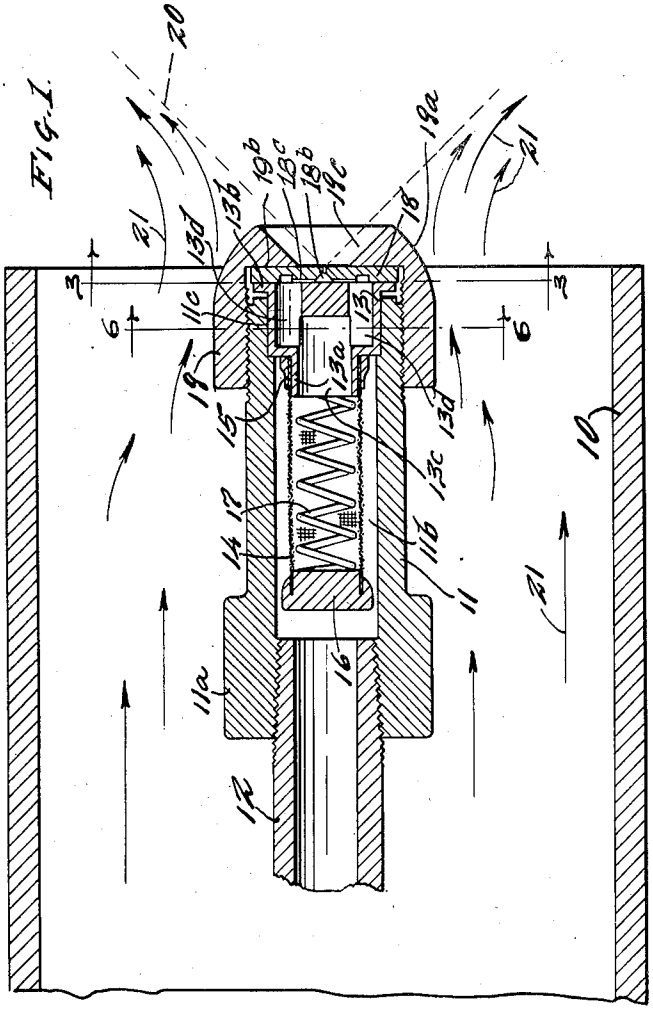
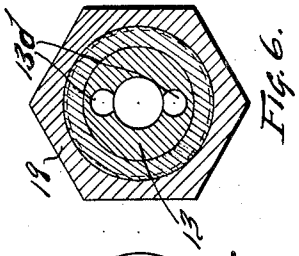
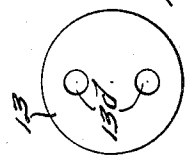
Dec. 4, 1934. W. A. HUBBARD 1,982,871

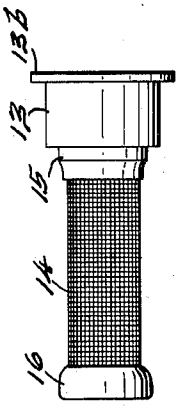
NOZZLE FOR LIQUID FUEL BURNERS

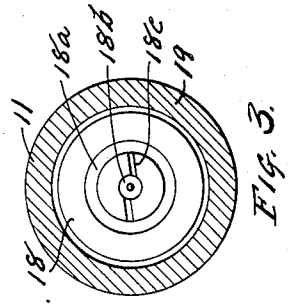
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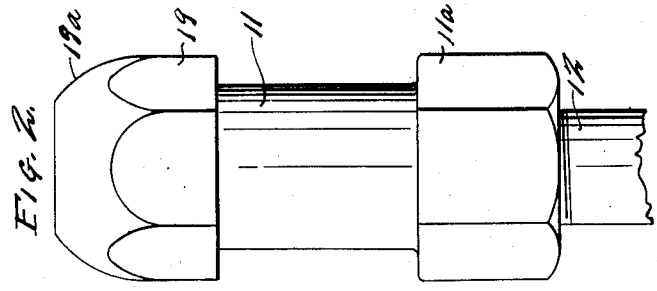












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NOZZLE FOR LIQUID FUEL BURNERS

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3 Claims. (Cl. 299—120)

This invention relates to a liquid fuel burner, and particularly to a nozzle for such a burner. Such liquid fuel or oil burners are now used in large numbers in residences and other buildings for heating purposes. In one common type of burner, the oil is discharged from the nozzle disposed within an air conduit through which air is forced. It is desirable to project the oil from a small central aperture in a disk at one end of the nozzle and the oil passes outwardly from the aperture in the form of a cone having its apex substantially at said aperture. An end member or cap is used on the nozzle and it has been found that with certain constructions of this cap or end member an area of low pressure is formed at the end of the nozzle some distance from the aperture, causing oil to collect at the end of the nozzle and drip.

