Feb. 15, 1944.

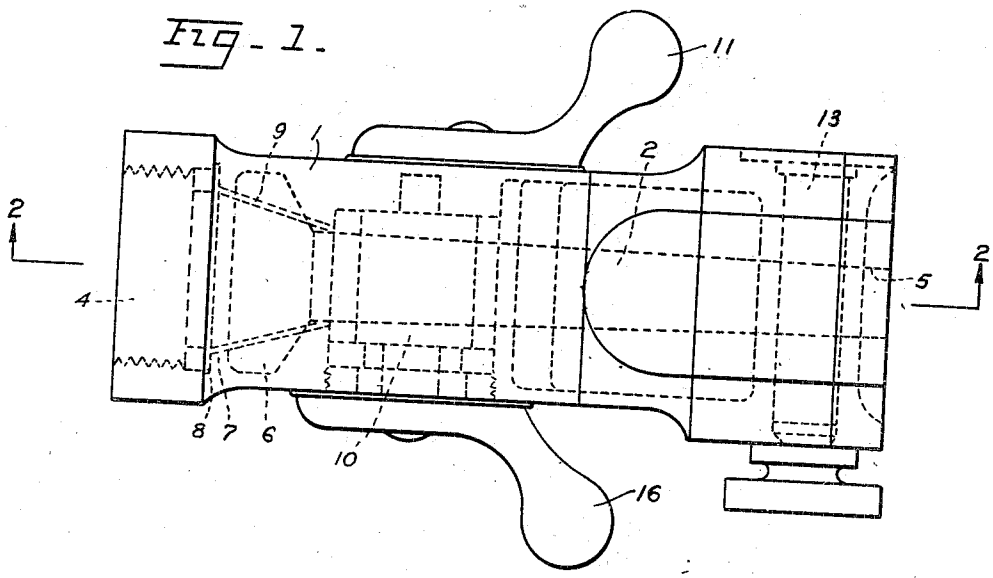
G. F. HURST

2,342,050

FOG STREAM NOZZLE

Filed July 28, 1942

Fig. 1.



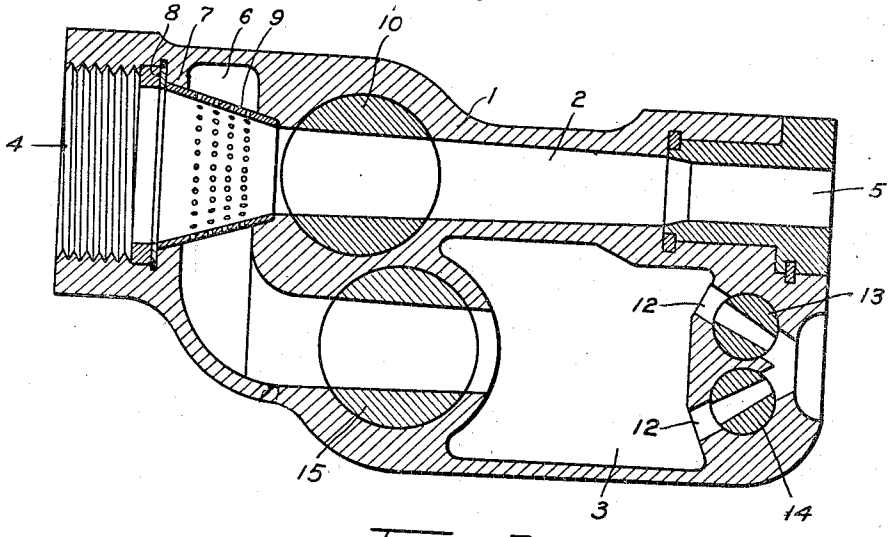


Fig. 2.

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FOG STREAM NOZZLE

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11 Claims. (Cl. 299—144)

This invention relates to a fog stream nozzle, or as it is sometimes called, a fog nozzle.

One of the objects of this invention is the provision of means in a fog nozzle that will enable the operator thereof to maintain the maximum efficiency of the nozzle for producing a fog-like spray irrespective of insoluble material in the fluid or liquid being conducted to the nozzle that would ordinarily impair the efficiency of the nozzle.

Another object is the provision of a nozzle that, when connected with a source of fluid under pressure, has means for maintaining the fog producing discharge aperture or apertures clear of foreign material in the fluid conducted to the nozzle and for ejecting such particles from the nozzle.

A still further object is a fog nozzle provided with a discharge aperture or apertures for ejection of a fluid therefrom, and which nozzle has a screen therein for obstructing the passage of foreign solids of predetermined size to such aperture or apertures, and which screen is so arranged in the nozzle as to be capable of being cleared of such solids by fluid passing through the nozzle without dismantling the nozzle or any part thereof and without moving the screen or creating a trap or eddy space where impurities might lodge or be retained in the nozzle.

