

[54] **DEVICE FOR RECLAIMING DRY POWDER PARTICULATES**

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[51] Int. Cl. **B05b 1/28, B05b 15/04**

[58] Field of Search **118/DIG. 7, 309, 118/326, 634, 639, 640; 117/93.41, 102 A; 98/115 SB**

[56] **References Cited**
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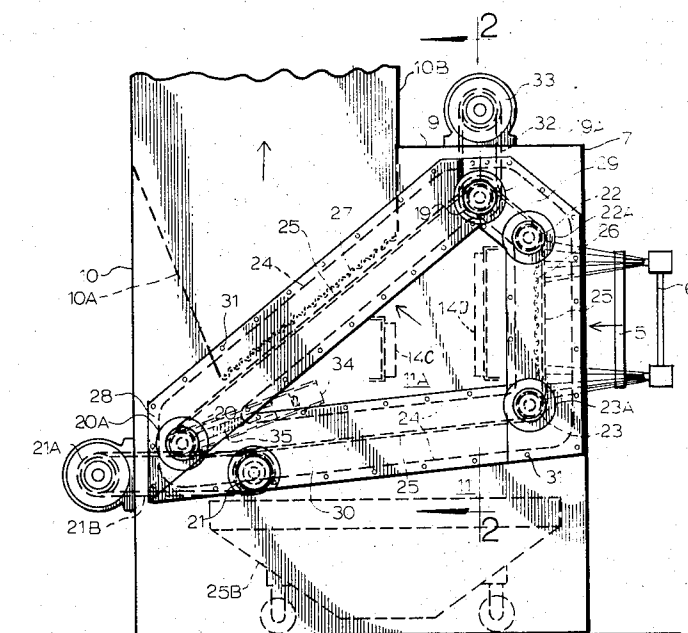
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[57] **ABSTRACT**

A moveable backdrop filter element mounted for travel over a plurality of rollers and arranged for collecting and reclaiming surplus dry powder particulates, such as used in electrostatic deposition systems. A particular feature of the invention is the ready interchangeability of the filter elements to permit the rapid change of deposition colors.

