May 20, 1941. C. A. SCHACHT 2,242,680

NOZZLE

Filed Feb. 27, 1940

Fig. 1.

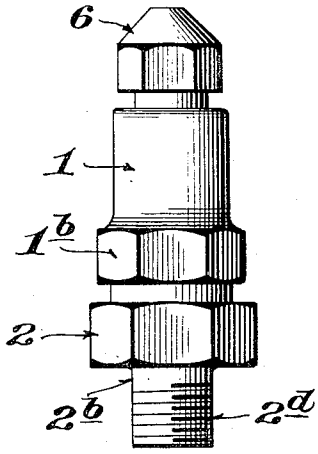


Fig. 4.

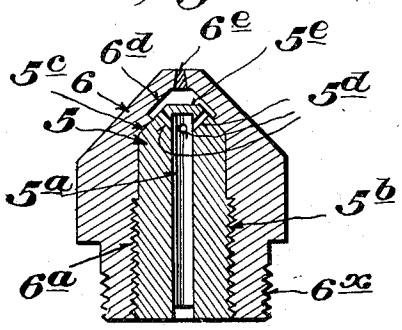


Fig. 2.

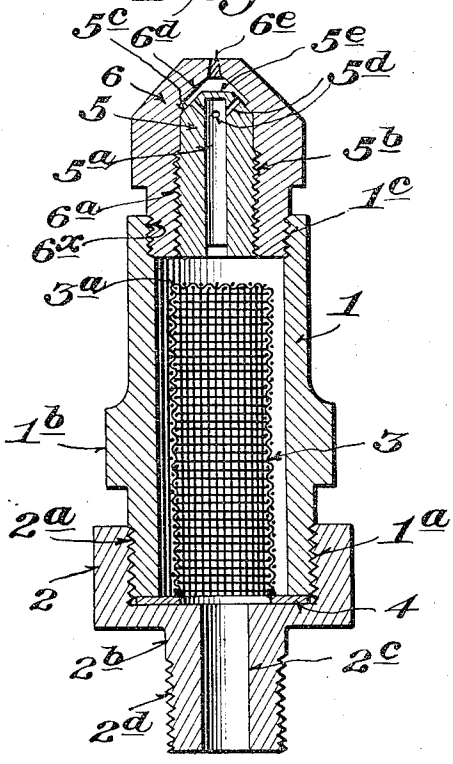


Fig. 3.

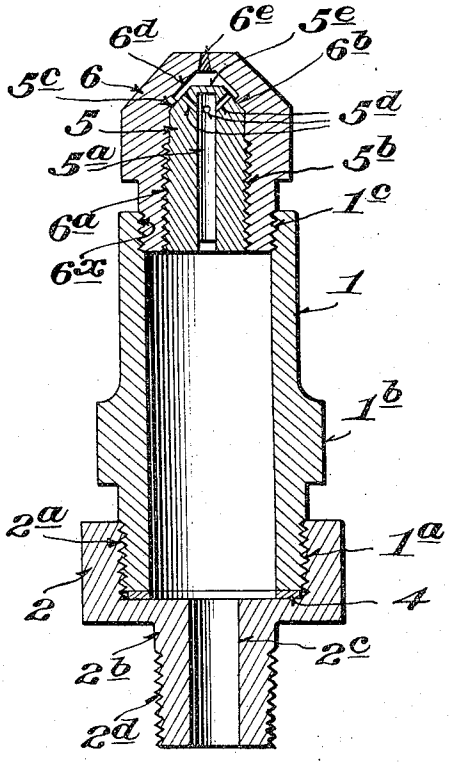


Fig. 5.

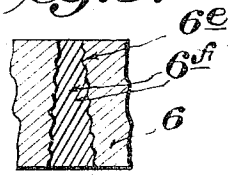
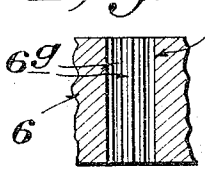


Fig. 6.



Inventor

Clifford A. Schacht

By Howard & Howell

Attorneys

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UNITED STATES PATENT OFFICE

2,242,680

NOZZLE

Clifford A. Schacht, Huntington, Ind.

