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B. ZABBAN

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DEVICE FOR THE PRODUCTION OF ARTIFICIAL FOGS

Filed Oct. 21, 1938

FIG. 1

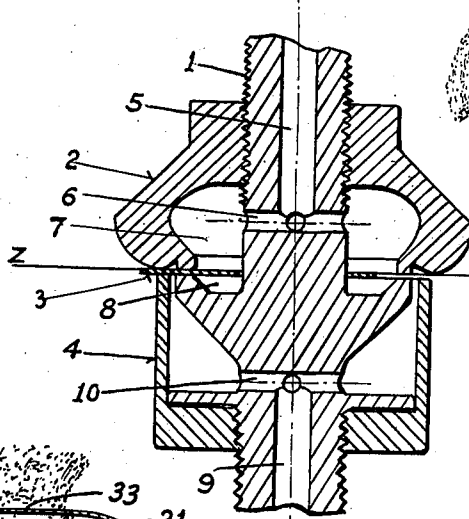


Fig. 3.

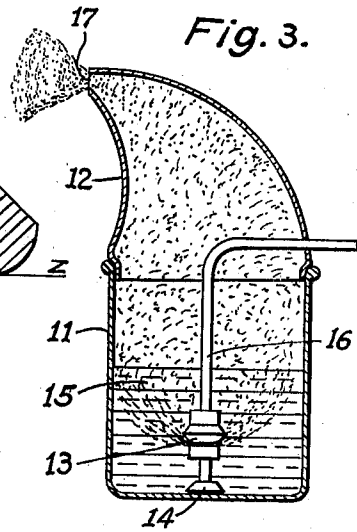


Fig. 4.

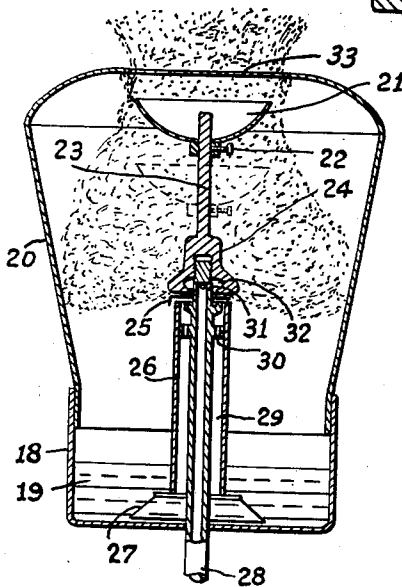
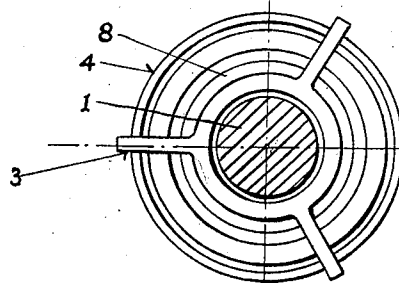


Fig. 2



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DEVICE FOR THE PRODUCTION OF
ARTIFICIAL FOGS

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8 Claims. (Cl. 299—86)

Many methods and devices have already been proposed for the production of artificial fogs, most of which were based upon the atomizing by means of a jet of compressed fluid of a liquid on which said jet comes to act by means of an injector or equivalent member.

In the known devices, and in particular those of the kind including one or several fluid outlet orifices in the form of pairs of coaxing thin slits or slots, constancy of the size and relationship of said slit is difficult to ensure or maintain.

The present invention has for its object, in devices of the kind set forth, the use between the two elements limiting the slit of a spacing member such that the eventual play in the assembly of these elements cannot exert any action upon the value and regularity of the dimensions of the slit and this even for dimensions below one tenth of a millimeter. This arrangement insures simultaneously the regularity of the projection, the possibility of adjusting the size of said orifice with a view to adapting it to the physical or chemical characteristics of the fluid or liquid to be projected, and the possibility of easy cleaning of this orifice and also of instantaneous adjustment of the apparatus after cleaning.

When carrying out the process which is the object of the invention, that is to say when making two concentric, thin slots of constant value, arranged as above indicated, I have discovered an effect which is unexpected and surprising, to wit: that the apparatus thus devised work in a perfect manner when immersed inside any liquid. Therefore it is thus possible to produce a fog as dense as it is desired, this fog being made of droplets of very small size, therefore of very high superficial tension, and rigorously dry.

