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SPRAY NOZZLE

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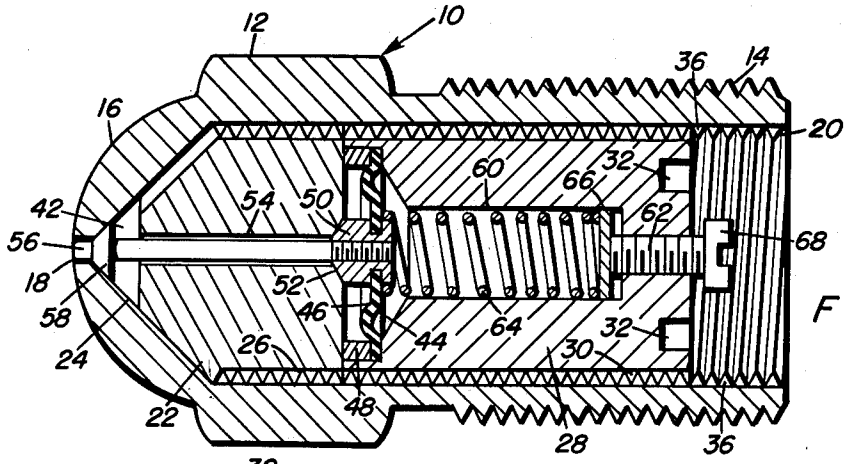


Fig. 1

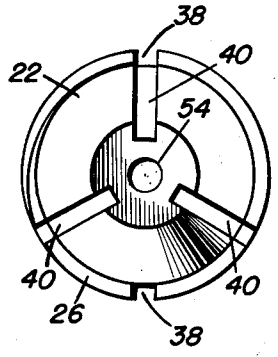


Fig. 3

Fig. 2

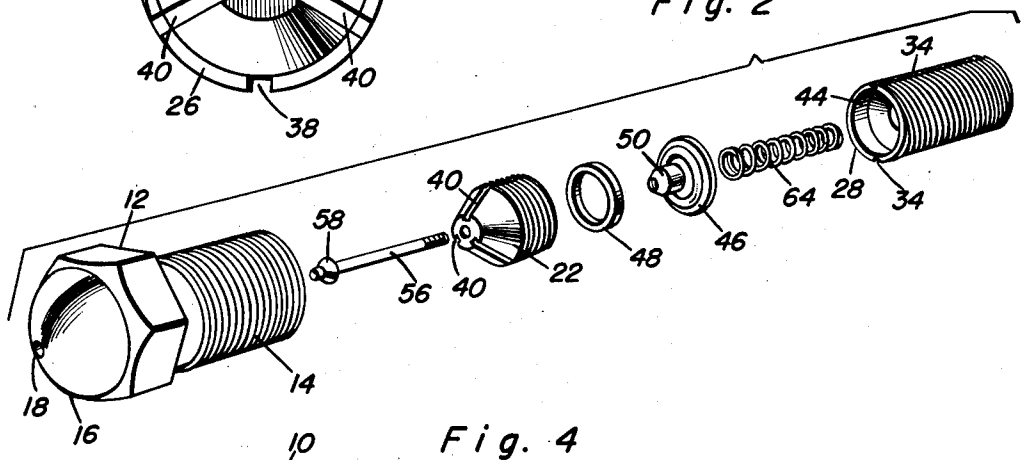
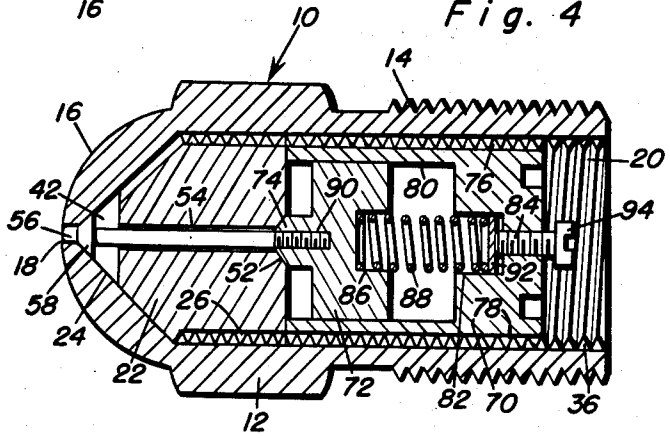


Fig. 4



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SPRAY NOZZLE

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3 Claims. (Cl. 299—59)

This invention relates in general to spray nozzles and more specifically to improvements in oil burner nozzles.

The primary object of this invention is to provide an improved spray nozzle for oil burners which has means for automatically cleaning an orifice thereof.

Another object of this invention is to provide improved spray nozzle for oil burners which includes a shut-off valve for an outlet orifice, said shut-off valve being automatically actuated in response to introduction of pressure into the interior of the nozzle.

