United States Patent

[11] **3,566,831**

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[54] **PRINT TONER BATH AND FEED CONSTRUCTION FOR PHOTOCOPIER DEVICES**
1 Claim, 2 Drawing Figs.

[52] U.S. Cl. **118/304,** 118/419
[51] **Int. Cl.** **B05c 5/00**
[50] **Field of Search** ..... 117/37 (LX); 355/10; 95/89, 97; 118/637 (LA), 429, 304, 419

[56] **References Cited**
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ABSTRACT: A toner bath apparatus including a tray having a curved upper surface open which a sheet of exposed, sensitized paper travels, and a toner spray device extending above the curved tray and dispensing an elongated spray of toner of substantial angular extent whereby the spray impinges upon the surface of the paper and forces it to conform to the curvature of the tray.

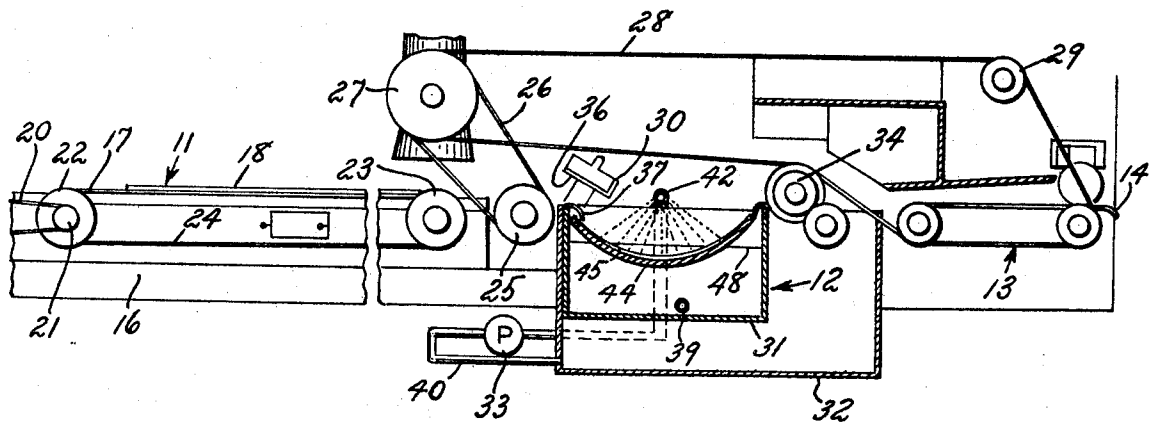
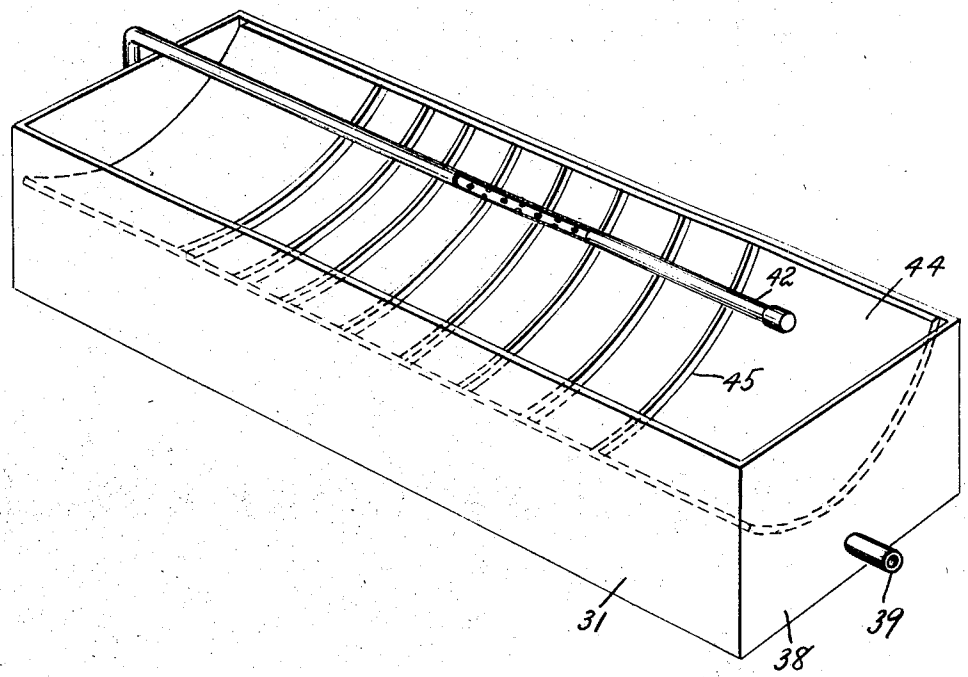


