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FIRE HOSE NOZZLE

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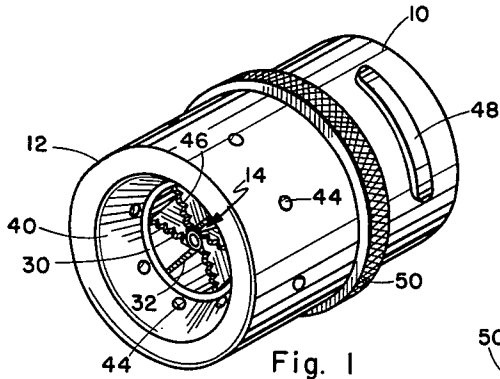


Fig. 1

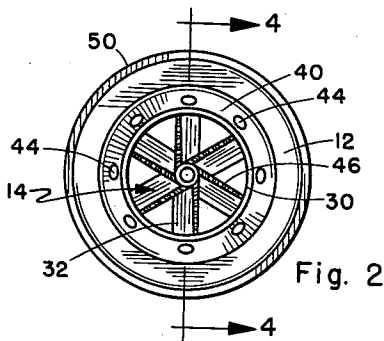


Fig. 2

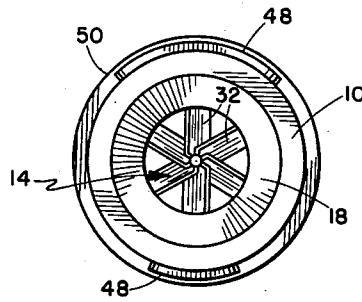


Fig. 3

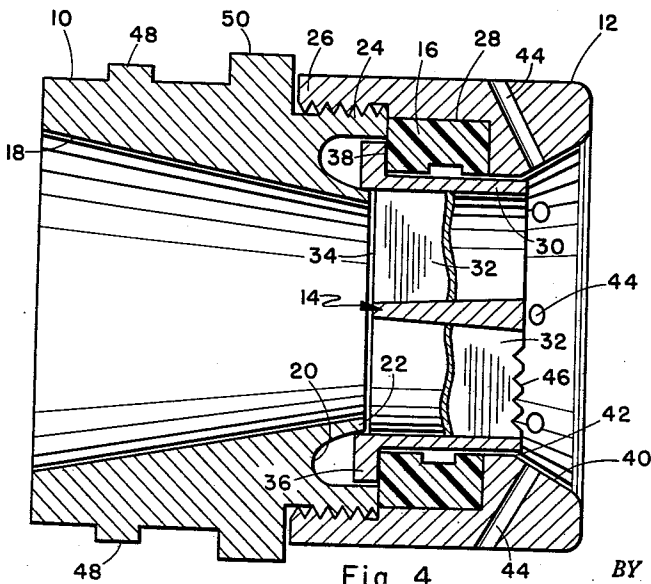


Fig. 4

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1

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FIRE HOSE NOZZLE

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5 Claims. (Cl. 239—383)

The present invention relates generally to nozzles and more particularly to a fire hose nozzle.

The primary object of this invention is to provide a fire hose nozzle having a divergent outlet portion which is perforated so that the stream of water entrains a layer of air between the water and the outlet wall, to reduce friction and prevent turbulence in the stream due to contact with the wall.

Another object of this invention is to provide a fire hose nozzle having a water driven rotor disposed in the nozzle to break up the stream into large droplets, which are very effective in wetting down a larger area than a solid stream and with less tendency to evaporate than a fine mist.

A further object of this invention is to provide a fire hose nozzle constructed to ensure a smooth flow of water and prevent back leakage or undesirable water circulation in the nozzle.

Finally, it is an object to provide a fire hose nozzle of the aforementioned character which is simple and convenient to manufacture and use and which will give generally efficient and durable service.

With these and other objects definitely in view, this invention consists in the novel construction, combination and arrangement of elements and portions, as will be hereinafter fully described in the specification, particularly pointed out in the claims, and illustrated in the drawing which forms a material part of this disclosure, and in which:

FIGURE 1 is a perspective view of the complete nozzle;

FIGURE 2 is a front elevation view thereof;

FIGURE 3 is a rear elevation view thereof; and

FIGURE 4 is an enlarged sectional view taken on the line 4—4 of FIGURE 2.

Similar characters of reference indicate similar or identical elements and portions throughout the specification and throughout the views of the drawing.

The nozzle is composed of only four parts, a barrel 10, a cap 12, a rotor 14 and a bearing collar 16, the rotor being the only movable portion. The barrel 10 is of cylindrical form and has a tapered bore 18 converging in the direction of flow, the forward end face of said barrel having an undercut annular channel 20 leaving a thin, forwardly protruding rim 22 concentric with said bore. The forward end of the barrel 10 has an externally threaded portion 24 on which the internally threaded rear end 26 of the cap 12 is fitted. Inside the cap 12 is a counterbore 28 in which the bearing collar 16 is a press fit, the bearing collar being held tight against the end of the threaded portion 24 when said cap is secured in place.

The rotor 14 comprises a cylindrical sleeve 30 which is a free rotating fit inside the bearing collar 16, the sleeve containing a plurality of generally radial vanes 32 angularly disposed from front to rear, so that the water flow spins the rotor. The rear edges 34 of the vanes 32 are inset, allowing the rotor 14 to seat concentrically on the protruding rim 22, the rear end of the sleeve 30 having a radially outwardly extending thrust flange 36 which rides in the annular channel 20. The bearing collar 16 has a flat rear face 38, against which the thrust flange 36 bears, to retain the rotor 14 against the water pressure. To minimize friction, the bearing collar 16 is preferably made from a plastic material such as nylon or Teflon (trade name), although certain metals may also be suitable.

