July 25, 1961 H. W. BADBERG 2,993,650

FOG FIRE NOZZLE

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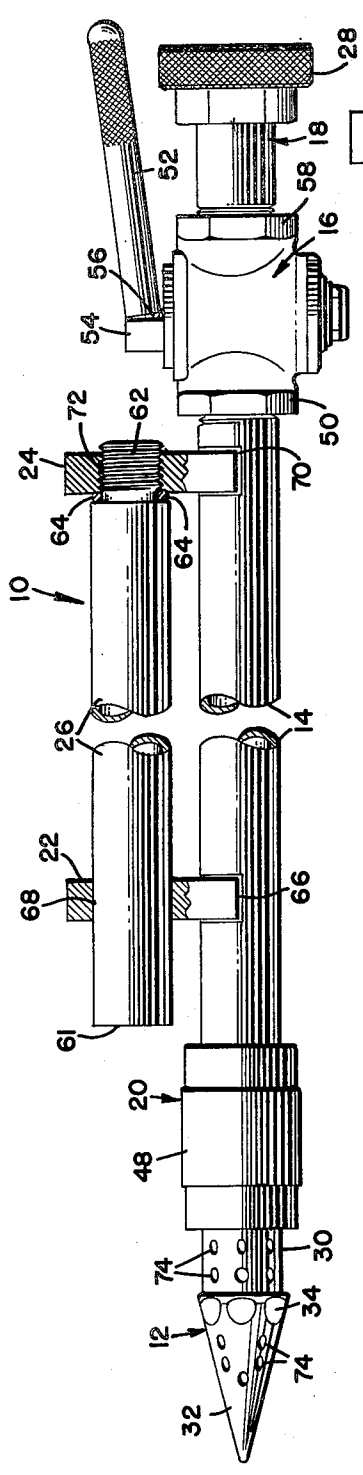


