and the nozzle, and is readily available for inspection and cleaning by loosening the nut and removing the spout from the nozzle. The nut can be hand tightened and loosened without the need for tools because the O-rings do not require compression as do conventional gaskets and packing glands, thus facilitating inspection and cleaning. The invention nozzle spout can be utilized on existing nozzles without modification. In another embodiment of the nozzle spout is incorporated with a nozzle valve, the latter being actuated by the operator by lifting the nozzle spout.

A principal object of this invention is to provide a nozzle capable of dispensing liquids safely and without leaks, particularly aviation fuels.

Another object is to provide such a nozzle which can be readily disassembled, and, preferably, without tools, to permit frequent inspection and cleaning of the parts.

A further object is to provide a nozzle assembly of a rugged construction and which can be dropped without damaging the nozzle seals.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following

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detailed description when considered in connection with the accompanying drawings wherein:

Fig. 1 is a longitudinal section of a fuel dispensing nozzle spout illustrating the inspection screen mounting;

Fig. 2 is a longitudinal section of a modified fuel dispensing nozzle having a valve assembly actuated by a lever hinged to the spout; and

Fig. 3 is a side view of the nozzle taken along line III—III of Fig. 2 showing the details of the lever mounting.

Referring to the drawing where like reference numerals refer to similar parts throughout the drawing, there is shown in Fig. 1 a fuel dispensing nozzle spout 10 comprising a tubular spout body or support 12 externally threaded at 14 in one end for mounting to a conventional nozzle, not shown. A retaining ring 16 is soldered or otherwise secured within spout support 12 at the aforementioned end for a purpose presently to be described.

A spout 18 is telescopically mounted within the other end of spout support 12, the outer periphery of the spout that is housed within the spout support being provided preferably with a pair of spaced annular recesses 20 in which are seated O-rings 22 that bear against the bore surface of spout support 12 in sealing relation. The housed end of spout 18 forms a shoulder 24 for supporting a lip 26 of a removable screen 28, the screen being generally conical in shape and extending longitudinally into the spout. A gasket 25 is seated around lip 26 and engages shoulder 24.

The other end of spout support 12 is externally threaded to receive a retaining nut 30 adapted to abut a shoulder 32 on the spout for clamping the gasket against retaining ring 16 in sealing engagement. Retaining nut 30 need only be tightened by hand to secure the nozzle spout in its support. It should be noted that gasket 25 is completely enclosed by metal parts reducing the likelihood of damage and fuel contamination. O-rings 22 provide a slidable seal enabling spout 18 to be readily and frequently removed by unthreading retaining nut 30 and sliding the spout out of its support. A stop 34 restrains nut 30 on the spout preventing loss during disassembly.

In Figs. 2 and 3, a nozzle 36 incorporates the features of nozzle spout 10 of Fig. 1, however, the spout is movable, and not stationary as in Fig. 1, to serve an additional function. Nozzle 36 consists of a globular body 38 having a threaded opening 40 to receive a nipple 42 of a fuel supply hose. A second body opening 43 is closed by an inspection cap 45 secured therein by a ring 47 threaded to body 38. Cap 45 is provided with O-rings 49 to seal the slidable connection. An integral sleeve 44 intersects body 38 directly opposite opening 43, body 38 providing a fluid passage connecting the sleeve and nipple 42. Sleeve 44 functions to support a nozzle spout 46, similar to sleeve 12 and nozzle spout 18, respectively, of Fig. 1. Spout 46 is also provided with a series of annular grooves 48 which seat O-rings 50 for sealing contact with the bore of sleeve 44. A screen 52, which can be identical to screen 28 of Fig. 1 is similarly supported by an integral lip 53 on the end of sleeve 44 between which a gasket 54 is positioned.

Fluid flow between nipple 42 and spout 46 is controlled by a poppet valve 56 adapted to engage a corresponding seat 58 in body 38. Valve 56 is supported by a stem 60 being secured to and extending through valve 56, one stem portion 62 slidably extending into an integral bushing 64 in cap 45 for guiding the opening and closing movement of the valve.

The valve is biased to a closed position by a compression coil spring 66 seated at one end around bushing 64 and at the other end around a valve securing

nut 68. An opposite extending stem portion 70 supports a six-legged cage 72 resting on screen 52.

Valve 56 is actuated to an open position, shown by broken lines, against the action of spring 66, by a valve operating assembly 74. The assembly comprises a hinged arm 76 extending substantially parallel to nipple 42, the two being conveniently spaced apart to be grasped by an operator's hand. Arm 76 has two fork extensions 78 which straddle sleeve 44 and are secured together at their ends by a screw 80 pivotally anchoring the arm to a lug 82 integral with sleeve 44. Arm 76 is connected to spout 46 by a pair of links 84 pivotally mounted at one end to ears 86 integrally mounted to spout 46, the other ends of links 84 being pivotally connected at 88 intermediately the fork extension 78. Thus, when arm 76 is lifted by the operator toward nipple 42, spout 46 is moved in the same direction against cage 72 to move valve 56 to the open position.

Cage 72 can be made integral with lip 53 of screen 52 in which instance the screen can be inspected by withdrawal through inspection opening 43, or cage 72 can merely rest on the screen and the latter removed from the nozzle end as in Fig. 1. Nozzle 46 is normally restrained within sleeve by arm 76, however, a restraining nut similar to 30 (Fig. 1) can be employed if desired.

The invention device provides a simple and leakproof spout and nozzle capable of dispensing fuels in safety. The device can be quickly and easily disassembled by hand for inspection without excessive wear on the sealed joints, and without danger of fuel contamination by ground gasket material.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

I claim:

1. A nozzle comprising a tubular body open at both ends, a fluid inlet intersecting said body, one end opening of said body being sealed by a removable inspection cap, an open-bored spout member having a portion telescopically and slidably mounted in the other end of said body, means for sealing said slidable connection comprising a plurality of spaced O-rings, a poppet valve positioned

within the body between the inlet and the spout, said valve operating selectively to open or close the fluid flow to the spout, said inspection cap having means for guiding the movement of the poppet valve, a screen extending into said spout and having a peripheral lip supported on one side by an end of the spout portion, said valve having a cage engaging the other side of the lip, said valve and cage being movable by said spout, lever means hinged to the body and to the spout for moving the latter and actuating the valve, said valve, cage and screen being longitudinally aligned with the cap and capable of removal through said one end opening of said body for inspection.

2. A nozzle comprising an elongated tubular body open at both ends, a fluid inlet intersecting said body, one end opening of said body being sealed by a removable inspection cap, an open-bored spout member having a portion telescopically and slidably supported in the other end of said body, means for sealing said slidable connection comprising a plurality of spaced O-rings, a poppet valve positioned in said body between the inlet and the spout, said valve operating selectively to open or close the fluid flow to the spout, a valve stem extending through said valve and secured to both sides thereof, one end of the stem being guided in a recess in the cap, a compression spring restrained between said cap and said valve for normally biasing the valve to a closed position blocking fluid flow to the spout, the other end of said stem supporting a cage, a screen extending into said spout and having a peripheral lip, said lip provided with a ring-shaped gasket, said lip and gasket supported between said cage and an end of the spout portion, means for moving said spout to open said valve including a lever hinged at one end to said body and articulated to said spout whereby a lifting movement on the lever will move the spout in the same direction to open the valve against the spring action.

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