

- [54] **SPRAYING APPARATUS**
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- [58] Field of Search ..... **239/222.11, 222.17, 223, 239/224, 380**

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[57] **ABSTRACT**

An apparatus for producing a very fine spray or mist of liquid of droplet size between 25 and 250 microns, comprises a plurality of annular strips coaxially mounted with and radially supported by a rotateable shaft. A supply pipe which terminates within the space enclosed by the strips is capable of producing a fan jet of liquid, the longitudinal axis of symmetry of the jet being inclined to the longitudinal axis of the rotateable shaft. The optimum distribution of liquid on the annular strips is achieved by using a fan jet of the curled-plate type.

- [56] **References Cited**
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**4 Claims, 2 Drawing Figures**

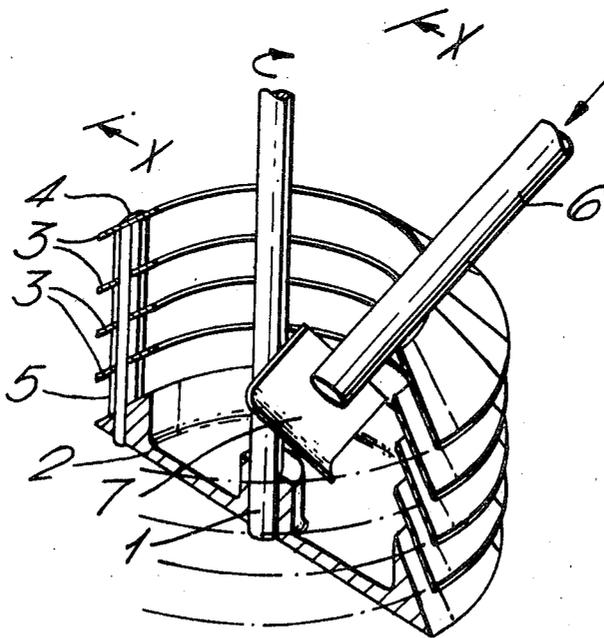


Fig. 1.

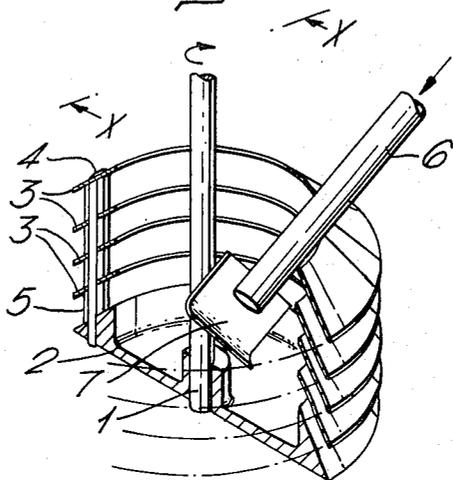
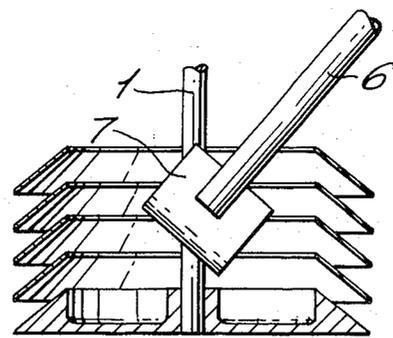


Fig. 2.



## SPRAYING APPARATUS

The present invention relates to apparatus for producing a very fine spray or mist of a liquid.

There are many occasions when a fine spray or mist of a liquid is required, for example agricultural chemicals are invariably applied to crops in this form. One type of apparatus currently in use for this purpose is the rotary disc atomiser which disperses a liquid in the form of a fine mist by reason of the centrifugal forces acting on a liquid fed to the surface of the disc. It is at present usual to design the system for a specific flow rate. Variations in the rate of flow from the design values result in a broadening of the spectrum of droplets produced.

An improved apparatus is now provided in which the load on individual discs is kept substantially constant over a wide range of flow variations.

Thus according to the present invention there is provided apparatus for producing a very fine spray or mist of liquid which apparatus comprises a plurality of annular strips coaxially mounted with and radially supported by a rotateable shaft and a supply pipe terminating within the space enclosed by the strips and having means at the end thereof to produce a fan jet of liquid, the longitudinal axis of symmetry of the jet being inclined to the longitudinal axis of the rotateable shaft.

