

[54] **SPRAYING BOOTH**
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665,747 1/1901 Martin118/DIG. 7
821,776 5/1906 Zoller118/DIG. 7

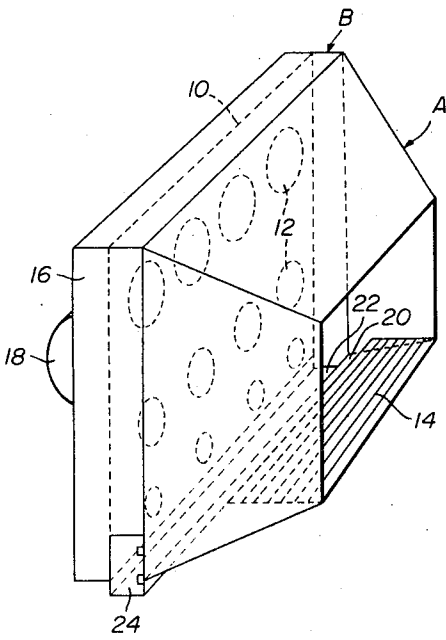
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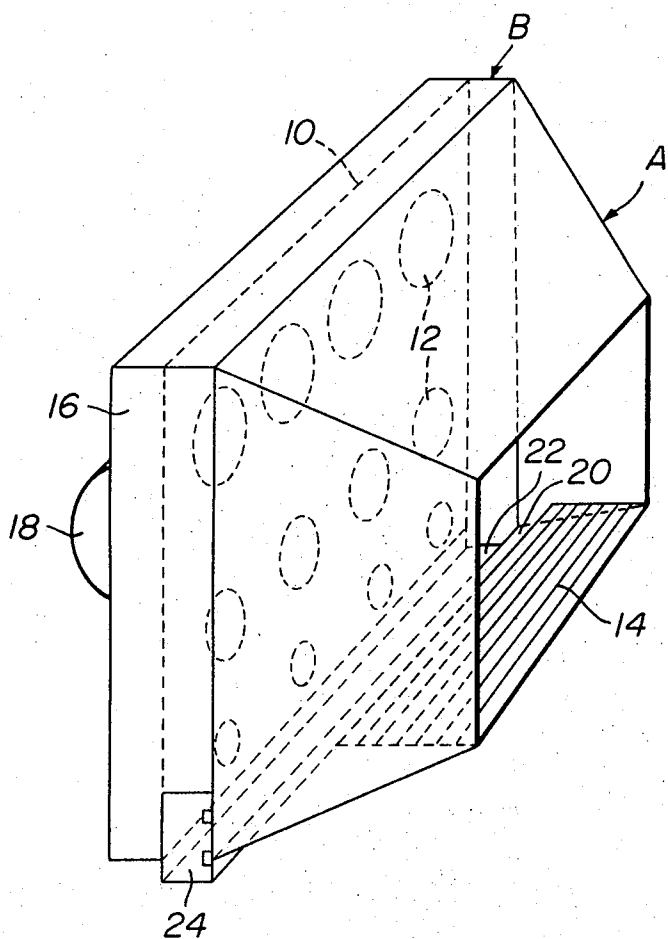
[57] **ABSTRACT**

A spraying booth for facilitating the recovery of the surplus of pulverulent material used to coat an object with an electrostatic gun, which includes at the rear means for enabling the booth to communicate with an air extraction installation, which is open at the front to give access to the gun, and which has a vertical cross-section that increases from the front rearwards.

[56] **References Cited**
UNITED STATES PATENTS
2,217,345 10/1940 McGraw118/DIG. 7

6 Claims, 1 Drawing Figure





SPRAYING BOOTH

BACKGROUND OF THE INVENTION

The present invention provides a spraying booth for facilitating the recovery of the surplus of pulverulent material used to coat an object with an electrostatic gun.

As is known, particles of pulverulent material projected by an electrostatic gun do not all end up on the object to be coated. For various reasons it is desirable to recover this unused or excess material. That is why the object to be coated is usually placed in a booth, open at the front to give access to the gun.

However, the various air currents which manifest themselves near the opening of the booth, e.g., the air currents that are to be found in any workshop or those that are set up under the convection effect of the operator's body, cause a rather substantial amount of pulverulent material to be drawn out of the booth and to be disseminated in the atmosphere of the workshop, instead of depositing on the base of the booth. To remedy this drawback, the rear of the booth is usually connected to an air extraction installation the effect of which is to establish a negative pressure in the booth thereby tending to prevent the particles of pulverulent material from leaving the booth through the opening at the front. In order that the particles may not escape from the booth along the edges of the front opening of the latter under the action of counter currents spontaneously occurring near the side walls, the ceiling and the base of the booth, a rather high flow velocity is imparted to the aspirated air. Under these conditions, the proportion of pulverulent material that does not end up on the object to be coated increases very substantially and the major part of this excess material, in particular the finer particles, are entrained with the aspirated air instead of ending up on the base of the booth. In order to recover the material that is entrained with the air, the extraction installation must be fitted with rather complex filtering apparatus in view not only of the amount of excess material to be recovered but also because of the low grain size of the particles (of the order of a few microns).

An object of the present invention is to produce a spraying booth which eliminates, at least to a large extent, the above-mentioned drawbacks.

SUMMARY OF THE INVENTION

The booth provided by the invention includes means for enabling it to communicate with an air extraction installation. The booth is open at the front to give access to the gun, and has a vertical cross-section that increases from the front rearwards.

Thus, during operation, Because of this increasing vertical cross-section, it is possible, for a given air flow rate, it is possible to have a relatively high flow velocity in the forward portion of the booth, sufficient to prevent the egress of particles at the front, and a flow velocity sufficiently low in the region of the object being coated to enable the major proportion of the excess material particles to be deposited on the base of the booth and in particular to enable the amount of excess material to be reduced in relation to the amount of material effectively used on the object being coated.