FIG. 1

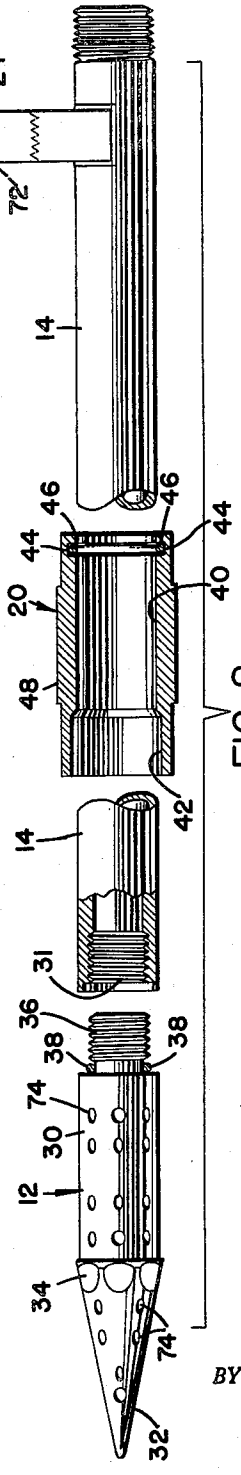


FIG. 2

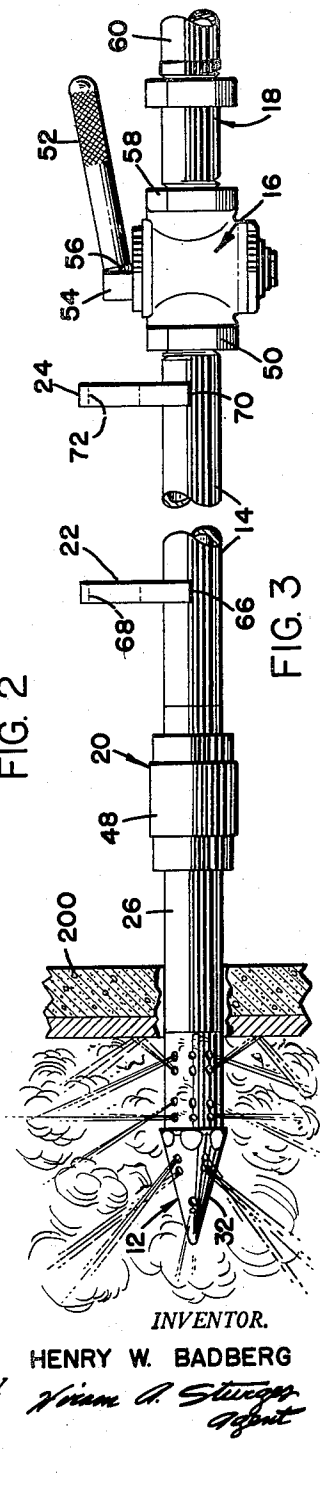


FIG. 3

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FOG FIRE NOZZLE

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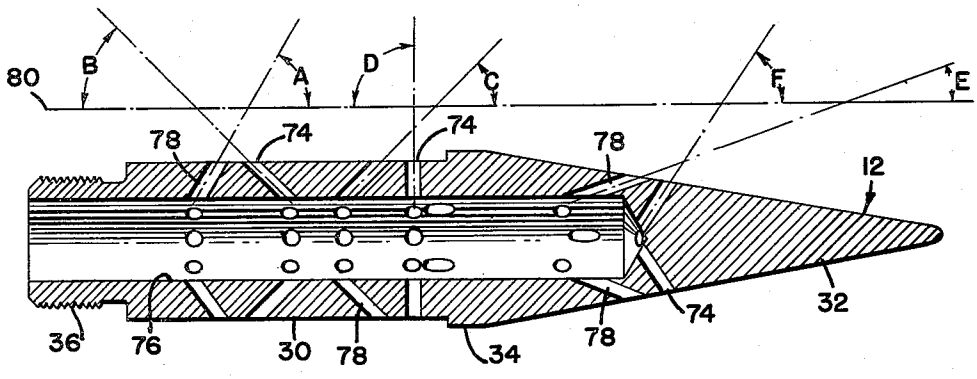


FIG. 5

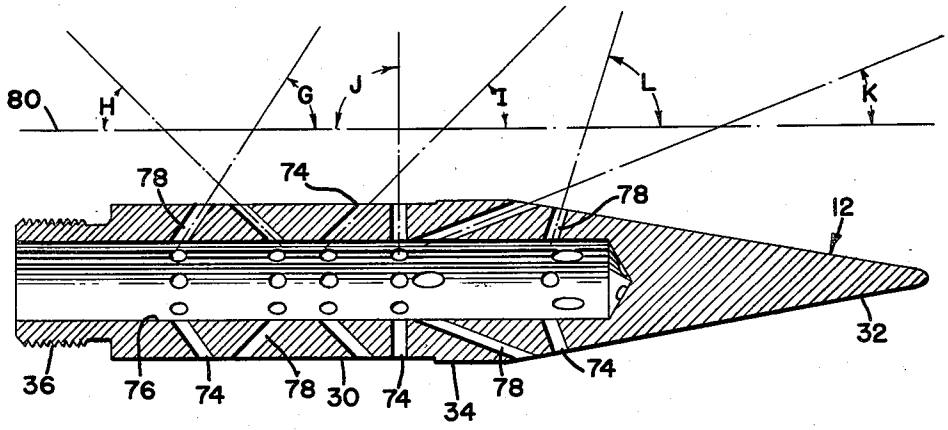


FIG. 6

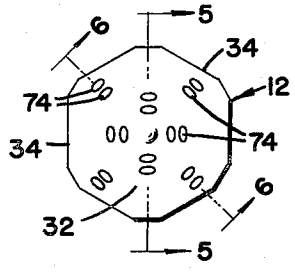


FIG. 4

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FOG FIRE NOZZLE

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1 Claim. (Cl. 239—271)

This invention relates to fire fighting nozzles adapted for use in combination with a fire hose or the like and more particularly to a fog producing nozzle.

