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H. HUSS

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NOZZLE

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Fig. 1

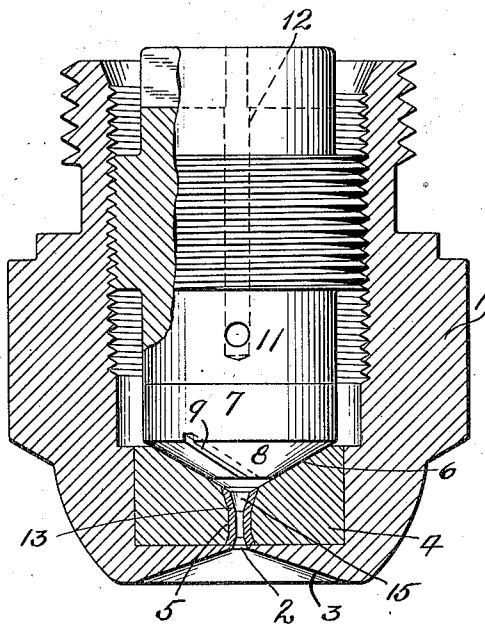
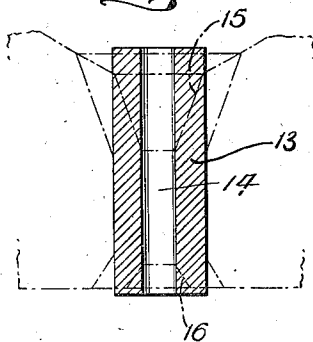


Fig. 2



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NOZZLE

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3 Claims. (Cl. 299—120)

This invention relates to atomizing nozzles or tips and provides a nozzle or tip which is particularly well adapted for use in connection with oil burners where the oil is delivered under high pressure.

In nozzles of the type to which the present invention is directed it is customary to employ a nozzle body equipped with a discharge orifice, the bore of the nozzle body being provided adjacent this discharge orifice with a member which is in turn provided with a swirl chamber and an ejection orifice, this chamber and orifice, as will be understood, being aligned with the discharge orifice of the nozzle body. It is of paramount importance that the ejection orifice be perfectly formed and inasmuch as this orifice is extremely small in diameter and relatively long, it is an exceedingly difficult task to form the orifice in production with the necessary accuracy and perfection. Difficulty is experienced also with erosion and corrosion. It has been suggested heretofore that the ejection orifice and swirl chamber be formed in a hard mineral substance set in the member above referred to. It will be appreciated that while a hard mineral substance, such as sapphire (oxide of aluminum), is highly erosion and corrosion resistant, such material is very expensive as compared with metal and owing to the difficulties experienced in working this material, its use is expensive.

The present invention provides a construction in which the difficulties above mentioned are overcome in a simple and relatively inexpensive manner. Briefly, I have found that drawn metal tubing, known commercially as Rezistal KA-2 a non-hardenable austenitic chromium nickel steel of Group 1, and which is highly erosion and corrosion resistant may be employed at a relatively small expense to provide the swirl chamber and ejection orifice structure. It is possible by modern commercial methods to draw tubing of such material to any desired wall thickness and to the minute inside diameter desired in nozzle practice, to provide an orifice which is free of defects and truly round, smooth and accurate in every detail. I might add also that it is an extremely difficult and slow operation to drill this steel, and as a consequence a drilled orifice is not practicable, inasmuch as in the nozzle of this invention the ejection orifice is relatively long as compared to its diameter. Inasmuch as I propose using drawn tubing, it will be appreciated that in addition to the advantages above mentioned, my construction provides for the ready formation of the swirl chamber, a difficult task when using a

hard mineral substance such as above referred to.

In the drawing accompanying this application:

Fig. 1 is a sectional elevation of an embodiment of my invention; and

Fig. 2 is a smaller view of the ejection orifice tube.

Referring to the drawing in detail, 1 designates a nozzle body which may be of usual construction, for example, provided with a discharge orifice 2 at one end, this orifice constituting the apex of a recess 3 in the end of the nozzle body.

