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APPARATUS FOR OVERSPRAY RECOVERY

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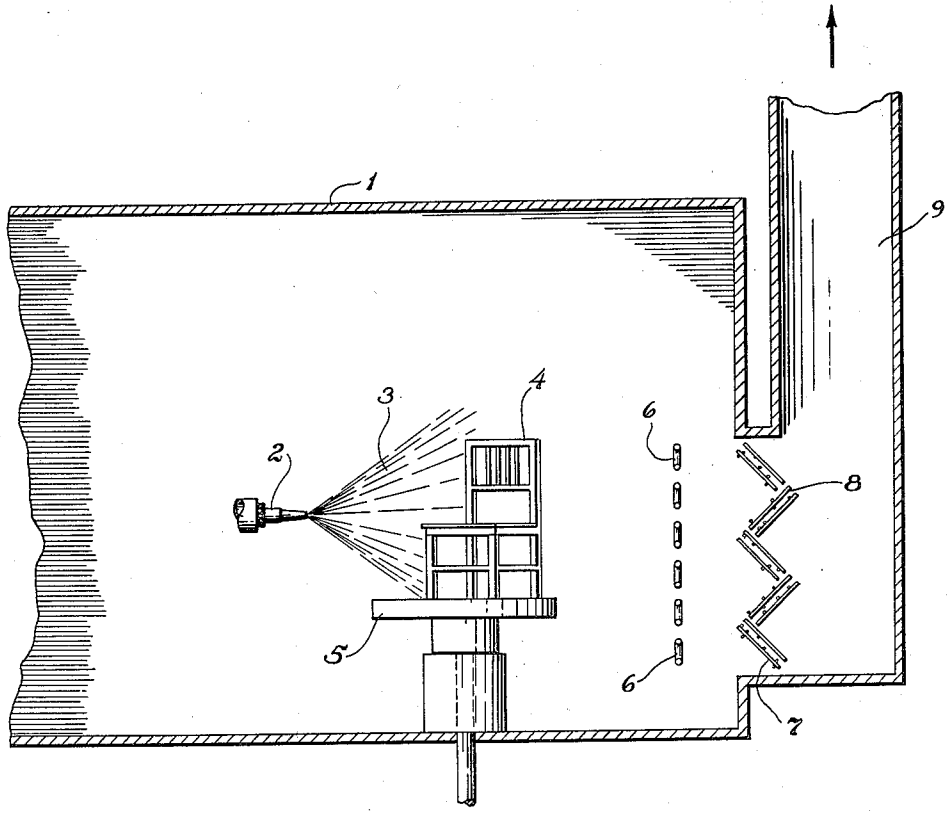

Fig. 1

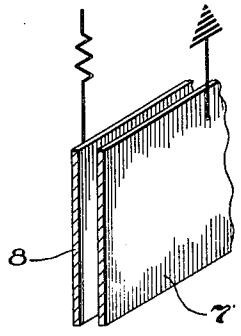

Fig. 2

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APPARATUS FOR OVERSPRAY RECOVERY

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2 Claims. (Cl. 91—60)

This invention relates to an apparatus for the recovery of the overspray in spraying operations for forming decorative and protective coatings and more particularly to the recovery of lacquers, enamels, primers, oleoresinous nonvolatile overspray of all kinds resulting from such operations. These may be clear or pigmented.

This invention has as a principal object the provision of a simple means for recovering the overspray in spray coating operations.

Another object is the provision of means for the recovery of overspray which eliminates the use of water to assist in the recovery of the overspray.

A further object is the provision of means for the recovery of overspray which eliminates the use of wetting agents.

A still further object is the provision of means to recover overspray from a spray gun, either manually operated or automatic, which may be readily converted into a product similar to the original product by the simple addition of suitable solvents thus eliminating the present tedious operations of removing water, etc.

These objects are accomplished in the present invention by the use of a suitable arrangement of baffles in the spray booth placed in an electrostatic field to collect the overspray.

In the drawing Fig. 1 is a diagrammatic view showing the arrangement of the parts. Fig. 2 is a detailed view of the baffle plates 7 and 8.

In the drawing 1 is a spray booth in which an object, illustrated as chair 4, is sprayed with a lacquer, enamel, or paint 3 from a conventional spray gun 2. The object may be supported by a rotatable table shown as 5. An electrostatic field is set between a fine grid of wires indicated as 6 and a series of grounded baffles shown as 7 and 8. The spray booth is also provided with a vent 9 through which the air, substantially free from paint particles, is withdrawn.

