

[54] **COATING HEAD SUBASSEMBLY WITH CLEANOUT PORT**

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 [58] Field of Search**239/104, 106, 553, 566; 28/76 R; 346/75**

[56] **References Cited**

UNITED STATES PATENTS

3,485,706 12/1969 Evans.....28/76 R X

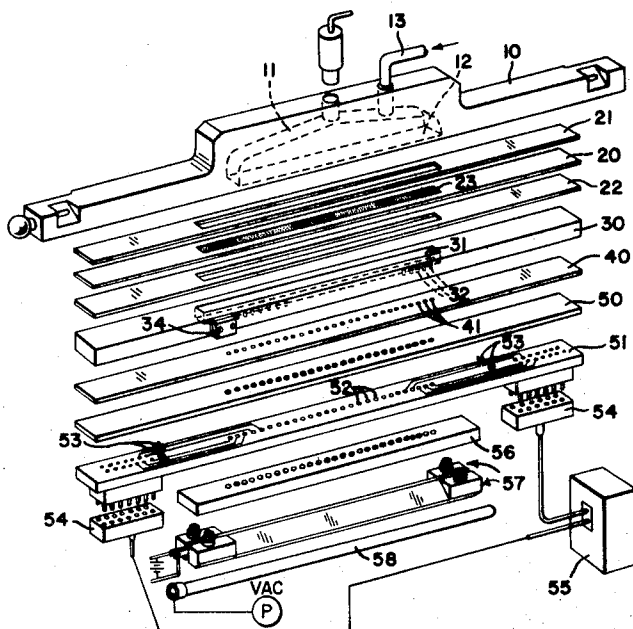
3,373,437 3/1968 Sweet et al.....346/75

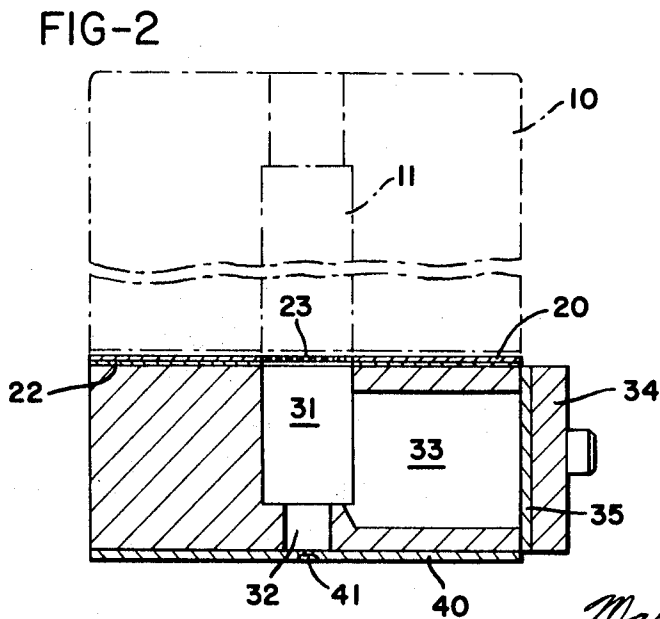
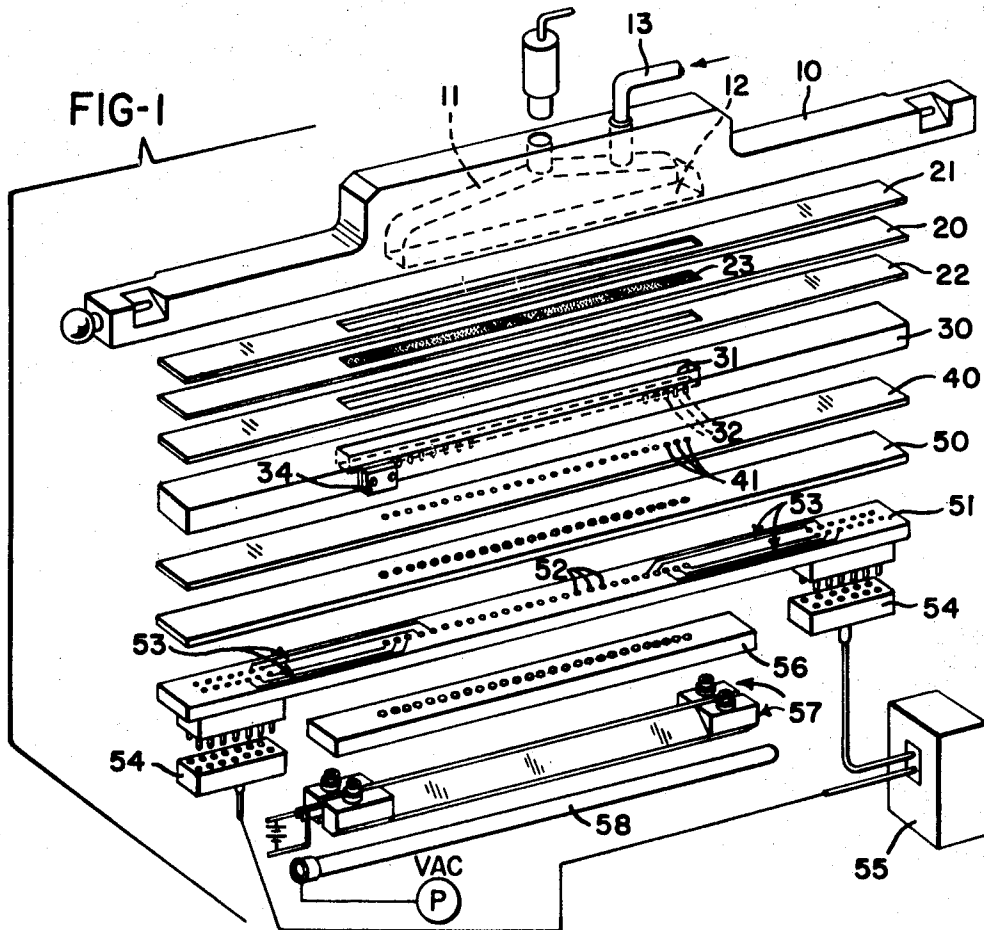
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[57] **ABSTRACT**

