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SPRAY NOZZLE WITH FLAT FAN PATTERN

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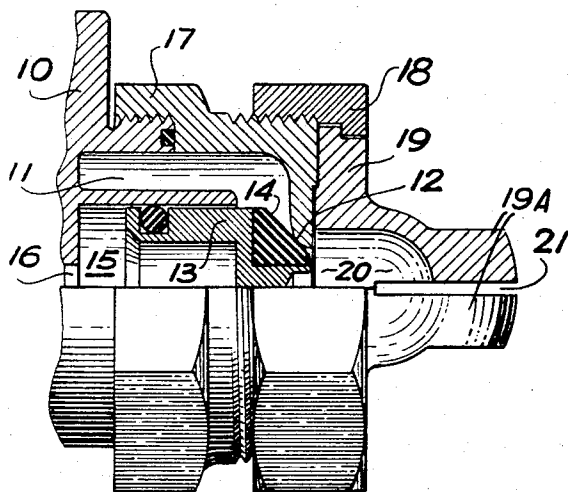


Fig. 1

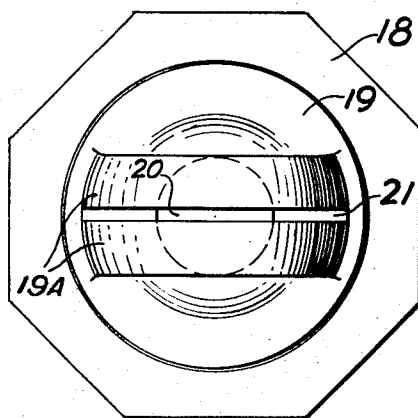


Fig. 2

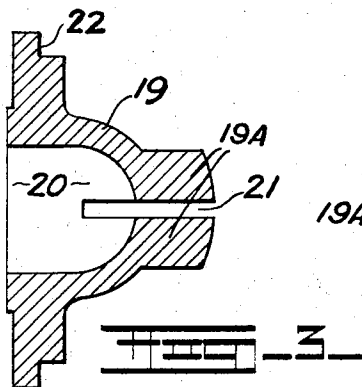


Fig. 3

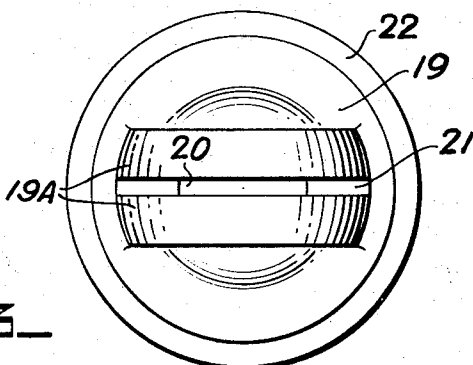


Fig. 4

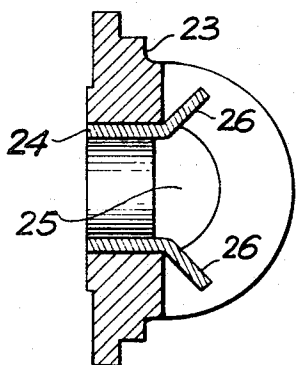


Fig. 5

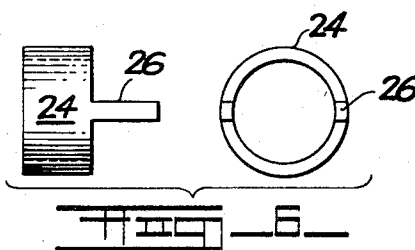


Fig. 6

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SPRAY NOZZLE WITH FLAT FAN PATTERN

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ABSTRACT OF THE DISCLOSURE

A spray nozzle having a flat fan pattern formed by a dome shaped body having a narrow slot defined by walls of relatively great uniform thickness.

This invention relates to a spray nozzle and more particularly to a spray nozzle for fire extinguishing fluids and the like and incorporating a novel orifice disc arranged to direct the fluid in a flat fan pattern.

The principal object of the invention is the provision of a nozzle arranged to provide a horizontal flat fan pattern discharge so as to deliver fluid uniformly throughout the area of said flat fan pattern.

A further object of the invention is the provision of a spray nozzle that is advantageously combined with a pilot operated valve so that instantaneous delivery of fire extinguishing fluid in a desired flat fan pattern over a predetermined area may be achieved.

A still further object of the invention is the provision of a spray nozzle that is relatively simple in construction and capable of economic and rapid manufacture.

A still further object of the invention is the provision of a spray nozzle that is arranged to permit adjustments of the width of the flat fan pattern of fluid discharged therefrom.

The spray nozzle disclosed herein comprises an improvement in the art relating to devices for spraying liquids and the like and particularly fire extinguishing fluids in automatic sprinkler systems. In the fire protection industry it has heretofore been common to utilize sprinklers to discharge the fire extinguishing fluid in a circular pattern and about the sprinkler itself and attempts have been made to direct the pattern of the fluid discharged by the sprinkler in particular areas for specific purposes. The present invention relates to an improvement in fluid directing and controlling nozzles in that a highly desirable flat fan pattern of fluid discharged from the nozzle is realized and the discharge limited to a segment of a circle for example, 90°. A preferred form of the invention and a modified form are illustrated and described. The device disclosed herein is particularly useful in controlling combustion temperatures in missile storage areas where relatively narrow horizontal spaces exist between horizontal stored missiles and the like.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination arrangement of parts and in the details of construction hereinafter described and claimed, it being the invention to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, where do not constitute departures from the spirit and scope of the invention.