Application February 27, 1940, Serial No. 321,121

2 Claims. (Cl. 299—107)

This invention relates to nozzles for spraying liquids, and the principal object thereof is to provide a nozzle particularly adapted for use in connection with oil burners, but may be also utilized with spray guns, atomizers or analogous devices.

Another object of the invention is to provide a nozzle for use in connection with oil burners operating on either high or low pressures, said nozzle being so constructed that it will produce maximum heat per oil consumption.

A further object is to provide a nozzle of the above type having an orifice which may be conical or cylindrical and provided with spiral flutes to give the oil issuing from the orifice a whirling effect to produce a very fine oil mist; the use of the spiral flutes minimizing possibility that the orifice will become clogged or carbonized, and thus obviating the necessity of utilizing air or steam to atomize the oil as it leaves the nozzle orifice.

Further objects of the invention are to provide a nozzle of the above type made in sections, one of which comprises an interchangeable coupling having a standard pipe thread, whereby selection of the proper size of coupling will permit the nozzle to be installed on any size oil burner or the like; also to provide a nozzle consisting of detachable sections which may be readily taken apart and cleaned when necessary; also to provide a nozzle which may have a brass screen of very fine wire mesh therein soldered to a copper washer, which washer serves as a gasket between certain of the nozzle sections to prevent leakage of oil; also to provide a removable threaded tip member for the nozzle formed of two separable members threaded together and formed so as to provide a small oil chamber opposite the orifice of the tip into which the oil collects before passing therethrough, the tip member being provided with a central bore communicating with the nozzle body and further provided with one or more small angularly disposed bores extending through the tip from the central bore to the oil chamber whereby the size of the latter bores will determine the grade of fuel oil to be used with the nozzle, a heavy grade of fuel oil being used when the angularly disposed bores are of relatively large diameter, and a light grade oil being used when the bores are small.

Other minor objects will be hereinafter set forth.

I will explain the invention with reference to the accompanying drawing which illustrates one practical embodiment thereof to enable others to adopt and use the same; and will summarize in the claims the novel features of construction, and novel combinations of parts, for which protection is desired.

In said drawing:

Fig. 1 is an elevation of the complete nozzle.

Fig. 2 is an enlarged vertical section therethrough showing a filter screen housed within the nozzle body.

Fig. 3 is a view similar to Fig. 2 but showing the screen omitted.

Fig. 4 is an enlarged vertical section through the nozzle tip, detached.

Fig. 5 is an enlarged detail showing a fluted conical orifice in the tip member, the orifice contracting towards its outer end.

Fig. 6 is a view similar to Fig. 5 but showing the orifice as cylindrical, and the fluting straight instead of spiral.

As shown, the nozzle is formed of separable sections comprising a body section 1 of substantially tubular form externally threaded at its lower end 1*a*, and having a non-circular outer wall portion 1*b* intermediate its ends to receive a wrench to facilitate assembly of the sections. The end of body 1 opposite from the threads 1*a* is provided with internal threads 1*c* for the reception of the removable tip section, hereinafter described.

On the threaded portion 1*a* of body 1 is a coupling section 2 having a non-circular outer wall and having an internally threaded recess 2*a* in its upper end receiving the external threads 1*a* of body section 1. Section 2 has a reduced extension 2*b* at its lower end provided with a central bore 2*c* communicating with recess 2*a*, the extension 2*b* being externally threaded as at 2*d*, whereby the same may be threaded onto any oil burner or the like by selection of a coupling section 2 having the proper size extension 2*b*.

As shown in Fig. 2, extending upwardly within body section 1 is a tubular screen 3 of somewhat smaller diameter than the bore of the section, terminating below the upper end of said section, screen 3 being preferably made of brass wire of fine mesh, and the upper end of said screen being provided with an end wall 3*a* of same material as the body of the screen, whereby oil or other liquid entering body 1 through coupling section 2 will be required to pass through said screen before entering the tip section. To the lower open end of screen 3 is soldered a washer 4 preferably of copper, and of size to fit within the threaded recess 2*a* in coupling section 2 to form a gasket between the bottom of recess 2*a* and the adjacent end of the body 1 when the parts are screwed

together, gasket 4 preventing leakage of oil between the parts 1 and 2. Screen 3 however may be omitted if desired and as indicated in Fig. 3.