From the preceding, it results that the process and devices which are the objects of the invention permit of producing a dense and dry fog of homogeneous composition, or again—when making simultaneously use of several apparatus working in several liquids—of heterogeneous composition. In this latter case, the mixture is extremely intimate and therefore permits of obtaining condensates made of liquids which normally would not be mixable.

The invention also permits of obtaining, in a chamber of invariable volume, and in which there is a constant pressure, any concentration of liquid in suspension.

The processes and devices obviously involve a considerable number of applications and correspond in particular, but without being limited

thereto, to medicine, hygiene, sanitation, agriculture, viticulture, horticulture, and so on, the destruction, or on the contrary, the preservation of living organisms, the impregnation and preservation of any surfaces or objects, the formation of films on such objects or surfaces, the production and neutralization of poisonous atmospheres, the formation of heterogeneous mixtures, in particular of combustible and explosive mixtures, and so on.

In order to explain the invention, I shall hereinafter describe several embodiments, shown diagrammatically and by way of example which are not in any way limitative on the appended drawing in which:

Fig. 1 is a vertical section view, and

Fig. 2 a horizontal sectional view along the axis Z—Z of an embodiment of the device which is the object of the invention.

Fig. 3 is a vertical section of an embodiment showing the apparatus working when immersed;

Fig. 4 shows a modification of construction.

The apparatus of Figs. 1 and 2 is constituted by a central body 1 on which are juxtaposed two members 2 and 4 providing between them a pair of radially spaced and aligned annular slots the height of which is determined and maintained by the thickness of the distance member or leaf 3. This distance piece or leaf made for instance of cut metal, may be of any desired form and it has been shown by way of example in the form of a three branch star in Fig. 2.

The fluid under pressure arrives through the port 5 opening into the series of transverse apertures 6 into the center of chamber 7, from which it escapes radially through the annular slots between the opposed concentric edge portions of members 2 and 4.

On its passage through the radially spaced annular slots formed by the cylindrical inner wall of cap 4a and the inner cooperating slot forming cylindrical edge portion 2a of the lower half of the member 2, the fluid under pressure drives and tears off the liquid, which is sucked from a vessel located below through the axial port 9, which opens into the series of transverse apertures 10, hence up between the radially spaced annular pairs of slot forming edge portions 2a—4a and 2b—4b.

The fog thus produced therefore escapes along line Z—Z, of Fig. 1.

Practice has taught that in some cases where the adjustment can be considered as adapted to remain invariable and also in the case where the space available for the apparatus is very small,

or for any other reason, the device such as described in particular by Figs. 1 and 2 can undergo modifications according to which the spacing member of incompressible material is replaced by projections provided on one or the other of the faces limiting the passage of the fluid. These projections may be of any desired shape and number and they may be obtained either by removal of matter or by fixing, onto or in the face that is considered, elements of constant height playing the same part.

When the space that is available is very much reduced, it may be of interest to dispense with the upper part of the central body of the apparatus and to utilize a shortened central body, the upper cap being screwed in a base provided with sufficient notches for permitting lateral atomizing on the desired angles of dispersion, inclination and aperture.

Fig. 3 represents the apparatus 13 of Fig. 1, immersed in the liquid 15 contained in a vessel 11, provided with its lid 12. The fluid under pressure is fed through the tube 16, and the liquid is sucked through a suitable filter 14, which serves to retain the impurities and dust which may be present in the liquid. The fog escapes through the liquid mass 15, its big droplets being retained on their passage by said mass. The mist issuing through the orifice 17 is thus constituted by liquid particles of a very small mass and of a very high superficial tension.

Fig. 4 shows an apparatus with an adjustable mechanical device for the sorting of the droplets. It is constituted by the vessel 18 provided with a frusto-conical envelope 20, on the inside of which is mounted the central body 28, surrounded by a concentric tube 26 and covered by the cap 24, the rod 23 of which acts as a slideway for the deflector 21 which can be fixed at the desired height by means of the screw 22. The position of the deflector 21 can therefore vary in height, as indicated in dotted lines. The fluid under pressure arrives through the axial hole provided in the body 28 opening through the transverse holes 31 into the chamber 32, from which it escapes radially through the circular slot existing between the flaring of the central body 28 and the lower cheeks of the cap 24, this orifice being conditioned by the interposition of the cut away distance piece 25.