Other objects and advantages will appear in the description.

The fog producing discharge aperture or apertures in a fog nozzle are necessarily relatively small, since the fluid, such as water for example, is broken up to fog-like form at or adjacent such apertures. Since one of the principal uses of a fog nozzle is in fighting fires, it is obvious that failure of the nozzle to produce the desired fog-like spray may well result in destruction of the property that would otherwise be saved.

With my invention, the nozzle may be quickly and thoroughly cleared of impurities that would impair the efficiency of the fog creating function of the nozzle before the impurities reach the fog producing discharge apertures, and the nozzle also provides means for ejecting a solid stream of water or fluid when such stream is needed. This result of maintaining the fog producing apertures clear of impurities is accomplished by a stationary compact screen of perforated metal or wire mesh, having a relatively large capacity to pass fluid through the openings so as to produce the proper fog stream, and which screen may be quickly cleaned of impurities by a momentary ejection of the fluid from the nozzle through another aperture or discharge opening than the fog producing aperture or apertures, and the impurities are ejected from the screen and nozzle through such other aperture. This result is accomplished by structure that is simple, economical to make, compact and reliable.

Fig. 1 is an elevational view of the nozzle.

Fig. 2 is a sectional view taken along line 2—2 of Fig. 1.

In detail, the nozzle illustrated in the drawing comprises an elongated body 1, which may be a casting, and which body is provided with a pair of separate passageways 2, 3 therein, extending longitudinally thereof. For convenience of description, the passageway 2 will be called the upper passageway, and passageway 3 will be called the lower passageway since this is their relation as shown in Fig. 2, although it is to be understood that this relationship is not essential to the accomplishment of the desired results. In actual use the position of the passageways may be reversed from that shown in the drawing or they may both be in any plane between horizontal and vertical.

The upper passageway 2 has a co-axial interiorly threaded inlet opening 4 at one end and a co-axial discharge opening 5 at the other end. Adjacent the inlet opening a portion of the passageway is enlarged to provide a substantially annular portion which constitutes a chamber 6 between the inlet opening 4 and the passageway 2, communicating inter-axially with both.

A radially, inwardly projecting, annular flange 7 is formed in body 1 at the juncture between chamber 6 and inlet 4 and forms one side of said chamber. The side of flange 7 that faces into said threaded inlet 4 provides an abutment for a radially outwardly projecting flange 8 that is formed on the larger diameter end of a frusto-conical screen 9, and which screen extends across the open side of channel 6.

The smaller diameter end of screen 9 fits into an annular recess formed by a tapered enlargement in the end of passageway 2 adjacent chamber 6. Thus it is seen that the inner sides of screen 9 extend convergently from inlet 4 through chamber 6 to passageway 2.

A plug valve 10 is provided in body 1 and extends across the upper passageway 2 adjacent chamber 6. This valve has a handle 11 projecting from one side of body 1 for manually turning the valve from a position closing passageway 2 to flow of fluid therethrough to a position opening said passageway and vise versa.

The lower passageway 3 communicates at one end with the chamber 6 at a point spaced radially

outwardly of screen 9, and the opposite end of said passageway 3 communicates with the inner, spaced ends of one or more pairs of relatively small diameter, outwardly converging fog-spray discharge passageways 12.

While rotary plug members 13, 14 are indicated in the drawing extending across passageways 12, and respectively provided with transverse openings coaxial with passageways 12, it is to be understood that insofar as this invention is concerned, the said members may be integral with body 1 and in the description and claims the passageways 12 include the openings in the members 13, 14 as portions of said passageways.

The passageways 12 are arranged so that the paths of streams of water or fluid passing therethrough will intercept at a point relatively close to the body 1 and adjacent the convergent ends of said passageways to produce the fog-like spray.

Adjacent the chamber 6 a plug valve 15 is provided in passageway 3. This valve is mounted in body 1 for rotation to open and close passageway 3 to flow of fluid therethrough from the chamber 6 upon manual manipulation of handle 16 on said valve. Handle 16 projects from the side of body 1 opposite the handle 11 on valve 10.

In operation, assuming the inlet 4 is connected with a fluid pressure line and valve 10 is closed while valve 15 is open, the fluid will pass through the perforations in screen 9 and into chamber 6, and from chamber 6 into passageway 3 for ejection through the discharge apertures 12. Any material in the fluid that would tend to block up passageways 12 is caught by the tubular screen 9, and never passes to said passageways 12. As soon as it is apparent that the fog stream is impaired by material caught by the screen, the operator merely momentarily opens valve 10, and as inlet 4, screen 9 and passageway 2 are coaxial, the fluid will all tend to be discharged from passageway 2, which is of sufficiently large diameter to freely conduct the foreign material therethrough. The angular relation between the inner sides of screen 9 on which the foreign matter collects and the axis of the screen is such that the dynamic pressure of the fluid moving axially through the tubular screen and into passageway 2 will forcibly remove any matter that might tend to stick in the perforations of the screen. It is obvious, of course, that a stronger cleaning action can be produced by merely closing valve 15 when valve 10 is opened, to thereby cause all of the fluid entering inlet 4 to be passed axially through screen 9 and passageway 2.