A primary object of this invention is to provide a fog nozzle of the type described capable of penetrating walls, ceilings, floors, doors and the like to place the water fog closer to the fire for more effectively combating the fire.

A further object is to provide a fire fighting fog nozzle having a particular water outlet passage arrangement for providing a more effective fog pattern.

Another object is to provide a fog nozzle having, in combination, adjustable means whereby the operator may selectively control and direct the fog pattern.

Yet another object of the present invention is to provide a fog nozzle of the character described readily capable of being extended in length as the situation demands.

Still another object is to provide a fire fighting fog nozzle especially useful on enclosed fires such as fires in haystacks, rubbish piles, coal piles and other such compacted materials.

Another object of the present invention is to provide a fog nozzle of the character described which is economical of manufacture, simple and efficient in operation and of rugged and durable construction.

Other and further objects and advantages of the invention will be understood from the following detailed description thereof.

FIG. 1 is a side elevational view of the assembled fog fire nozzle of this invention with some parts broken away and other parts shown in section for clarity of illustration;

FIG. 2 is an exploded side view of the component parts of the invention;

FIG. 3 is a side view on a reduced scale of the assembled nozzle in an extended operating position as attached to a fire hose and with the head penetrating a building wall, some parts being broken away for clarity of illustration;

FIG. 4 is a front elevational view on an enlarged scale of the head of the nozzle;

FIG. 5 is a longitudinal cross sectional view on an enlarged scale of the head taken along the line 5—5 of FIG. 4; and

FIG. 6 is a longitudinal cross sectional view on an enlarged scale of the head taken along the line 6—6 of FIG. 4.

While one embodiment of the invention is illustrated in the above-referred-to drawings, it is to be understood that they are merely for the purpose of illustration and that various changes in construction may be resorted to in the course of manufacture in order that the invention may be utilized to the best advantage according to circumstances which may arise, without in any manner departing from the spirit and intention of the device, which is to be limited only in accordance with the appended claims. And while there is stated the primary field of utility of the invention, it remains obvious that it may be employed in any other capacity wherein it may be found applicable.

The fog nozzle 10 of this invention generally comprises a head 12 positioned at the forward end of an elongated tubular shaft or tube 14, a shut-off valve 16 having its outlet side threadedly secured at the rearward end of the

shaft 14, coupling 18 extended from the inlet side of the valve 16, a baffle sleeve 20 disposed about the forward end of the tube 14 and adapted to be slidably positioned therealong, brackets 22 and 24 extending from the tube 14 for supporting an auxiliary tubular shaft or tube 26 which later may be employed to extend the length of the nozzle assembly at desired times and a reducer coupling 28 which may be threaded into the coupling 18 at desired times to connect the nozzle to a conduit of larger diameter.

The head 12 has a cylindrical body portion 30 and a spear point 32 of conical shape formed integral with and extended from the forward end of the body portion 30.

The base 34 of the point 32 is of larger diameter than that of the body portion 30 and the peripheral surface of the base portion 34 is formed with flattened surfaces and appears in hexagonal shape in cross section or in front view as best seen in FIG. 4 for accepting a wrench thereon.

A threaded stem or nipple 36 of reduced diameter extends from the rear end of the body portion 30 and is secured in the internally threaded forward end 31 of the tubular tube 14.

An O-ring gasket 38 is disposed about the stem 36 and positioned between the opposed vertical faces of the rear end of the body portion 30 and the forward end of the tube 14 to provide a water tight seal upon tightening the connection between the head and tube.

The baffle sleeve 20 is of substantially a hollow cylindrical shape having a first bore 40 of a diameter complemental to the outer diameter of the shaft 14 and a second bore 42 of greater diameter and of substantial length extending inwardly from the forward end of the sleeve 20.

The second bore 42 is of sufficient diameter greater than the base 34 of the point 32 of the head 12 so as to freely pass thereover when the sleeve 20 is moved forwardly on the shaft. At this point it will be noted that the outer diameter of both the body portion 30 of the head 12 and the shaft 14 are equal whereby the sleeve 20 may be moved along the shaft from a position rearwardly of the head as shown in FIG. 4 to a position substantially covering the head 12 as shown in FIG. 1 or it can be moved further forwardly about the head whereby the second bore 42 extends beyond the base 34 of the point 32.

