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NOZZLE AND ADJUSTABLE SPRAY DEFLECTOR

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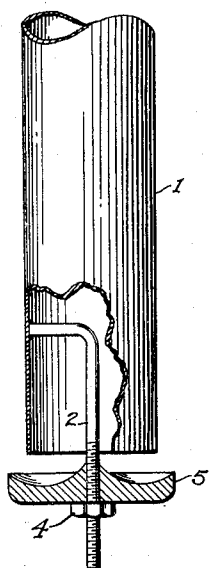


Fig. 1.

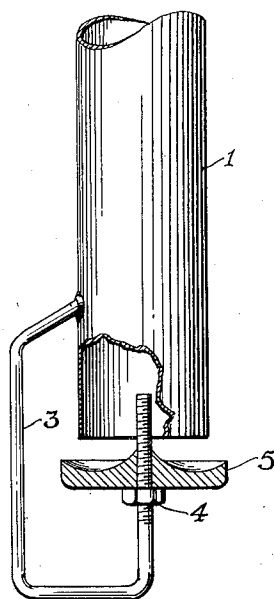


Fig. 2

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NOZZLE AND ADJUSTABLE SPRAY
DEFLECTOR

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1 Claim. (Cl. 299-130)

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This invention relates to a unique spray device and more particularly to a device adapted for the spraying of fluids which are contaminated by impurities such as scale, slime, dirt and the like.

In certain communities and in certain industrial operations water containing a considerable amount of dirt and scale is often employed for fire protective purposes and similar instances in which a substantially pure water need not necessarily be used. In spraying such water, it has been found that large particles of scale and other matter contained therein would rapidly clog the relatively small openings of conventional spray nozzles, giving rise to an uneven stream of water or in some cases completely stopping the flow, thus rendering the nozzle totally ineffective for its intended use.

Spraying devices equipped with revolving parts likewise prove to be of little value in the spraying of fluids containing impurities of fairly large particle size or those of a slimy or sticky nature which tend to build up a deposit of foreign matter in the nozzle tube or in the revolving sections gradually closing the openings or grooves of the revolving portion and stopping the flow of liquid.

An important object of the present invention accordingly is the provision of a non-plugging spray device through which a steady stream of water can pass uninterrupted by impurities contained in the liquid. A further object is the provision in a device of this type of an adjustable deflecting body so that water being discharged from the nozzle is spread into a uniform sheet. A still further object is the provision of an inexpensive nozzle which can readily be dismantled for purposes of repair, cleaning and the like. Another object is the provision of a spray nozzle free of revolving parts.

These and other objects which will occur to those skilled in the art are attained by the device shown in the accompanying drawings wherein:

Figure 1 is a vertical partial section view of the spray nozzle having a curved disc deflecting body.

Figure 2 is a vertical partial section view of a modified form of the nozzle having a curved disc deflecting body.

Referring more particularly to the drawings, numeral 1 designates a circular tube of uniform internal diameter open at one end for spray discharge of a fluid. A threaded stem, either 2 or 3 is mounted coaxially with said tube in the open end thereof. A curved disc deflecting body 5 has an axial threaded bore which engages the threads of said stem and is held in a fixed adjustable position by a lock nut 4 on the threaded stem, the

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lock nut engaging the surface of the deflecting body most remote from the tube opening. The deflecting body is adjustable on the threaded stem at a right angle to the open end of the tube to throttle and spray fluid issuing therefrom.

In Figure 1, the stem support is welded to the inside of the tube in a horizontal position being bent at a right angle so that the vertical portion of the stem is substantially in the center of and coaxial with the tube. The stem is attached to the inside of the tube at such a point that a stream of liquid passing through the tube which is deflected by the horizontal portion of the stem will be reunited before it passes from the nozzle opening. The vertical section of the stem, being in the center of the tube, permits water flowing therethrough to be discharged in a uniform manner striking the deflecting body to produce a continuous uniform sheet of water.

In Figure 2, the stem support is welded to the outside of the tube, the threaded extremity of the stem engaging the lock nut and the axial threaded bore of the deflecting body and extending for a short distance up into the center of the tube.