Another object of this invention is to provide an improved oil burner nozzle which is both self cleaning and automatically actuated in response to application of pressure thereto, said nozzle being so constructed and designed whereby the same may be utilized in combination with conventional nozzle adapters.

A further object of this invention is to porvide an improved self cleaning oil burner nozzle which includes a plunger slidable through an outlet orifice of said nozzle, said plunger being carried by movable support means which are actuated by introduction of pressure into the nozzle.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a sectional view through a preferred form of oil burner nozzle and shows the general construction of the same;

Figure 2 is an exploded perspective view on a reduced scale of the oil burner nozzle of Figure 1;

Figure 3 is a front elevational view of a spinner of the nozzle of Figure 1; and

Figure 4 is a sectional view on a reduced scale of a modified form of oil burner nozzle.

Referring now to the drawings in detail, it will be seen that there is illustrated in Figures 1, 2, and 3 in particular, a preferred form of oil burner nozzle which is referred to in general by the reference numeral **10**. The oil burner nozzle **10** includes an elongated nozzle housing **12** which has an externally threaded rear portion **14** adapted to be removably secured to a nozzle adapter to permit the supplying of oil thereto. The forward portion of the nozzle housing **12** is rounded as at **16** and is provided with a centrally located outlet orifice **18** therethrough. The nozzle housing **16** is hollow and is internally threaded as at **20**.

Removably threaded in the forward portion of the nozzle housing **12** is a generally conical shaped stationary oil spinner **22** which has the forward portion thereof in abutment with a conical inner wall **24** of the nozzle housing. The oil spinner **22** is provided with external threads **26** which mesh with the threads **20** of the nozzle housing **12**.

Also threadedly engaged within the nozzle housing **12** is an elongated, generally cylindrical retainer **28**. The retainer **28** is provided with external threads **30** which also mesh with the threads **20** of the nozzle housing **12**. In order that the retainer **28** may be conveniently removed from the nozzle housing **12**, the rear end thereof is provided with a pair of spaced, shallow bores **32** for engagement with a similar wrench.

In order that oil entering the rear portion of the nozzle housing **12** may be supplied to the outlet orifice **18**, the retainer **28** is provided with diametrically opposite, longitudinally extending grooves **34** through the threaded portion thereof. The grooves **34** align with grooves **36** which extend longitudinally through the internal threads **20** of the nozzle housing **12** to form a suitable passageway for oil.

The oil spinner **22** is also provided with diametrically opposite grooves **38** which align with forward portions of the grooves **36**.

As it best illustrated in Figures 2 and 3, the oil spinner **22** has formed in the forward portion thereof a plurality of radiating grooves **40**. Inasmuch as the threads **20** of the nozzle housing **12** terminate short of the forward portion of the threaded part of the oil spinner **22**, oil entering the grooves **38** is permitted to pass around between adjacent threads **26** and therefore spin and to then enter into the grooves **40**. The oil then passes from the grooves **40** into a space **42** between the forward end of the oil spinner **22** and the forward inner wall of the nozzle housing **12**. The oil is then permitted to flow through the outlet orifice **18**.

The forward end of the retainer **28** is provided with a counter bore **44** in which is positioned a diaphragm **46**. The diaphragm **46** is clamped against the inner portion of the retainer **28** in sealing relation therewith by a locking ring **48** which abuts the rear end of the oil spinner **22**.

Carried by the central portion of the diaphragm **46** for movement therewith is an internally threaded support member **50**. The support member **50** is provided with a conical forward end portion which fits in a conical recess **52** formed in the rear end of the spinner **22**. The member **50** does not seal against the spinner **22**.

Aligned with the support member **50** is centrally disposed longitudinal bore **54** through the spinner. Removably threaded in the support member **50** and passing through the bore **54** is an elongated plunger **56** whose forward end is normally seated in the outlet orifice **18**. The forward portion of the plunger **56** is provided with a conical valve portion **58** which is disposed slightly rearwardly of the forward end of the plunger **56**. The valve portion **58** seats against the forward inner wall of the nozzle housing **12** and seals the orifice **18** against the outward flow of oil.

Extending rearwardly as a continuation of the counter bore **44** is an elongated bore **60** of a reduced diameter. Also, there is provided as a rearward continuation of the bore **60**, a still smaller bore **62** which is internally threaded and which opens through the rear end of the retainer **28**.

Disposed within the bore **60** is an elongated coil spring **64** which abuts against the rear of the central portion of the diaphragm **46** to urge the same forwardly. The rear end of the coil spring **64** abuts against a washer **66** whose rearward movement is controlled by an adjusting screw **68** adjustably disposed within the internally threaded bores **62**. It will be seen that by adjusting the adjusting screw **68**, the pressure exerted on the diaphragm **46** by the coil spring **64** may be varied.

