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C. KELLY

SPRAY NOZZLE

Filed April 10, 1920

Fig. 1.

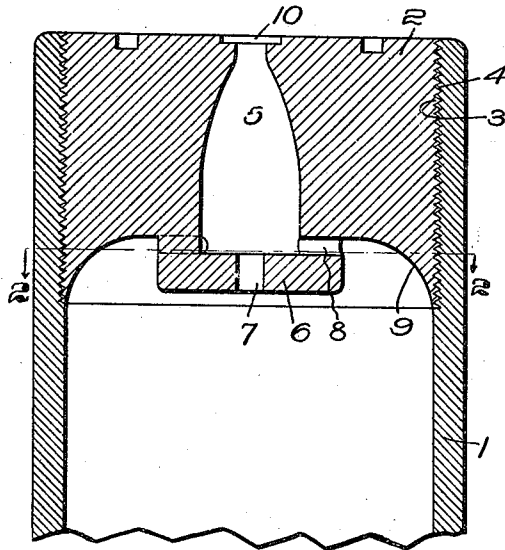
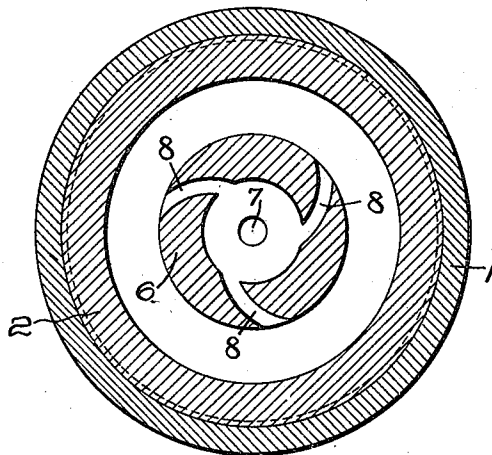


Fig. 2.



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UNITED STATES PATENT OFFICE.

CHARLES KELLY, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO SPRAY ENGINEERING COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

SPRAY NOZZLE.

Application filed April 10, 1920. Serial No. 372,991.

To all whom it may concern:

Be it known that I, CHARLES KELLY, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Spray Nozzles, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to fluid spray nozzles of general application for distributing fluid preferably in liquid form.

In order that the principle of the invention may readily be understood, I have in the accompanying drawing disclosed a single type of spray nozzle embodying my invention.

In the drawing,

Fig. 1 is a vertical central section of a spray nozzle constructed in accordance with my invention, and by which the method of my invention may be practised; and

Fig. 2 is a horizontal or transverse section upon the line 2—2 of Fig. 1 and looking downward in said figure.

By the nozzle herein disclosed and in accordance with and in carrying out my invention, I form and distribute over preferably an extended area, a spray composed of or comprising water or other liquid or suitable fluid, and which is, in the most effective embodiment thereof, of substantially uniform homogeneity throughout. Such spray is capable of use in many and varied relations. Among other uses, to which I am in no wise limited in the practice of my invention, I may enumerate the following: for aerating municipal and other water supplies in reservoirs and other places; in connection with cooling ponds to spray the water heated in condensers of turbine or other engines; for spraying effluent in connection with sprinkling filter beds; for precipitating coal dust; for air washing; for condensing vapors; for humidifying air in chemical plants and in cotton mills, for oil burners, fire extinguishers, and in fact for many other uses not herein necessary to enumerate.

In carrying out my invention, I project the fluid, of whatever nature, in a flaring spray and I preferably simultaneously produce an inner jet and one or more outer jets that are introduced along inwardly directed paths or lines which desirably are inclined or

curved so as to enter a mixing chamber and there mix, mingle or blend with the said inner jet.

Preferably the inner jet is a central one and desirably it is a truly axial one, and it may be either non-rotary or rotary as desired. Desirably the inwardly directed outer or surrounding jets enter the mixing chamber in paths that are in substantially a single horizontal plane. Desirably the liquid is entered into the nozzle in a single stream which is subdivided so as to produce the inner jet and the outer inwardly directed jet or jets, but within the scope of my invention I may separately introduce the inner jet and the outer jet or jets, as by providing separate pipes or passages and thus provide for using a plurality of different initial streams.

In that embodiment of the nozzle of my invention herein selected for illustration and by which I may practice my invention, the nozzle comprises an outer shell or casing 1 formed as a pipe of standard size having suitably applied thereto a terminal member 2 here shown as exteriorly threaded at 3 and received by the threaded portion 4 of the shell or casing 1. The terminal member 2 may if desired be threaded or otherwise mounted upon the outer surface of the shell or casing 1 in which case it would be provided with an end part and a depending flange preferably interiorly threaded.