2

The cap 12 has a tapered outlet 40 diverging from a mouth 42 forwardly of the bearing collar 16, the forward end of the rotor sleeve 30 projecting slightly forwardly of said mouth to prevent leakage of water back into the nozzle. In the outlet 40 are a plurality of circumferentially spaced vents 44 communicating with the exterior of the cap 12, said vents being substantially perpendicular to the diverging wall of said outlet at their inner ends. As a stream of water is ejected from the nozzle, a flow of ambient air is induced through the vents 44 into the outlet 40 and forms a boundary layer between the water and the wall of the outlet. This reduces friction and prevents turbulence in the stream due to breaking over the end of the outlet, so increasing the effective range of the water stream.

In extinguishing a fire it is necessary to cool the burning material over as large an area as possible to stop combustion. A jet of water, as from a conventional nozzle, covers a very limited area, while a fog or mist may be evaporated by an intense fire before reaching the combustion zone. The nozzle described herein provides a divergent stream of large water droplets which have sufficient body to carry to the base of a fire. If additional breaking up of the water stream is required, the forward edges of the vanes 32 may be notched as indicated at 46.

Since the rim 22 extends into the rotor sleeve 30 and the sleeve itself projects into the divergent outlet 40, leakage of water back into the nozzle is prevented and efficiency is increased by the induced air flow through the vents 44 to prevent direct contact of the water on the wall of the outlet. Thus the stream of droplets can be projected substantially as far as a narrow jet of water.

To facilitate its use with conventional fire hose connections, the barrel 10 is provided with the usual locking lugs 48, which fit the well known twist lock connection and a knurled band 50 is formed on said barrel for ease of handling.

The operation of this invention will be clearly comprehended from a consideration of the foregoing description of the mechanical details thereof, taken in connection with the drawing and the above recited objects. It will be obvious that all said objects are amply achieved by this invention.

It is understood that minor variation from the form of the invention disclosed herein may be made without departure from the spirit and scope of the invention, and that the specification and drawing are to be considered as merely illustrative rather than limiting.

I claim:

1. A fire hose nozzle comprising: a cylindrical barrel having a water conducting bore; a cap removably attached to the forward end of said barrel; said cap having a divergent outlet; a bearing collar in said cap concentric with and surrounding said bore; means, comprising a vaned rotor freely rotatably mounted in said bearing collar for converting a stream of water passing through said bore into large drops of water; and means, comprising a plurality of vents in said outlet communicating with the exterior of said cap for admitting air between the wall of said outlet and the flow of water and reducing the friction between said wall and said water.

2. A fire hose nozzle comprising: a cylindrical barrel having a water conducting bore, a cap removably attached to the forward end of said barrel; said cap having a divergent outlet; a bearing collar in said cap concentric with and surrounding said bore; a rotor having a sleeve portion freely rotatable in said bearing collar; a plurality of vanes in said sleeve portion; the rear end of said sleeve portion having a radially extending thrust flange engaging the rear face of said bearing collar; and a plurality of vents in said outlet communicating with the exterior

3

of said cap to produce a film of air between the wall of said outlet and the stream of water.

3. A fire hose nozzle comprising: a cylindrical barrel having a water conducting bore; a cap removably attached to the forward end of said barrel; said cap having a divergent outlet; a bearing collar in said cap concentric with and encircling said bore; a rotor having a sleeve portion freely rotatable in said bearing collar; a plurality of vanes in said sleeve portion; the rear end of said sleeve portion having a radially extending thrust flange engaging the rear face of said bearing collar; the rear edges of said vanes being inset into said sleeve portion, said barrel having a rim at the forward end of said bore; said rim extending into said sleeve portion; and means, comprising a plurality of vents in said outlet communicating with the exterior of said cap, for producing a friction-reducing film of air between the wall of said outlet and the flow of water.

4. A fire hose nozzle comprising: a cylindrical barrel having a water conducting bore; a cap removably attached to the forward end of said barrel; said cap having a divergent outlet; a bearing collar having a cylindrical inner surface positioned in said cap concentric with said bore; a rotor having a cylindrical sleeve portion freely rotatable in the cylindrical portion of said bearing collar; a plurality of vanes positioned in said sleeve portion; the rear end of said sleeve portion having a radially

4

extending thrust flange engaging the rear face of said bearing collar; the rear edges of said vanes being inset into said sleeve portion, said barrel having a rim at the forward end of said bore; said rim extending into said sleeve portion; the forward end of said sleeve portion projecting into said outlet; and means comprising a plurality of vents in said outlet communicating at an angle with the exterior of said cap to admit air between the wall of said outlet and the flow of water.

5. A fire hose nozzle according to claim 4 and wherein the forward edges of said vanes are notched.

References Cited in the file of this patent

UNITED STATES PATENTS

666,297	Winkle	Jan. 22, 1901
730,927	Koegler	June 16, 1903
1,205,563	Pepper	Nov. 21, 1916
1,840,686	Zechmanek	Jan. 12, 1932
2,053,403	McCormick	Sept. 8, 1936
2,120,620	Mowery	June 14, 1938
2,562,096	Herrmann	July 24, 1951
2,624,559	Hyde	Jan. 6, 1953
2,657,024	Reinecke	Oct. 27, 1953
2,767,024	Swan	Oct. 16, 1956
2,905,394	Swan	Sept. 22, 1959
2,941,729	Goodrie	June 21, 1960