Feb. 7, 1933. C. S. FRICK 1,896,744

LIQUID ATOMIZER

Filed July 27, 1931

Fig. 1.

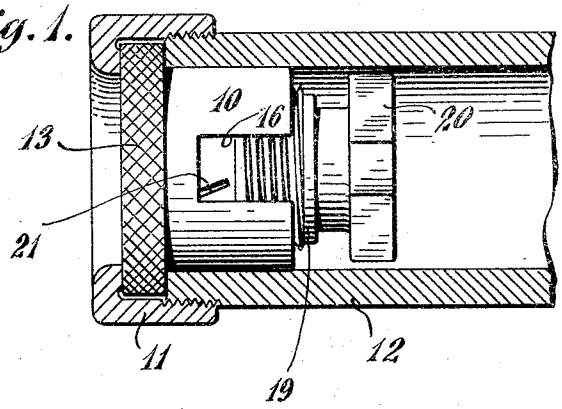


Fig. 2.

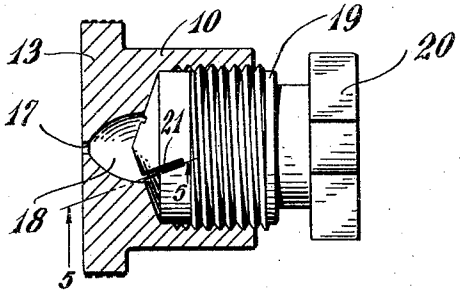


Fig. 3.

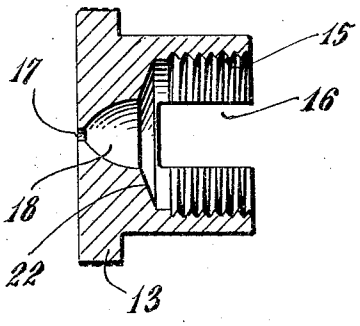


Fig. 4.

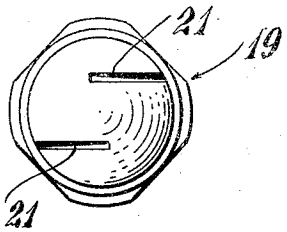
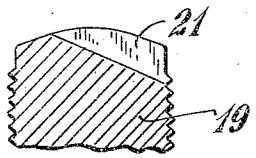


Fig. 5.



INVENTOR
Carl S. Frick

BY his ATTORNEY
Sheldon H. Graves

Patented Feb. 7, 1933 1,896,744

UNITED STATES PATENT OFFICE

CARL S. FRICK, OF JANESVILLE, WISCONSIN

LIQUID ATOMIZER

Application filed July 27, 1931. Serial No. 553,332.

This invention relates to liquid atomizers of the so-called mechanical type, wherein a whirling motion is imparted to the liquid and the liquid then caused to issue from an orifice, in finely divided condition, in the form of an expanding jet. My invention is primarily designed for use as an oil burner although it may be employed in other cases where a spray of this character is desired.

Among the objects of my invention is to provide an atomizer of this type, which is simple and economical in construction, durable in use, which may be easily installed and readily taken apart for inspection and cleaning. In carrying out one embodiment of my invention, and which is highly efficient in operation, I provide a tip having a discharge orifice back of which is formed a whirl chamber which preferably is parabolic in section and leading to the chamber are a number of straight tangential passages which are tapered or nozzle shaped. The particular form of the passages is one important feature of my invention as I find by the use of passages of this shape I am able to secure the desirable high velocity of the liquid with a minimum of internal friction, thus resulting in a marked increase of efficiency. In the preferred form of my invention, the atomizer or atomizer head is a self-contained unit and of but two parts of relatively simple construction, a cap and a plug, which together form the discharge orifice, the whirl chamber and the tangential passages leading to the whirl chamber.

Other objects and advantages of my invention will appear from the following description taken in connection with the accompanying drawing wherein:

Figure 1 is a side elevation of an atomizer embodying one form of my invention showing part of the oil supply pipe to the end of which the atomizer is clamped;

Figure 2 is a vertical longitudinal sectional view partly in elevation of the atomizer shown in Figure 1;

Figure 3 is a sectional view of the atomizer tip or cap;

Figure 4 is an end elevation of the plug showing an arrangement of slots forming the tapering oil passages which discharge into the whirl chamber; and

Figure 5 is a sectional view of a portion of the plug taken on the line 5—5 of Figure 2.

Referring more particularly to Figures 1 and 2 the atomizer comprises a cap 10 having an enlarged head 13 which is adapted to be clamped by an outer cap 11 to a pipe or tube 12 through which the oil to be atomized is supplied. Cap 10 is internally screw-threaded as indicated at 15 and the sides of the cap are cut away at opposite points to form slots or recesses 16. The cap is formed with a central nozzle orifice 17 back of which is formed a whirl chamber 18 which as shown is parabolic in longitudinal section. Back of the whirl chamber the inner wall of the cap 10 has an annular conical portion 22 which forms a seat for the forward conical end of a plug 19.

Plug 19 is externally screwthreaded for engagement with internal threads of cap 10 and is formed at its rear with a head 20 adapted to receive a wrench for screwing the plug onto its seat. The inner end of the plug has two opposite transverse slots 21 which as shown in Figures 1 and 2 are inclined rearwardly toward the central axis of the plug and as shown in Figure 5 have their bottoms inclined so that the passage through the slot from its outer end is tapered and as shown in Figure 4, is straight. While I have shown but two slots 21 in the end of the plug it is apparent that I can employ three or more spaced at equal angular distances apart.

Figure 1 shows the cap 10 and plug 19 in assembled position and it will be seen from this figure that the slots 21 communicate at their outer ends with the recesses 16 so that oil flowing inwardly through the pipe 12 will enter the slots 21 at opposite sides of the plug. The liquid then tapering flows inwardly through passages formed by the slots 21 and the seat 22 of the cap 10 from which it discharges in tangential directions into the whirl chamber 18. This chamber gives to the oil a rapid whirling motion and the oil issues from the orifice 17 in the form

of a conical spray in a state of very fine subdivision.

I find that by forming the chamber 18 of the shape described I am able to effect a very rapid whirling of the oil and at the same time minimize the erosion of the walls of the chamber. The oil in passing through the tapering slots 21 has its velocity very materially increased and at the same time, as these passages are substantially straight, there is very little internal friction between the oil and the walls of the passages.

While I have shown the seat 22 as beveled and the inner end of the plug conical I may in certain cases make these parts flat.

I claim:

1. A liquid atomizer consisting of a cap and plug, the cap having longitudinal cut away portions forming recesses extending inwardly from the rear end of said cap and said cap being formed with a central discharge orifice and also formed with a whirl chamber at the rear of said orifice and an annular seat around said chamber, and said plug having at its inner end a plurality of straight tangential slots which with said seat form inwardly tapering passages communicating with said whirl chamber the outer ends of said passages communicating with said recesses when said plug and cap are assembled.

2. A liquid atomizer consisting of a screw cap and plug, the cap having longitudinal cut away portions forming recesses extending inwardly from the rear end of said cap and said cap being formed with a central discharge orifice and also formed with a parabolic whirl chamber at the rear of said orifice and an annular seat around said chamber, and said plug having a relatively blunt inner end and having at its inner end a plurality of substantially transverse straight tangential slots which with said seat form inwardly tapering passages communicating with said whirl chamber the outer ends of said passages communicating with said recesses when said plug and cap are assembled.

Signed at New York city in the county of New York and State of New York this 15th day of July A. D. 1931.

CARL S. FRICK.