Sept. 8, 1953 R. S. CALHOUN 2,651,547

NOZZLE HEAD

Filed Feb. 27, 1950

Fig. 1.

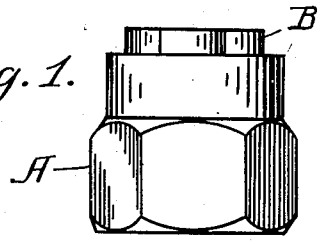


Fig. 6.

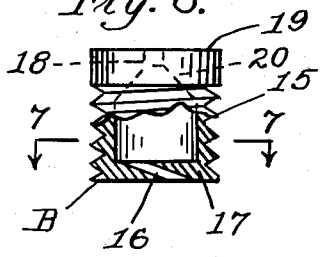


Fig. 7.

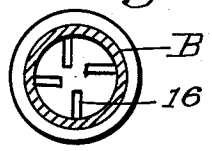


Fig. 2.

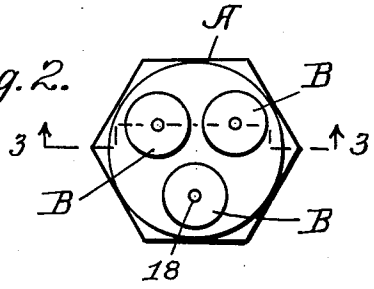


Fig. 9.

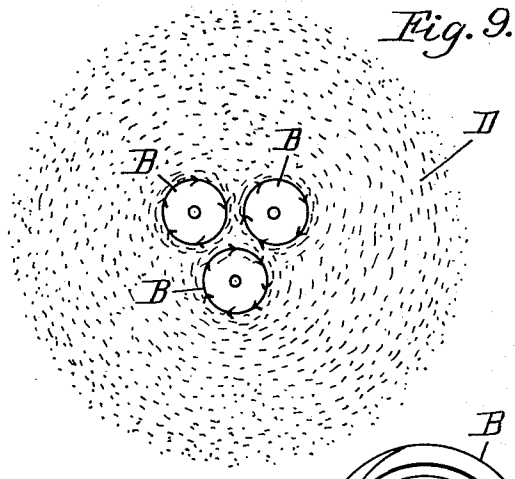


Fig. 3.

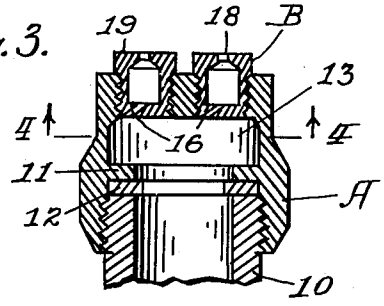


Fig. 11.

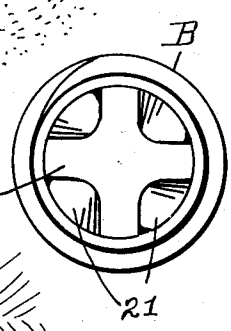


Fig. 4.

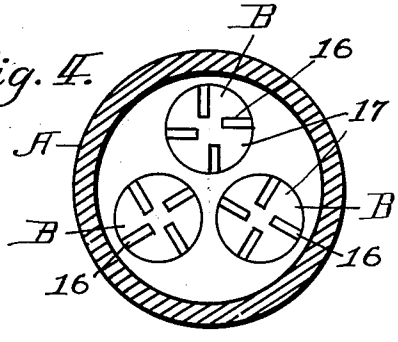


Fig. 8.

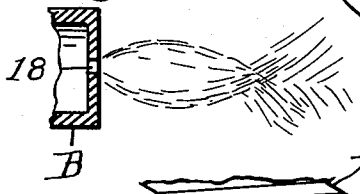


Fig. 10.

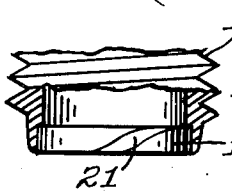
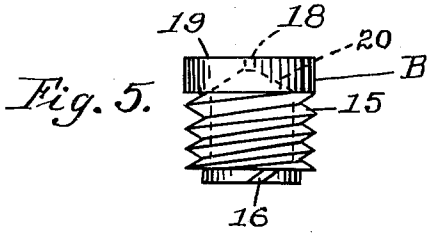


Fig. 5.



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NOZZLE HEAD

Rollin S. Calhoun, Oceanside, Calif.

Application February 27, 1950, Serial No. 146,539

1 Claim. (Cl. 299—114)

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My invention relates to an improved nozzle head which is adapted to produce a cloud of vapor from a stream of liquid. My invention also relates to an improved method in relation to said structure.

An object of my improvement is to produce a cloud of vapor which can be most effectively applied in use for extinguishing fire, air conditioning, applying insecticide, spraying vegetation, moistening fuel and various other uses. Another object is the assemblage of nozzle orifices or jets of improved type which coact in producing an exceedingly large volume of fine vapor and which can be easily repaired, adjusted and directed in use. Among further objects is maximum simplicity of construction and increased effectiveness in use.