The invention is illustrated in the accompanying drawing, wherein:

FIGURE 1 is a side elevation of a portion of a nozzle with parts broken away and parts in cross section including a valve and a fan pattern discharge orifice.

FIGURE 2 is a front elevation of the device illustrated in FIGURE 1.

FIGURE 3 is a vertical cross section of the nozzle por-

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tion of the device illustrated in FIGURES 1 and 2. FIGURE 4 is a front elevation thereof.

FIGURE 5 is a vertical section through a modification of the device illustrated in FIGURES 1 through 4.

FIGURE 6 is a composite view showing a side and front elevation respectively of an insert forming a part of the modification of FIGURE 5.

By referring to the drawings and FIGURE 1 in particular it will be seen that a valve body 10 has an inlet chamber 11 wherein which communicates by means not shown with an inlet opening which in turn is in communication with a source of fluid, such as a fire extinguishing liquid. An outlet 12 is normally closed by a piston valve 13 provided with an annular tapered gasket 14 registering with the outlet 12. The piston valve 13 is reciprocally mounted in a secondary chamber 15 in the valve body 10 and a separate passageway 16 extends from the secondary chamber 15 exteriorly of the valve body 10 and is adapted to be placed in communication with a source of fluid pressure and a valve actuating line. The valve body 10 is circular in the areas just described and is illustrated as a two part construction wherein a cap like portion 17 extends the chamber 11 and defines the outlet 12.

The cap like portion 17 is in turn circular and provided with an exterior annular thread pattern for receiving a clamping ring 18 which is used to attach an orifice disc body 19 which defines a dome shape cavity 20 in alignment and communication with the outlet 12 the outer surface of the orifice disc body 19 is bulged about the dome shaped cavity 20 and has a thick 180° flange 19A outwardly thereof, the flange 19A has a horizontally disposed flat 180° slot 21 on the axial center line of the device.

By referring now to FIGURES 1 and 2 of the drawings it will be seen that the bulged central portion of the orifice disc body 19 the flange 19A thereon extends forwardly, to the right as seen in FIGURE 1 of the drawings, so that the entire 180° flat thin slot 21 is positioned in the body 19 and flange 19A outwardly of the clamping ring 18 and the remainder of the orifice disc body 19. The arrangement is such that fluid entering the cavity 20 is present in sufficient volume and pressure to create the desirable flat fan pattern discharge when the same moves outwardly through the flat 180° slot 21.

By referring now to FIGURES 3 and 4 of the drawings, a detailed vertical section through the orifice disc body 19 may be seen and it will be observed that it is provided with an offset shoulder 22 to facilitate its ready mounting on the valve body 17.

Those skilled in the art will observe that modifications of the constructions disclosed herein are possible and one such desirable modification is illustrated in FIGURE 5 of the drawing. In FIGURE 5 a modified orifice disc body 23 is disclosed and it will be seen that it is structurally the same as the orifice disc body 19 heretofore referred with the exception that a cylindrical sleeve 24 has been inserted in the area of the orifice disc body 23 defining a cavity 25 therein. The cylindrical sleeve 24 is provided with two oppositely disposed angularly positioned wings 26. It will further be seen that the modified orifice disc body 23 is interchangeable with the disc body 19 heretofore described and that in addition to controlling the effective width of the flat fan pattern the wings 26 may further be altered as, for example, in the field to increase or decrease the particular width of the flat fan pattern as desired.

In FIGURE 6 of the drawings a composite view discloses the cylindrical sleeve 24 and the extending wings 26 thereof and in FIGURE 6 in the side view and front view of the cylindrical sleeve and the wings 26 are shown positioned in spaced parallel relation to one another as the device is formed, it being understood that the wings 26

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will be positioned in an angular relation such as, for example, that illustrated in FIGURE 5 heretofore disclosed when the cylindrical sleeve 24 is positioned in the orifice disc 23. Those skilled in the art will observe that the cylindrical sleeve 24 may be press fit in the orifice discs 23.

It will thus be seen that a flat fan pattern nozzle has been disclosed which is particularly suitable for directing fire extinguishing or fire controlling liquid into narrow areas such as those that exist between plurality of horizontally disposed vertically spaced missiles or the like and wherein it is desirable that the fire extinguishing or fire controlling or cooling liquid be directed into such areas so as to completely penetrate the same and thereby be capable of carrying out its desired purpose.

Having thus disclosed my invention what I claim is:

1. A spray nozzle tip for discharging fluids under pressure formed in the shape of a dome provided with a narrow discharge slot extending 180°, the walls defining said slot having thickened edges in registry, said thickened edges being of uniform width throughout said 180°, a cylindrical member positioned in said dome, spaced wings on one end of said cylindrical member extending into said discharge slot and disposed in angular relation to one another.

2. The spray nozzle tip set forth in claim 1 and wherein said dome includes a cylindrical extension and wherein said cylindrical member is positioned in the said cylindrical extension.

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3. The combination of a pilot operated valve having an orifice on the axial center line thereof and an orifice disc body having a configuration enclosing a cavity extending thereinto from one side thereof, said orifice disc body mounted on said pilot operated valve with said cavity lying on the axial center line of said valve and communicating with said orifice thereof, a portion of said orifice disc body extending outwardly oppositely of said cavity, a narrow transverse slot formed in said outwardly extending portion of said orifice disc body and communicating with said cavity, the walls of said outwardly extending portion defining said slot being thickened and of uniform width, a cylindrical sleeve disposed in said cavity, oppositely disposed angularly positioned wings on one end of said cylindrical sleeve, said wings positioned in said narrow transverse slot and acting to limit the width of the flat fan pattern of said spray nozzle.

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