Set into the bore of the nozzle body 1 adjacent the discharge orifice 2 is a metal member 4 provided centrally with a longitudinally extending bore 5, the rear face of this member 4 being provided with a tapered recess as shown at 6. Co-acting with this recessed face of the member 4 is a distributor or distributor head 7 in the form of a metal member the forward end of which is beveled or tapered as shown at 8 to the same shape as the recessed face 6 of the member 4. The tapered face 8 of this distributor head is provided with tangential slots 9 for the passage of oil or other fluid being atomized to the swirl chamber.

The distributor head 8 is held seated in the recessed or beveled face 6 of the member 4 by the threaded stem 11 which, as will be seen from the drawings, is threaded into the nozzle body, this stem being provided with a longitudinal and cross-bore or channel 12 for the passage of the material being atomized to the distributor head 7 and from thence to the swirl chamber.

The bore 5 in the member 4 is of materially larger diameter than the desired diameter of the ejection orifice of the member 4, and in accordance with the present invention, I insert a drawn metal tube 13 of Rezistal KA-2 into this bore, this tube, which as above pointed out is highly resistant to erosion and corrosion, being drawn down to provide an ejection orifice 14 of the desired extremely small diameter as, for example, .018" or even down to .013" and relatively long as compared with its diameter. After the insertion of this tubing the ends are flared as shown at 15 and 16, the flared end 15 terminating at the inner edge of the recess 6 of the member 4 and functioning as a swirl chamber in the operation of the nozzle.

As above mentioned the tubing 13 can be drawn to any desired length while retaining the perfection and accuracy of the ejection orifice 14, even though the diameter of this orifice is of the minute size above referred to, so that it

is a simple matter to provide the nozzle with an ejection orifice of minute dimensions as to diameter, but the length of which is several times its diameter, which I have found desirable in nozzles
5 for oil burning equipment, without the risk of any distortion or imperfections in the orifice. I might add also that it is highly desirable, in fact it is essential, for most efficient operation that these orifices in oil burning nozzles be of uniform
10 diameter throughout and truly round inasmuch as otherwise the oil or other material being atomized is not discharged in a true cone nor is the material atomized uniformly, and I have found that the construction provided by the
15 present invention presents no difficulty in these connections.

It will be evident also that the flared end 15, providing the swirl chamber, in fact the flared end 16 as well, can be formed with great accuracy with respect to the ejection orifice 14 itself, thereby avoiding off center constructions which in oil burning cause a one sided fire. In other words, the fire will be greater on one side of the fire box than the other, or may slant up
20 or down depending upon the off centering of these flared areas with respect to the ejection orifice itself.

It is to be understood that changes may be made in the details of construction and arrangement of parts herein illustrated and described within the purview of my invention.

What I claim is:—

1. An atomizing nozzle comprising in combination a nozzle body provided at one end with a discharge orifice, a member in the nozzle body
35 provided with a longitudinal bore and with a re-

cessed rear face, a distributor head cooperating with said recessed face, and a drawn metal tube in said longitudinal bore, the bore of said tube being flared at each end, one flared end of said bore lying adjacent the discharge orifice of the nozzle body, the other flared end of said bore
5 providing a swirl chamber cooperating with said distributor head.

2. An atomizing nozzle comprising in combination a nozzle body provided at one end with a discharge orifice, a member in the nozzle body
10 provided with a longitudinal bore and with a recessed rear face, a distributor head cooperating with said recessed face, and a drawn tube of highly corrosion and erosion resistant metal in said longitudinal bore, the bore of said tube being
15 flared at each end, one flared end of said bore lying adjacent the discharge orifice of the nozzle body, the other flared end of said bore providing a swirl chamber cooperating with said distributor head.
20

3. An atomizing nozzle comprising in combination a nozzle body provided at one end with a discharge orifice, a member in the nozzle body provided with a longitudinal bore and with a recessed rear face, a distributor head cooperating
25 with said recessed face, and a drawn tube of metal, austenitic in character and highly corrosion and erosion resistant in said longitudinal bore, the bore of said tube being flared at each end, one flared end of said bore lying adjacent
30 the discharge orifice of the nozzle body, the flare at the other end of said tube terminating at the inner edge of the said tapered rear face and providing a swirl chamber for cooperation with said distributor head.
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