July 16, 1946. A. E. COLLINS 2,404,217

SPRAYING APPARATUS

Filed July 27, 1944

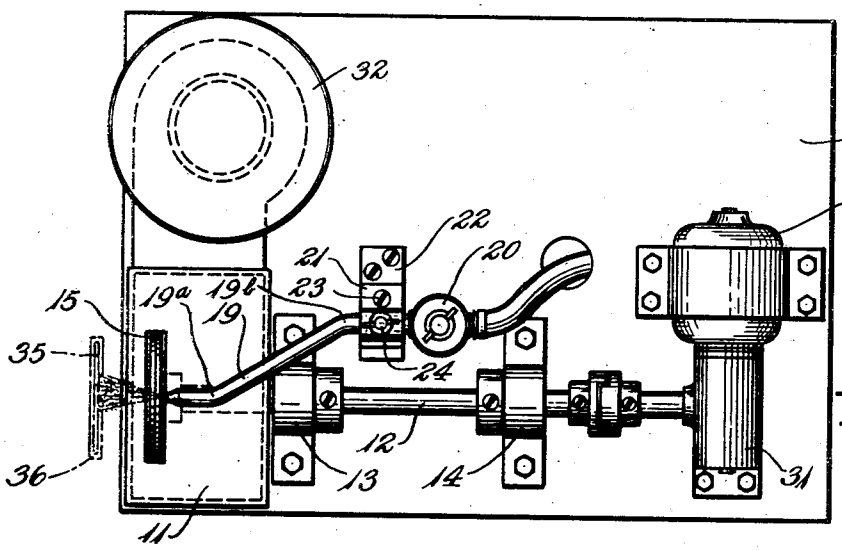


Fig-1

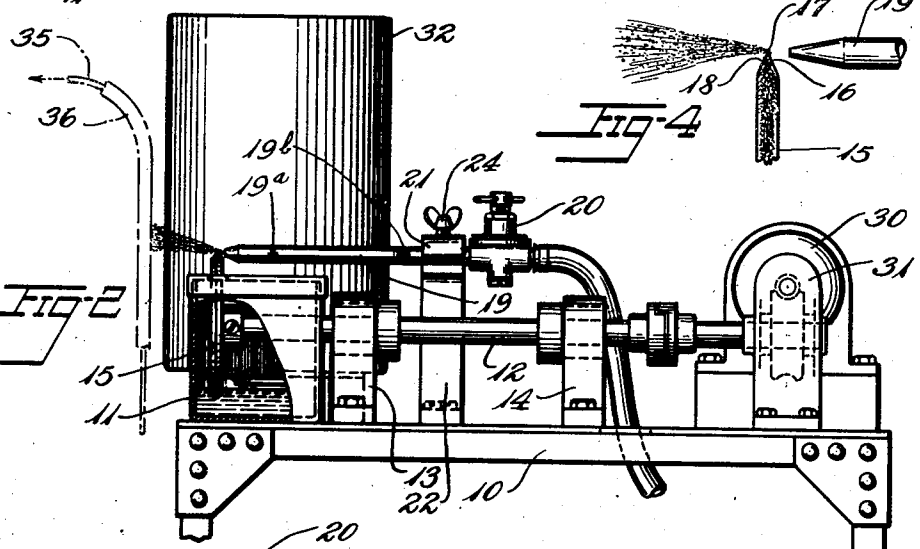


Fig-2

Fig-4

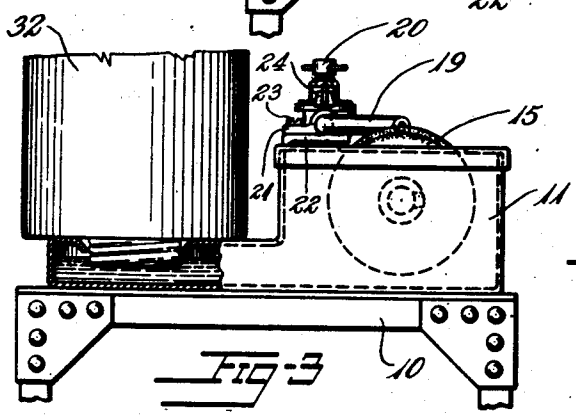


Fig-3

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Patented July 16, 1946

2,404,217

UNITED STATES PATENT OFFICE

2,404,217

SPRAYING APPARATUS

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Application July 27, 1944, Serial No. 546,830

1 Claim. (Cl. 91—45)

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This invention relates to spraying apparatus and is especially useful where rapid drying liquids are to be sprayed.