In the operation of the apparatus the material issuing from the spray gun which does not strike the article being coated passes through the ionizing section of the unit which constitutes that portion in which the charging wires 6 are located. These fine wires are supplied with a high direct current having a voltage of about 30,000 volts. No limitation is intended to be placed on the voltage which may be used except as defined by practical limitations of other factors involved, voltages as high as or upwards of 100,000 being permissible. A high local electrostatic field is thus produced through which the particles in the air from the overspray pass and become charged. These charged particles then pass on over and between the plates or baffles which constitute what may be termed the precipitator and represented by 7 and 8 in Fig. 1. An electrostatic field is created between the fine wire grid 6 and the baffles 7 and 8. As the particles of the overspray, having received a charge from the grid 6, pass over these baffles or plates they are deposited thereon. The overspray as deposited on the baffles is in a substantially dry condition and may be removed therefrom by any suitable means such as manual scraping or a mechanical scraping device. This material is substantially free from water, alkalies and other contaminating agents and may be readily converted to a re-useable product by the addition thereto of suitable solvent and/or diluents with proper agitation, etc. Suitable procedures for this conversion and variations thereof will be readily apparent to those skilled in the art of preparing such compositions. Such compositions will be more desirable and satisfactory than recovered compositions prepared from overspray sludge obtained from practices of the present state of the art.

The above arrangement may be modified by supplying a voltage to the baffle 8 to assist in driving the particles in contact with the grounded baffle 7. This voltage may be about half of that supplied to wires 6, but should not be high enough to present any danger of arcing with baffle 7. This modification is shown in Fig. 2.

The baffles for collecting the overspray may be of any convenient size or shape that may be readily adapted to the size and shape of the spray booth. For example the baffles may be placed in a horizontal or vertical position and may be closely or widely spaced as the conditions demand or warrant. While only one arrangement of the baffles in the precipitator is shown in the accompanying drawing other suitable arrangements will readily suggest themselves to those skilled in the art. It will also be understood that the wires 6 are some distance from the baffles so that there is no danger of arcing.

The equipment required for furnishing the necessary direct current voltage such as transformers, rectifier tubes and condensers will be governed largely by the original source of the electric current, by the size and location of the recovery equipment and other conditions and may be readily selected by those skilled in the art of using such equipment. Since such equip-

ment per se comprises no part of the present invention a detailed description thereof is not considered necessary. The direct current voltage required may be determined by experiment and will be largely governed by the particular type of coating composition overspray being precipitated. Too high voltage should not be used so that excessive amounts of ozone and nitrogen oxides will not be formed which might become objectionable.

In connection with the power unit it is desirable to have a suitable indicator such as, e. g., a neon indicator lamp or alarm to indicate any drop in voltage to the ionizing unit under which conditions the unit would not be in normal operation. It is further desirable to have suitable indicating and alarm devices to detect any short circuits which may develop from various causes. Such and other safety devices which are commonly required for use with high voltage electric current are well known and require no further detailed description.

The process and apparatus of the present invention may be applied to the recovery of overspray of cellulose ester and ether lacquers of various types, synthetic resin enamels of, e. g., the alkyd resin, phenol-aldehyde, vinyl, etc., type and oleoresinous type coating compositions. Variations in the solvent and diluent constituents of the coating compositions may require adjustments in the intensity of the electrostatic field but such adjustments may be readily determined through the general knowledge of those skilled in the art and through simple experimentation.

In the operation of the recovery device it is desirable not to allow too heavy a deposit to accumulate on the baffles. The recovered material should be removed frequently and this may be conveniently accomplished by manual or mechanical scraping.

It is apparent that many widely different embodiments of this invention may be made without departing from the spirit and scope thereof, and therefore, it is not intended to be limited except as indicated in the appended claims.

I claim:

1. An apparatus for collecting the overspray in the form of substantially dry paint particles which comprises a spray booth, means for spraying a coating composition, means for producing a current of air over the object being sprayed and passing it through an exhaust vent, a fine wire connected to a source of direct current of about 30,000 volts, and a series of electrostatically charged baffles on which the overspray solids are collected.

2. An apparatus for collecting the overspray in the form of substantially dry paint particles which comprises a spray booth, means for spraying a coating composition, means for producing a current of air over the object being sprayed, and means for passing it through an exhaust vent, a conductor connected to a source of high voltage direct current, and a series of electrostatically charged baffles on which the overspray solids are collected.

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