5 Claims, 3 Drawing Figures



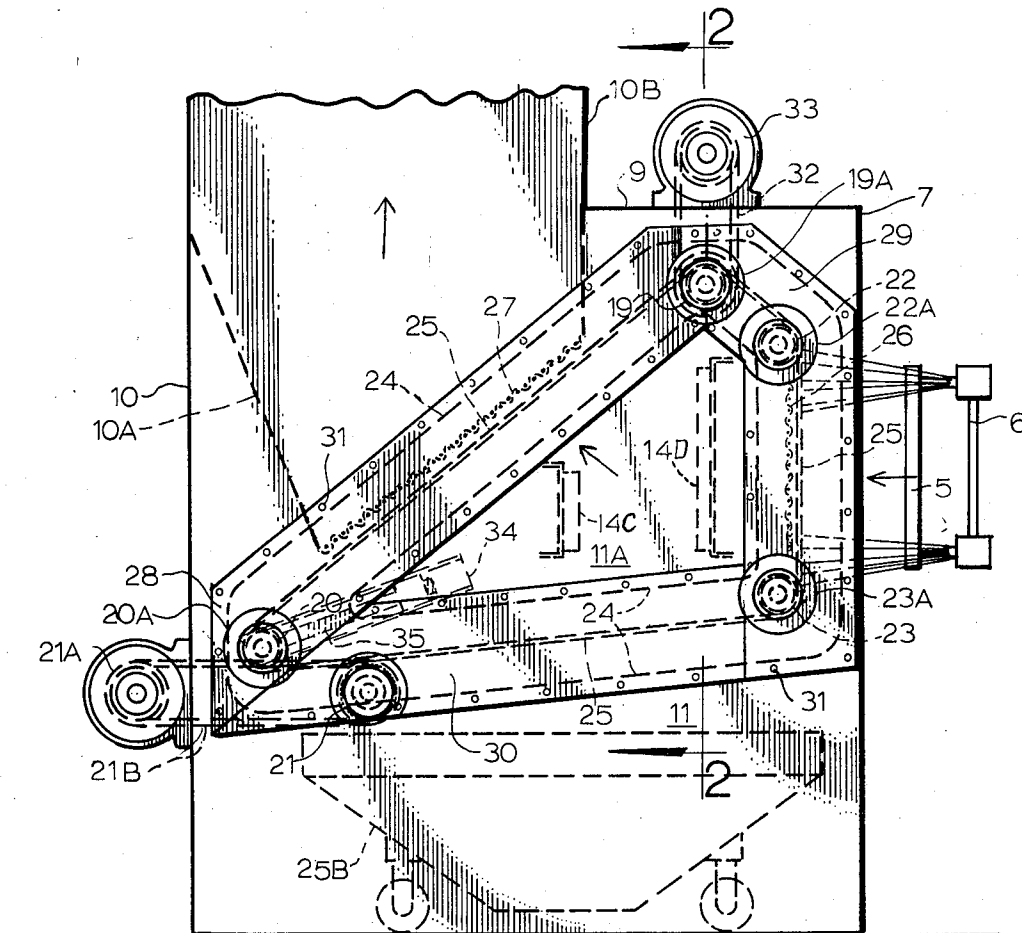


Fig. 1

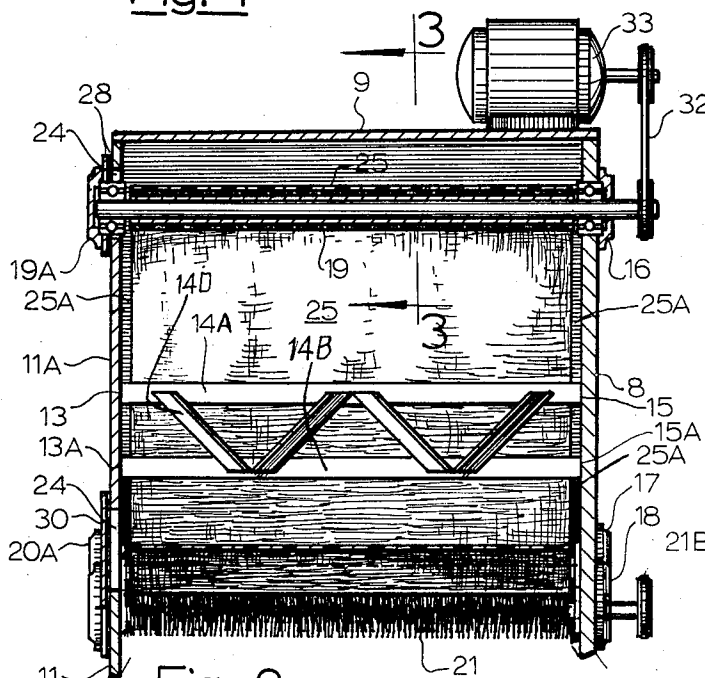


Fig. 2

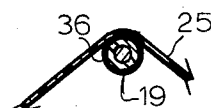


Fig. 3

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DEVICE FOR RECLAIMING DRY POWDER PARTICULATES

This invention relates to electrostatic deposition systems, in which dry powder particulates are deposited on work pieces, prior to the heat treating operation.

This invention is an improvement on the invention disclosed in U.S. letters Pat. No. 3,201,272 issued to me Aug. 17, 1965 under my previous name Sheila Forsee. In that Patent I disclosed a METHOD AND MEANS FOR TRAPPING AND RECLAIMING PORCELAIN FRIT. That disclosure concerned itself with the handling of wet substances, whereas the instant disclosure relates to the trapping and reclamation of the over spray of dry powder used in electrostatic deposition operations.

In the electrostatic deposition and reclamation and other systems, now known to the public, various pieces of equipment are necessitated, for example, in addition to the conventional electrostatic gun and supply elements a "cyclone" power unit, complicated conduits and bag stations are used and when the production schedule calls for a change in color, the entire set-up has to be changed, all of which is time consuming and economically unsound, because of "down-time" in production and cost of labor in the change over.

