July 1, 1952 W. FAHRBACH 2,602,006

FUEL SCREENING DISCHARGE NOZZLE FOR OIL BURNERS

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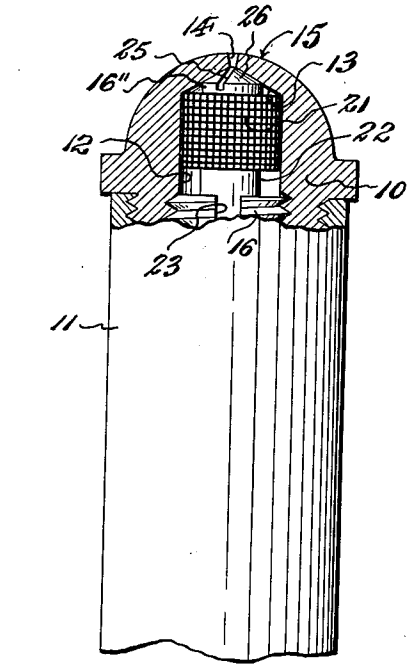


Fig. 1

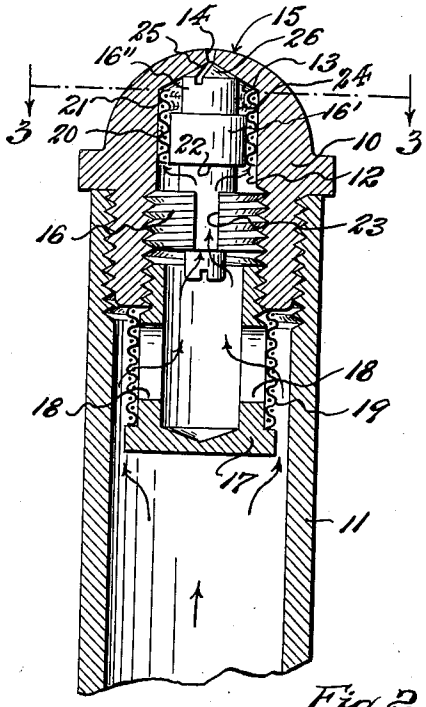


Fig. 2

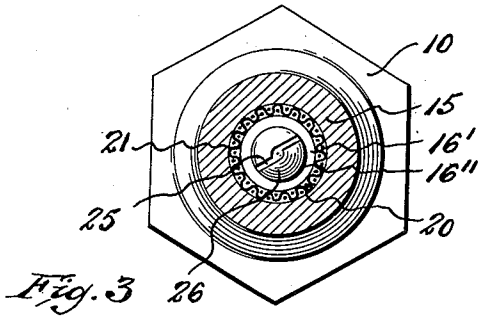


Fig. 3

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FUEL SCREENING DISCHARGE NOZZLE FOR OIL BURNERS

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2 Claims. (Cl. 299—120)

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The invention relates to oil burners and has particular reference to an improved fuel screening nozzle therefor.

Prior to the present invention, oil burner nozzles have been provided with various types of mesh screens through which the fuel oil must pass in going from the supply pipe to the discharge orifice at the burner tip for the purpose of arresting any solid particles that may be suspended in the fuel. These screens have been so constructed and arranged that the fuel penetrates transversely or at right angles to the plane of the screen, and thus has frictional contact therewith throughout a distance only equal to its thickness. As a consequence of this, particles often squeeze through and reach the discharge orifice to clog the same and thereby choke the burner flame.

It is the primary object of the invention to improve upon the existing inefficient discharge nozzles by providing a sleeve-type screen of woven mesh which is incorporated and confined in the nozzle construction in such a manner that the fuel must weave longitudinally through the interstices of the mesh in its passage to the discharge orifice. These interstices are as long as the screen instead of being equal only to its thickness, which multiplies the distance of frictional contact.

Since the usual screen arrangement, through which the fuel passes transversely, is useful in arresting the larger solid particles, it is proposed to utilize a screen so arranged as a primary screen and to add a secondary woven mesh screen related to means for confining fuel passage to movement longitudinally through its interstices, i. e. along the plane thereof. Furthermore, since longitudinal penetration of woven mesh is more readily accomplished when the fuel oil has been thinned by heating, the secondary screen is located closer to the discharge orifice than the primary screen in order that heat from the burner tip may be conducted to the said secondary screen through the metallic mass of the nozzle.

Other objects and advantages will become apparent as the following specific description is read in connection with the accompanying drawing, in which:

Fig. 1 is a fragmentary side elevation, partly in section, of an oil burner nozzle constructed in accordance with the invention;

Fig. 2 is a longitudinal cross-sectional view of the same; and

Fig. 3 is a transverse section on line 3—3 of Fig. 2.

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Referring in detail to the drawing, wherein like reference characters designate corresponding parts in the several views, the reference character 10 indicates the nozzle head, which has screw-threaded detachable connection with the outer end of fuel supply pipe 11. Nozzle head 10 is axially bored to provide a cylindrical chamber 12, which has a tapered seat 13 formed at its outer end and a central discharge orifice 14 leading outward through burner tip 15 from the apex of said seat. The outer portion of chamber 12 adjacent to seat 13 is smooth-surfaced, whereas its inner portion is screw-threaded for engagement by the screw-threaded base portion of a cylindrical plug 16, which plug is completely contained within said chamber, and also for detachable reception of the externally screw-threaded open end of a thimble 17.

