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FIRE HOSE NOZZLE

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Fig. 1.

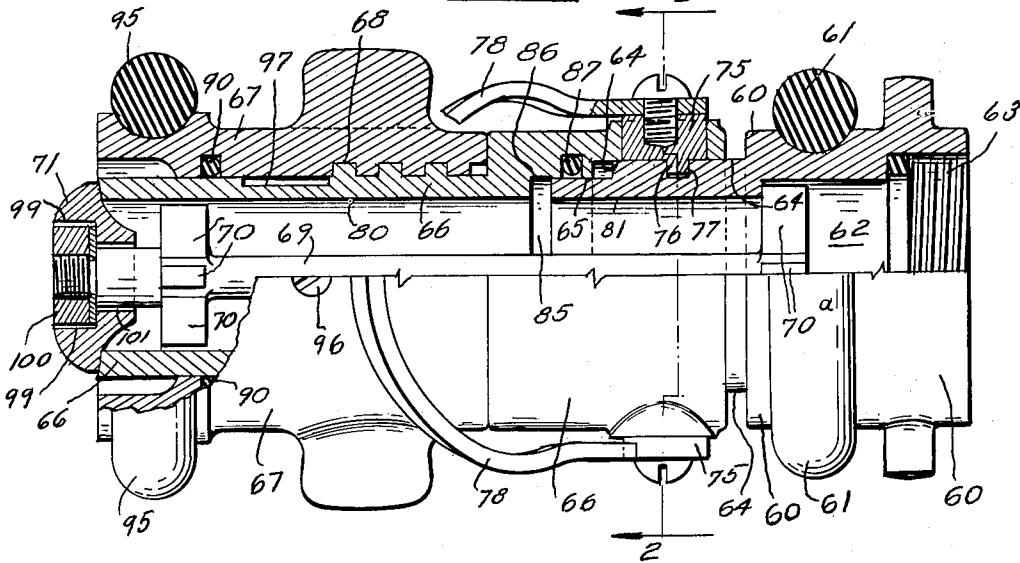
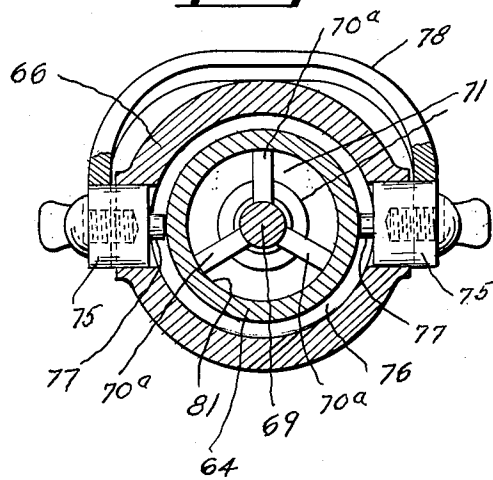


Fig. 2.



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2,733,962

FIRE HOSE NOZZLE

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Original application July 16, 1952, Serial No. 299,212,
now Patent No. 2,678,847, dated May 18, 1954. Di-
vided and this application May 11, 1953, Serial No.
353,952

4 Claims. (Cl. 299—130)

My present invention relates to fire hose nozzles and particularly to hose nozzles in which the nozzle is manually held open, the nozzle closing automatically when released by the operator.

This application is a divisional of my co-pending application "Fire Hose Nozzle," Serial Number 299,212, filed July 16, 1952, now Patent No. 2,678,847.

The principal object of the invention is to produce an improved heavy-duty, self-closing, fire nozzle.

Another object of the invention is to produce a self-closing fire nozzle provided with eccentric cam action mechanical means for opening the nozzle valve and maintaining it in any desired degree of opening but at the same time permitting the instant closing of the nozzle valve should the nozzle get out of control and freed from the operator's hands.

Other objects and novel features comprising the construction and operation of the nozzle will be more apparent as the description of the same progresses.

