

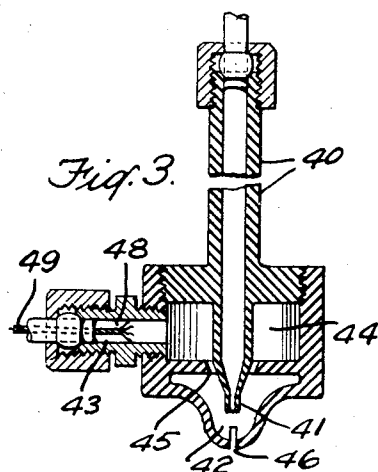
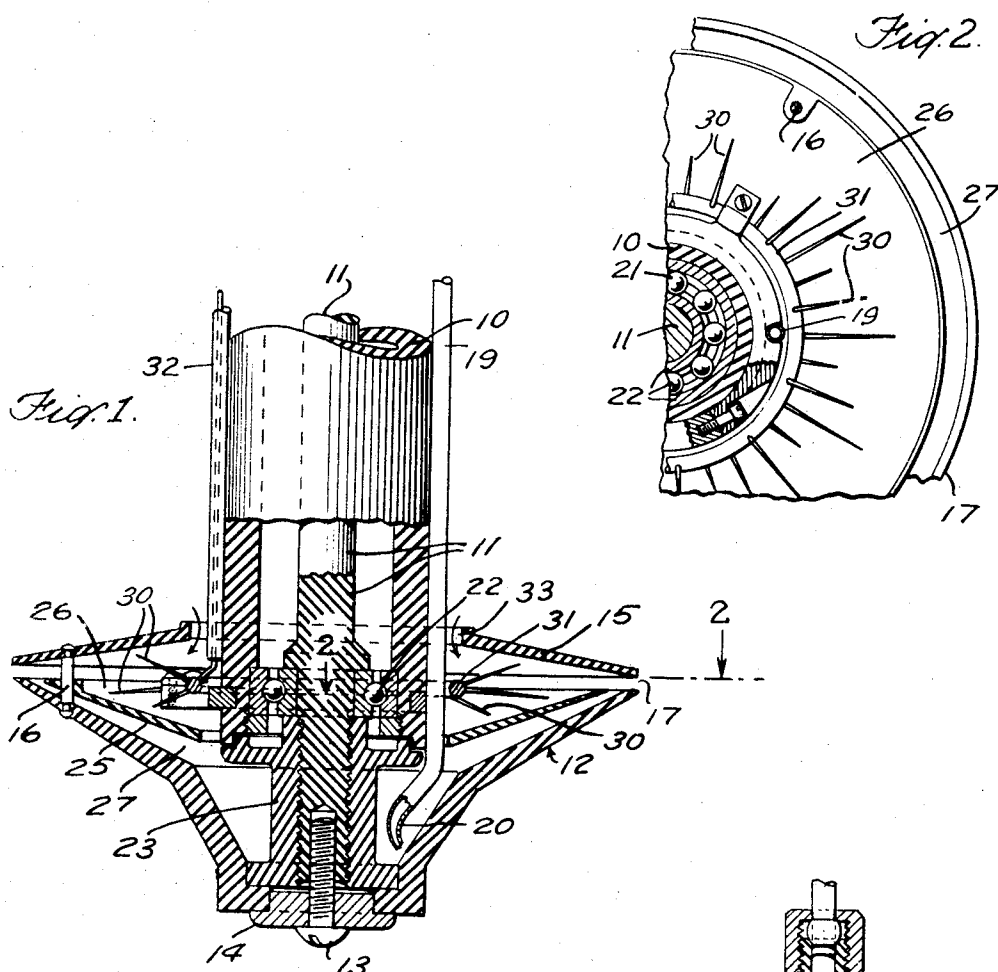
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SPRAYING APPARATUS

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2,901,178

SPRAYING APPARATUS

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1 Claim. (Cl. 239—15)

This invention relates to a method and apparatus for spray coating articles and has for an object to provide a coating system having novel and improved characteristics.

Another object is to provide improved means to project an ionized spray into a spray zone without using exposed high potential electrodes.

A further object is to minimize the possibility of flash-over between the atomizer head and the parts being sprayed.

A further object is to provide improved means for producing an ionized spray using enclosed electrodes, of materials having conducting properties.

Other objects and advantages will be apparent as the nature of the invention is more fully disclosed.

The invention will be better understood by referring to the following description, taken in connection with the accompanying drawing wherein specific embodiments have been set forth for purposes of illustration.