The liquid is aspirated through the filter 27, the channel 29 and the holes 30 for coming to the annular surface comprised between the flaring of the body 28 and the inner walls of the tube 26. The fog therefore escapes in the horizontal plane and, striking the inclined walls of the envelope 20, it is broken and projected toward the deflector 21, which again breaks it so that the particles escaping through the aperture 33 of the envelope are compelled to undergo the dividing and sorting effect adjusted at will.

Although I have above described only some embodiments and applications of the device which is the object of the invention, it is obvious that the latter extends also to many modifications. What I claim is:

1. An apparatus for the production of artificial fog which comprises, in combination, two sets of coaxial cylindrical members arranged end to end with their adjacent edges opposite each other so as to leave a thin slot between said edges, central means in one of said members for feeding a compressed fluid to said slot, means in the other member for feeding a liquid to be disintegrated across the path of said compressed fluid on its

way to said slot, and incompressible spacing means located between said members for maintaining the size of said slot.

2. An apparatus for the production of artificial fog which comprises a body having two pairs of coaxial members arranged end to end with their adjacent edges located opposite each other in slightly spaced relationship providing two relatively thin concentric slots between said edges, said body being adapted to be immersed in a liquid to be disintegrated, central means in one of said pair of members for feeding compressed fluid through the inner of said slots, means in the other pair of members for conveying the liquid therethrough and into the path of fluid discharge from said inner slot for common discharge through the outer of said slots, and incompressible spacing means interposed between said adjacent edges of said members for maintaining the size of said slots uniform.

3. An apparatus for the production of artificial fog comprising, a vessel adapted to contain a liquid to be disintegrated, two pair of coaxial members arranged end to end with their adjacent edges located opposite each other so as to leave two thin concentric slots between said edges, said members being adapted to be located in said vessel with the outer of said slots immersed in the liquid in said vessel, central means in one of said pair of members for feeding compressed fluid to the inner of said slots, means in the other pair of members for conveying the liquid in the vessel into the path of fluid discharge from said inner slot for common discharge through said outer slot, and incompressible spacing means interposed between said members for maintaining the size of said slots uniform.

4. An apparatus for the production of artificial fog comprising, a vessel adapted to contain a liquid to be disintegrated, two concentric sets of members arranged end to end with their adjacent edges located opposite each other so as to leave two thin circular slots between said edges, said members being located within said vessel, central means in one of said members for feeding compressed fluid through the inner of said slots, means in the other member for feeding a liquid to be disintegrated into the path of fluid discharge from the inner of said slots for common discharge through the outer of said slots, incompressible spacing means interposed between said members for maintaining the size of said slots uniform, said vessel having an aperture in the top thereof, and deflector means mounted in said vessel between said members and said aperture.

5. An apparatus according to claim 4 in which the wall of the vessel opposite the outer of said slots is of flaring shape toward the top of the vessel.

6. An apparatus for the production of artificial fog comprising, a body having two concentric sets of coaxially disposed members in end to end relationship, said members having their adjacent edges located opposite each other in slightly spaced relation so as to leave two thin radially spaced circular slots between said edges, one of said members cooperating with said body to provide a chamber opening into the inner of said slots, means in said body opening into said chamber for feeding compressed fluid therinto, the other member forming with said body an annular recess opening into the passage between said concentric sets of members, means in said body opening into said annular recess for feeding liquid therinto for disintegration thereof, and incom-

pressible spacing means interposed between said members for maintaining the size of said radially spaced slots uniform.

5 7. An apparatus according to claim 4 in which the aperture at the top of the vessel is in line with the axis of said concentric sets of elements, and the deflector means is adjustable along said axis relative to said aperture.

10 8. An apparatus for the production of artificial fog comprising coaxially arranged members having two sets of opposed slot forming edge portions, an incompressible spacing means located between and supporting said sets of edge portions

in predetermined spaced relationship whereby radially spaced and aligned discharge slots of fixed dimensions are provided, means in one member for feeding a compressed fluid between the opposed edge portions comprising the inner slot, 5 and means in the other member for feeding a disintegrating liquid between said sets of slot forming edge portions and across the path of fluid discharge from said inner slot for common discharge between the opposed edge portions comprising the outer slot. 10

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