

Research On The Toner Supply And The Waste Toner Recovery Of A Business Machine

Shih-Ping Hu

Department of mechanical engineering
Hungkuo Delin University of Technology
New Taipei City, Taiwan, Republic of China
hushihping@yahoo.com.tw

Abstract—In the 21st century with industry and business are developed, the business machine is the most indispensable machine in the office of all related companies. In the operation of a business machine, the toner is a consumable material and its cost is a variable cost. The quality of the toner supply system design directly affects the level of toner supply costs, so it must be carefully designed. During each printing, there will be toner spillage, and these spilled toners (that is, waste toner) need to be recycled. Recycling toner, on the one hand, it can save costs and improve the efficiency of the business machine, on the other hand, it will not allow waste toner to pollute the entire business machine. The trace of waste toner can be detected and recovered by the feedback system of the sensor. At present, the recovery of waste toner depends on the auxiliary bucket toner supply system.

Keywords—*sensor, feedback system, auxiliary bucket toner supply system*

I. Introduction

The toner supply system of the business machine has other color toners in addition to the black toner. The color toner is composed of three different colors of cyanic color, magenta color, yellow color, etc. After the scanner scans the color of the manuscript, the optical character recognition (OCR) system analyzes and recognizes the image file of the text data and obtains the text and layout information. After the above steps,

the toner supply system then relies on the different ratios of cyanic, magenta and yellow toner to match the same color as the manuscript for printing. This entire printing system is called the intelligent printer data stream (IPDS). In other words, the colors of toner in toner supply system are black, cyanic, magenta and yellow.

II. Literature review:

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, here are a few papers as example. In literature [1], Ricoh Taiwan Company has finished a complete operation manual of the company's business machine, which is very detailed. In literature [2], Wong Zhichao graduate student published "Research on dismantling and recycling of waste toner cartridge". This paper promotes the recycling of waste toner cartridges and their reuse. In this way, we can save resources and reduce the amount of garbage. In literature [3], Chen Yucheng graduate student published "Research on the optimal component configuration for multiple quality characteristics of recycled toner cartridges". This thesis enables in-life toner to exert its maximum effect, saving space and energy. In literature [4], Chang Yiting graduate student published "Patent analysis of toner cartridges remanufacturing technology". This paper enables the manufacturing of toner cartridges to significantly reduce costs.

III. Explanation of principle:



Fig.1 The appearance of a business machine

A. The position of the waste toner recycling system in the overall business machine

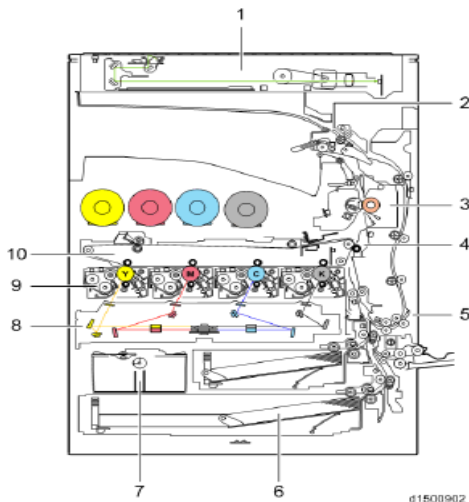


Fig.2 The main structure of a business machine

7. The waste toner recycling system

B. The toner supply system:

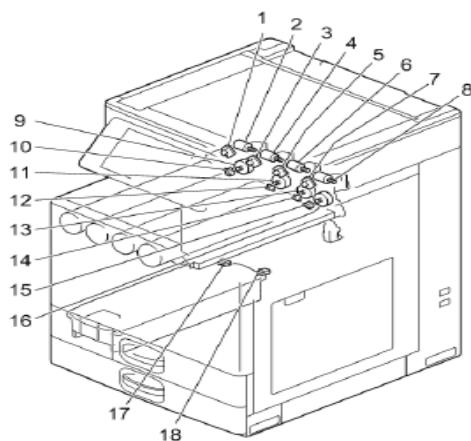


Fig.3 The toner supply system

1. ID chip of yellow color 2.toner bottle drive motor of yellow color 3.ID chip of magenta color 4.toner bottle drive motor of magenta color 5.ID chip of cyanic color 6.toner bottle drive motor of cyanic color 7.ID chip of black color 8.toner bottle drive motor of black color 9.toner transport motor of yellow color 10.toner end sensor of yellow color 11.toner transport motor of magenta color 12. toner end sensor of magenta color 13.toner transport motor of cyanic color 14. toner end sensor of cyanic color 15. toner end sensor of black color 16. toner transport motor of black color 17.waste toner capacity sensor 18.waste toner bottle set switch

C. The drive layout for the toner supply system:

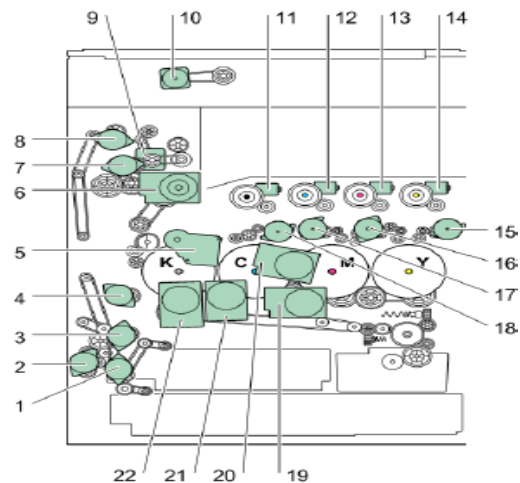


Fig.4 The drive layout for the toner supply system

9.inversion motor 12.toner bottle drive motor of cyanic color 13. toner bottle drive motor of magenta color 14. toner bottle drive motor of yellow color 15.toner transport motor of yellow color 16.toner transport motor of magenta color 17. toner transport motor of cyanic color 18. toner transport motor of black color

19.development motor of cyanic, magenta,
yellow

IV. Practical operation of maintenance technology about the toner supply and the waste toner recovery of a business machine (experiment):



Fig.5 The toner cartridge inspection



Fig.6 The inspection of waste toner recycling system

V.The result of maintenance about the toner supply and the waste toner recovery of a business machine



Fig.7 The toner cartridge and the toner roller system after inspecting and repairing

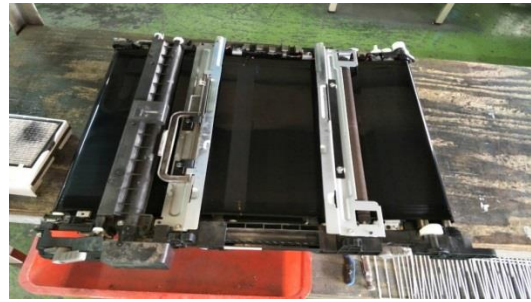


Fig.8 The toner drive motor and the waste toner recycling system after inspecting and repairing

VI. Conclusion:

Comparing the new business machine with the old business machine, the new business machine has been improved a lot about the toner supply and the waste toner recovery system.

(1) The two-axis expansion new carrier

replaces the traditional two-axis unidirectional expansion body, which can improve the stability of the image density along the main axis.

(2) The diameter of the toner cartridge

drum is increased to 20mm instead of the traditional 18mm to improve the image quality.

(3) The toner screw diameter increased

to 20mm to replace the traditional 14mm that can improve productivity and increase the development volume.

(4) The air filter of the toner cartridge is

enlarged to prevent the dispersion and pollution of toner.

VII. Reference:

[1](2015), "Service manual of Ricoh university: learning, knowledge, performance", page 1-1~1-44, Ricoh Americas corporation, 1st edition.

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