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SPRAY BOOTH FOR POWDER COATING

TECHNICAL FIELD

The invention relates to spray booths and more particularly to an improved spray booth for spray coating objects with powder which is suited particularly for automatic spray coating operation, but also can be used for coating with the aid of hand-held powder spray guns.

BACKGROUND ART

The powder sprayed in the prior art powder coating booths and not adhering to the object drops for the most part on a booth floor, while a small share clings to the booth walls. The surplus powder not adhering to the object can be drawn from the booth floor and separated from the exhaust airflow by means of powder separation, notably cyclone and/or filter elements, subsequently screened and thereafter mixed with fresh powder before being returned to the spray device and sprayed again. A color change (change from one powder type to another) requires not only extremely thorough cleaning of all inside surfaces of the booth, but also of the cyclones and filter systems as well as powder lines, so that no powder particles of the powder used first will be mixed with the powder used thereafter. Even single powder particles can lead to coating defects on the object, making the coating unacceptable. One only needs to imagine a change from a black or red powder to a white powder or vice versa. The objects being coated may be, for example, household utensils or car bodies, whose buyers will not tolerate color defects. While the reclamation of surface powder reduces the manufacturing cost, the problem remains, however, that very much time and/or additional system parts (for example, exchangeable powder separators, screening devices, fluid lines) are needed in a color change in order to avoid long down times of the system. A spray coating operation with surplus powder reclamation becomes uneconomical and the operation must be run on a loss whenever multiple color coatings are involved and objects need to be coated with different colors. "Running on loss" means that the surplus powder is not reclaimed and reused, but is discarded as waste. Cleaning is more difficult and time-consuming when more powder is allowed to deposit in the booth and on other parts. Therefore, metal booths are substituted by plastic booths, since the powder particles adhere less strongly and in smaller amounts to the latter than they do to metal booths. The powder particles consist mostly of plastic, but may consist also of ceramic.

DISCLOSURE OF INVENTION

The objective which the invention is meant to accomplish is to further reduce the expense of time and/or additional system parts required for a color change or powder change, without having to forego a good coating quality.

The spray booth according to the invention represents a system for quick color change. It consists in a preferred embodiment of the booth, a cyclone separator with following screening machine and powder feed system, and of a powder center supplying the spray device, or spray devices, with coating powder either from separate powder containers or directly from drums (containers in which the coating powder is shipped to powder users by the powder manufacturer). When for long periods of operation objects are coated with the same powder type and other powder needs to be used in between only for short periods of operation, it is advantageous to run this other powder "on loss" and remove it from the booth as waste, without passing

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surplus powder to the powder reclamation device provided for long periods of operation. This eliminates for this color change or powder change the need for cleaning the powder reclamation device. Only the booth needs to be cleaned. While cleaning the booth, regardless of whether with or without cleaning the powder reclamation device, it is advantageous to continuously draw the powder removed from the booth inside surfaces off by means of an exhaust airflow which is generated separately from an exhaust airflow of the powder reclamation system in the booth.

According to the invention, the spray booth includes two powder collection means at the bottom of the booth. Any powder which contacts the side walls of the booth falls into an outer collection means. The outer collection means also may collect a small amount of powder which did not adhere to the object being sprayed and which did not contact the booth walls. The powder collected in the outer collection means is discarded as waste, since it may include powder contamination from previous spraying with a different color or a different type of powder. Most of the powder which does not adhere to the object being sprayed is collected in an inner collection means. None of the powder which contacts the booth walls enters the inner collection means. The powder collected in the inner collection means is separated from the exhaust air with, for example, a cyclone separator, and is recycled to the spray guns for application to objects.

Accordingly, it is an object of the invention to provide a spray booth for powder coating articles which is easily cleaned to facilitate color change.

Other objects and advantages of the invention will become apparent from the following detailed description of the invention and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagrammatic vertical cross section of a powder coating spray booth according to the invention for either manually or automatically spray coating of objects with coating powder;

FIG. 2, a plan view, in partial section, of essential parts of the spray booth relative to FIG. 1;

FIG. 3 is an enlarged fragmentary cross sectional view of a portion of a wall of the booth of FIG. 1;

FIG. 4 is a diagrammatic vertical cross section of a powder coating spray booth according to a modified embodiment of the invention;

FIG. 5 is a top plan view of essential parts of the spray booth of FIG. 4;

FIG. 6 is a side elevational view of the spray booth of FIG. 1 as viewed from the left along arrow IX;

FIG. 7 is an enlarged diagrammatic fragmentary vertical sectional view through various embodiments of cleaning means used to clean the inside surfaces of the booth wall;

FIG. 8 is a diagrammatic vertical cross section of a powder coating spray booth according to a further modified embodiment of the invention; and

FIG. 9 is a top plan view of essential parts of the spray booth of FIG. 8.

BEST MODE FOR CARRYING OUT THE INVENTION

Illustrated in FIGS. 1 through 3, the spray coating device for manual and automatic operation for the spray coating of objects 2 comprises a spray booth 4 that forms a coating space 6 in which the objects 2 are coated by means of one