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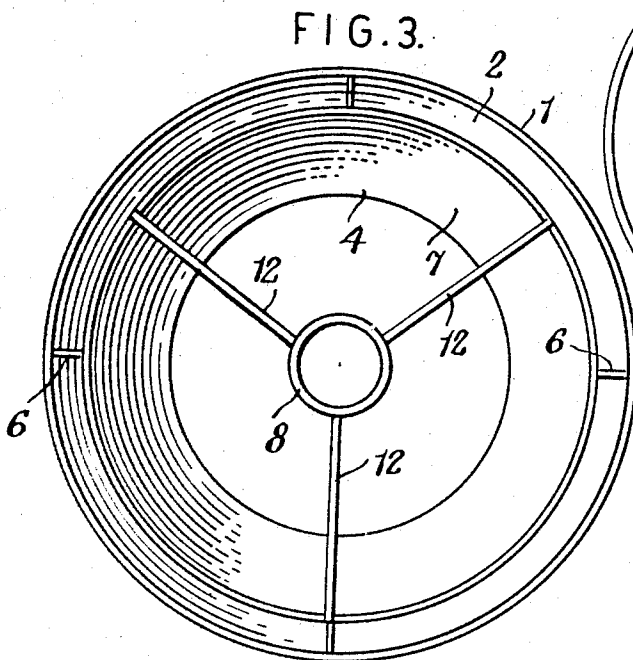
N. C. HOUT

3,446,285

FOAM DEVICES FOR FOG NOZZLES

Filed Aug. 7, 1967

Sheet 1 of 2



INVENTOR.
Norman C. Hout
BY *Erwin A. Grogg*
Attorney

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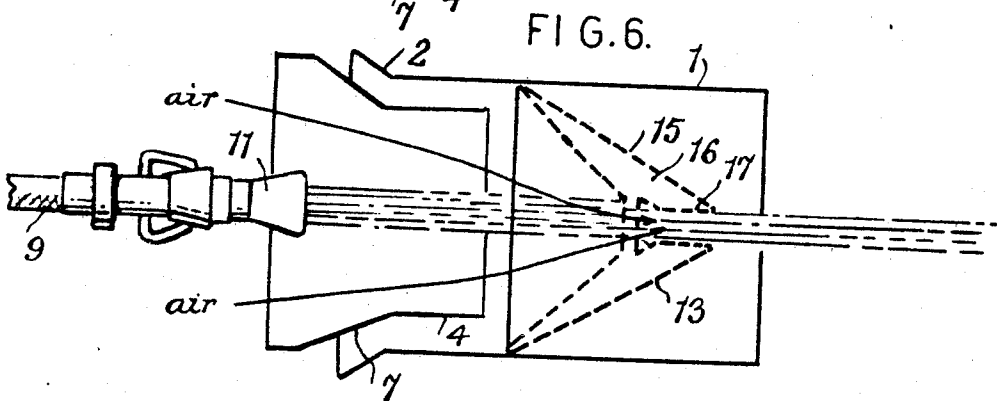
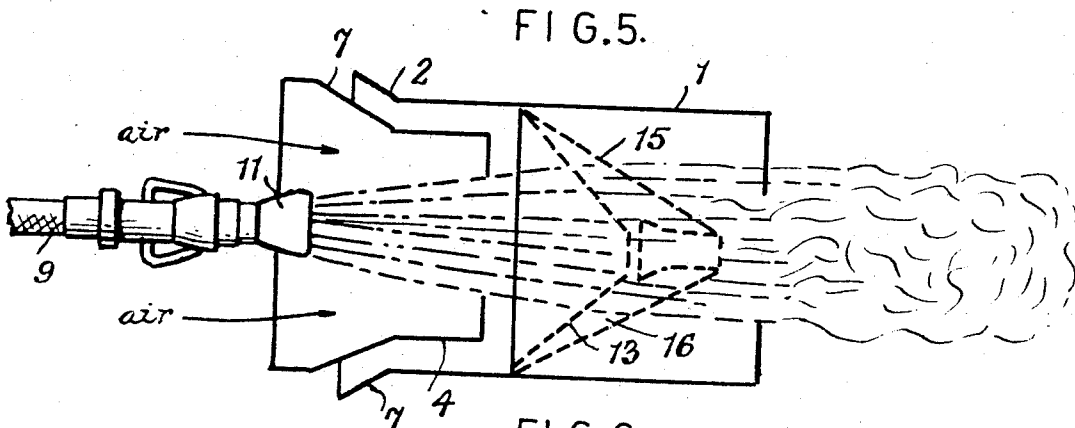
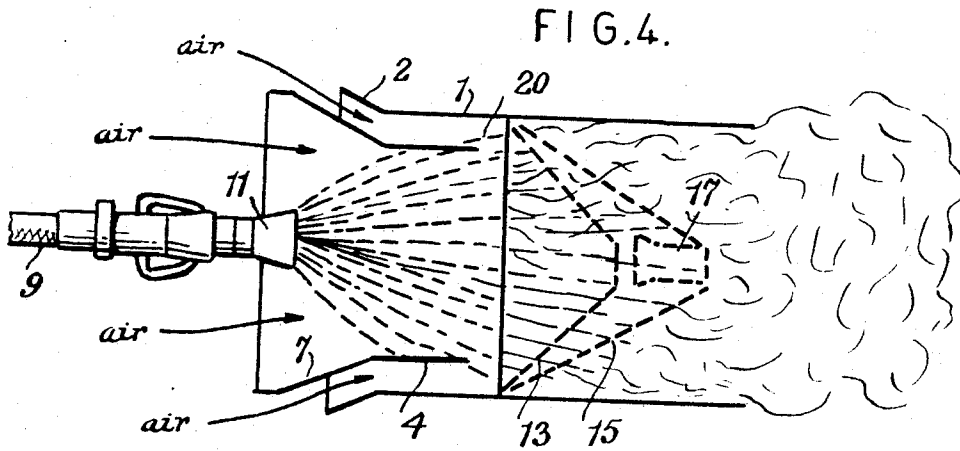
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Sheet 2 of 2