Threaded into the bore 1c at the upper end of body 1 is a removable tip section formed of two parts, one part consisting of a cylindrical member 5 having an axial bore 5a extending from the lower end to a point substantially at the upper end thereof. The upper end of member 5 is conically tapered as at 5c, and the upper end of bore 5a extends into said conical portion and terminates therein. Extending through the conical portion 5c substantially normal to the outer wall thereof is an outwardly flaring series of bores 5d whereby the oil or other liquid from bore 5a will be caused to split up and pass out of the member 5 through the series of bores 5d. The upper tip of member 5 above the bores 5d is truncated or cut off as at 5e for the purpose hereinafter set forth. For heavy grade oil, bores 5d of relatively large size will be required, whereas for light oil smaller bores will be required, the size of the bores determining the grade of oil or other liquid to be used with the nozzle. Instead of utilizing the series of bores 5d in member 5, the same results may be obtained by utilizing only one large bore in the tip; however the provision of the series of bores 5d minimizes the chances that the tip will become plugged or clogged.

Member 5 is provided with external threads 5b at its lower portion, and threaded thereon is a cap member 6 having an axial bore the lower enlarged end of which is provided with internal threads 6a adapted to engage the threads 5b on member 5, to lock the members 5 and 6 together. The lower end of cap member 6 is provided with external threads 6x to engage the internal threads 1c of body section 1. The upper end of the bore in cap member 6 is conically formed as at 6b to correspond with the conical shape of the upper end 5c of member 5, and in the upper end of conical portion 6b is an enlarged conical recess 6d embracing the upper ends of the series of bores 5d in member 5, whereby the oil emerging through bores 5d will enter the chamber formed between the upper truncated end of member 5 and the recess in the upper inner end of the bore of cap member 6.

On the axis of cap member 6 at the upper end thereof is an orifice 6e, preferably of conical shape contracting towards its upper end into a substantially small opening as shown more particularly in Fig. 5. In the walls of orifice 6e are spiral flutings 6f adapted to impart a whirling effect to the oil or other liquid passing through the orifice, to break same up into a very fine mist. By utilizing the spiral fluting 6f in the nozzle orifice, the nozzle is not likely to clog or carbonize; and use of such flutings obviates the necessity for utilizing air or steam to break up the oil as it leaves the orifice, and thus results in a construction which is inexpensive to manufacture and operate. If desired however, the flutes 6f may be straight as at 6g (Fig. 6) instead of spiral; also the orifice 6e may be cylindrical as in Fig. 6 instead of conical as in Fig. 5. The size of orifice 6e determines the size and characteristic of the flame issuing from the nozzle.

By the above construction, a nozzle is provided in which the sections and members may be readily separated for the purpose of cleaning in event any parts should become clogged or carbonized; also a nozzle that will operate at either high or low oil pressures, and one that has been found to work satisfactory with heavy grade fuel oil at very low pressures in cold weather; also a nozzle that operates efficiently on a minimum rate of oil consumption. The nozzle may not only be used in connection with oil burners, but may also be used in connection with spray guns, atomizers, or other analogous devices.

I claim:

1. In a nozzle, a tip comprising a cap member adapted to be connected to a liquid supply, said cap having a conical bore contracting into a conical recess terminating in an orifice; and a member within the bore having its inner end correspondingly conically formed and contacting with the conical walls of the bore in the cap while spaced from the conical walls of said recess, the inner tip of said member terminating within the recess opposite the orifice, said member having a bore open at its outer end and closed at its inner end, and having a series of ducts therethrough adjacent the inner end of the bore discharging directly into the conical recess.

2. In a nozzle, a tip comprising a cap member adapted to be connected to a liquid supply, said cap having a conical bore contracting into a conical recess terminating in an orifice; and a member within the bore having its inner end correspondingly conically formed and contacting with the conical walls of the bore in the cap while spaced from the conical walls of said recess, the inner tip of said member being truncated and terminating within the recess opposite the orifice, said member having a bore open at its outer end and closed at its inner end, and having a series of radially disposed ducts therethrough adjacent the inner end of the bore discharging directly into the conical recess.

CLIFFORD A. SCHACHT.