Dec. 4, 1956 T. A. HENSHAW ET AL 2,772,923

NOZZLE

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FIG. 1.

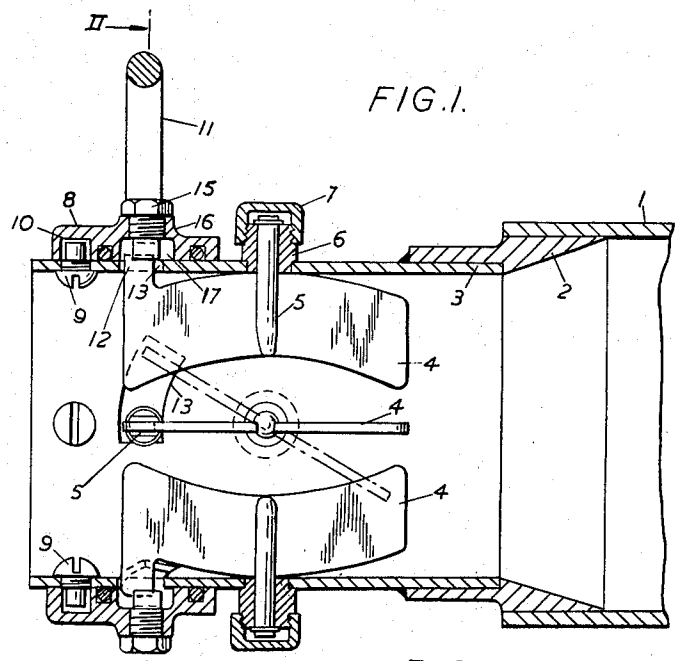
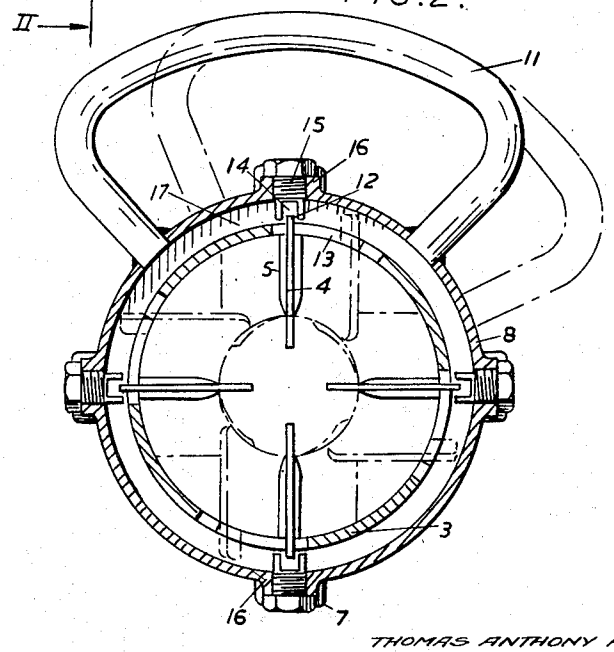


FIG. 2.



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FIG. 3.

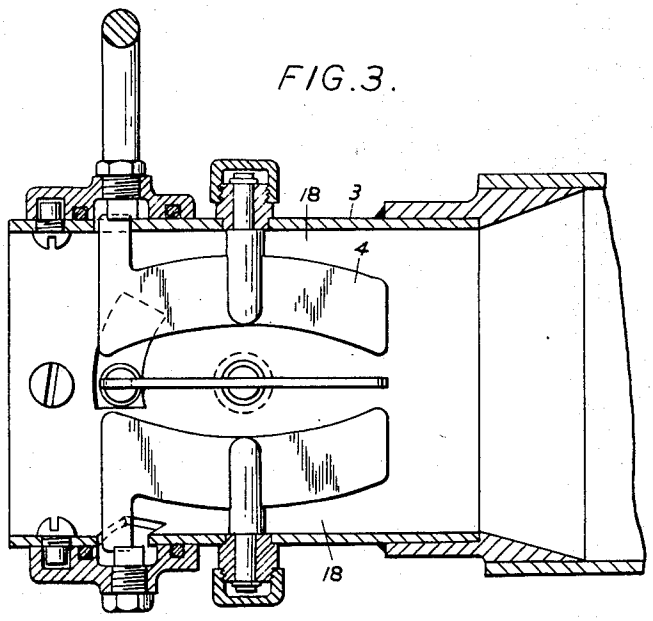


FIG. 4.

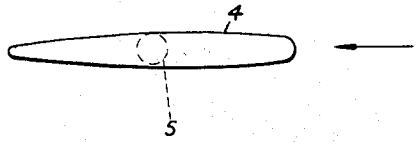
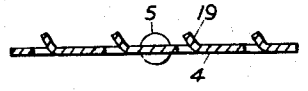


FIG. 5.



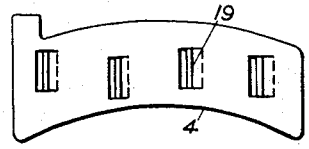


FIG. 6.

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NOZZLE

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Application October 27, 1953, Serial No. 388,476

Claims priority, application Great Britain November 3, 1952

3 Claims. (Cl. 299—117)

This invention relates to nozzles adjustable to vary the extent to which liquid delivered through the nozzle spreads out from the axis. The invention is particularly applicable but not limited to nozzles for delivering foam for fire-extinguishing purposes.

It is an object of this invention to provide an improved nozzle by which the liquid delivered by the nozzle can either be caused to emerge as a rod-like jet or can be given a rotary movement which causes scatter due to centrifugal force.

