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FIREMAN'S NOZZLE

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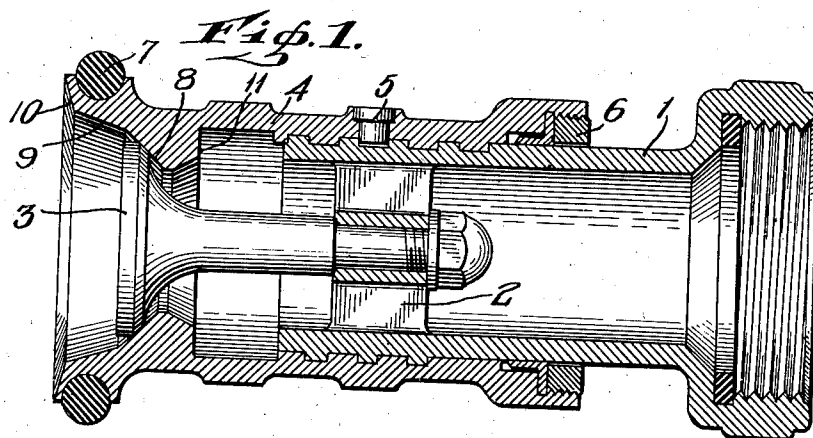


Fig. 2.

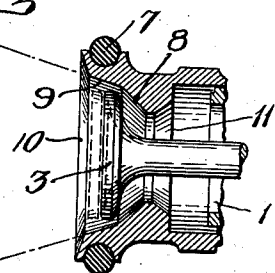
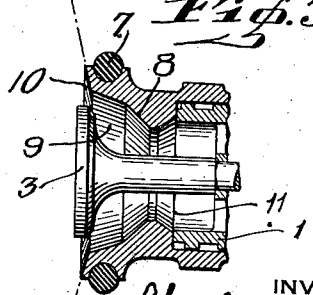


Fig. 3.



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FIREMAN'S NOZZLE

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2 Claims. (Cl. 299—131)

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The invention is a double function fireman's hose nozzle adapted for use either to produce a water-curtain for the fireman's protection against heat and smoke, or to produce a deluge stream of the kind that can be safely used on fires involving objects at high electric potential without danger of shock to the fireman, being quickly convertible from one use to the other without, in any intermediate or other adjustment position, delivering a stream of the kind dangerous to the fireman if played upon a high potential circuit. Such a nozzle has great practical advantage in fire-fighting, because it allows the instant use of either kind of delivery as quickly changing circumstances may require, thus enabling the fireman to work closely to the fire and with greater confidence as to his personal safety.

In the adjustment in which the nozzle delivers the safe deluge stream, it uses the discovery disclosed in co-pending application Serial No. 321,001, filed February 27, 1940, Patent 2,311,884, wherein it is shown that a hose stream of adequate range distance and volume but composed of properly dispersed water particles, offers an electric resistance so high, even for distances of a few feet, that it can be played on high potential objects without transmitting to the fireman holding the nozzle a current intensity in excess of 3 milliamperes. This is true even up to the unusual potential of 250,000 volts, and the practical advantage of it is that it allows the firemen to put water on the fire immediately on arrival, without waiting to be assured, as heretofore, that the current has been shut off. Thus costly delay is avoided.

The present nozzle affords this important practical advantage and at the same time provides the protection of the water-curtain when such protection is required, although it would be within the broad scope of this invention if the nozzle were constructed without this latter facility.

In the accompanying drawings,

Fig. 1 is a longitudinal section of the preferred form of the new nozzle, being there shown in its closed position.

Fig. 2 is the same view in a slightly opened position, and Fig. 3 is a similar view in the full open adjustment.

The nozzle comprises two principal members, one of which is a tubular body 1 internally threaded at one end to couple with a standard 2 inch or 2½ inch hose terminal such as used by fire departments, and formed at its other end

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with an integral spider 2 carrying a spreader 3 permanently fixed in the axis of the body. The other member 4 is a sleeve longitudinally adjustable on the body by means of the threaded engagement indicated at 5, or otherwise, so that it can be moved back and forth on the body. It has a packing 6 at its rear end to prevent drip and a rubber cushion ring 7 at its front end to protect it from injury.

The forward end of the sleeve embodies a special internal formation around the spreader head for controlling the waterflow. This formation comprises three adjacent annular surfaces, the first of which, marked 8 is the shut-off surface, located directly behind the head of the spreader, and is adapted for contact with the rear corner of such head when the sleeve is screwed forwardly on the body to the position indicated in Fig. 1. This is the closed position, and the surface 8 is desirably a conical surface, the spreader head being similarly coned, so as to make an effective water-tight closure.