It is therefore an object of this invention to obviate the foregoing difficulties and to produce other beneficial results.

Another object of the invention is to provide a trapping and reclamation system for dry powder particulates, which is compact in size, inexpensive to assemble and operate, and efficient in use.

Another object of the invention is to provide a dry powder reclamation system, which is constructed and arranged so that change of colors in the particulates used may be effected rapidly and deeconomically.

Another object of the invention is to provide a mechanism of the character indicated in which the filter media may be changed rapidly by the simple expedient of removal and replacement, through cut out portions of the spray booth housing.

Another object of the invention is to provide an endless belt type filtering media, which is carried on rollers, at least one of which is tension adjustable, from the exterior of the device.

Another object of the invention is to provide an endless belt type of filtering media which may be removed, replaced, and adjusted by removing one or more simple cover plates from the housing.

Another object of the invention is to provide a mechanism of the character indicated which performs double filtering actions, whereby to render negative emission-to-atmosphere of particulates, which might be damaging to the ecology.

Another object of the invention is to provide a powder deposition and reclamation system which can readily be used in continuing, or constant indexing, powder coating operations of heavy production.

Another object of the invention is to provide a device of the character indicated in which the filter media for the dry powder particulates may be felt, paper, or any other material which will allow the passage there through of air, but will trap even the finest of particulates to reach the media.

Another object of the invention is to provide a device of the character indicated which has a high safety fac-

tor in that the collected over shot powder is quickly removed from the spraying area.

Another object of the invention is to provide a device of the character indicated in which the dry particulates recovered are made more easily accessible for re-use.

Another object of the invention is to provide means to protect the media support shafts from any powder particulates, which might reach the area between the front and return portions of the endless belt filter.

Another object of the invention is to provide a mechanism arranged so that air going through the return portion of the endless belt removes any residue of powder, not removed by the brushes, scraper, or vibrator.

The foregoing and other objects and advantages of the invention will become more apparent as the description proceeds, reference being made from time to time to the accompanying drawing, forming part of the within disclosure, in which drawing:

FIG. 1, is a side elevational view of a device embodying the invention.

FIG. 2, is a section taken substantially on the line 2—2 of FIG. 1, with the stack removed.

FIG. 3, is a section taken substantially on the line 3—3 of FIG. 2.

Referring now more particularly to the drawing, it will be understood that in the embodiment herein disclosed the reference character 5, indicates a work piece, which is being sprayed with a coating from a conventional electrostatic gun. The reference character 7, indicates in general, the spray booth which in this instance consists of a comparatively heavy side wall 8, a top wall 9, a back wall 10, an air plenum 10A, and a source of air supply not shown, and a comparatively light weight side wall 11, the major portion 11A, of which is supported, as at 13, and 13A at one end of a bridge like, cantilever, assembly 14, comprising elements 14A, 14B, 14C, and 14D, which assembly is welded, or otherwise secured, as at 15, and 15A, to the heavy side wall 8. The side wall 8 also carries heavy bearings 16, 17, and 18, which support at one end the rollers 19, and 20, and the shaft of a rotatable brush 21 which is used to remove the overspray from the media 25, and cause it to fall into a removal receptacle 25B. The brush 21 is rotated by a motor 21A, and belt 21B. The rollers 22, and 23 (FIG. 1) are likewise supported at one end by bearings (not shown) carried by the side wall 8. It will be understood that these bearings are large enough, and have thrust capabilities to hold the rollers at one end only, when the bearings at the opposite ends of the rollers are temporarily removed, as hereinafter described. The side wall 11—11A has a cut out portion 24 (FIG. 2) which is substantially of the contour of the endless belt filter media 25, which passes over the rollers as shown in FIG. 1. The spaces between the edges of the media belt 25, and the side walls 8—11 are sealed as at 25A. The cut out 24 is trapezoidal in contour and is defined between the adjacent edges of the portions 11, and 11A of the side wall 11, and is of sufficient width to permit the entry of a man's hands, or any tool, which may be used to install, or remove, the filter media 25, endwise from the rollers. This is an important feature of the invention as it permits the filters 25 to be removed and replaced from the side of the spray booth, when a change of color is indicated. The filter media may be the material as disclosed in U.S. Pat. Nos. 2,841,073, 2,875,680, 3,071,060, 3,201,272 issued to me under my previous name,

Sheila Forshee, or it may be cloth, paper, felt or any other material found efficient for use in catching fine, dry powder particulates.

