Sept. 14, 1926. 1,599,411

J. J. GILSENAN

NOZZLE

Filed June 20, 1924

Fig. 1

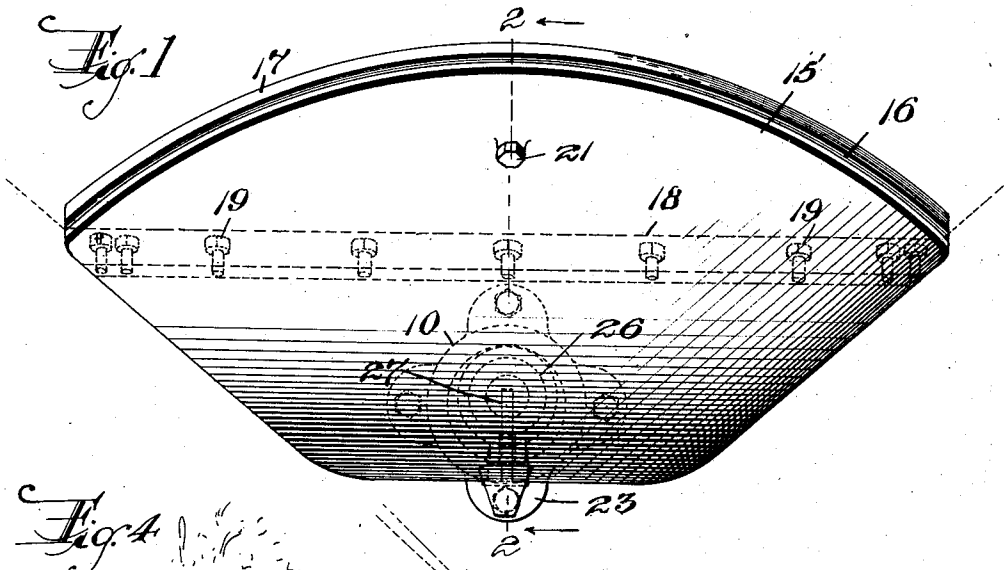


Fig. 4

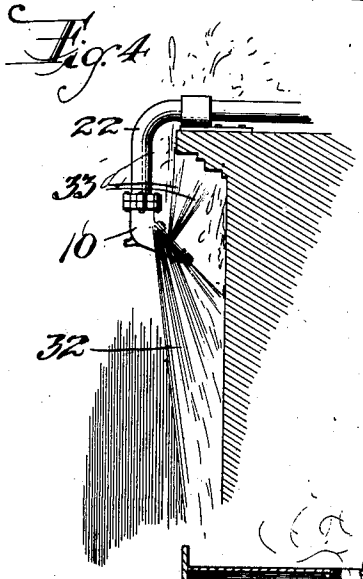


Fig. 2

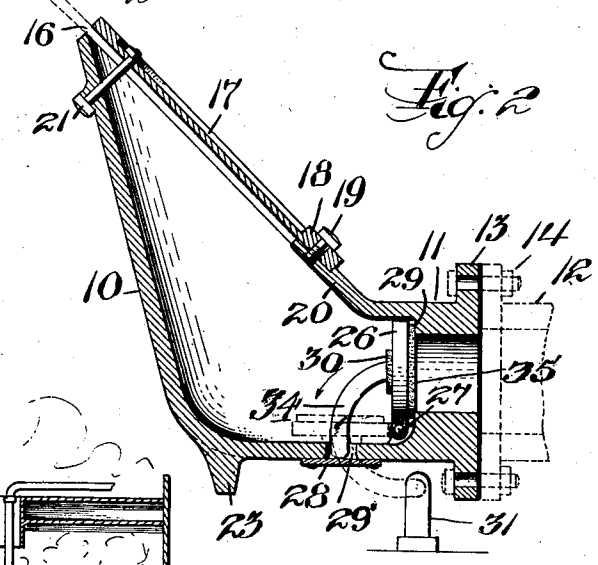
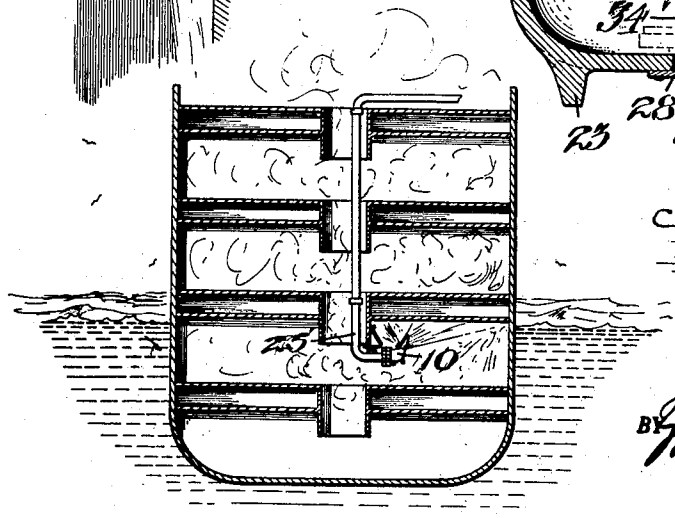


Fig. 3



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UNITED STATES PATENT OFFICE.

JOHN J. GILSENAN, OF NEWARK, NEW JERSEY.

NOZZLE.

Application filed June 20, 1924. Serial No. 721,186.

This invention relates to an improved nozzle which is designed to provide particularly for fire protection, and which is adapted to project a thin, fan-shaped sheet of water to either extinguish a fire or to provide what, in fire department operation, is called a water curtain.

The invention is particularly designed to provide a nozzle which can be quickly changed to provide for various installations and to meet different requirements and one, which while light, is firm enough to withstand hard usage and to keep its shape even under excessive water pressure.

The particular object of the invention is to project an unbroken sheet of water, that is, a curtain of water and not a spray or series of adjacent streams which latter are not efficient as heat will penetrate between the subdivisions of the stream. This water curtain is accomplished by making the nozzle casing so that the water undergoes a rather sharp change or acute change in direction at the same time that it begins to spread and it is thus formed into a smooth unbroken sheet, the slit at the end serving only for regulating its thickness and its direction. If this angular wall or spreader is not interposed to spread the stream into a sheet, that is, if the fan-shaped stream is projected straight ahead or only slightly changed it does not form a sheet but soon after leaving the nozzle it "shoestrings". In other words, it separates into independent small streams or a spray, which is not the sort of stream that will serve as a water curtain at a large fire or conflagration.