In operation, when oil is introduced into the nozzle housing **12**, the same enters the space **42** and since its escape through the outlet orifice **18** is blocked by the valve portion **58**, it passes rearwardly through the bore **54** in the oil spinner **22**. The oil then causes rear-

ward movement of the support member 50 when sufficient pressure has been built up to overcome the pressure exerted on the diaphragm 46 by the coil spring 64. At this time the plunger 56 moves rearwardly out of the orifice 18 and the valve portion 58 becomes unseated with the result that the oil is permitted to pass out through the outlet orifice 18 in the normal manner.

When the oil is shut off or the pressure reduced for any reason, the pressure urging the diaphragm 46 rearwardly is reduced with the result that the same is moved back to the position illustrated in Figure 1 by the coil spring 64. This automatically shuts off the nozzle 10. Furthermore, the movement of the forward end of the plunger 56 through the outlet orifice 18 results in the cleaning of the same due to the pushing of carbon or other formations out through the forward end of the nozzle housing 12.

Referring now to Figure 4 in particular, it will be seen that there is illustrated a modified form of the oil burner nozzle 10. In the particular form illustrated, the retainer 28 has been replaced by a modified form of retainer 70 and the diaphragm 46, the locking ring 48 and the support member 50 has been replaced by a piston 72 having a forward extending valve portion 74. It will be understood that the other portions of the nozzle 10 remain unchanged and will be referred to by the same reference numerals.

The retainer 70 is generally cylindrical in shape and is provided with external threads 76. Like the retainer 28, the retainer 70 is provided with a diametrically opposed, longitudinal extending grooves 78 formed in the threads 76. The grooves 78 align with the grooves 36 in the interior of the nozzle housing 12 and cooperate to supply oil to the oil spinner 22.

The forward portion of the retainer 70 is provided with a relatively deep bore 80 which has formed as a continuation thereof a rearwardly extending bore 82 of a lesser diameter. Communicating the bore 82 with the rear end of the retainer 70 is an internally threaded bore 84.

Mounted within the bore 80 for longitudinal movement is the piston 72 which has formed in the rear portion thereof a bore 86 which is in alignment with the bore 82. Disposed in the bores 82 and 86 are opposite ends of a coil spring 88 which urges the piston 72 forward to a position where its valve portion 74 is seated in the seat 52. The valve 74 does not completely seal against seat 52, but merely restricts the flow of fluid therethrough. The piston 72 has formed in the valve portion 74 thereof an internally threaded bore 90 in which is threadedly engaged the rear end of the plunger 56.

Disposed in the rear portion of the bore 82 is a washer 92 which engages the rear end of the coil spring 88. The washer 92 is positioned by an adjusting screw 94 which is disposed within the internally threaded bore 84.

It will be understood that the modified form of the nozzle 10 functions in exactly the same manner as the nozzle 10 illustrated in Figure 1 with the exception that the piston 72 is moved rearwardly in response to pressure within the nozzle housing in lieu of the diaphragm 46.

In view of the foregoing, it will be seen that there has been illustrated and described an improved oil burner nozzle which is of a relatively simple construction and which will function in the same manner as conventional burner nozzles. Also, it will be noted that the oil burner nozzle has the added features of being automatically shut-off in response to reduction of pressure and is self cleaning.

Although the invention has been illustrated and described as pertaining to an oil burner nozzle, it will be understood that the invention is not intended to be so limited. The automatic shut-off portion of the nozzle may be utilized equally as well in other types of spray nozzles including those which are utilized in the spraying of animals and the like.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. A self-cleaning liquid spray nozzle comprising a cylindrical housing having a front end provided with an inner conical wall and a liquid outlet orifice in said front end at the apex of said wall, said housing having a rear liquid inlet end, a stationary cylindrical oil spinner threaded into said housing and forming with said inner wall a conical liquid receiving space at said orifice, said spinner having a rear end provided with an axial conical recess and also having an axial bore for passing liquid under back pressure in said space rearwardly through the spinner and out of the recess, a hollow cylindrical spinner retainer threaded into said housing and engaging the rear end of the spinner, peripheral longitudinal grooves in said spinner and retainer for passing liquid under pressure from the rear end of the housing into said space, a plunger in said bore and orifice and movable rearwardly to be moved out of said orifice, said plunger having a rear end extending out of said recess, a conical enlarged valve in said plunger and in said space seating against said inner wall to close said orifice and cause back pressure of liquid in said space and movable by rearward movement of the plunger to open the orifice and relieve back pressure in said space, a spring loaded member mounted in said retainer for rearward movement in response to the pressure of liquid passing rearwardly out of said bore and recess, and a reduced conical support attached to said member and the rear end of the plunger for moving the plunger rearwardly upon rearward movement of said member, said support fitting in said recess to space said member from said spinner.

2. The combination of claim 1, said member comprising a flexible diaphragm.

3. The combination of claim 1, said member comprising a piston having said support attached thereto in the axis thereof.

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