In the drawing:

Fig. 1 is a longitudinal section of a rotary atomizing head embodying the invention;

Fig. 2 is a partial transverse section taken on the line 2—2 of Fig. 1; and

Fig. 3 is a detail view of an air jet nozzle embodying the invention.

Referring to the drawing more in detail the rotary atomizer head is shown in Figs. 1 and 2 as mounted on the lower end of an insulating tube 10 which provides a bearing and support for the lower end of a drive shaft 11 which is driven by a motor, not shown. The shaft 11 and tube 10 are of insulating material. A lower frusto conical atomizer member 12 of insulating material is attached to the lower end of the shaft 11 by a screw 13 and collar 14. An upper frusto conical member 15 is disposed above the lower head 12 and is held by brackets 16 in spaced relationship with respect to the lower member 12 to provide a peripheral slot 17 therebetween. A feed pipe 19 extends down along the outside of the tube 10 with its lower end terminating in a discharge nozzle 20 adjacent the lower inner surface of the member 12 so that liquid discharged from the nozzle 20 is fed upwardly along the frusto conical inner surface of the member 12 by centrifugal force and outwardly as an atomized spray through the peripheral slot 17. Bearing 22 for the shaft 11 is shielded by a sleeve 23 which is secured to and rotates with the member 12.

An insulating cone 25 is attached to the brackets 16 and divides the head into an upper compartment 26 and a lower compartment 27. The nozzle 20 discharges the liquid for atomization into the lower compartment 27. A set of spring wires 30 are attached to a ring 31 which is mounted to the tube 10 and is electrically connected to a high tension electric cable 32.

In operation air is drawn in through passage 33 between the upper member 15 and the tube 10 and is forced outwardly through the peripheral slot 17 by centrifugal action, contacting the wires 30 and receiving an ionizing charge therefrom. This ionized air is mixed with the liquid from the lower compartment 27 at the peripheral slot 17 and imparts an ionizing charge to the spray. In some cases it has been found advisable to make the non-

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conducting discs larger in diameter to hold the electrodes as close to the cable as possible to further isolate the electrodes.

This apparatus is particularly useful for liquids such as emulsions or suspensions having conducting or semi-conducting characteristics such that a charge will feed back through the system. The ionized air imparts a charge to the spray which is formed at the peripheral slot 17 and assists in the atomization. The spray thus formed can be attracted to an oppositely charged or grounded surface such as a metal can shell as shown in my co-pending application Serial No. 607,105, filed August 30, 1956, now abandoned.

Fig. 3 illustrates an embodiment wherein feed pipe 40 terminates in a nozzle 41 in a mixing chamber 42. Air is supplied from pipe 43 to chamber 44, thence through passages 45 to mixing chamber 42, where it is mixed with the liquid and assists in atomization from jet opening 46.

An electrical charging electrode 48 is disposed in the air pipe 43 and is connected to a high tension electric cable 49.

This embodiment, like that of Figs. 1 and 2, is useful with liquids of conducting or semi-conducting types. The ionized air mixes with the uncharged liquid to impart an ionizing charge to the spray.

The parts which contact the liquid and air streams after ionization should be made of non-conducting material such as Bakelite or nylon or the like in order to minimize loss of charge.

In some instances it may be desirable to apply an ionizing charge directly to the liquid as well as to the air stream, particularly when the liquid is non-conducting and is capable of retaining its charge. Various other changes and adaptations will be apparent to a person skilled in the art.

What is claimed:

Apparatus for producing an ionized spray of sprayable material, comprising a rotary spray head including a pair of frusto conical members of electrical insulating material forming a confined area therebetween and having peripheral edges spaced to provide therebetween a peripheral discharge opening and a radial member of electrical insulating material disposed between said first members to divide said confined area into two separate chambers, said radial member having a peripheral edge spaced from the peripheral edges of said first member to provide a peripheral discharge opening communicating with each of said chambers, a fluid pipe disposed to feed material for spraying to the central portion of one of said frusto conical members, means rotating said head to cause said material to flow along the frusto conical surface of said last member by centrifugal force and to be discharged from said peripheral discharge opening and a fixed electrode disposed between said radial member and the other of said frusto conical members, means connected to pass air through the chamber containing said electrodes and outwardly therefrom through said peripheral discharge opening for mixing with and assisting in the atomization of said material and electrical connections to apply an ionizing potential to said electrode suited to ionize the air in its passage through said last mentioned chamber.

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