It is an object of this invention, therefore, to provide a structure of nozzle which will eliminate said area of low pressure and which will project the oil cleanly, so that no oil collects and drips at the end of the nozzle.

It is a further object of the invention to provide a nozzle for discharging oil or liquid fuel having an end member with a small aperture therein from which the oil is projected in the form of a cone, said nozzle having a cap extending beyond said end member and having its surface converging towards its outer end and also having an outwardly flaring recess at its end, the smaller end of which is adjacent said aperture.

It is a further object of the invention to provide an oil discharge nozzle comprising a shell through which the oil passes, a member adjacent the end of said shell having an aperture therethrough through which the oil is discharged, said oil passing outwardly in the form of a cone, and a cap member for said shell extending beyond said end member, the end surface of which converges outwardly, and having a frusto-conical recess in its end, the walls of which extend in the same general direction as the sides of said cone.

It is more specifically an object of the invention to provide an oil discharge nozzle comprising a substantially cylindrical shell, a disk at one end of the shell having a central discharge aperture of small diameter from which the oil is discharged in the form of a cone, and a cap for said shell having a substantially semi-spherical end surface with a frusto-conical recess at its front end, the walls of which extend in the same general direction as the sides of said cone, all of said parts being coaxially arranged.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawing, in which like reference characters refer to similar parts throughout the several views, and in which:—

Fig. 1 is a central vertical section taken longitudinally through the discharge nozzle and air discharge pipe;

Fig. 2 is a view in side elevation of the nozzle, the same being shown as disposed vertically;

Fig. 3 is a vertical section taken on line 3—3 of Fig. 1, as indicated by the arrows;

Fig. 4 is a view in side elevation of the screen and discharge member used;

Fig. 5 is a view in end elevation of the member shown in Fig. 4, as seen from the right of said figure; and

Fig. 6 is a vertical section taken on line 6—6 of Fig. 1 as indicated by the arrows.

Referring to the drawing, a portion of the structure of an oil burner of one common type is shown, including an air discharge conduit 10 and an oil discharge nozzle. The nozzle comprises a body or shell member 11 of substantially cylindrical form, having its rear portion 11*a* of larger diameter and formed as a hexagon as shown in Fig. 2. The shell 11 is bored and tapped at its rear end and has connected thereto the oil supply pipe 12 through which oil is supplied under pressure. Said shell is provided with a cylindrical bore 11*b* which is enlarged or counterbored at its front end as shown at 11*c*, thus forming a shoulder. A member 13 is provided of general cylindrical form, the same having a portion 13*a* of reduced diameter at its inner end, thus forming a shoulder. The member 13 fits and is disposed in the bore 11*c* with its shoulder fitting against the shoulder formed thereby. Member 13 has a flange 13*b* at its front end which is disposed a slight distance in front of the front end of shell 11. A cylindrical screen member 14 extends over the reduced portion 13*a* and is tightly clamped thereon by a sleeve 15 surrounding portion 13*a*. Screen member 14 at its rear end is closed by a cap 16 into which its end extends. A helical member 17 is disposed in screen 14 to insure that it maintains its cylindrical form. Member 13 has a central bore 13*c* of rather large diameter at its inner end which communicates with a pair of spaced smaller bores 13*d* which extend to its front end. The front end of the flange 13*b* is disposed against a washer or disk 18,

said disk at its inner side having an annular groove 18*a* extending thereabout and the same has a central aperture 18*b* which is substantially cylindrical at its outer portion but is frusto-conical at its inner portion, the same flaring toward the inner side of said disk. Small grooves 18*c* extend from opposite sides of the groove 18*a* to aperture 18*b*, being substantially tangential to said aperture. A cap member 19 is provided for the nozzle and shell 11 is exteriorly threaded at its front end to receive this cap. Cap member 19 has its front surface 19*a* substantially semi-spherical so that the same converges toward the outer end of said cap. Said cap 19 has an inner flat surface 19*b* which engages the outer flat side of the disk 18. Said cap has a central recess 19*c* at its front end which flares outwardly and is thus of frusto-conical shape, the walls of which extend in the same general direction as the projected cone of oil indicated by the dotted lines 20. It will be seen that shell 11 and members 13, 18 and 19 are coaxially arranged.