Fig. 1


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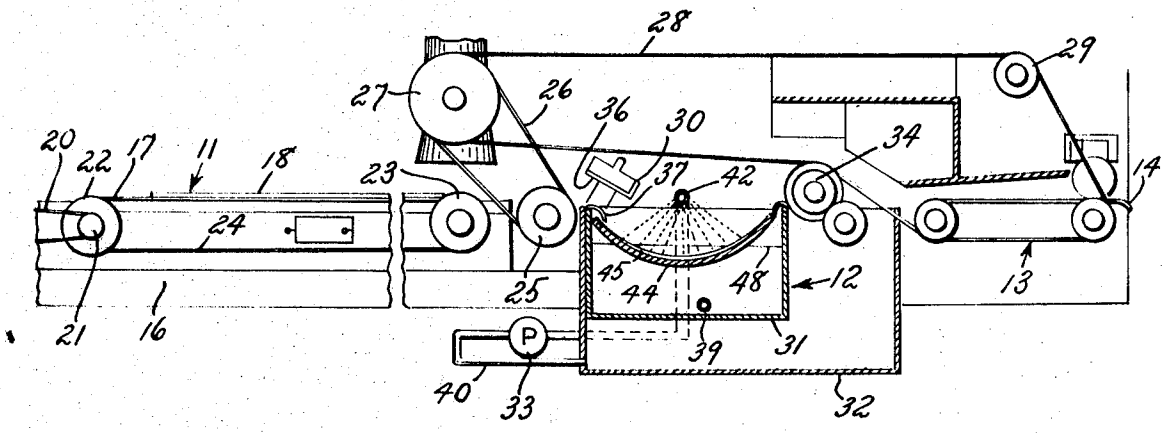

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Fig. 2

PRINT TONER BATH AND FEED CONSTRUCTION FOR PHOTOCOPIER DEVICES

This invention relates generally to the field of electrostatic and other type photocopy devices in which the exposed sheet which forms the copy is subjected to the action of a liquid activator, either in the form of a carbon particle bearing toner solution, or other developing agents. In prior art devices, the exposed sheet is mechanically moved from an exposure station to the point of activation by mechanical means, and the activation process normally requires the immersion of the sheet in the liquid chemical. To achieve this end, the device is provided with a tank or tray, and guide means are provided to force the sheet into the contents of the tray, such guide means usually extending down to the level of the toner or other solution. Using such constructions, whether the sensitized surface is faced upwardly or downwardly, such surface will come into contact with the guides, and marring of the sensitized surface, through abrasion or prevention of contact with the toner solution is a common problem.

It is, therefore, among the principal objects of the present invention to provide an improved construction in which it is unnecessary to contact the sensitized surface of the copy paper during the period in which it is subjected to the action of the toner bath, thereby eliminating the possibility of marring or failure to fully subject the surface to the action of the toner solution.

Another object of the invention lies in the provision of improved structure of the class described which may be readily incorporated into existing prior art devices with a minimum of modification and expense.

Yet another object of the invention lies in the provision of improved print toner bath and feed construction, possessed of the above advantages, which utilizes the spraying of the toner or developing solution in a downward direction to impinge upon the upwardly facing sensitized surface of the copy sheet, whereby the force of the spray serves as a guiding means to direct the paper into a bowed or otherwise curved shape for proper immersion in the activating tray.

