July 12, 1955 R. H. GODDARD 2,712,962

DOUBLE DEFLECTING SPRAY NOZZLE

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Fig. 1

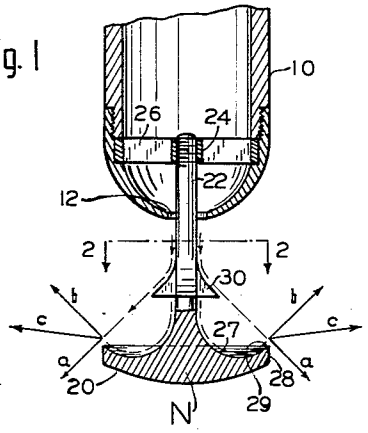


Fig. 2

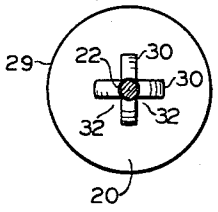
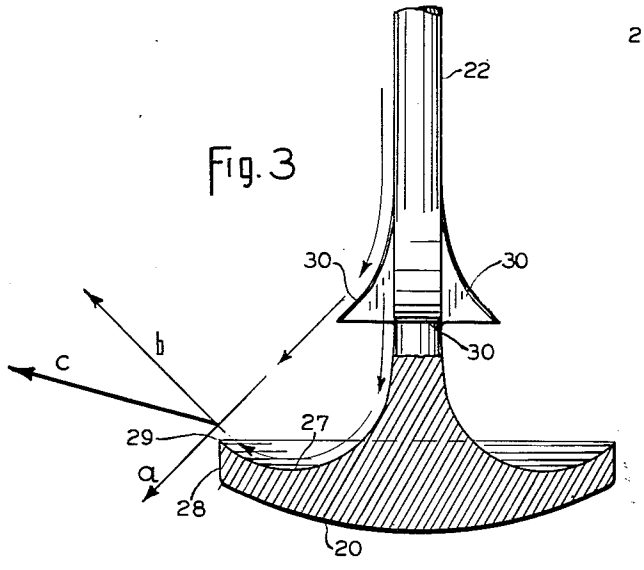


Fig. 3



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DOUBLE DEFLECTING SPRAY NOZZLE

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1 Claim. (Cl. 299—121)

This invention relates to nozzles adapted to provide a liquid spray in an internal combustion chamber.

It is the general object of the invention to provide very simple and unitary means for delivering a liquid in two separate and intersecting portions. By the intersection of these separate portions, the liquid supplied through the nozzle is effectively broken up and a resultant sheet of spray of very uniform consistency is attained.

The invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claim.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a sectional side elevation of the improved nozzle;

Fig. 2 is a sectional plan view, taken along the line 2—2 in Fig. 1; and

Fig. 3 is an enlarged sectional view of certain parts shown in Fig. 1.

Referring to Fig. 1, the liquid to be sprayed is delivered under pressure through a supply pipe **10** having a reduced end opening **12** at its lower end.

The nozzle N comprises an end disc **20** and an axial supporting stem **22**. The stem **22** may be threaded into a collar **24**, held in fixed position within the pipe **10** by a plurality of narrow radial supporting arms **26**.

The end disc or plate **20** of the nozzle N is provided with a stream-lined upwardly concave annular surface **27** extending outward to the peripheral surface **28** of the member **20**, and with which peripheral surface it intersects at an acute angle to define a relatively sharp edge **29**.

The stem **22** has a plurality of outwardly projecting lugs **30**, which are spaced substantially above the end plate **20**. The upper surfaces of these lugs **30** are stream-lined and are angularly directed outward as shown in Figs. 1 and 3. Substantial flow passages **32** are provided between the lugs **30**.

The operation of the improved double deflecting nozzle is as follows:

When a desired liquid, such as liquid oxygen, is delivered under pressure through the supply pipe **10**, an annular stream of the liquid passes downward through the opening **12**, and portions of the liquid are deflected outward by the lugs **30** and pass closely adjacent the relatively sharp edge **29** of the plate **20**, as indicated at *a* (Fig. 3). The remaining and somewhat larger portions of liquid pass directly downward through the unobstructed openings **32** and thereafter engage the concave annular surface **27** of the disc or plate **20**. This liquid is then directed as indicated at *b* (Fig. 3) and approximately at right angles to the direction of flow of the first liquid portions.

The two sets of streams of liquid are both effectively broken up by the intersecting impact of the streams on each other, and a single combined spray sheet of uniform consistency and with a thickened edge portion is delivered from the spray nozzle at the approximate angle indicated at *c*.

It will be particularly noted that this desirable result is attained by the use of the single nozzle N, which is of extremely simple and unitary construction.

Having thus described the invention and the advantages thereof, it will be understood that the invention is not to be limited to the details herein disclosed, otherwise than as set forth in the claim, but what is claimed is:

A double deflecting spray nozzle for a combustion liquid which comprises an axial supporting stem about which an annular stream of liquid flows, said stem having angularly-spaced deflecting lugs thereon which are circumferentially separated by unobstructed and relatively deep recesses which provide open passages extending inward substantially to said stem, and an end disc mounted on said stem below said lugs and having an annular concave deflecting surface, said lugs and said concave surface being engaged by different circumferential portions of the annular stream of combustion liquid, and said different portions being thereby directed along intersecting paths.

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