In the accompanying drawing forming part of this specification, Fig. 1 is a side elevation of a nozzle head which represents one form of my invention;

Fig. 2 is a plan looking down upon the upper end of the nozzle head shown in Fig. 1;

Fig. 3 is a vertical section taken on line 3—3 of Fig. 2;

Fig. 4 is a section taken on the line 4—4 of Fig. 3;

Fig. 5 is a side elevation of one of the orifice jets;

Fig. 6 is a side elevation partly in section of a modified form of one of the orifice jets shown in Fig. 5;

Fig. 7 is a section taken on the line 7—7 of Fig. 6;

Fig. 8 is a view of a detail which is shown partly in section, illustrating graphically, the action of one of the voluted jets of fluid emitted by one of the orifice jets in the nozzle;

Fig. 9 is a diagrammatic view illustrating the voluted vapor produced by my improvement;

Fig. 10 is a detail showing an alternate construction, and

Fig. 11 is an end view of the construction shown in Fig. 10.

In the drawing my improved nozzle head as shown has an internally threaded body A which is adapted to be threadedly coupled to a hose or other duct 10, as shown in Fig. 3. An inner annular shoulder 11 is provided in the body of the nozzle so that a washer 12 may be interposed to produce a tight connection between the nozzle head and duct. A fluid delivery chamber 13 is provided between the shoulder and the outer end portion of the nozzle and a plurality of orifice tips B—B—B are removably mounted at

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equal circumferentially spaced distances apart in the delivery end portion of the nozzle.

Each orifice tip has an externally threaded cylindrical body 15 (Fig. 6), into which fluid is admitted from the fluid delivery chamber 13 into the jet through a plurality of whirler slots 16, which enter the lower end portion 17 of the jet. The whirler slots slant upwardly and circumferentially at an acute angle relative to the axis of the orifice jet so as to direct the fluid laterally and circumferentially in the form of a forward spiral like stream which whirls outwardly through a small orifice 18 in the outer end 19 (Fig. 6) of the jet as illustrated graphically in Fig. 9. As many whirler slots may be employed in a circular series as desired, four slots, for illustration being shown in each jet. Also as many jets may be employed as desired, a circular series of three being shown in the illustration which I found to be highly effective. Each jet is threadedly connected with its body seated in and connected with the chamber 13 in the nozzle and the plurality of orifice jets are arranged with their sets of baffle slots 16 and cooperating orifices 18 coaxially and sufficiently close together so that the several jets of spray produced thereby intermingle in the manner described as follows.

For the purpose of describing the manner in which the several sprays emitted by the cluster of jets cooperate, reference is made to the diagrammatic views shown in Figs. 8 and 9. Fig. 9 illustrates diagrammatically a cluster of jets B—B—B, of a nozzle head, applied in the manner of my improvement in a circular group. The spray produced by each of these jets resembles a whirling voluted stream of vapor as shown in Fig. 8. By assembling these jets in relatively close order in the nozzle head the voluted streams are baffled and comingle by impingement and the resulting mixture D is thereby further reduced to a cloud of refined vapor as illustrated in Fig. 9. The circular impingement of the whirling streams is highly effective for various purposes to which the invention can be applied.

While three jets are shown with their baffle slots directed to produce whirling action, it is contemplated that any number of jets may be employed, or the slots in the series of tips inclined alternately in reversed direction to further augment the baffle effect produced by voluted impingement of the sprays to produce a cloud of highly refined vapor.

In Figs. 10 and 11 the whirler slots 21 in the disk-like lower end 17 of the jet B are each in the

form of a reverse curve annularly as shown to enhance the whirling mixing action of the fluid.

My improvement is applicable for various uses, such as fire control, air conditioning, cooling systems, atmospheric use in green houses, reducing fluid and powdered fuel, spraying and various other purposes where the presence of vapor is beneficial.

Various modifications of the invention are contemplated within the spirit of the invention and the scope of the following claim.

I claim:

A fog nozzle comprising a nozzle internally screw-threaded to receive at one end a duct supplying liquid under pressure, a liquid-delivery chamber in said nozzle connected with said duct, an annular group of three spray jet units threadedly received into the other end of said nozzle and connected with said chamber, each of said units having a circular outer surface with a small axial orifice in the center thereof flush with said surface, a generally cylindrical-shaped chamber in each of said jet units and connected to said axial orifices, the passage from said cylindrical-shaped chamber to said orifice being cone-shaped, a circular series of four whirler slots in each of said spray jet units connecting said nozzle chamber with said jet chamber, the axis of each centrally-directed whirler slot being at approximately 120° to its adjacent slot, each of said whirler slots being slanted upwardly and circumferentially at an acute angle relative to the axis of the orifice jet, each of said whirler slots being cut up through the circular, bottom surface of the jet unit on off-set, chords, the passage of the liquid through the whirler slots, jet chamber and jet orifices being such that sprays are caused to commingle by whirling impingement beyond the delivery end portion of the nozzle to produce highly refined liquid fog.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
564,349	Van Sickle	July 21, 1896
916,984	Bleymehl	Apr. 6, 1909
1,529,531	Young	Mar. 10, 1925
1,665,744	Landberg	Apr. 10, 1928
1,668,271	Fisk	May 1, 1928
2,250,079	McDonald	July 22, 1941