A feature of the described embodiment lies in the fact that the above described guiding means requires no moving parts.

These objects and features, as well as other incidental ends and advantages, will more clearly appear in the progress of the following disclosure, and be pointed out in the appended claims.

In the drawing, to which reference will be made in the specification, similar reference characters have been employed to designate corresponding parts throughout the several views.

FIG. 1 is a view in perspective of an actuating tray forming a part of the disclosed embodiment; and

FIG. 2 is a fragmentary schematic view of the disclosed embodiment.

In accordance with the invention, the device, generally indicated by reference character **10**, comprises broadly: A print exposure station **11**, a print toning or actuating station **12**, and a print drying station **13** leading to print exit means **14**.

The print exposure station **11** includes a bed **16** of the device, an upper surface **17** of which lies within the focal plane of image projection means (not shown) to support a length of paper **18** for exposure either in sheet or web form.

Transport means **19** serves to move the paper **18** to the toning station **12**, and is operated by a driven belt **20** engaging a pulley **21**. Driven pulleys **22** and **23** support a series of paper transport belts, one of which is indicated by reference character **24** which operate in conjunction with a paper drive roller **25** driven by a belt **26** from a pulley **27**. A main drive belt **28** driven by a prime mover **29** rotates the shaft upon which the pulley **27** is disposed for rotation therewith.

The print toning station **12** includes an upper paper guide **30**, an activating tank **31** (FIG. 1), a reservoir element **32**, a recirculating pump **33** and print transport means **34**.

The upper guide **30** includes an angularly disposed surface **36** adapted to engage the upper surface of the paper **18**. It operates in conjunction with a curved guide **37** adapted to overlie a portion of the tank **31**. The tank **31** is of rectangular configuration, and includes a sidewall **38** having drain means **39** communicating with the element **32**. A conduit **40** circulates toner (not shown) to the pump **33**, and a second conduit **41** conveys the same to an elongated hollow toner-dispensing member **42**, which overlies the container **31**. The member **42** is provided with a plurality of dispersant openings **43** adapted to spray in an arcuately shaped pattern to fall upon a correspondingly arcuately shaped supporting tray **44** within the container **31**. To reduce friction, the upper surface of the tray **44**, may be provided with print-supporting ridges **45**, as is well known in the art. It will be observed that aside from contact with the guide **30**, the upper surface of the paper **18** is not physically contacted other than by toner solution during its course of travel over the tray **44**.

During operation, an exposed length of paper **18** upon striking the guide **30** is deflected downwardly to enter the area above the tray **44**. As it moves, it is contacted by spray emanating from the member **42**, the impact of which tends to deflect it downwardly while simultaneously wetting the emulsion or coating on the upper surface of the paper. With proper operation, the level of the toner or actuator, indicated by reference character **48** within the container **38** is such that the entire upper surface of the paper will be bathed therein for a suitable period of time as the paper passes to the drying station **13**.

Upon exiting from the toning station **12**, the sheet passes to the drying station **13** where it is subjected to the action of warm air wherein the remaining volatile solvent phase of the toner is dried.

I claim:

1. Improved print toner bath and feed construction for use with a photocopying device comprising: An activating tank having means for the maintenance of an activating liquid therein at predetermined level, said tan having an upwardly disposed generally rectangular opening, an arcuately shaped tray disposed within said opening, paper guiding means leading to said opening, toner-dispensing means overlying said opening, and having means for spraying toner in a spray which is coextensive with a substantial portion of said opening and has an angularly directed discharge of substantial extent onto said tray, whereby upon the operation of said spraying means, and the introduction of an exposed copy sheet to said guiding means, said copy sheet is curved to conform to the arcuate configuration of said tray to be immersed in liquid toner by the downward force of the spray emanating from said toner-dispensing means.