Within the terminal member 2 I provide a suitable mixing chamber 5 which, if desired, may be formed in a separate piece that is inserted in or attached to the terminal member 2. For cheapness of construction, however, I preferably form the mixing chamber 5 in the terminal member 2 as most clearly indicated in Fig. 1. The mixing chamber 5 may be of any suitable shape and desirably of the form indicated in Fig. 1, and is provided with a base 6 desirably integral with the terminal member 2 and having therein an opening or passage 7 preferably central or axial with respect to the mixing chamber 5.

In the wall of the mixing chamber 5 at a suitable point and preferably at or close to the base 6 I provide one or more, and preferably a series, of inwardly directed passages 8 here shown as three in number, but which may be of any desired number. Desirably the openings 8 are all in substantially the

same plane and herein a horizontal plane, and the said openings 8, constituting passages of any desired length, may be curved as indicated or may be straight and in the latter case they are desirably inclined, but within the scope of my invention may be radial. I have, however, produced the best results by employing openings or passages which are not radial, but which introduce the liquid in a more tangential direction.

Desirably I guide or direct the liquid to the openings or passages 8, and herein I accomplish this result by concaving the lower end of the terminal member 2, as indicated at 9.

The streams or jets of liquid entering the mixing chamber 5 through the openings 8, from whatever source, mingle with the jet or stream entering through the passage or opening 7, and several streams become thoroughly mixed in the chamber 5 and issue therefrom in a spray that is of substantially uniform homogeneity throughout.

The jet or jets entering through the passages 8 partake of a whirling or rotary motion, and were the central or inner jet not present, the said jets entering through the passages 8 would issue from the outlet 10 in a substantially hollow spray or cone. The inner or central jet or stream, however, so mixes with the jets entering through the passages 8 as to result, as stated, in a cone or spray of substantially uniform homogeneity.

Having thus described certain illustrative embodiments of my invention, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims—

1. A spray nozzle comprising a shell or casing 1 and a single member received within said shell or casing and having formed therein a mixing chamber having an inlet for a circumferential series of inlets for a plurality of streams, and an outlet, said single member being shaped to direct the liquid to said inlets and constituting the only formation for directing liquid to said inlets.

2. A spray nozzle comprising a shell or casing 1, a unitary terminal member inserted in the shell or casing, said terminal member having formed therein a mixing chamber having outwardly converging side walls, said chamber being provided near one end with a series of circumferential inlets for the liquid and at its opposite end with a single outlet, said terminal member being shaped

at its inner end to direct the liquid to said circumferential inlets.

3. A spray nozzle comprising a shell or casing 1 formed as a pipe of standard size and length provided with an interior thread at one end, a terminal member 2 threaded into said shell or casing and terminating flush with the outer end of the latter, said terminal member having a mixing chamber formed integrally therewith and provided with a surrounding series of inwardly directed inlet ports and an axial inlet port for the liquid and a single outlet port for the liquid.

4. A spray nozzle comprising a shell or casing having a member applied thereto provided with a mixing chamber having side inlets and a substantially axial inlet, the inner end of the member being inclined from its outer surface inwardly and extending uninterruptedly to said side inlets so as to direct or guide the liquid without obstruction thereto.

5. A spray nozzle comprising a shell or casing, a member applied to said shell or casing having a mixing chamber provided with an axial inlet and a surrounding series of substantially radiating inlets, the inner end of the member being inclined from its outer surface inwardly to said substantially radiating inlet members to direct the liquid without obstruction thereto.

6. A spray nozzle comprising a pipe of standard size and uniform diameter throughout having a threaded end, an integrally formed terminal member applied to said threaded end, and an elongated mixing chamber formed wholly in said plug or cap and provided with a circumferential series of inlets and an outlet, the inner end of said terminal member having a laterally extending, relatively extensive, guiding face for guiding the liquid to said circumferential series of inlets.

7. A spray nozzle comprising a shell or casing of uniform diameter throughout and provided with an interior thread at one end, an unitary plug threaded into said shell or casing and terminating flush with the outer end of the latter, said member having therein a mixing chamber provided with an axial inlet, a surrounding series of side inlets and a single outlet, the inner end of said member being inclined from its outer surface inwardly and terminating in the transverse plane containing said side inlets to direct the liquid unobstructedly thereto.

In testimony whereof, I have signed my name to this specification.

CHARLES KELLY.