By manipulation of valves 10, 15, the operator may eject a full solid stream from passageway 2, or a combination of a fog stream and a solid stream as desired.

While I have shown a particular arrangement of passageways 12 for producing a fog stream, it is to be understood that any desired type of fog creating discharge apertures may be used. Also, while screen 9 is preferably of generally frustoconical form as illustrated, it may be cylindrical.

The inside diameter of inlet 4 is slightly greater than the outside diameter of flange 8 on screen 6, making it easy to remove screen 9 upon uncoupling the inlet from the source of fluid to be ejected from the nozzle. Thus, any desired mesh screen may be quickly positioned in the body 1 or replacement of damaged screens may be as easily effected.

Having described my invention, I claim:

1. A nozzle of the character described, comprising a body provided with an inlet opening in one end, a tubular screen and a first passageway in end-to-end coaxial alignment with said screen positioned between said inlet and said passageway and with the end of said passageway remote from said screen opening outwardly of said body; a second passageway in said body offset to one side only of said first passageway provided with a fog producing discharge aperture opening outwardly of the body at one of its ends and the opposite end thereof communicating with the outer sides of said screen; valve means in said first passageway operable for closing said first passageway to thereby cause fluid entering said inlet to pass through said screen to said second passageway for ejection from the latter.

2. A nozzle of the character described, comprising a body provided therein with an inlet opening in one end, a tubular screen, and a first passageway in end-to-end coaxial alignment with said screen positioned between said inlet and said passageway and with the end of said passageway remote from said screen opening outwardly of said body; a chamber formed in said body, the walls of which are spaced radially from said screen; a second passageway in said body provided with a fog producing discharge aperture opening outwardly of the body at one of its ends and the opposite end thereof opening into said chamber; a valve in said first passageway for closing said first passageway to thereby cause fluid entering said inlet to pass through said screen to said second passageway and for opening said first passageway to direct flow of fluid axially through said screen to said first passageway; said screen being of substantially frustoconical shape with its larger diameter end positioned adjacent said inlet and the major portion of said screen that extends between said inlet and said first passageway being unobstructed at all times to passage of fluid therethrough into said chamber.

3. A nozzle of the character described comprising a body provided with an inlet opening in one end, a tubular screen, and a first passageway in end-to-end coaxial alignment with said screen positioned between said inlet and said passageway, and with the end of said passageway remote from said screen opening outwardly of said body; a second passageway in said body provided with a fog producing discharge aperture opening outwardly of the body at one of its ends, and the opposite end thereof communicating with the outer sides of said screen; valve means respectively positioned in said first passageway and in said second passageway for opening and closing either or both passageways to passage of fluid therethrough as desired, the valve means in said first passageway being adapted to cause fluid entering said inlet to pass through said screen to said second passageway for discharge from said discharge aperture when the valve means in said first passageway is closed and the valve means in said second passageway is open.

4. A nozzle of the character described, comprising an elongated body provided with an inlet at one end, a tubular screen, and a first passageway in end-to-end coaxial relation disposed longitudinally of said body with said screen disposed between said inlet and said passageway and with one end of said passageway opening outwardly of the opposite end of said body; a second passageway in said body offset to one side only of said first passageway and extending substantially parallel with said first passageway, provided with a fog producing discharge aperture opening out-

wardly of said opposite end of said body; said screen being spaced at its sides from the material of said body and the end of said second passageway opposite its fog producing aperture, opening into the space around said screen; valve means carried by said body for controlling the flow of fluid entering said inlet to one or the other of said first and second passageways as desired, and the ends of said screen being in direct substantially sealing relation with the walls of said inlet and said first passageway whereby the only access of fluid to said second passageway from said inlet is through the perforations in said screen.

5. A nozzle of the character described, comprising a body formed with an inlet opening for fluid in one end thereof; a tubular open-ended, screen spaced within said body in coaxial alignment with said inlet and with one of its ends secured in said inlet; a chamber at one side of the latter formed in said body enclosing said screen with its walls spaced therefrom around the sides of the screen; a passageway communicating at one of its ends with said chamber and provided at its opposite end with a fog producing discharge aperture opening outwardly of said body; means for opening and closing said screen to flow of fluid from said inlet axially therethrough and radially thereof through its perforations as desired, said means including a valved conduit opening at one end at all times directly into the open-end of said screen opposite said inlet opening.