Heretofore in the coating of articles by a spray of coating material the liquid material has been atomized by means of spray guns in which the liquid has been conducted and projected through spray heads by the use of compressed air. Where it has been attempted to handle coating liquids which become gummy and dry rapidly or which congeal readily upon agitation, great difficulty has been experienced due to gumming and clogging of the spray gun, especially when it was attempted to employ solutions or dispersions of rubber or other rubber-like material, synthetic resins, and the like, and the deposit often has not been satisfactorily uniform.

The present invention has as an object to provide spray apparatus and procedure which does not require the passing of the liquid through jets.

Other objects of the invention are to provide continuous spraying without gumming and clogging of the apparatus, to provide uniformity of spray and deposit, to provide control of quality and quantity of deposit, and to provide simplicity of apparatus and facility of procedure.

These and other objects will appear from the following description and the accompanying drawing.

Of the drawing,

Fig. 1 is a plan view of apparatus constructed in accordance with and embodying the invention.

Fig. 2 is a front elevation thereof, parts being broken away and parts shown in section.

Fig. 3 is an end elevation thereof, looking from the left of Fig. 1, parts being broken away and parts shown in section.

Fig. 4 is a detail view showing a portion of the wheel and air jet, other parts being broken away.

Referring to the drawing, the numeral 10 designates a frame on which is mounted a tank 11 for holding a supply of coating liquid. A shaft 12 is rotatably journaled in bearings 13, 14 fixed to the frame and has a wheel 15 adapted to dip in the liquid continuously at its lower portion. The wheel is formed with a peripheral surface 16, preferably conical or bevelled, terminating at the periphery in a sharp uninterrupted edge 17 and may have a second conical face 18 at its opposite side. Means, described more fully hereinafter, are provided for rotating the wheel so that a coating of the liquid is continuously deposited thereon and carried out of the bath.

For providing a spray of the liquid, a jet tube 19 is mounted on the frame and connected to a

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source of constant pressure, compressed air or other suitable fluid through a needle valve 20. A pressure regulator may be included in the line to assure even pressure. The jet tube or nozzle 19 is mounted in a direction to direct a jet of air against the wheel at or near the sharp periphery thereof. The wheel picks up a coat of the liquid which is carried to the upper part of its periphery where it meets the jet of air from the nozzle 19 and is blown from the wheel as a spray or mist. The wheel picks up the liquid continuously and it is found that a highly uniform spray results.

Adjustment of the nozzle with relation to the wheel is provided by a clamp block 21 secured to a standard 22 by a bolt 23 and thumb nut 24 and offset bends 19a, 19b in the nozzle whereby the nozzle may be raised or lowered to change the position of impingement of its jet radially of the wheel, and also by adjustment of the nozzle toward and from the wheel through the clamp block to which it is clamped, as by a screw 25 and thumb nut 26.

For rotating the wheel, any desired motor may be employed although adjustment of speed is desirable to regulation of the character of the spray. A convenient source of adjustable speed may be provided by a rotary air turbine 30 through which the shaft 12 may be driven directly although it is preferred to provide a speed reducer 31 between the motor and the shaft so that the turbine may operate at high speed.

Although the level of the liquid in the bath 11 is not critical, it is desirable to provide means for supplying the liquid at a nearly constant level and for this purpose a feeding fountain 32 may be employed. As liquid is used from the bath so that it is lowered to the level of the open lower mouth of the fountain, air is admitted to the fountain and displaces liquid therefrom, the top of the fountain being sealed so as to hold a partial vacuum.

The operation of the apparatus is as follows: The work 35 to be coated, which may have such parts as are not to be coated covered by a mask 36, is placed or moved along at a place near the side of the wheel 15 opposite the nozzle 19. The bath 11 is supplied with liquid at substantially constant level by the fountain 32. The wheel 15 is rotated carrying a supply of liquid from the bath to the upper part of its periphery where it meets a steady jet of air from the nozzle 19 and is blown from the wheel as a spray upon the work. By increasing the speed of the wheel 15 the amount of liquid carried by the wheel increases and the density of the spray increases providing

a heavier coating, while decreasing the speed reduces the density of the spray and provides a lighter coating. By adjusting the closeness of the nozzle and position of impingement of the jet with respect to the peripheral edge 17 of the wheel, the character of the spray may be adjusted from the throwing of droplets to the production of a very fine mist.

The invention has advantages over the ordinary spray gun, especially in that no liquid is passed through the nozzle and continuous operation is provided without building up a deposit of gum or dried material about the nozzle, making possible the spraying of rubber solutions and dispersions and other liquids otherwise difficult to handle.

Variations may be made without departing from the scope of the invention as it is defined by the following claim.

I claim:

Spraying apparatus comprising a disc rotatable about an axis and having a beveled peripheral margin, means for providing on said margin a deposit of material to be sprayed, means for directing a jet of fluid against said margin in a direction substantially parallel to the axis of said disc to form a spray of said material, and means for adjusting said jet with relation to said margin.

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