INVENTOR.
Norman C. Hout
BY *Erwin G. Geyer*
Attorney

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3,446,285
FOAM DEVICES FOR FOG NOZZLES
Norman C. Hout, 4841 NW. 10th Terrace,
Fort Lauderdale, Fla. 33309
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7 Claims

ABSTRACT OF THE DISCLOSURE

An attachment for fog nozzles of the character employed by firemen comprising, a pair of concentric tubes or sleeves disposed in spaced relation, the innermost tube or sleeve being shaped to form a primary Venturi passage; the spacing between the two tubes constituting a secondary Venturi passage. A coupling for a hose and an attachment for a fog nozzle is located centrally and at the mouth of the innermost tube. The outermost tube has a portion projecting beyond an end of the innermost tube and said portion of the outermost tube contains nested, concentric frusto-conical foraminous screens of different angularity, each of the screens having a central opening, which openings are axially aligned, and one of the screens has a foraminous aerator tube disposed in its central opening and which tube is directed therefrom toward the central opening in the other screen.

The present invention relates to fog nozzle attachments for use in connection with fire hoses and has for one of its objects the provision of a device of this character by means of which substantial variation in the outflow of foam or liquid can be had. It is an object of the invention to provide a device of this character which can provide for straight stream operation in addition to ultra high expansion flow and to secure various other flow effects and reach that are desirable and advantageous under different operating conditions.

With these and other objects to be hereinafter set forth in view, I have devised the arrangement of parts to be described and more particularly pointed out in the claims appended hereto.

In the accompanying drawings, wherein an illustrative embodiment of the invention is disclosed,

FIG. 1 is a longitudinal sectional view of a device constructed according to the invention;

FIG. 2 is a view of the screen unit as seen from the right of FIG. 1;

FIG. 3 is a view of the outer and inner shells or sleeves as seen from the left of FIG. 1 and with the screen unit omitted;

FIGS. 4, 5 and 6 are diagrammatic views showing the operation of the device under different fog nozzle adjustments.