An annular recess 44 is provided adjacent the rearward end of the first bore 40. An O-ring gasket 46 is positioned in the recess 44 and engages against the surface of the shaft 14 and provides a watertight seal at the rearward end of the sleeve.

The exterior surface of the sleeve 20 is provided with a raised portion 48 extending thereabout and positioned intermediate the ends of the sleeve 20. The raised portion 48 serves as a hand grip to facilitate sliding of the sleeve along the shaft 14 manually. The surface of the grip may be knurled if desired.

The rearward end of the tubular shaft 14 is exteriorly threaded for connection to the outlet side 50 of the shut-off valve 16. The valve 16 is provided with a hand lever 52 attached to an extended end of a valve stem 54 by welding 56 or the like.

The coupling 18 is secured in the inlet side 58 of the valve 16 and as shown in FIG. 3, through the coupling 18, the nozzle 10 is connected to a fire hose 60.

The auxiliary tubular shaft 26 is of the same diametric dimensions as the shaft 14 and has an interiorly threaded forward end 61 similar to the forward end of the shaft 14 as disclosed in FIG. 2.

The rearward end of the auxiliary shaft **26** has a reduced threaded stem **62** adapted to be received in the forward end of the shaft **14** at desired times.

The stem **62** has an O-ring gasket **64** positioned thereon providing a watertight seal between the facing surfaces of the respective ends of the shafts at times when they are joined.

When not in use, the auxiliary shaft **26** is held in storage position parallel to and spaced from the shaft **14**, being supported in the brackets **22** and **24**.

The brackets **22** and **24** are in the form of lugs or ears and the forwardmost bracket **22** is positioned on the shaft **14** at a point spaced rearwardly of the forward end of the shaft **14** and at a distance from the end to allow clearance for sufficient forward and rearward movement of the baffle sleeve **20** over or away from the head **12**.

The bracket **22** extends outwardly from the shaft **14** at a right angle thereto and its lower end is secured to the surface of the shaft **14** by welding **66**.

The bracket **22** further has an aperture **68** extending through the outer end thereof which is of a diameter complemental to the outside diameter of the shaft **26**.

The rearward bracket **24** is fixed to the shaft **14** in a manner similar to the forward bracket **22** and is secured to the shaft by welding **70** and at a point adjacent the threaded rearward end of the shaft **14**.

The bracket **24** is also provided with an aperture **72** axially aligned with aperture **68** in the forward bracket **22**. However, the aperture **72** is interiorly threaded and of a size to threadedly receive the stem **62** at the rear end of the auxiliary shaft **26**.

Therefore to place the auxiliary shaft **26** in storage position the shaft is passed, stem first, through the aperture **68** in the forward bracket **22** and moved rearwardly so that the stem **62** may be threadedly engaged in the aperture **72** of the rearward bracket **24**.

It will be seen that the head has a plurality of regularly spaced outlets **74** opening upon the surface thereof. With particular reference to FIGURES 4, 5 and 6 wherein the interior construction of the head is shown in detail, it will be seen that the head has a central bore **76** opening upon the rearward end thereof and its forward end terminating at a point interiorly of the point **32**. The bore **76** is of a diameter complemental to the inside diameters of either of the tubular shafts **14** or **26**.

The outlets **74** provide communication from the bore **76** to the exterior through passageways **78** which later are disposed at various angles.

The passageways can be separated into two distinct patterns or sets, one pattern being shown in FIG. 5 and the other pattern being shown in FIG. 6.

The passageways **78** of each pattern extend radially outwardly of the bore **76** at equally spaced distances therearound.

Each set of passageways **78** are staggered at a 45° angle from the axis of the bore **78** whereby each pattern is repeated four times.