In the construction of a laminated coating head in which drops of coating material are ejected from very small orifices in an orifice plate toward a web or other article to be coated, the orifice plate, the filter plate, and an inlet plate are first assembled in what is termed a "clean package" and flushed through a port in the inlet plate with a cleaning fluid to insure that no particles large enough to clog the orifices have been trapped in the coating head during construction thereof. Compressed air may also be blown into the assembly during flushing and following flushing, the port on the inlet plate is sealed and the remaining components attached to the "clean package."

1 Claims, 2 Drawing Figures





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CROSS-REFERENCE TO RELATED APPLICATIONS

Image Construction System Using Multiple Arrays of Drop Generators, Ser. No. 768,790, filed Oct. 18, 1968, now U.S. Pat. No. 3,560,641; Filter Plate For Coating Head, Ser. No. 877,251; and Inlet Plate For Coating Head Ser. No. 877,256; the latter two filed on even date herewith.

BACKGROUND OF THE INVENTION

The above-noted related application Ser. No. 768,790, discloses a noncontacting coating system in which a plurality of drops are ejected from a series of small orifices toward a moving web or other article to be provided with a patterned coating, as in printing, with selected drops being charged as they issue from the orifices so that when they subsequently pass through an electrostatic deflecting field established downstream of the charging means they will be deflected from their normal trajectory. Drops of coating material following one path are then ingested by a catcher while drops of material following another path are imprinted on the web or other article being coated in a desired pattern of coating.

The dimensions of the various components of the system are relatively small, particularly the openings through the components of the coating head. Therefore, it would be a relatively simple matter for small particles to lodge in the coating head and block the orifices through which the coating is ejected. It is desirable, therefore, to provide some means to insure that any foreign objects of a size larger than the smallest openings into the coating apparatus, which are the orifices in the orifice plate, are cleaned from the system before the components of the coating head are assembled.

SUMMARY OF THE INVENTION

To insure that the coating head is not assembled with particles entrapped therein of a size large enough to clog the orifices in the orifice plate, the orifice plate and filter plate are first assembled with an inlet plate positioned therebetween to provide a chamber and a cleaning fluid flushed through this subassembly of components to subject them to a meticulous cleaning action. A cleanout port is formed in the inlet plate so that cleaning fluid pumped into the subassembly through the filter plate may pass out the cleanout port and compressed air may also be blown through the orifices to insure that they are free of foreign materials or to remove any foreign materials which may become entrapped therein during the flushing process.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded perspective view showing, somewhat schematically, the various components of a laminated coating head; and

FIG. 2 is a perspective view showing the sub-assembly during the flushing process.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As seen in FIG. 1 of the drawings, a typical laminated coating head may comprise a manifold 10 having a chamber 11 opening outwardly, as at 12, and a conduit 13 for delivering coating material to the chamber 11. A filter plate 20 is positioned immediately beneath the manifold 10 with gaskets 21 and 22 on either side thereof to prevent leakage around the filter plate when the components are assembled.