Referring to the drawings, 1 indicates an outer shell or sleeve of tubular form, said shell being provided with a flared end 2 co-operating in the formation of a Venturi passage between it and the inner shell or sleeve shown at 4. The shorter inner sleeve or shell 4 is arranged within and is spaced from the outer shell 1, so that there is an annular spacing 3 between it and the outer shell or sleeve 1. Both of the sleeves 1 and 4 are composed of imperforate material and the outer sleeve or shell is provided on its exterior with a number of handles 5 by means of which it can be conveniently handled and used.

The inner sleeve or shell 4 is supported within the outer sleeve by suitable radial braces 6 or other supports which serve to maintain the two sleeves 1 and 4 in their required spaced and concentric relation. The inner sleeve 4 is flared at one end, as shown at 7 thus providing what is herein referred to as the "primary Venturi opening"

extending through it. The inner sleeve 4 extends beyond the flared end 2 of the outer sleeve and at its opposite end the outer sleeve extends beyond the inner sleeve, thus providing a projecting portion 23.

Arranged centrally of the two sleeves or shells 1 and 4 is a hose coupling 8 to one end of which is attached the hose 9, shown in FIGS. 4 to 6, and said coupling is threaded at 10 to receive a conventional fog nozzle 11. The coupling 8 is supported from the inner sleeve 4 by means of radial braces shown at 12. An in-line foam educator is used in connection with the fog nozzle to introduce foam solution into the water stream before it reaches the unit.

Mounted within the outer sleeve 1 and forwardly of one end of the inner sleeve 4 is a screen unit which primarily consists of a plurality of nested and concentrically arranged foraminous frusto-conical screens and a centrally-arranged foraminous straight-stream aerator. One of the screens, shown at 13 and referred to as the inner cone, is a relatively flat frusto-cone of mesh material having a central opening 14 at its apex. The outer cone shown at 15 is also foraminous or composed of mesh material and is of steeper angularity and because of the difference in angularity between the two cones 13 and 15, annular spacing 16 is provided between these two frusto-conical mesh screens. The interstices of the mesh in the two screens may be of the same size or may be of different size in the two screens. Located at the center or apex of the outer screen 15 is a straight stream mesh tube 17 which is axially aligned with the opening 14 in the inner cone, but physically slightly spaced from the inner cone. The tube 17 has a flared end 18 facing the opening 14, and said tube 17 is located in the spacing 16 between the two cones.

The operation of the device is diagrammatically disclosed in FIGS. 4 to 6 inclusive. In FIG. 4, the foam nozzle 11 has been adjusted for the spreading or flaring action of the emanating fluid 20, and which fluid thus tends to spread upon leaving the inner sleeve or shell 4 to pass through the screen unit and emerge as foam for wide spread or short reach to thereby snuff out an adjacent fire. While the unit is thus operating, air will enter through the primary Venturi passage 4 as indicated by the arrows in FIG. 4 and air will also enter through the secondary passage 3, the siphoning action of the fluid emanating from the foam nozzle aiding in the securing of this effect. With the flow from the foam nozzle 11 adjusted for wide angle fog (approximately 60 degrees or less) the flow of fluid passing through the primary Venturi passage defined by the sleeve 4 and filling the narrower end thereof causes a lower pressure differential at the wider end of the sleeve 4, causing an inrush of air through the primary Venturi and increases the velocity of the solution and air to enter the secondary Venturi passage 3. The velocity of the solution and air passing through the screen 13 causes a rapid air expansion of the foam solution. This expansion and the forward velocity of the mixture through the screen 13 causes a pressure differential at the opening of the secondary Venturi passage 3, causing more air to flow around the outside of the sleeve 4 and through the screens 13 and 15. This added air increases the expansion ratio of the expanded solution flowing through the foam screens.