BRIEF DESCRIPTION OF THE DRAWING

The single FIGURE of the accompanying diagrammatic drawing shows in perspective by way of example, one possible embodiment of the spraying booth provided by the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The spraying booth illustrated in the drawing comprises two main parts A and B whose walls are made of insulating material, e.g., glass fiber. As can be seen, part A is shaped like a truncated pyramid, open at the front, whereas part B, located behind part A, is shaped like a parallelepiped and is closed off by a wall 10, also of insulating material.

To coat an object, e.g., a metal chair, with a layer of pulverulent material, the object is first positioned in the booth, in this instance by placing it on a horizontal grid 14 of conductive material, e.g., aluminum, that is grounded. The operator, holding an electrostatic gun, stands before the opening of the booth and aims the gun at the object. Upon actuation of the gun, pulverulent material is fed under pressure to the head of the gun where the particles are charged by means of a high-voltage direct-current source, to which the gun is connected, in order to be moved towards the object to be coated, the latter being the conductive object nearest the gun head.

To prevent the excess pulverulent material that has not adhered to the object from being drawn out, as explained earlier, the booth is connected to an air extraction installation (not shown). This connection is established through holes 12 formed in the wall 10, which holes open out into a chamber 16 located behind the wall 10 and communicating through a horizontal series of holes that are not visible with a semi-cylindrical collector 18 connected to a discharge conduit (not shown). The flow rate of the extraction installation is so adjusted that the speed at which the air flows through the opening of the booth may be as small as possible, i.e., just high enough to prevent the particles of excess pulverulent material from issuing from the booth at the front.

Because the forward part A is of increasing cross-section from the front rearwards, the speed at which air enters the booth correspondingly decreases so that the excess material particles, instead of being entrained through the holes 12 with the aspirated air, mostly drop on to the inclined base 20 of part A of the booth and into a channel 22 formed at the bottom of part B of the booth. This channel 22 is provided to facilitate the removal of the thus recovered pulverulent material. Since the base 20 is inclined, the excess material which deposits thereon can either slide down by itself into the channel 22, or be made to slide down by vibrating the base 20. When the channel 22 is full or when it is desired to spray a different pulverulent material, a door 24 at the foot of one of the side walls of part B of the booth is opened and the material that has collected therein is discharged into any form of container with the aid of a suitable tool that is inserted through the doorway.

Further, because the speed of flow of the aspirated air is thus reduced, a greater proportion of the sprayed

material can be made to adhere to the object being coated since the latter will be placed, as far as possible, on the grid 14 at a certain distance from the opening of the booth.

The depositing of the excess material particles is moreover helped by the fact that the diameter of the holes 12 decreases from the top downwards, as can be seen from the drawing. This depositing can also be promoted by making or coating the base 20 with an electrically conductive material that is grounded.

The spraying booth illustrated in the drawing can be modified in various respects. For instance, in order that the process for coating objects to be sprayed may be automated to a certain extent, the grid 14 could be dispensed with, a transverse slot could be formed in the ceiling of part A of the booth and an endless chain could be provided which passes above the booth over the transverse slot and which is fitted with a succession of hooks successively passing through the booth along the slot. In order that the objects which require spraying and which are to be carried by the hooks may enter the booth and subsequently issue therefrom, openings of suitable size are made in the side walls of part A of the booth. Instead of placing the object to be sprayed on the grid 14, it could be carried by a metal hook suspended from a metal wire extending through a hole in the ceiling of part A of the booth to be secured to the ceiling of the workshop and be grounded.

The booth can have many shapes: part A and B can, respectively, have a frusto-conical shape and a cylindrical shape; for reasons of space, the booth may have a constant width, i.e. the width at the rear is the same as at the front, the varying cross-section occurring solely heightwise. Although the larger geometric base of part A of the booth has in the illustrated example an area about four times as large as that of its smaller geometric base, good results can already be achieved with a ratio of areas of 2 : 1. According to another variant, the booth can be made of plastics sheet material, mounted on a frame of non-conductive material.

What is claimed is:

1. A spraying booth for spray coating a dry sprayed

material onto an object within said booth comprising, in combination: a booth enclosure having a bottom and enclosing wall means, said wall means defining an open front for admission of said dry sprayed material into said enclosure and for forming an air flow inlet to said enclosure, said wall means including sides and a rear portion and also defining openings in said rear portion of the enclosure distributed over an area greater than the area of said open front, said openings forming an air flow outlet from said enclosure, said enclosure including means for support of an object located intermediate said open front and said openings, said means for support defining the position where an object to be sprayed is placed in said enclosure, said booth also comprising air collector means communicating with said enclosure through said openings, said collector means connectable with air extractor means to positively draw air through said open front, about said means for support and an object supported thereby and then to withdraw air from said booth through said openings and into said collector means, to maintain the velocity of air, at least about an object supported by said means for support relatively less than the velocity at said open front into said enclosure.

2. A spraying booth according to claim 1 wherein said openings are distributed over an area of said wall means at least twice as great as the opening at the open front.

3. A spraying booth according to claim 1 wherein the bottom of the enclosure has a downward slope from the front rearwards and terminates in a transverse channel for collecting excess sprayed material.

4. A spraying booth according to claim 1 having a vertical cross section that increases from the front rearwards.

5. A spraying booth according to claim 1 wherein the bottom of the enclosure is made at least partially of conductive material which is grounded.

6. A spraying booth according to claim 1 wherein said openings comprise circular passages arranged in said wall means with passages having decreasing diameters from the top downward.

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