The next forward annular surface 9 coacts with the spreader 3 to produce the safe deluge stream above referred to. It is a conical surface immediately contiguous to the shut-off surface 8 and in the present case has an included or cone-angle of about 40°. On the initial separation of the shut-off surface 8 from the spreader head (Fig. 2) the nozzle is opened and this surface 9 immediately functions to convert the water which then flows past the head into a spray stream having about the same cone-angle as the surface, which angle however diminishes to a somewhat smaller value a few feet from the nozzle. Such a stream embodies a sufficient degree of water particle dispersion to be safe against the transmission of current. Continued opening of the nozzle, as suggested by dotted lines in Fig. 2, increases the volume of water composing this stream but does not change its resistance characteristic, and it is a safe stream for use on all electrical fires under any water pressure obtainable from fire pumps, as explained in the above application. Under usual fire-fighting conditions it has a range in the order of 85 feet, and a delivery rate in the order of 165 gallons per minute, and although the volume is subject to variation with the pressure, under no condition is the stream electrically dangerous. To the extent that the angle controls the water particle dispersion and electric safety the limits are set at 25° minimum and 45° maximum, measured at the tip. Less than this is electrically

dangerous and wider streams have inefficient range. The transition from shut-off adjustment to stream adjustment occurs without producing a dangerous stream, that is to say, there is no intermediate straight or nearly solid delivery of water; the nozzle opens immediately to the safe stream.

The next of the three annular surfaces, marked 10, is immediately contiguous to the deluge stream surface 9 and has a much wider angle, of about 150°. It becomes active when the sleeve member is retracted as far as it will go, indicated in Fig. 3, in which setting the shoulder 11 abuts the body 1. The water is then directed over and to some extent guided by the wide-angled surface 10, so as to deliver the spray in substantially flat or curtain form, forming a screen or water-curtain of large enough unbroken area to protect at least two men. In this adjustment, as may be observed, the nozzle offers least resistance to flow and consequently the full volume of water available is used for the curtain effect, which is desirable, and in this case as before, the transition from deluge adjustment to curtain adjustment is accomplished with no intermediate straight or solid stream, and hence without danger to the firemen from high electric potentials.

The importance of the new nozzle resides first, in its incapability of delivering an electrically dangerous stream, and second, in its quick convertibility from one adjustment to the other with no intermediate dangerous condition, combined with its ability to be completely closed. While the specific structural design above described is believed to be the simplest possible, and preferred on that account, it will be recognized that within the principle disclosed the structural form, and particularly the means of adjustment, can be variously modified without substantial sacrifice of the advantages referred to.

This application is an improvement on the above mentioned application in which the nozzle is permanently adjusted to produce only the safe deluge stream, produced by the present nozzle in its middle adjustment. Such nozzle is entirely satisfactory in the respect that no dangerous stream can be produced by it, but it lacks the convenience of the curtain and shut-off adjustments now provided by the structure herein disclosed.

I claim:

1. A fireman's hose nozzle comprising a tubular member threaded at one end to couple with standard fire hose and a companion member longitudinally movable thereon to establish at least two adjustments, one of said members having an internal spider carrying a spreader fixed therein, and the other member having a flow-controlling formation coacting with such spreader, such formation including an annular shut-off surface forming a seat for said spreader in one of said adjustments for closing the nozzle, and having a conical surface immediately forward of said shut-off surface adapted to co-

operate with said spreader to produce a deluge stream of a cone-angle not less than 25° nor more than 45°, and of such water particle dispersion as to be safe for use on high potential electric objects, by which is meant a stream having such electric resistance as to prevent the passage of more than 3 milliamperes to the nozzle when it is played on objects of such high potential, said members being incapable of any adjustment giving a stream of less cone-angle or particle dispersion than the stream produced in such deluge stream adjustment.

2. A fireman's hose nozzle comprising a tubular body member threaded at one end to couple with standard fire hose and a companion member longitudinally movable thereon, one of said members carrying a spreader and the other member having a flow-controlling formation for coaction with such spreader, such formation comprising an annular shut-off surface on said member for contact with said spreader to close the nozzle, a conical stream-forming surface having an included angle of between 25° and 45° immediately adjacent to said shut-off surface shaped to produce in cooperation with said spreader a deluge stream of such cone-angle and degree of water particle dispersion as to be safe for use in high potential electric objects, such surface being so closely related to said shut-off surface as to produce such deluge stream directly on the opening of the nozzle without any intervening solid or dangerous stream, and said formation also including a conical curtain-forming surface immediately adjacent to said deluge surface, of a cone-angle approximating 150°, adapted to cooperate with said spreader to form a protecting water curtain and being so closely related to said deluge stream surface as to produce such curtain without any intervening solid or dangerous stream, the relative movement of said members being limited to render the nozzle incapable of any other adjustment giving a stream of less cone-angle or degree of dispersion than said deluge stream, whereby the fireman may optionally employ either of said flow adjustments without risk of shock.

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