By the expression a very fine spray or mist of liquid is meant within the context of this specification a dispersion of liquid droplets having a droplet size between 25 and 250 microns.

Any means for producing fan jets, both of the high-pressure or low-pressure type, may be used but it is preferred to employ a low-pressure fan jet of the curled-plate type. The fan jet is arranged so that the jet is directed within the core of the space enclosed by the discs. In this way the body of liquid impinging on the discs is fan shaped, which provides the necessary geometrical arrangement for ensuring that each disc receives an equal share of the atomising function even when the flow-rate changes, as invariably occurs with gravity feed systems. At low flow rates the feed to the discs is in the form of a narrow fan feeding only one or two discs whereas at higher flow rates the fan angle widens so that the increased flow is shared between a higher number of discs thus keeping the performance of each disc within its design capacity.

The annular strip may be fabricated from plastics material, metal or any other suitable material though fabrication from plastics material is preferred because it offers the advantages of corrosion resistance, low weight and ease of fabrication at relatively low cost. The strip may be in the form of a flat disc or in the shape of the outer surface of the frustum of a cone, the latter shape being preferred.

It is envisaged that the apparatus will find application in agriculture, particularly where liquids are applied to crops by devices incorporating the gravity feed principle.

A preferred embodiment of the invention will be described with reference to the drawings in which:

FIG. 1 is a cross-sectional view of the device and

FIG. 2 is a section on the line X—X of FIG. 1.

With reference to FIGS. 1 and 2 a rotateable motor shaft 1 has attached to its lower extremity a disc sup-

port plate 2. The shaft is attached to an electric motor but any means for producing high-speed rotation of the shaft may be used. The multiplicity of discs 3 are attached to the disc support plate 2 via a number of rivets 4. The discs are kept apart by the spacers 5. In this embodiment the discs are fabricated from plastics material but they may be constructed from metals or any other suitable material.

The liquid is fed to the atomiser assembly via the tube 6 attached to the end of which is the curled plate 7. The combination of items 6 and 7 provide a low pressure fan jet. One design and size of the assembly 6 and 7 is capable of maintaining a fan jet pattern which has an angle of spread such that on suitably spaced discs the number of discs being fed is substantially proportional to the feed rate.

In operation liquid introduced through the tube 6 impinges on the curved plate 7 producing a fan shaped film which falls on the rapidly rotating discs 3. At the highest flow rate the inclination of the curved plate 7 can be adjusted so that the liquid falls on the discs. The forces on the liquid propel it to the circumference of the discs, from which it is ejected in the form of a fine spray or mist. As the flow rate of the liquid through the tube 6 falls the fan of liquid produced by the curved plate describes a smaller arc and thus engages a fewer number of the rotating discs, placing an equal load on each.

I claim:

1. Apparatus for producing a dispersion of liquid droplets having a droplet size between 25 and 250 microns which apparatus comprises a rotatable shaft, a plurality of annular strips co-axial with and supported from said shaft for rotation therewith, said strips being spaced from each other in the axial direction of said shaft and having their inner peripheries spaced from said shaft to provide a space between said inner peripheries and said shaft, and means for producing a fan-shaped jet of liquid directed outwardly from the axis of said shaft and with the plane of the fan inclined with respect to a further plane perpendicular to said axis, said means comprising a stationary liquid supply pipe extending and opening into said space and disposed to discharge and direct said liquid along a path which is inclined with respect to said further plane and a stationary curled plate mounted with the curled portion thereof in said path of said liquid and extending transversely to said path, said curled portion also extending in a direction outwardly of said axis so as to direct said liquid onto said annular strips in a fan-shaped pattern in a plane which is inclined with respect to said further plane, whereby each strip receives a substantially equal share of the atomizing function irrespective of flow rate changes of the liquid discharged from said supply pipe.

2. Apparatus according to claim 1, wherein said means for producing a fan-shaped jet is low pressure means.

3. Apparatus according to claim 1, wherein each of said annular strips is in the form of a flat disc.

4. Apparatus according to claim 1, wherein each of said annular strips is in the form of the outer surface of a frustum of a cone.

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