The particular passageway patterns are important to the extent that they provide an improved fog producing nozzle. Water under pressure enters the bore **78** and is forced outwardly of the passages in small streams. The passageways are so inclined as to cause the intersection of the streams at points spaced from the surface of the head to further atomize the water producing a more effective and heat absorbent fog. The angles of the passageways are indicated in FIGURES 5 and 6 wherein the longitudinal centerline of the bore **76** is represented by line **80**.

The passageway angles that I have found to be most effective are as follows, beginning with those disposed adjacent the rear end of the head and moving forwardly: A, forwardly at 45°; B, rearwardly at 45°; C, forwardly at 45°; D, outwardly at 90°; E, forwardly at 20°; F, forwardly at 55°; and in the second pattern shown in FIGURE 6, G, forwardly at 55°; H, rearwardly at 45°; I, forwardly at 45°; J, outwardly at 90°; K, forwardly at 20°; and L, forwardly at 70°.

It is to be understood that each of the opposed passageways of each pattern are disposed in the respective angles indicated.

The nozzle is shown assembled for operation in FIG. 3 with a fire hose or other suitable fluid supply line **60** connected to the coupling **18** of the nozzle. The valve lever **52** may then be actuated to pass fluid through the valve **16** into the tubular shafts **14** and **26** and out the passageways in the head **12**. As shown, the head **12** has been manually driven through a wall or the like **200** such action facilitated by the conical shaped point **32**, the fog being dispersed into the fire area which at times is concentrated between the outer and inner walls or the ceiling and roof of a building or the like.

In FIG. 3, the device is shown fully extended; that is, the auxiliary tubular shaft has been inserted between the forward end of shaft **14** and the head **12**. If the extended length is not desired the valve may be shut down whereupon the head **12** may be unscrewed from the forward end of the auxiliary shaft **26**, and the auxiliary shaft **26** unscrewed from the forward end of the shaft **14** whereby the head may then be screwed into the end of the shaft **14**.

The auxiliary shaft **26** may then be passed through the aperture **68** in the forward storage bracket **22** of the main shaft **14** and its threaded end **62** screwed into the threaded aperture **72** of the rearward bracket **24** thereby locking it in its storage position preventing its loss and placing it in position for immediate use if extended length is required.

In the operation shown in FIG. 3, the baffle sleeve **20** is not employed. However, in use of the nozzle on open or accessible fires and the like the sleeve **20** may be manually moved along the shaft **14** or **26** and over the body portion of the head to provide forward directional control of the spray and fog. It is to be understood that the sleeve can be moved forward sufficiently to allow the forward or second bore **42** thereof to pass over the base **34** of the point **32** and cover a substantial area about the point **32** of the head **12** to produce a substantially concentrated stream.

From the foregoing specification, it will become apparent that the invention disclosed will adequately accomplish the functions for which it has been designed and in an economical manner, and that its simplicity, accuracy, and ease of operation are such as to provide a relatively inexpensive device, considering what it will accomplish, and that it will find an important place in the art to which it appertains when once placed on the market.

It is thought that persons skilled in the art to which the invention relates will be able to obtain a clear understanding of the invention after considering the description in connection with the drawings. Therefore a more lengthy description is regarded as unnecessary.

Changes in shape, size and arrangement of details and parts such as come within the purview of the invention claimed may be resorted to in actual practice, if desired.

I claim:

In a fog producing fire hose nozzle, the combination which comprises an elongated tube, said tube being threaded externally on one end and internally in the opposite end, a sleeve slidably mounted on the tube, and a head including a perforated cylindrical body with an elongated perforated cone extended from one end and a threaded nipple extended from the opposite end, and formed to be received in the internally threaded end of said elongated tube, said sleeve being positioned whereby one end thereof provides a cover for some of the perforations of the cylindrical body, the perforations of the cylindrical body and cone being radially disposed and positioned in pairs, and the perforations of the pairs being inclined longitudinally whereby water sprayed from

one perforation of a pair impinges upon water sprayed from the other perforation of the pair atomizing the water and producing fog.

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