The embodiment of the invention shown in Figure 1 being more compact is generally to be preferred for spraying water containing solid particles of scale or other impurities. However, for the discharge of water containing sticky or slimy matter the nozzle shown in Figure 2 is to be preferred since in this device there is less surface of stem support exposed in the interior of the tube to which the slimy material may adhere and consequently less likelihood of the flow of liquid issuing from the tube to be diminished.

The curved disc deflector, comprising a circular disc having a concave surface adjacent to the open end of the tube and surrounding the threaded stem support, permits a wide opening between the end of the pipe and the deflector, thus allowing passage of a greater volume of water and larger particles of scale and the like with retention of the advantage of distributing water uniformly over a wide area. In either instance, the deflecting body is able to be adjusted to give a fine spray of liquid or as will usually be the case using water containing a considerable quantity of impurities the body will be adjusted to a desired fixed position, the size of the opening being governed by the particle size of the impurities contained in the water. In this way, large pieces of scale and the like pass through the opening of the nozzle along with the sprayed sheet of water. Thus, plugging or clogging of the nozzle is prevented to give a smooth flow of liquid.

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If it is desired to adjust the position of the deflecting body to give a finer spray, it is only necessary to screw the body inward on the threaded stem support to the desired point and then to bring the lock nut against it holding the body in a firm, fixed position. If the adjustment of the body is to outward giving a heavier spray of water, it is first necessary to release the lock nut on the threaded stem support to the desired position, turn the body downward on the threaded stem until contact with the lock nut is obtained and then tighten the lock nut to hold the body at a fixed point.

A strikingly simple and yet important feature of the present device is that the internal diameter of the nozzle tube is uniform throughout, that is the diameter of the tube at its aperture is the same as that at the point where liquid is admitted to the tube. An inherent feature of nozzles used heretofore was that they were tapered so that the opening of the tube was smaller in diameter than the tube itself. The nozzle of the present invention has a distinct advantage over such tapered nozzles where a liquid is to be sprayed containing contaminating bodies of fairly large particle size. With a tapered nozzle or those having an opening of smaller diameter than that of the tube itself, the water stream containing scale, slime, and the like issuing forth under a heavy pressure is choked back into the interior of the tube as it strikes a deflecting body such as that shown in the drawings. While a portion of the contaminating bodies thus choked back is removed by the oncoming stream of water some of such material, particularly sticky or scaly matter, remains in the interior of the tube. This accumulation of foreign matter rapidly builds up in tapered nozzles resulting in early clogging of the opening with impurities carried in the water. In the nozzle of the present invention any scale, slime, dirt or other impurities contained in the water upon entering the tube of the nozzle passes through without clogging.

The spray device of this invention will usually be constructed of metal such as brass, iron, steel, etc. The various steels including acid-resistant steel, stainless steel and steels plated with metals, such as chromium and the like, may be employed under certain conditions warranting their use. In certain operations it may be desirable to construct the nozzle of a transparent substance, in which case glass or particular plastics may be used.

However, the nozzle herein described is pri-

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marily intended to be used for spraying water in the combat of fires and is particularly adapted for installation in industrial plants, manufacturing or using combustible or volatile substances. Under such conditions, it is convenient to use a number of spray nozzles spaced at intervals throughout the area to be protected, the upper extremities of the nozzle tubes being connected to a common pipe line.

In the installation of spray nozzles for fire protective purposes, it is particularly important to employ a nozzle which will not become readily clogged or plugged upon use. The nozzle of the present invention upon use over an extended period of time for spraying water containing a fairly large quantity of foreign matter has been found to function in a suitable and efficient manner.

We claim:

A non-plugging spray device comprising a tube of uniform internal diameter open at one end for spray discharge of a fluid; a U-shaped stem, one leg thereof secured to the exterior of said tube, the other leg being threaded and extending into and axially within the said tube; a disc-like deflector of greater diameter than said tube having a threaded axial bore and being adjustably mounted on the threaded leg of said stem; said deflector having its face adjacent the end of the tube formed with an annular groove extending in a plane parallel to the open end of the tube and extending over an area of the face from immediately adjacent the stem to an annular edge beyond the area of the opening in the tube.

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