In the drawings illustrating the preferred embodiment of the invention:

Fig. 1 is a combination side elevation and vertical cross-section of a regulation size fire hose nozzle, the division line being cut along the horizontal major axis. The internal structure of the nozzle is symmetrical corresponding to that shown in the cross-section, other portions being in elevation.

Fig. 2 is a cross-section taken on the line 2—2 of Fig. 1, the eccentric cams and other portions being shown in elevation.

Referring more in detail to the drawings, the base 60 is provided with a resilient rubber bumper ring 61, a chamber 62 and an internally threaded end portion 63 adapted to threadably engage with a standard sized fire hose, not shown. The forward end of the base member 60 is shouldered at 64, and again at 65 to receive corresponding recessed portions of the tubular valve seat member 66. A spray sleeve member 67 is threaded at 68 to engage corresponding threads on the valve member 66. A poppet valve stem 69 having three-point front spider legs 70 and rear spider legs 70a align and support the poppet valve member 71 against which the slidable tubular valve seat member 66 engages when the valve is closed.

The tubular valve seat member 66 is controlled by means of eccentric cams 75 journaled in the opposite sides of the tubular valve seat member 66 being rotated by means of the handle member 78. Pins 77 off-set from the cams 75 operate in an annular groove 76 formed around the shouldered portion 64 of the base portion 60.

The bore 80 of the tubular valve seat member 66 is of the same diameter as the bore 81 of the base member 60. The valve seat portion 66 sliding on the shouldered portion 64 of the base portion 60. At all times there is a cavity of greater or lesser degree between the rear end of the bore 80 and the adjacent forward end of the base portion 60. This cavity varies in size with the

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separation of the base 60 and the valve seat portion 66 even when only a crack is present when the valve seat portion 66 is pulled all of the way back in a full open position. This cavity or chamber is always exposed to the very high water pressure delivered from the fire hose service line. The cavity or chamber 85 is larger in diameter than the bores 80 and 81 and hydraulic thrust pressure is greater here against the tubular valve member than at any other point along the bores 80 and 81. Due to the velocity of the very high water pressure passing through the nozzle bores 80 and 81 there is also a frictional tendency to push the valve stem member 66 forward, also tending to reduce any back pressure from the opening between the poppet valve member 71 and the bore 80 of the valve stem member 66.

As the valve seat member 66 moves forward toward the poppet valve member 71 which is stationary with the base 60, the space between the rear end of the bore 80 and the forward corresponding portion of the base 60 widens thereby increasing this separation to a point where there is a relatively large chamber 85 present with resulting increasing hydraulic pressure against the valve stem member 66. At the same time, the fast movement of water under high pressure by the shoulder portion of the rear end of the bore 80 exerts considerable friction all of which tends to force the valve seat member 66 forward against the poppet valve member 71.

In actual tests, the forward thrust pressure of the valve seat member 66 increases very rapidly as the valve seat member 66 moves forward and if unopposed by the operator's control by means of the lever handle 78 would hit the seat portion of the poppet valve with considerable impact.

Back pressure of the water between the shouldered portion 86 of the valve seat member 66 and the forward shouldered portion 65 of the base portion 60 is checked by the rubber ring 87 in the square annular groove of the base member 60. In a similar manner any water back pressure from the recessed portion 88 of the sleeve portion 67 is prevented from entrance to the threaded area of the sleeve portion by the O ring 90. The forward end of the sleeve portion 67 is fitted with a flexible rubber annular bumper ring 95.

A set screw 96 engages in the annular recess 97 of the sleeve 67 limiting its longitudinal movement on the valve seat member 66.

In the position shown in Fig. 1, the nozzle is closed but a slight movement of the valve seat member 66 toward the rear opens the valve and the nozzle throws a disc-like pattern of fog. As the sleeve portion 67 is moved backward its pattern becomes conical finally terminating in a solid stream.

At 99 I have indicated a wide clearance between the poppet valve 71 and the nut 100 which secures the poppet valve 71 to the spider stem 69. A similar clearance is indicated at 101. These clearances are more than ordinary working clearances. In other words in the language of the shop, they are sloppy clearances. This makes it possible for water passing under the poppet valve to align the poppet valve with the tapered end of the tubular valve seat member 66 so that the water pressure floats the poppet valve in a perfect central position with respect to the outer end of the bore 80 of the valve seat member 66.

