

D. J. IRISH.
LIQUID ATOMIZER.
APPLICATION FILED DEC. 17, 1913.

1,192,901.

Patented Aug. 1, 1916.

Fig. 1

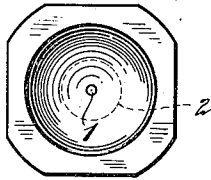


Fig. 2

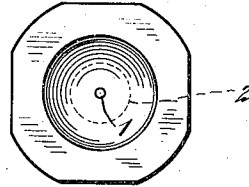


Fig. 3

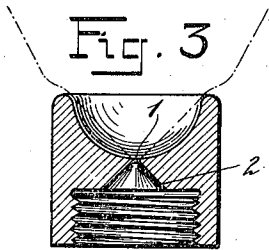


Fig. 4

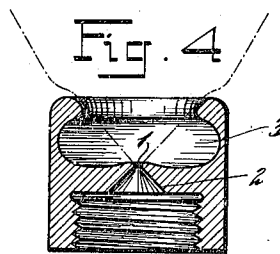


Fig. 5

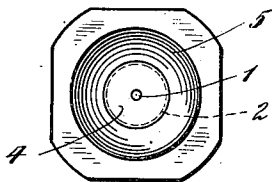


Fig. 6

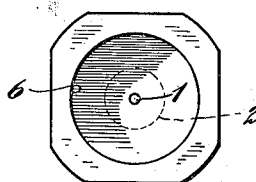


Fig. 7

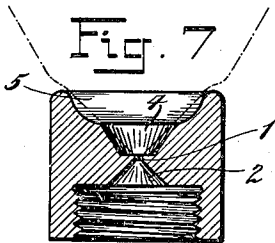
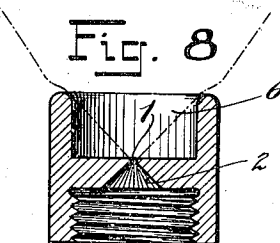


Fig. 8



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UNITED STATES PATENT OFFICE.

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LIQUID-ATOMIZER.

1,192,901.

Specification of Letters Patent.

Patented Aug. 1, 1916.

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To all whom it may concern:

Be it known that I, DAVID J. IRISH, a citizen of the United States, residing at New York city, borough of Richmond, county of Richmond, and State of New York, have invented certain new and useful Improvements in Liquid-Atomizers, of which the following is a specification.

My invention relates to atomizers for spraying liquid fuel and more particularly to the tip member thereof, the object being to provide a device by which a given quantity of oil may be burned more efficiently, with less air for combustion and less smoke, than can be realized by the use of the standard designs of mechanical atomizers.

In the accompanying drawings Figures 1, 2, 5 and 6 are end views, and Figs. 3, 4, 7 and 8 corresponding central sections showing various forms or embodiments of the invention.

In all of the embodiments shown the end of the tip is hollowed out to provide a relatively large chamber at the base of which, and centrally thereof, is a discharge orifice 1, said orifice being at the apex of a cone-shaped cavity 2 into which the oil to be sprayed is delivered by any suitable means, such for example, as that shown in United States Patents 1,007,793, 1,007,794, and 1,007,795. While I have described the end of the tip as hollowed out, the large chamber in the end thereof may also be described as being formed by an extension of the wall of the tip beyond the plane of the discharge orifice in the standard forms of mechanical atomizers.

The chamber above referred to may assume various forms. In Figs. 1 and 3 it is substantially semi-circular in section. In Figs. 2 and 4 the body 3 of the chamber is of greater width than in Fig. 3 and the upper part is contracted slightly, forming a mouth with a rounded edge. In Figs. 5 and 7 the lower part 4 is in the form of a frustum of a cone with its narrow end substantially coincident with the plane of the discharge orifice, and the upper part 5 dish-shaped. In Figs. 6 and 8 the chamber 6 is cylindrical. In all of these forms the side wall of the tip is extended to such distance beyond the transverse plane of the discharge orifice that the open end or mouth of the chamber is of such diameter that the outside

of the extending cone of oil will not strike the wall. The form assumed by the oil spray is indicated by the broken lines in Figs. 3, 4, 7 and 8 and, as shown, the diameter of the cone as it emerges from the mouth of the chamber is slightly less than the internal diameter of the chamber at that point, so that a space is left between the surface of the extending oil cone from the discharge orifice 1 to the point of closest proximity to the mouth of the chamber.

In operation, the oil emerging from the discharge orifice under high pressure creates a partial vacuum in the tip chamber outside the wall of oil spray, the formation of such vacuum being assisted by the rush of air around the outside of the tip, the air for combustion being supplied by natural or forced draft. The oil being thus sprayed into a space in which the air is below atmospheric pressure, the atomization of the oil is increased thereby allowing a more intimate mixture of the air with the oil at a point closer to the discharge orifice than has been possible heretofore. Also the creation of a partial vacuum within the tip chamber causes an inflow of air over the edge of the tip, which air penetrates the hollow oil cone and in so doing carries with it some of the atomized oil, thereby making a solid cone of atomized oil at the very start or very close to the apex of the cone. One effect of the present invention is, therefore, to fill the hollow cone of oil spray with more finely atomized oil than is now effected mechanically by centrifugal action only; and at the same time air is supplied for combustion which starts the combustion practically at the discharge orifice.

It has been observed in the operation of the described atomizer that the diameter of the cone of oil spray at the point of exit from the mouth of the tip chamber is greater, as indicated by the broken lines, than at the same point in the cone formed by a standard mechanical atomizer supplying the same quantity of oil per hour. This seems to indicate that the oil particles on the outside of the cone were being further torn apart by the partial vacuum within the tip chamber, and at the same time being aided by the expansion of air and oil vapor in the interior of the cone due to the heat of combustion.

What I claim and desire to secure by Letters Patent of the United States is:—

1. An atomizing tip for liquid fuel burn-
ers having a jet or discharge orifice through
5 which a stream of oil is continuously forced,
said orifice opening into a chamber closed to
the atmosphere except at its mouth, the
outer edge of the wall of said chamber being
so positioned that the wall of the cone of
10 atomized oil will just clear said nozzle to
form an annular pocket for air between the
walls of the chamber and the cone of atom-
ized oil; substantially as described.

2. A separable atomizing tip for liquid
15 fuel burners having a discharge orifice
through which a stream of the fuel is forced
and atomized so as to form a jet which di-
verges directly upon leaving the orifice, said
orifice opening into a chamber closed to the
20 atmosphere except at its mouth, the outer
edge of the wall of said chamber being so
positioned that it will come nearer the out-

side of the diverging jet than some other
parts of the wall of said chamber, there-
by forming a pocket for air between the 25
wall of the chamber and the diverging jet of
atomized fuel.

3. A separable atomizing tip for liquid
fuel burners having a discharge orifice
through which a stream of the fuel is forced 30
and atomized so as to form a jet which di-
verges directly on leaving the orifice, said
orifice being in the base of a chamber, the
sectional area of said chamber between the
discharge orifice and the mouth being 35
greater than the sectional area of the mouth.

In testimony whereof I have hereunto
signed my name in the presence of two sub-
scribing witnesses.

DAVID J. IRISH.

Witnesses:

ARTHUR N. LOWES,
EDWARD A. BANNON.