Although I have here in disclosed the use of an endless belt type of filter media, it will be understood that I may also use a media which has ends, and the ends may be joined together by any suitable means to form an endless belt. With such a structure the media could also be positioned over the rollers from the front.

It will also be understood that I intend to seal the spray booth between the edges of the media 25, and the side walls 8-11 of the booth by any suitable means available.

The media 25 is reinforced against air movement in the direction of the arrows, as at 26 and 27 as in conventional practice. The cut out 24 is covered by removable cover plates 28, 29, and 30 which are secured in place by machine screws 31 (FIG. 1) which engage suitable threaded bores (not shown) in the side wall 11-11A. The rollers 19, 22, and 23 are supported at the opposite ends in suitable bearings 19A, 22A, and 23A which are carried by the cover plates 28, 29, and 30 and the same end of the shaft, of the brush 21 is carried by the side wall 11.

The roller 20 is an idler, as are the rollers 22 and 23. The roller 19 is driven, as at 32, by a belt and motor 33. The idler 20 is mounted in bearings (not shown) carried by blocks which are adjustable in slides 34, carried on the inside of both the walls 8 and 11A. The blocks are adjusted by threaded rods 35. The rods 35 are accessible through the cut out 24, and a covered cut out (not shown) in the side wall 8. By adjusting the rods 35, the roller 20 may be moved to and away from the filter media 25. Movement of the roller 20 away from the return section of the filter media 25, develops slack in the endless belt 25, so that it can more easily be removed from the ends of the rollers, through the cut out 24.

In order to protect the rollers from collecting different colored powder, I may insert sleeves 36, (FIG. 3) over the ends of the rollers, which sleeves 36 may also be removed endwise through the cut out 24.

In order to install or remove the endless belt media 25, the cover plates 28, 29, and 30 are first removed. It will be remembered that the end bearings 19A, 20A, 22A, and 23A are carried by the cover plates 28, 29,

30 and are also removed from the ends of the rollers. This then enables the media 25 to be slipped off the ends of the rollers and a replacement to be installed. In replacing the cover plates 28, 29, 30 the bearings 19A, 20A, 22A, and 23A carried by them are first placed over the ends of the roller shafts and the cover plates are then secured by the machine screws 31.

It is believed that the operation of the device is obvious from the foregoing description.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. In a device for trapping and reclaiming dry powder particulates, including a spray booth having an air plenum and an exhaust stack, the improvement consisting of a continuous length of air permeable media, of sufficient tensile strength to prevent shear, forming both a flexible front wall and a flexible rear wall within said booth, said media being positioned ahead of said plenum and stack and arranged to receive powdered particulates from an electrostatic gun, said front wall length of media having a rearwardly directed angular portion arranged to travel over a removable collecting receptacle, means to remove the particulates from said media and deposit them in said receptacle and means to move said media through said front and rear wall areas and return, said rear wall portion of said media being angularly directed with respect to said front wall portion, said media being supported for travel over a plurality of elongated rollers and is removable from said rollers laterally with respect to the length of said media and axially with respect to said rollers.

2. The structure of claim 1, in which said spray booth is provided with at least one trapezoidal shaped side wall opening, which provides access to said media and said rollers, said opening having removable covers thereon.

3. The structure of claim 2, in which at least one of said removable covers supports a bearing having received therein one end of one of said rollers.

4. The structure of claim 1, in which at least one of said rollers is provided with a replaceable protective element.

5. The structure of claim 1, including means to move air through both front and rear wall areas of said media.

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