6. In a construction as defined in claim 5, said screen being of generally frusto-conical shape with its larger diameter end in said inlet, and said inlet opening being of a diameter greater than the largest diameter of said screen whereby the latter is removable from within said chamber through said inlet opening.

7. A nozzle of the character described, comprising an elongated body having therein an open-ended, through conduit extending longitudinally therethrough from end to end thereof; a section of the walls of said conduit spaced from its ends being perforated; a passageway formed in said body communicating at one of its ends with said section and having a fog producing discharge aperture at its opposite end opening outwardly of said body adjacent one of the open ends of said conduit; valve means in such body spaced from said section for closing and opening the portion of such conduit at one end only of said section to passage of fluid therethrough, and the portion of said conduit at the other end of said screen being threaded for connection with the fitting of a fluid pressure line, said perforated section being of progressively smaller diameter from the end thereof adjacent said last mentioned threaded portion of said conduit toward the other portion of said conduit, and said other portion of said conduit being of a diameter about equal to the smallest diameter of said perforated section.

8. A fog nozzle provided with a fog producing discharge aperture at one end, a passageway therethrough communicating with said aperture at one of its ends, and an inlet opening in the opposite end of said nozzle in communication with the other end of said passageway; a screen in said body interposed between said inlet and said aperture adapted to pass a liquid from said inlet at right angles to said screen and in one direction through its perforations for passage thereof to said aperture; said screen being positioned with its sides extending generally in the same direction as the axis of said opening, and means including a valved passageway having its inner end connected in co-axial alignment with one end of the said screen, the other end of said screen being co-axially connected to the said inlet whereby liquid passing from said inlet to said valved passageway will flow over the walls of said screen substantially parallel with the latter for clearing foreign material from said walls, the adjacent connected ends of said valved passageway and said screen being of substantially the same diameter.

9. A nozzle of the character described comprising an elongated body having a pair of substantially parallel passageways therein opening outwardly of one end of said body at one of their corresponding ends providing for discharge openings at said one end; an inlet opening formed in the opposite end of said body co-axial with one passageway of said pair; a portion of said one passageway adjacent said inlet being enlarged to provide a substantially annular chamber between said inlet opening and said one passageway communicating inter-axially between said pair of passageways; a frusto-conical screen co-axial with said inlet opening connected with the sides thereof at its larger diameter end and connected with the adjacent end of said one passageway at its smaller diameter end; the outer sides of said screen between its ends being fully exposed to define the radially inner wall of said annular chamber, and the adjacent ends of said screen and said one passageway being of substantially the same diameter for unobstructed flow of fluid from said screen into said latter passageway.

10. A nozzle of the character described comprising an elongated body having a pair of substantially parallel passageways therein opening outwardly of one end of said body at one of their corresponding ends providing for discharge openings at said one end; an inlet opening formed in the opposite end of said body co-axial with one passageway of said pair; a portion of said one passageway adjacent said inlet being enlarged to provide a substantially annular chamber between said inlet opening and said one passageway communicating inter-axially between said pair of passageways; a frusto-conical screen co-axial with said inlet opening connected with the sides thereof at its larger diameter end and connected with the adjacent end of said one passageway at its smaller diameter end; the outer sides of said screen between its ends being fully exposed to define the radially inner wall of said annular chamber, and the adjacent ends of said screen and said one passageway being of substantially the same diameter for unobstructed flow of fluid from said screen into said latter passageway, a pair of valves respectively positioned in said passageways and actuatable independently of each other for opening and closing either or both of said passageways to flow of fluid therethrough as desired.

11. A nozzle of the character described comprising an elongated body having a pair of substantially parallel passageways therein opening outwardly of one end of said body at one of their corresponding ends providing for discharge openings at said one end; an inlet opening formed in the opposite end of said body co-axial with one passageway of said pair; a portion of said one passageway adjacent said inlet being enlarged to provide a substantially annular chamber between said inlet opening and said one passageway communicating inter-axially between said pair of passageways; a frusto-conical screen co-axial with said inlet opening connected with the sides there-

of at its larger diameter end and connected with the adjacent end of said one passageway at its smaller diameter end; the outer sides of said screen between its ends being fully exposed to define the radially inner wall of said annular chamber, and the adjacent ends of said screen and said one passageway being of substantially the same diameter for unobstructed flow of fluid from said screen into said latter passageway, the inner sides of said inlet opening being threaded outwardly of the end of the screen that is connected with said inlet for threadedly securing a threaded fitting of a fluid pressure line therein, and for securing said screen stationary between such fitting and the end of the passageway that is connected with the smaller diameter end of said screen.

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