Thimble 17 projects into the fuel supply pipe 11, and is reduced in diameter relative to the internal diameter of said supply pipe. Thimble 17 has a plurality of lateral apertures 18, and supports the usual screen sleeve 19 in covering relation to said apertures. This screen sleeve 19, which will be termed the primary screen, is intended to arrest solid particles suspended in the fuel oil as it flows from the supply pipe 11 radially inward through apertures 18 and thence upwardly out of the thimble interior. For this primary screen, it may be practicable to employ some type of mesh other than the woven type shown. It is also within the scope of the invention to adopt some shape other than that of a cylindrical sleeve.

Plug 16 has an outer portion 16' of reduced diameter to provide a smooth cylindrical peripheral surface concentric to the internal side wall surface of chamber 12 of head 10, its diameter being such that an annular space 20 is formed between said surfaces. This annular space 20 should be of just the precise radial extent or width to accommodate the thickness of a screen sleeve 21 of woven mesh for snug fit therein. Screen sleeve 21 will be known herein as the secondary screen of the combination.

In order to permit passage of fuel from the interior of thimble 17 to the inner end of annular space 20, plug 16 is provided with a peripheral groove 22 immediately forward of the screw-threaded base portion thereof, and with at least one longitudinal groove 23 extending endwise through said base portion. Passage of fuel from annular space 20 to discharge orifice 14 is provided for by a further reduction in diameter of the terminal portion 16'' of plug 16'—16' just beyond said space 20 to form an annular chan-

nel 24 adjoining tapered seat 13, and by the further provision of grooves 25 in the end face 26 of the terminal portion 16'', which latter is shaped to engage said seat 13. Grooves 25 have been arranged in the usual manner tangential to discharge orifice 14 in order to impart swirling atomizing motion to the issuing fuel jet.

In the operation of the improved nozzle, when the fuel stream reaches groove 22 at the inner end of annular space 20, it will be forced to penetrate the longitudinally extending interstices of secondary screen 21, and thus to flow lengthwise of said screen. These interstices are both tortuous and smaller in cross-section than the transverse interstices, which is an advantage because any solid particles that may have escaped through primary screen 19 will be arrested by said secondary screen. The fuel is thus required to weave back and forth between and across the wires of the screen mesh and between the screen and the confining wall surfaces of the nozzle head 10 and the plug portion 16', as it flows from the inner end of secondary screen 21 through to the outer end thereof. During this tortuous passage of the fuel, any solid particles remaining in suspension therein will be in frictional contact with said wires and surfaces and will be subjected to the constant retarding effect of such contact, with the practical certainty that they will eventually become lodged against some obstructing shoulder or wire intersection of the screen mesh, or become wedged securely between some relatively opposed surfaces. The result will be very efficient screening of even the finest particles from the fluid stream. Due to the close proximity of secondary screen 21 to burner tip 15, heat conducted inwardly from said tip through the metallic mass of nozzle head 10 and of plug 16 to the region of annular space 20 will thin the fuel and thereby improve its screen penetrating ability.

In order to clean both screens, all that is necessary is to unscrew nozzle head 10 from supply pipe 11, unscrew thimble 17 from said nozzle head, and remove plug 16 from said nozzle head also by unscrewing the same. When this has been done, both screens are readily separable from their applied positions.

It should be apparent that the complete nozzle is very compact in form, simple in construction and composed of a minimum number of parts, as well as being of high efficiency in its fuel cleaning capacity.

Having thus described the invention, I claim:

1. A discharge nozzle for oil burners comprising a nozzle head adapted for connection to a fuel supply pipe and having a burner tip, said nozzle head being provided with a cylindrical chamber and a central discharge orifice leading therefrom through the burner tip, a cylindrical

plug supported in said head chamber and having a reduced outer portion providing an annular space between the periphery thereof and the side wall of the said chamber adjacent to the discharge orifice, a thimble engaged with the inner end of the nozzle head and having apertures furnishing communication between the interior of said thimble and the supply pipe, a primary screen covering the said apertures of the thimble and adapted for transverse fuel penetration, said plug having fuel passages leading from the interior of the thimble to said annular space and from the latter outward to the discharge orifice, and a secondary screen in the form of a woven mesh sleeve fitted snugly in said annular space, whereby fuel passing through said space toward the discharge orifice must weave longitudinally through the interstices of the woven mesh.

2. A discharge nozzle for oil burners comprising a nozzle head adapted for connection to a fuel supply pipe and having a burner tip, a primary fuel screening means intermediate the interior of the supply pipe and said nozzle head, said nozzle head being provided with a cylindrical chamber beneath the burner tip, said burner tip having a central discharge orifice leading outwardly from said chamber, a cylindrical plug within the chamber of said nozzle head, said plug being of less diameter than the internal diameter of said chamber whereby to provide an intermediate annular space, said plug having a fuel passageway through which fuel from the primary fuel screening means flows into said annular space and from said space outwardly to the discharge orifice, and a tubular woven metallic mesh screen filling said annular space so as to span the same, whereby fuel passing through said space toward the discharge orifice must weave longitudinally through the interstices of said woven mesh screen.

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