When longer reach of the foam emanating from the device is required, the operator will adjust his fog nozzle as shown in FIG. 5 to thereby narrow the fog pattern in the throat of the sleeve 4, causing a higher flow velocity through the screens at a reduced expansion ratio on the final discharge. This is shown in FIG. 5 wherein the manner in which air is drawn into the primary Venturi or within the sleeve 4, is disclosed.

For greater reach of the output from the unit, the

operator can alter the fog nozzle pattern to a straight stream substantially as shown in FIG. 5. In the operation of the device in this manner, there is considerably less air flow introduced through the screen unit, 13, 15 and 17, causing a lower expansion ratio of the finally discharged stream. The straight stream aerator tube 17 introduces air into the straight stream of solution flowing through it. To enhance straight stream operation, the foam screens 13 and 15 must have axially aligned central openings of appropriate size to allow the straight stream to pass to the aerator cone.

From the foregoing, it will be apparent that there is herein disclosed a foam attachment which can be employed with various settings or adjustments of a foam nozzle, thus giving the fireman or other user more versatility and selection of different operations, and which is of such efficiency that there is considerable saving in water and foam solution per cubic foot of output, and greater safety of the fireman.

Most fire departments are provided with in-line educators and matching nozzles as standard equipment and can use them in connection with the described device at great saving in the initial purchase cost.

What I claim is:

1. A unit for use in connection with a fog nozzle comprising, a pair of sleeves arranged in concentric, spaced relation to thereby provide an annular spacing between them, the spacing constituting a secondary Venturi passage, the innermost of the sleeves forming a primary Venturi passage through it, mounting means for a fog nozzle at an entrance to the innermost sleeve, a plurality of nested, conical foraminous screens located in the outermost sleeve beyond one end of the innermost sleeve one of the screens having a tubular extension directed toward another of the screens and located between said screens.

2. A unit according to claim 1, wherein the nested foraminous screens are of different angularity and provide for an annular spacing between them, and the outermost screen carrying the tubular extension disposed in said spacing.

3. A unit according to claim 2, wherein said tubular extension is flared at one end and such flared end is situated adjacent to the central portion of the screen.

4. A unit according to claim 1, wherein the screens have axially aligned central openings, and the tubular extension is a foraminous tube carried by one of the screens and directed toward another of the screens and is axially aligned with said central openings.

5. A unit for use in conjunction with a fog nozzle

comprising, a pair of sleeves arranged in concentric spaced relation to provide an annular spacing between them, said spacing constituting a secondary Venturi passage, the innermost of the sleeves forming a primary Venturi passage through it, both of the sleeves being flared at one end, the flared end of the innermost sleeve extending beyond the flared end of the outer sleeve, a hose coupling and a fog nozzle connection located centrally of the innermost sleeve at the entrance end thereof, so that solution from the nozzle will be directed through said innermost sleeve, a pair of nested frusto-conical foraminous screens fitted in the outer sleeve beyond one end of the inner sleeve, the screens having axially aligned central openings, and one of the screens being provided with a centrally located foraminous tube directed toward the central opening in the other tube.

6. A unit according to claim 5, wherein the foraminous tube is attached only to one of the screens and has a flared end directed toward another of the screens and is located near the central opening in said other screen.

7. A unit for use in conjunction with a fog nozzle comprising, a pair of concentric sleeves arranged one within the other and providing spacing between them, each of the sleeves being flared at one end, the flared end of the innermost sleeve extending beyond the flared end of the outer sleeve a fog nozzle connection located centrally of the innermost sleeve beyond the flared end thereof, radial supports extending from the fog nozzle connection to said flared end, the innermost sleeve being shorter in length than the outermost sleeve so that said outermost sleeve has a portion projecting beyond the innermost sleeve remote from the flared ends of the sleeves, a plurality of centrally-apertured conical foraminous screens situated in said projecting portion of the outermost screen, one of the screens having a central tube in its aperture extending axially of the screens and directed toward the central aperture in the other screen.

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M. HENSON WOOD, JR., *Primary Examiner*.

MICHAEL Y. MAR, *Assistant Examiner*.

U.S. Cl. X.R.

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