Another object of the invention is so to provide vanes inside a nozzle that by varying the angle between the vanes and the axis of the nozzle varying degrees of spread can be obtained.

According to the invention vanes extending substantially longitudinally are mounted in a nozzle formed by an open-ended and preferably cylindrical tube between positions in which they are parallel to the axis, so that a rod-like jet is produced, to positions in which they lie at varying angles to the axis, so that the liquid in passing through the inclined channels formed between the vanes is given a rotary movement which causes scatter due to centrifugal force.

The preferred constructions are shown in the accompanying drawings, in which:

Figure 1 is a longitudinal section through one nozzle;

Figure 2 is a section on the line II—II in Figure 1;

Figure 3 is a section similar to Figure 1 through a second nozzle;

Figure 4 is an edge view of a modified vane; and

Figures 5 and 6 are respectively a section through and a plan of another modified vane.

Referring first to Figures 1 and 2, the nozzle shown is intended for use on the end of a foam generator to which it is joined by a connector **2**. The nozzle consists of an open-ended cylindrical tube **3** in which four vanes **4** are mounted. Each vane is a flat metal plate extending longitudinally within the tube **3**, and is fixed midway between its ends in a spilt pin **5** which projects radially into the tube **3** from a socket **6** screwed into an opening in the wall of the tube. The socket **6** forms a bearing for the pin and is covered by a cap **7**. Each vane **4** can therefore turn with its pin **5** about the axis thereof.

The width of the vanes is less than that of the radius of the tube, and they leave a central axial zone of small radius unobstructed. Both the circumferential edges of each vane **4** are curved, the outer edge of each vane being curved to conform to the inner wall of the tube **3** in the position of maximum inclination to the axis. The vanes are mounted so that these outer edges nearly touch the inner wall of the tube in this position as shown in chain lines in Figure 2.

The vanes **4** are all mechanically connected to a ring **8** encircling the tube **3** and mounted to turn on it without moving axially, the ring being guided by the engagement of screws **9**, which project radially outwards from the tube **3** in an annular slot **10** in the ring. O-rings

form seals between the ring **8** and the tube **3**. The ring **8** is rigid with a handle **11** by which the nozzle is held in use. The mechanical connections between the ring **8** and the vanes **4** consist of a lug **12** on each vane projecting through a slot **13** in the wall of the tube **3** and entering a slot **14** in the end of a screw **15**. Each screw **15** screws into an internally threaded boss **16** integral with the ring **8** and projects into an annular recess **17** in the inner surface of the ring. The screws **15** turn with the ring, and when the ring is turned one or other wall bounding the slot **14** of each screw engages the lug **12** in that recess and so causes the vane **4** to turn about the axis of the pin **5**. With the construction shown there is adequate freedom of axial movement between the lug and the ring to allow the turning movement to take place, the lugs sliding freely through the slots **13** and **14** and the recess **17**. The length of the slots **13** determines the extent of the angular movement of each vane, which may be, for instance, 45°.

In operation the nozzle will produce a rod-like jet if the vanes are all parallel to the axis. By turning the vanes slightly the effective zone of the jet, that is to say, the area it covers at a distance from the nozzle may be adjusted without much interference with the flow and therefore without necessarily reducing the effective range. However, by increasing the angle further the effective range may be shortened. Thus, if in tackling a fire the operator finds he is too near to allow foam to fall quietly on to the fire he may spread the foam to a wider angle and in so doing shorten the effective range and thus form a uniform blanket of foam over the fire without having to change his position. For instance, with one nozzle made as shown in Figures 1 and 2 it is found that at a range of 80 feet an effective zone of influence of 4 feet diameter may be increased to 12 feet by turning the vanes through a small angle, whereas at a range of 20 feet the foam can be effectively spread over a zone of 20 feet diameter by turning the vanes to their maximum inclination to the axis without altering the supply pressure.

In the nozzle shown in Figure 3, the vanes are arranged to lie some distance from the wall of the tube **3** so as to leave an annular passage **18** between the vanes and the wall. Some of the foam flows uninterrupted through this passage and impinges on the diverging spray and thus produces increased scattering.

Instead of being flat plates, the vanes may be streamlined axially, as shown in Figure 4. If desired, they may be drilled or provided with small obstructions **19**, as shown in Figures 5 and 6, to cause breaking up of the spray.

The number of vanes may vary with the diameter of the nozzle, the degree of spreading required and the velocity of the foam or other liquid to be passed through the nozzle. Two or three vanes, as well as the four vanes shown, are found to give satisfactory results.

A nozzle according to the invention may be constructed as an adaptor for connection to a normal foam outlet nozzle on hose if the foam is generated at a remote position, or may (as shown) be embodied in a foam generator of the kind commonly known as a foam branch-pipe.

We claim:

1. A nozzle comprising a tube open at both ends, a plurality of vanes extending longitudinally within said tube, means located at the center of said vanes pivotally mounting said vanes to said tube, said means lying in a common plane perpendicular to the axis of said tube, and supplying substantially radial axes for turning movement of said vanes, and means for turning said vanes by actuating one end of said vanes, said second means comprising a ring encircling said tube and mounted to turn on it

without moving axially, mechanical connections between said ring and said vanes, whereby all said vanes are adjusted simultaneously by turning the ring, and further comprising a handle rigidly attached to said ring by which the nozzle is held in use.

2. A nozzle according to claim 1 in which each vane has a lug which projects through a slot in the tube to be engaged when the ring is turned.

3. A nozzle according to claim 2 in which the slots in the tube are arcuate.

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