An inlet plate 30 having a slot 31 formed longitudinally thereof and a series of passages 32 extending from the slot to the lower surface of the inlet plate is positioned immediately beneath the filter plate 20. Adjacent one end of the inlet plate 30 and in communication with the slot 31 is a cleanout port 33 which is normally closed by a cover plate 34 attached to the inlet plate by means of bolts or the like. An orifice plate 40 having a series of orifices 41 through which coating is ejected

is positioned beneath the inlet plate 30 with its openings concentrically positioned with respect to the passages 32.

A spacer plate 50 is mounted beneath the orifice plate 40 and serves to space the charge ring plate 51 the proper distance from the orifice plate to impart a charge on drops of coating material just before they break from the filament of coating being ejected through the orifices 41. The charge ring plate 50 has a series of charge rings 52 connected through leads 53 and connectors 54 to a source of power 55, whereby an electric charge may be imparted to drops of coating material as they are ejected from the orifices 41. The charge ring plate 51 may conveniently be constructed by conventional printed circuit techniques although the degree of precision required will be somewhat greater than that usually necessary for conventional printed circuits.

A clamp plate 56 is positioned adjacent the charge ring plate 51 and a series of bolts, not shown, pass downwardly through all of the components of the laminated coating head and are threadedly received in the clamp plate to secure the components together in laminar relationship. A pair of electrodes 57 are positioned downstream of the charge plate 51 and all drops, whether charged or uncharged, pass through the electrostatic field set up by the electrodes 57 and are accordingly, deflected or not deflected depending upon whether or not they have received a charge as they pass through the charge ring plate. A catcher 58 then catches those drops of coating material which it is desired to prevent from being deposited on the article being coated, all as described in the above-noted related application, Ser. No. 768,790.

As noted above, there is an appreciable danger of fine particles being trapped in the coating head upstream of the orifice plate when the various components of the coating head are assembled. To minimize the possibility of such materials being trapped in the components during construction thereof, which would necessitate a complete dismantling of the coating head, the orifice plate 40, filter plate 20 and inlet plate 30 are preassembled to form what is known as a "clean package." A cleaning fluid is then pumped through these components to flush them out thoroughly. In this respect, the manifold 10 may be conveniently connected to the filter plate 20 and a cleaning fluid pumped through the conduit 13 and thence, downwardly through the perforations in the perforated central portion of the filter plate. The cleanout port 33 in the inlet plate 30 is opened by removing the cover 34 and the cleaning fluid, together with any particles found on the undersurface of the filter plate 20, the interior of the inlet plate, or the uppersurface of the orifice plate, are swept out through the cleanout port. The "clean package" is observed during the flushing operation and if it appears that one or more of the orifices are clogged a cleaning fluid is pumped through the clogged orifices to break loose the material entrapped therein. Alternatively, it may be desirable to routinely backflush the orifices 41. In either case, a suitable cleaning fluid has been found to be compressed air.

Following complete cleaning of the assembly of the components 20, 30 and 40, the cover plate 34 is reattached with a gasket 35 interposed therebetween and the "clean package" laminated with the remaining components of the system in the order shown in FIG. 1 of the drawings.

From the above it will be apparent that the present invention provides means for preventing malfunctioning of the coating apparatus of the type disclosed herein by clogging of the openings through any of the components through the introduction of foreign materials during assembly thereof.

While the method herein described, and the form of apparatus for carrying this method into effect, constitute preferred embodiments of the invention, it is to be understood that the invention is not limited to this precise method and form of apparatus, and that changes may be made in either without departing from the scope of the invention.

What is claimed is:

1. A subassembly of coating head components comprising:
 - a. a filter plate having a plurality of perforations formed therein;

- b. an orifice plate having a series of orifices formed therein;
- c. an inlet plate member interposed between said filter plate and said orifice plate and having an elongated slot formed therein defining an enclosed space extending between and interconnecting said perforations and said orifices; 5
- and
- d. a cleanout port extending from an external wall of said inlet plate member and communicating with said slot.

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