The invention is illustrated in the accompanying drawings in which Figure 1 is a front view of a nozzle embodying my invention and Figure 2 is a vertical section on line 2—2 in Figure 1. Figure 3 shows the manner of using the nozzle on a vessel and Figure 4 shows the method of using the nozzle on the roof of a building to provide for a curtain of water when necessary to cover the outer walls of the building.

The nozzle consists of a casing 10 which for lightness, is usually made of aluminum and is cast, having walls sufficiently thick to provide for handling high pressure and is provided at one end with a cylindrical portion 11 which is adapted for connection to a pipe 12 either being screwed thereon or it can be fastened as illustrated by means of the flange 13 which receives the bolts 14.

The nozzle has an outlet end and to provide for a broad, thin sheet of water, the outlet end 15 is arcuate or fan-shaped and is provided with a narrow slit 16. The body portion is directly connected with the inlet portion and has an outwardly flaring wall 17 disposed transversely relative to the inlet passage. This wall is arranged at an angle and I have found an angle of 45 degrees substantially the proper angle. A second outwardly flaring wall 35 is joined to the first wall by outwardly flaring walls 36. These outwardly tapering side walls 36 define the edges of the thin sheet of water into which the stream is transformed by the outwardly flaring walls 17 and 35. The device can be made of one integral piece as a casting but I may form it by making the wall 17 in the form of a blade which in the form shown has a rib 18 which is secured by the bolts 19.