In throwing a perfect pattern of a fog screen or heavier spray of water it is very important that such spray be uniform. If more water passes one side of the valve than the other the spray is thin in one portion and heavy in the other and is not flat. With the present device the spray is uniform throughout. To obtain a similar result mechanically, extreme precision is necessary in the shop and such precision is very expensive work.

The hydraulic automatic closing of the nozzle is very important and is unique. This feature reduces accident in the handling of fire hose nozzles.

As is well known in the use of fire hose using service water under high pressure, if the hose nozzle gets free from the fireman, the extreme jet pressure action causes the hose and the heavy nozzle attached thereto to thrash around in vicious gyrations often causing serious injuries to firemen. With my improved self closing nozzle this risk is eliminated because if the fireman loses control of the nozzle, the valve instantly closes and stops all back jet pressure gyrations of the hose.

While I have shown and described the invention somewhat in detail yet it is to be understood that I may vary the proportions and use equivalent parts within wide latitude while still remaining within the spirit of the appended claims.

Having thus described my invention what I claim as new is:

1. An improved fire hose nozzle comprising in combination, a base member having an internally threaded end portion for receiving threaded end portions of standard fire hose, a longitudinally slidable valve seat portion having a shouldered end portion slidably engaged over shouldered portions located on the forward end of said base portion, said valve seat portion having a stepped-down forward portion over which is located a longitudinally movable water spray sleeve portion the forward end of which is undercut providing an annular recess spaced away from the forward end of said valve seat portion, means located between the said sleeve portion and said valve seat portion for advancing said sleeve portion on said valve seat portion in an uninterrupted progressive movement, diametrically uniform bores located in said base portion and said valve seat portions, said bores having the same longitudinal axis, said bores being horizontally movable to and from each other and separated by a diametrically enlarged hydraulic pressure chamber, a poppet valve stem anchored in the said base portions and centrally and longitudinally located in said bores, the said poppet valve engaging with the forward end of said valve seat portion when said nozzle is closed, a lever and cam means pivoted on said valve stem for controlling said nozzle operation.

2. An improved fire hose nozzle as set forth in claim 1 in which the lever and cam control means comprises eccentric cams journaled in opposite sides of the rear portion of said valve seat portion, off-set pin portions mounted on the inner flat faces of said cam portions and engaging in an annular groove located around the exterior surface of a shouldered portion of said base portion, an operating lever secured to said cams for sliding said valve seat portion on said base portion and thereby opening the valve of said nozzle.

3. An improved fire hose nozzle set forth in claim 2 in which the poppet valve portion is centrally positioned with respect to the valve seat bore when in operation by means of a water column back of said poppet valve portion, and passage of said water by said poppet valve portion.

4. An improved fire hose nozzle comprising in combination, a rear base portion engageable with a standard fire hose, a valve seat portion slidably engaged on said base portion, a water spray portion horizontally adjustable on said valve seat portion, said base and valve seat portions being provided with concentric bore portions, a poppet valve member engageable with one end of said valve seat portion, said poppet valve member being centrally supported in said bores by means of a main stem attached to spider legs bearing on the said bores, said main stem being anchored against forward movement by a shouldered portion in said base portion, said valve seat portion being longitudinally slidably operated on said base portion by means of eccentric cams journaled in said valve seat portion and eccentrically engaged with said base portion, a hydraulically influenced spacing chamber between the rear end portion of said valve seat portion and the forward end of said base portion for the purpose of forcing said valve seat against said poppet valve portion and thereby make the nozzle self closing.

References Cited in the file of this patent

UNITED STATES PATENTS

711,754	Blake	Oct. 21, 1902
772,910	McKechney	Oct. 18, 1904
1,580,828	Harvey	Apr. 13, 1926
2,552,445	Nielsen	May 8, 1951