In operation the oil is delivered through the pipe 12 and passes into bore 11*b*. The oil from here passes through the screen 14 into bore 13*c* and through the holes or bores 13*d*. The oil enters groove 18*a* and passes then through the small grooves 18*c* to the aperture 18*b* through which it is discharged. It has been found that by having a disk with a discharge aperture therein as shown, a projected cone of oil having a wide angle can be secured. The air passes through the conduit 10 as indicated by the arrows 21 and follows a general direction of the arrows as shown, the air, of course, eventually mixing with the oil and forming a combustible mixture. Owing to the converging surface 19*a* of the cap 19, the air follows the general direction of said surface and meets the cone of oil without producing any area of low pressure at the end of the nozzle outwardly of the aperture 18*b*. The portion of cap 19 surrounding the recess 19*c* protects said recess from dirt and this portion of the cap also protects the projected cone of oil 20, insuring that said cone will be well formed before passing beyond said cap. The end of the projected cone is thus brought some distance within the cap and this, together with the rounded or converging surfaces on cap 19, prevents any accumulation of oil at the end of the nozzle. The oil is thus all sprayed outwardly and the end of the nozzle is dry and clean. It will be seen that all parts of the nozzle are readily accessible by unscrewing and removing cap 19 which can readily be done. As shown in Fig. 2, the rear portion of said cap is of hexagon shape and it can usually be removed with the fingers or with the application of a light pressure by means of a wrench. When the cap is removed, disk 18 is readily removed and member 13 with the screen thereon can be withdrawn.

From the above description it is seen that applicant has provided a simple and efficient construction of nozzle and one which cleanly projects the oil in the desired manner. The trouble encountered with some nozzles is entirely eliminated and the structure of nozzle prevents oil collecting at the end thereof and dripping from the nozzle. The parts of the nozzle are comparatively few, and the same are easily assembled and disassembled and are maintained securely in position when the nozzle is assembled. The device has been amply demonstrated in actual practice, and found to be very successful and efficient.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicant's invention, which generally stated, consists in a device capable of carrying out the objects above set forth, in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:—

1. A nozzle for a liquid fuel burner having in combination, a shell through which fuel passes, a disk at one end of said shell having a flat outer surface and having a central aperture through which fuel is discharged, said disk at its inner side having a recess communicating with said aperture with tangential grooves leading thereto, whereby said fuel is discharged in the form of a cone having its apex at said aperture, a cap for said nozzle threaded on said shell having a substantially semi-spherical end extending a considerable distance beyond the outer surface of said disk and having a central recess with a wall forming the surface of a frustum of a cone extending from the outer surface of said disk to said semi-spherical surface and intersecting said latter surface at a substantially acute angle, said wall being located adjacent to the sides of said cone of projected fuel whereby said cone of projected fuel has a considerable portion thereof in said recess and no area of low pressure is formed about said portion of said cone by air passing longitudinally about said nozzle, and collection and dripping of oil on said nozzle is prevented.

2. A nozzle for a liquid fuel burner having in combination, a substantially cylindrical shell through which fuel passes, a disk having a flat outer surface and a central discharge aperture extending therethrough, through which said fuel is discharged in the form of a cone having its apex at said aperture and a cap for said shell having a substantially semi-spherical end and having a frusto-conical recess in its outer end coaxial therewith, with the large end of said recess extending to said semi-spherical surface and intersecting the same at a decided angle and the smaller end of said recess disposed at said flat surface of said disk, the ends of said recess being arranged to be adjacent the sides of said projected cone of fuel, whereby when air is discharged around said nozzle no area of low pressure is formed at the end of said nozzle and about the inner portion of said projected cone of fuel so that collection and dripping of fuel on said nozzle will be prevented.

3. A nozzle for a liquid fuel burner having in combination, a substantially cylindrical shell through which fuel passes, a disk having a flat outer surface and a central discharge aperture extending therethrough, through which said fuel is discharged in the form of a cone having its apex at said aperture and a cap for said shell having a curved surface converging at its outer end toward the central longitudinal axis of said nozzle, said cap having a frusto-conical recess in its outer end coaxial therewith, the wall of which extends from the flat outer surface of said disk to said curved surface and intersects said latter surface at a substantially acute angle, said wall being arranged to be closely adjacent the sides of said discharge cone of fuel.

WILLIAM A. HUBBARD.