To brace the plate 17 at the outlet end of the nozzle, one or more bolts 21 may be used to hold these parts in their normal positions and when high pressure is necessary because the strain on the casing is severe in transferring the stream of water quickly from a cylindrical stream to one that is very broad and narrow.

The casing 10 is usually made so that its outlet is at an angle to its inlet end, this arrangement being of the greatest advantage as in the installation shown in Figure 4 in which the nozzle is shown as secured to the pipe 22 and is directed downward over the end of the roof and is adapted to be in place at all times, being part of the permanent equipment of the structure. It will be evident, however, that it can be a portable device used on the end of a line of hose. When it is used as a portable device the nozzle is very often used to spray such things as lumber piles, and in this case it is caused to rest on the ground and to hold it in position I may provide it with the rib 23 of the desired width and depth.

The device is also particularly adapted for use on ships and the like, as it can be lowered down through a hatchway 24 and when placed on a bend pipe can be installed to direct a fan-like sheet of water along any particular deck and I show a pipe 25 in Figure 3 which form of pipe for this purpose will be more fully understood from my United States Letters Patent #1,476,810, issued December 11, 1923, for nozzle.

When mounted in situations where automatic operation is desired, such as in oil works or in the tank rooms of paint and varnish manufacturing plants, in lumber yards or on the outer walls of buildings that are close to danger of fire risks, I equip the nozzle with an automatic valve for permitting the operation of the nozzle under very high heat. In the drawing I show the valve 26 which is a flap valve, pivoted at 27 at the inlet end of the nozzle and having a gasket or washer 35 adapted to be seated against the valve seat 29 to shut off the water.

The valve is held shut by a bracing arm inside the casing which rests against a suitable part of the valve casing and to illustrate this feature I show the curved arm 34 resting against the fusible element 28 usually a sheet of metal used for fusible and similar purposes, this element 28 being fastened in place to part of the casing and covering the opening 29′ through which the bracing arm 34 is adapted to project when the water forces the valve open after the fusible element 28 has melted.

The flap valve 26 has a washer or other suitable means which seats itself around the edges of the opening 29 when the valve 26 is swung to its open position so that when the valve is open there is no leakage at this point. The projection of the bracing arm can be utilized in the operation of a signal, electric or otherwise, and to make this clear I show in the drawing a switch 31 which can be formed of plates as in an ordinary electric knife switch and the arm 34 comes between them and completes a circuit in which they are placed so that either under fire conditions or due to accident when the valve is open the alarm is actuated. Any other form of signal than electric signals can be operated from the arm 34 as will be evident.

In using the nozzle it is mounted as shown in Figure 4 either by turning on a valve in the structure or by thermostatic operation. The nozzle, when put in service, projects a broad flat sheet of water 32 downward to entirely cover the building below it and to a large extent to each side.

Small supplemental openings can be put in where necessary to permit small streams as at 33 to be projected upward on the cornice or any other elements above the nozzle. The nozzle is also particularly adapted for use in projecting foaming materials that are commonly caused to flow over the contents of oil tanks to prevent or to stop combustion since the flowing from the broad flat nozzle does not break up the stream which under smaller stream conditions does happen and the foaming apparatus loses its efficiency.

I claim:

A nozzle comprising an inlet portion and a body portion directly connected thereto, said body portion formed of an outwardly flaring wall disposed transversely across the inlet passage at an angle of substantially 45° to the axis thereof, and a second outwardly flaring wall joined to the first wall by outwardly tapering side walls, said outwardly flaring walls being spaced at their outer ends to provide a narrow elongated discharge opening.

In testimony that I claim the foregoing, I have hereto set my hand, this 7th day of June, 1924.

JOHN J. GILSENAN.